St. Saviours Heating and Sustainable Energy Team

Heating Options Review Paper

21 June 2022

1.0 INTRODUCTION

This paper provides a comparison between proposed heating solutions for the Church and Church Centre. It uses the following key factors to provide a balanced scorecard of the options that are considered most appropriate for St. Saviours. These are:

- Church-users being comfortable, so the church is welcoming and usable,
- Historic fabric and materials not being harmed,
- Affordability (to install, maintain and run),
- The feasibility of the solution – "will it actually work?"
- Reducing our carbon footprint – in consideration of General Synod guidelines (Net zero by 2030)

Consideration is also made of our current building usage, projected energy requirements, current energy tariffs and technology trends towards a more sustainable future. Some of these considerations are key assumptions, based on our current understanding or information that is available.

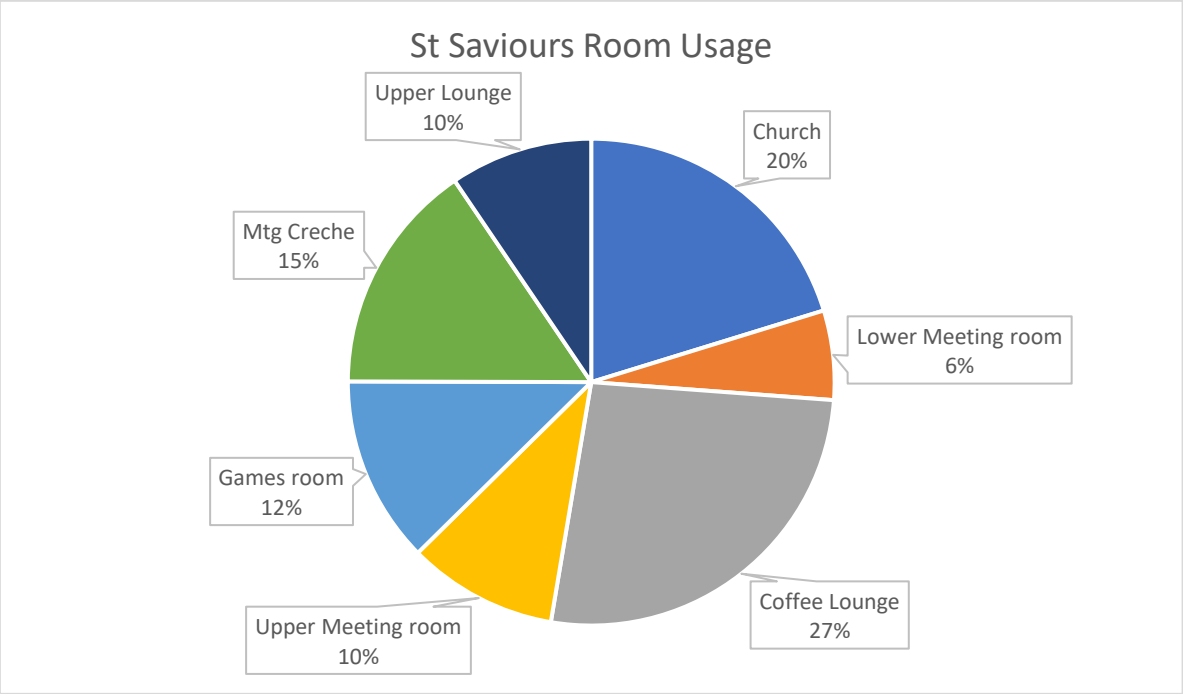
To set the scene, we have the following key risks to factor into the decision making process:

1. We have a 26 year old boiler system which is under stress and on its last operating cycle. 3 of the 5 boilers have failed, leaving 2 90kw boilers still operating. The mechanical parts for our boilers are obsolete and simply no longer available. There are significant concerns that our boilers may not make it through the coming winter period.

2. New Faculty rules are coming into effect from 1st July, which are creating a significant challenge for us. The only energy options that are on List A and not subject to a full Faculty process will be:
   - Air Source Heat Pumps (ASHP) – Diocesan evidence does not advocate these in old uninsulated Buildings
   - Ground Source Heat Pumps (GSHP) – expensive and not practicable
   - Biomass – not feasible

2.0 BUILDING & ENERGY USAGE

We are just starting the journey to a more comprehensive understanding of the use of our buildings and facilities and how this relates to energy usage. This analysis will build in accuracy and benefit year on year and at this stage provides some important strategic indicators only.



The enclosed Chart reflects projected Church and Centre usage based on information from our Bookings system and taking into consideration the use of the Church on Sundays. It is based on data for an entire year, but clearly does not include the Office, Kitchen and certain other administration / ancillary rooms in the analysis.

As we start to build out a more accurate operating model for building and room usage, this will help us to provision for more effective use of our heating and indeed our overall energy footprint.

It is clearly important to acknowledge that we have 2 very distinct environments, with very different energy overlay models:

- The Church – an old listed building with very limited insulation and a huge roof space, which makes heating the building a very energy intensive requirement (based on conventional convection heating methods – radiators etc).
- The Centre – a modern, reasonably well insulated building with multiple rooms / zones that require different usage requirements across the entire week, not just on a Sunday. This building lends itself to more effective and sustainable heating and use of energy.

Our objective is to limit the use of gas, as we commence the journey towards a net zero target for our carbon footprint. However, the 5 key validation markers (as stated at the beginning of this paper) must be factored into the timeline and progression towards this objective.

We will consider the building and room usage more, when we evaluate the 3 main heating options for the Church and Centre later in this paper.

Let's now consider the actual gas and electric usage of St. Saviours.

	St Saviours Energy Usage Model																
													assumed				
		Jan	Feb	Mar	Q1	Apr	May	Jun	Q2	Jul	Aug	Sep	Q3	Oct	Nov	Dec	Q4	Total
GAS	KwH	44,506.40	35,990.86	29370.80	109,868.06	21943.70	15524.50	10027.80	47,496.00	5719.00	6464.3	8628.5	20,811.80	32000	37745.5	39670.1	109,415.60	287,591.46
	Price (p) / Unit	2.2112	2.2112	2.2112		2.2112	2.2112	2.2112		2.2112	2.2112	2.2112		2.0493	2.0493	2.0493		
	Total Consumption (£)	984.13	795.83	649.45		485.22	343.28	221.73		126.46	142.94	190.79		655.78	773.52	812.96		
	Standing Charge (£)	223.51	201.88	223.51		216.30	223.51	216.30		223.51	223.51	216.30		205.53	198.9	205.53		
	VAT @ 5%	60.39	49.89	43.65		35.08	28.34	21.92		17.50	18.33	20.37		43.07	48.63	50.93		
	Total Gas (£)	1268.03	1047.60	916.61	3,232.23	736.60	595.13	459.95	1,791.68	367.47	384.78	427.46	1,179.71	904.38	1021.05	1069.42	2,994.84	9,198.47
ELECTRIC	Day (0700-2400) KwH	8708	8716.2	9289.7			6859.6	6726.5		6196.7					8214.9	8057.1		
	Day Price (p) / Unit	12.99	12.99	12.99		12.99	12.99	12.99		12.99	12.99	12.99		13.2482	13.2482	13.2482		
	Night (0000-0700) KwH	1559.7	1378.5	1676.6			1452.2	1390.2		1397.1					1276.2	1427.3		
	Night Price (p) / Unit	9.8635	9.8635	9.8635		9.8635	9.8635	9.8635		9.8635	9.8635	9.8635		10.1522	10.1522	10.1522		
	Total KwH	10267.7	10094.7	10966.3	31,328.70	8885.67	8311.8	8116.7	25,314.17	7593.8	7147.65	7854.50	22,595.96	8962.69	9491.1	9484.4	27,938.19	107,177.02
	Total Consumption	1285.01	1268.20	1372.10		1105.71	1034.3	1010.89		942.75	881.92	975.12		1150.08	1217.89	1212.32		
	Total Other Charges	92.78	90.67	92.78		92.08	92.78	92.08		92.78	92.78	92.08		150.23	147.88	150.23		
	VAT @ 5%	68.89	67.94	73.24		59.89	56.35	55.15		51.78	48.73	53.36		65.02	68.29	68.13		
	Total Electric (£)	1446.68	1426.82	1538.13	4,411.624	1257.68	1183.43	1158.12	3,599.24	1087.31	1023.43	1120.56	3,231.30	1365.33	1434.06	1430.68	4,230.07	15,472.23
	Supplier: Total Gas & Power															based on 2019 figures		

The above energy usage is based on the last full year that was not impacted by the Covid pandemic – that is 2019. Energy figures for 2020 and 2021 are significantly impacted and therefore not reflective of our overall usage requirements. The figures for 2022 are becoming available but we have chosen to use 2019 as a representative and indicative reference point. Clearly, for budgeting purposes, this type of Usage Model will prove extremely helpful by overlaying existing and projected tariffs and changes in the proportion of gas and electric as the underlying energy source.

The key items of note are:

- 75% of our gas usage is through the 6 month combined, Winter and Autumn periods, that is Jan – Mar and Oct – Dec
- Our electric usage has less seasonality, but still reflects a maximum usage in the Jan – Mar Winter period.
- Tariff and Standing charge increases will have a material effect on our overall energy budget.
- With tariffs increasing significantly, we have a responsibility to use our energy as efficiently as possible and, where appropriate, consider additional building insulation programmes to reduce energy loss/wastage. This is an issue for the Church itself, but certainly an area of inspection for the Centre.
- Electric tariffs are typically more expensive than gas, so gas usage still remains a more cost effective option in the short term.

- Our electricity usage at night is c. 15 – 20% of our overall electricity consumption. This is between the hours of midnight and 7am. This may be unavoidable, but we should certainly inspect this to see are there any operating procedures we can introduce that reduce this footprint – e.g. computer / monitors / screens left on standby through the night.
- The introduction of a Solar array (as a future programme) will certainly have a significant impact on our net electric usage. Initial discussions have commenced with Solar Energy Cooperatives and with a Solar Array contractor involved with Salisbury Cathedral to determine the opportunity here.

Taking note of the above, we will now consider the options available to us to heat the Church and Centre. These options are rated against the 5 markers and apply whether we make a decision before the Faculty deadline change of 1st July or not.

The options considered are:

- Like for Like – Gas boiler replacement to provide heating for the Church and Church Centre
- Hybrid – Gas boiler replacement to provide heating for the Church with Infra-Red introduced for the Centre
- IR – Infra red heating for the Church and Church Centre

The balanced scorecard is based on a Green, Amber and Red rating, where the interpretation of this is as follows:

Green: Marker is met with no or very limited issues or risks

Amber: Marker is met in part. There are material factors and risks to be considered

Red: Marker is not met. There are significant issues and risks to be considered.

3.0 LIKE FOR LIKE – GAS BOILER REPLACEMENT FOR CHURCH AND CENTRE

3.1 Church and Centre comfort

As we have considered, the Church and Centre have different usage requirements and different energy efficiency ratings.

The Church takes a significant time to heat up with the existing radiators and pipework being quite old and inefficient. Pipework in the heating system needs an extensive clean and flush to help improve the flow of water and retention of temperature, which is all part of the scope of works being proposed. Usage of the Church around the Christmas season is increased, at a time when outside ambient temperatures are approaching their coldest and reliance on the heating system becomes essential. The ability to warm the Church effectively is therefore an important consideration.

The Centre has more effective radiators in certain rooms, supplemented by air conditioning units that can provide temperature control and assistance in both winter and summer. Some radiators have thermostatic valves to enable room temperature control where appropriate.

The Church has been supported by two working 90Kw old gas boilers until recently and the Centre with one 90Kw boiler. We currently have two working boilers, one for each building.

We have a viable proposal for two 120Kw modern A rated gas boilers, with the option for new pumps and an up to date control board to enable more effective zoning of heating in the Centre on a room by room basis.

Assessment:

3.2 Historic fabric and materials not being harmed

This is predominantly focused on the Church itself, albeit under Diocesan Faculty rules, both the Church and the Centre are registered consecrated buildings and therefore treated as one.

The installation of a Like for Like heating system will involve:

- Boiler replacement, new flus and pipework in the current Boiler room itself
- Flushing of the system to ensure a cleaner environment
- A new Control Panel to be installed in the Church Office – existing cupboard location

The existing fabric and materials of the Church and Centre are therefore least impacted by this option, especially as the current proposal and scope for a Like for Like does not involve an upgrade to the radiators and underfloor pipes in the Church.

Clearly one cannot allow for any leakage or joint failure that may occur as a result of the system flushing, but this is a contained risk to be aware of.

Assessment: 

3.3 Affordability (to install, maintain and run)

We have a proposal (dated April 2022) for two 120kw modern A rated gas boilers, a purge and clean of the system, a new flu and lining and the provision of a new controller board to manage and zone the heating in the Church and Centre. Pipework will be upgraded and aligned to enable either boiler to be directed to heating requirements for the Church and Centre.

The current proposal for this is £85,000 + VAT (£102,000).

We have an additional proposal for 3 new pumps for heating and hot water requirements, replacing existing pumps and providing new expansion bellows and wiring modifications as required.

The existing pumps are currently operational, so the intent is to hold this as a proposal and not carry out this work until absolutely needed.

The current proposal for this work is £10,700 + VAT (£12,840).

However, we have been informed by the supplier that the pumps and parts are subject to adjustment due to availability and increases in material prices. The original quotes are from April and were only valid for 30 days, so we need to build in a contingency of c.10% to be absolutely covered here.

The equivalent value of the VAT is recoverable as a Grant through the Church Heritage Trust, following extensive review of the VAT legislation and applicability to a Church Energy project. This will be reclaimed once the invoices have been settled.

CAPEX SUMMARY:

• Boiler replacement with new controller system :		£85,000 + VAT =	£102,000
• Pumps (not required currently – future requirement):		£10,700 + VAT =	£ 12,840
• Contingency of c.10% :			£ 10,000
	Sub-total		£124,840
• VAT reclaim		-	£ 19,140
	Net Total		**£105,700**

We also currently have a CAPEX budget approved for £100,000, which would need to be reviewed to cover the cashflow requirements and slight increase in contingency for this Project. **Total gross budget is therefore £124,840.**

From an operating cost (OPEX) perspective, we can take guidance from the Room Usage model and the related Energy Usage spreadsheet.

We expect the introduction of a modern thermostatically controlled and more efficient boiler system, together with the New Control board, to zone and manage the use of our heating, will result in a 40% reduction in gas usage. This is very good news from a carbon footprint perspective.

However, energy tariffs are suffering from global volatility in unit prices, and we have to factor in some increases in our gas tariff costs. We are on a CoE Tariff currently, which is more attractive than private dwelling tariffs. Therefore, overall we can expect the savings in gas consumption will be offset by increases in operating costs due to increasing gas tariffs. Electric tariffs are more expensive and also subject to volatility, so there are pressures from both sides of the energy supply.

Assessment: 

3.4 Feasibility and Timeline

We can have a high degree of confidence in the Like for Like boiler replacement that it will provide improved heating and control of heating for the Church and Centre. There is some concern over the existing pumps, which are operating fine at present, that these will need replacing in the future.

Material and parts are highly volatile in the marketplace at present and therefore it is important we commit to an option so that final and committed proposals can be obtained. Based on a commitment from PCC to this proposal with order acknowledgement by 1st July, we are anticipating a 6 week programme of works on site with a completion if operations in late Summer / early Autumn. Fixed dates will be obtained once a final programme of works has been costed and reviewed. However, this is in line with our primary objective to have a warm and functioning Church and Centre from October onwards.

Assessment: 

3.5 Reducing our carbon footprint

The primary objective is to significantly reduce our carbon footprint with the overall objective of targeting Net Zero by 2030. Faculty rules are changing on 1st July 2022 to encourage Churches to consider more sustainable options. However, the choices presented on List A (no Faculty required) are not suitable for old listed uninsulated buildings like St Saviours. The purpose of the Faculty change is somewhat self defeating in this regard.

The “Like for Like” gas boiler replacement will lead to a significant immediate reduction in our carbon footprint (from hydrocarbons) of c.30-40%. This is the commencement of the journey towards Net Zero and will require some innovative and flexible planning in the coming years to offset this carbon footprint through additional means. These may include:

- Use of Solar Array to reduce our electricity footprint and provide back to the grid in Summer
- Transfer onto electric green tariffs
- Potential introduction by the gas network of a 20% hydrogen / 80% gas mix, reducing further the hydrocarbon footprint.
- Offset of carbon footprint through Mission partner engagement (tree planting, solar array investment overseas etc)

More discussions and strategic planning is needed here.

Assessment 

4.0 HYBRID – GAS BOILER FOR THE CHURCH AND INFRA RED FOR THE CENTRE

4.1 Church and Centre comfort

As we have considered, the Church and Centre have different usage requirements and different energy efficiency ratings. This does lend itself to choosing different heating options for the two buildings. This section considers the introduction of Infra-Red heating for the Church Centre, whilst upgrading the gas boilers for the Church itself.

In view of the requirements of the Church, the gas boiler option has been retained albeit with slightly lower rated boilers. During Autumn and Winter, when our greatest gas usage occurs, the Church itself will use a greater proportion of KwH due to the nature of the building itself. Therefore the ratings on the boilers being proposed can only be adjusted slightly due to the peak throughput required to warm the Church at this time of year. This is considered further in Section 4.3

The Centre lends itself mor effectively to alternative heating options. One such option is the introduction of Infra-Red heating. The concept of IR is quite different – instead of heating the air itself in a room, IR heats the objects within the room to bring the environment upto a comfortable temperature.

By way of illustration – imagine going for a walk in the Winter on a cold day with the outside temperature at 5 degrees. It feels cold. Now imagine going for a walk in the Winter on a sunny day at the same outside temperature. The warmth of the sun makes you feel warmer and more comfortable, even though the air temperature is the same.

Evidence from other Churches that have implemented IR is that it is very effective in reasonably modern buildings and therefore a good fit for the Centre. We have spoken to a number of Churches that are very happy with the introduction of IR. Although it has been introduced for a number of older Church buildings, there is still some experience of cold feet, especially where pews remain fixed in position.

In this option we are considering IR for the Centre alone and believe it to be a very suitable solution.

Further information on the use of IR please refer to some of the case studies from our recommended contractor Jigsaw Infrared heating - Infrared Heating Case Studies | Jigsaw Infrared | Heating Panels | Infrared

Assessment: 

4.2 Historic fabric and materials not being harmed

This is predominantly focused on the Church itself, albeit under Diocesan Faculty rules, both the Church and the Centre are registered consecrated buildings and therefore treated as one.

The installation of a Like for Like heating system will involve:

- Extensive boiler and pipework in the current Boiler room itself
- Flushing of all pipework to ensure a cleaner environment (contained)
- A new Control Panel to be installed in the Church Office – existing cupboard location

The existing fabric and materials of the Church and Centre are therefore least impacted by this option, especially as the current proposal and scope for a Like for Like does not involve an upgrade to the radiators and underfloor pipes in the Church.

With regard to the Church Centre, the implementation of IR will be quite understated with white or off-white bar heaters on the walls or ceilings that will blend into the rooms. The technology has developed at a real pace and modern IR heaters are no light omitting panels that blend well into modern living and working spaces.

Assessment: 

4.3 Affordability (to install, maintain and run)

We have a new proposal (dated June 2022) for two 100kw modern A rated gas boilers, a purge and clean of the system, a new flu and lining and the provision of a new controller board to manage the heating in the Church. Pipework will be upgraded and aligned to enable either boiler to fulfil the heating requirements for the Church.

The new proposal for this is £70,000 + VAT (£84,000).

On first impression, this proposal seems high as we are seeking a solution just for the Church itself. However, please note the following key points:

- At the time of the Church Centre commissioning, our consultant rated a requirement for five 90 Kw boilers – three for the Church and two for the Centre,
- The Boiler room (under the Church) is a very tight space. Implementing 2 boilers provides flexibility on space and pipework configuration to improve the layout and use of the pipework.
- The advantage of 2 boilers is that if one fails, the other remains in operation to provide some heating to the Church
- The replacement of flus, purge and clean of the system, introduction of a control board system and associated resources remains a requirement, with the timeline only reducing from 6 weeks to 5 weeks for the implementation and commissioning process.

The additional proposal for 3 new pumps for heating and hot water requirements, replacing existing pumps and providing new expansion bellows and wiring modifications as required remains on the table as an option.

The existing pumps are currently operational, so the intent is to hold this as a proposal and not carry out this work until absolutely needed.

The current proposal for this work is £10,700 + VAT (£12,840).

The same rules apply to the VAT, with a Grant to be applied for once invoices are settled to reclaim the equivalent value.

CHURCH CAPEX SUMMARY:

• Boiler replacement with new controller system :	£70,000 + VAT =	£ 84,000	
• Pumps (not required currently – future requirement):	£10,700 + VAT =	£ 12,840	
	Sub-total		£ 92,840
• VAT reclaim through a Grant		-	£ 16,140
	Net Total		**£ 76,700**

For the Church Centre, which will be subject to a full Faculty under the new rules that come into effect from 1st July, we have a preliminary quote of £27,331.42 + VAT for the Centre.

This is also subject to the results of an Electrical survey conducted on 16th June and confirmation that we have sufficient capacity on the cabling and associated substation. UKPN require St. Saviours to have full details of the current devices and load on the network and associated additional capacity required. This is required to get permission from UKPN to connect IR Heaters. We may not have clarity on this before we have to agree a Resolution – this is a RISK so please understand.

CHURCH CENTRE CAPEX SUMMARY:

• IR installation for Centre (preliminary quote):	£27,331.42 + VAT =	£32,797.70	
• VAT reclaim		-	£5,466.28
	Net Total		**£27.331.42**

We currently have a CAPEX budget approved for £100,000, which will not quite cover the net overall CAPEX cost. For this model, we would need **Gross budget approval of £125,637.70,** anticipating that the VAT is redeemable, so our net expenditure is £104,031.42.

These works will be conducted at different timelines, with the Gas Boiler replacement by late Summer / Early Autumn and the IR installation occurring once a full Faculty has been realised. The timeline for this is most likely to be early 2023.

From an operating cost (OPEX) perspective, we can take guidance from the Room Usage model and the related Energy Usage spreadsheet.

We expect the introduction of a modern thermostatically controlled and more efficient boiler system, together with the New Control board, to zone and manage the use of our heating, will result in a 40% reduction in gas usage. This is very good news from a carbon footprint perspective and confirmed from other Churches that have followed a similar programme of works.
Case Study - St Paul's Cathedral - Hamworthy Heating - Energy Live News

We have to factor in some increases in our gas tariff costs. We are on a CoE Tariff currently, which is more attractive than private dwelling tariffs. Therefore, overall we can expect the savings in gas consumption will be offset by increases in operating costs due to increasing gas tariffs.

Having said this, electric tariffs are also more expensive and subject to the same volatility as gas tariffs. We can expect an increase in OPEX of c.20-25% in switching the Centre from gas to electric. We then need to factor in the increases in wholesale tariffs. This will be a more expensive option in the short term than a gas option for both the Church and Centre.

The introduction of IR can be offset by considering the future introduction of a Solar array on the Church roof.

Assessed as Amber and Red Assessment: 

4.4 Feasibility and Timeline

We can have a high degree of confidence in the Like for Like boiler replacement that it will provide improved heating and control of heating for the Church. There is some concern over the existing pumps, which are operating fine at present, that these will need replacing in the future.

Based on a commitment by 1st July to the boiler replacement for the Church, we will have a fully commissioned system by end Summer / early Autumn, according to current Faculty rules permitting this “Like for Like” upgrade.

The introduction of IR for the Centre will be subject to the new Faculty procedure that comes into effect from 1st July. This will be a 4 to 6 month process, followed once approved, by a lead time of c. 6 to 8 weeks before works can commence. Implementation of IR in the Centre is a 1 to 2 week programme.

Therefore, at best case, subject to approval to commence the Faculty process from 1st July, we need to consider that IR will not be operational in the Centre until March 2023. Therefore we will need contingency planning for the Centre through Autumn and Winter – the use of mobile heaters and radiators in key rooms.

Assessment: 

4.5 Reducing our carbon footprint

The “Like for Like” gas boiler replacement will lead to a significant immediate reduction in our carbon footprint (from hydrocarbons) of c. 40%. This is the commencement of the journey towards Net Zero and will require some innovative and flexible planning in the coming years to offset this carbon footprint through additional means. These may include:

- Use of Solar Array to reduce our electricity footprint and provide back to the grid in Summer
- Transfer onto electric green tariffs
- Offset of carbon footprint through Mission partner engagement (tree planting, solar array investment overseas etc)

The introduction of IR, alongside a move to Green Tariffs and / or the future introduction of a Solar Array on the Church roof, will have a significant impact on our carbon footprint.

Assessment 

5.0 IR HEATING FOR THE CHURCH AND CENTRE

5.1 Church and Centre comfort

This option considers the introduction of IR for both the Church and Centre. It is perhaps the most sustainable option and aligned most closely with the objective for a Net Zero position by 2030. However, in the short term it presents significant challenges for the Church and Centre for this Autumn and Winter, as the requirement for a full Faculty will mean that we rely on the existing old boilers to keep St. Saviours warm this winter.

This is a significant risk that we must all be aware of and accept. Contingency planning for the Church and Centre will be required, should the existing boilers fail.

Putting this immediate and short term risk aside, we must consider in principle whether IR is feasible for the Church and Centre to provide suitable heating and comfort.

Evidence from other Churches that have implemented IR is that it is very effective in reasonably modern buildings and therefore a good fit for the Centre. We have spoken to a number of Churches that are very happy with the introduction of IR. Although it has been introduced for a number of older Church buildings, there is still some experience of cold feet, especially where pews remain fixed in position.

Please note the following Case Studies where IR has been introduced into older Church buildings. However, please note these are much smaller than St. Saviours.

https://www.churchofengland.org/sites/default/files/2020-04/Chalgrove%20church%20electric%20radiant%20and%20pew%20heating%20FINAL%20April%202020.pdf

https://www.churchofengland.org/sites/default/files/2020-12/St_Andrews_Chedworth_Gloucester_electric_heating_move_away_from_oil_FINAL.pdf

Assessment:

5.2 Historic fabric and materials not being harmed

This assessment is predominantly focused on the Church itself. We would prefer the introduction of IR heaters will need to be above the main arches in the Church and below the stone balustrade – ideally in an off white colour to blend as effectively as possible. However, the Electrical Survey has revealed that this is too high to be an effective location and they believe the working location needs to be as illustrated below for the main Arches.

In the Side Aisles, the heaters would be above the stain glass windows connecting to the Church Centre and the outside south facing elevation. In the Chapel area, the heaters would be positioned on the stone walls on either side of the altar facing inwards.

Assessment: 

5.3 Affordability (to install, maintain and run)

We currently have a preliminary proposal for the introduction of IR for the Church and Centre, subject to the full results of the Electrical Survey, to confirm whether the existing Church and Centre has sufficient spare capacity. On first inspection, there appears to be sufficient capacity for the Centre, but some risk on coverage for the Church, without an upgrade.

We will require UKPN to conduct a survey to confirm any supply upgrade required and that our existing substation in College Road has capacity to fulfil this increase in electric supply. There may be a requirement to route our power from an alternative substation. This is all feasible, but involves more time and cost, which is yet to be determined.

Subject to the results of the Electric Survey, the IR provider - Jigsaw IR Heating is proposing capacity for 46KW of heating for the Centre and 58KW of heating for the Church. On initial inspection this seems lower than the gas boiler output requirements, but bear in mind IR heating is instant, not dependent on extensive runs of old pipes and does not heat the space but the objects within the space. Further technical studies on this are available.

CAPEX SUMMARY:

• IR implementation - Church	:	£21,741.55 + VAT =	£26,089.85
• IR implementation – Centre	:	£27,331.42 + VAT =	£32,797.70
	Gross Total		£58,887.55
• VAT reclaim		-	£ 9,814.58
	Net Total		**£49,072.97**
• Recommended contingency (UKPN, additional IR works etc)			£20,000.00

Note:

(i) Even if we decide we need a slightly higher capacity in the Church, we should have plenty of budget to cover this.
(ii) There is significant risk due to the fact that this option is subject to a full Faculty and will not be available until c. March 2023
(iii) We will need to overlay UKPN costs for cabling upgrade or re-routing from an alternative substation
(iv) A contingency budget of minimum £20,000 is recommended to cover any UKPN upgrades / work.

From an operating cost (OPEX) perspective, IR is an energy efficient heating option. The IR solution will be zoned by room and building and provide extensive control to us to create different working temperatures and environments by room across St. Saviours as a whole.

However, Electric is more expensive than Gas and with the wholesale increase and volatility in energy tariffs, our operating costs will increase substantially.

The introduction of IR can be offset by considering the future introduction of a Solar array on the Church roof, but this will only have a real impact in the spring and summer months when heating is less of an issue.

Assessment: 

5.4 Feasibility and Timeline

As has already been stated, the introduction of IR for the Church and Centre will be subject to the new Faculty procedure that comes into effect from 1st July. This will be a 4 to 6 month process, followed once approved, by a lead time of c. 6 to 8 weeks before works can commence. Implementation of IR is a minimum 3 to 4 week programme.

Therefore, at best case, subject to approval to commence the Faculty process from 1st July, we need to consider that IR will not be operational in the Church or Centre until March 2023.

Therefore we will need extensive contingency planning through Autumn and Winter to cover a worst case scenario of the failure of existing boilers. These costs have not currently been factored in.

Assessment: 

5.5 Reducing our carbon footprint

The introduction of IR will reduce our hydrocarbon footprint to zero from a heating perspective, but please bear in mind we use gas cookers currently for our kitchen. Gas will need to be retained to operate our kitchen until such time as we can replace with suitable alternatives.

Our dependence on electricity will increase and this may well increase overall our operating cost in the short term compared to gas. We will not get a full understanding on this for at least one winter cycle. However, we can look to offset and reduce our carbon footprint in the future by:

- Use of Solar Array to reduce our electricity footprint and provide back to the grid in Summer
- Transfer onto electric green tariffs
- Mission partner engagement (tree planting, solar array investment overseas etc)

Assessment 

6.0 SUMMARY

Based on the scorecard process, taking into consideration all factors, I would suggest that the choices for PCC are between:

- Like for Like Gas boiler replacement
- Hybrid of Gas and IR

The Heating team is predominantly in favour of a Like for Like gas boiler replacement. This is driven more from an affordability perspective due to the high cost and volatility of energy tariffs, noting that the modern gas boiler replacement could yield a 40% reduction in gas usage.

Clearly as a PCC we need to reach a consensus on this. I strongly recommend that we take advantage of the current Faculty rules and approve a Resolution to replace the Gas boilers to cover either the Church alone or the Church and Centre combined (so we are covered). This is our insurance policy. It will require opening a Case on the Faculty system prior to 1st July and the approved Resolution.

There is still a confirmation of our electricity capacity, supply and ability to upgrade that needs to be confirmed by the Electric Survey results from Jigsaw and additional consultation with UKPN. I do not see how we can make a final decision on which option without this information.

We should authorise a Standing Committee to make the final decision. We will not be able to come back to PCC to vote on this as it will invalidate the Resolution.

Furthermore, Glenn needs to commence the heating programme upgrade as quickly as possible, so we have a guaranteed warm and welcoming Church building for Autumn.