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QUESTIONS AT ANY TIME TO CABINET PORTFOLIO HOLDERS

Response by the Cabinet Member:

Many thanks for your email in respect of energy savings within schools. I asked the schools team to collate a response to your specific questions which I have provided below. I hope the response provides clarity on the current position within the service. The team have advised they will happily meet with you to discuss any of your queries further. Your questions are repeated for reference.

1. Has the portfolio holder looked into zoning the heating systems in our schools into smaller zones than we currently have at the moment in school buildings throughout Powys, so we are not heating classrooms that are not being used at certain times of the day?

- All new schools are designed with the ability to set different temperatures for most occupied rooms (classrooms etc) most having underfloor heating. The majority of the existing school stock which are served with dated single pipe heating systems are more complex to modify, modification of these systems is expensive and very disruptive as most of the pipework would need to be removed and replaced to afford better heating control. A more cost-effective solution is to ensure that radiators are fitted with thermostatic radiator valves (TRVs) where the room temp can be adjusted locally. Another problem associated with zoning and cutting heat to specific rooms is that it is very unresponsive, so it would take some time for the room temperature to change when needed.

2. Every school in Powys has a LoRaWAN gateway installed. Currently LoRaWAN is used to monitor CO2 and humidity in classrooms which has been necessary granted, but it is a bit of a waste of the capability of LoRaWAN, especially as the majority of schools have their own dedicated gateway which are seriously underutilised . Has the portfolio holder looked at the LoRaWAN network as a way to save money by controlling the heating systems in Powys schools?

- The LoRaWan gateway system is a one-way data transfer - we can gather information from the school site (CO2 etc), but we are unable to change any settings or parameters remotely using this technology. All new schools and most of the older stock are now fitted with building management systems (BMS). The BMS system allows us to remotely view any information we have designed into the control strategy (room temps, boiler state, alarms, CO2 etc) but it also gives the ability to remotely adjust controls and parameters. A BMS system is a standard solution across most large buildings and have been used for many years. There is an ongoing programme to upgrade and install these systems across all PCC schools.

3. Has the portfolio holder looked at solar battery storge for schools? Also, some electricity providers pay very attractive rates for solar battery systems to export their load onto the grid at peak times. Has the portfolio holder looked into this as a possible revenue stream for schools over the weekends and a way of cutting electricity cost during the school week?

- As all new schools are required to be built to 'net zero carbon' standards, the first sites with battery storage are currently nearing construction (Brynllywarch etc), this works in conjunction with large areas of PV to make the site as standalone as possible for energy consumption.

  PVs are the most practical solution to offset energy use as they reduce the energy imported from the grid against the baseload energy use of the building. One small issue with a school site is that it is not occupied during weekends and during the holiday periods. Battery storage would offset some of this downtime where the battery could be charged to feed the school requirements when in session. The team have advised that installing battery technology will be considered during any future PV installations where practicable.

  A future consideration for PV will be 'smart' use of energy with a combined PV and battery system as it is possible to export electricity to the grid for a small generation income or purchase electricity at night on a cheaper rate to energise the battery ready for the next day's usage.

  The school's team have recently commissioned a project to assess suitable sites for PV and battery storage, where we should see some sites benefit from the installation of PV and hopefully battery storage. It is noted however that potential sites will need to be surveyed and assessed to identify suitability for any such technologies as there are export limitations in place in the south of Powys due to limited capacity on the network.

4. Has the portfolio holder looked at installing air or ground source heat pumps alongside the current heating systems at school properties? Air source heat pumps work at a ratio of every 1 KW of electricity you put in, you get 3KW of heat out. Throughout the day the electricity input could be offset by solar battery storage.

- Air source heat pumps (ASHP) are being installed in the latest new schools builds (Cedewain, Ysgol Gymraeg Y Trallwng and Brynllywarch), where combined with a very efficient building fabric and large PV arrays, these will offer very low energy usage and much reduced carbon emissions.

  Retro fitting to existing buildings is more complicated and expensive as existing building fabric and pipework may require considerable improvement to benefit from this technology. Some of the newer build schools however may warrant consideration for a retrofit system where they have suitable levels of insulation and ideally underfloor heating. ASHP works well alongside a suitable PV system to offset some of the

running costs of these systems. Retro fitting to older less efficient schools may not be cost effective unless substantial thermal improvements are made to the building envelope.

Ground source heat pumps (GSHP) are more expensive than ASHP and would require some free area for the coils to be installed. We have seen examples of schools from other authorities where GSHPs have been installed where the coils leaked underground requiring very expensive repairs. ASHP is the preferred option.

- For a school such as Llandinam - Llandinam currently has a web enabled BMS installed although some of the software and control kit would benefit from an upgrade. Some quick win energy improvements would be to replace the existing lighting with the latest LED fittings, which will reduce running costs and improve the classroom environment. A PV system may be suitable depending on survey.