Energy Solutions

Energy Master Plan and

Register of Opportunities

Batterstown SEC

Final

PES20301

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Table of Contents

1 Summary

Batterstown Sustainable Energy Community

Total Energy Consumption 6,066,548 kWh	Estimated Cost €670,017	244 Dwellings
Average BER 316 kWh/m²/yr (E2)	93% Residential	

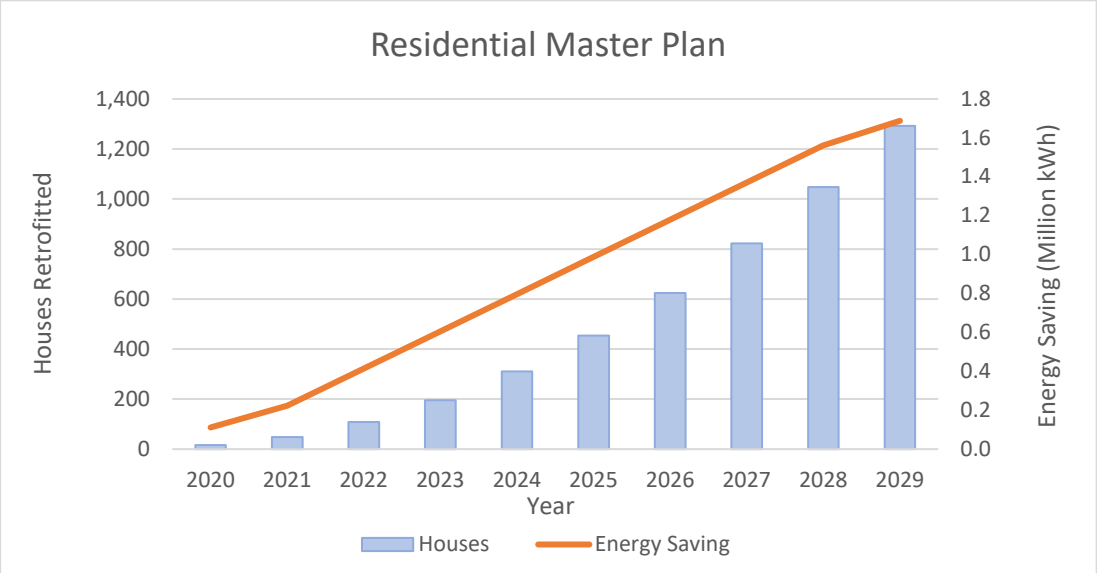
Residential Retrofit Measures

	Starter Package[1]	Standard Package	Advanced Package
Low energy lights	Yes	Yes	Yes
Roof insulation	Yes	Yes	Yes
Heating Controls	Yes	Yes	No
Wall Insulation[1]	Cavity fill	Yes	Yes
Condensing Boiler[3]	Possible	Yes	No
Wood Stove	Possible	Yes	Yes
2G Windows[2]	No	Yes	No
3G Windows[2]	No	No	Yes
Susp. Floor insul.	No	No	Yes (if applicable)
Doors	No	No	Yes
Air Source Heat Pump[3]	No	No	Yes
Airtightness and Ventilation	No	No	Yes
Photovoltaics	No	No	Yes

Average Costs and Savings for Retrofit Packages				
	Average Cost	**Cost After Grant**	**Average Saving**	**Payback**
Starter	€1,750	€1,138	€600	1.9
Standard	€18,000	€11,700	€1,000	11.7
Advanced	€36,000	€23,400	€1,500	15.6

[1] For SEAI Community grant the minimum post works BER is C1 (or B2 where wall insulation is included) which will define a minimum package and will exclude the starter package from the Communities grant for most homes. Individual measures can still be funded through the Better Energy Homes scheme.

Residential Energy Master Plan



Commercial & Public

Projects Identified		
Low Cost	Medium Cost	High Cost
LED Lighting Heating Controls Insulation Energy Management	Boiler Retrofit Zone Control	Solar PV Heat Pump

Energy Management Plan

- Engagement with householders and businesses
- Build on successful response to surveys
- Workshops to cement engagement
- Promote inclusion of energy efficiency in refurbishment/extension projects
- Get commitment to projects for Communities Application
- Promote alternative grant schemes (BEH & deep retrofit)
- Promote community based renewable energy sources
- Monitor progress
- Publicise success stories

2 Introduction

Energy Solutions was appointed to develop a comprehensive Energy Master Plan (EMP) as well as generating an associated Register of Opportunities (RoO) for Batterstown Sustainable Energy Community.

The EMP and RoO includes:

- A baseline analysis of energy consumption and uses in Batterstown and factors affecting consumption.
- Energy audits of commercial and domestic buildings.
- A plan to reduce total residential energy use by 30% over 10 years.
- Identification of commercial buildings in the Batterstown area that could cost effectively achieve significant energy savings.
- A Register of Opportunities

3 Baseline Energy Balance

3.1 Overview of Batterstown SEC

The boundary of Batterstown SEC is defined by the boundary of three small areas (as defined by the CSO for the purposes of the census) as shown in Figure 1.

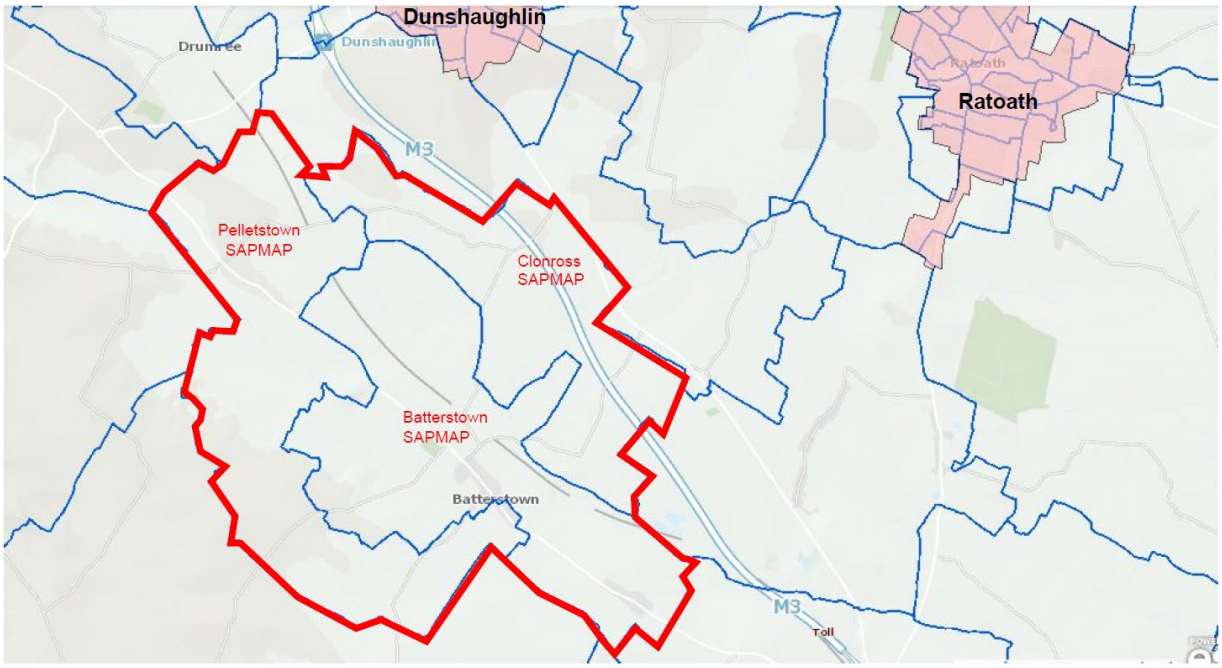


Figure 1 – Map of Batterstown SEC

3.2 Batterstown SEC Energy Demand Analysis

Residential Total Energy Use kWh/yr:	5,625, 467
Residential Total Electricity Demand kWh/yr:	1,377,081
Residential Total Fossil Fuel Use kWh/yr:	4,248,386
Residential Estimated Total Annual Cost:	€598,760
Commercial Total Energy Use kWh/yr:	441,081
Commercial Total Electricity Demand kWh/yr:	220,540
Commercial Total Fossil Fuel Use kWh/yr:	220,540
Commercial Estimated Total Annual Cost:	€71,257

Table 1 – Batterstown SEC Baseline Energy Consumption

Table 1 shows the baseline energy consumption in Batterstown SEC. The domestic consumption is based on the typical domestic consumption adjusted for the average BER of dwellings in the

SEC. The commercial consumption is estimated based on the reported heat demand in SEAI's heat demand atlas. [2]

The 2016 census data provides much information relevant to energy consumption and energy efficiency including age of dwellings, heating fuel type, house ownership and car ownership.

3.3 Energy Consumption in Dwellings

The BER database published by SEAI is used in this analysis for the calculation of energy consumption. BERs have been carried out and registered for 35 houses in the SEC area or 15% of the total housing stock. While this is a relatively low percentage, it is nevertheless a reasonable sample of the housing stock and the data may be considered reasonably representative.

The BER is based on a Dwelling Energy Assessment Procedure (DEAP) model which calculates normal use of energy for space heating, hot water, ventilation and lighting per metre squared area of a residential unit. The final energy rating given to a household is in kWh/m2/year of primary energy and an energy efficiency scale from A to G.

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.

Figure 2 – Distribution of BERs in Batterstown SEC

The average BER across the entire area is 316 kWh/m^2/yr or a BER of E2. This reflects the older age profile of housing in the area and shows significant potential for improvement in energy performance of dwellings.

The primary factor, other than floor area, influencing energy consumption in houses is the year of construction. Figure 3 shows the year of construction from the distribution of the year of construction according to the CSO census data and the BER database. Although the age bands used are different, the data shows a similar age profile. In the CSO data 55% of houses were built between 1960 and 1990 while in the BER database 60% of houses were built between 1967 and 1993. This correlation between the data sets provides confidence of the representativeness of the BER database sample of the total.

[2] http://maps.seai.ie/heatdemand/

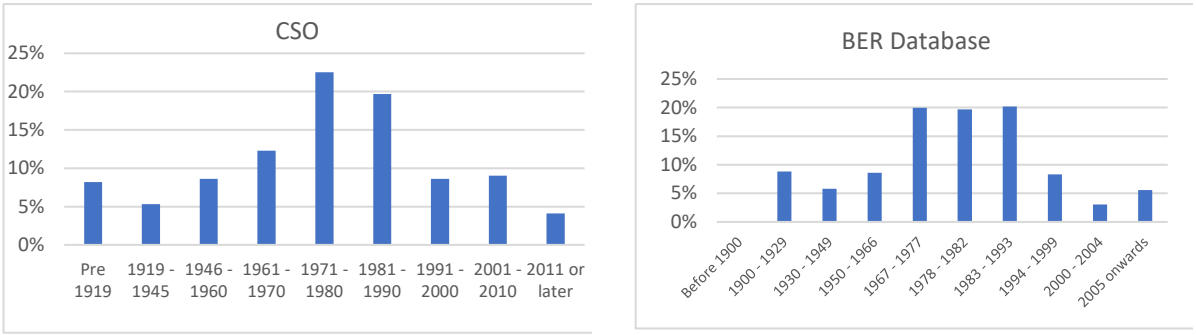


Figure 3 – Distribution of Housing by Year of Construction in Batterstown SEC

SEAI's Energy in the Residential Sector 2019 report[3] details the efficiency and consumption patterns across the residential sector in Ireland. The average 'non-electrical energy' (fossil fuel) consumption is 13,614 kWh/year and the average electricity consumption was 4,594 kWh/year. The fossil fuel consumption in Batterstown SEC is estimated at 17,411 kWh/dwelling/year, this is higher than the SEAI national average of fossil fuel consumption. The electricity consumption reported in Batterstown is primarily for lighting and appliances. (Very few households are heated by electricity).

	Batterstown SEC Total (kWh/yr)	**Batterstown SEC (kWh/ household/yr)**	**SEAI (kWh/ household/yr)**
Residential Total Energy Use kWh/yr	5,625,467	23,055	19,449
Residential Electricity Consumption kWh/yr	1,377,081	5,644	4,594
Residential Fossil Fuel Use kWh/yr	4,248,386	17,411	13,614
Annual Energy Cost	€598,760	€2,454	€1,990

Table 2 – Batterstown SEC Energy Consumption compared to national average

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

3.4 Characterisation of the Domestic Sector

3.4.1 Age Profile of Dwellings

The age profile of domestic dwellings is shown in Figure 4

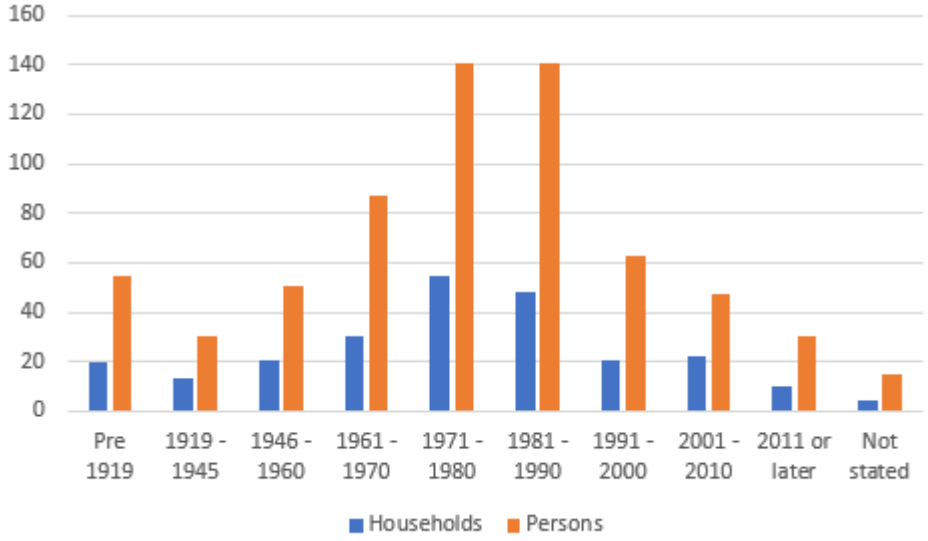


Figure 4 – Summary of Age Profile of Dwellings

The age profile of domestic dwellings is shown in Figure 4. 13% of the 244 dwellings were constructed pre 1945, while 18% of dwellings were built between 1991 and 2010. The majority were built between 1970 and 1990 which is consistent with the BER profile of dwellings.

3.4.2 Dwelling Type and Ownership

Figure 5 shows the distribution of dwelling ownership with a small proportion of dwellings 3% are rented from a private landlord with 92% privately owned and 1% rented from a local authority. The ownership profile has a bearing on the potential for energy efficient retrofits, especially in the private rented sector where there is little incentive for a property owner to invest in energy efficiency. The high rate of home ownership in the area should facilitate improvements through energy retrofits.

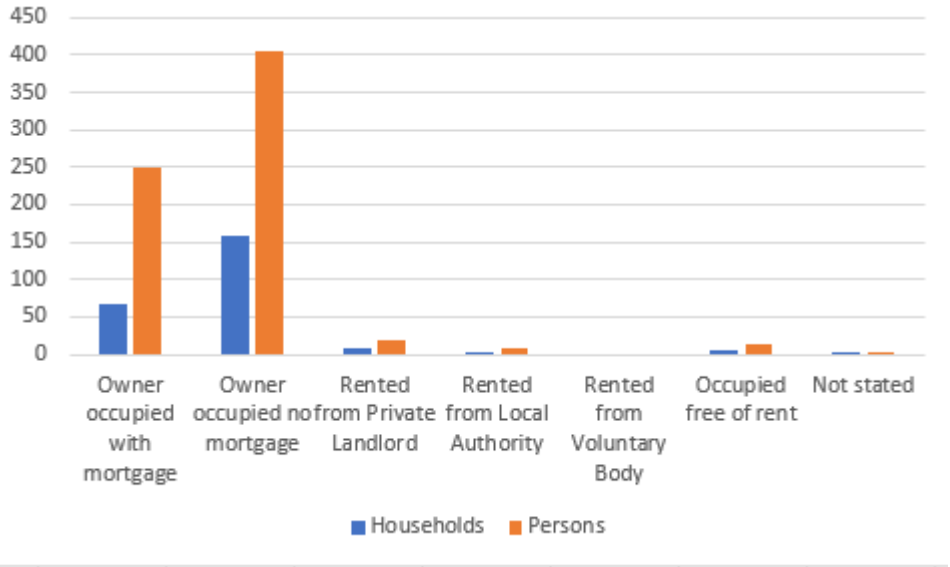


Figure 5 – Summary of Dwelling Ownership

3.4.3 Heating and Hot Water

The predominant means of heating is by oil (Figure 6) accounting for 78% of the heating, Only 3% of households are heated electrically with solid fuels (coal, peat and wood) accounting for 15% of houses.

72% of households also use oil for the primary water heating fuel with the remaining 18% using electricity as the primary water heating fuel.

The main electricity use in the SEC is then for lighting and appliances with some consumption for domestic hot water supply.

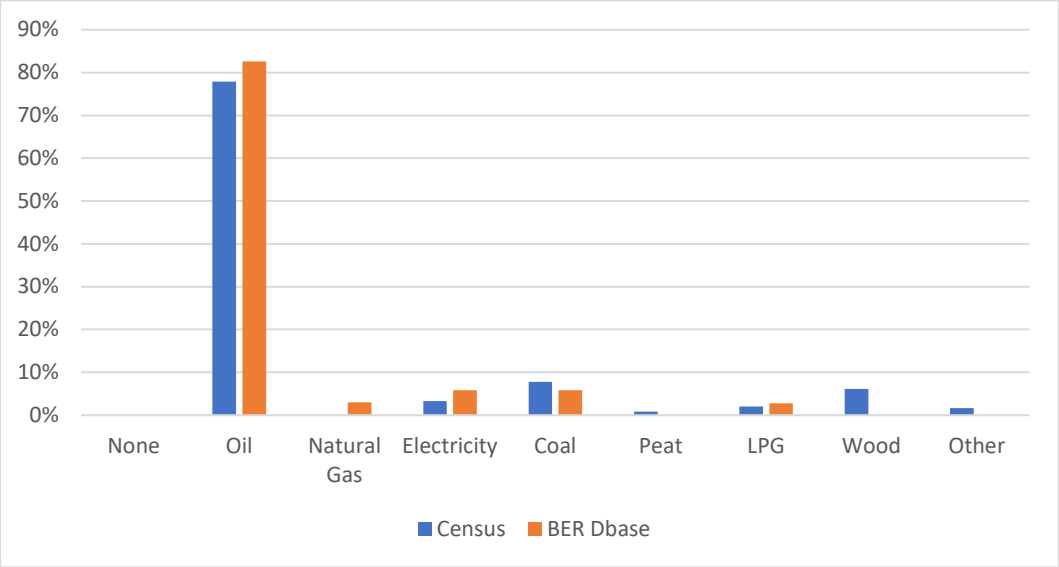


Figure 6 – Distribution of Heating Type – Census and BER Database

3.5 Transport

3.5.1 Car Ownership

Figure 5 displays the car ownership of each household. With 29% of households having one car, 50% having two cars, 10% having 3 cars and 7% of households having four or more cars. All but 4 household in the area of Batterstown has at least one car, this could be due to the fact that County Meath is on the commuter belt and Batterstown is a rural area. The majority of individuals in Batterstown travel to work by car, this could be a result of poor public transport connections in the area.

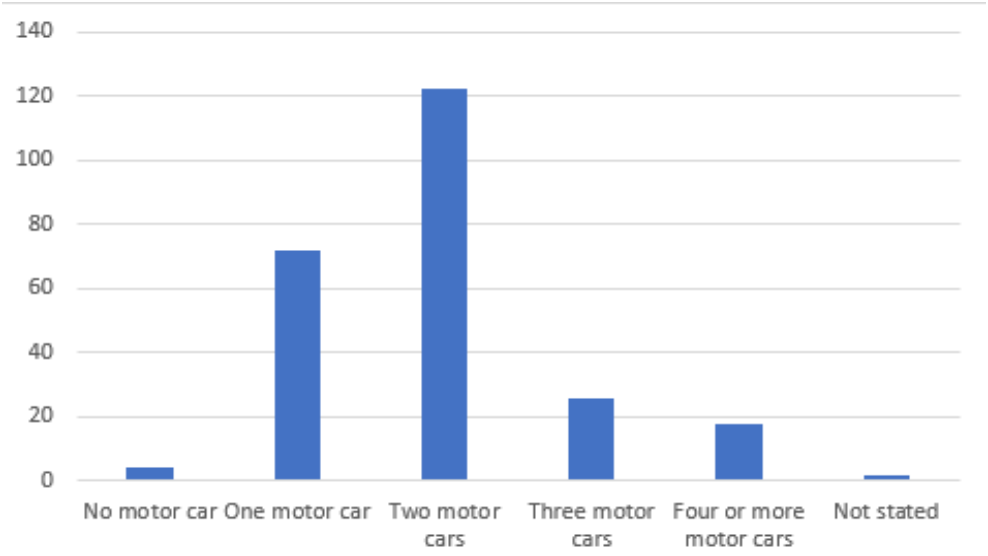
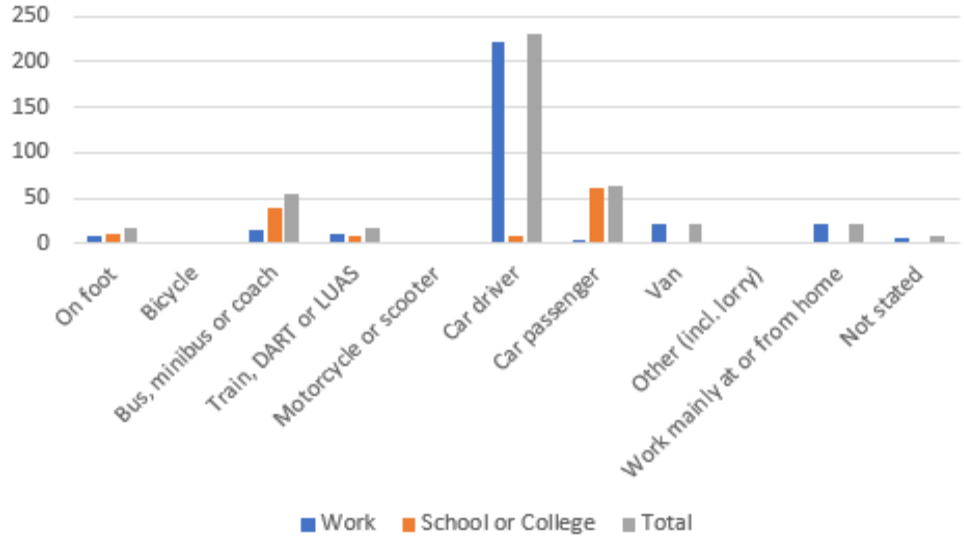


Figure 7 – Car Ownership

3.5.2 Means of travel to work, school & college



From the 2016 census data we can see that the majority of residents travel to work or school by car or as a passenger in a car. As mentioned above, this could be due to the lack of public transport facilities in the area. Some residents use the bus or coach service, according to the census the bus is the second most used method of transport to get to school (see figure 9). From the journey time of traveling to work or school (see figure 10) we can assume that many of the residents are employed outside of Batterstown.

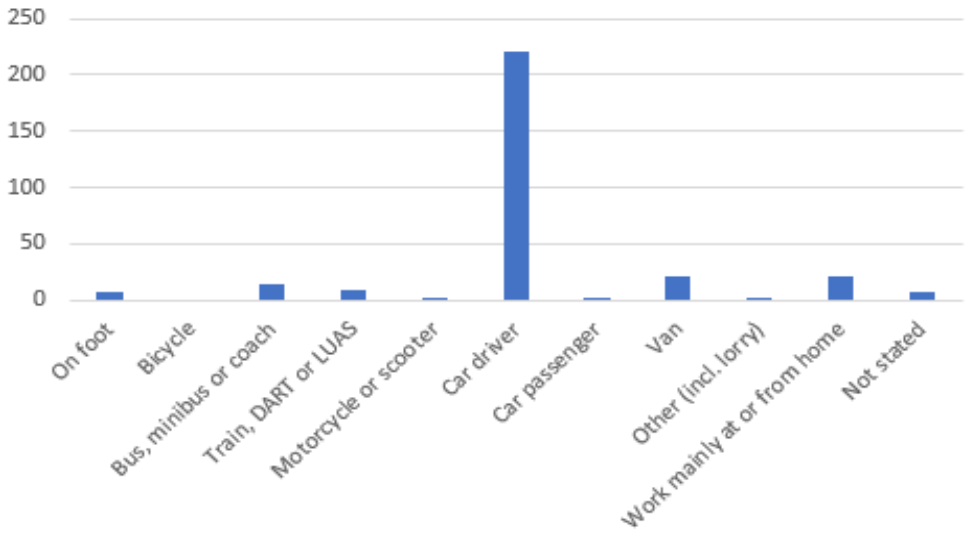


Figure 8 – Means of Travel to Work

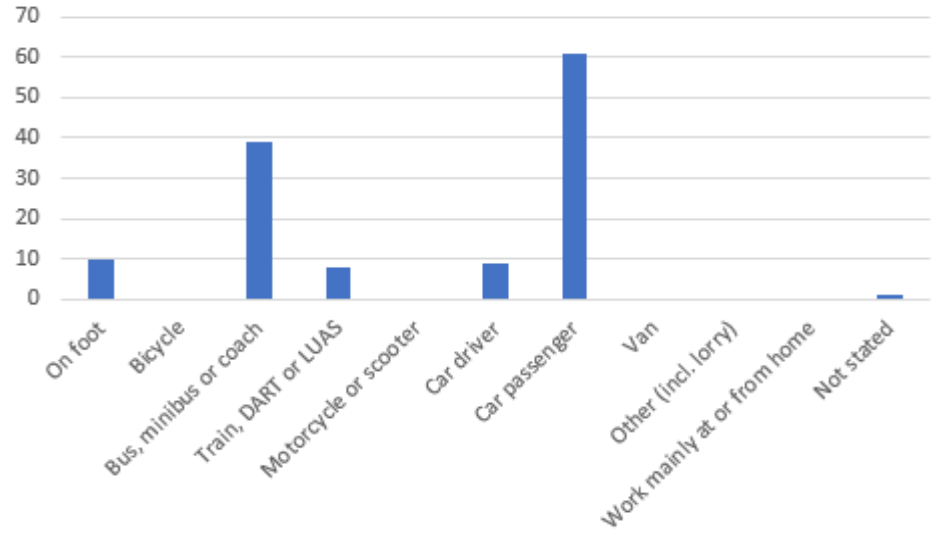


Figure 9 – Means of travel to school

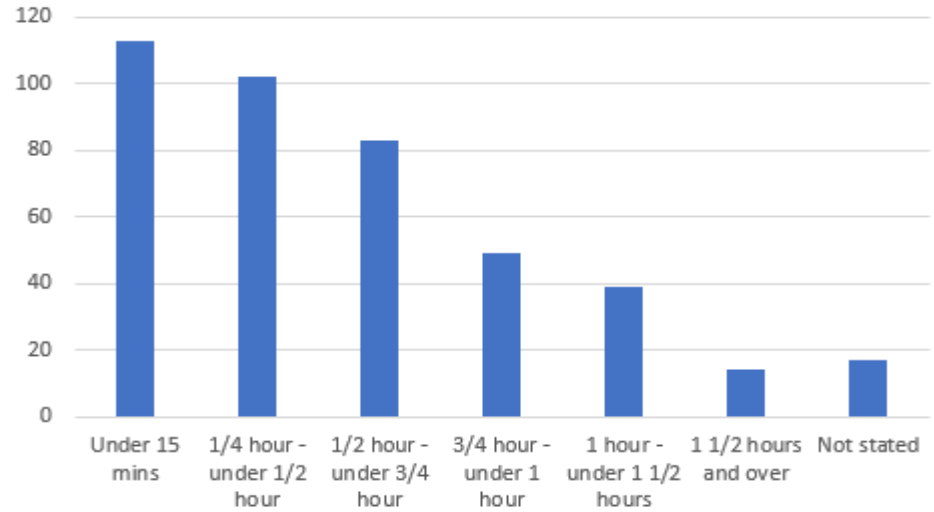


Figure 10 – Journey time to work, school or college

3.6 Commercial and Public Sector

Batterstown is a rural community and one of the main sectors in the area being agriculture, there are few other industries located in Batterstown. The CSO census data indicates that many of the residents work in the agriculture and manufacturing sector. According the Valuation Office there is a small number of industrial workshops (0-20) and offices properties (0-50) found near Batterstown. A petrol station/shop, car dealership, pub, school, GAA, butchers and football club are located in Batterstown. Given the fact that County Meath is on the commuter belt and the journey time to work or school taking some individuals between 30 minutes to an hour (See figure 8), we can assume that several of the locals work outside of Batterstown and commute to their employment daily.

Total commercial energy consumption is estimated as 441,081 MWh/yr based on SEAI's Heat Atlas[4]. There are mainly small commercial operations, a GA club and school with no large energy users in Batterstown.

3.7 Agriculture & Fisheries

3.7.1 Agriculture in Meath

Agriculture accounts for 5.7% of the total employment level in Ireland compared to the EU average of 4.7%. Batterstown is a rural community located in County Meath with multiple farms being located around the town. According to the CSO the total number of farms in Meath in 2010 was 4,569 with the total area being farmed was 191,846 hectares. The average farm size in county Meath is 42,000 hectares. Agriculture in Meath is made up of mainly grazing livestock with the majority of farms specialising in dairy and beef production. Forestry is also found in Meath with 6,349 hectares in the area. Agriculture in Meath accounts for €121 million in income annually as well as supporting thousands of jobs in the rural economy directly in food, processing and in the wider Agri-industry including input suppliers, contractors, transport and other advisory services.

3.7.2 Agriculture in Batterstown

From speaking to the locals in Batterstown we were informed that there were no longer many dairy farms located in the area but mainly tillage and stud farms. Some farmers in the area have already taken steps to decrease energy waste and improve efficiency by installing LED lighting. LED lighting can significantly reduce energy bills and produce instant savings as well as increasing yields in the process. The long lifespan of LEDs (20,000+ hours), low power usage and low operating temperature, means that they are environmentally friendly. These factors make them up to 80% cheaper to run that traditional light sources. The payback period for LED lighting is typically around two to five years not including grant aid, this undoubtedly save farmers and other agricultural businesses money on their lighting costs.

3.7.3 Targeted Agricultural Modernisation Schemes (TAMS)

In 2010 the European Union Commission approved the introduction of a number of targeted modernisation schemes focused on supporting productive investment in the agriculture sector. TAMS provide grants to farmers to build or improve a specified range of farm buildings and equipment on their holding. The measures provide grants for capital investment in assets to assist the Irish agriculture sector in responding to a range of policy challenges. There are six schemes under TAMS, including The Young Farmer Capital Investment Scheme, The Dairy Equipment Scheme, The Organic Capital Investment Scheme, The Low Emissions Slurry Spreading Equipment Scheme, The Pig and Poultry Investments Scheme and the Animal Welfare Safety and Nutrient Scheme.

[4] http://maps.seai.ie/giswiki/

Renewable energy investment is now available under TAMS, grant aid in the pilot phase will be from 40% to 60% to fund the cost of a solar system of 6kWp. The financial aid for TAMS was around €395 million and almost 30,000 applications have been submitted with 75% of these applications being approved. When TAMS was originally announced The Low Emissions Slurry Spreading Scheme was not taken up by farmers. However, according to Fine Gael ministers it is now the biggest issue spoken about by farmers today. Payments to date under the TAMS scheme now exceed €155 million and continue to issue at an average rate of €1.5 million per week. There are still over 10,000 approved applications with farmers who have yet to submit payment claims. These outstanding payment claims are worth approximately €110 million.

4 Household and Business Surveys

4.1.1 Residential Survey Results

195 surveys were sent out to the residents of Batterstown, there was an excellent response rate with 51 responses from households. The results of the surveys showed that all but one of the respondents live in detached houses with the majority using oil as the primary heating source. These results are in line with the CSO census data for Batterstown.

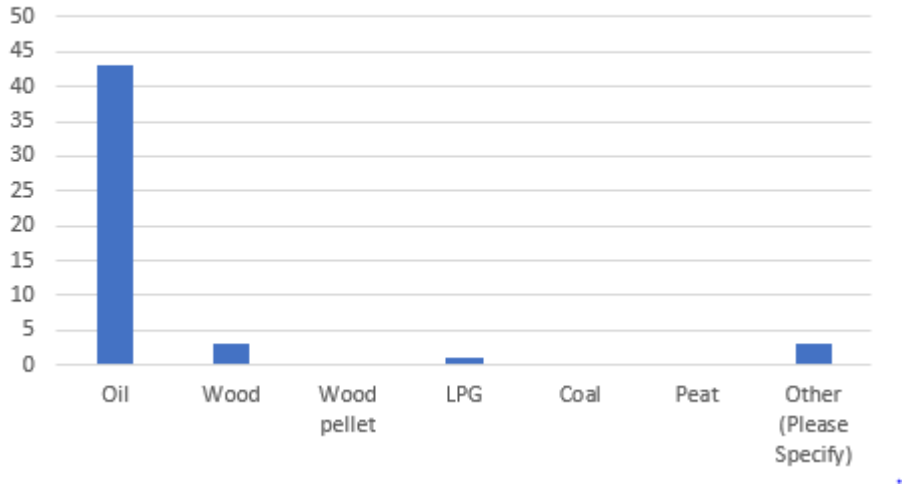


Figure 11- Primary fuel source

16 of the respondents said that they are considering in investing in refurbishments or energy efficiency upgrades, including improved insulation, double glazed windows, heat pumps and solar panels. Residents were asked to rate the comfort and warmth of their home on a scale of 0-10 (0 being extremely uncomfortable and 10 being extremely comfortable).

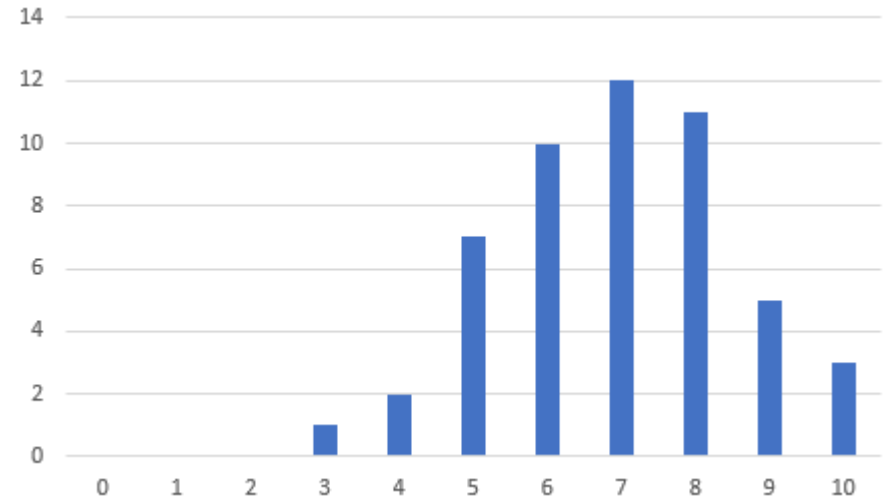


Figure 12- Level of comfort and warmth of home

8 respondents had a BER (including A, B2, B3, two C1's, C2, C3 and E ratings), Several of respondents stated that their home did not have a BER or they were unaware if they had a BER. The majority of respondents agreed or strongly agreed on a scale of 0-5 (0 being strongly disagree

and 5 being strongly agree) that energy improvements would add value to their home (See Figure 13) and several agreed or strongly agreed that energy improvements would make their home more comfortable and enjoyable (See Figure 14).

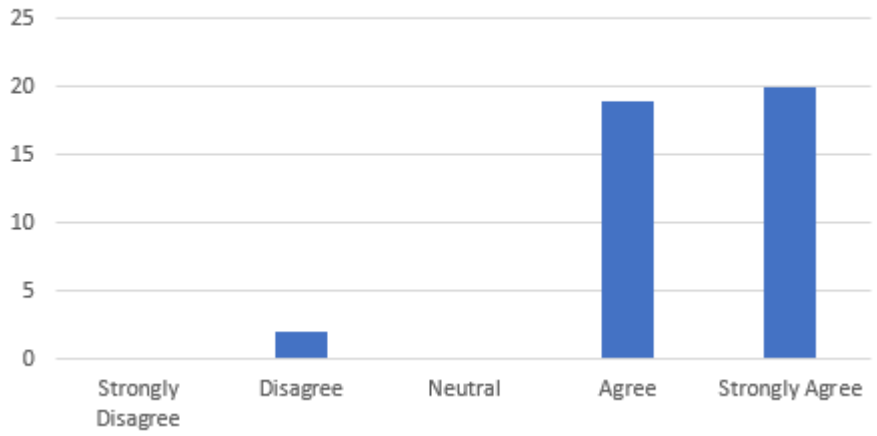


Figure 13- Do you think energy improvements will add value to your home

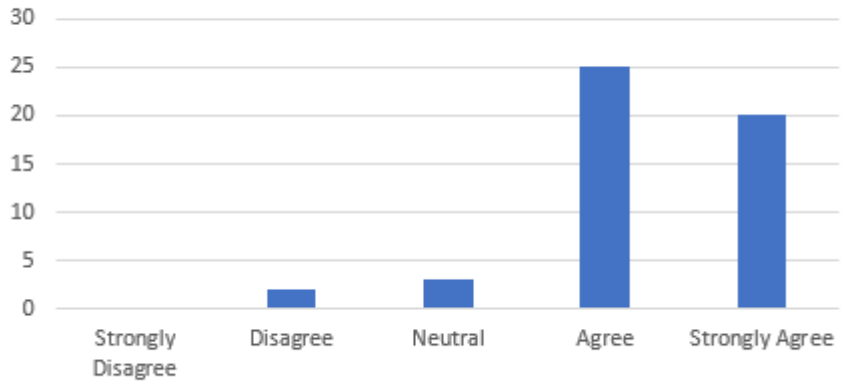


Figure 14- Do you think energy improvements will make your home more comfortable and enjoyable.

The findings from the surveys (Figure 15) show that many residents would consider investing into energy efficiency, with respondents being asked to rate the likeliness of investing into energy improvements on a scale of 0-10 (0 being very unlikely and 10 being very likely). This shows a high level of interest in investing in energy efficient retrofits.

31 of the respondents were aware of the government grants of between 35% and 80% that are available to make your home warmer and more efficient. 41 of the respondents said they would be interested in participating in a community application to avail of these grants and 36 respondents said they would be interested in entering into a pilot scheme to upgrade their home as part of the SEAI, BEC grant program 2020. Again, this is encouraging in terms of the level of interest in household energy upgrades.

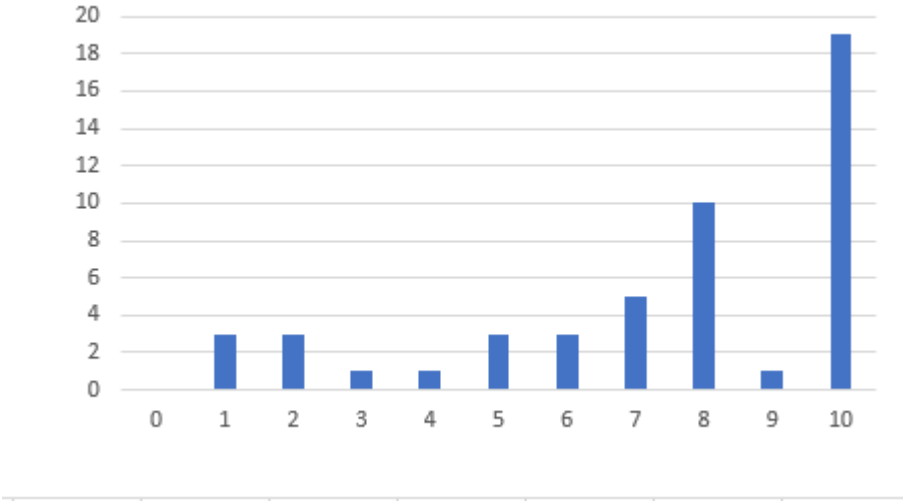


Figure 15- Would you consider investing in your home to improve energy efficiency and comfort?

From the surveys we can see that many of the resident's travel to work by car with journey time ranging from 10 minutes to an hour and a half, several of the respondents stated that they were retired in this section of the survey. There were mixed results with the level of satisfaction in terms of transport options available in the area with many respondents indicating they would like more frequent buses or to have access to train services.

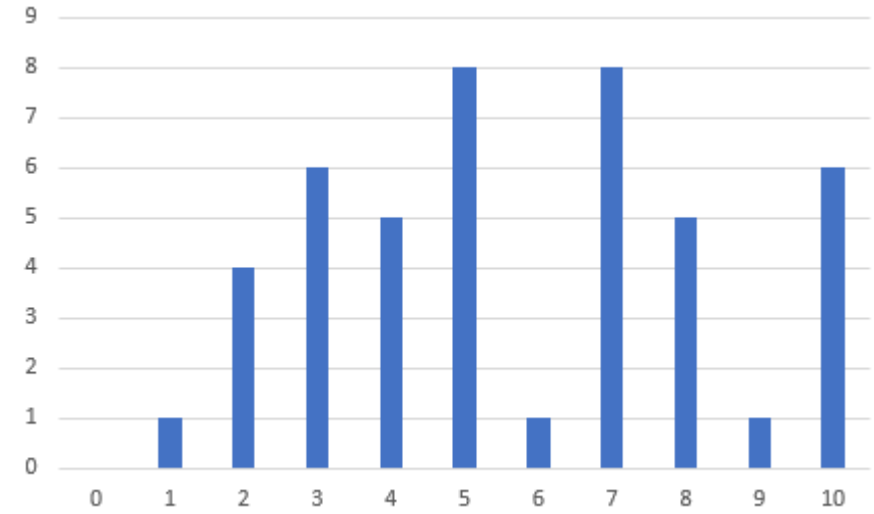


Figure 16- How satisfied are you with the transport options available (0 Satisfied 10 Unsatisfied)

4.2 Commercial Survey Results

There are very few commercial properties in Batterstown, 4 businesses/institutions responded to the survey that was sent out. These respondents include retail, offices, a church and a school. 3 of the respondents use oil as their primary heating source with 1 respondent stating that they do not use any fuel for heating but do use energy using equipment. None of the businesses have carried out energy efficient or renewable projects in the last 5 years but 2 out of 4 respondents are planning or are interested in investing in refurbishments or energy efficient upgrades in the future.

5 Register of Opportunities

The register of opportunities (RoO) primarily comprises the accompanying excel spreadsheet which 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 should be populated with households committed to and implementing energy efficiency projects.

The RoO for non-residential records potential projects identified through energy audits and similarly allows tracking through from identification to completion.

Appendix 1 contains extracts from the RoO.

5.1 Residential Retrofit Costs and Incentives

The average investment cost and savings for typical households are listed in Table 4. The grant levels are assumed at 35% which is the level for the Communities and National Retrofit program grants and are the approximate levels of the Better Energy Homes grants. There is clearly a substantial investment from the householder but the grant levels assist financially and provides an opportunity to improve comfort, reduce energy costs and enhance the value of houses.

	Average Cost	Cost After Grant	Average Saving	Payback
Starter	€1,750	€1,138	€600	1.9
Standard	€18,000	€11,700	€1,000	11.7
Advanced	€36,000	€23,400	€1,500	15.6

Table 3 – Average costs and savings for retrofit packages

Table 6 summarises typical costs of measures together with grant levels. The grant levels are for the SEAI Better Energy Homes (BEH) and for the SEAI Communities grant and the SEAI National Home Retrofit Scheme[5].

[5] https://www.seai.ie/grants/national-home-retrofit/

	Cost	Better Energy Homes	Communities/ NHRF
Starter			
Roof insulation	€500-€1,000	€400	35%
Low energy lights	€100	NA	35%
Heating Controls	€1,600	€700	35%
Standard			
Cavity Wall Insulation	€1,000	€400	35%
External Wall Insulation	€10,000 - €20,000	€2,750-€6,000	35%
Internal Wall Insulation	€10,000 - €15,000	€1,600-€2,400	35%
Susp. Floor insul.	€2,500	NA	35%
Condensing Boiler	€2,500	NA	NA
Wood Stove	€1,500	NA	35%
2G Windows	€5,000	NA	35%
Advanced			
3G Windows	€10,000	NA	35%
Doors	€1,000	NA	35%
AS Heat Pump	€12,000	€3,500	35%
MVHR		NA	35%
DCV & AT measures	€5,000	NA	35%
Photovoltaics	€2,500	€900/kWp	35%

Table 4 – Costs of Measures and Grants Available

The grant levels for works done under the Better Energy Homes scheme (BEH) and the Communities grant are similar although there are more individual options in the Communities grant. The grant levels for deep retrofit are higher reflecting the increased cost of measures.

It is likely that a number of houses will carry out works, particularly a low cost package of measures, under the BEH scheme and Drimnagh should capture this activity in performance monitoring assessment for the SEC.

The suite of measures in the starter package is generally applicable across all households and includes:

- Increase attic insulation to 300mm
- Energy efficient lighting
- *Heating controls upgrade (potentially redundant in case of later heat pump installation)*
- Wall insulation (generally external)
- Wood burning stove replacing open fire
- Double/Triple glazed windows (U=1.4)
- *Condensing boiler*

Condensing boiler retrofits preclude heat pumps and achieving the deeper energy savings in the high cost package of measures.

5.2 Residential Register of Opportunities

The housing in Batterstown is mainly owner occupied with few households renting from private landlords or local authority. The main targets for energy efficient upgrades are owner occupied and local authority housing. A target of 30% improvement in energy performance of owner occupied and local authority housing over the next ten years is ambitious yet attainable.. Batterstown will review targets as national policy and support emerges.

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. A suite of measures from which householders may choose, depending on their budget and personal preferences will assist householders in making informed decisions and in meeting the objectives of Batterstown.

Dwellings rented from local authorities will be upgraded by the local authority. Batterstown intends to engage with Meath County Council on retrofit plans for local authority housing.

The ambition of Batterstown is to achieve a 30% reduction in residential energy consumption over 10 years. The target of a 30% reduction in residential energy use is an ambitious target and represents an improvement from 316kWh/m^2/yr to c. 211 (D1). This is an uplift of 105 kWh/m^2/yr. Improvement to B1. Achieving 75 kWh (A3) would represent an uplift of 241kWh/m^2/yr which was the standard for SEAI's pilot deep retrofit programme. While a 30% reduction is an ambitious target, Batterstown believe this level of commitment is essential to meeting global climate and sustainability challenges.

In essence the ambition roughly translates to carrying out a retrofit with an average saving of an average of 30% in all houses in the Batterstown over the next 10 years. In reality, there will be a range of BER uplifts and improvement levels with a targeted average uplift of 105 kWh/m^2/yr.

Table 6 lays out the plan for residential retrofits in Batterstown. The key factors are the number of houses and the depth of the retrofit. The plan shows the number of houses required to achieve the targeted savings assuming an average saving of 30% in energy consumption. There will obviously be variation in the percentage energy savings across houses retrofitted and the actual saving should be recorded from before and after BERs and aggregated for monitoring each year.

Year	Target	# Houses	Average saving per house (% and kWh/yr)		Total Cumulative Energy Saving
1	6.6%	16	30%	6,917	111,384
2	13.2%	32	30%	6,917	222,768
3	24.5%	60	30%	6,917	414,034
4	35.9%	88	30%	6,917	605,300
5	47.2%	115	30%	6,917	796,566
6	58.5%	143	30%	6,917	987,832
7	69.9%	170	30%	6,917	1,179,098
8	81.2%	198	30%	6,917	1,370,364
9	92.5%	226	30%	6,917	1,561,630
10	100%	244	30%	6,917	1,687,640

Table 5 – Residential retrofit plan

Engagement with the community and recruitment of householders planning upgrades is essential to achieving these goals.

A householder may choose to implement a basic package of measure without major cost and disruption. However, an intermediate or advanced package is a bigger investment and a bigger more complex project and could be carried out as part of a general refurbishment or extension project than as standalone measures.

It is important therefore to capture houses where refurbishment work is planned to provide the option of grant aided energy efficiency measures. This could be done through general engagement and awareness, estate agents and planning searches.

In summary:

- The ambition to reduce energy consumption by 30% in housing over ten years is challenging and entails, on average, a standard measure of packages across 16homes a year.
- 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).
- Packages of measures must be flexible and must be adaptable to householders' preferences and budgets.

5.3 Commercial and Public Sector

Engagement with commercial operations should be considered as the commercial sector provides opportunities for significant energy savings with fewer sites and can improve the value for money assessment in a SEAI Communities grant application.

Community organisations such as sports clubs are valuable demonstrators, where energy efficiency projects promote awareness of the SEC and of energy efficiency in the community. Likewise, schools act as educators and promote the concept of energy efficiency. Projects in these types of organisations therefore have a multiplier effect and are encouraged in SEAI's community programme.

During the development of the EMP and RoO we sought to identify and engage with commercial and public sector organisations that might be suitable for energy efficient retrofits. Commercial

and Public Sector buildings were identified through the Valuation Office[6] and through local knowledge.

Preliminary site surveys of the following sites were carried out:

- Blackhall Gaels GAA Club
- Kilcloon Football Club
- Rathregan National School

The following tables (Tables 6 & 7) summarises annual electricity consumption for Blackhalls Gaels GAA clubhouse, Kilcloon clubhouse and Rathregan National School. The electricity consumption for Blackhalls GAA Club house is based from October 2017-August 2018, with estimates for the months of April and May 2018 based on previous Spring/Summer months. Kilcloon Football Club house electricity bills are available from October 2017-August 2018. The total energy spend between both club houses is around €3,853.57 per annum in electricity consumption. Rathregan National School provided the annual consumption of oil from the years 2013-2019 and electricity consumption from December 2018- November 2019.

	kWh/yr	**€/yr**
Kilcloon Electricity	6,836	€2,412
Blackhalls Gaels Electricity	3,751	€1,440

Table 6 Blackhalls/ Kilcloon energy consumption

Year	**Total Ltrs per year**
2013	2100
2014	2970
2015	2959
2016	3294
2017	3219
2018	3999
2019	3471

Table 7- Rathregan National School energy consumption (Oil)

[6] https://maps.valoff.ie/maps/VO.html#

Month	Day Units	Night Units	Total	Revenue
Dec 18	892	263	1155	€178
Jan 19	2159	134	2293	€367
Feb 19	962	254	1216	€187
Mar 19	910	241	1151	€179
Apr 19	832	220	1052	€165
May 19	816	216	1032	€163
Jun 19	736	195	931	€148
Jul 19	777	206	983	€156
Aug 19	777	205	982	€156
Sep 19	90	-287	-197	€14
Oct 19	879	186	1065	€175
Nov 19	2200	181	2381	€388
Total	12030	2014	14044	€2276

Table 8- Rathregan National School energy consumption (Electricity)

6 Energy Management Action Plan

6.1 Community Engagement

Engagement of the community with sustainability and Batterstown is the cornerstone of success of the initiative and in achieving behavioural change and energy and environmental gains within the community. There is an opportunity to leverage and build on the current interest in environmental issues: plastic waste, climate change and sustainable energy and to plan and implement a path to a sustainable community.

Generic Retrofit Opportunities

The approach in the EMP has been to develop retrofit approaches to provide examples measures that could be taken in typical houses in the area. This will then be a source of information for residents considering energy retrofits and will provide a path to action.

Website & Social Media

A Website will be developed as more initiatives are taken, more projects are completed and the SEC expands and develops.

Following completion of the EMP and energy audits and delivery of the first exemplar SEC projects, the marketing of the SEC via social media and other routes will be accelerated. The social media campaigns will build on existing community social media groups on Facebook and Instagram. As with other areas, the specialist expertise of community members will be utilised in social media campaigns.

Workshops

Workshops will be held to promote community engagement and to progress specific identified projects to implementation either through a Communities project or independently. The requirement to achieve a B2 BER for households in the Communities grant programme is a barrier to identifying projects for this but projects may proceed through Better Energy Homes or without grant aid. A number of houses have already implemented individual measures under Better Energy Homes and these can act as ambassadors and spread the word throughout the SEC.

The workshops will inform the attendees of the SEC activities, opportunities for participation and contribution and in identifying and considering potential energy efficiency projects.

Exemplar Projects

At an early stage in the development of the SEC, the need for concrete tangible exemplar projects demonstrating the benefits of sustainable energy was identified. The SEC has engaged with key potential exemplar sites including the GAA club, the school and the church and parochial house.

Blackhall Gaels GAA Club is planning to progress projects including a lighting retrofit in the clubhouse and external LED floodlights on one of the pitches.

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. Energy Solutions will provide advice and potentially audits for non-domestic sites in 2020 and beyond to feed into the RoO and measures identified in workshops will also be included.

7 Renewable Energy Opportunities

7.1 SEAI's Local Authority Renewable Energy Strategy Methodology Overview

The SEAI prepared a methodology or a template to act as a guide to assist local authorities in the preparation of their Local Authority Renewable Energy Strategy (LARES) with the aim of facilitating consistency as well as assisting local authorities in developing co-ordinated and sustainable strategies in line with national and European obligations. The methodology addresses the most common issues associated with renewable energy technologies and projects.

The key objectives of this methodology include:

- Providing a structural approach in preparing a LARES
- Providing information and support to local authorities creating LARES.
- Facilitate consistency
- Support local authorities in the development of specific policies and objectives.
- Assist in providing transparent information to the public on future development of renewable energy (RE) within a local authority area.
- Facilitation the identification of key RE resources and development areas.

LARES need to be developed within the local, regional, national and European policy context in order to insure a concreate set of assumptions is developed for the strategy and the validity of the strategy. The SEAI will promote the LARES methodology with the appropriate institutions to ensure that there is communication and promotion with stakeholders, industry participants and the general public. Consultation during the preparation of a LARES could be carried out as public consultation, Strategic Environmental Assessment (SEA), Habitats Directive Assessment (HAD), Appropriate Assessment and Scoping consultation. It is recommended that local authorities, incorporate flood risk assessments for RE developments, RE projects must be carried out in accordance with flood-risk management guideline.

7.2 Preparing a Renewable Energy Strategy

Step 1: Undertake a Policy Review

It is vital that local authorities consider their production in the context of the national legal binding requirements to increase the contribution to energy demand by RE sources. It is recommended that the strategy is to be set out in hierarchy of international and national legislation and policy. It is important that relevant legislation and policy context is reviewed by local authorities to ensure that it is up to date. Local authorities should consult relevant bodies when preparing their LARES if necessary.

Step 2: Identify and Assess the Renewable Energy Resources and Potential

It recommended that an examination of existing RE projects and a review of available information on the RE resource in the local authority area. Local authorities should review any RE projects already developed in the administrative area including RE developments that are operational and applications that have been successful but are not yet implemented. It is recommended that unsuccessful applications be identified and reviews by the local authority. The information should be spatially represented so it can gain maximum value from the review process. The objective is to produce sufficient data with the development of GIS maps of RE resources available in the area and providing a foundation on which infrastructural and environmental constraints and facilitators can be overlaid.

Step 3: Constraints and Facilitators Reviews

This involves the consideration and review of any limiting or restrictive factors that may need to be considered during project development. Local authorities should consider international and national policy regarding the environment that may influence the development of RE strategies. The result of undertaking this review is to determine what renewable resources are viable for future development. Local authorities need to undertake a review of the infrastructural constrains and

facilitators within their administrative area, this would indicate where and what RE facilities could be put in place within the infrastructural limits of the administrative area. If the infrastructure is not present, planned or is constrained, this may restrict the scale and location of RE within the local authority area.

Step 4: Development of Renewable Energy Policy and Implementation

Local authorities develop a RE policy and provide detail on the implementation. Local authorities may wish to engage with members of the public during or at the conclusion of this step. This step will culminate in the production of a LARES document. The local authorities could develop an initial and final draft version for public consultation. Having already assessed the RE potential and constraints, local authorities should start to tailor their RE strategy, policies and objectives to suit the renewable resources available, with having considered the infrastructural, technology, spatial and environmental constraints, RE potential within the area, national RE policy targets and ability to contribute as well as economic and job creation objectives.

7.3 Applying LARES to Batterstown

7.3.1 Renewable Energy Resource and Potential

Solar *Power:*

There is huge potential for Solar power to be utilized in Ireland, currently Solar power is not being used to its full potential. Solar farms at the utility scale will typically be at least 1 megawatt (MW). The cost of solar farms is generally €1/watt; therefore a 1 MW solar farm would cost around €1 million. In County Meath and the area of Batterstown the PV potential is around 949 kwh per year.

16 planning applications for solar farms have been submitted to Meath County Council since 2016. A total of 3 application where withdrawn, 9 being granted conditional planning permission, 2 applications where incomplete and one application of 3MW proposed by Panda power in Newtown being refused permission in 2018, this site is approximately 19km away from Batterstown. There is currently one new application of 3MW submitted by Panda Power in November 2019 which is also located in Newtown, this application was refused planning permission on the 28th of January 2020.

In 2016 Lightsource proposed the development of a 70 MW solar farm in Vesingstown and Polleban with the goal of supplying over 19,000 households with clean and locally produced electricity, this application was granted conditional planning permission. This site is located approximately 1.6 km away from Batterstown. Lightsource have been granted planning permission for 3 solar farms in Meath in recent years.

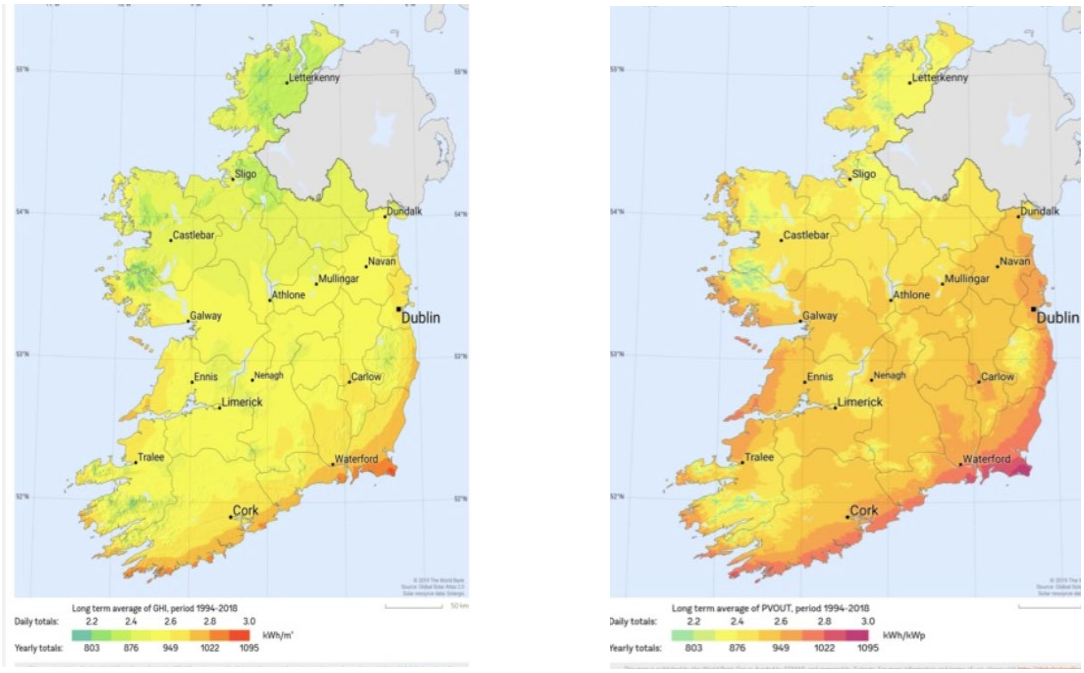


Figure 15- Solar power (solar power farms vs solar power potential) (solargis, 2019)

Wind Power:

According to the SEAI wind mapping system, there are currently no turbines present in Batterstown. The wind speed is around 5.70 m/s at 20 meters. The potential for wind power in Batterstown is similar to the majority of the country and would not have as much potential compared to off shore sites. However, there is often public opposition to wind farms with the public having concerns on the impact the turbines would have on the landscape and local amenities, this often makes it difficult to gain public support and implement wind farms. There is no record of wind farm planning applications being submitted to Meath County Council.

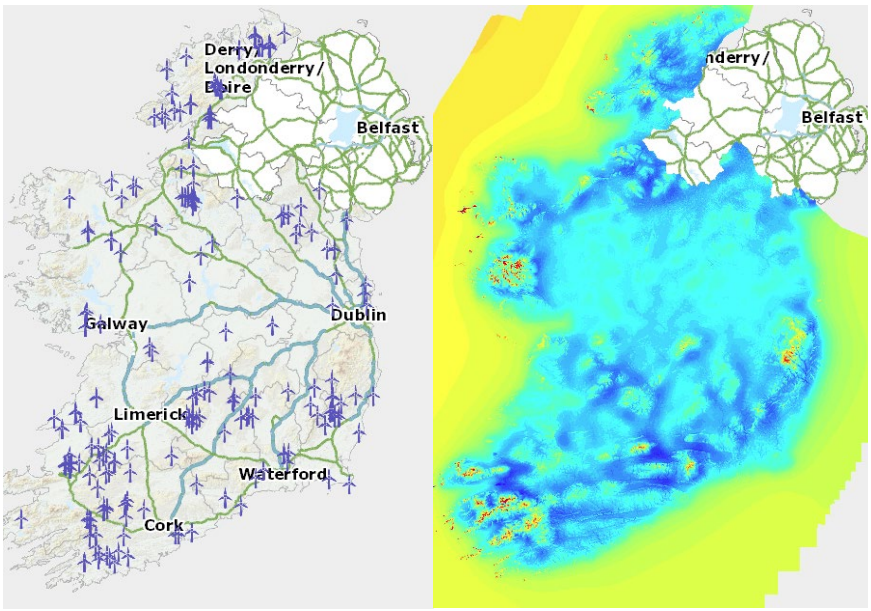


Figure 17- Wind Atlas mapping system (wind farms vs wind speed map) (SEAI, 2020)

Biomass*:*

Bio energy has been the largest contributor to Irish RE through heat generation. Biomass is biodegradable proportion of products, waste and residues from agriculture, forestry and related industries. Considering that Batterstown is a rural community there is potential for energy to be generated from biomass in the area. Forestry sites can be found near Batterstown according to the SEAI Bioenergy Mapping System. There is a high Biomass demand in Leinster, however the demand in Meath and Batterstown appears to be low according to the SEAI. At present there is very little heating from biomass in the SEC area and the replacement of oil by biomass presents a significant opportunity to increase energy supply from renewable sources.

The Support Scheme for Renewable heat provides operational support in the form of a tariff for non-domestic biomass heating systems making them an attractive proposition. There is no financial support for the installation of domestic biomass heating systems at present.

Figure 18- Biomass Demand in Ireland (SEAI, 2020)

7.4 Constraints and Facilitators Reviews

The Renewable Energy Support Scheme (RESS) provides support to renewable electricity projects in Ireland with a focus on cost effectiveness. The RESS is an auction-based scheme which invites RE projects to bid for capacity and receive a guaranteed price for the electricity they generate. The RESS enables framework for community participation and supports communities to participate in RE projects, increases technology diversity, delivering an ambitious RE policy to 2030, increasing energy security and sustainability and ensuing cost effectiveness of energy policy. In terms of Communities**,** all projects looking for support under the new RESS will need to meet pre-qualification criteria including offering the community an opportunity to invest in and take ownership of a portion of renewable projects in their local area.

A national register of community benefit payments will also be established. An obligatory benefit fund scheme will provide opportunities for communities to play their part in Ireland's RE transition. Every project developer will be obliged to contribute to a Community Benefit Fund. There is a considerable focus on community involvement as the support of the public is vital for the success of projects and public objection to RE projects can delay RE developments. Public engagement

through community planning workshops, discussion events, considering natural assists and building awareness are important when developing RE projects.

In July of 2019 the government published details of the new RESS which is aimed at encouraging the development of sustainable RE with two significant community opportunities for projects which will be developed under the scheme. These opportunities include a significant increase in community funds to €2/MWhr every year, these funds will allow community investment opportunity for those living within 10km of a project with priority given to those who are living with 5km.

7.5 A Renewable Energy Plan for Batterstown SEC

A target of 30% RES source has been set by Batterstown SEC. This can be achieved through a mixture of renewable heat and renewable electricity, but given the absence of large heat demands it is likely that the predominant source will be renewable electricity. Given the lower wind resource, lack of wind farms in the area and the visual and other impacts of wind turbines, solar PV has the largest realistic potential to provide locally generated renewable energy to the SEC.

The total electricity demand in the SEC is 1.6 GWh/yr and the total heat demand is 4.47 GWh/yr. The heat could be supplied by heat pumps with an efficiency in the region of 500% and for this reason heat pumps are sometimes classified as renewable energy appliances. The concept of primary energy is used to weight electricity as a higher grade energy source – the current primary energy factor is 2. The total primary energy use is then 8.1 GWh/yr.

One MW of solar PV generates around 0.9 GWh/yr. So, if solar PV were to supply 30% of the total primary energy use in the SEC, 2.7 MW of solar PV would be required.

8 Communities Grant

The Better Energy Communities SEAI grant has been replaced by the Communities grant which is open for applications on a first come first served basis since December 2019. The grant is similar to the previous BEC grant but allows for smaller projects and gives preferential treatment to applications with a strong SEC participation.

The main points of the grant scheme are:

- Fossil fuel boilers are not grant aided
- The minimum post works BER for a dwelling is C1 (<175 kWh/m^2/yr)
- Where wall insulation is included, the minimum post works BER is B2 (<125 kWh/m^2/yr)

For the SEAI Community grant, the minimum post works BER of C1 will define a minimum package and will exclude the starter package from the Communities grant for most homes. Individual measures can still be funded through the Better Energy Homes scheme. The average post works BER for houses getting the standard package was 129 kWh/m2/yr which is above the minimum B2 requirement and only 6 of the housing types (1,558 houses) achieved the requirement with the standard suite of works.

Therefore, the standard package, and in some cases a little more than the standard packages, will be required as a minimum to meet SEAI's requirement for the Communities grant.

Batterstown SEC has set an objective of applying for a Communities grant. The 2020 grant is already oversubscribed as of end of January so the target should now be 2021. Assembling a suite of projects for a Communities grant will require commitment from businesses and householders. As that commitment is achieved the RoO will be updated and an application form and workbook will be completed.

Appendix 1

Register of Opportunities

Batterstown Sustainable Energy Community
Register of Opportunities - Summary

Residential	Total Savings	
Status	Primary Energy Saving	Energy Credits
Owner commited	0	0
In progress	0	0
Complete	4,070	4,070

Non-Residential	Total Savings		
Status	Electrical	Thermal	Primary
Identified	27,100	21,000	88,750
Discussed with site	0	0	0
Under consideration - short term	32,626	0	81,564
Under Consideration - long term	0	0	0
Not under consideration	0	0	0
In progress	0	0	0
Complete	0	0	0

Batterstown Irishtown Sustainable Energy Community
Residential - General Register of Opportunities

	Starter Package	Standard Package	Advanced Package	Energy Credits (kWh) (SEAI)	Value of savings	Cost of Measure	Payback
Low energy lights	Yes	Yes	Yes	85	€8	€100	12
Roof insulation	Yes	Yes	Yes	1300	€123	€750	6
Heating Controls	Yes	Yes	No	4070	€386	€1,600	4
Wall Insulation	Optional	Yes	Yes	5900	€559	€15,000	27
Condensing Boiler	Optional	Yes	No	5745	€544	€2,500	5
Wood Stove	Optional	Yes	Yes	2060	€195	€1,500	8
Windows	No	No	Yes	1650	€156	€10,000	64
Susp. Floor insul.	No	No	If applicable	1100	€104	€2,500	24
Doors	No	No	Yes	520	€49	€1,000	20
Air Source Heat Pump	No	No	Yes	9210	€873	€12,000	14
Airtightness and Ventilation	No	No	Yes			€5,000	
Photovoltaics	No	No	Yes	3600	€853	€6,000	7

Batterstown Sustainable Energy Community
Residential - Register of Opportunities

Ref	Address	PostCode	BER Before (Indicative)	BER After (Indicative)	BER Before (Actual)	BER After (Actual)	Floor Area	Primary Energy Saving	Energy Credits (SEAI)	Status
D-1		A85VW01						4070	4070	Complete

Batterstown Sustainable Energy Community
Non-Residential Register of Opportunities

Ref	Organisation	Opportunity	Electrical Savings kWh	Thermal Savings kWh	Value of Savings (€)	CO2 Savings	Cost (€)	Cost After Grant	Payback (after grant)	Status	Comment
		Rathregan National School									
RNS-01	Rathregan National School	LED Lighting	24,500		€4,337	10.0	€15,000	€7,500	1.7	Identified	
RNS-02	Rathregan National School	Smart heating & zone controls		10,500	€454	2.2	€2,000	€1,000	2.2	Identified	
RNS-03	Rathregan National School	Solar PV. 3 kW	2,600		€460	1.1	€4,500	€2,250	4.9	Identified	
RNS-04	Rathregan National School	Insulation		10,500	€454	2.2	€20,000	€10,000	22.0	Identified	
		GAA Club									
GAA-0	GAA Club	LED Floodlights	30000		€5,310	12.3	€80,000	€40,000	7.5	Under consideration - short term	
GAA-0	GAA Club	LED internal lights	2626		€465	1.1	€2,000	€1,000	2.2	Under consideration - short term	