

This document provides technical support for portable electrical heated cushions for church use. It covers the journey to selecting a system, advice on purchasing and setting up a system and on how to maintain it. Reference is made to Marown Church (Isle of Man) [case study](#) and a study in the Diocese of St.Edmundsbury and Ipswich.

Introduction:

- There are a wide variety of direct electric heating solutions, including electric radiators, storage heaters, far infrared heaters, chandeliers, pew cushions, etc. This technical advisory note refers only to PORTABLE heated cushions.
- Churches vary enormously, differing in their age, size, usage, listing, materials, current grid connections, and more. The right heating solution will also therefore vary. There are a number of useful resources available on the Church of England website. On your web browser the search term “Church of England Webinars” and “Church of England heating” will take you to relevant sections. The accessible videos are also available directly on the ChurchCare YouTube channel.

1. Portable Heated cushions for chairs or pews:

The most familiar comparison to a portable heated electrical cushion is a hot water bottle. Warming occurs by conduction, local to the point of contact with the body. A heated cushion, like a hot water bottle, can be positioned to where it is desired and brought out or stored, as necessary. They do not require faculty permissions and the energy use (and associate emissions) is minimal compared to conventional space heating.

The advantage of an electric version is that it does not cool down; the heat output can be kept constant for the duration of the service or meeting. The output can also be designed optimally so as not to confuse the body’s own thermal regulation, and achieve a comfortable level of warmth. For example, too much local warming creates contrast between the hot point of contact and the extremities of the body, making it uncomfortable, as the body does not know whether to adapt to lose heat or to retain it.

There are instances where such portable electric cushions may be suitable. Here are some suitable applications:

- If you are a smaller, especially rural church who are thinking of using the cushions on a Sunday, instead of space heating, saving money and carbon.
- If you are a larger, busier church using them mid-week and for smaller activities, to reduce the hours and/or temperature of the space heating, again saving money and carbon.
- If you wish to continue with space heating, but wish to delay putting the space heating on in autumn, and also turn it off sooner in spring.
- If you represent a DAC and would like to have a set of cushions as an emergency back-up for churches who’s heating fails. In this instance, it also allows more evaluation time to ensure an effective replacement system.

2. Choosing a system that matches your budget

OPTION 1: Self assembly

2.1. The system designed in our case study, did require thought to assemble suitable matching elements: the battery, the charger, the cushion. The only system support is provided in this guidance, so in that sense it is not for the technologically fearful. However, assembling a system yourselves comes with a considerable cost-saving and a price tag that most churches can afford.

In the case study, people were asked both about effectiveness and whether they wanted their own cushion system to charge at home. As the systems cost in the region of £20, they were affordable to most of the congregation. It makes the charging less onerous on the church and individuals may also be tempted to personalise their cushion by making a cover (that can be washed).

OPTION2: Purchase a ready made system

2.2. As well as this self-assembly option, there is a commercial system, Sit&Heat, currently being trialed by St Edmundsbury and Ipswich Diocese. It comes with bespoke design options, larger battery capacity, more robustness and is aesthetically pleasing. There is back-up support (and therefore peace of mind). The price reflects this (£120 for a base cushion and £150 for a base and back).

Comparative costs:

For a set of 30 cushions, the self-assembly system would cost in the region of £600, as compared to £3,600 for a ready-made system.

3. Managing expectations with the example of lessons from the pilot scheme

3.1. Intro.

The starting point in any survey of your energy requirements of your building is the Practical Path to Net Carbon Zero self-assessment checklist, available to download on the Church of England website, which provides a broader perspective and enables smoother navigation of what can be quite a daunting process.

3.1 Summary findings of our case study:

- It was found that the cushion enabled a feeling of core comfort for the duration of an hour-long service in an unheated church in December/January in the Isle of Man.
- However, heated cushions were shown to not warm extremities (feet, hands and head) and with this aspect it is important to manage the expectations of a congregation.

3.2 Considerations from the findings of the pilot study:

In light of these findings, and the desire to reduce the amount of space heating, Marown church in the Isle of Man, considered a number of factors that could assist with comfort. *These may not apply to your church*, but provide some potentially useful ideas.

Clothing:

Where wearing a hat or gloves inside a church is not the norm or regarded as culturally irreverent, it may require an invitation to highlight the issue and welcome personal freedom for the sake of avoiding unnecessary discomfort / risk to health.

Chairs:

Consideration was given to how well the chairs offered protection from draughts around the lower leg and the back. Open frame structures are lightweight, but are not designed for colder open spaces. Consider chairs with some form of panel / moulding on the back and as high a back as possible (without obscuring the view from those sitting behind). Failing that, a draped lightweight fleece blanket could be offered to persons more sensitive to the cold.

Carpets.

These can reduce the problem of cold feet, as the heated cushions do not prevent extremities from cooling.

Side-chapel:

Marown plan to use a currently unused side-chapel for the coldest months of January to March, where the existing eclectic IR heaters, heating the head and torso, complement the heating effect of the cushions. The insulation of walls and ceiling in the side-chapel could be improved at relatively low cost.

Ventilation:

In the case-study, there was concern about dampness in the church, if reduced space-heating was applied. Adaptations to the structure (sealed additional spaces and an extension) meant that there was need for trickle ventilation (carefully selected ducting and small fan units).

4. Technical support for Option 1 (low-cost self-assembled system) (referenced in the Marown case study)

4.1 How to find a reliable source of powerbanks / chargers and cushions.

There are three main components to setting up your system.

You will need a battery (powerbanks), a portable electric heated cushion and a way of charging your battery. In its simplest form, the battery usually comes with a USB cable which connects to the mains 3-pin socket with a standard adaptor plug or can even be charged from your laptop.

So the charging facility is not required for a single battery (if the user takes the cushion home each time), but if the church is to charge multiple batteries, then a multi-port usb charger is required that connects to a socket.

You will most likely require a cabinet for safe keeping and charging. This could be an existing cabinet.

The components are often made in the far-east and models and availability change regularly, as they are often batch-produced. Therefore, purchases are often online and you should take care to find a reputable supplier based in the UK/Europe. Many foreign-based suppliers appear to be UK based, but are not. Trustpilot is a good way to verify your supplier.

Whilst chargers and power banks are available from many sources, there is less variety in the manufacture of 5V electric heated cushions.

4.2 The technical specifications needed to purchase the parts you need

Heated cushion: A 5V system is required, NOT a 12V one. The CE certified item purchased for the case-study was EAN: WALSER 9001778166487. It is beyond the scope of this report to recommend a supplier. Putting the code into a search engine will provide suppliers of car accessories with the UK and EU, from which it can be purchased.

Battery: 1A output specified (or the cushion may turn off). Capacity recommended is 2000mAh. In theory it should deliver 1A at 5V (ie 5W) for 2.2 hours, but this is likely to be closer to between 1 and 1.5 hours in practical use, as there are losses. The upside is that the battery can be held as a gentle hand-warmer during use.

USB chargers: Multi-port 16 USB chargers are available as consumer products online. They plug directly into the mains. It is worth checking the performance from an independent verifier - such as YouTube videos by electronics enthusiasts.

4.3 Maintenance: How to store and charge a system effectively.

General advice:

- Do not leave batteries unused for extended periods of time, either in the product or in storage. You can expect it to last 2-3 years
- Consider replacing the battery with a new one if you note either of the following conditions:
 - The battery run time drops below about 80% of the original run time.
 - The battery charge time increases significantly.

Storage advice:

- Charge or discharge the battery to approximately 50% of capacity before storage.
- Charge the battery to approximately 50% of capacity at least once every six months.
- Remove the battery and store it separately from the product.
Store the battery at temperatures between 5 °C and 20 °C.

Handling advice:

- Do not disassemble, crush, or puncture a battery.
Do not short the external contacts on a battery.
Do not dispose of a battery in fire or water.
Do not expose a battery to temperatures above 60 °C (140 °F). Keep the battery away from children.
- Avoid exposing the battery to excessive shock or vibration.
- Do not use a damaged battery.
- If a battery pack has leaking fluids, do not touch any fluids. Dispose of a leaking battery pack (contact local authority for disposal).

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