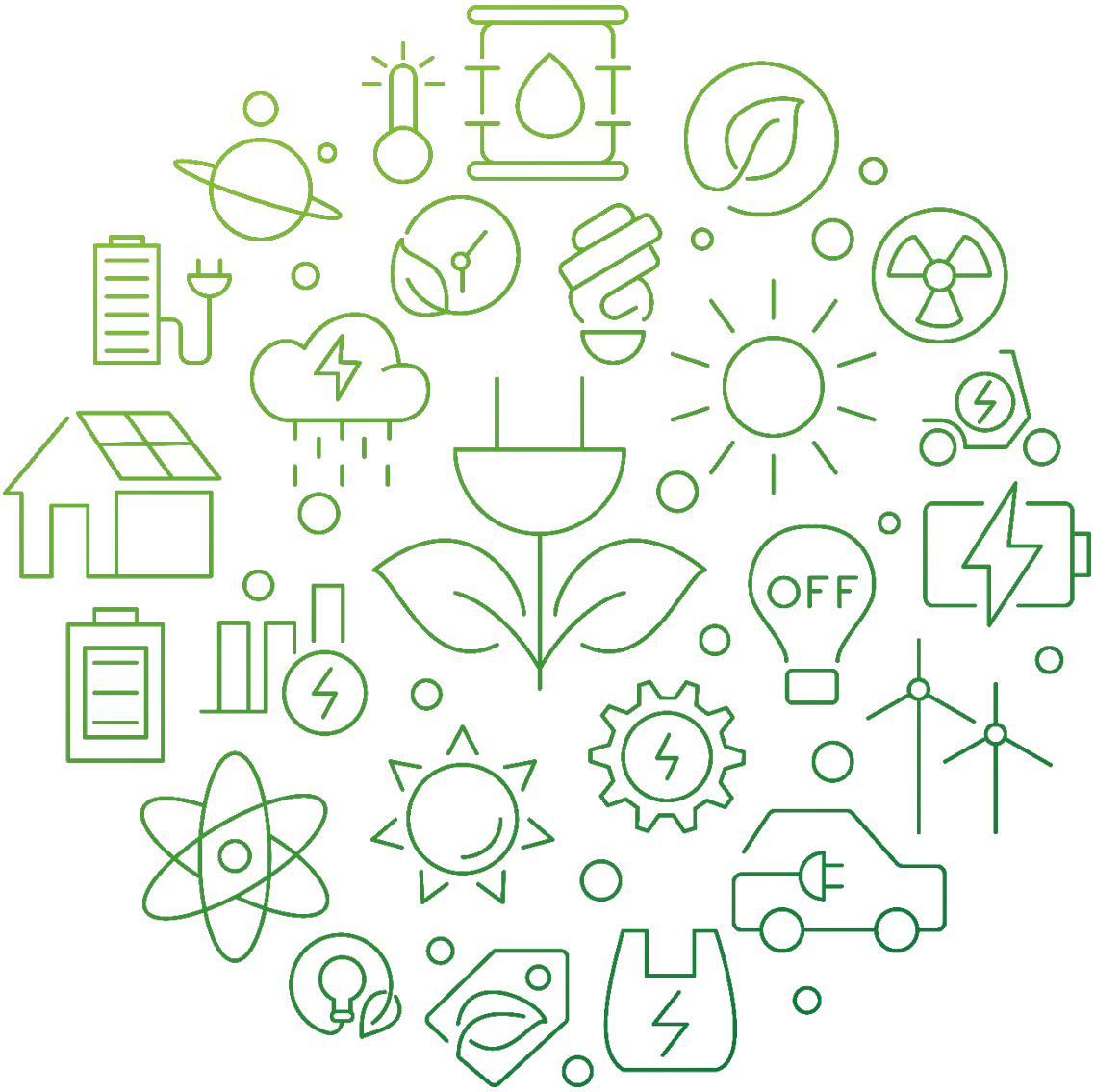

Corca Dhuibhne Tourism and Hospitality SEC (Sustainable Energy Community)

Energy Master Plan

23 October 2024

Dingle HUB

Fáilte Ireland | An tÚdarás Náisiúnta Forbartha Turasóireachta National Tourism Development Authority

Údarás na Gaeltachta

DCSix Technologies

seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND

IRELAND'S DINGLE PENINSULA CORCA DHUIBHNE

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Glossary of Terms

CDT&H – Corca Dhuibhne Tourism & Hospitality
SEAI – Sustainable Energy Authority of Ireland
CD – Corca Dhuibhne
SEC – Sustainable Energy Community
EMP – Energy Master Plan
TED – Total Energy Demand
MW – Megawatt
MWh – Megawatt hours
kW – Kilowatt
kWh – Kilowatt hours
HRU – Heat Recovery Unit
CFL – Compact Fluorescent Light
LED – Light Emitting Diode
PV – Photovoltaic
SSRSS – Small Scale Renewable Electricity Support Scheme
RESS – Renewable Electricity Support Scheme
TCO_2e – Tonnes of Carbon Dioxide equivalent
LPG – Liquefied Petroleum Gas
Bio LPG – Bioliquefied Petroleum Gas
SSEA – Support Scheme for Energy Audits
ASHP – Air Source Heat Pump
RoO – Register of Opportunities – a list of potential energy efficiency opportunities highlighting where energy and cost savings can be made, return on said opportunities and environmental impact are also captured in the RoO.

Executive Summary

The purpose of this report is to present the findings and recommendations of the energy audit conducted for the Corca Dhuibhne Tourism & Hospitality (CDT&H) Sector, a Sustainable Energy Community (SEC) in the Dingle Peninsula. The baseline and analysis were carried out by DCSix Technologies, an independent energy consultant, between January 2023 and March 2024, with the aim of identifying energy consumption patterns, benchmarking energy performance, and proposing energy efficiency and renewable energy opportunities for the sector. All energy baselines are based on 2022 billing data and 2023 monitoring data.

The report covers the following aspects:

- The background and context of the CDT&H Sector and the SEC initiative, including the vision, objectives, and scope of the project.
- The methodology and data sources used for the energy audit, including the site visits, surveys, interviews, and measurements conducted for a representative sample of 25 businesses from the sector.
- The analysis and results of the energy audit, including the breakdown of energy consumption by fuel type, end-use, and business category, the comparison of energy performance indicators with national and international benchmarks, and the identification of key drivers and barriers for energy efficiency and renewable energy in the sector.
- The Register of Opportunities (RoO), a list of potential energy efficiency and renewable energy measures that can be implemented by the businesses in the sector, highlighting the estimated energy and cost savings, payback periods, and environmental benefits of each measure.
- The recommendations and next steps for the CDT&H Sector and the SEC steering committee, including the prioritisation of the RoO measures, the development of an action plan, and the establishment of a monitoring and evaluation system.
- The CDT&H Sector consumed 29,913 MWh of energy, equivalent to €5.9 million in energy costs and 8,170 tonnes of CO2 emissions in 2022. Transport accounted for 29% and electricity accounted for 24% of the energy consumption, followed by oil (21%), LPG (21%), and Solid Fuel (5%).
- The main energy end-uses in the CDT&H Sector were space heating, lighting, hot water, catering, and cooling and refrigeration. The energy consumption varied significantly by business category, with hotels being the most energy-intensive, followed by pubs and restaurants, self-catering accommodation and guesthouses and B&Bs.
- The RoO identified 115 energy efficiency and renewable energy opportunities for the CDT&H Community, requiring a total investment cost of €18 million and a total annual saving of €3 million per annum. The average payback period of the top 5 RoO measures is less than 1.5 years. The most cost-effective and impactful measures are tariff reviews, audits, LED lighting retrofits and solar PV installations.
- The CDT&H Sector has the potential to reduce its energy consumption by 75% and its carbon footprint by 85% by implementing the RoO measures. This will achieve significant economic and environmental benefits and contribute to the SEC vision of becoming a low-carbon and sustainable destination.

The report recommends that the CDT&H Sector and the SEC steering committee take the following actions:

1. Communicate the results of the energy audit and the RoO to the businesses in the sector and provide them with guidance and support for the implementation of the measures.
2. Establish a project management structure and explore funding mechanisms to facilitate the financing and delivery of the RoO measures, leveraging existing schemes and incentives such as the RESS, SEAI grants, SRESS and green loans.
3. Develop an action plan and a roadmap for the CDT&H Sector, setting short-term and long-term targets and milestones for energy efficiency and renewable energy, and aligning them with the national and regional policies and strategies.
4. Implement a monitoring and evaluation system to track the progress and impact of the RoO measures and the action plan, using key performance indicators and feedback mechanisms, and reporting on the achievements and challenges of the SEC initiative.

- Engage with other stakeholders and partners, such as Fáilte Ireland, Údarás na Gaeltachta, Kerry County Council, and Dingle Hub, to promote the SEC initiative and share the best practices and lessons learned from the CDT&H Sector.

A summary document of this plan is also available via this link:
Corca Dhuibhne Tourism and Hospitality EMP Summary.

Introduction

The Corca Dhuibhne Tourism & Hospitality (CDT&H) Sector consists of 337 businesses. Within this industry, the Sustainable Energy Community (SEC) was created in 2023 with support from Fáilte Ireland, Údarás na Gaeltachta, Kerry County Council, and Dingle Hub and consists of 120 businesses (a 36% representation). A steering committee was formed consisting of 16 representatives for the Corca Dhuibhne Tourism & Hospitality community.

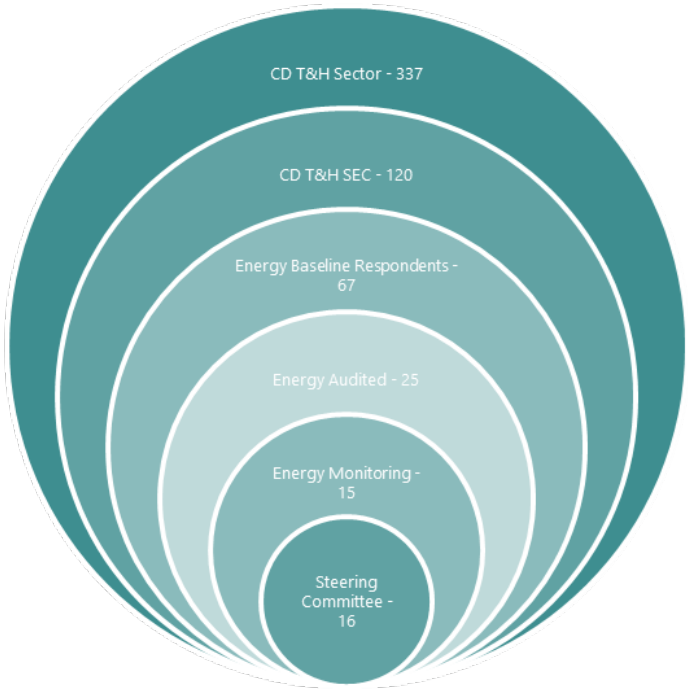

Figure 1: The SEC in detail

The SEC represents various business types, the survey respondents can be broken down as follows.

- 69% of businesses own the property they operate their business from.
- 31% of businesses lease the property they operate their business from, of those that lease 76% have a short-term lease which can impact the ability to deploy energy efficiency measures.
- 56% of businesses are family owned and intend on passing on the business to the next generation.

Background

The Dingle Peninsula is a popular tourist destination in the southwest of Ireland on the Wild Atlantic Way, attracting visitors from all over the world for its scenic beauty, cultural heritage, and diverse activities. The tourism and hospitality sector is a vital source of income and employment for the local community on the Dingle Peninsula. However, the sector also faces significant challenges in terms of sustainability, competitiveness, and resilience, especially in the context of the cost of living, housing crisis and the climate crisis. Therefore, it is essential to develop an Energy Master Plan (EMP) that will help the sector reduce its energy demand, increase its use of renewable energy sources, and enhance its environmental performance. The EMP is a collaborative initiative between the Dingle Tourism and Hospitality Community, the Dingle Sustainable Energy Community (SEC) and all stakeholders. This project follows on from the success of the West Kerry Dairy Farmers SEC, a project that was the first sectoral SEC in Ireland and has led to significantly accelerated adoption of technologies such as solar PV within that community.

Aims and Objectives

The goal of the Energy Master Plan (EMP) was to review the existing energy practices undertaken by the community and to then provide a roadmap for efficient, practical, cost-effective recommendations for energy efficiency measures across the SEC. Key to this effort is to provide a high-level overview in the form of an Energy Baseline, providing a breakdown of the overall energy demand of the community. Further detail on energy consuming processes was established from conducting energy audits and installing energy monitoring.

The overall project was broken down into the following objectives.

1. Install energy monitoring in 16 businesses.
2. Carry out energy audits in 21 businesses.
3. Provide a baseline of total energy usage estimates for participating businesses.
4. Provide detailed recommendations for energy efficiency at an individual businesses level.
5. Establish a Register of Opportunities for the reduction of energy demand and the transition to renewable energy supply by the SEC members.
6. Provide a roadmap and action plan to implement the recommended Register of Opportunities in a prioritised way.

Methodology

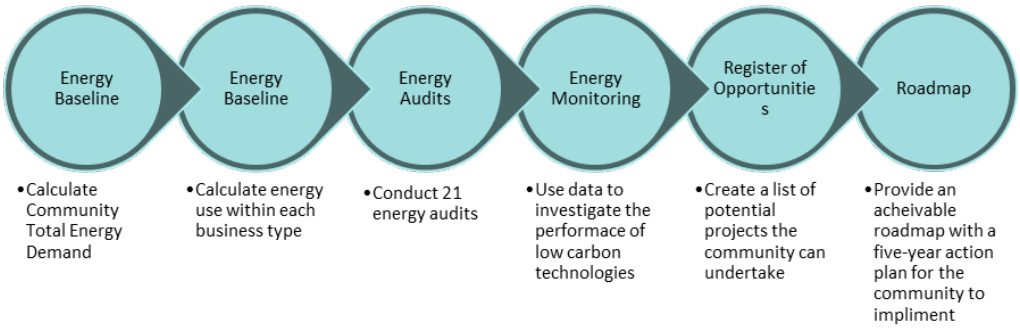

Figure 2: Methodology

As mentioned, the Corca Dhuibhne Tourism and Hospitality Sector consists of 337 businesses. To ensure that all types of business are represented and accounted for in the EMP it was necessary to conduct several exploratory sessions with stakeholders in the community and document the business types. The outcome of this effort allowed for the categorisation of 8 common T&H business types on the peninsula and are demonstrated in figure 3.

Following categorisation and quantification of the various business types across the community, a macro level view of energy, resource, buildings, and business models was required. Over 3,000 datapoints were captured from 69 of the community members to achieve the ability to contextualise different behaviours, consumptions, and opportunities across the various business types.

In addition to the macro view, it is essential to generate data sets at a micro level to accurately demonstrate different energy processes across various business types and use this to understand costs, energy consumption, options, appetite to change, impact and opportunities that exist.

A best-in-class approach to this is to conduct in-depth audits and interviews, in conjunction with measurement over a period of time (monitoring). It is generally accepted as adequate, to conduct in-depth measures in the square root of the total community size (~18 locations). DCSix Technologies conducted audits at 21 locations and installed monitoring solutions at 16 locations to ensure an accurate data set was generated at a micro level. This has allowed for the collection of 1-minute granular information for 224 different electrical consumers within the community for a 6-month period.

Community

An energy baseline for the community was developed based on the analysis of bills and data from questionnaires with the 69 survey participants across 8 classifications. In addition, 12 months of electricity bills were analysed for 21 audited locations. Both data sets were cross referenced to ensure they align and are representative of the business type and these representative data points have. This validated data has been scaled up for each business type to inform the Total Energy Demand (TED) and is broken out per fuel source. Note: The Total Energy Demand and related data are presented prior to the consideration of any opportunities, such as the implementation of Solar PV.

The Energy Baseline includes the following energy sources.

1. Electricity
2. Liquid Petroleum Gas
3. Kerosene
4. Solid Fuel (Turf, Wood etc.)
5. Transport Fuel

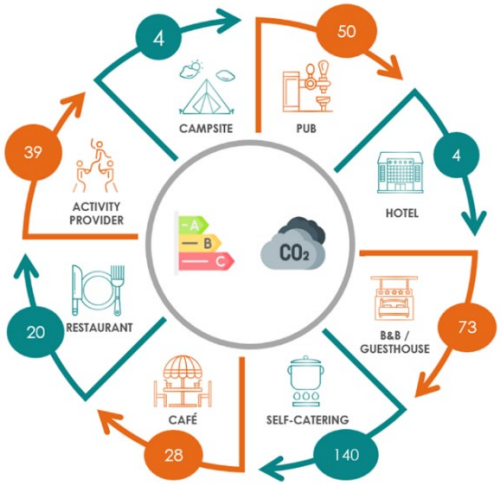

Figure 3: Number of businesses in each category

Due to the nature of a community, this EMP addresses energy demand for Business and owned fleet transport. The energy usage profile of each sector was developed using bottom-up data, based on actual fuel bills from 2022.

Information was gathered using an energy questionnaire that was emailed to all community members.

Over 50% of the community members submitted their fuel consumption for 2022.

For all energy baseline calculations & Return on Investment (RoI) calculations, values are based on the SEAI Comparison of Energy Costs – Q1 2024. (SEAI, 2034).

A significant energy source consumed by the community, petrol and diesel consumption from private cars, was omitted from the Energy Baseline. This is in recognition of work previously undertaken by the Dingle Peninsula Sustainable Energy Community Energy Master Plan (MaREI, 2018) which addresses private car transport for the entire peninsula. Any analysis conducted on this sector would be a repetition of this work, while only using a significantly smaller sample size.

Of the community members that completed the questionnaire, 16 were selected to have energy monitoring installed at the business for the duration of the project and conduct an energy audit. All members were invited to complete a further questionnaire to which there was a 56% response rate.

Data gathered using the efforts above was then extrapolated to model the sector total (all 337 businesses).

The following sections describe the breakdown of the sector across the peninsula:

Hotels

The hotel sector on the Dingle Peninsula is a vital part of the local economy and tourism industry. There are 4 hotels in the area, ranging from small boutique hotels to large four-star hotels. The hotels offer a variety of services and amenities, such as restaurants, bars, spas, leisure centres, conference rooms, and outdoor activities. The hotels cater to different segments of the market, such as families, couples, groups, and business travellers. The hotel sector employs hundreds of people in the Dingle peninsula, both directly and indirectly, and contributes to the social and cultural life of the community. The hotel sector also faces some challenges, such as seasonality, competition, staffing and recruitment, energy costs, and environmental impact. The hotels are constantly looking for ways to improve their efficiency, quality, and sustainability, and to attract more visitors to the Dingle Peninsula throughout the year.

B&B/Guesthouses

The guest house sector on the Dingle Peninsula is another important part of the local accommodation and tourism industry. There are over 70 B&Bs and Guesthouses in the area, offering a very personalised and bespoke experience. These are usually family-run businesses that offer comfortable rooms, breakfast service, and often have a common lounge or garden where guests can relax and socialise. B&Bs and Guesthouse tend to be located in various scenic locations on the peninsula, near the beach, the mountains, or the town centre. B&Bs and Guesthouses appeals to visitors who are looking for a more authentic and affordable stay on the Dingle Peninsula, and who want to support the local economy and culture.

Restaurants

The Dingle Peninsula is known for its gastronomic diversity. The Dingle Peninsula offers a wide range of options for different tastes, budgets, and occasions. There are approximately 20 restaurants in the area, with many of them located in the town of Dingle. Although many pubs also offer comprehensive dining options, these community members are considered ‘Pubs’ and are not represented in this category.

Trends and Innovations

The restaurant sector on the Dingle Peninsula is constantly evolving and adapting to the changing preferences and expectations of the customers, as well as the challenges and opportunities of the market. Some of the current trends and innovations in the sector are:

- Local and seasonal: Many restaurants emphasise the use of local and seasonal ingredients, sourced from the nearby farms, markets, and fishermen. Some restaurants also grow their own herbs and vegetables, or have their own livestock, such as fish and beef.
- Classical, contemporary and creative cuisine: Many restaurants experiment with fusion and creativity, combining different cuisines, flavours, and techniques, to create new and exciting dishes.
- Vegetarian and vegan: Many restaurants cater to the growing demand for vegetarian and vegan options, offering dishes that are free of meat, dairy, and eggs, or that can be easily modified to suit the dietary

requirements of the customers. Some restaurants also have gluten-free, dairy-free, or nut-free options, or cater to other allergies and intolerances.

Pubs

Dingle is known for welcoming and lively pubs, with approximately 50 pubs on the peninsula The pub sector on the peninsula is diverse and vibrant, offering a range of options for locals and visitors alike. Some pubs are traditional and cosy, serving local beers, whiskeys, and ciders, and featuring live music, storytelling, or Irish dancing. Some pubs are more modern and trendier, offering craft cocktails, gourmet food, and DJ sets.

Cafés

There are approximately 28 charming and cosy cafés, where locals and visitors can enjoy a cup of coffee, tea, or hot chocolate, along with a variety of delicious pastries, cakes, and sandwiches. Some cafés are in historic buildings, offering a glimpse of the town's history and heritage, while others are more contemporary and stylish, showcasing local art and design. The café sector on the Dingle Peninsula provides a warm and friendly atmosphere, where people can relax, socialise, work, or read, and sample some of the finest local produce and specialties.

Visitor Experience/ Activity Provider

If you are looking for some adventure and excitement, you will find plenty of options on the Dingle peninsula. There are approximately 39 visitor experience/activity providers who offer a range of outdoor and indoor activities for all ages and abilities, such as surfing, kayaking, hiking, cycling, golfing, horse riding, fishing, pottery, yoga, and more. You can choose to join a guided tour, rent equipment, or book a lesson with qualified instructors who will ensure your safety and enjoyment. Whether you want to explore the stunning coastline, the majestic mountains, or the charming villages, there is an activity that suits your preferences and budget.

The Dingle Peninsula is not only a place of natural beauty and adventure, but also a place of culture and history. Visitors can immerse themselves in the rich heritage and traditions of the region by visiting some of the many attractions and landmarks that showcase its fascinating past and present.

Self-catering

One of the most popular and affordable ways to stay on the Dingle Peninsula is self-catering. There are over 140 self-catering properties in the area, mostly private residences that offer visitors a comfortable and convenient home away from home, this sector has grown over the past 5 years with Airbnb being the driving force behind this growth.

Campsites & Carvan Parks

There are 6 campsites/Carvan Parks on the peninsula. These are very seasonal in nature and have quite low energy requirements in comparison to other businesses in the community. The masterplan leverages data based on a 50% uptake on questionnaires.

Energy Baseline

The Total Energy Demand (TED) for the community in 2022 is estimated at 29,913 MWh, with associated costs of €5,924,972 and emissions of 8,170 tonnes of CO_2. The breakdown of each is shown below.

8,170 tonnes of CO_2e represents a significant quantity of greenhouse gas emissions, necessitating the planting of 408,500 trees (equivalent to 2,000 acres) for offsetting.

29,913 MWh is enough energy to drive:

1. An EV 149,500,000 km (a one-way trip to the Sun).
2. 57,500 EV's driving the 2500km of the Wild Atlantic Way.
3. A diesel car 92,327,778 km in one year.
4. 35,510 diesel cars driving the 2500km of the Wild Atlantic Way.

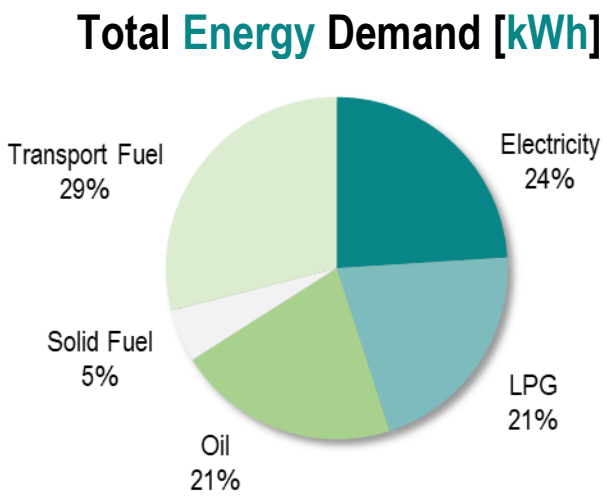

Figure 4: Total Energy Demand [kWh].

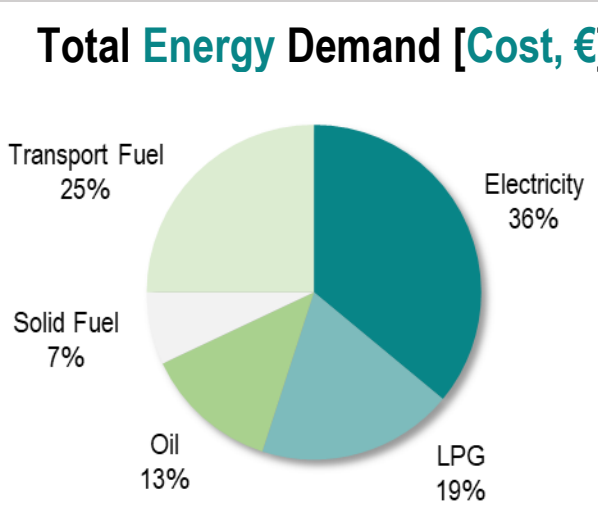

Figure 5: Total Energy Demand (€)

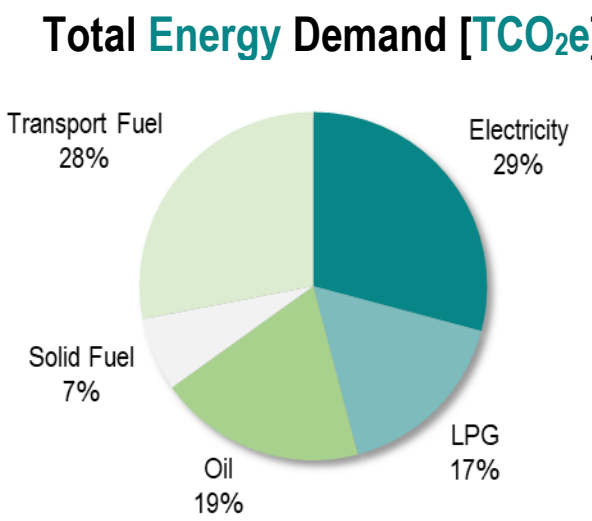

Figure 6: Total Energy Demand (TCO_2e)

Transport Fuel

Transport fuel is the single biggest energy consumer, contributing 8,812 MWh which is 29% of the TED of the community. It is worth noting that only 43% of businesses in the SEC have a transport fuel bill associated with their business yet it still manages to be the main energy source consumed. The most popular fuel type was diesel.

The significant contribution transport makes to the peninsula TED was also highlighted in the 2018 Dingle SEC EMP (MaREI, 2018). A suggestion from this report was to investigate the construction of an anaerobic digestor. Since then, a feasibility study has been carried out (XD Sustainable Energy Consulting Ltd, 2020).

Electricity

Electricity is the largest cost for the community at €2,132,136 annually. Through working with businesses on the energy audit process, it was discovered that many had been with the same electricity provider for several years and were not taking advantage of the most competitive rates available in the market.

Kerosene

Kerosene is the largest contributor of the thermal fuels with an energy demand estimated to be 6,282 MWh. This is used to provide both space heating and water heating, mostly to smaller businesses as the larger hotels and guesthouses are mostly on LPG.

LPG

LPG energy consumption is very close to Kerosene at 6,828 MWh, unit rate was slightly higher.

The Corca Dhuibhne Tourism & Hospitality Sector

Data for the energy consumption was gathered from various sources, including meter readings, customer bills, questionnaires, and online monitoring platforms. The project team conducted energy audits for selected businesses in the Corca Dhuibhne Tourism & Hospitality Sector, using a standardised methodology and tools which were used to further enrich the dataset and validate common opportunities across members. Audits assessed the current energy performance (based on 2022 bills), identified potential saving opportunities, and estimated the costs and benefits of implementing energy efficiency measures while also highlighting potential carbon reductions post implementation. The project also monitored the energy consumption and savings of some participating businesses, to evaluate the impact of the project and provide feedback to the stakeholders.

The following sections will highlight each member type and delve into their energy usage based on fuel makeup, thermal energy breakdown and final electricity use. This is used to identify the most impactful changes which can be made when understanding opportunities later in the EMP.

Hotels

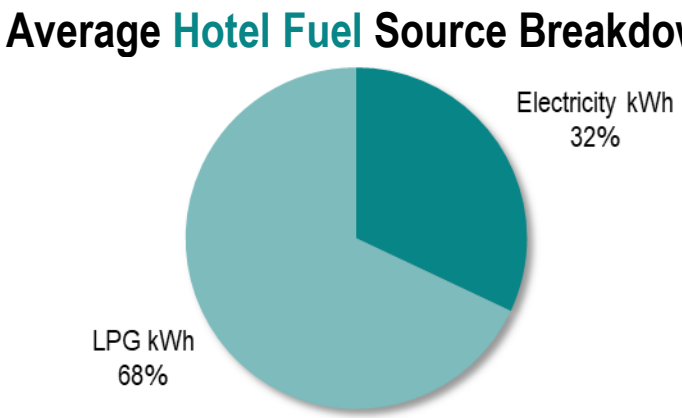

Figure 7: Average Hotel Fuel Source Breakdown

Hotels are the largest energy consumers in the sector. Hotels use mainly electricity (32%) and LPG (68%) to meet their energy needs. Electricity is used for lighting, appliances, ventilation, cooling, and some water heating, while LPG is used for space heating, water heating and cooking.

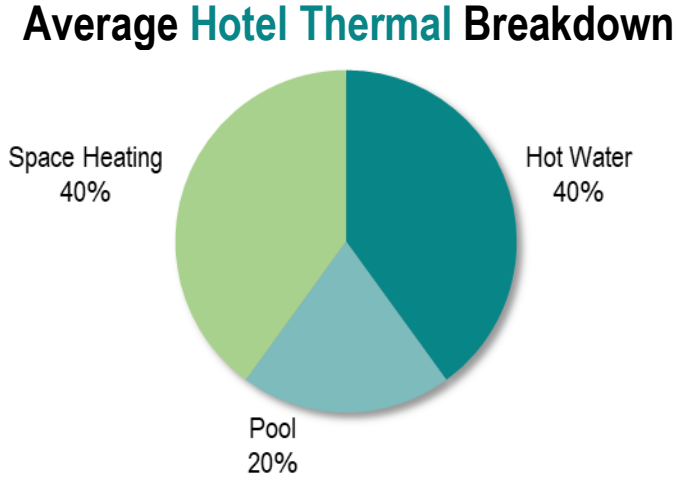

Figure 8: Average Hotel Thermal Breakdown

Thermal energy, which includes space heating and water heating, represents 73% of the total energy consumption of hotels. Space heating alone accounts for 40% of the total energy consumption, indicating a high demand for heating and a potential for improvement in insulation and heating controls. Water heating represents 40% of the total energy consumption, which is consistent with the high occupancy rate and the provision of en-suite bathrooms in most hotels. The average water consumption per hotel room is 241 Liters per bed night, which is higher than the national average of 180 Liters. While it is not absolutely clear as to what makes up the higher trend, the nature of activities and attractions in the Community does drive the need for more showers to be had after trips to the beach etc which would not happen in a city destination.

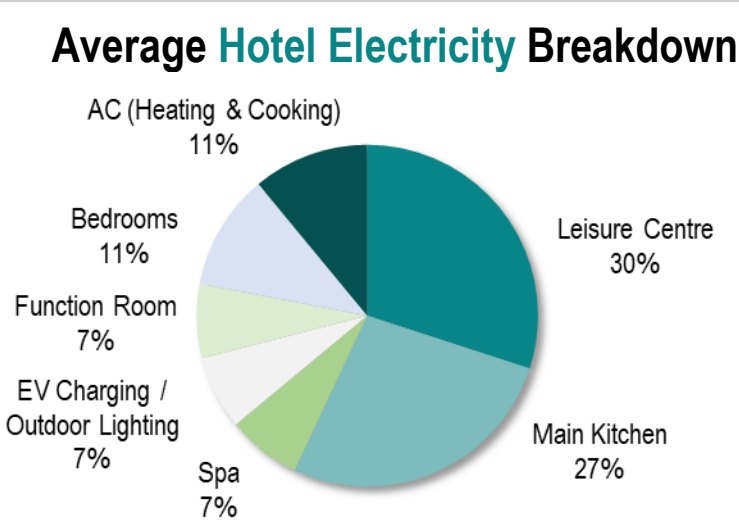

Figure 9: Average Hotel Electricity Breakdown

Electricity consumption, which excludes thermal energy, represents 27% of the total energy consumption of hotels. Lighting accounts for 12% of the total energy consumption, which is higher than the national average of 9%. This suggests that there is room for improvement in lighting efficiency and controls, such as switching to LED bulbs and installing occupancy sensors. Appliances account for 10% of the total energy consumption, which is lower than the national average of 13%. This indicates that hotels are using energy-efficient appliances and minimising standby losses. Ventilation and cooling account for 5% of the total energy consumption, which is similar to the national average of 4%. This reflects the moderate climate and the low demand for air conditioning in the region. Access to and the use of EV charging is quite low at the moment but is expected to rise significantly in the coming years.

B&Bs/Guesthouses

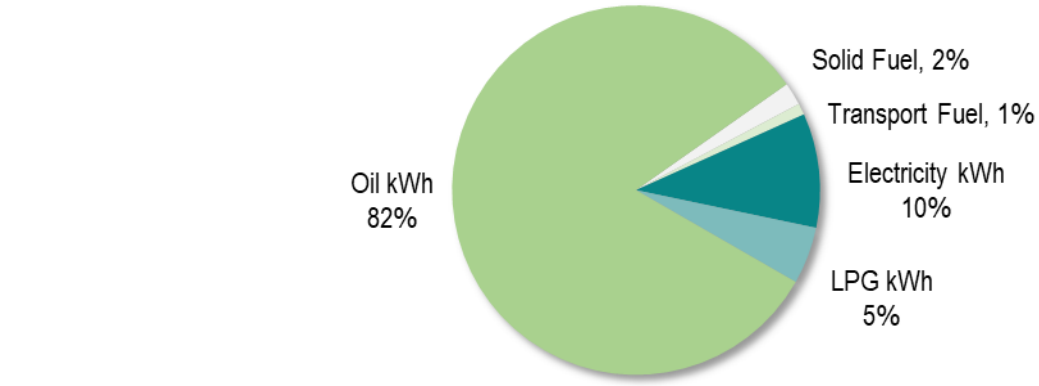

Figure 10: Average B&B / Guesthouse Fuel Source Breakdown

There is a more diverse use of fuels within this sector in comparison with the hotel sector. The predominant fuel being oil used for heating (in most cases Kerosene). The amount of Kerosene consumed in relation to electricity gives an indication that there is an opportunity to leverage higher efficiency heating plant such as condensing systems to raise efficiencies and lower costs and emissions.

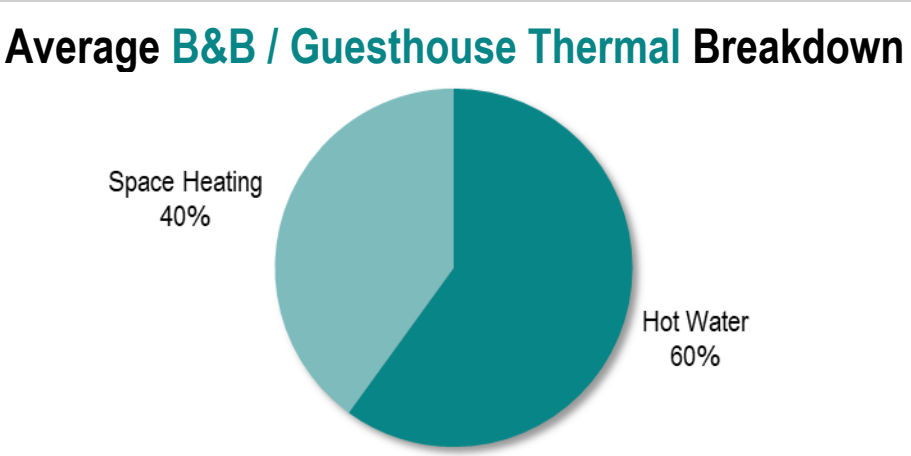

Figure 11: Average B&B / Guesthouse Thermal Breakdown

Thermal energy, which includes space heating and water heating, represents 66% of the total energy consumption of B&Bs /guesthouses. Space heating alone accounts for 34% of the total energy consumption, which is lower than the hotels' share of 40%. This may be due to the smaller size and lower occupancy rate of B&Bs / guesthouses, as well as the use of alternative heating sources such as fireplaces or stoves. Water heating represents 32% of the total energy consumption, which is lower than the hotels' share of 40%, but still high compared to the national average of 25%. This may be explained by the fact that most B&Bs / guesthouses offer en-suite bathrooms and showers, and some also provide hot tubs or saunas. The average water consumption per room is 215 litres per bed night, which is lower than the hotels' average of 241 litres, but still higher than the national average of 180 litres and aligning with the trend above with water heating. Like hotels, it is not clear as to what makes up the higher trend. The nature of activities and attractions in the Community does drive the need for more showers to be had after trips to the beach etc which would not happen in a city destination.

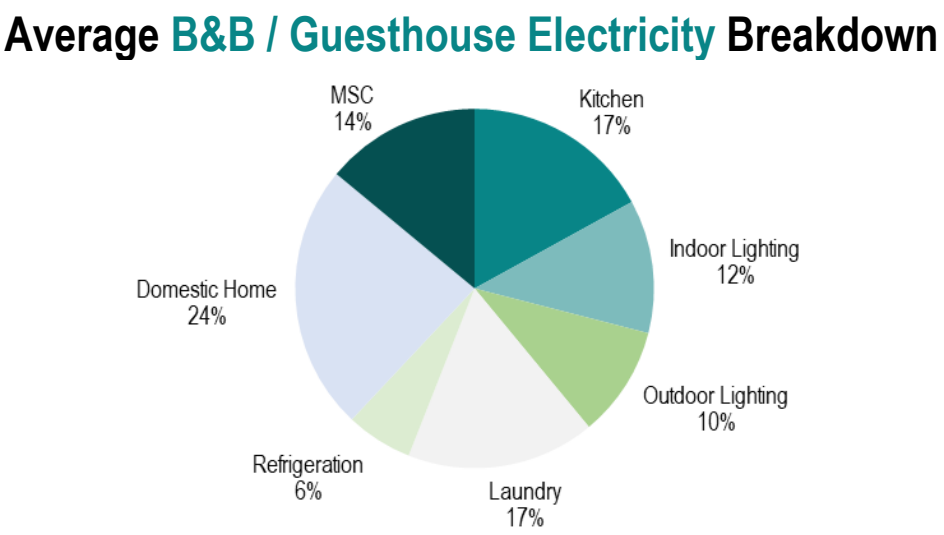

Figure 12: Average B&B / Guesthouse Thermal Breakdown

Electricity consumption, which excludes thermal energy, represents 34% of the total energy consumption of B&Bs/guesthouses. Lighting accounts for 22% of the total energy consumption, which is higher than the hotels' share of 12% and the national average of 9%. This may be due to the longer operating hours and the lack of lighting controls in some B&Bs/guesthouses. Miscellaneous Appliances (MSC) account for 14% of the total energy consumption, which is higher than the hotels' share of 10%, and in line with the national average of 13%. This may be attributed to the variety and number of appliances used by the guests and the owners, such as TVs, kettles, hairdryers, refrigerators, microwaves, etc.

Restaurants

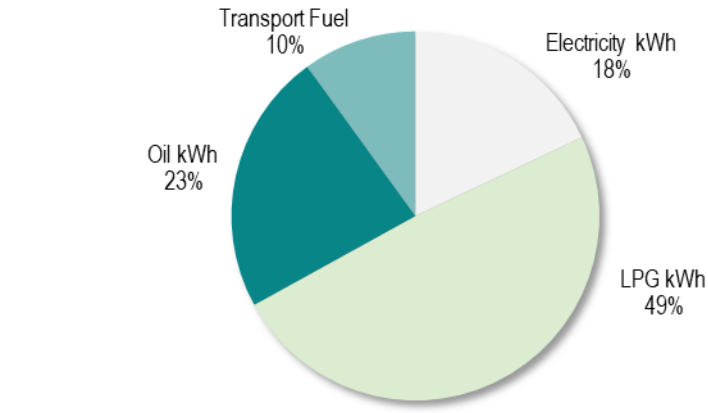

Figure 13: Average Restaurant Fuel Source Breakdown

Transport fuel, which represents 10% of the total energy consumption, is the only fuel source that is not used by the other types of accommodation. This is due to the need to source produce from various locations and suppliers. Again, there is a diverse use of fuels within this sector in comparison with the hotel sector. The predominant fuel being LPG used for cooking. There is little use of electrified cooking.

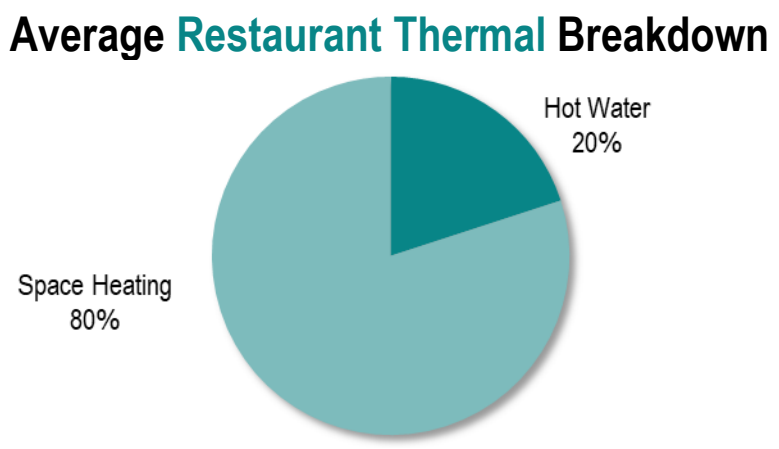

Figure 14: Average Restaurant Thermal Breakdown

Space heating is the most demanding of thermal heating requirements with hot water quite low in comparison to accommodation sectors. This is noteworthy when looking at opportunities such as heat recovery.

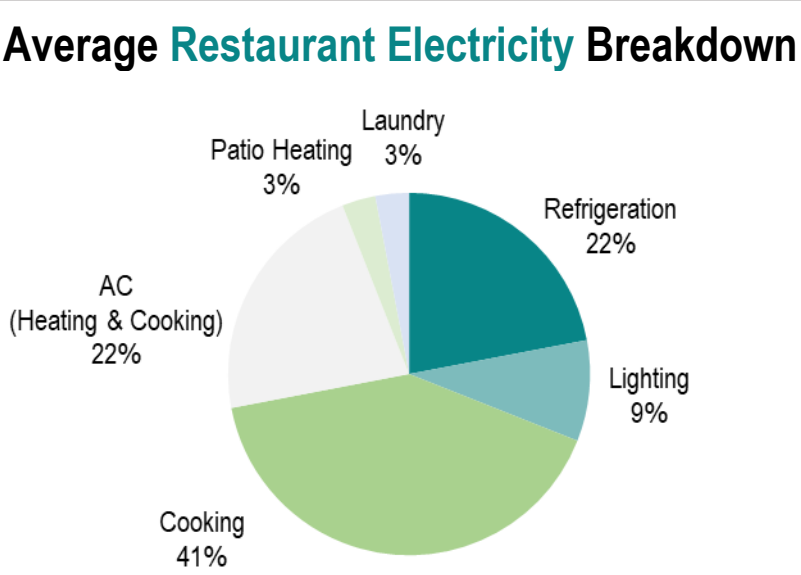

Figure 15: Average Restaurant Electricity Breakdown

Electricity consumption, which excludes thermal energy, represents 18% of the total energy consumption of restaurants. Cooking accounts for 41% of this consumption, which is higher than the B&Bs / guesthouses' share of 17% and the hotels' share of 27%. This is expected, as restaurants use various types of cooking equipment, such as ovens, grills, fryers, microwaves and do not necessarily unlock economies of scale that we see in hotels. Lighting accounts for 9% of the electrical energy consumption, which is lower than the B&Bs / guesthouses' and is the same as the national average. This may be due to the use of energy-efficient lighting systems or natural lighting in some restaurants. Appliances account for 7% of the total energy consumption. This may be attributed to the type and number of appliances used by the staff and the customers, such as dishwashers, refrigerators, freezers, cash registers, etc. Ventilation and cooling account for 22% of the electrical energy. This may be due to the use of natural ventilation and the surplus of heat emitted from cooking processes in some restaurants.

Pubs

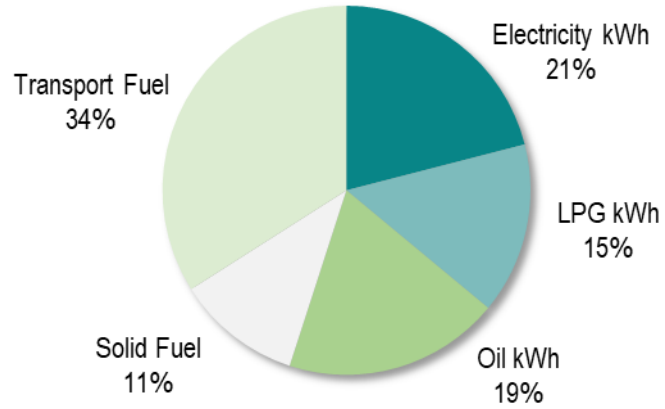

Figure 16: Average Pub Fuel Source Breakdown

Like restaurants, a diverse set of fuels with evidence of one of the selling points of pubs in the Dingle Peninsula area being solid fuel and the open fire. Energy usage in pubs is considerably lower than in the restaurant sector, which makes the transport fuel segment a more significant component of the overall energy mix.

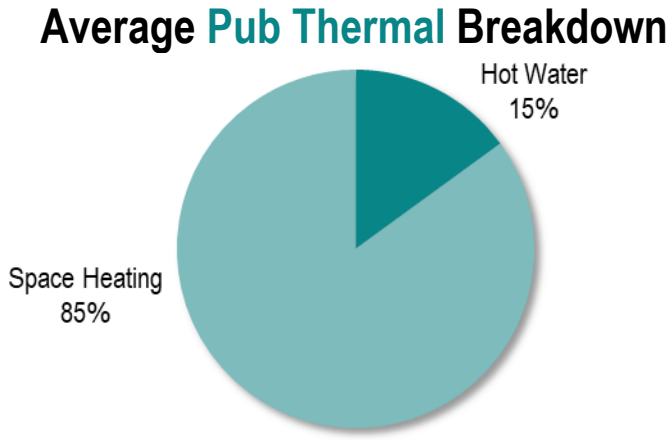

Figure 17: Average Pub Thermal Breakdown

Most of the thermal heat in a pub is related to space heating. This is noteworthy when looking at opportunities as the fabric of the building and lack of hot water requirement limit the payback of measures which offer good financial benefits to accommodation and restaurant sectors.

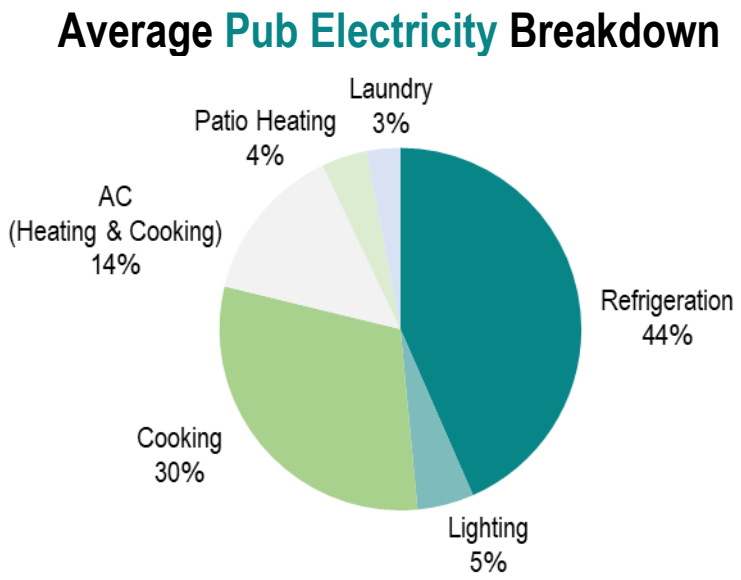

Figure 18: Average Pub Electricity Breakdown

This breakdown can vary significantly per pub and can also vary seasonally especially for locations which serve food for some of the year. One of the largest loads on the pub is the requirement for cooling of beverages which is a year-round requirement and makes up a substantial proportion of the electrical use within the premises (typically about 50%).

Cafés

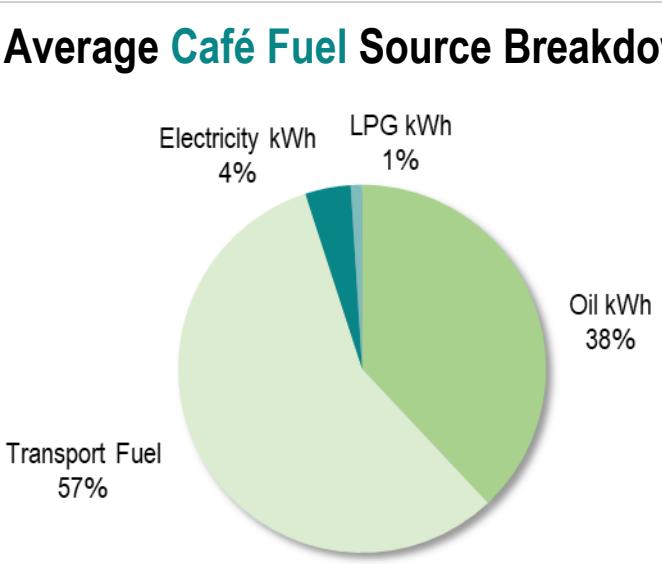

Figure 19: Average Café Fuel Source Breakdown

Continuing the trend observed in pubs, energy consumption in cafés declines compared to pubs and restaurants, further increasing the share of transport fuel. Due to the nature of a café there tends to be a lot of air changes in the premise with doors left open and the demand for heat is higher. This is evident in the amount of oil which is being used in comparison with electricity.

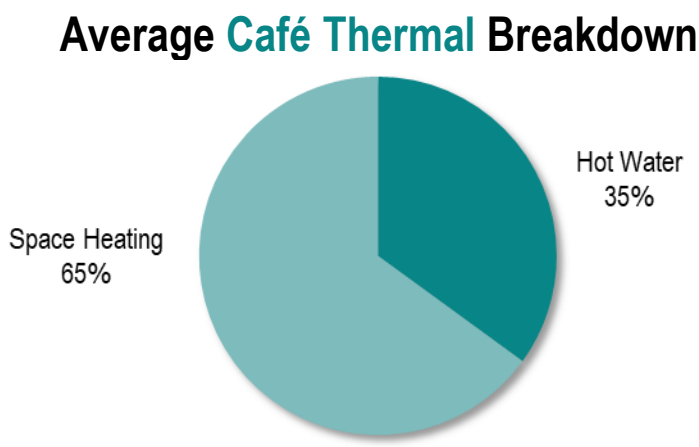

Figure 20: Average Café Thermal Breakdown

65% of thermal heat is attributed to space heating, while a significant portion, 35%, is associated with hot water. This is noteworthy when looking at opportunities. This can vary substantially based on the café but in most cases the share of hot water increases which presents opportunities that are highlighted later in the document.

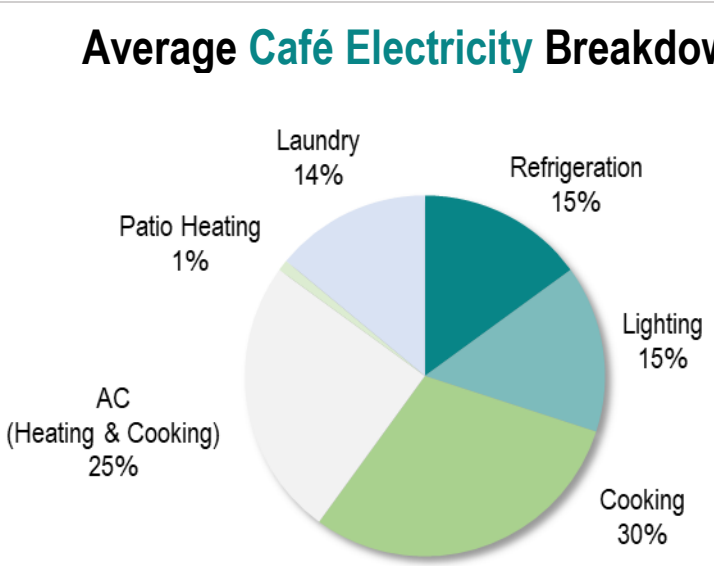

Figure 21: Average Café Electricity Breakdown

This breakdown can vary significantly per café and can also vary seasonally especially for locations which serve food for some of the year. One of the largest energy consumers is hot beverages, which account for a significant portion of the 30% cooking demand.

Campsites & Carvan Parks

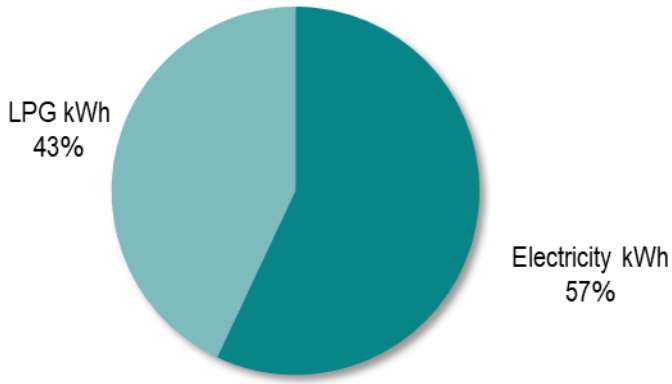

Figure 22: Average Campsite Fuel Source Breakdown

Campsites & caravan parks are unique compared to other businesses in the community because electricity consumption is dominated by appliances customers bring with them in their mobile homes and caravans, this also means that the business can submeter their electricity consumption and charge them upon check out.

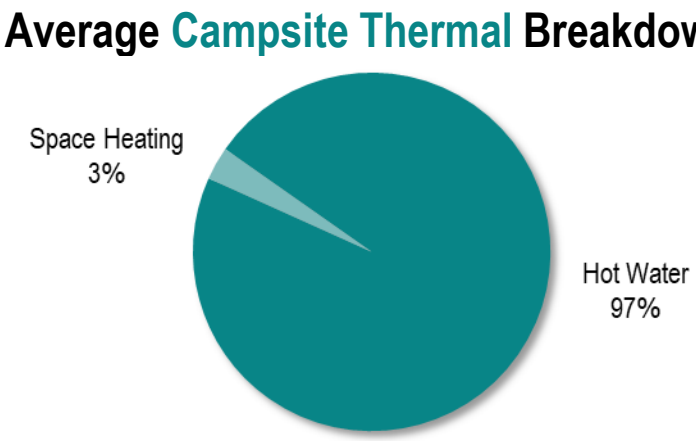

Figure 23: Average Campsite Thermal Breakdown

Thermal energy use at campsites and caravan parks is dominated by water heating, hot water is provided in communal shower areas and with only a very small amount of space heating needed in this building throughout the year.

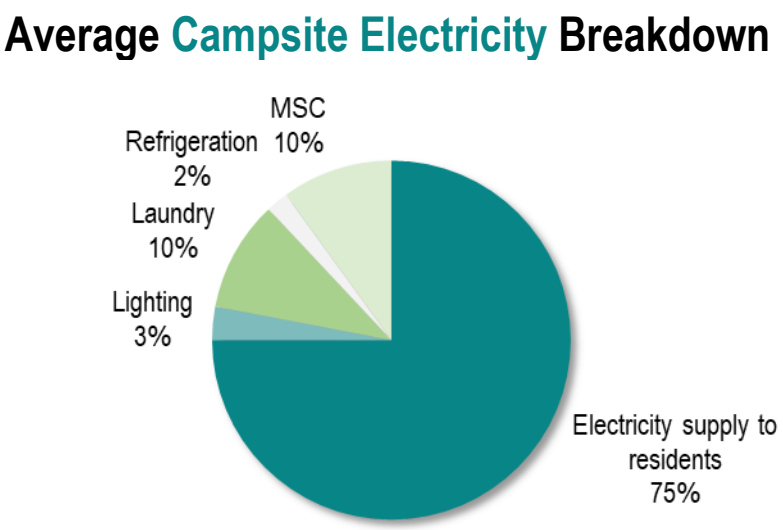

Figure 24: Average Campsite Electricity Breakdown

Outside of electrical supply to residents, the laundry machines are the next biggest user of electricity. Lighting consumption has reduced much in recent years with the installation of LED lighting now being commonplace.

Activity Provider / Visitor Experience/

One of the challenges of assessing the energy demand of the activity providers and visitor attractions in the community is the diversity and variability of their energy profiles. Some providers and attractions use only one fuel type, while others use a mix of different fuels, such as electricity, gas, oil, wood, or other renewables. Some have high energy demand throughout the year, while others have seasonal peaks and lows. To capture the collective energy demand of this sector, we aggregated the data on the fuel types used by each provider or attraction and calculated their percentage of the total energy demand. The table below presents the results of this analysis.

The figure below shows the breakdown of the fuel types used by the activity providers and visitor attractions in the community.

Fuel type	Percentage of total energy demand
Electricity	51%
Gas	0%
Oil	8%
Solid Fuel	2%
Transport Fuel (Diesel)	35%
Other renewables	5%

Table 1: Breakdown of the Fuel Types Used by the Activity Providers and Visitor Attractions

The output of this section allows opportunities to be explored later in this document, which could be adopted by some members but not all, given the diverse nature of activities and attractions (Aquarium, Kayaking, Boat Tours to name a few).

Register of Opportunities

The aim of the register of opportunities is to appreciate, summarise and prioritise projects and highlight key metrics that will be important elements for any future grant application or decision-making process for the community. It allows for the coordinated and disciplined approach to action for the community using coordinated resourcing, planning, and budgeting for projects over a multi annual plan.

After reviewing and analysing the output of audits and monitoring, it was possible to demonstrate common opportunities across all the categories of the community which should be considered for accelerated implementation. Measures and opportunities which are common across all categories are:

1. Energy Rate
2. Solar PV
3. Fabric Upgrades
4. LED Lighting
5. Refrigeration Upgrades
6. Heat Recovery
7. Space heating Upgrades
8. Water heating Upgrades
9. Electrification of fleet
10. Substitution of transport fuels to biofuels

Based on the clear ROI, impact, and appetite for the first two measures, a decision was made to immediately progress these in parallel to the master planning exercise. These specific opportunities and efforts are discussed in their relevant sections below.

Energy Rates

For all energy baseline calculations & return of investment calculations, values are based on the SEAI Comparison of Energy Costs – Q1 2024. (SEAI, 2024)

Fuel	Form	Unit of Supply	Average Price per Unit (€)[1]	Gross Calorific Value (kWh/unit)	Delivered Energy Cost cent/kWh	Percentage change since 1 October, 2023	Percentage change since 1 January, 2023
Coal [2]	Industrial Fines	**Tonne**	n/a	7759.2	n/a	-	-
Oil [3]	Gas Oil 10ppm	**Litre**	1.207	10.55	11.45	-14.2%	-8.2%
	Light Fuel Oil	**Litre**	n/a	11.21	n/a	-	-
	Medium Fuel Oil	**Litre**	n/a	11.32	n/a	-	-
	Heavy Fuel Oil	**Litre**	n/a	11.45	n/a	-	-
L.P.G.	Commercial Cylinders	**kg**	2.294	13.96	16.43	+0.1%	-10.9%
	Bulk L.P.G. (0-3 tonnes) [4]	**Litre**	1.005	7.09	14.17	-	+3.3%
	Bulk L.P.G. (3.1-40 tonnes)	**Litre**	0.856	7.09	12.07	-	+0.7%
Wood [5]	Fuel Chips (35% moisture)	**kg wet**	0.162	3.2	5.06	-	-0.6%
	Pellets bulk delivery [6]	**kg**	0.494	4.8	10.29	-	-10.8%
	Pellets bagged	**kg**	0.572	4.8	11.91	+2.0%	+1.1%

Fuel	Form	Unit of Supply	Average Price per Unit (€)[1]	Gross Calorific Value (kWh/unit)	Delivered Energy Cost cent/kWh	Percentage change since 1 October, 2023	Percentage change since 1 January, 2023
Natural Gas [7]	Band I1: <278 MWh per annum	kWh	0.1411	1.0	14.11	-	+4.9%
	Band I2: >=278 <2,778 MWh per annum	kWh	0.1053	1.0	10.53	-	-8.0%
	Band I3: >=2,778 <27,778 MWh per annum	kWh	0.0815	1.0	8.15	-	-6.8%
	Band I4: >=27,778 <277,778 MWh per annum	kWh	0.0665	1.0	6.65	-	-0.0%
	Band I5: >=277,778 <1,100,000 MWh per annum	kWh	0.0602	1.0	6.02	-	-37.0%
Electricity [8]	Band IA: <20MWh per annum	kWh	0.4033	1.0	40.33	-	+0.7%
	Band IB: >=20 < 500 MWh per annum	kWh	0.3872	1.0	38.72	-	+10.9%
	Band IC: >=500 < 2000 MWh per annum	kWh	0.3070	1.0	30.70	-	-1.6%
	Band ID: >=2000 < 20,000 MWh per annum	kWh	0.2581	1.0	25.81	-	-3.3%
	Band IE: >=20,000 < 70,000 MWh per annum	kWh	0.2434	1.0	24.34	-	-1.7%
	Band IF: >=70,000 < 150,000 MWh per annum	kWh	0.2578	1.0	25.78	-	+9.0%
	Night rate[9]	kWh	0.1613	1.0	16.13		

Table 2: Comparison of Energy Costs – Q1 2024. (SEAI, 2024)

Electricity Supply

Tariff Structure

A night rate tariff is more cost effective for anyone who consumes at least 30% of their electricity during 'off-peak' times. During the winter, these times are from 11:00 to 08:00 and in the summer from 00:00 until 09:00.

A noteworthy point is that the installation of solar PV will change the percentage of day rate energy versus night rate and an evaluation of night rate tariffs is advisable post installation of PV.

Domestic Vs Commercial

Many of the smaller businesses are on domestic tariffs, this is often because the business owner lives or once lived on the property. This is of interest because commercial energy is typically cheaper than domestic energy, primarily due to a lower unit rate. This is because businesses use more energy in a year than a household. Business contracts also tend to be longer contracts that can last years. Because they are more restrictive, suppliers are more open to offering cheaper rates. There are several suppliers which offer "dom com" rates if you can demonstrate a commercial business operated from your domestic connection. This unlocks commercial rates in the domestic world, but it does usually come with a higher contact breakout penalty.

Electricity Rate

Throughout the project we came across many businesses that had not changed electricity provider in the past 2 years. When it comes to getting the best value possible, it is advisable to shop around for a new plan every 12 months, one way of making this less time consuming is to recruit an energy broker, they go out to the market on your behalf and negotiate the best deal possible for you.

Fixed Vs Flexible Tariff

A fixed rate tariff guarantees the price of your energy for a set period (usually 12 months). Fixed rate tariffs are designed to protect you from energy price rises. If you are on a fixed rate tariff, these price increases will not be passed on to you, and your cost per unit (kWh) will remain the same. During the energy crisis, most fixed rate tariffs available to new customers were more expensive than variable rates. This may change as prices continue to stabilise. Prices on a variable tariff can go up or down according to the market. So, if prices fall, you could benefit from cheaper energy bills. However, you will pay more when they rise.

	Advantages	Disadvantages
Fixed rate	• As the cost of your energy remains the same, it can be easier to budget. • Your cost per unit will not be affected by price hikes in the energy market.	• If you want to leave your contract early, you may be charged an exit fee, which could be costly. • If the cost of energy falls, you won't benefit from cheaper bills.
Flexible rate	• Flexible, there is no early exit fee. • If energy prices fall, you can benefit from cheaper bills.	• If energy prices go up, so will your energy bills. • Payments can fluctuate, which makes budgeting more difficult.

Table 3: Fixed vs Flexible Tariff

Energy Tariffs Summary

Based on the data set gathered we estimate that the community stands to save 12% on the cost of electricity if all businesses are on the best tariff possible, this would result in a saving of €255,856/year for the community. This is the easiest route to significant energy savings highlighted in this report and does not require any upfront investment. Additionally, what was found during the project was that most of the larger businesses were already on a very competitive tariff and it was the smaller ones that stood to gain the most, many businesses that switched during the project saved 30-40%.

LPG Supply

Liquified Petroleum Gas (LPG) is consumed by the community in two forms,

Bulk Gas: Propane gas in tanks which are filled by gas tankers.

Propane cylinders:

Propane gas in portable red cylinders of different sizes, usually in tall red 47kg cylinders, each one of these contains around 680 kWh of energy.

Bulk Gas is almost 30% cheaper per kWh than propane cylinders or 'bottled gas'. The vast majority of business in Dingle town do not have space to facilitate a bulk LPG tank and have no option but to use bottled gas.

Additionally, customers with a bulk gas tank have the option to purchase BioLPG. BioLPG is identical in appearance and performance to conventional LPG. It is used for the same applications and equipment and transported and stored in the same tanks. There is just one important difference – how it is produced. BioLPG is renewable and can be made in several ways using different technologies and thermal or chemical processes. For example, BioLPG is often a co-product of sustainable aviation fuel production or through gasification processes. Feedstocks for BioLPG include cooking oil, animal fat, vegetable oil, waste, plant dry matter, sugar, and starch.

Energy Efficiency Upgrades

Lighting

Lighting consumption varied from business to business, and many had already replaced old CFL bulbs with new LED ones, it is estimated that around 40% of the bulbs being used by the community are CFL. Upgrading to LED bulbs will save 40-60% on energy consumption. Additionally, most business have not deployed motion sensors in toilet or backrooms storage areas. Upgrading all the lighting to LED and using motion sensors, where practical, should save 292,035 kWh/year or €87,610.47/year.

Appliances

During the project, it was noted that much of the catering equipment in use was over 20 years old. Any equipment with high operational hours should be considered for replacement with more modern alternatives. The best examples found during this project were:

- Dishwashers
- Fridges
- Electric ovens
- Washing machine/tumble dryer

In most instances energy savings of around 30% can be achieved with modern energy efficient equipment. Upgrading all the appliances in 150 locations should save 525,000 kWh/year or €157,000/year.

Micro Generation

Micro Generation Solar PV

Solar PV is the most prevalent form of microgeneration in Ireland today, it can present an attractive investment opportunity provided the rate of self-consumption is high. A 6kVA solar south facing installation will typically generate 5,200 kWh/year in southwest Ireland. Self-consumption is the proportion of the electricity this is consumed within the business. If all the energy from the solar PV is self-consumed it should result in a payback period of less than 4 years.

Upgrading to solar PV at 150 locations should save 2,628,000 kWh/year or €657,000/year.

Using the energy profiles gathered from the energy monitoring we are able to simulate how solar PV might have performed if it was installed on each category. Our findings are summarised below:

Late-night Restaurant

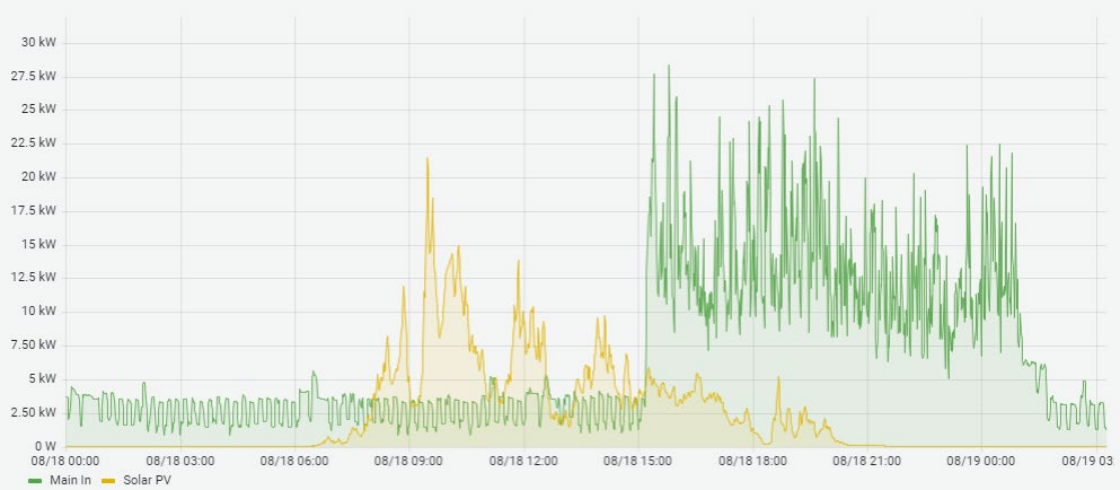

Figure 25: Late-night restaurant energy consumption profile Vs solar PV generation profile.

Figure 25 is a graphical representation of how a south facing solar PV install might integrate with a later night restaurant. Without substantial energy storage, whether through battery energy storage or thermal storage for hot water, a significant portion of the electricity generated by the solar PV system will be exported to the grid. As a result, the payback period for the system will be longer compared to premises with higher self-consumption, making it dependent on the export tariff provided by the electricity supplier. An east-facing array would better align with the consumption profile and could potentially be more cost-effective if properly sized.

Large Guesthouse B&B

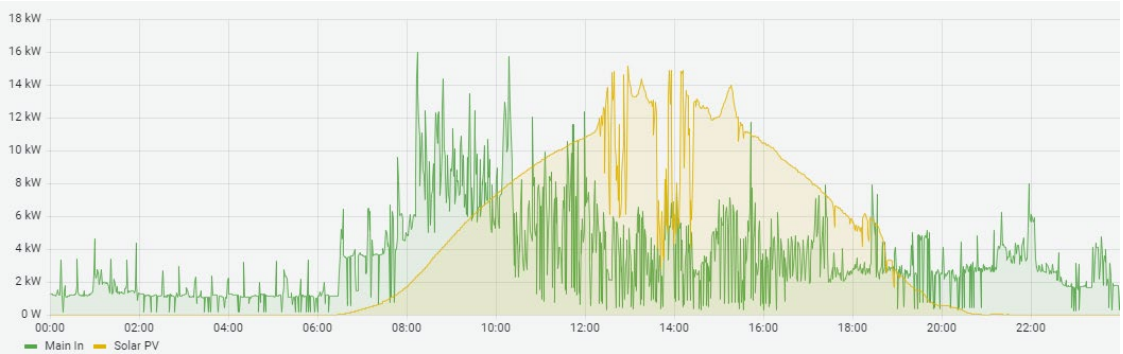

Figure 26: Large Guesthouse energy consumption profile Vs solar PV generation profile.

Figure 26 is a graphical representation of how a south facing solar PV installation might integrate with a large guesthouse. The level of self-consumption is relatively strong here throughout the day, however a south-east facing solar PV array would match the premises needs better.

Pub

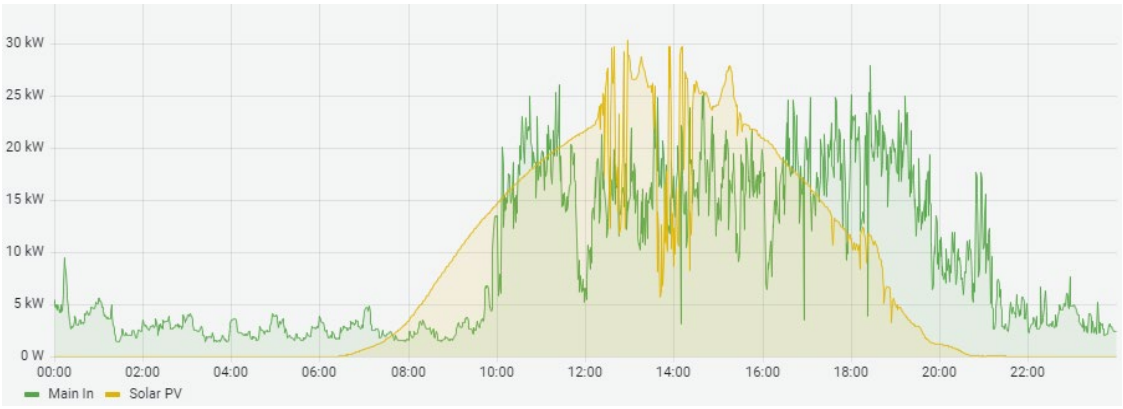

Figure 27: Pub energy consumption profile Vs solar PV generation profile.

Figure 27 is a graphical representation of how a south facing solar PV install might integrate with a large pub. Their solar generation profile aligns very well with consumption resulting in almost 100% self-consumption. As you can see from the curve, it is crucial to 'right-size' the installation to minimise surplus energy generation.

Fabric Upgrades

Fabric upgrades in the community present substantial increases in energy efficiency but considerable capital outlay. While there are supports available for such upgrades, the impact of works, loss of revenue and long payback (10-30 years) means that these efforts are best aligned with long term plans and predetermined closures. While it favours seasonal businesses who close to get works completed, the fact that the building use is seasonal pushes out the payback significantly. For these reasons, the appetite and ability for the community to collectively enhance fabric is limited to shallow measures such as:

1. Pump cavity walls.
2. Replacement of glazing, windows, and doors.
3. External wraps.
4. Attic insulation.

Upgrading Fabric at 169 locations should save
5,416,000 kWh/year or €542,000/year.

Refrigeration Upgrades

There is a substantial amount of refrigeration equipment within the community primarily associated with the following:

1. Cold storage of food (cold rooms, freezers, freestanding units)
2. Cold storage of drinks and minerals (keg rooms, beer coolers, mineral fridges)

The expected efficient lifespan of any of these units is between 5 and 10 years. When auditing businesses in the community it was clear that there is an even spread of plant ranging from 0-30 years old. A unit over 10

years old will tend to be 10-15% less efficient than a new equivalent. Additionally, many audited sites have multiple 'split-twin' units that, when they reach the end of their lifespan, can be replaced with a single high-efficiency outdoor unit. Replacing five units with one variable compression system can yield an efficiency gain of 35%, while simply swapping like for like typically results in only marginal energy efficiency improvements. This also unlocks opportunities for heat recovery which is covered in the next section.

Heat Recovery

Heat recovery is a technology which recovers heat being generated from the cooling process in the refrigeration section above. Waste heat is transferred into water which can reach temperatures of up to 70C and can be used in other processes in the business to offset Gas, LPG, Kerosene or electrical heating bills. The key requirements for heat recovery to be suitable for your business is that there is suitable substantial cooling onsite (centralised) AND a substantial requirement for hot water (i.e. large accommodation related hot water demand, substantial kitchens, swimming pools, large and constant space heating demand). This technology can be “bolt on” and quickly deployed if there is a centralised cooling system in place and is most applicable to restaurants (preferably with accommodation overhead), large pubs with kitchens, and hotels.

Introduction of Heat recovery in 14 locations should save
113,000 kWh/year or €13,330/year.

Space heating Upgrades

Most sites audited are suitable for low-cost measures which can be deployed to reduce losses and inefficiencies. Examples of this are using smart controllers/timers on heating, thermostats and lagging of pipes and tanks which are currently uninsulated.

Opportunities exist to tune existing heating systems to ensure they are running optimally. For example, a traditional LPG or kerosene condensing heating unit which is not operating efficiently can drop from 90% efficiency down to 50% efficiency.

Space heating is a process which is highly reliant on many external factors and the building fabric. It can be difficult to isolate as opportunity if the building fabric has a moderate to high heat loss.

In a situation where the building has a low heat loss (HLI of less than 2.4), heating can be supplied using heat pumps which can reduce energy consumption by up to 75%.

In a situation where the building has a higher heat loss (HLI of 2.5 up), heat pumps may not work well and alternative sources of heating using biomass, bioLPG and HVO should be explored. Most of these measures do not bring an energy or cost efficiencies therefore the suggested projects will not include the use of these technologies.

Upgrading space heating in 169 locations
should save 2,166,000 kWh/year or €584,000/year.

Water Heating Upgrades

Most sites audited are suitable for low-cost measures which can be deployed to reduce losses and inefficiencies. Examples of this are using smart controllers/timers on heating, thermostats and lagging of pipes and tanks which are currently uninsulated.

Opportunities exist to tune existing heating systems to ensure they are running optimally. For example, a traditional LPG or kerosene condensing heating unit which is not operating efficiently can drop from 90% efficiency down to 50% efficiency.

Smart water pumps in the heating system can reduce pumping costs by up to 90% in comparison with a standard equivalent.

Water heating is a process which is not reliant on many external factors and can be isolated as opportunity for energy efficiency separate to space heating. The ability to easily separate water and space heating circuits varies per business. In a situation where water heating can be separate, there is an opportunity to leverage several technologies to reduce costs and emissions. The primary technology available to deploy is heat pumps which can reduce energy consumption by up to 75%.

Upgrading water heating in 169 locations
should save 1,152,000 kWh/year or €106,000/year.

Electrification of fleet

The EMP exercise does not include "grey fleet" data or operations associated with the Grey Fleet. The opportunities below relate to the company owned fleets across the community of which there is an estimated 50 vehicles.

The use of electric vehicles presents an opportunity to reduce energy consumed by the community by 19% and reduce CO_2e by 17% with an estimated payback of 4-6 years. It would be possible to complete this change in the medium term in line with depreciation of transport assets and procure electric at the next opportunity available. Alternative options in the area of leasing could also be explored as a collective.

Converting the fleet of 50 vehicles to EV
save 5,816,000 kWh/year or €550,000/year.

Substitution of transport fuels to biofuels

HVO (Hydrotreated Vegetable Oil)

HVO is a low-carbon biofuel that serves as a direct replacement for regular diesel. HVO is made from vegetable oil and fats which i.e. waste plant matter. Unlike conventional biodiesel, hydrogen is used as a catalyst instead of methanol, which makes HVO a cleaner burning fuel, and ensures a longer shelf life. HVO is safe to mix with regular diesel at any volume, so there is no need to make any changes to existing equipment. It is 100% interchangeable with regular diesel.

The use of HVO does not reduce energy consumption or air quality, however the biofuel lifecycle contains 91% less carbon than traditional diesel. This opportunity can reduce the total CO_2e emitted by the community by 26% with immediate effect. The downside to this is that HVO costs more than diesel and the community

would be at a deficit of €60,000 per annum. A suggested opportunity would be for the community to directly negotiate a price with a large distributor of HVO which could potentially match forecourt prices. This is common practice with large fleet operators.

Anaerobic Digestion

The development of anaerobic digestion and biomethane production presents a significant opportunity for both the tourism and hospitality sector and the agriculture sector to work together towards deep rural decarbonisation. By using agricultural by-products like slurry and silage to produce biogas, local farms can generate additional income, which supports their economic viability. Meanwhile, the tourism and hospitality sector can use the locally produced biomethane as a sustainable fuel for cooking, boats, and bus fleets, promoting the area as a Sustainable Destination. Dingle Hub is developing a proposal to explore the potential for a micro-scale demonstration facility on the Dingle Peninsula. This project will focus on developing the optimal feedstock recipes and business models, aiming to process local biomaterials, such as local wool, and prepare the community for future decarbonisation targets beyond 2030. This demonstrator facility would first be established on a not-for-profit, research basis with the goal of developing a profitable business model that can be proposed for community-led investment for the future.

Electric Vehicle Charging Infrastructure

An EMP doesn't usually look at EV charging, but we know that this is something to highlight for this industry as 30% of Ireland's car rental fleet is expected to be electric by 2030. All B&B's, guesthouses and hotels can't install EV chargers as it will cause too much pressure on the grid so it will be important to look at innovative solutions in the midterm. These could include:

- Exploring a combination of Solar PV and battery storage solutions directly linked to car charging would address grid infrastructure challenges.
- Enhanced promotion of public transport and electric bike use while visitors are on the peninsula will reduce the energy demand. A feasibility study for the development of e-mobility hubs on the peninsula was completed by Fáilte Ireland in 2023. Progressing the proposed plans to implementation should be considered as part of this plan.
- At the time of writing, the Zero Emissions Vehicles Ireland (ZEVI) initiative is seeking suitable locations to conduct a shared EV charging pilot programme, similar to an Airbnb model for domestic driveways or local businesses. The aim is to utilise existing or potential charging points in areas with limited off-street parking. A centralised application to manage booking and payments of the chargers for hosts and users will play a central part in the project. It is anticipated that market facilitators will be appointed shortly to explain how it all works, to engage locally and to encourage sign up. This approach allows EV owners to access reliable charging options (and parking) and encourages those considering an EV purchase. It will help build confidence in charging availability, benefiting areas like the Dingle Peninsula while awaiting grid infrastructure upgrades.

Roadmap

From the register of Opportunities, we have identified the following potential suitable projects to be achieved by 2040. Combined, they can reduce the TED of the community to 7,422 MWh, a reduction of over 74% with an overall carbon reduction of 85%. Collectively all actions present the equivalent outcome of building 4 grid scale solar farm (5MW each). This would cost €20,000,000, take up 120 acres of land take a long time to get permitted and implemented.

A breakdown of this reduction both in energy source and opportunity is shown below.

Project	Target Number of Deployments	Annual TED Reduction (MWh)	Annual CO_2 Reduction (tCO_2)	Annual Savings (€)	Potential Grant Aid (€)	Estimated Cost Post Grant (€)	Time to implement (€)	Reduction in overall CO_2e
Energy Tariff	150	0	0	€255,856	€-	€-	2-4 months	0%
Solar PV	150	2,628	880	€657,000	€600,000	€3,000,000	2 - 3 years	11%
LED Lighting	200	200	67	€60,000	€100,000	€100,000	less than 1 year	1%
Upgrading Appliances	150	525	176	€157,500	€750,000	€750,000	6-12 months	2%
Electrification of fleet	100% (50)	5,816	1352	€550,099	€3,489,473	€3,000,000	4-6 years	17%
Fleet substitute to HVO	100% (50)	-	2094	-€59,597	€-	€-	immediate	26%
Heat Recovery	14	113	35	€14,000	€50,000.00	€70,000.00	2 -3 years	
Fabric Upgrades	169	5,416	1392	€541,607	€1,404,000	€5,616,000	10 - 15 years	17%
Space heating Upgrades (ASHP post fabric)	169	2,166	1899	€584,936	€845,000	€3,380,000	5 - 15 years	23%
Water heating Upgrades	169	5,316	1152	€106,314	€507,000	€2,028,000	3 -10 years	14%

Table 4: Energy Reduction and Opportunities

We now need to assess each project based on what the individual or the community needs to do to execute and deliver the project. The community is driven by a number of factors of which 4 are most important to ensure its sustainability and resiliency into the future:

1. Biggest opportunity to reduce CO_2e
2. Fastest Return on Investment
3. Best CO_2e reduction per year
4. Most cost effective CO_2e reduction per Euro spent

The following Table ranks the opportunities against these factors, with a score of 1 being the best and 10 being the least impactful:

	Biggest opportunity to reduce CO_2e	Fastest Return on Investment	Best CO_2e reduction per year	Most cost effective CO_2e reduction
Energy Tariff	10	1	10	10
Solar PV	6	3	4	2
LED Lighting	8	2	8	8
Upgrading Appliances	7	4	7	3
Electrification of fleet	3	9	3	7
Fleet substitute to HVO	1	10	1	1
Heat Recovery	9	5	9	4
Fabric Upgrades	4	8	5	9
Space heating Upgrades (ASHP post fabric)	2	7	2	6
Water heating Upgrades	5	6	6	5
Energy Audit	NA	NA	NA	NA

Table 5: Opportunity Rankings

To summarise the RoO, there are almost €18,000,000 worth of projects involved in the decarbonisation of the SEC which is projected to reduce costs per annum by more than €3,000,000 presenting a simple payback of 6 years or a rate of return of 45% over 10 years for a community investment.

If all opportunities highlighted were to be implemented, the 75% reduction in energy would reduce carbon emissions by 85%. This equates to 7,000 tonnes of CO_2e per annum or the equivalent of 1700 acres of natural forest.

Opportunities of note per category.

While no two businesses are the same, this section aims to highlight a prioritised approach which best lends itself to each category of business in the community.

The best way to realise a structured plan and route forward for your business is to engage in an SSEA Audit similar to audits which were conducted within this EMP exercise. SSEA Audits are supported by SEAI and allow the business to fully appreciate options and chart out a plan specific to their business and circumstances.

Project	B&B	Hotel	Pub	Café	Restaurant	Campsite	Activity Provider
Energy Tariff	1	1	1	1	1	1	1
Energy Audit	2	2	2	2	2	2	2
Solar PV	3	3	3	3	3	3	4
LED Lighting	5	4	5	5	6	4	3
Upgrading Appliances	4	9	4	4	5	5	7
Electrification of fleet	9	11	11	11	11	8	6
Fleet substitute to HVO	10	10	10	10	10	7	5
Heat Recovery	11	5	6	7	4	11	11
Fabric Upgrades	7	7	8	8	8	9	9
Space heating Upgrades*	8	8	9	9	9	10	10
Water heating Upgrades	6	6	7	6	7	6	8

**ASHP post fabric*

Table 6: Significant Opportunities by Category