

Kinmel Bay Community Building

Carbon Report and Reduction Plan

April 2026



1. Contents

2.	Overview	2
3.	Current State.....	3
3.1	Building Fabric	3
3.2	Heating and Domestic Hot Water	3
3.3	Cooling	4
3.4	Ventilation.....	4
3.5	Lighting	4
3.6	Process / Small Power Equipment.....	5
3.7	Building Use	5
4.	Energy Consumption and Carbon Emissions	5
4.1	Energy Monitoring.....	5
4.2	Reporting Boundary	6
4.3	Data Collection	6
4.4	Scope 1 Emissions	6
4.5	Scope 2 Emissions	6
4.6	Building Performance	7
5.	Decarbonisation Plan	8
5.1	Fabric Upgrades	8
5.2	Heating	8
5.3	Renewables and Storage	9
5.4	Lighting Upgrade	11
5.5	Energy Monitoring.....	11
5.6	Electric Vehicle Charging Points.....	11
5.7	Electricity Procurement	12



2. Overview

Kinmel Bay Community Centre is a multi-purpose building. It houses the Kinmel Bay Community Centre, Kinmel Bay Library and Kinmel Bay Clinic. The building is currently under the control of Conwy Borough County Council, this energy audit and recommendations report is prepared for Towyn and Kinmel Bay Town Council who are considering taking over the building.

This energy audit evaluation was prepared for Kinmel Bay Community Centre for the reporting year 2024 – 2025. The energy audit took place on the 26/03/2026.

Organisation Name: Kinmel Bay Community Centre

Background Address: Foryd Road, Rhyl, LL18 5BB

Calculated Emissions Scope 1: Direct Emissions: 23.63 tCO₂e

Scope 2: Indirect Emissions from
Energy: 3.68 tCO₂e

All information, intensity metrics and recommendations contained within this report are accurate at the date of issue.



3. Current State

3.1 Building Fabric

The building was constructed in 1986. The building consists of a main, slate covered, pitched roof area which contains the community centre and the western end of the clinic. This part of the building is connected to two areas of single storey, flat roofed areas to the east and south. The eastern flat roofed area contains the rest of the clinic while the southern area contains the entrance hall, toilets, library and plant room.

The building is of brick cavity wall construction. It is not possible to determine whether there is any insulation within the cavity without access to the original design drawings or physical investigation, but anecdotal evidence suggests the cavity is unfilled.

The windows within the community centre part of the building are a mixture of single and double glazing with noticeable draughts around some windows. Exterior doors in this part of the building have noticeable gaps and some areas of surrounding panelling are damaged.

The windows in the clinic are all double glazed.

The library was extensively refurbished in 2024. All glazing was replaced with double glazed units and roof insulation was upgraded from 70 mm to either 140 mm or 270 mm depending on what was possible.



Figure 1 Exterior View of Kinmel Bay Community Centre

3.2 Heating and Domestic Hot Water

The heating system is powered by two Hamworthy UR300 88.8 kW gas fired boilers. These boilers appear to be the original boilers installed in the building so are estimated to be over 35 years old. Each of the three parts of the building are on a separate heating loop with two pumps on each circuit. The community centre has two more modern pumps both of which work, the library and health clinic have older pumps and anecdotally only



one on each loop works. Each heating loop is fitted with a heat meter so the heat demand of each area of the building can be identified.



Figure 2 New pumps for community centre (left) and older pumps for clinic (right)

In addition to the main heating boilers there are two modern Rinnai boilers a 70 kW and 55 kW model. In total this equates to 300 kW of heating capacity in the building, this seems like an unnecessary amount and may be due to the age and reduced efficiency of the older original boilers.

The plant room is located centrally within the building so none of the heating loops are excessively long. Despite this the areas of the clinic that are furthest away from the boilers do struggle to get warm in the winter and supplementary heating, plug in portable heaters, are used in these areas. This may be due to poor circulation of the heating circuit caused by reduced pump capacity.

Heat is distributed around the building through a network of radiators. Many of these radiators have a fan to blow air over the warmed radiators to speed up the distribution of heat.

Heating controls within the building are complicated and poorly understood by the building users. This is probably a symptom of three separate organisations relying on a central heating system. During the audit a few things were noticed that point to a poorly run system. The main central heating control in the plant room was set to ON, putting the responsibility on individual unit users to set thermostats and timers in different parts of the building. The main community centre hall was set to maintain 20°C between 0700 and 2200 even though it is only used for a few hours a day.

3.3 Cooling

The only active cooling in the building is in the main community centre hall where there are two ceiling mounted rotary fans

3.4 Ventilation

Ventilation is achieved through passive means only.

3.5 Lighting

The lighting in the building is a mixture of low energy LED fittings and fluorescent fittings.



The library part of the building has upgraded all of the lighting to LED.

The community centre is mainly non-LED fittings. Of the 15 light panels in the main hall, 3 have been upgraded to LED. Non-LED lights within the community centre unit are detailed below. Some lights could not be accurately inspected due to health and safety reasons so some wattages may vary.

Room	Fitting	Quantity
Community Hall	900mm T5 49W	36
Lobby	1200mm T5 49W	1
Office	600mm T8 70W	2
Equipment Store	1800mm T8 70W	1

Table 1 Non-LED Light Inventory - Community Centre

The clinic has predominantly older fluorescent lighting with only approximately 15 % LED fittings. It was not possible to conduct a full lighting count in the clinic as some rooms were in use.

3.6 Process / Small Power Equipment

Kinmel Bay Community Centre has a low amount of small power equipment for a building of its size. It has workstations in the library and clinic and standard kitchen appliances in the kitchen areas.

There is no power intensive or heavy process equipment in the building.

3.7 Building Use

The library is open 4 days a week, with a total opening hours of 16 per week.

The clinic generally operates on standard business hours with services being available from 0900 to 1700 Monday to Friday. A total of 40 hours a week.

Information on the community centre operating hours are harder to determine as there is the possibility of irregular use from one-off bookings. According to the website there is a scheduled activity each day from Monday to Friday with a total of 18 hours a week use.

4. Energy Consumption and Carbon Emissions

4.1 Energy Monitoring

There is a complicated set up of energy monitoring and billing within the building. Each part of the building has its own electricity meter but only one single bill is produced for the building. A similar arrangement is in place for gas consumption, each unit has a heat meter installed on the heating loop so accurate readings of how much energy each unit



is using can be made. These bills are then divided between the three occupants of the building.

The library has provided a month-by-month breakdown of their energy usage showing that on average they use 212 kWh of electricity and 695 kWh of heat per month. This equates to 15% of overall electricity consumption and 7% of overall gas consumption.

The tenants are also billed on different timescales with the library receiving a bill every 6 months and Betsi Cadwalader University Health Board, who lease the clinic, being charged annually.

In the future it would be more accurate and fairer for all individual units to have a separate bill for each utility.

4.2 Reporting Boundary

The reporting boundary identifies which emission sources have been reviewed.

- Scope 1: Direct Emissions are emissions from operations that are owned or controlled by the reporting organisation.
- Scope 2: Indirect Emissions from Energy are emissions from the generation of purchased or acquired electricity, steam, heating, or cooling generated by a third party and consumed by the reporting organisation.

4.3 Data Collection

Data was collected by the responsible party of the community building and reviewed by Greener Edge. All emissions were calculated by Greener Edge. The calculation method that has been used for quantifying the emission inventory was the emissions source activity data multiplied by the emissions factor as shown in the formula below:

$$\text{Tonnes CO}_2\text{e} = \sum \text{ghg activity} \times \text{EF}$$

Where $\sum \text{ghg activity}$ equals the sum of greenhouse gas activity and EF equals the emissions factor for the greenhouse gas activity. Multiplying these gives the total quantity of greenhouse gas emissions (kg CO₂e) per activity. For example, 4000 kilowatt hours (kWh) of electricity (the greenhouse gas activity) is multiplied by 0.00019 (the emission factor, tCO₂e per kWh of electricity) to equal 0.388 tCO₂e.

4.4 Scope 1 Emissions

The Kinmel Bay Community Building is heated by gas-fired boilers. This activity is responsible for the biggest proportion of emissions, 87% of energy emissions.

4.5 Scope 2 Emissions

The dual reporting methodology has been used to report the associated emissions from electricity consumption. This reports two different figures; one figure using the location-based method, the other figure using the market-based methodology. The location-



based method calculates the emissions using a national average emission factor for grid supplied electricity. This reveals the emissions the organisation is physically putting into the air. The market-based method calculates the emissions from supplier-specific data in the form of contractual instruments, such as REGOs (Renewable Energy Guarantees of Origin) and this reveals the emissions the company is responsible for through its purchasing decisions.

Consumption data has been provided for 2024 / 2025, an annual electricity consumption of 17,782 kWh.

Scope	Activity	Quantity (kWh)	Calculated Emissions (tCO ₂ e)	
			Location-Based Total	Market-Based Total
Scope 1: Direct Emissions	Natural Gas Combustion	129,177	23.63	23.63
Scope 2: Indirect Emissions	Purchased electricity	17,782	3.68	3.68
	Total		27.31	27.31

Table 2 Kinmel Bay Community Centre Energy Emissions

4.6 Building Performance

The Kinmel Bay Community Centre has a Display Energy Certificate (DEC) issued in 2014. This certificate is now out of date, and the building should have been re-evaluated and a new certificate issued in 2024. The DEC shows a building score of 96, which puts the building in category D. This score may well have improved due to the refurbishment of the library.

Metric Category	Intensity Metric	Calculation Method
Building Emissions Rate	38.30 kg CO ₂ e / m ²	Based on building measurements and carbon emission calculations
Electricity Consumption Rate	24.94 kWh / m ²	
Gas Consumption Rate	181.17 kWh / m ²	
Total Energy Consumption Rate	206.11 kWh / m ²	

Table 3 Building Performance Metrics



It is difficult to make comparisons to benchmark building performance standards given the variety of uses and occupation levels of the different areas of the building. However, current building performance metrics can be used as a basis for measuring improvements.

5. Decarbonisation Plan

5.1 Fabric Upgrades

In order to support low carbon heating technology, it would be advantageous to upgrade some elements of the building fabric.

The first and most important thing to address is the necessary routine maintenance tasks within the building. Some elements of the building are damaged or poorly maintained and are contributing to excessive heat loss and security issues. During the audit it was noted that there is no letter box cover on the front door, gaps were noticeable around fire doors and in some cases panelling around fire doors was not secure.

Upgrading any remaining single glazed windows would also provide improved thermal insulation and security benefits. Most glazing units within the building have already been upgraded to double glazing but there are still some in the community centre that could be replaced.

The library has already upgraded the roof insulation during the 2024 refurbishment. It is recommended that in other areas of the building the insulation is also upgraded. There is a suspended ceiling in the main community centre hall

5.2 Heating

It is recommended that each part of the building is supplied by a separate heating source. This may initially seem like an overcomplicated recommendation with higher than necessary initial outlay, but it is deemed to be the best overall solution. The three different parts of the building have different usage patterns and are used for different activities which leads to different heating requirements. Having standalone systems for each entity within the building would also give each unit greater control over their energy use and bills.

The main aim for the entire building is to switch to an electrified heat source. This eliminates the use of fossil fuels within the building and allows for further decarbonisation by self-generating renewable electricity. A common form of electrifying heat is through air source heat pumps (ASHP). ASHPs come in two main categories, Air to Water systems and Air to Air systems. Air to Water systems work best when allowed to maintain a constant temperature for a prolonged period of time and are not designed to heat a space quickly. Air to Air systems provide quicker response times and can be used for shorter periods.



It is recommended that the clinic installs an Air to Water ASHP. This would feed a network of new, larger and more efficient radiators to heat this part of the building. Due to the longer service hours and 5 day a week use Air to Water is seen as an appropriate technology.

For the library and community centre, with their reduced opening hours then an Air-to-Air ASHP would be a better fit. Both units already have an element of blown air heating with both areas having fan assisted radiators. Providing heat from a heat pump rather than a gas-fired boiler is a much more efficient method of heating with ASHPs capable of providing 3kW of heat per 1 kW of energy consumed compared to gas' 0.9 kW of heat for every 1 kW of energy consumed.

Having three separate heating systems allows each entity within the building to be responsible for their own energy consumption and allows for a variety of technologies that suit the use of every unit.

Domestic hot water within the building would need to be provided by point-of-use electric water heaters in the parts of the building heated by Air-to-Air systems. It would be possible for the clinic to have hot water provided by the Air to Water ASHP but unless the hot water consumption is high then point-of-use heaters would probably be the best option here too.

5.3 Renewables and Storage

The building has excellent potential for solar photovoltaic (PV) panels being installed on the roof. The roof space is ideal for PV as it has a southerly aspect and is not overshadowed by other buildings or trees.

Greener Edge has designed a preliminary solar PV model to help quantify the amount of electricity that could be generated onsite. The model shows that a 27.1 kWp array could be installed on the south facing roof. This array would generate 31.2 MWh of renewable electricity annually. When combined with a 43.7 kWh battery this could provide 89% of the buildings current electrical demand as well as a modest income stream from exported excess electricity.





Figure 3 Potential Siting of PV Array

Greener Edge expect the cost of the 27.1 kWp PV array to be around £25,000 and a 43.7 kWh battery to be around £10,000. The total cost of the system would be c. £35,000.

Source	Consumption kWh	Emissions Factor kgCO ₂ e/kWh	Savings £	Savings kgCO ₂ e	Cost £	ROI Years
PV	11,881	0.17700	2,931.04	2,102.94	25,000	8.53
Battery	4,100	0.17700	1,011.47	725.70	10,000	9.89
Total	15,981	0.17700	3,942.51	2,828.64	35,000	8.88

Table 4 PV Array and Battery Benefits

Table 4 shows the potential financial benefits of installing a PV array. In the absence of specific unit price data for the building the current OFGEM Energy Price Cap has been used to calculate savings. In addition to these savings there would be the potential to earn money from electricity exports. The model shows 15,364 kWh of excess generation; at a Smart Export Guarantee price of 10 p/kWh this would be an annual income of around £1,500.

This model has been sized to the current electrical demand of the building. There is space on the areas of flat roof for expanding the array which would generate more electricity. This may be of interest if electrifying the heating system which will lead to an increase in electricity demand.

It would also be possible for the three separate entities within the building to have their own individual arrays to promote independence. This is probably a good idea for the library as they have suitable roof space and are a low energy consumer. For the clinic, which is presumed to be the highest energy user, utilising the best roof space on the pitched roof makes more sense.



5.4 Lighting Upgrade

Greener Edge recommend that all existing non-LED light fittings are replaced with low energy LED substitutes. This has already been completed in the library, due to this the library's electricity consumption has been removed for these calculations.

Replacing non-LED light fittings with low energy LED fittings should save in the region of 50% of lighting energy consumption for each fitting changed. As lighting is likely to make up a significant portion, c. 25% of the overall electricity use of the building this intervention will result in noticeable savings.

Based on the above assumption, the current annual electricity consumption for lighting is 3,800 kWh. Replacing all non-LED fittings will save 1,615 kWh. This would mean savings of 0.29 tCO₂e and £400.

The cost of replacing the light fittings is estimated to be £1,800. This would give an ROI of 4.5 years.

5.5 Energy Monitoring

Energy monitoring helps to evaluate the performance of the building and to quickly identify any anomalies that may require attention. The first step to energy monitoring is to sign up for a Smart Meter that will give access to half hourly (HH) electricity consumption data. Making sure that this data is regularly analysed is key to improving the energy performance of the building. It is important that those paying the bills have access to energy consumption data.

While simply installing energy monitoring capabilities will not reduce energy consumption it is an important tool in reducing unnecessary energy consumption and improving operational efficiency. As a result of actions taken, informed by energy monitoring data, a saving of 10% of electricity consumption can often be achieved. At Kinmel Bay Community Centre this would equate to a saving of over £440 per year on electricity. Installing a Smart Meter would be free of charge, contacting the electricity provider and requesting one is all that is required.

Accurate consumption data is important for modelling building performance and calculating accurate emissions.

5.6 Electric Vehicle Charging Points

Kinmel Bay Community Centre may wish to investigate the possibility of installing EV charging points in the car park. This could have the benefits of providing an income stream for the organisation and providing an important resource to the local community.

The second biggest barrier to EV ownership, apart from the cost of purchase, is charging infrastructure. Providing a publicly accessible EV charging point would allow local residents the option of changing to an EV.



There are different options for EV charge point installation. The charging point can either be bought outright, leased from an installer or the parking spaces can be leased to a EV charging company. There are advantages and disadvantages to each option.

If Kinmel Bay Community Centre wanted to buy the charging points outright, then a cost of £1,000 per charging point is to be expected.

5.7 Electricity Procurement

Greener Edge suggests undertaking a review of the current energy tariff. By switching to a 100% renewable energy tariff, backed by the REGO scheme, the organisation could eliminate all Scope 2 emissions, saving 3.68 tCO₂e per year.

The change of an energy tariff can also have minor financial benefits as well as saving carbon emissions.

There are multiple energy suppliers offering 100% REGO backed tariffs, an example of a couple are 'Ecotricity' and 'Good Energy'.

