Can We Afford To Run It?

All Saints Bedworth — a Net Zero Demonstrator Church

When you're a busy urban church serving a deprived community, with constrained finances and no margin for error, ‘can we afford to install it?’ is not the only question. The harder question is ‘can we afford to run it?’ You can get grants to install a new heating system. You can't get grants to pay the electricity bills.

This was the question that kept me awake. And it took two years of data, a winter's worth of deliberate experimentation, and some careful analysis by our engineering consultants Max Fordham before I felt I could honestly say yes.

Starting with what we know

Our current gas bills give us a baseline. Over the past five years, a typical year at All Saints sits around 70,000 kWh of gas for heating, with minor fluctuations down to 64,000 kWh depending entirely on the weather. While historical anomalies did occasionally push that figure higher—such as in 2021, due to a combination of high boiler flow temperatures and a mystery overnight running period—70,000 kWh represents our true, managed baseline.

At our current gas price of 5.8p per kWh, that typical consumption costs roughly £4,000 per year. That's the number we need to beat, or at least match.

How a heat pump changes the maths

After discussion with our heating engineer, I learned our particular old gas boilers converted fuel to heat at roughly 65% efficiency—the rest goes up the flue. So around a third of what we burned and paid for gave us nothing. In a more typical year, consumption sits around 70,000 kWh of gas purchased, meaning our building only actually received about 45,500 kWh of useful heat.

A heat pump works differently: it moves heat from outside air into the building rather than generating it by burning fuel. For every unit of electricity it uses, it delivers three or more units of heat. That ratio is called the Coefficient of Performance, or COP.

For a building like ours, running low and slow at a consistent background temperature, a COP of around 3 is a reasonable working assumption for the heating season as a whole. Because a heat pump delivers 100% of its heat into the building with no flue waste, we don't need to replace the 70,000 kWh of gas we used to buy. We only need to match the 45,500 kWh of actual heat the building used.

At a COP of 3, we would therefore need roughly 15,000 kWh of electricity to deliver the same warmth. At current electricity prices, that puts a conservative estimate of our baseline running costs in the region of £3,900. On the face of it, this matches or beats our current gas bill—even before we factor in our solar panels, battery storage and reduced overnight rate.

Energy Source & System	Annual Energy Demand	Est. Annual Base Unit Cost	Key Operational Behaviour
Existing Gas Boiler (Historic Baseline)	70,000 kWh *(Gas purchased)*	**£4,000** *(At 5.8p/kWh + standing charge)*	Intermittent heating; high peak demand; **35% of energy wasted** up the flue.
Proposed Air-to-Water Heat Pump	15,000 kWh *(Electricity needed)*	**£3,600–£3,900** *(Before solar offset)*	"Low and slow" 24/7 background warmth; high efficiency (COP 3)

What the data showed us

Understandably, the idea of leaving a church heating system running continuously tends to cause financial panic in the PCC. To get permission from the Rector to try it, I promised that if the experiment cost measurably more to run this way, I would personally underwrite the difference. I was nervous, but I trusted the engineering theory enough to put my money where my mouth was.



The Sanctuary floor full of school children for a service

The result surprised us all. Despite heating the building constantly, gas consumption for the year was almost identical to 2023 — only about 2% different when you account for the colder weather. The building's thermal mass — thousands of tonnes of Victorian sandstone — means that keeping it ticking over used remarkably little extra energy. The stone holds the warmth, so the boiler only ever topped up rather than recovered from scratch.

This matters for running costs because Air-to-Water heat pumps work best in exactly this mode: low flow temperatures, steady state, running efficiently rather than working flat out. Max Fordham's analysis confirmed that a 40kW heat pump — which delivers 32kW output even at -3°C — would be sufficient for the Sanctuary end of the building. The whole building never used more than 30kW in the coldest weather. There is margin for cold snaps. The system is not being asked to do more than it can manage efficiently.

The solar factor

All Saints installed solar panels and a battery storage system in October 2024. In 2025, the panels generated 21,485 kWh, of which 58% was used directly by the church. The rest was exported to the grid at 12p per unit, generating income that offset our electricity bills. From May to November 2025 — seven months — we made no net payments for electricity at all.

From next winter, that solar generation will offset a portion of the heat pump's electricity use directly. The panels generate most in summer when heating demand is lowest, but spring and autumn generation is meaningful, and the battery allows us to use more of what we generate rather than exporting it, managed automatically by our battery's smart software system.



Our solar array over the South Aisle catching the winter sun

The honest position is that solar doesn't transform the running cost calculation on its own — the heating load in January is real, and the sun is not reliably shining. But it is a genuine contribution across the year, and it shifts the annual electricity cost downward from that £3,900 figure.

So will it cost more to run?

It doesn’t look like it. Max Fordham's calculations estimated that the electricity needed to deliver the same heat we currently get from gas was unlikely to cost more than gas overall. That assessment was based on our actual heat loss data, our building's thermal behaviour, the proposed 40kW system specification, and current energy prices. While a COP of 3.0 is a conservative estimate, the manufacturer’s figures indicate we may get better than that.

There is also a hidden dividend here that the spreadsheets don't capture: we are buying a completely different level of comfort. Our historic gas baseline didn't buy us a warm church; it bought us a building that was freezing for five days a week and barely up to temperature on the other two. For prayer meetings, visitors, small groups and staff in the church outside of these times it was cold and uncomfortable. By keeping the sandstone fabric consistently ticking over at 16°C, the heat pump delivers far more actual, usable warmth per pound spent, than gas ever did. We aren't just matching the cost; we are dramatically upgrading the environment for everyone who uses the building.

There are caveats. Electricity prices can change. COP in practice depends on how well the system is commissioned and controlled. The first winter with a new system always has a learning curve. And our situation — solar panels, battery storage, a building with unusually good heat retention for its age and type — is not every church's situation.

But the direction of travel is clear. Gas prices have risen sharply and the market is likely to continue to be volatile. Electricity prices, while higher now, are expected to converge with gas over time as the grid decarbonises. A heat pump installed now is a hedge against that shift, not a gamble on it.

What actually gave us confidence

It wasn't one number. It was the accumulation of evidence: five years of gas consumption and temperature data that I'd tracked; a winter's experiment that showed the building behaves better than expected; Max Fordham's heat loss calculations confirming that a 40kW system was appropriate; and the knowledge that our solar panels were already demonstrating how electricity costs could be offset.

None of those pieces of evidence stood alone. Together, they painted a consistent picture.

It also helped to talk to churches that had already made the transition. St Peter Mancroft in Norwich reported that its Air-to-Water heat pumps were working well. St Martin's in Oxfordshire heated its Christmas Eve midnight service using Air-to-Air heat pumps for around £26—comparable with the £30 we would have expected to spend on gas. Their experience couldn't prove that our installation would perform the same way, but it showed that what we were planning was neither unusual nor unrealistic.

None of this guarantees exactly what our electricity bills will be after the first winter. We'll only know that by running the system and measuring it.

But we now have enough evidence to make an informed decision rather than an optimistic one. For me, that was the point at which we could finally answer the question: yes, we can afford to run it.

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