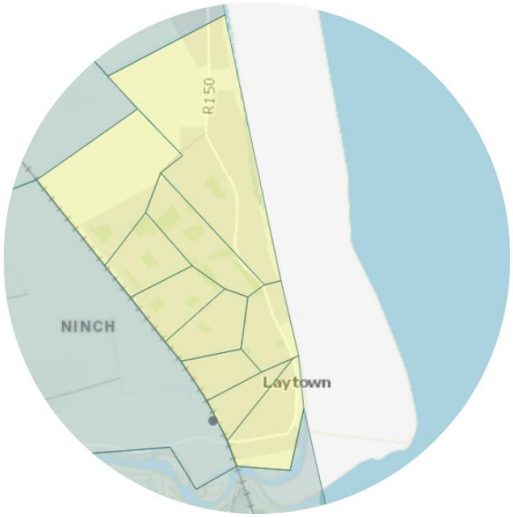
Energy Master Plan and

Register of Opportunities

Laytown Sustainable Energy Community (SEC)



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Contents

1 Summary

Laytown Sustainable Energy Community

Laytown Sustainable Energy Community was established in Sep'22 with a simple vision, to make the town carbon neutral within 10 years. While the vision is simple the task is not and will require the whole community's sustained effort to succeed. Laytown SEC plans to achieve its vision by identifying, financing and implementing renewable and energy efficiency projects in Laytown.

Building Retrofit and Individual Renewable Generation:

This encompasses a spectrum of measures, including roof, wall, and floor insulation, upgrades to windows and doors, implementation of smart controls, and the incorporation of local renewable generation and storage solutions. These initiatives collectively contribute to enhancing the energy efficiency and sustainability of buildings.

Green Transport:

This category involves the promotion of safe, environmentally friendly, regular, and cost-effective or subsidized public transportation. Additionally, efforts are directed towards improving pedestrian and cycling access to public transport hubs with the overarching goal of reducing reliance on individual vehicular transportation.

Renewable Energy Community:

This pertains to initiatives aimed at large-scale renewable energy generation, encompassing both electricity and thermal storage solutions. It further includes the establishment of district heating networks and the exploration of community energy aggregation, virtual power plants, and peer-to-peer trading mechanisms. These endeavours collectively foster the development of sustainable and community-centric energy ecosystems.

Both Figure 1 and Figure 2 present high-level energy statistics for Laytown. This report delves extensively into the residential sector, elucidating Laytown's role as a commuter town. It serves as a vital residential hub for individuals commuting to Dublin City and local towns such as Drogheda, and Balbriggan.

Total Energy Consumption	**Estimated Energy Spend**	**Residential Total Energy**
30,432,406 kWh/yr.	€ 3,992,360	13,092,323kWh/yr.
Tertiary (Public and Commercial) Total Energy	**Average Domestic BER**	**Total Dwellings[1]**
4,607,152 kWh/yr.	203 kWh/m^2/yr. (C3)	1089

Figure 1. Current Laytown SEC Baseline Data

[1] Including occupied and unoccupied.

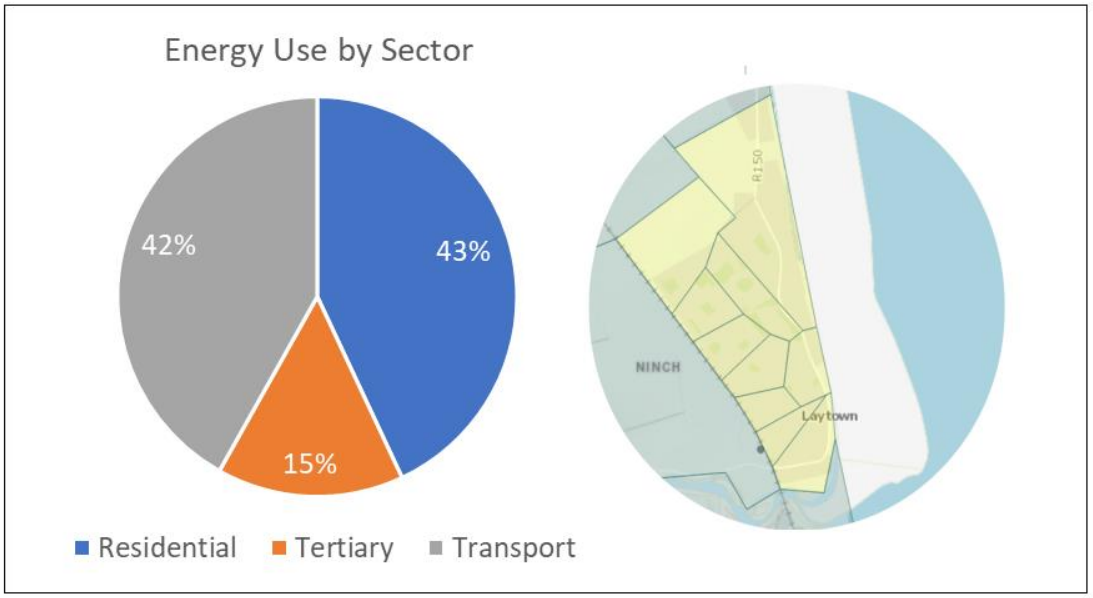

Figure 2. Energy Use per Sector (L) and SEC boundary (R)

Residential Retrofit Measures

Four households were selected for residential audits based on responses to a survey circulated by LaytownSEC and the profile of house types in the area. Retrofits are cost effective and apart from energy savings will improve the comfort and health of occupants and will also add to the value of the house. There are significant grants available from SEAI towards the cost of residential energy retrofits.

The Energy Efficiency Strategy for residential properties encompassed the implementation of essential prerequisites for the integration of heat pumps. This strategic initiative intends to facilitate the attainment of a low carbon status, denoted by a B1 or superior Building Energy Rating (BER). The incorporation of heat pumps is in alignment with the national strategy aimed at decarbonizing and electrifying the heat network. The findings from the four site assessments demonstrated an average estimated cost associated with these measures is denoted as 51,837 euros, with an average grant of 19,800 euros resulting in an average actual cost of 32,0137 euros.

Energy Management Plan

Laytown SEC group has been promoting engagement with the local community. The group has already held a number of initiatives and plans to build on these. These include:

- Completed a community online and paper energy use survey - where four household responders received a free BER energy audit. The survey/questionnaire got 11 responses from people in the community who provided information on their home and transport energy use. Placed several articles in local newspapers, keeping the community up to speed with their progress and carried out a design our logo competition for kids which was not well responded to (we had 1 submission despite involving the local school)
- Developed a Laytown SEC Website https://www.laytownenergy.ie/
- Placed several articles in local newspapers, keeping the community up to speed with their progress and carried out a “design our logo competition” for kids which had a poor response rate.

Laytown SEC plans to build on this success through, *inter alia*, the following measures:

- Engagement with householders and businesses.
- Awareness-raising activities within the community (Community newsletter articles, social media posts on Twitter, Facebook and Instagram, events and surveys)
- Promoting the inclusion of energy efficiency in refurbishment/extension projects planned in the community.
- Promoting interest in projects for SEAI Communities Grant Application (community schools and community buildings / halls etc).
- Publicising success stories on websites and social media postings and at local public buildings (printed documentation for those who do not use electronic communications).
- Initiatives such as encouraging increased use of public transport, walking & cycling and switching off and turning down the thermostat campaigns.

2 Introduction

Arden Energy was appointed to develop a comprehensive Energy Master Plan (EMP) as well as generate an associated Register of Opportunities (RoO) for Laytown SEC.

The EMP and RoO include:

- A baseline analysis of energy consumption and uses in Laytown and factors affecting consumption; e.g. age of houses.
- Energy audits of domestic buildings.
- A plan to improve efficiency and reduce CO_2 emissions.
- Opportunities to introduce renewable energy technologies for homes and small businesses.
- A Register of Opportunities.

3 Baseline Energy Balance

3.1 Overview of Laytown SEC

The boundary of Laytown SEC is defined by the boundary of 10 small areas (as defined by the CSO for the purposes of the census) as shown in Figure 3.

Figure 3. Map of Laytown SEC

3.2 Laytown SEC Energy Demand Analysis

The 2022 census data provides much information relevant to energy consumption and energy efficiency including age of dwellings, heating fuel type, house ownership and car ownership. The SEC area has a total of 1,089 dwellings.

3.3 Energy Consumption in Dwellings

SEAI has published the BER database by small area and BERs have been carried out and registered for 695 houses in the SEC area or 64% of the total housing stock. This is a reasonable sample of the housing stock and the data may be considered reasonably representative.

The BER database published by SEAI is used in this analysis for the calculation of energy consumption. The BER is an indication of the energy consumption of a house standardised for typical occupancy and comfort levels. It is calculated based on a Dwelling Energy Assessment Procedure (DEAP) model which calculates the normal use of energy for space heating, hot water, ventilation and lighting per square metre of the area of a residential unit. The final energy rating given to a household is in kWh/m^2/year of primary energy and an energy efficiency scale from A (<25) to G. (>450).

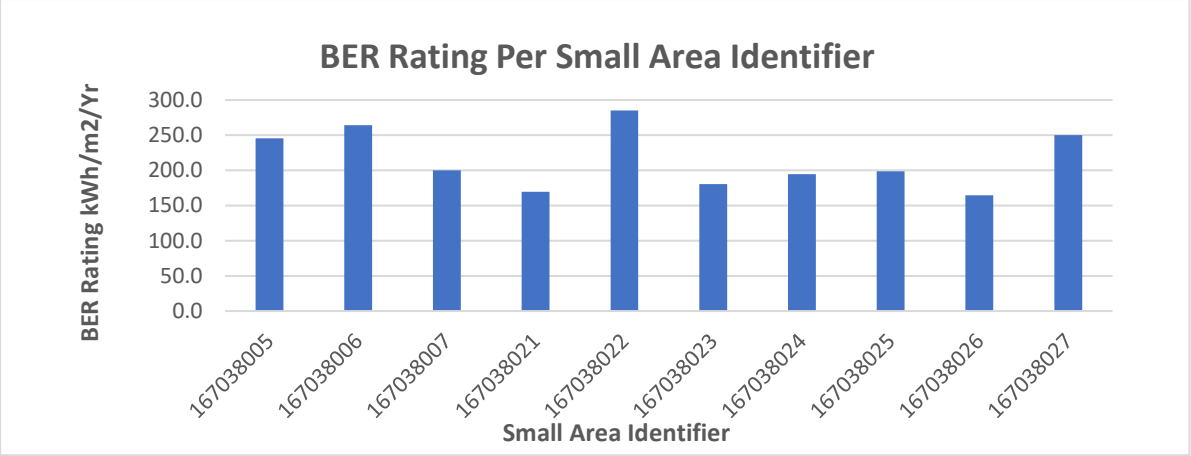

Figure 4. Distribution of Domestic Mean BERs by small area within the Laytown boundary

The BER does not account for electricity used for domestic appliances which is the largest consumer of electricity. The electricity baseline demand of the SEC is therefore based on the national average household electricity consumption.

	kWh/yr.	€/yr.	CO_2 T/yr.
Residential Electricity Demand	1,914,583	506,407	566
Residential Heat Demand	11,177,740	951,226	2,260
Total Residential	**13,092,323**	**1,457,633**	**2,826**
Commercial Electricity Demand	1,727,682	420,345	511
Commercial Heat Demand	2,879,470	204,442	582
Total Commercial	**4,607,152**	**624,787**	**1,093**
Transport Energy	**12,732,931**	**1,909,940**	**3.247**
Total	**30,432,406**	**3,992,360**	**7,167**

Table 1. Laytown SEC Baseline Energy Consumption

The data from SEAI shows that the average BER across the entire area is 203 kWh/m^2/yr. or a BER of C3. The energy demand is stated in delivered energy which would be equivalent to metered energy consumption at a premise. Energy consumption in BERs is stated as primary energy which is the energy supply at a system level required to deliver that quantity of energy to the final consumer. A primary energy factor of 1.89 is applied for electricity and 1.1 for gas and other household fuels. The total residential energy use stated in primary energy is 15,914,076 kWh/year.

SEAI's Energy in the Residential Sector 2019 report[2] details the efficiency and consumption patterns across the residential sector in Ireland. The national average 'non-electrical energy' (fossil fuel) consumption is 13,885 kWh/year and the average electricity consumption was 4,638 kWh/year per dwelling.

The consumption per household within the Laytown SEC boundary is estimated by adjusting the national average household energy consumption according to differences between BER data within the Laytown SEC boundary vs national averages. The fossil fuel consumption is estimated at 10,570 kWh/dwelling/year, this is 24% lower than the SEAI national average of fossil fuel consumption. Figure 5 shows the average household energy consumption in Laytown compared to the national average.

[2] Energy in the Residential Sector, https://www.seai.ie/resources/publications/Energy-in-the-Residential-Sector-2018-Final.pdf

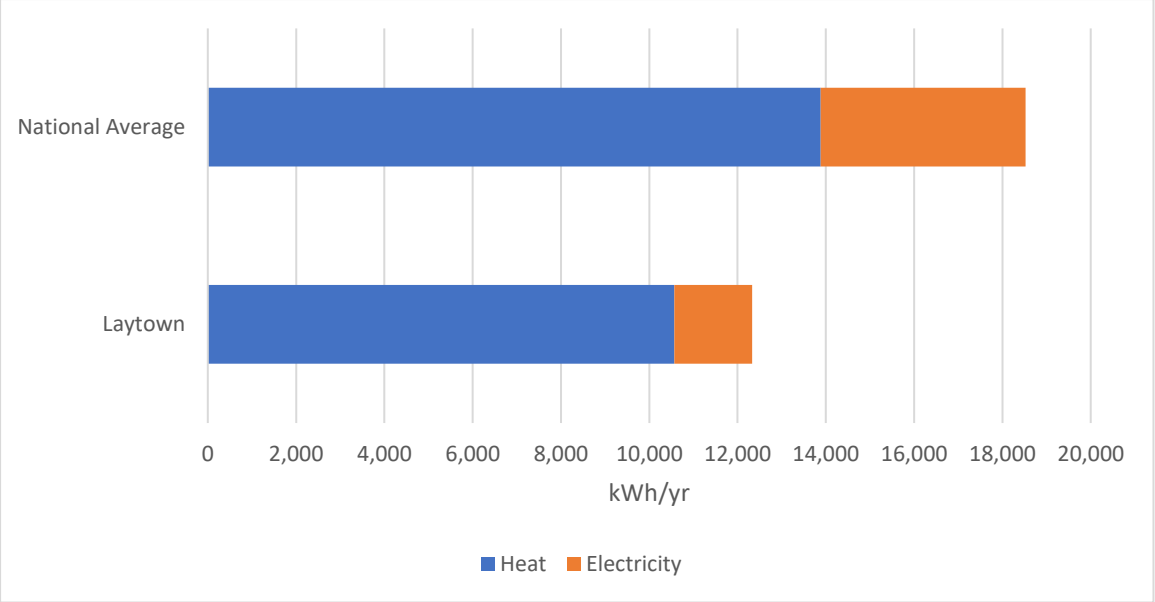

Figure 5. Laytown Household Energy Consumption vs National Average

4 Transport Sector

The transport sector is where we, as a nation, consume the most fossil fuels and where we emit the most CO_2. It is also the largest source of final energy demand in Ireland. Despite this, there has been no meaningful reduction in this consumption in the last 30 years according to energy balance reports from the SEAI. Private cars are the transport mode with the largest energy use. They accounted for 42% of transport's final energy demand in 2019. On the other hand, public and private bus or coach transport accounted for 2.6% of transport energy use in 2019 and rail accounted for less than 1%. The balance is largely accounted for by HGV, LGV and aviation with the sum of the three being 42.8%.

The average CO_2 emissions per kilometre per car in Ireland is 112 g CO_2/km. In comparison, a passenger on the dart only contributes to 11 g CO_2/km and a passenger on an intercity bus, 15 g CO_2/km.

Renewable transport fuels grew by 0.6% between 2018 and 2019 to 3.6%. This is almost all from biofuels blended with petrol and diesel. Electricity increased to 0.3% of transport's final energy demand in 2019. There are many environmental benefits to owning an electric car. There are no tailpipe emissions from an electric car, thus it produces less than half the CO_2 per km compared to a diesel or petrol car. In terms of cost, EV's have the lowest rate of motor tax per annum at €120 and can have a 74% reduction in transport costs compared to a comparable new diesel engine car.

Barriers to EV adoption include cost, range limitation and limited charging infrastructure. Fortunately, many houses have a private driveway in Laytown to facilitate the installation of household EV chargers. As shown in the map Figure 8 in section 4.4, there is only one EV charging point options currently within the Laytown boundary.

4.1 Car Ownership

Figure 6 displays the car ownership of each household. 11.4% of households have no car, 44.1% of households have one car, 31.3% have two cars, 4.7% have three cars and 1.4% of households have four or more cars. As anticipated, Laytown, being characterized as a commuter town, exhibits a higher prevalence of car ownership compared to the national average. According to the 2022 Irish census data, the proportion of households in Ireland possessing at least one automobile stood at 69.7%. Figure 7 displays the means of travelling to work. Laytown has relatively good public transport including train and bus routes.

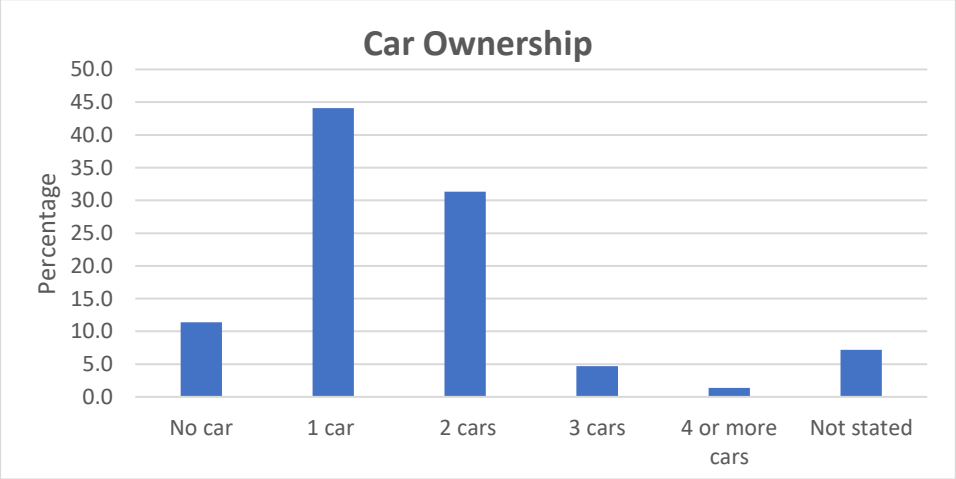

Figure 6. Car Ownership

4.2 Means of Travelling to Work

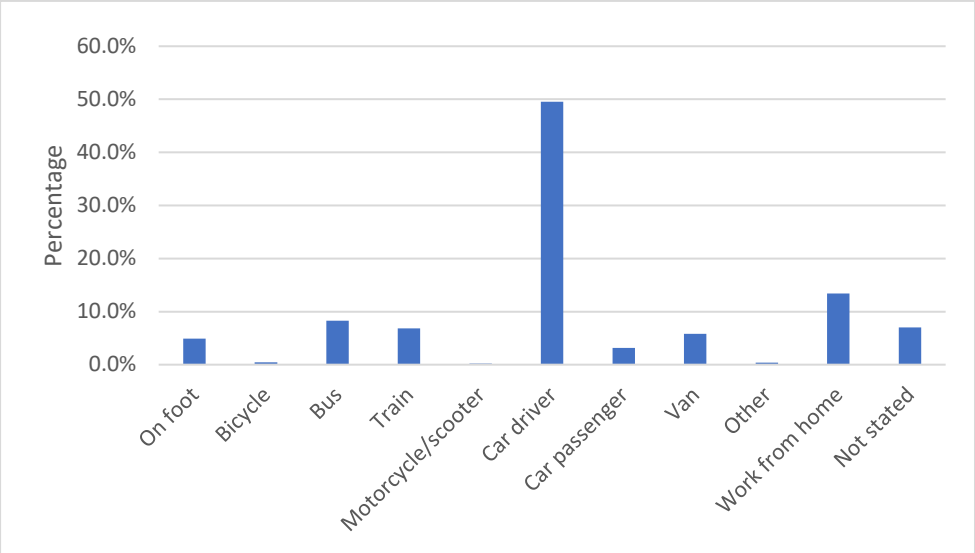

Figure 7. Means of travelling to Work

From the 2022 census data,49.5% of residents travelled to work by car and 15.2% travelled to work by public transport.

4.3 Baseline Emissions

We have evaluated transport energy consumption based on car ownership, activity and emission factors.

Number of Cars	1375
Cars per household	1.26
Transport Energy Consumption (kWh/yr.)	12,732,931
Transport Energy Spend (€/yr.)	1,909,940
CO_2 T/yr.	3.247

Table 2. Transport Data

4.4 EV Charging and Mobility Hubs

The supply of electric vehicles EVs has been increasing annually faster than demand. In 2022 there was a high purchase level of EVs at 15,678 up 81% on 2021 and accounting for approximately 15% of all new car purchases in Ireland. With this increase in demand there is an urgent need for charging infrastructure in the country. The Electric Vehicle Charging Infrastructure Strategy 2022 – 2025 published by the Department of Transport outlines four main categories of infrastructure to serve different user needs according to where, when and how drivers need to charge their EV's. These are home charging, residential neighbourhood charging (including on-street and co-charging), destination charging (e.g. sports facilities, shops, hotels, tourist locations) and motorway/ en route charging (ultra-rapid charging).

The map below displays the one current EV Charging facility within the Laytown SEC boundary, ESB EV Charger(Type2, 22kW Charger, 2 charge points) positioned to the south of map.

Figure 8. Local EV Charging Infrastructure

It is the government's ambition to have a charging network to support up to 194,000 electric cars and vans by 2025. However, the framework to specify national EV charge points has yet to be published. Home charging currently accounts for 80% of charging points in Ireland. It is the most cost effective and convenient charging method. There are many schemes for financial support for EVs available at the moment which also cover charging installation. One such scheme is the EV Home Charge Point Grant Scheme which provides up to €600 towards the installation cost of a domestic charge point. Home charging allows electric vehicles to be parked, plugged in and left to charge overnight, with the possibility of benefiting from lower night-rate electricity prices. The impact of this scheme could be significant in Laytown considering a very high proportion of the houses have the required space to facilitate charging infrastructure. Furthermore, it would be expected that EV Home Charge infrastructure should facilitate the needs of the local Community for the transition to Electric Cars.

5 Characterization of the Domestic Sector Buildings

5.1 Age Profile of Dwellings

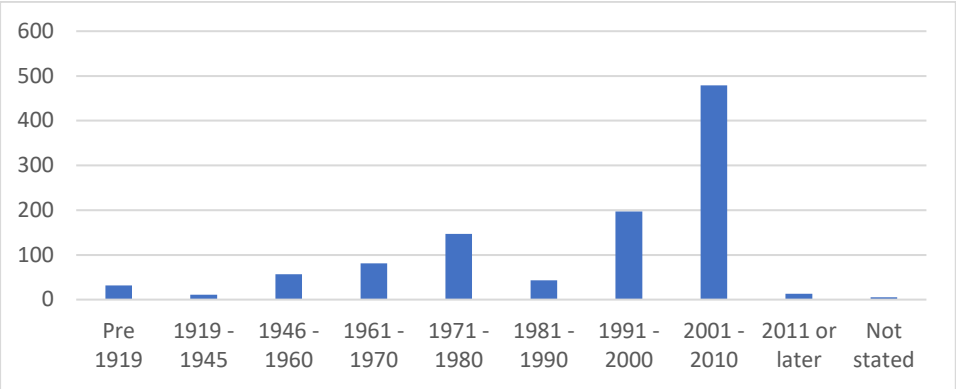

Figure 9. Summary of Age Profile of Dwellings

The age profile of domestic dwellings is shown in Figure 9, 4% of dwellings were constructed pre-1945, while 63.5% of dwellings were built between 1991 and 2010. The data concludes that a considerable proportion of the buildings were constructed post-1991.

5.2 Dwelling Type and Ownership

Figure 10 shows the distribution of dwelling ownership with the majority being privately owned. 71.7% of residents own their home in Laytown, 9.9% of households are rented from a private landlord, while 11.4% of households are rented from the Local Authority. The ownership profile has a bearing on the potential for energy efficient retrofits, especially in the privately rented sector where there is little incentive for a property owner to invest in energy efficiency while the benefit of reduced energy costs and increased comfort is accrued to the tenant. This may effectively rule out the privately rented dwellings as candidates for energy efficient retrofits. A Local Authority is more likely to invest in energy efficiency than a private landlord.

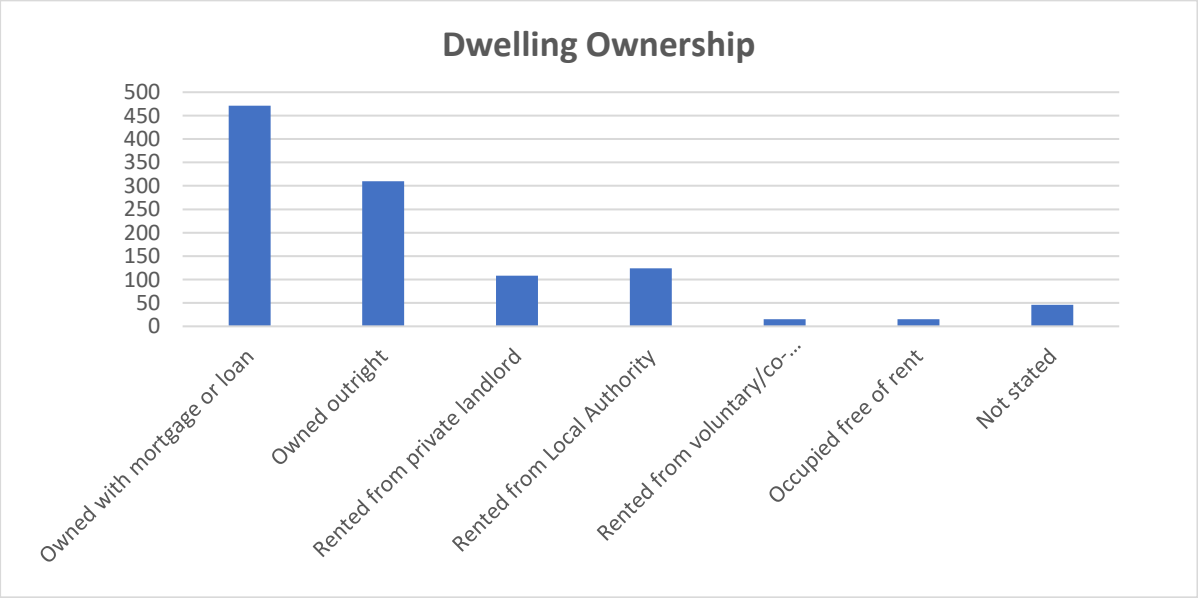

Figure 10. Summary of Dwelling Ownership

5.3 Heating Type

As displayed in Figure 11, the predominant means of heating is natural gas accounting for 73.7% of the heating (Gas national average: 30%). 2.8% of households use Electric heating (Electrical heating national average:7%), solid fuels (coal, peat and wood) account for 2.9% (Solid fuels national average:11%) and 15.3% of households use oil (oil National average:48%) as their primary source of heating.

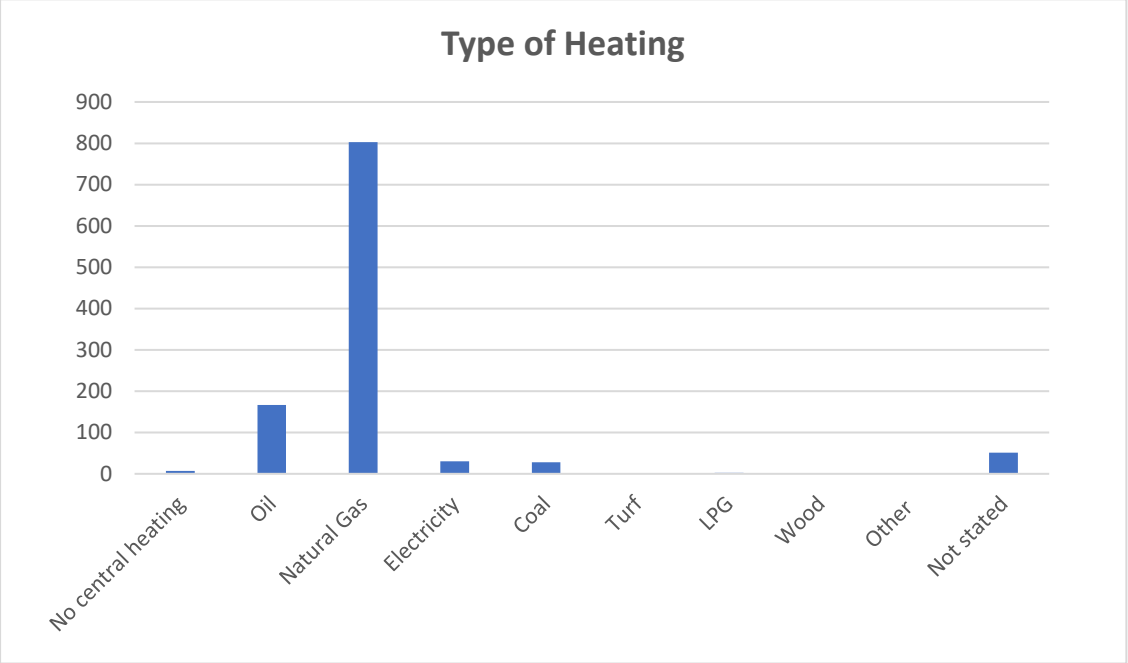

Figure 11. Distribution of heating Type

5.4 Laytown SEC Heating Demand

The presented figure 12 delineates the distribution of heating demand based on area density.

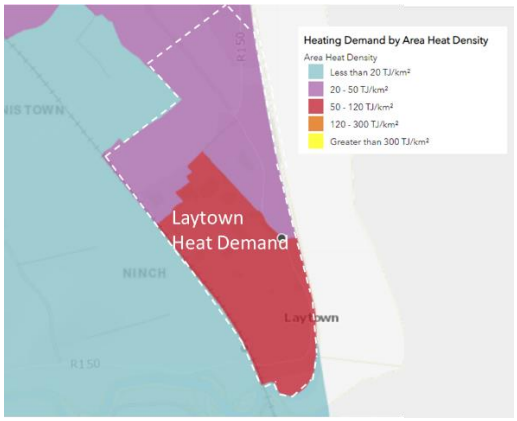

Figure 12. Heat Map: Residential Heat Demand

In Laytown, the predominant contributor to the heat load is residential dwellings, while the commercial heat load remains comparatively low when compared with other Sustainability Energy Communities situated in towns. This discrepancy is attributed to Laytown's status as a commuter town, serving as a residential hub for individuals commuting to both Dublin City and sizable towns like Drogheda and Balbriggan.

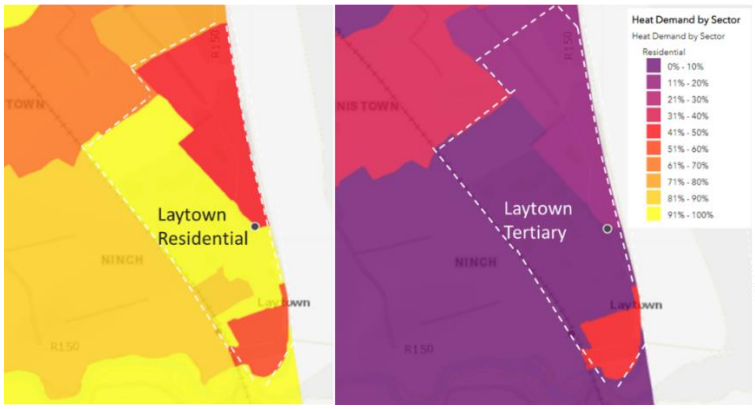

Figure 13. Heat Map: Relative Percentage of Heat of Residential and Commercial Sector

6 Community Survey

Laytown SEC carried out a survey of residents with 11 respondents. The survey served a dual function of capturing information on attitudes and behaviours in relation to sustainable energy and engaging with and recruiting households and individuals to the SEC. 10 of these provided contact details and expressed support and an interest in taking part in future Communities' energy efficiency grants.

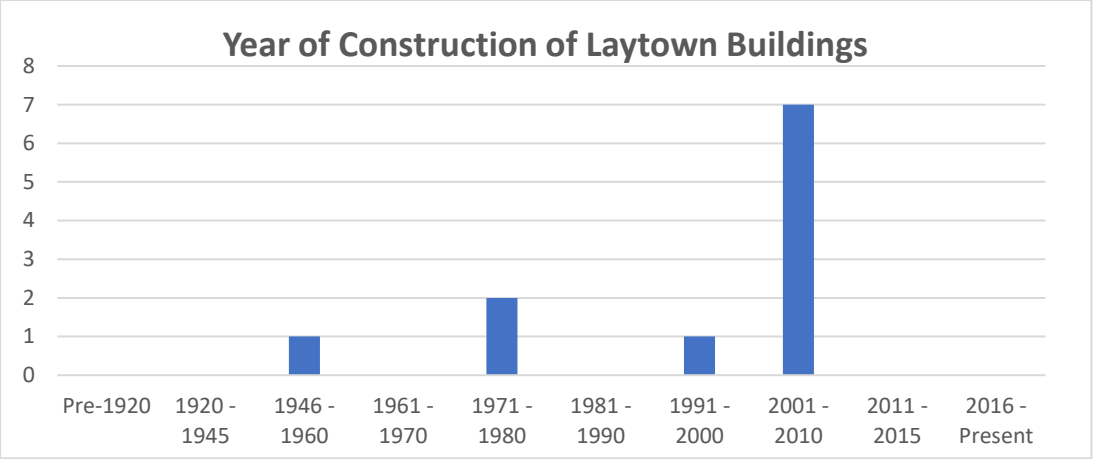

Figure 14. Year of construction of dwellings surveyed

Figure 14 shows the age distribution of the houses surveyed. The profile does not match that of the whole SEC exactly but the survey result of 0% of the houses are pre-1945 compared to 4% of all dwellings in the Laytown SEC, in both this was the significant minority. 5 respondents provided a BER rating for their house. 4 respondents had a rating of C or worse and 1 had a rating of E1 or worse. 3 respondents said they did not have a BER. Based on SEAI data, the average BER in the SEC is C3, so the BER of the respondent sample is similar to that in the entire SEC.

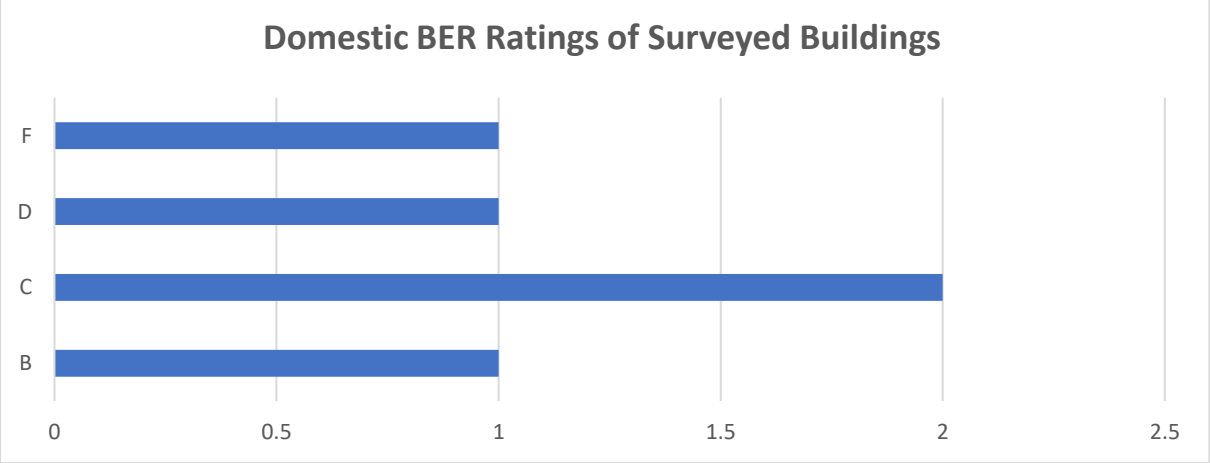

Figure 15. Distribution of BERs

Respondents are generally satisfied with comfort levels in their homes with 82% being quite comfortable or extremely comfortable, but, notwithstanding this, it was found that most of the respondents harbour reservations regarding the notion that enhancing energy efficiency would improve comfort levels or add value to your home. However, 82% of respondents stated they are very likely or extremely likely to invest in energy efficiency measures.

The chart below represents a significant potential pipeline of projects and Laytown SEC will maintain contact with the respondents who provided contact details to encourage and facilitate projects.

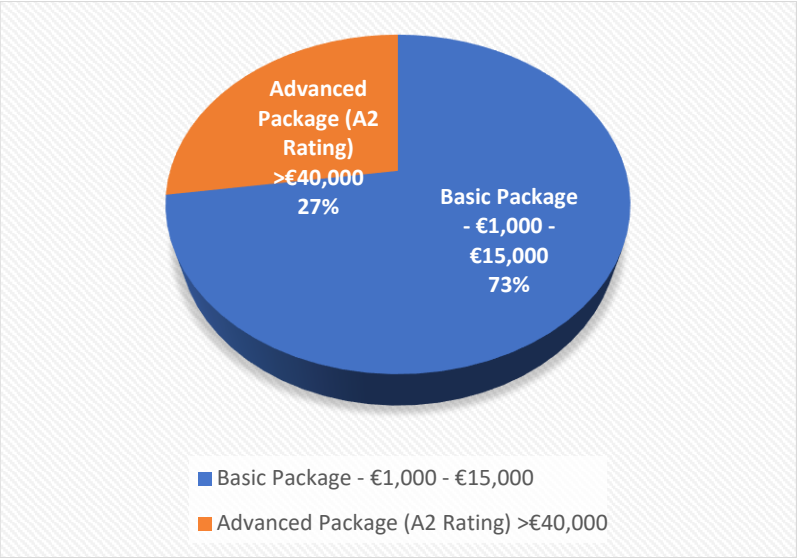

Figure 16. Likely budget for investment in energy efficiency

7 Register of Opportunities

The Register of Opportunities (RoO) primarily is designed to record potential projects through identification, commitment, and implementation.

The register of opportunities for residential has been developed as a template for specific houses and projects with a general register of opportunities for the sector.

The Register of Opportunities is presented in the proceeding section for the 4 sites in tables 3-6.

7.1 Residential Register of Opportunities

The housing within the Laytown boundary is mainly privately owned accounting for 781 (72%), 108 households are rented (10% of total households) and 124 are managed by local authorities (11.4% of total households). The main targets for energy efficient upgrades are owner occupied and local authority housing.

For owner occupied dwellings, the engagement of householders and recruitment for deeper engagement will be on an individual basis. Each householder will personally fund the works in their house and the recommended actions must be flexible and avoid being too prescriptive. The Local authority housing is the responsibility of the County Council. Engagement with the community and recruitment of householders planning upgrades are essential to achieving these goals.

In summary:

- The ambition to reduce energy consumption in owner occupied and local authority housing in line with national goals over the next ten years
- Engagement and recruitment of householders is key to achieving the targeted savings as is capturing interest and activity (e.g., works carried out under Better Energy Homes).
  .

There are ambitious National targets for retrofits in dwellings including the plan to retrofit 500,000 dwellings to B2 by 2030 stated in the Climate Action Plan. This equates to approximately 25% of the National housing stock. Applied to Laytown SEC it equates to about 272 dwellings in total.

7.2 Domestic Audits (Incl. Register of Opportunities)

Audited buildings were representative of typical house types in the area. They are referred from LT1 to LT4 to preserve anonymity. The average BER of the houses surveyed is a D1, which is worse than the average BER in the wider SEC which is C3. Figure 17 shows the BER bands in kWh/ m2/yr.

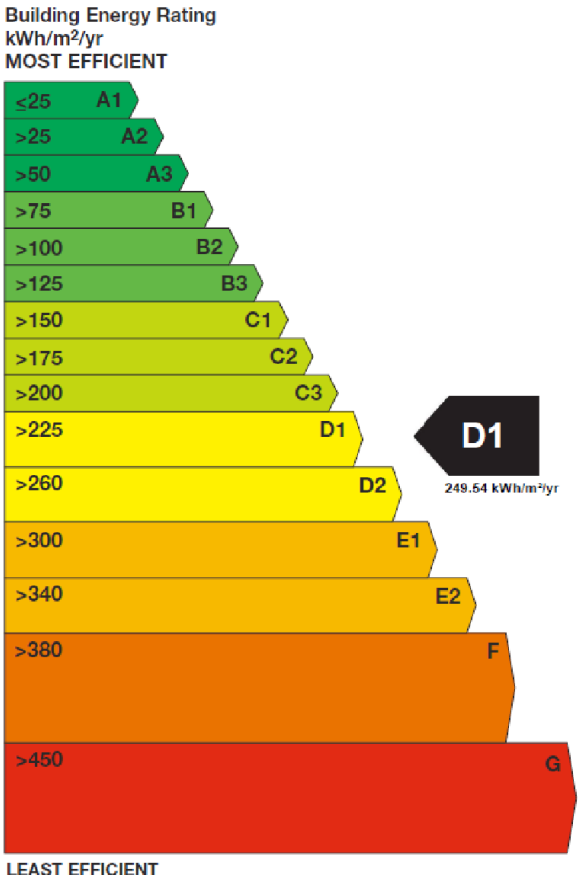

Figure 17. BER grade ranges.

The domestic energy audit reports are intended to provide a generic template for representative audits. So, for example, a house built in the 1930s may be likely to have had upgrades at some stage including the installation of central heating, double glazing and a degree of roof insulation. The houses do not typically have substantial levels of existing wall insulation or solar PV or heat pumps. In all cases pathways to improved energy performance are laid out in the energy audit reports.

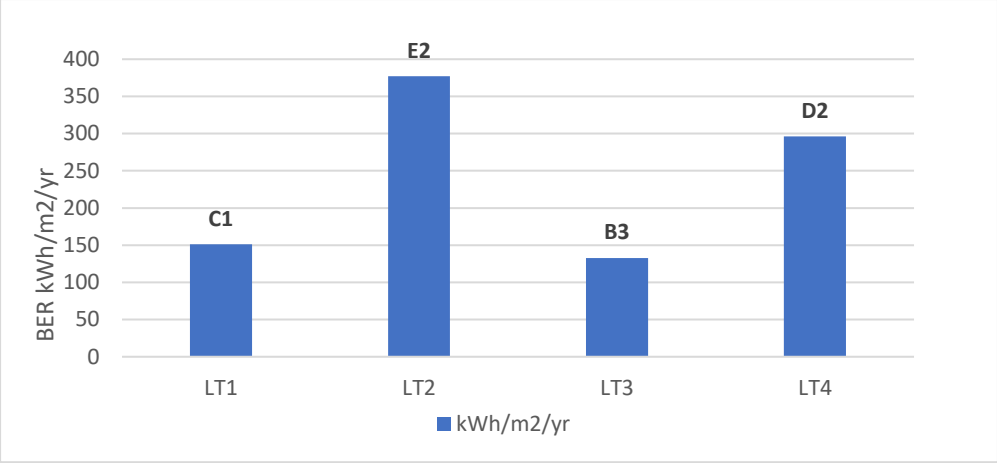

Figure 18. BERs of Houses Surveyed

The Energy Efficiency Strategy for residential properties encompassed the implementation of essential prerequisites for the integration of heat pumps. This strategic initiative intends to facilitate the attainment of a low carbon status, denoted by a B1 or superior Building Energy Rating (BER). The incorporation of heat pumps is in alignment with the national strategy aimed at decarbonizing and electrifying the heat network. The findings from the four site assessments demonstrated an average estimated cost associated with these measures is denoted as 51,837 euros, with an average grant of 19,800 euros resulting in an average actual cost of 32,0137 euros. The available grant is considerable, reducing estimated cost by 38%. It should be noted that these costs are only indicative, and it is difficult to estimate costs in the current inflationary environment. Homeowners considering retrofits should contact potential service providers for 2-3 quotes and discuss with neighbours who have completed similar projects before making a final decision.

The following tables present the full list of Register of Opportunities / Energy Control measures per site audited.

Step	Upgrade Measure	Primary Energy (kWh/m2/yr)	Uplift (100kWh/m2/yr)	HLI	BER Rating	Estimated Cost	Grant available	Difference
Required Measures								
0	Existing / Current	151.04		2.22	C1			
1	Triple Glazed Windows (U<0.8)	138.09	12.95	1.98	B3	€ 9,292.80	€ 3,000.00	€ 6,292.80
2	Remove Fireplace	124.84	26.2	1.91	B2	€ 715.00	€ -	€ 715.00
3	Air To Water Heat Pump	63.08	87.96	1.91	A3	€ 18,469.00	€ 8,500.00	€ 9,969.00
4	Solar PV	32.91	118.13	1.91	A2	€ 5,500.00	€ 1,800.00	€ 3,700.00
Total						**€ 33,976.80**	**€13,300.00**	**€20,676.80**
Best Practice Measures								
5	Air Tightness (< 5)	31.17	119.87	1.84	A2	€ 3,300.00	€ 1,000.00	€ 2,300.00
6	Demand Control Ventilation	32.97	118.07	1.85	A2	€ 4,950.00	€ 1,500.00	€ 3,450.00
	OSS Bonus						€ 2,000.00	-€ 2,000.00
Total						**€ 8,250.00**	**€ 4,500.00**	**€ 3,750.00**
Combined Total						**€ 42,226.80**	**€17,800.00**	**€24,426.80**

Table 3. Energy Control Measures Site LT1

Step	Upgrade Measure	Primary Energy (kWh/m2/yr)	Uplift (100kWh/m2/yr)	HLI	BER Rating	Estimated Cost	Grant available	Difference
Required Measures								
0	Existing / Current	377.02		3.85	E2			
1	Cavity Wall Insulation	290.04	86.98	2.85	D2	€1,827.10	€1,700.00	€127.10
2	Low Energy Door(s)	284.34	92.68	2.79	D2	€4,400.00	€1,600.00	€2,800.00
3	Triple Glazed Windows (U<0.8)	255.85	121.17	2.55	D1	€11,292.60	€4,000.00	€7,292.60
4	Suspended Floor Insulation	212.09	164.93	2.09	C3	€14,526.60	€3,500.00	€11,026.60
5	Remove Stove and Seal Chimney	209.2	167.82	1.98	C3	€715.00	€0.00	€715.00
6	Air To Water Heat Pump	59.4	317.62	1.98	A3	€21,769.00	€8,500.00	€13,269.00
	OSS Bonus						€2,000.00	-€2,000.00
Total						**€54,530.30**	**€21,300.00**	**€33,230.30**
Best Practice Measures								
7	Air Tightness (< 5)	58.32	318.7	1.94	A3	€3,300.00	€1,000.00	€2,300.00
8	Demand Control Ventilation	59.66	317.36	1.94	A3	€4,950.00	€1,500.00	€3,450.00
Total						**€8,250.00**	**€2,500.00**	**€5,750.00**
Combined Total						**€ 62,780.30**	**€23,800.00**	**€38,980.30**

Table 4. Energy Control Measures Site LT2

Step	Upgrade Measure	Primary Energy (kWh/m2/yr)	Uplift (100kWh/m2/yr)	HLI	BER Rating	Estimated Cost	Grant available	Difference
Required Measures								
0	Existing / Current	132.85		2.38	B3			
1	Attic Insulation	127.92	4.93	2.26	B3	€2,737.90	€1,300.00	€1,437.90
2	Low Energy Door(s)	125.86	6.99	2.22	B3	€4,400.00	€1,600.00	€2,800.00
3	Triple Glazed Windows (U<0.8)	111.55	21.3	1.91	B2	€15,952.20	€3,000.00	€12,952.20
4	Remove secondary gas heating	108.77	24.08	1.85	B2	€1,265.00	€0.00	€1,265.00
5	Air To Water Heat Pump	60.47	72.38	1.85	A3	€19,074.00	€8,500.00	€10,574.00
6	Solar PV 3kWp	25.05	107.8	1.85	A2	€7,150.00	€2,100.00	€5,050.00
	OSS Bonus						€2,000.00	-€2,000.00
Total						**€50,579.10**	**€18,500.00**	**€32,079.10**
Best Practice Measures								
8	Air Tightness (< 5)	21.56	111.29	1.76	A1	€3,300.00	€1,000.00	€2,300.00
9	Demand Control Ventilation	24.32	108.53	1.79	A1	€4,950.00	€1,500.00	€3,450.00
Total						**€8,250.00**	**€2,500.00**	**€5,750.00**
Combined Total						**€58,829.10**	**€21,000.00**	**€37,829.10**

Table 5. Energy Control Measures Site LT3

Step	Upgrade Measure	Primary Energy (kWh/m2/yr)	Uplift (100kWh/m2/yr)	HLI	BER Rating	Estimated Cost	Grant available	Difference
Required Measures								
0	Existing / Current	296.15		3.01	D2			
1	Attic Insulation	230.29	65.86	2.3	D1	€2,989.80	€1,200	€1,789.80
2	Cavity Wall Insulation	191.97	104.18	1.9	C2	€1,314.50	€800	€514.50
3	Air To Water Heat Pump	99.79	196.36	1.9	B1	€17,677.00	€8,500	€9,177.00
Total						**€21,981**	**€10,500**	**€11,481.30**
Best Practice Measures								
4	Seal Chimney(s)	78.22	217.93	1.84	B1	€715.00	€0	€715.00
5	Air Tightness	76.23	211.98	1.75	B1	€3,300.00	€1,000	€2,300.00
6	Demand Control Ventilation	77.68	212.28	1.77	B1	€4,950.00	€1,500	€3,450.00
8	Low Energy Door(s)	75.21	214.75	1.71	B1	€4,840.00	€1,600	€3,240.00
9	Double Glazed Windows (U<1.4)	72.3	217.66	1.64	B1	€7,726.40	€0	€7,726.40
	OSS Bonus					€0.00	€2,000	-€2,000.00
Total						**€21,531.40**	**€6,100**	**€15,431.40**
Combined Total						**€43,512.70**	**€16,600**	**€26,912.70**

Table 6. Energy Control Measures Site LT4

Additionally, Section 5.2 sheds light on the distribution of dwelling ownership, revealing that a significant portion of dwellings in the area are privately owned. This ownership profile plays a crucial role in determining the feasibility of implementing energy-efficient retrofits, particularly within the private rented sector. In this sector, property owners often lack the motivation to invest in energy efficiency measures, as the resulting benefits of reduced energy costs and enhanced comfort primarily accrue to the tenants.

The following are excellent resources to assist tenants to reduce their energy bill.

The Codema Home Energy Saving Kit is a valuable resource that helps homeowners and tenants understand their energy consumption and identify areas in their homes that can benefit from energy upgrades. With practical tools and exercises, users can conduct their own energy audit to pinpoint effective areas for energy reduction. By implementing simple energy-saving measures, such as those provided in the kit, users can reduce energy bills by up to 20% while enhancing home comfort and contributing to environmental sustainability. The user-friendly tools make energy awareness accessible to all, enabling families to actively participate in energy efficiency. There is a kit is available for borrowing through the Laytown SEC.

The SEAI website is a valuable resource for tenants who are looking for effective ways to reduce their energy consumption and lower their energy costs. On the SEAI website, tenants can find a wide range of energy-saving tips specifically tailored for homes. These tips cover various aspects of energy efficiency, such as heating, insulation, lighting, and appliances. By following these tips, tenants can make informed choices and take practical steps to improve the energy efficiency of their homes, leading to energy savings and a more sustainable living environment Energy Saving Tips | Home Energy | SEAI.

7.3 Tertiary Energy Uses and Retrofit Opportunities

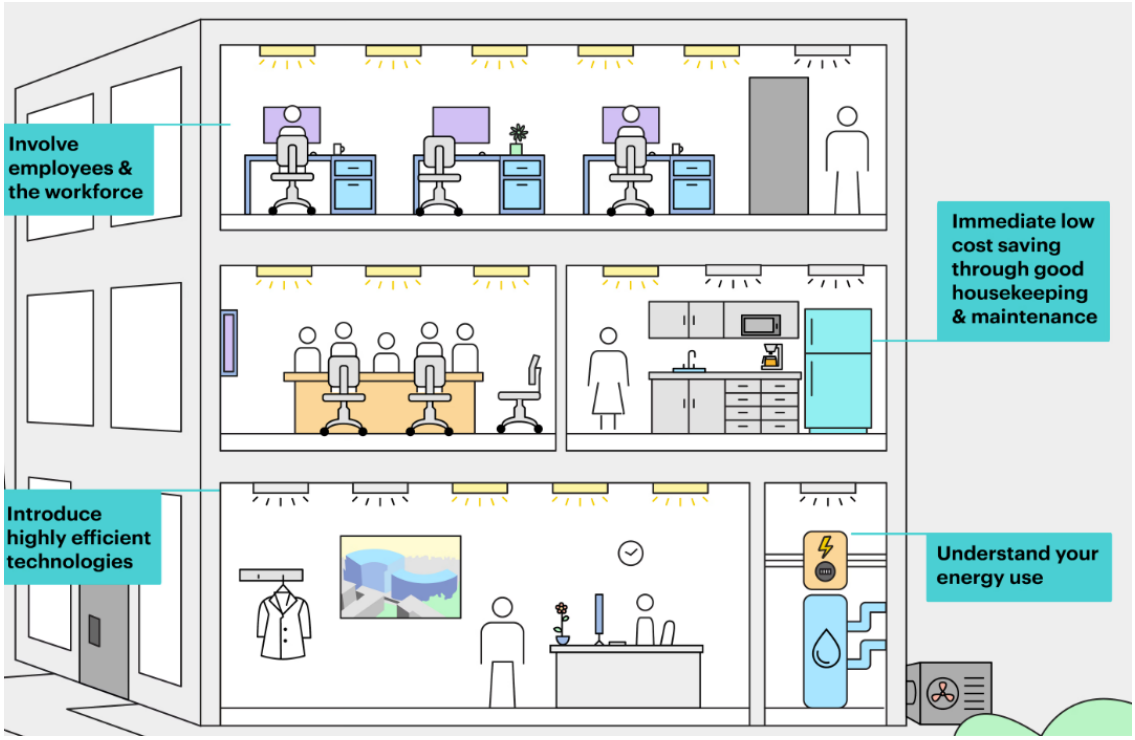

Figure 19. Opportunities for Energy Efficiency (International Energy Agency (IEA))

Low Energy Lights

Lighting is a significant energy use in all buildings. Switching to lower energy lighting such as LEDs will lower bills. For example, switching a typical double linear fluorescent fitting (139W) with a 60W equivalent LED fitting would reduce electricity consumption by 57% and replacing a 50W halogen lamp with a 6W equivalent LED would save almost 90%. In general LEDs use approximately a 20-40% of the energy of alternatives thus also reducing your carbon footprint. Furthermore, LEDs last up to ten times longer than halogen bulbs.

Heating Controls

Space heating is the largest energy use in most buildings. Upgrading the heating controls of a building results in a warmer, more energy efficient structure. By installing heating controls energy usage can be reduced by up to 20% and save money on your heating bills. For example, zoned controls with independent time and temperature control allows heat supply to be targeted to only those areas that need heating, thus cutting out unnecessary energy usage.

Heat Pump

For buildings with existing direct electric heating (e.g., storage heaters) installing an air to air heat pump, sometimes called a split system air conditioner, would improve efficiency. A heat pump would have a typical efficiency of up to 500% compared to the efficiency of less than 100% for storage heaters. It would also be easier to control and more responsive to demands and would improve comfort.

Typical Indoor Unit for Air to Air Heat Pump

Alternatively, for buildings with existing wet based heating systems, installing an air to water heat pump would significantly improve efficiency. Like split units, air to water heat pumps would have a typical efficiency of up to 500% compared to the efficiency of less than 100% for Gas based Boilers.

Heat pumps for residential use in Ireland typically fall into the range of 6-20 kilowatts (kW) in capacity. There are challenges with installing Heat pumps in existing buildings. The OPW submitted a report (see the report[3] "OPW Report on Phasing Out Fossil Fuel Heating from Public Service Buildings") which outlined the significant challenges of using decentralised RES Heat technology to phase out fossil fuel in existing public buildings. A central point in the report is the challenge of integrating renewable heat-based technologies; neither heat pumps nor biomass are drop-in solutions for existing fossil-based boilers. Heat pumps, in particular, can generally only be installed in existing buildings as part of an extensive building upgrade project which in many cases is not financially feasible.

[3] Climate Action Plan (Action 57a): Phasing out of fossil-fuel heating from public buildings Office of Public Works Published on 6 July 2022

8 Renewable Energy and Active Consumers

8.1 Renewable Energy Sources

Renewable sources of energy are the cleanest source we can produce in terms of greenhouse gas emissions and increasing the proportion of energy sourced from renewable sources is central to national and EU energy and climate change policy. Renewable Energy Sources include:

- **Solar Photovoltaic**
  Solar PV panels convert energy from light directly into electricity. The cost of solar PV panels has fallen by around 90% in the past 10-15 years making the business case for solar PV a reasonable investment.

- **Solar Thermal**
  Solar thermal panels convert the energy from sunlight into heat, usually for domestic hot water. It is a proven and reliable technology but possibly has a longer payback than solar PV. It is also slightly more complicated to install in existing buildings.

- **Wind**
  Wind turbines convert energy from the wind into electricity. Larger 'utility scale' wind turbines are common. There are small scale wind turbines available, but these work best in rural areas with uninterrupted wind flows. Turbulence from building and other obstacles reduces the yield from small wind turbines significantly and they are not suitable for urban areas.

- **District Heating**
  District heating systems deliver space and water heating through a network of insulated pipes. Energy in the form of heat is produced in large, centralised plants (Energy sources include Geothermal, heat pump, Biofuel based plants, and Waste-Heat). District heating systems are widely used in Europe and provide 90% of the heat in Sustainable cities such as Copenhagen and Stockholm. In Ireland, district heating systems have a relatively low level of adoption, but recently, there is a greater interest in District heating with a scheme recently established in Tallaght and a long-planned scheme supplying waste heat from the waste incinerator to buildings in the Dublin docklands and surrounding areas.

8.2 Solar Photovoltaic

Solar PV panels are those that generate electricity when exposed to light. They are the rooftop solar you see on roofs and businesses. There are numerous benefits to switching to a solar PV system. These benefits include lower electricity bills and an improved BER. Thus, when it comes to selling your home, a higher BER will add value and help you achieve a higher sale price, as well as reducing your energy waste. Using a solar PV system means you are generating your own renewable energy. This has great benefits for our environment and lowers your greenhouse gas emissions.

Solar PV panels are rated in kWp (kW peak). By definition, 1 kWp generates 1 kWh of electricity per kWh/m2/yr of solar insolation. The average solar insolation in Ireland is 962 kWh/m^2/yr.

The electricity produced by the PV module in kWh/year is

$$Solar\ Output\ (kWh/yr) = 0.80 \times kWp \times S \times ZPV^{4}$$

where S is the annual solar radiation (kWh/m2/yr), ZPV is the overshading factor and 0.8 is a factor accounting for system losses.

Tilt of collector	Orientation of collector				
	South	SE/SW	E/W	NE/NW	North
Horizontal	963				
15°	1036	1005	929	848	813
30°	1074	1021	886	736	676
45°	1072	1005	837	644	556
60°	1027	956	778	574	463
75°	942	879	708	515	416
Vertical	822	773	628	461	380

Table 7. Annual solar radiation (insolation) for different orientations and tilt (SEAI)

The European Commission has developed a simple online PV calculation PVGIS. According to PVGIS, the yield for a 1 kW south-facing, 30-degree tilt solar PV installation in Laytown would be 930 kWh/yr.

Typically, in the SolarPV industry, a reasonable rule of thumb would be around 900 kWh per annum for a 1 kW solar PV system in Ireland. As a rough estimate, in Ireland, a south-facing panel may generate around 10-15% more electricity per year than a southeast-facing panel, assuming all other factors are equal. However, this percentage can vary significantly depending on the specific location, shading, and other factors that can impact solar panel performance. Sustainable Energy Authority of Ireland (SEAI) conducted a study in 2015, which estimated that a south-facing panel in Dublin would generate around 10% more electricity per year than a southeast-facing panel, assuming all other factors are equal.

Figure 20 displays an aerial photograph of a proportion of Laytown, there is very low integration of PV in Laytown, less than 2% of the total housing stock, this aligns with the SEAI BER small area statistics.

[4] SEAI Dwelling Energy Assessment Procedure

An important observation from the aerial view of the Laytown is the Orientation of PV systems is not ideal. Therefore, the orientation factor loss will need to be applied in determining the impact of considerable integration of Micro PV systems in Laytown.

Figure 20. Building Orientation & Penetration of Solar PV in Laytown

As shown in the figure below, Laytown has an abundance of flatland which is ideal for the installation of Utility/Commercial-Scale Solar systems. In 2022, in Meath. there were 52 applications on 46 sites, 22 were refused, 34 were granted, three were withdrawn and four were pending. A breakdown of applications for permission was also given – Ashbourne 15, Kells five, Laytown-Bettystown 10, Navan one, Ratoath nine and Trim six. Applications were mainly focused on the east and Southeast of the county. Out of 34 applications, only 6 have commenced construction. (Meath Chronicles[5]).

The ESBN Generation Capacity Map displayed in the figure below demonstrates a reasonable degree of available Generation Capacity within Laytown. However, there is a limited number of local substations in the surrounding farmland outside Laytown town. The option to run cables between the solar farm and the local substation directly affects the cost. Longer cable runs require more materials and labour for installation. The type and size of the cables chosen for the project impact costs. Higher capacity cables or those with special features, such as underground or overhead installation, can be more expensive. The method of cable installation, whether it's underground or overhead, will also influence costs.

The recent approval of many solar farms in local areas could significantly impact the success of future Utility Scale Solar Plants. The local electrical grid's capacity is a crucial factor. The approval of numerous solar farms connected to the grid, may cause the local network to reach or approach its capacity limits. In such cases, obtaining approval for new solar farms could be challenging unless grid upgrades are made to accommodate additional capacity. Local land use and zoning regulations play a significant role in the approval process. If the area is already densely populated with solar farms, authorities may be more cautious about permitting additional development to prevent overuse of the land or conflicts with other land-use objectives. There are many considerations in the development of a Solar PV plant which is highlighted in the SEAI Community Energy Resource Toolkit Document (Business Planning and Procurement) published in July 2023.

Further analysis for Solar Plant integration is required, apart from the technical issues outlined in the previous paragraphs. There are also challenges in developing business cases for large Solar Farms, considering the recent increased inflationary cost in the construction industry. For the RESS3 projects, there were 20 solar projects accepted, ESB Solar's Tracystown Solar Park is the largest of all the projects accepted at 101.1MW, and projects range in size down to the Tead More

[5] https://www.meathchronicle.ie/2022/10/12/snails-pace-switch-to-solar-highlighted-at-meeting/ (Visited 30/11/22)

Solar project (3.95MW), the smallest successful applicant. There would be considerable Investment required to fund the development of a Utility-Scale Solar farm. As displayed in the table below, SEC's should consider availing of Project appraisal and feasibility delivered by Trusted Advisors of SEAI, the cost is covered by SEAI.

Stage	Finance	Source
Project appraisal and feasibility	Cost covered by SEAI	Delivered through SEAI Trusted Advisor s
Planning	€40-60k (excluding EIA)	Enabling Grant Framework (SEAI) Local Enterprise Offices Community Benefit Fund associated with nearby Renewable Energy Project Community contributors(a) Private community partner(b)
Grid	c.€2k (grid assessment) – c. €37k Stage payment thereafter linked to grid connection costs – refer to Grid https://www.seai.ie/publications/Community-Toolkit-Grid-Connection.pdf	Community contributors Enabling Grant Framework (SEAI) Private community partner
Route to Market	c. €10k to support the development of a detailed financial model to inform auction bid price	Community contributors Enabling Grant Framework (SEAI) Private community partner
Construction	C. €1M - €6M	Community equity Private community partner Bank debt

Table 8. Finance and funding requirements and sources for project stages

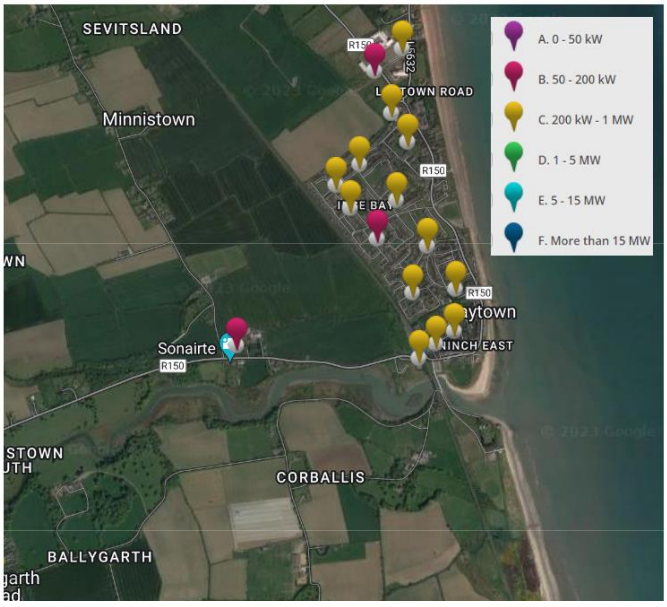

Figure 21. ESBN Generation Capacity Map

Installing Microgeneration(<50kW) Solar PV could make a significant impact on Laytown. New planning permission exemptions for rooftop solar panels on homes and other buildings were published on Friday 7th October 2022. Planning permission is no longer required for solar PV installations. Installing 1 MW of solar PV would provide 0.75 million kWh per annum (accounting for non-ideal roof orientation losses), this would require 5,000m2 of roof space. There is

considerable roof space within the Laytown SEC, the residential dwellings have a combined area of >50,000m2. As a general guideline, most installers aim to cover between 30% to 60% of the roof with solar PV panels. However, the exact percentage will depend on the specific characteristics of the roof and the desired output of the solar system.

Cost-Benefit and Supports

Solar PV installations can cost from €2,200/kW to €1,000/kW depending on size. A 3kW system would cost around €6,000 while a 6kW system would cost around €9,000, so there are economies of scale. A solar system has generally been designed around on site demands and to avoid excessive export in the absence of an export tariff.

A Microgeneration Support Scheme which provides an export tariff was recently established. The scheme provides a Clean Export Guarantee tariff offered by electricity suppliers at around the wholesale market rate for electricity. A Clean Export Premium set at a level to incentivise solar PV further is also mooted. Furthermore, the government has recently agreed to reduce the VAT rate on the supply and installation of solar panels to zero for private dwellings from 1 May 2023.

At present, the installation of solar photovoltaic (PV) panels can be funded through the SEAI community grant or the domestic Solar PV grant. From the 1st of January 2024, for a solar PV grant, one would receive €800 per kWp up to 2 kWp and €250 for every additional kWp up to 4kWp if you get a battery. For example, you will receive €1,600 for 2kWp solar panels (i.e. 6/7 solar panels).

	Indicative Cost	Grant	Cost after grant	Annual Generation (kWh)	Value of Electricity (€/yr)	Payback
2 KW Solar	€4,400.00	€1,600.00	€2,800.00	1,500	€375	7.5
4 kW Solar	€7,000.00	€2,100.00	€4,900.00	3,000	€750	6.5

Table 9. Solar PV Cost Benefit Summary

8.3 Wind Energy Systems

Ireland has made significant strides in harnessing wind energy as a sustainable power source. With its favourable geographic location and strong prevailing winds from the Atlantic Ocean, the country has embraced wind energy as a key component of its renewable energy strategy. Ireland has the highest relative proportion of Wind Energy contributing to its generation mix than any other European country.

The electricity generated by a wind turbine can be calculated using the formula:

$P=.5\times\rho\times A\times v3\times Cp$

where P is the power output in kilowatts (kW), ρ is the air density in kilograms per cubic meter (kg/m^3), A is the swept area of the wind turbine's blades in square meters (m^2), v is the wind speed in meters per second (m/s), Cp is the power coefficient, representing the efficiency of the wind turbine in converting the kinetic energy of the wind into electrical power.

With respect to site assessment, the key variable parameter is v, the wind speed in meters per second (m/s). The Weibull distribution (A two-parameter function commonly used to fit the wind speed frequency distribution) is another very important determinant. As displayed in the SEAI GIS wind assessment tool[6], Laytown has similar Wind Speeds to other current Windfarms in the local vicinity.

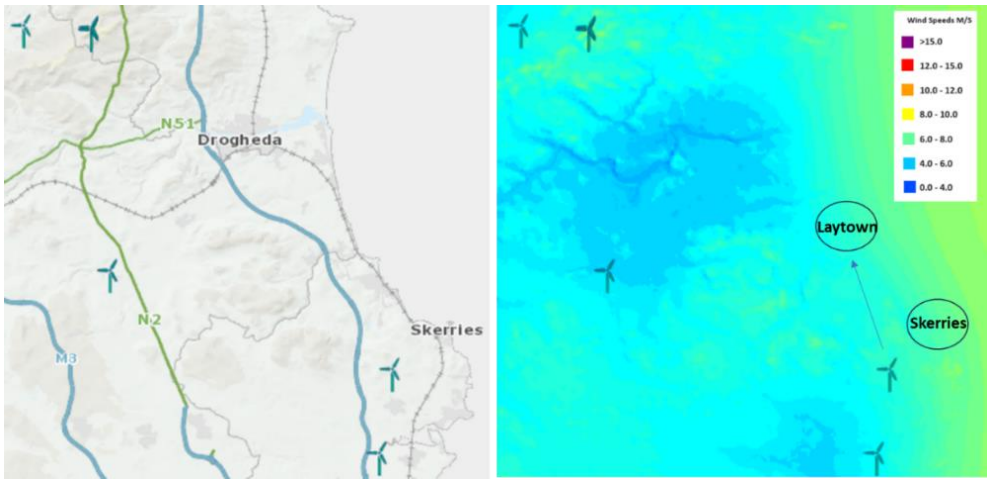

Figure 22. GIS Wind assessment SEAI Tool (https://gis.seai.ie/wind/)

A commonly used rule of thumb for onshore wind turbines in moderate wind speed regions like Ireland is around 2,000 to 2,500 kilowatt-hours (kWh) per installed kilowatt (kW) of capacity per year. So, for example, if you have a 1 MW (1,000 kW) onshore wind turbine in Ireland, the estimated annual energy production might be in the range of 2,000,000 to 2,500,000 kWh.

It's important to note that this is a general estimate, and actual energy production can vary based on the specific characteristics of the wind turbine, the height of the tower, the wind speed at the site, and other local conditions. It's always recommended to conduct a site-specific analysis or refer to wind resource assessments for more accurate predictions of energy production for a particular location.

Wind Farm development faces many of the same challenges outlined in the previous section pertaining to Solar Farm development. Windfarms face similar technical changes such as grid connection approval and Planning permission. Table 8, which outlines Finance and funding requirements and sources for project stages is also applicable, however, Wind Farm also generally

[6] https://gis.seai.ie/wind/

require the installation of MET Mast to undertake MCP (Measure-Correlate-Predict) for yield assessment of a target location. The SEC should also consider the impact of several recent Solar Farms being awarded planning permission in the local vicinity and the potential construction of 50-60 offshore Wind Turbines[7] in close proximity of Laytown. For Onshore RES integration, Solar PV is becoming a more significant RES technology than Wind Technology. A total of 36 projects applied to participate in the RESS 3 qualification process, out of 23 projects deemed provisionally successful, 20 of these projects were Solar PV Plants with just 3 Wind Projects. However, as stated in the SEAI Community Energy Resource Toolkit Document (Business Planning and Procurement) published in July 2023, Communities should consider availing of Project appraisal and feasibility delivered by Trusted Advisors of SEAI, the cost is covered by SEAI.

8.4 Heat Pumps

Heat pumps are discussed in section 7.3 which outlines retrofit options. Heatpumps are classed as a Renewable source by providing an alternative to fossil fuel heating systems. Heat-pumps are electrical devices which convert energy from the air outside of your home into useful heat. They are an extremely efficient supplementary system in retrofit situations to reduce reliance on oil, gas, solid fuel and electric home heating systems and thereby reduce your carbon footprint.

One of the requirements for a dwelling to qualify for a heat pump system grant is that the dwelling has low heat loss. This requires buildings to be correctly insulated to a high standard The efficiency performance of the heat pump depends on buildings having a Heat Loss Indicator (HLI) of at least 2.0 or under. This is to ensure your heat pump system performs well and does not adversely affect your electricity bills. Once again this is why it is recommended in the advanced package of domestic retrofit measures. The grant for an air source heat pump through the SEAI is €3,500. The insulation required is also grant aided.

As discussed in section 7.2, Heat pumps can generally only be installed in existing buildings as part of an extensive building upgrade project which in many cases is not financially feasible. It is also challenging to retrofit Heatpumps to standard domestic wet based systems, 89% of Laytown domestic dwellings use wet based central heating systems.

However, the Energy Efficiency Strategy by Laytown SEC for residential properties encompasses the implementation of essential prerequisites for the integration of heat pumps. This strategic initiative intends to facilitate the attainment of a low carbon status, denoted by a B1 or superior Building Energy Rating (BER). The incorporation of heat pumps is in alignment with the national strategy aimed at decarbonizing and electrifying the heat network. The findings from the four site assessments demonstrated an average estimated cost associated with these measures denoted as 51,837 euros, with an average grant of 19,800 euros resulting in an average actual cost of 32,0137 euros.

8.5 Energy Communities and Active Consumers

The Clean Energy for all Europeans Package (CEP) contains provisions for the empowerment of individuals and groups of consumers seeking to participate in the electricity sector.

The Commission for the Regulation of Utilities (CRU), which is responsible for regulation of energy and water supply, recently published a paper titled “Energy Communities and Active Consumers”. The CRU defines a ‘citizen energy community’ as a legal entity that is based on voluntary and open participation and is effectively controlled by members or shareholders and has for its primary purpose to provide environmental, economic, or social community benefits to its members or shareholders or to the local areas where it operates, rather than to generate financial profits; and, may engage in generation, including from renewable sources, distribution, supply, consumption,

[7] https://northirishseaarray.ie/the-project/location-and-visuals/

aggregation, energy storage, energy efficiency services or charging services for electric vehicles or provide other energy services to its members or shareholders.

When appropriate market and regulatory arrangements are instituted, this will give communities such as Laytown the opportunity to become energy independent. This has already been achieved by Samso, an island in Denmark. They managed to become 100% green by working on community projects such as solar and wind farms.

Supports are available for Community Energy initiatives including the following.

- Renewable Electricity Support Scheme (RESS)

  The Renewable Electricity Support Scheme (RESS) has been set up by the government to promote investment in renewable energy generation in Ireland. RESS is a competitive auction-based framework will help achieve Ireland's targets for electricity generation from renewable sources by 2030. RESS is designed to help deliver community participation through community-led projects and community benefit funds.

Community-led projects can apply for RESS if they meet the following criteria[8]:

1. Application must be made in conjunction with a Sustainable Energy Community (SEC) such as Laytown;
2. Project size must be between >0.5MW;
3. The Community group must be based on open and voluntary participation; and,
4. Participation to be based on local domicile.

The RESS aims to promote investment in renewable energy through the provision of a supported tariff for electricity produced from renewable sources. It is a competitive auction-based, cost effective framework to help Ireland achieve its renewable energy targets of 80% renewable electricity by 2030. The first onshore RESS auction took place in 2020 (RESS 1). The second auction (RESS 2) took place in 2022 and the third RESS 3 in 2023. The RESS 4 is to take place in 2024.

A mandatory Community Benefit Fund must be provided by all projects successful in a RESS auction. The contribution is to be set at €2/MWh generated by successful projects. The Fund will be targeted at encouraging investment in local renewable energy, energy efficiency measures and climate action initiatives.

The primary authorities are presently in the process of formulating a novel Renewable Energy Support Scheme, designated as the Small-Scale Generation Scheme (SSG). The overarching intention behind this initiative is to serve to address and bridge the existing gap between Microgeneration (less than 50 kW) and the Renewable Energy Support Scheme (RESS) catering to larger capacities exceeding 0.5 MW.

[8]In February 2021 it was announced that Community-led projects seeking to apply to future RESS auctions, must be 100% owned by the community (to gain 15-year support from Government in the form of a premium on top of the market price), as opposed to being majority owned as for RESS-1.

9 SEAI Grants

When considering retrofitting your home, it can be difficult to determine the most financially beneficial method. Today SEAI have three main grant schemes to help with the cost taken on by homeowners when trying to make their premises more energy efficient:

1. Community Grants Scheme
2. One Stop Shop Service
3. Individual Grants

9.1 Communities Grant

SEAI's Communities grant is generally open for applications on a first come first served basis each year. It tends to be launched for applications in the latter part of the year for delivery of projects the following year. The grant gives preferential treatment to applications with a strong SEC participation.

The SEAI Community Grant supports energy efficiency community projects through capital funding, partnerships, and technical support. To successfully apply for a community grant there are several requirements the proposal must meet. Firstly, projects are required to demonstrate a building fabric first approach meaning that they must be as energy efficient as possible, decarbonise heat considering and utilising renewables where feasible, improve ventilation and adopt smart technologies as appropriate. Projects should prioritise the delivery of homes to a minimum BER of B2 (homes constructed after 2011 can't be included). A minimum of 10 homes must be included in the proposal and an SEC should also be involved. All homes require a pre- and post-works Building Energy Rating (BER) to be completed and published. Local Authority Homes are exempt from publishing a pre-BER. The domestic grant rates are identical to the grant offerings under the One Stop Shop scheme, see Table 10.

Laytown SEC personal and interested householders should contact project co-ordinators[9] and one-stop shops[10] to discuss potential projects and the possibility of including projects in Laytown in a grant application.

Main points of the grant schemes include:

- Fossil fuel boilers are not grant aided,
- The minimum post works BER for dwellings is B2 (<125 kWh/m^2/yr)
- Community Grant levels are 30% for non-domestic. Higher grant levels are available for fuel poor households and for voluntary community organisations as well as schools and some other non-domestics which may qualify for a 50% grant. See SEAI's website for further details.
- A project co-ordinator needs to assemble various projects and submit an application which when aggregated, meets the schemes criteria.

For the SEAI Community grant, the minimum post works BER is B2. (Building Regulations also require a minimum BER of B2 where >25% of the total building fabric is upgraded). Individual measures can still be funded through the Better Energy Homes scheme. Laytown SEC has hopes to apply for a communities grant in the future. This will require commitment from businesses and householders. As that commitment is achieved the RoO should be updated and an application form and workbook completed.

[9] https://www.seai.ie/grants/community-grants/project-coordinator/

[10] https://www.seai.ie/grants/national-home-retrofit/one-stop-shops/

9.2 One Stop Shop

The idea behind the One Stop Shop service is to offer homeowners all the services required for a complete energy upgrade. A One Stop Shop is a registered private operator who manages the entire process of a home energy upgrade from the initial BER assessment to the post-works assessment. Other benefits unique to the One Stop Shop service include a wider range of grants offered and grant values are deducted from the cost of the works up front.

Here is a brief summary of the process if you chose to carry out retrofits through a One Stop Shop:

- After contacting a One Stop Shop, you will be asked some basic questions to determine if your home is suitable for an energy upgrade and what supports are available.
- Onsite review carried out by One Stop Shop
- A BER assessor will visit your home and carry out a BER and technical assessment, energy bills will be requested (SEAI grant available of €350 towards the cost of a Home Energy Assessment)
- If you are happy with the assessment and recommendations, the One Stop Shop will apply and accept all SEAI grants for your project and deduct the values upfront from the cost of your works.

	Private Homes			
Measure	**Detached**	**Semi-Detached / End Terrace**	**Mid Terrace**	**Apartment**
Heat Pump	€6,500			€4,500
Central Heating System for Heat Pump	€2,000			€1,000
Heat Pump Air-to-Air	€3,500			
Heating Controls only	€700			
Launch bonus for reaching B2 with a Heat Pump	€2,000			
Ceiling Insulation	€1,500	€1,300	€1,200	€800
Rafter Insulation	€3,000	€3,000	€2,000	€1,500
Cavity Wall Insulation	€1,700	€1,200	€800	€700
External Wall Insulation	€8,000	€6,000	€3,500	€3,000
Internal Wall Insulation	€4,500	€3,500	€2,000	€1,500
Windows (Complete Upgrade)	€4,000	€3,000	€1,800	€1,500
External Doors (max. 2)	€800 per door			
Floor Insulation	€3,500			
Solar Thermal	€1,200			
Solar PV	0 to 2 kWp €900/kWp 2 to 4 kWp €300/kWp			
Mechanical Ventilation	€1,500			
Air Tightness	€1,000			
Home Energy Assessment	€350			
Project Management	€2,000	€1,600	€1,200	€800

Table 10. Grant amounts available under One Stop Shop and Community Grant Scheme

9.3 Better Energy Homes Grant

SEAI's Better Energy Homes Grants provide grants for selected individual measures as an alternative to the combined measures approach in the Communities and National Retrofit grants.

Homeowners are well within their right to choose to manage their own energy upgrades. These upgrades can still receive grant funding if they fall under certain criteria. This option is suitable if you are looking to carry out individual upgrades. If you are selecting this option you must manage your own project and pay for full cost of works and claim grants after. To qualify for funding, a BER assessment must be carried out and the contractor you employ must be from the SEAI register who must be registered for the type of work that they are carrying out and put a contract for works in place with you before work begins. Finally, you must have grant approval before you begin works. The specific works for which you can receive funding can be seen in Tale 2.

Some homeowners can avail of free energy upgrades. This scheme targets homes built and occupied before 1993 and have a pre-works BER of E, F or G. The specific criteria you must meet to be eligible for a free energy upgrade is as follows:

- You must own and live in your own home
- Your home was built and occupied before 2006
- You receive one of the following welfare payments.
    - Fuel Allowance as part of the National Fuel Scheme.
    - Job Seekers Allowance for over six months and have a child under seven years of age.
    - Working Family Payment

The upgrades offered under this scheme include:

- Attic insulation
- Cavity wall insulation
- External wall insulation
- Internal wall insulation
- Secondary work such as lagging jackets, draught proofing and energy efficient lighting
- New heating systems and windows are occasionally recommended.

Measure	Detached House	Semi-Detached/ End Terrace	Mid Terrace House	Apartment
Heat Pump Systems		€6,500		€4,500
Heat Pump Air to Air		€3,500		
Heating Controls		€700		
Solar Hot Water		€1,200		
Attic Insulation	€1,500	€1,300	€1,200	€800
Cavity Wall Insulation	€1,700	€1,200	€800	€700
Internal Insulation (Dry Lining)	€4,500	€3,500	€2,000	€1,500
External Wall Insulation	€8,000	€6,000	€3,500	€3,000
BER	€50			
Technical Assessment	€200			

Table 11. Grant amounts for individual home energy upgrades

9.4 Solar PV Grants

Homeowners can also avail of individual grants for solar PV. All homes built and occupied prior to 2021 can apply. The process is very similar to the other individual grants. Firstly, appoint a registered SEAI solar PV company. Apply for the grant, installer applies to ESB networks then install the PV. A post works BER must be carried out again which the cost for is included in the grant.

The breakdown for the solar PV grant is as follows:

- €900 per kWp up to 2kWp
- €300 for every additional kWp up to 4kWp
- Total Solar PV grant capped at €2,400

9.5 EXEED Grant Scheme (Commercial)

The EXEED grant scheme is appropriate for larger energy users and is designed for organisations who are planning an energy investment project. Grant support of up to €1,000,000 per project is available. SEAI provide grant support for projects which are following the EXEED Certified standard for Excellence in Energy Efficient Design. The EXEED standard encourages innovation in design projects to help future-proof the investment, by optimising energy performance, reducing operational energy costs and carbon emissions, improving competitiveness and demonstrating commitment to sustainability, which could also bring a reputational boost. The percentage of funding received is based on the size of the company with large companies receiving up to 30%, medium up to 40% and small up to 50%.

9.6 Project Assistance Grants

For a company spending over €250,000 per year on energy bills, SEAI offers grants to develop energy saving projects. The aim of these projects should be to achieve significant energy savings and build good procurement practices. Applications are taken from the public and private sector. A business can first get up to 50% funding for a feasibility study of up to €15,000. A grant of up to 75% can be attained for the final business case and project delivery.

10 Energy Management Action Plan

Community Engagement

Community Engagement on sustainability in Laytown is the cornerstone of the success of the initiative to achieve behavioural change that can result in energy and environmental gains within the community.

Generic Energy Audits

The approach in the EMP has been to develop energy audits that provide examples of energy audits for typical dwellings, community buildings and businesses in the area. This will then be a source of information for residents considering energy retrofits and will provide a path to action. It also helps to spread the message of the benefits of sustainable retrofits in the community.

Register of Opportunities

Through the workshops, promotional activity and dissemination of exemplar projects the SEC will continue to build and develop the pipeline of projects for the Register of Opportunities. Laytown SEC will continue to engage with organisations in the area such as local businesses, other community groups, schools, local sports clubs, etc.

The 4 dwellings for which residential audits were carried out and the 11 community members who responded to the survey is a significant start to a register of opportunities that has the potential to lead to projects and exemplar case studies.

Path to Sustainable Energy

Figure 23 shows pathways to sustainable energy within the Laytown SEC boundary. As noted previously, the predominant energy use is in the residential sector and the main opportunity is for improved efficiency in the residential sector through retrofits. For example, carrying out a deep retrofit in all houses in Laytown would save over 8 million kWh per annum. In comparison, installing 1MW of solar PV would provide 0.75 million kWh per annum, this would require 5,000m2 of roof area.

In order to meet the objectives of decarbonising the energy consumption in Laytown, these gains in energy efficiency must happen in parallel with the decarbonisation of the energy supply. Government policy is to retrofit housing and to electrify heat and transport energy demands while decarbonising the supply of electricity. Aligning plans with this policy is most likely to achieve success in the Laytown SEC area. Although the transition to EVs will make a significant impact, Laytown SEC recognise that there is also a significant opportunity to reduce transport emissions by residents transitioning to public transport.

The Energy Efficiency Strategy for residential properties encompassed the implementation of essential prerequisites for the integration of heat pumps. This strategic initiative intends to facilitate the attainment of a low carbon status, denoted by a B1 or superior Building Energy Rating (BER). The incorporation of heat pumps is in alignment with the national strategy aimed at decarbonizing and electrifying the heat network. As seen from the Sustainability Pathways, Deep retrofits of buildings can make a significant impact. As discussed, Laytown has many practical factors in its favour such as a very high percentage of dwellings are privately owned.

Furthermore, for Laytown to meet its objectives, it is essential to explore the integration of Utility-Scale plant-based renewable energy generation. The town possesses substantial potential renewable energy resources, particularly in wind and solar, along with available local land. However, the development of utility-scale renewable energy plants involves various considerations and challenges, as detailed in section 8 of this report. To guide Laytown SEC through this process, the SEAI Community Energy Resource Toolkit Document (Business Planning and Procurement), published in July 2023, provides comprehensive insights. For a more in-depth understanding of community-led renewable energy plant development, the report

recommends engaging with the SEAI. The SEAI offers abundant best practice guidelines and support services, including the Community RES Project appraisal and feasibility assessment, delivered by Trusted Advisors, with costs covered by the SEAI. This collaborative approach can facilitate Laytown in navigating the complexities of developing a sustainable and impactful renewable energy project.

In order for Laytown to realize the ambitious objective of attaining carbon neutrality within the forthcoming decade as part of its commitment to the Sustainable Energy Community initiative, an imperative shift towards Electric Vehicles (EVs) is essential among Laytown residents. As elucidated in Section 4.4, there exist nationally instituted schemes that provide substantial financial support for the acquisition of EVs, encompassing the installation of charging infrastructure. The potential impact of these schemes holds considerable significance for Laytown, given the notable prevalence of residences equipped with ample space to accommodate the requisite charging infrastructure.

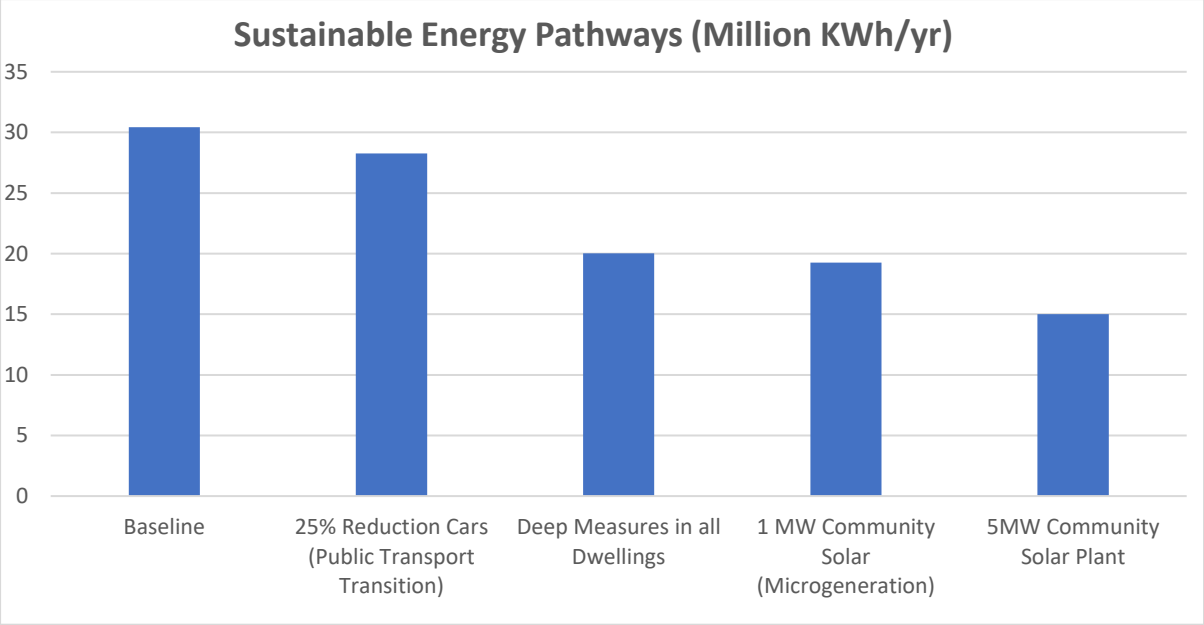

Figure 23. Sustainable Energy Pathways Chart for Laytown SEC

Appendix 1 Glossary of Terms

Term	Definition
Delivered Energy	Delivered energy is the amount of energy consumed at the point of sale (e.g., that enters the home, building, or establishment) without adjustment for any energy loss in the generation, transmission, and distribution of that energy.
Dwelling Energy Assessment Procedure (DEAP)	The Dwelling Energy Assessment Procedure (DEAP) is Ireland's official method for calculating the Building Energy Rating of new and existing dwellings.
Energy Master Plan (EMP)	The aim of an EMP is to allow a community or business to understand its current and future energy needs (in electricity, heat and transport) in order for the community or business to make informed decisions and prioritise actions.
Feed in Tariff	A payment for excess electricity generated and exported to the network. Arrangements for a feed in tariff are currently being finalised under the microgeneration scheme which launched February 2022.
Kilowatt-Hour (kWh)	The kilowatt-hour is a unit used by energy companies to determine how much you are charged. It is equivalent to the energy used in a single bar electric heater in one hour.
Kilowatt-Peak (kWp)	kWp is the peak power of a PV system or panel.
LED Lighting	LED stands for light emitting diode. LED lights are more efficient than traditional lamps (incandescent and fluorescent) and also have a longer lifespan.
Level 1 Audit	The Level 1 audit is alternatively called a simple audit, screening audit or walk-through audit and is the most basic. It involves minimal interviews with site operating personnel, a brief review of facility utility bills and other operating data, and a walk-through of the facility, all geared toward the identification of glaring areas of energy waste or inefficiency. The data compiled is then used for the preliminary energy use analysis and a report detailing low-cost/no-cost measures and potential capital improvements for further study. Typically, a Level 1 audit will only uncover major problem areas. Corrective measures are briefly described, and quick estimates of implementation costs, potential operating cost savings, and simple payback periods are provided. This level of detail, while not sufficient for reaching a final decision on implementing proposed measures, is adequate to prioritise energy efficiency projects and to assess the need for a more detailed investigation.
Primary Energy	Primary energy is an energy form found in nature that has not been subjected to any human engineered conversion process. It is energy contained in raw fuels, and other forms of energy received as input to a system.

Register of Opportunities (RoO)	A RoO is for recording all opportunities for energy savings at a facility or in a community.
Smart Meter	A Smart Meter offers the client more detailed information on their energy consumption as well as reducing the need for estimated electricity bills. Smart Meters provide 1/2 hourly consumption data and allow for time of use tariffs. ESB Networks started a 4 year program to install smart meters at every connection point in 2020. It is scheduled to finish in 2024. Refer to ESB Networks for more information. https://www.esbnetworks.ie/existing-connection/meters-readings/smart-meter-upgrade
Smart Meter Device	A device, other than an ESB Networks Smart Meter, installed to provide smart metering data.
Solar PV	A solar photovoltaic (Solar PV) system is one which converts light into electricity.