All Saints Long Ashton and St Michaels Flax Bourton

Last week I visited the churches of All Saints and St Michaels. The Reverend, James, kindly gave me a tour around both churches and I met the 'Eco Group' at St Michaels.

What's the current heating situation?

All Saints:

An air source heat pump is the primary energy source of the church, supplemented by solar panels, as well as a 'green' electricity tariff. On paper the church building is 'Net Zero' and the only reason the EFT shows All Saints as having a carbon footprint at all, is due to the 'church house' being included in the calculations (which has a gas supply). The air source heat pump is connected to water tanks, which in turn, heats the water supply and the heat is given off throughout the church via radiators. The church is large, despite this, the whole church is heated quite comfortably by the current system, and a background temperature is kept low, constantly, for efficiency. The system has previously had issues with maintenance, particularly when the air temperature outside is very cold. Since a local engineer had a look at the pump and made some slight alterations, there have not been any problems this year and the heating has been reliable.

As for the thermal insulation of the building, as with most churches, insulation is essentially non existent, single glazed windows and doors with gaps/draughts. It's surprising that the building was so warm when I visited, which may be testament to how effective the heating system is.

The church isn't used very frequently, two Sunday services, a funeral (typically weekly), various use by local school. For the Sunday service, the heating is 'switched on' the day before, but is only really on an intensive heat for the morning of the service. **The heating here is not used very often, so it would be interesting to hear from James about the exact running costs – potential for the heating system to be replicated elsewhere.**

St Michaels:

A very different heating system for this church. The primary heating source of the church is a gas boiler, that is over 15 years old. Heat is distributed through the church via radiators. This heating system is run at a low constant temperature and fired up when needed. The warm up time is approx. 10 hours. However, there has been several issues with the 'programming' of the systems timer and, as a result, the heating comes on when not needed. Further, there have been multiple instances of the boiler not switching on at all. The boiler is still running at an acceptable efficiency but on the whole, the system is not very effective – certainly not comfortable for the parishioners. There is also an electricity supply **(unsure if on green tariff or if three phase – please advise).** This electricity supply covers lighting but also a few infrared heaters, ones that glow, and they are quite effective. The heaters are on the walls of a sealed meeting room, as well as a small space attached to the main church hall. These panels are over 20 years old, so their efficiency is unclear. There is also kitchen and

bathroom facilities that require energy. **There are no pews which is advantageous for a flexible zonal heating system – as there is no rigidity to where people can sit.**

Regarding the thermal insulation of the building, heat escapes easily through the single glazed windows, poorly insulated roof and walls, and through various draughts and door gaps.

Unlike All Saints, the church is used quite frequently and as I understand it, the team at St Michaels is keen to increase the usage of the church for both community, and commercial use. There are two services per month, warm welcome cafes, art groups, school visits, soup lunches, weddings, funerals, PCC meetings. The average service size is approx. 16 and for big events, 60 people. The time that the heating is needed is not usually very long, very rarely is the church required to be heated for several hours continuously.

What goals did both churches have in mind?

All Saints is quite unique in the sense that on paper, the church building is Net Zero. The Net Zero ambitions have already been achieved. Reducing emissions of the 'church house' may be something James wants to look at. But on the whole, James would like to ensure running costs are kept down and potentially look at improving the thermal insulation of the building, and introducing a supplementary heating system such as infrared heaters or heated pew cushions or underpew heaters.

As for St Michaels, finances are an issue, so something cheap to install would be preferable – although, funding is an option … Primarily, the team wanted something effective, heating that could be zoned and flexible, as well as the ability to control said heating system. The team is very 'eco-minded' and are absolutely keen to pursue a heating arrangement that would progress their route to 'Net Zero'. Keeping their emissions low seems to be a priority to the church, which is very promising to see.

Energy Efficiency

First and foremost, when making the switch over to renewable/low carbon/'greener' alternatives of energy the following must be taken into account.

- You may potentially be using an energy source that is less ENERGY efficient.
- You may potentially be using an energy source that is less reliable.
- You may be using an energy source that is weather dependent.
- You may need to combine multiple 'low carbon' alternative energy sources to maximise a reduction of carbon emissions, whilst ensuring energy security.
- You may be using an energy source that requires more maintenance and the costs that come with this must be taken into account.
- You may have to pay a large upfront cost to install your new source of energy.

- Your investment into alternative energy sources may take years to be paid back in full.
- Taking advantage of 'green tariffs' provided by energy suppliers can be expensive, as well as not being a complete guarantee of a 100% renewable supply, nor will it likely get you close enough to 'Net Zero' to potentially offset your remaining emissions.

With all of this in mind, the most important step to take before considering switching your energy source, would be to take steps to reduce energy usage. If the churches become more efficient with its overall energy use, there is less risk associated with decarbonisation. There would be less pressure on sources that have low energy efficiency (like solar), and therefore, less chance of receiving large energy bills due to the need to 'keep the lights on', and less chance of using fossil fuels to 'top off' the overall energy usage.

Reducing energy usage would be a good step to take for the churches regardless of a transition to low carbon energy sources. In order to do this, the following steps should be taken:

- Get an Energy Audit. As discussed, subsidies have reduced the cost of Green Journey, who offer a free audit, as well as a more in depth one (that you have to pay for). The basic free audit, I would advise against, as the in depth one is relatively cheap for the benefit you get out of it. Although, mixed reviews with Green Journey, so please research first, please remember that you just need an audit, initially you DO NOT want to buy energy through them … unless you decide you do of course - https://greenjourney.org/churches_and_religious_buildings.html
- An alternative place to get an audit, Inspired Efficiency, who are amazing. We have a contact - matt@inspiredefficiency.co.uk – but please do check out their website - https://www.inspiredefficiency.co.uk/services/audits/
- There are other options also – please contact us for information around funding for audits and organisations we work with.
- Raise awareness of the church's journey to Net Zero and highlight the importance of energy efficiency – COMMUNICATION is key.
- Work alongside the Diocese to create a plan for reducing energy usage. Ask ME!
- Contact DAC to discuss feasibility for methods of reducing heat escape.
- Encourage employees/volunteers at the churches to ensure reduction of energy usage – eg: turning off lights, not heating areas where there are not people, etc.
- Perhaps utilise the Eco Group who can manage the energy use.

- Registering with Eco Church and utilising their resources could help the churches become more efficient.

What to rule out?

Ideally, for both churches, any alterations, or replacements of current heating systems would involve moving away from fossil fuels. This means that unless absolutely necessary/ appropriate, a like for like gas boiler replacement should be the last option. Fossil fuels are not in line with the CofE's Net Zero by 2030 target, and in regards to efficiency, electrical heating systems are better.

Options on the table?

All Saints

Infrared Heaters

Electricity, particularly three phase electric, which I would assume All Saints has, pairs well with infrared heating panels and halo's – which are highly efficient and would provide less wasteful/more localised heating than the current heating system. With that being said, with the small amount of IR heaters that would need to be introduced to suit All Saint's needs, it isn't a foregone conclusion that a single-phase electricity supply would not suffice. As they are not designed to heat the entire space, they could also be better suited for All Saints where, on occasion, only a small volume of the church hall is occupied by people – eg. Small services. Infrared panels can be mounted on the wall, or standing, and moved to where is needed. IR panels are relatively cheap to install and have very little running costs. A benefit of the panels is that you can switch on/off when you need, as well as control the temperature – essentially 'zoning' the heating system. Another benefit, is you have control over the design of the panels, so they could be coloured to match the walls. Another benefit is that IR panels generally have a low surface temperature, so you would not necessarily need to worry about people burning their hands. Another benefit, is that panels that are not mounted, can be placed on stands and moved to where the people are, making them a highly efficient and flexible solution. A downside of the panels would be that the lack of whole space heating may cause damp inside the church hall. Although, as this would be a supplementary measure to the existing heating system, this wouldn't be an issue.

We have had dealings with three companies who sell infrared panels.

Herschel – a company in Bristol. They have worked with the following churches:

All Saints Church – Martock – they have halo heaters, which are infrared, unsure if that would be an option for St John's, but for sure could be enquiring about how they have found IR heating. St Phillip and St James in Norton St Phillip also have radiant heating. Again, could be worth getting in touch with them to see how their experience has been.

https://www.herschel-infrared.co.uk/

Sol Ray – a company in South Wales. I do not believe they have worked with churches within the Diocese yet, but they have worked with several churches elsewhere. Find out which ones below:

https://www.solray.co.uk/heritage/

My colleague, Jonathan, and I, met with Sol Ray recently and it was quite promising. They can alter the colour of the panel to match it to the church's requirements. We met with a man called Phillip, so could be a good option to talk to him directly – phillip.jones@solray.co.uk

Or just contact them through the website.

Flexel – we have only just come across this company, but they are working with St Mary's in Brompton Regis, and we have heard really good things. Could be worth getting in touch.

https://flexel.co.uk/contact/?gclid=EAIaIQobChMIx5rZ_p6ggwMVO5NQBh18fAcsEAAYAiACEgK2UvD_BwE

Underpew Heaters

These are also a good option for heating smaller areas of the church. When you have a smaller service, having multiple heaters installed under various pews can mean you don't have to use the central heating system – less energy used, cost savings. They are also aesthetically non-invasive and have the potential to bypass the faculty process ….

Heated Pew Cushions

These pew cushions a warm and heat the person directly. Cheap, removable, but certainly not as effective at warming a person as infrared heating or underpew heaters.

St Michaels

Infrared Heaters

Electricity, particularly three phase electric, which I would assume St Michaels has (to be confirmed), pairs well with infrared heating panels and halo's – which are highly efficient and would provide less wasteful/more localised heating than the current heating system. Herschel offer a 'halo' heater which is quite powerful and offers a good coverage too – although, very expensive, and multiple halo's would likely be needed for St Michaels. Another option, infrared panels, which can be mounted on the wall, or standing, and moved to where is needed. IR panels are relatively cheap to install and have very little running

costs. A benefit of IR heating is that you can switch on/off when you need, as well as control the temperature – essentially 'zoning' the heating system. Another benefit, is you have control over the design of the panels, so they could be coloured to match the walls. Another benefit is that IR panels generally have a low surface temperature, so you would not necessarily need to worry about people burning their hands. Another benefit, is that panels that are not mounted, can be placed on stands and moved to where the people are, making them a highly efficient and flexible solution. A downside of the panels would be that the lack of whole space heating may cause damp inside the church hall. Also, in terms of cost effectiveness of running a system like this, it is really dependent on how often the IR heaters would be used. It would require plenty of quotes and calculating running costs through predicted usage and the cost of electricity – electricity is expensive, but the panels are efficient – some simple calculations could highlight the balance.

A full replacement of the central heating system

Although it is an inefficient option to attempt to heat an entire church building (particularly one that is as poorly thermally insulated as St Michaels), if the ENTIRE church is to be used more frequently, ergo the heating needs to be on more often, it might not make financial sense to run a system reliant on infrared heaters. If able to limit the volume of the church that is occupied by people at any point, a zonal heating system is ideal, if not possible, a replacement of the central heating system may be the only option. The caveat being, the thermal insulation of the building must be improved!

There are several options for a central heating system. From a Net Zero perspective, and taking into account the effectiveness of the heating system at All Saints, heat pumps are an option. Whether or not they are suitable for St Michaels would have to be determined by a heating expert. Ground source heat pumps are generally not appropriate for churches, but air source heat pumps can be run as both 'wet' and 'dry' systems – so they can be a flexible option. An air source heat pump could be run as a form of air con system, blowing hot air around the building, alternatively, much like All Saints, the pump could heat water tanks and run through the existing radiators (presumably). The obvious downsides of heat pumps are their aesthetic invasiveness, their ineffectiveness in very cold temperatures, and the potential high running costs if needed to run all the time in a building that leaks heat as significantly as St Michaels does. If running a new electrical central heating system, three phase electricity will be necessary.

Solar Panels

Fuelling an electrical heating system with electricity from a 'green' energy supplier is good from a Net Zero perspective. However, it does not always make financial sense to do this. Generating your own electricity can be a sure way of reducing running costs. Of course, the effectiveness of solar panels for St Michaels is very dependent on multiple factors: area of church roof exposed to the sun; the cost of installation, the likelihood of having a successful faculty process. Although the faculty process for solar panels is hard work, St Michaels is

blessed to have an environmental group that could potentially put some time into this. Of course, getting some quotes and calculating the payback time will be the logical first step.

Funding

The installation costs of upgrading/replacing a heating system can be significant. Thankfully we have an amazing Giving and Funding Team who can talk you through all of the options there are. Both through the CofE and private foundations, there are many avenues that can be explored.

The Giving and Funding Advisor for your archdeaconry is Kate. Get in touch!
Kate.mayo@bathwells.anglican.org

Conclusions + Next Steps

1) For both churches, get an energy audit. This is an excellent option, where heating professionals can come to your church and highlight and compare a range of heating options for you. This usually comes at a cost, but there is also funding available for energy audits through CofE. It is significantly more important that St Michaels gets an energy audit, than All Saints.

2) Get in touch with our Church Buildings Advisor, Jonathan Foyle, who will be able to offer you a much more expert opinion than myself, and he will be able to talk you through options that would be most appropriate to your church from a faculty perspective. In addition to this, get in touch with our Secretary to the DAC, Jacqui Carreira-White, as it will be essential to involve the DAC from the beginning of your journey. This makes the faculty process much easier. They can both put you in touch with qualified heating experts who can advise on the most appropriate heating solution for your church. Jonathan.foyle@bathwells.anglican.org – Jacqui.carreira-white@bathwells.anglican.org

3) Get quotes for various heating options!! See if they are a good option in comparison to your existing heating system.

4) Contact our Giving and Funding Team RE financial assistance.

5) Explore possibility of reducing energy usage and improving thermal insulation – Contact Jonathan regarding this.

6) Finally, contact Owain Wynne, on our property team, who would be keen to talk to James about the heating system in the vicarage and a funded pilot scheme through CofE – potential for a 'Net Zero Parish' could be on the horizon … Owain.wynne@bathwells.anglican.org

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Dan Wills