

## CARBON NEUTRAL GUIDANCE NOTES

1. The initial approach should always be taken as fabric first, ie. to look at ways of improving the thermal properties of the building through the provision of double glazing, roof and wall insulation.
2. Lighting should be looked at with the provision of LED lamps wherever possible.
3. Look at the possibilities of introducing Solar PV panels for the generation of electricity, and / or wherever possible for the domestic hot water usage look at the provision of Solar Thermal panels connected into a twin coil cylinder.
4. The heat source is the big challenge for us at the moment certainly with the drive to move away from fossil fuels, however the following considerations should be made;
  - (i) The initial thoughts are to try and changeover onto electrically based systems, but unless you can introduce the use of heat pumps which have a proven track record of providing 3kW of heat from 1kW of electricity, then as the cost of electricity is still currently approx., 3 times more expensive than gas, then any other electrically based systems may prove to be unaffordable to run.
  - (ii) Heat pumps take the form of 2 types, ie. either air source heat pumps (ASHP) or ground source heat pumps (GSHP). Whilst GSHP's operate with a slightly better efficiency they are probably twice the cost to install than ASHP's simply because of the ground works required to either accommodate pipe loops or boreholes.
  - (iii) Ideally the use of heat pumps would need a 3-phase electrical supply although there are some single phase units available for domestic size ASHP's, but again the existing loading on the incoming electrical supply would have to be checked for capacity availability.
  - (iv) The only real further consideration for the use of heat pumps would be just what the existing heating system is that the present boiler is serving, as this would have been sized to provide the heat output with water supplied from the boiler at a mean temperature of 70degC, whereas heat pumps only provide a mean temperature of 50degC. This will mean that if you simply put say an ASHP onto an existing radiator system that you would have to run the system longer and lose any carbon benefits, whilst increasing running costs. Hence if heat pumps are to be looked at then the existing heating system may have also to be considered for replacement.
  - (v) If the electrical supply is inadequate then the option may have to be to still remain with a boiler system, and where a gas supply existing then the consideration would be to look at the use of a 'hydrogen ready' gas boiler. New boilers are probably twice as efficient as old / existing gas boilers and hence there would be an immediate reduction in carbon generation in the order of 50%. The new proposed hydrogen gas mix through the national grid network system could become available by 2030, and of course when this does so the already reduced carbon generation from any new / replacement gas boiler would be further significantly reduced.
  - (vi) Where gas is not available then the use of either a bio-fuel oil or a bio-LPG boiler could be considered, which would obviously show good reductions in carbon generation, albeit these costs are more expensive than conventional oil or LPG
  - (vii) Depending upon electrical supply capacity issues, it may be possible to consider 'hybrid' systems, having a mix of heat pumps and boilers with the heat pump providing enough heat to maintain a background warmth in the Church of 10 – 12degC, with a hydrogen or biofuel boiler simply being used to raise that temperature to 16-18degC for Service times
  - (viii) The use of programmable thermostat controls which can be accessed remotely would be essential to consider so that actual space temperatures and operating times may be assessed.