

# Towards Net Zero Carbon by 2030

## A Case Study - St Mary's Church, Port St Mary

### Background

I am the churchwarden for St. Marys Church, a medium sized Victorian church in Port St Mary with a Sunday congregation of about 35. The church has solid stone walls, a high roof and large stained-glass windows. As such it was always a challenge to heat, particularly with a 30 year old oil boiler and the original large cast-iron pipes as the only radiators. The church was often cold for services even after leaving the heating on for 10 hours or more. The heat simply escaped faster than we could put it in, even with external polycarbonate glazing to insulate the windows.



My first reaction to the Net Zero by 2030 target, was that while I was completely supportive of the need to show leadership and good stewardship of our planet by reducing carbon emissions, I feared that our only options would be to close the building in the winter or worship huddled under blankets with hot water bottles.

### Re-ordering Project

For a number of years, the Parish had been planning to undertake a large re-ordering project, and we realised that this would be the ideal opportunity to explore how we might reduce our carbon footprint by adopting greener technologies. After talking to Henry Uniacke (a former Net Zero Carbon Officer) we realised that rather than heat the whole church, we only needed to heat the people, and that this could be done using a fraction of the previous energy total, and that the energy we needed could be supplied carbon free on the Manx Utilities (Guaranteed Green Tariff). We also realised that by heating the people we no longer needed to heat the whole church for smaller meetings and choir practice. We looked at several possible solutions: heated set cushions, under pew heaters, radiant infra-red (IR) heaters and heat pumps. All these electric heating methods have pros and cons which make them more or less applicable to individual churches.

After much thought and research, we decided upon a combination of low-glow and no-glow IR Radiant heaters from Herschell (<https://www.herschel-infrared.co.uk>). The IR heaters provide almost instant targeted heat to a particular area. To enable the IR heaters to work efficiently they are suspended over the congregation (at about 3m high). Each heater is controlled individually using a remote control (either half or full power), allowing us to direct exactly the right amount of heat where it was needed. We opted for no-glow heaters in the chancel; these are less effective but are less visually intrusive. Calculations



showed we would need at least 40kW of power to heat the congregation using a combination of 2.5kW and 3kW heaters.

As part of the re-ordering project, we also chose to upgrade our lighting system with new LED floods which have dramatically improved the light levels for services and other events. To provide sufficient power for heat and light, (not to mention the organ, kettles and other appliances) it was necessary to install a new three-phase supply rated at 48kW from Manx Utilities (negotiated with the help of Tony Thick (another former Net Carbon Zero Officer).

### **Costings**

The replacement of the heating system was just one element of a large re-ordering project. Consequently, it is difficult to provide an estimate for this part. The heaters cost between £400 and £500 each and we needed about 15 heaters (=£7,500). The other associated costs for heating and lighting came in about £20,000 (this included cabling, switchgear, labour, hoist hire, and groundworks for three-phase supply). This does sound a lot of money, in our case paid for largely from a generous legacy. However, the Church of England are making grants available to assist with capital costs.

The old oil boiler used about 5 litres per hour, so a January service with 9 hours of heating would cost £35 (at 78p per litre). In comparison the electric heaters use 40kWh for 2 hours (including warm up and after service refreshments) and only cost £26 (green tariff 33p per unit). The congregation feel a lot warmer too. This is good, but for us the real savings come at events where we would have previously heated the entire church with the oil boiler (e.g. choir practice) but we now only need to heat a smaller area (e.g. the chancel) for an hour and a half (£5).

### **Experience with the new heating system**

The work was completed last summer and has proved a great success, even in the cold days of winter. The heating is switched on just 30 minutes before a service or an event rather than up to ten hours. The congregation is a lot warmer. We no longer waste vast amounts of energy and the system is much more responsive. This has encouraged new weekly groups to use the building (ladies meeting, coffee morning/warm space, youth group), enabling us to increase our mission to the community at the same time a greatly reducing our carbon footprint.

Whilst the heaters have been a success, no solution is perfect and the radiant IR heaters do heat heads better than feet, and a couple of members of the congregation have requested (and been given) the ability to turn down the heat on their pew if it gets uncomfortable. We have also found that on very cold winter days after the heating has been on and a large congregation has been enthusiastically breathing and singing for an hour and a half, there is increased condensation on the unheated walls and ceiling. However, this is not a frequent occurrence and we have found that flushing out the warm moist air after such a service ensures that mildew doesn't form on the walls.

In line with DAC guidance, we have dropped the previous practice of maintaining the church at a base temperature when not in use. However, having a completely unheated church can carry the risk of increased damp and mould. To mitigate this, we have increased passive ventilation and installed low level electric heating inside the organ controlled by a humidstat to maintain airflow and preserve the instrument. This appears to be effective, though might not be enough in a building with a pre-existing damp problem. The advice is always to address the root cause of damp before rushing to deal with the consequences of it.

I originally predicted the new heaters would save carbon and save money. Whilst the carbon saving is indisputable (about 5000kg per year), the increased usage of the building and increased cost of electricity has rather cancelled out the predicted money saving, and in practice the effect on running costs has been largely cost neutral.

## Way Forward

Moving on from our experience at St Marys, we are now about to start a similar reordering program with low-glow IR heaters at St Catherine's in Port Erin, where the potential of saving carbon emissions is even greater than at St Mary's. Learning lessons from St Mary's, St Catherine's has a narrower nave, enabling us to wall mount the heaters, reducing visual clutter. Also, we will only use the more effective low-glow IR heaters at St Catherine's as these heat up faster and in practice the glow is not a problem.

If other churches are looking at the net zero carbon target and don't know where to start, we would always welcome be happy to welcome people to St Mary's to see what we have done, or come to visit your church to discuss the options for net-zero carbon heating in your building. One solution does not fit every church. So, while radiant IR worked for us, IR panel heaters, under pew heaters, heated pew cushions and ground or air source heat pumps (driving fan heaters / radiators / underfloor) can all have a place in our net-zero future.



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