Essex County Council

ECC School Energy Team: School Energy Survey

[redacted] PS / 16 Jan 2024 Complete

Score	18 / 66 (27.27%)
Site conducted	[redacted]
Conducted on	16.01.2024 10:00 GMT
Prepared by	Hilda Wu and Chloe Breach
Location	[redacted]

Disclaimer

The surveyors believe the information contained within this report to be correct at the time of sending. The surveyors do not accept responsibility for any consequences arising from the use of the information herein. The report is based on matters which were observed or came to the attention of the surveyors during the day of the assessment and should not be relied upon as an exhaustive record of all possible risks or hazards that may exist or potential improvements that can be made. When implementing any changes always follow your school's standard procedures, procurement policies, code of conduct and appropriate health and safety checks.

Please contact ECC for any further guidance:

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School Energy Survey

18 / 66 (27.27%)

Office/engagement

1 / 10 (10%)

Energy Contracts: Insert any images of bills and unit rates.

The school is under a group contract with [redacted] through the energy broker Laser for both electric and gas until [redacted]. The details are as below:

Electricity
Supplier: Npower (non-half-hourly billed)
MPAN: [redacted]
Unit rate: [redacted] (day) & [redacted] (night) pence/kWh

Gas
Supplier: TotalEnergies Gas & Power
MPRN: [redacted]
Unit rate: [redacted] pence/kWh

According to information provided by the school staff, the neighbouring [redacted], operated by the governors, shares the energy bills with the school. Since there is only a single meter for both electricity and gas, and no sub-meters, the energy usage for both institutions is combined. They share various resources, including the same boiler room for heating, and the school kitchen prepares hot meals for the pre-school at lunchtime. As a result, the pre-school pays a percentage of the total energy bills and contributes to HR and other shared services.

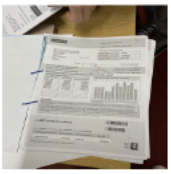
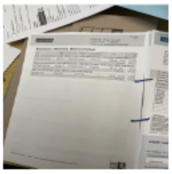


Photo 1


Photo 2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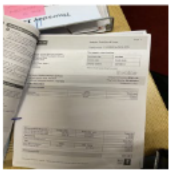
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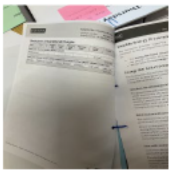
Photo 6

Is someone responsible for monitoring energy consumption?

We review the invoices and store them clearly (in an accessible folder), but do not note our consumption (i.e. on a spreadsheet).

Is information on consumption shared with everyone in the school?

There are no displays regarding energy consumption.

Is there any asbestos?

Requires further investigation.

A Condition Survey conducted in April 2023 revealed that the school is aware of asbestos locations and maintains a well-documented asbestos register.

Do you have an energy action/eco team?

We do not have an energy action team.

The school curriculum has focus on habitats, living things and energy. Consider expanding these to set up an eco/energy team. The eco/energy team could explore ways to reduce energy consumption within the school by promoting energy-saving practices, such as turning off lights and electronics when not in use. They could also keep track of the school's energy consumption via meter readings; monitoring the difference their initiatives are making. One effective initiative that has been successful in other schools is the creation of an end-of-day checklist for each classroom. The team can develop a checklist that ensures all electrical equipment, such as computers, projectors, and classroom lights, are switched off when not in use.

Additionally, they can include closing blinds or curtains to retain heat during the winter, reducing the need for excessive heating. The checklist can be displayed prominently in each classroom, serving as a visual reminder to everyone to switch off devices and conserve energy before leaving the room.

Does your school have an environmental and/or energy policy?

We do not have a school energy policy in place.

A comprehensive school-wide policy aimed at reducing energy consumption, complete with clear targets and designated responsible parties, will be instrumental in achieving our sustainability goals. Helpful templates will be included alongside the report to facilitate the implementation of this policy.

Do you run activities to engage students; raising awareness around energy/sustainability?

We do not run activities to engage students and raise awareness around energy/sustainability.

Are pupils involved in reading meters and monitoring the results?

We have never had an activity where we allow pupils to read meters/monitor energy use.

Sustainable transport: are there walk to school initiatives, adequate bike storage areas and/or a sustainable travel plan?

We would be interested in developing a sustainable travel plan, or improving our own.

Has the school received the ECC Schools Advice Pack?

The school will be emailed a copy of the Schools Advice Pack after the visit.

Boiler room, BMS/controls, meters and distribution boards

5 / 10 (50%)

Pictures and descriptions of the technologies which provide heat and hot water to the building. Include any boiler ages.

Main plant room:
2 x 2001 Remeha Gas 350-5 gas boilers, both rated at 108 kW each. 1 x AO Smith Cyclone BFC 28, 217L, 32.2 kW, gas-fired direct hot water cylinder.

Kitchen's plant room:
1 x Andrews Water Heaters 40/61 GB, 182L, 19 kW, gas-fired direct hot water cylinder. This hot water cylinder is likely for the kitchen.

Expansion:
While we did not access it during our visit, it is likely that the expansion has its own Vaillant gas combi boiler, according to the Condition Survey report.


Photo 7


Photo 8


Photo 9


Photo 10


Photo 11


Photo 12


Photo 13


Photo 14

Are boilers regularly serviced?

Boilers are serviced once a year.

Are pipes and valves fully insulated?

There is a good level of insulation throughout the pipes and valves, but some areas have been missed.

Consider using bespoke removable insulation jackets, foil/fibreglass wrap or tubular sleeves to cover exposed hot surfaces in the plant rooms, some of them may have been left open for maintenance access. Insulation can reduce heat loss from pipes by up to 90%, resulting in a reduction in energy costs. The pipework immediately leaving the heating pumps, hot water stores and boilers will be key to target. During the survey, exposed areas of pipework measured in excess of 69°C. The images below show examples of excellent insulation levels within a plant room, limiting energy loss via heat.


Photo 15


Photo 16


Photo 17


Photo 18


Photo 19


Photo 20


Photo 21

Photo 22

Photo 23

Do heating and hot water times match the occupancy of the school? Please note times.

The heating and hot water are on timers, but the hours could be reduced.

MAIN PLANT ROOM

There is a Unitron UC32 building management system (BMS) in the plant room that regulates the heating and hot water systems. It includes features such as a weekly programmer for occupancy periods, room temperature setpoints, flow temperature setpoint adjustment, and frost protection. It is important to thoroughly review these settings to ensure maximum energy savings.

Heating time schedule

Monday to Friday: 7:00am to 5:00pm
Saturday and Sunday: OFF

The school could explore aligning heating start times with staff and student arrival times while maintaining comfort levels, for example potentially starting at 8:00am rather than earlier times. It is likely that the system incorporates an 'optimum start' feature, allowing for delayed heating start times, as any warm-up time necessary is already taken into account by the system.

Similarly, the heating end times could be cut shorter, such as programming the heating to finish at 3:00pm, as latent heat in the building should keep the space to temperature, even after the heating is last timed to shut down.

If this is successful, further consider trimming times further to incorporate a two time on/off programmes, for example, 8:00am-11:00am and 1:00pm-3:00pm. This time setting has been successful in other schools as at lunchtime, often, doors are consistently opening. Therefore, it makes sense to turn the heating off to limit heat loss over this period.

Hot water schedule

Monday to Friday: 7:00am to 5:00pm
Saturday to Sunday: OFF

There is scope to reduce the hot water times. If point-of-use (POU) hot water stations can be assigned to the earliest/latest hot water users, such as breakfast/after-school club and cleaners, this should be done in favour of running the large stores at extensive hours. A time schedule of 8:00am to 1:00pm has been a successful policy in other schools. As water is heated to 60°C in the store timing the hot water store to go off at this time this should leave plenty of hot water at the recommended 43°C for handwashing throughout the rest of the day - the store is well-insulated and able to store water at high temperatures long after it is last timed to shut down.

It is also worth noting that according to the technical specifications of the AO Smith Cyclone BFC 28, the heating time for it is 22 minutes through a 45°C temperature rise, allowing the hot water store to heat the entire cylinder of hot water (217 litres) within 22 minutes. When adjusting the time schedule, the school should consider this information.

Internal temperature setpoint

Opt Room SP: 21°C (reduced to 20°C during our visit)

The heating will operate (according to timers) until room temperatures reach the above setpoint. Setpoint should be reviewed and further reduced, especially since it is common for heating to be on while windows are open. The school should consider setting the setpoint to align with the DfE recommendations; heating setpoints in classrooms and general school spaces should be set at 18-19°C, while sports halls and circulation spaces are recommended to be at 15°C.

Additionally, there is currently a single setpoint controlling the entire building. It is advisable to consult with your BMS installers to implement zone controls. This will enable the school to manage heating more effectively, preventing over and under heating in areas with different structural, orientation, occupation, or emitter characteristics.

Outside master setpoint

Outside hold off: 18°C

This setpoint means that the heating will operate if outside temperatures remain below the set temperature, while summer mode will be activated, turning off the heating system as long as the outside temperature rises to or above the set temperature, which was set as 18°C during our visit. The DfE guidance suggests a range between 15-17°C. Consider reducing this setpoint if staff and students can remain comfortable. An appropriate outside summer limit setpoint should help automating the switching on/off of the heating system, rather than manually switching between summer and winter modes, especially in spring and autumn when the outside temperature fluctuates.

Flow temperature

Flow at 20 outside: 20°C
Flow at 0 outside: 80°C

The boiler setpoint or flow temperature controls the temperature of the water leaving the boiler. Consider reducing these setpoints as reducing the boiler flow temperature can improve the efficiency of the boiler and reduce the amount of fuel it uses. 65°C would be the most reduced setting. This setting will ensure any associated hot water stores can still reach 60°C for legionella purposes. Changes can occur gradually alongside the evaluation of staff and student comfort. Remember to keep a record of the settings so you can switch them back if you feel the school is not getting warm enough during winter periods. It is important to find the optimal temperature that balances energy savings with comfort.

Frost protection setpoints

Outside frost: 2°C
Pipe frost: 10°C
Room frost: 12°C

These setpoints are designed to prevent the water within the heating system from freezing under cold temperatures. Based on the observed setpoints during our visit, frost protection mode will be activated if the outside temperature drops to or below 2°C, the pipe temperature drops to or below 10°C, or the room temperature drops to or below 12°C. The room frost setpoint also serves as the temperature to maintain during non-occupancy periods.

The school could consider reducing the pipe and room frost setpoints to 5°C, which is generally sufficient to ensure frost protection without unnecessary heating of an empty building. Higher setpoints may cause the boilers to activate more frequently than necessary, leading to increased energy consumption and costs.

Additionally, we have noted a setpoint named 'Boiler Frost SP,' which is set to 50°C. We are not sure if this stands for the setpoint that triggers frost protection, the setpoint to reach for frost protection, or if it has another meaning. We have inquired about this with the Unitron team at ABB, and they advised us to contact the original installer, which we believe may be challenging. Despite this, we suspect that a 50°C boiler frost setpoint is excessive, as it is not necessary to heat the boilers to 50°C for frost protection. If the school has any plumber or BMS control company working with it, it may be worth asking them to check if it is possible to lower this boiler frost setpoint.

Holiday shutdown

Although we did not thoroughly review the BMS during our visit, it is unlikely that the system has a holiday programme allowing users to set specific dates. The school should investigate further to check if holiday dates can be programmed. Inputting all holiday dates, including bank holidays, at the beginning of the year will ensure the boiler operates seamlessly and reduce the possibility of providing heat to an empty building. This approach also maintains the boilers' frost protection settings, as the boilers will enter holiday mode rather than being completely turned off.

If a holiday programme is unavailable, the control panel can still be used to activate holiday mode. The panel has two knobs for heating control and hot water supply (HWS) control. Switching these knobs to 'Hol' should prevent the heating and hot water systems from operating unnecessarily during periods of non-occupancy. This manual holiday switching procedure should be completed by an appointed person before every holiday or bank holiday period, with set reminders in place.

It is important to note that simply switching to 'summer' mode will only stop the heating operation; the hot water system will continue to run according to the time schedule set. This is a common issue in other schools where the hot water system remains operational during the summer holiday because holiday mode was not activated in addition to summer mode.

KITCHEN'S PLANT ROOM

No timer or programmer was identified with the hot water cylinder in the kitchen's plant room. We are unsure if the Unitron BMS in the main plant room also controls this kitchen's hot water cylinder, or if it operates independently. The school should investigate further to determine whether the kitchen hot water cylinder is run by a timed programme or operates continuously 24/7. If no control is in place, it is highly recommended to install a timer to regulate its operation time. Adjusting the hot water cylinder to operate solely from 8:00am to 1:00pm on weekdays, rather than running continuously throughout the week, could reduce operating hours from 168 hours a week to 25 hours, thereby cutting usage by approximately 85% and potentially saving significant costs. See the point-of-use (POU) section for detailed options on timers.

Additionally, ensuring a holiday shutdown will also be crucial to avoid unnecessary operation in an empty building.

EXPANSION

While we did not access it during our visit, it is likely that there is a time programmer located on the boiler itself, according to photos from the Condition Survey report. The school should check the time set on it and ensure it aligns with the expansion’s occupancy. When appropriate timing is set, it is important to ensure the middle knob is set to the clock symbol so the boiler will operate according to the time set, rather than being set to ‘on’ where the boiler runs constantly.

The school should also ensure that the boiler is manually switched off over weekends and holiday periods. This should be the responsibility of an appointed person with set reminders.


Photo 24


Photo 25


Photo 26


Photo 27


Photo 28


Photo 29


Photo 30


Photo 31


Photo 32


Photo 33


Photo 34


Photo 35

What temperature is the water heated to? It must be heated to a minimum of 60°C.

The hot water setpoint is above above/below 60°C.

We did not access the hot water setpoint in the BMS during our visit. However, it is currently set to 62°C at the AO Smith hot water cylinder in the main plant room. Additionally, the temperature control knob on the kitchen’s Andrews hot water cylinder is set to position 3, which likely corresponds to around 71°C. We recommend reducing this temperature to 60°C, which corresponds to position '2' on the control knob.

Reducing the setpoints to 60°C is advised. According to HSE legionella guidance, large tanks of hot water need to be stored at 60°C and should reach 50°C at the outlet (before the thermostatic mixing valve) within one minute. This adjustment will maintain safety standards while improving energy efficiency.


Photo 36

Electric meters

Rate 1 (day) meter read: 718,801 kWh
Rate 2 (night) meter read: 130,281 kWh


Photo 37


Photo 38


Photo 39

Electric MPAN numbers and meter serial numbers

MPAN: [redacted]. Meter serial number: [redacted].

Photo of main incoming UKPN head


Photo 40

Gas/Oil meter

Meter read: 189,802.3 m^3


Photo 41


Photo 42

Gas MPRN number and meter serial numbers

MPRN: [redacted]. Meter serial number: [redacted].

Water meter

Requires further investigation/not seen on visit

Are distribution boards labelled clearly?

All distribution boards are labelled clearly.

Direct labelling would improve site knowledge and help with the installation of timers.


Photo 43


Photo 44


Photo 45

Are there any distribution board/consumer unit timers? Are they set up and timed correctly?

There are no distribution board/consumer unit timers.

No timers were identified during our visit. The school should investigate further to check if there are any timers controlling external lights or point-of-use hot water units.

Windows and Lighting

5 / 17 (29.41%)

What type of glazing does the school have?

The school is almost fully double glazed; there are 1-5 windows/doors with single glazing.

The school is mostly double-glazed, with just a few single-glazed windows remaining. We did not record the exact locations of the single-glazed windows, but they are shown in 'Photo 50' below, likely the windows on the stairs between the ground floor and first floor.


Photo 46


Photo 47

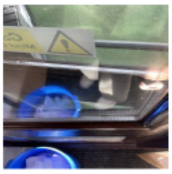
Photo 48


Photo 49

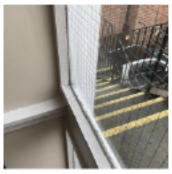
Photo 50


Photo 51


Photo 52


Photo 53

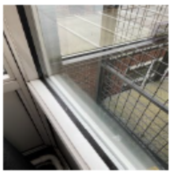
Photo 54

Are windows and skylights cleaned regularly to allow maximum natural daylight in?

There is scheduled maintenance for skylight cleaning/ skylights are generally clean.

What kind of lighting does the school have?

The school has full LED lighting.

The school has used the DfE energy efficiency grant to upgrade all internal lighting to LED, including the lights in the pre-school. However, they have found it difficult to see savings on their bills.

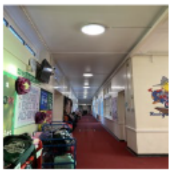
Photo 55

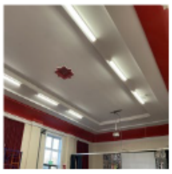
Photo 56


Photo 57


Photo 58


Photo 59


Photo 60


Photo 61


Photo 62


Photo 63


Photo 64

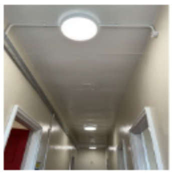
Photo 65

Are there any lighting sensors? Are they timed appropriately e.g. to switch lights off after 5 minutes of inactivity, rather than 30 minutes?

We have some sensors, but the timers could be adjusted/reduced.

Motion sensors are installed in some toilets, as well as in the office. The school should review if motion sensors can be programmed to switch off after shorter periods of inactivity. This can usually be assessed by removing the cover of sensors and reviewing the dial. Alternatively, there may be a universal remote. All sensors, especially those in circulation spaces, should be timed to go off after the shortest period of inactivity possible.

In areas without sensors, it would be beneficial to consider installing automatic controls with absence detection and daylight dimming. This would help reduce energy usage and wastage throughout the school.


Photo 66

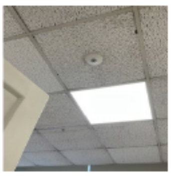
Photo 67

If LEDs are required, is this scheduled in the maintenance programme?

N/A - LEDs are not required.

The school has upgraded all internal lighting to LED. Plans should be in place to replace the external lights with LED as well.

If there are multiple light switches in rooms, are they clearly labelled to prevent them from being used unnecessarily?

Little to no light switches are labelled e.g. with a colour coded system/switch of reminder.


Photo 68


Photo 69

List some LUX level checks. General teaching spaces are recommended to be at 300 lux, while sports halls and kitchen prep areas are recommended to be at 500 lux. Circulation spaces can be between 80-120 lux.

Classrooms generally exceed the recommended lighting level, ranging from 455 to 545 lux. The hallway also slightly exceeds the advised level at 144 lux, while the hall falls below it at 323 lux when all lights are turned on.


Photo 70


Photo 71


Photo 72


Photo 73

Are there controls for exterior lights? Are they checked regularly to ensure they match occupancy periods and hours of daylight?

Requires further investigation.

During our visit, we observed several exterior lights remained on during daylight hours. We did not find any timers controlling the exterior lights throughout the building, the school should conduct further investigation to determine if the exterior lights are switched on regularly or remain on continuously 24/7. This investigation will help identify whether the lights are controlled by timers and if they rely on dusk-to-dawn sensors or motion sensors.

We recommend installing timers with appropriate schedules, such as a 7-day timer capable of at least 2 ON/OFF programmes. This implementation would ensure that energy-intensive lights operate only when necessary, such as from 6:00am to 8:00am and from 4:00pm to 7:00pm on weekdays. In addition to timers, having dusk-to-dawn sensors could ensure that the lights turn on and off with the changing seasons, while motion sensors could ensure that the lights are activated only when someone is present.


Photo 74


Photo 75

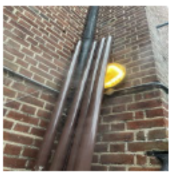
Photo 76

Kitchen

4 / 7 (57.14%)

Is catering equipment switched off immediately after use, including extractor fans?

Generally, catering equipment is only switched on when needed. There are a few exceptions e.g. busy periods like service time.

The kitchen typically operates from 8:00am to 2:00pm, providing lunch service for the school and the pre-school, with approximately 130 meals prepared each day. The kitchen is fully electric, with no gas appliances. Additionally, the kitchen staff are employed by an external catering company rather than being in-house staff.

According to the kitchen staff, the hot cupboards, typically rated at 3 kW, are switched on at 8:30am and remain operational throughout the lunch service. Delaying its start time by 2 hours to operate from 8:30am to 10:30am could result in significant energy savings. It is estimated that such an action could save the school £372 in electricity costs over 190 school days per year, based on the school's electricity rate of [redacted] pence per kWh. Timer plugs could be considered to implement this shutdown automatically. This solution not only helps in turning the hot cupboards on to warm in time for the lunch service but also ensures they are turned off automatically, reducing energy wastage. This method is budget-friendly and requires less reliance on staff.

As per the kitchen staff, the ventilation speed is not adjusted. It is recommended that the school investigates further whether there are any controls on fan speeds, which should be tailored to cooking patterns rather than being switched on at full speed continuously. For instance, when only a few items are cooking, generating minimal heat and moisture, a lower fan speed could be more appropriate. Despite the absence of control, practices such as switching extractor fans off as soon as cooking has ceased could result in significant energy savings.

The kitchen hosted two 'picnic days' in the last year, offering sandwiches or other ready-to-eat foods instead of a full hot meal. These events are not currently scheduled regularly. Consider implementing them periodically, such as once a month or during certain weeks in the summer. This could reduce the need for cooking and contribute to energy conservation.

There is also a gas-fired direct hot water cylinder in the plant room near the kitchen, but no timer or programmer was identified for it. The school should investigate further to determine whether the hot water cylinder operates on a timed programme or runs continuously 24/7. If no control is in place, it is highly recommended to install a timer to regulate its operation time. This will ensure the hot water cylinder operates only when needed and is properly shut down during weekends and holidays. See the boiler room and point-of-use (POU) sections for details.


Photo 77


Photo 78

Photo 79


Photo 80


Photo 81


Photo 82


Photo 83

Where possible are fridges and freezers located in areas away from heat sources?

Fridges are located as far away from heat sources as possible.

Are fridges and freezers defrosted regularly?

Fridges and freezers are defrosted from time to time, but this could occur more often.

Units are defrosted every Christmas holiday but are not left turning off during this period; this could occur more regularly if some units were shut down over the holidays by consolidating contents.

Is cooking equipment labelled with pre-heat times?

Equipment is not labelled with clear preheat times or appropriate usage advice.

Where possible are fridges and freezers emptied and switched off during holiday periods with doors propped open? If multiple appliances are present, the contents can be combined so some can be switched off.

Fridges/freezers are generally left on throughout holiday periods.

Despite the units being defrosted every Christmas holiday, they are turned off only for the defrost process and then switched on again, rather than being kept off. They are generally left on over holiday periods including summer holiday.

Over the periods of low stock/holiday, the school should move stock into one unit so another ones can be shut down and allowed to defrost. The Gram K400RU fridge is estimated to use 767 kWh of electricity every year; costing the school £219 at current unit rates if it is switched on 24/7. Shutting one fridge/freezer down for just 10 weeks of the year (6 weeks holiday and selective half term periods) could reduce running costs by 19% - this is an annual saving of £42 for the Gram unit. This incentivises consolidating produce into as few units as possible and shutting down other units (if not all) wherever possible, as well as planning stock depletion in line with holiday dates.


Photo 84


Photo 85


Photo 86


Photo 87


Photo 88

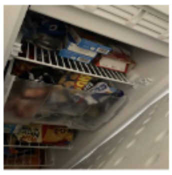
Photo 89

Are ventilation units and extractor hood grease filters cleaned regularly?

Ventilation units and extractor hood grease filters are a part of the regular cleaning/maintenance schedule.


Photo 90

Fabric

1 / 2 (50%)

When was the school built?

The original part of the school building was constructed in 1937, with multiple later extensions in 1949, 1998, and 2007. The latest addition is a standalone expansion completed in 2015.

What is the roof type? Has it been recently replaced/repaired?

A mix of roof types; including flat and pitched.

The main school building, including the original structure and the 1949 extension, is of solid brick construction with a combination of flat felt and predominantly pitched tiled roofs. The later extensions have cavity brick walls with pitched roofs. The 2015 expansion consists of a timber-framed and cladding modular hutted building with a flat felt roof.

Staff members mentioned that all flat roofs were replaced two years ago, and the kitchen roof was replaced in 2016. However, the other pitched roofs have not been replaced or repaired since 2003.

Is the level of insulation good? Where can this be improved? (roof, internal wall, external wall, around windows/doors)

There are areas which can be better insulated (subject to budget constraints).

Roof

The staff mentioned that the pitched roof and the ceiling above the hall need to be insulated. There is no insulation within the lofts, which are difficult to access, and no roofs have the full thickness of insulation. The school has quoted £15k for insulation and hatch access.

It would be advisable to consult experts to assess the potential benefits of adding mineral wool or insulation board on top of the ceiling. This measure would improve thermal efficiency, creating a 'warm loft space' and helping to reduce heat loss. There are many options to explore; ceiling tiles themselves can be purchased as an insulated version, pre-sized mineral wool pads, roll up rockwall quilts or slabs. Adding insulation boosts thermal performance by preventing heat escaping through the ceiling. This helps maintain a consistent room temperature and reduce energy use. Suspended acoustic ceiling solutions provide extra advantages by reducing noise transfer from adjacent dwellings in the same building. Additionally, if feasible, consider upgrading to meet current building regulations standards. 270mm of loft insulation is the current standard.

Wall

The original part of the school is characterised by its solid wall construction, which is typical for buildings of its period. In certain areas, these walls are of a single skin, suggesting a need for additional insulation. Internal wall lining or even the use of modern insulative plasterboard could be considered for this purpose. Furthermore, one option for insulating the external walls of a Victorian building is to use external wall insulation (EWI). This involves fixing an insulating layer to the outside of the existing walls, followed by a protective layer to provide weather resistance. EWI can help to reduce heat loss and improve energy efficiency, while also improving the appearance of the building. However, it is important to carefully consider the impact of any insulation work on the building's historic fabric, and to ensure that any work is carried out in accordance with the relevant conservation guidelines. To achieve the energy savings, it may be necessary to adjust the heating settings, such as reducing the flow temperatures, in response to the improved insulation. This can help to reduce the overall energy consumption and bills. However, it's worth noting that even without any adjustments to the heating settings, adding insulation to a Victorian building can help to make the building feel warmer and more comfortable, as it can reduce drafts and cold spots, and provide a more consistent internal temperature. Additionally, Victorian buildings often face challenges with dampness due to their solid construction, so any insulation strategy should consider breathability to prevent moisture build-up.

In some areas where composite panels are in place, e.g. staff room, implementing a programme to switch to foam-filled insulated infill panels could be considered. A U-value as low as 0.3 W/m2K can be achieved compared to a higher U-value, e.g., 1.5 for an uninsulated uPVC wall panel. Lower U-values help to reduce heat transfer and improve insulation, ultimately leading to energy savings. An example of an insulated infill panel is provided below for reference.

Windows/doors

During the visit, it was observed that some areas lacked blinds or curtains. The school should consider installing blinds or curtains in these areas. This would reduce heat transfer and save heating costs. We have seen over a 5°C difference between the closed blind and the exposed window in other schools. To further reduce heat transfer, consider upgrading the existing vertical blinds and Venetian blinds, to thermal or insulated blinds. They have a close fit around the window and most are designed to trap a layer of air inside the blind, so the blind works in a similar way to double glazing. This makes them great for preventing heat transfer, especially when closed overnight.

The school should also consider implementing a programme to replace blown double glazing. Blown double glazing, wherein the glazing seal has failed and moisture accumulates between the panes, greatly diminishes the insulative properties of the window. Especially during the heating season, this can lead to increased heat loss, causing the school's heating system to work harder and increasing energy costs. Upgrading to high-quality, energy-efficient glazing materials, such as low-emissivity (Low-E) coated glass, can help retain heat and minimise energy consumption.

Additionally, it was observed that privacy film has been installed in all the classrooms. Further investigation is recommended, especially considering our previous observation that privacy film may exacerbate overheating. During our visit at another school, windows with privacy film recorded temperatures 5°C higher than untreated windows. If this is also the case here, the school should consider installing low-emissivity (Low-E) window film on all windows, particularly in areas where temperatures often become too warm in summer and too cold in winter. The window film improves heat retention in the colder months while reducing glare in the summer months by enhancing the insulation properties of single- and double-glazed windows, making them approach the performance of double- and triple-glazing.

Furthermore, during our visit, we observed that some of the doors are draughty. Draught strips or door seals should be added or replaced to retain heat within the school.


Photo 91


Photo 92


Photo 93


Photo 94


Photo 95


Photo 96


Photo 97


Photo 98

Photo 99

Photo 100

Photo 101

Are any parts of the school too hot? if so, where? Insert thermal camera images here if required.

See insulation section above.

Are any parts of the school too cold/draughty? If so, where? Insert thermal camera images here if required.

See insulation section above.

List some room temperature checks. During the heating season is the temperature of classrooms, libraries and IT suites 18°C? Sports halls, circulation spaces and toilets have a recommended temperature of 15°C.

The BMS indicates that the school maintains a temperature of 15.7°C. This is likely because only one sensor is set within the school, resulting in a single temperature reading. During the visit, a temperature of 18.8°C was measured in a classroom.

Heating emitters and point of use hot water

1 / 9 (11.11%)

Are there any point of use (POU) electric water heaters? Are they on timers or switched off at the end of the day (especially over weekends/school holidays)?

It is uncertain whether any of the POU heaters are on timers and there is no switch off protocol. They are likely operating 24/7.

During the visit, three POU units without timer were identified: one in the pre-school, one in the staff room, and another in the main office. There should be one more POU unit in the pre-school, according to the distribution board. The school should identify all the POU units to check if they are subject to any timer or instead operate continuously, 24/7.

As an example, the second POU unit we pictured in the main office (Andris Lux 10 UR 3kW) can consume 561 kWh annually, which means this singular unit will cost about £160 a year in electricity to run 24/7 (calculated using the school's current electricity rates). Adjusting the POU unit to operate solely from 8:00am to 3:00pm on weekdays, rather than running continuously throughout the week, could reduce operating hours from 168 hours a week to 35 hours, thereby cutting usage by approximately 80% and potentially save £128 annually for this single unit. The school should evaluate the potential benefits of installing a consumer unit timer within the corresponding distribution board connected to the POU units. By doing so, the operation times of the unit can be synchronised with school occupancy periods or cleaners' working hours. As a cost-effective alternative, if there is an existing switch for the unit, digital timer switches, smart plugs, switch bots, or 7-day timers can be outfitted on it. Example of these timers are provided below for reference.

Additionally, many of these units allow for temperature adjustments, with dials typically ranging from 10°C to 70°C. The units usually tend to be set to their maximum temperature (70°C) in other schools, despite only needing to be at 43°C for effective handwashing. If that is also the case of the school, it might be worth reviewing. Modern units are often equipped with an anti-legionella function, reducing risks even when running at lower temperatures. In addition to this, the DfE recommends that POU units with storage volumes under 15L can be run at 50°C for legionella protection, rather than the 60°C required in larger tanks. Thus, the school should look into adjusting the temperature settings on the unit if appropriate.

Furthermore, there is a gas-fired direct hot water cylinder in the plant room near the kitchen, which is unlikely operated by a timer or programmer. Consider setting the timer to minimise on times as much as possible, for example, from 8:00am to 1:00pm, as well as restricting weekend operation. See the boiler room section above for further recommendations.


Photo 102


Photo 103


Photo 104


Photo 105


Photo 106


Photo 107


Photo 108

Photo 109

Photo 110

Photo 111

Photo 112

Are heating emitters (radiators, convectors etc.) free from obstructions such as tables, storage units and bags?

A significant number of heating emitters are obstructed.

During the visit, we observed that some radiators and convectors are obstructed by furniture placed in front of them. Obstructions should be avoided to allow a free flow of air for the process of convection, also to enhance the heating efficiency.

Some of the radiators and their exposed pipework are too hot, exceeded 68°C at the surface. Current government legislation reads that "In a special school, nursery school or teaching accommodation used by a nursery class in a school, the surface temperature of any radiator, including exposed pipework, which is in a position where it may be touched by a pupil shall not exceed 43°C". High temperatures suggests that the flow temperature in the main plant room is set too high. Consider reducing this after reviewing recommendations.

Additionally, there are areas of exposed radiator pipework throughout the school. Radiator pipework should be insulated with foam tubes, or other suitable insulation. Not only will this ensure H+S requirements are met but will improve the heat output of the radiators, ensuring they are working at maximum efficiency. Improved pipework insulation will also mean all the heat being emitted can be controlled via radiator TRVs, rather than allowed to leak into the room unrestricted via pipework. This will address overheating issues in the classrooms.


Photo 113


Photo 114


Photo 115


Photo 116


Photo 117


Photo 118

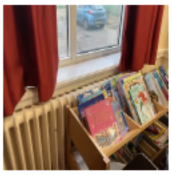
Photo 119


Photo 120


Photo 121


Photo 122


Photo 123


Photo 124


Photo 125


Photo 126


Photo 127


Photo 128


Photo 129


Photo 130


Photo 131


Photo 132


Photo 133


Photo 134

Are there thermostatic radiator valves (TRVs) and/or wall thermostats? Are they in good condition?

There are areas without TRV's/wall thermostats and condition varies for the ones that are in place.

There are radiators throughout the school that lack a TRV, and some of the existing TRVs are blocked. These limitations restrict the ability to adjust heat output or temperature, potentially resulting in overheating issues and reduced local control, especially since it is common for heating to be on while windows are open. To rectify this concern, it is advisable to install TRVs on all radiators and address the stuck TRVs to enable individual temperature control in each room.

Furthermore, to enhance temperature control and efficiency, the school could explore the possibility of upgrading to smart TRVs. Smart TRVs offer advanced functionality, allowing users to remotely control the temperature of each radiator via a mobile app. By utilising temperature sensors, smart TRVs automatically adjust the temperature based on room conditions and user-defined settings, offering a more sophisticated and customisable heating solution. Example of smart TRV is provided below for reference.


Photo 135


Photo 136


Photo 137


Photo 138


Photo 139


Photo 140

Photo 141

Is there a heating emitter maintenance programme? For example, cleaning, draining (with sampling) and bleeding radiators?	There is a heating emitter maintenance programme; bleeding/draining/cleaning has been undertaken where appropriate.
Is your school free from supplementary heaters? The use of these indicates an inefficient heating system	There are several plug-in heaters throughout the school.

Oil-filled radiators and a fan heater were observed in the pre-school's kitchen and staff room. As mentioned in the boiler room section above, the setpoints should be reviewed to determine if appropriate adjustments to the main heating system can eliminate the need for supplementary heaters throughout the school. Incorporating more zones, rather than relying on a single setpoint for the entire school, could help tailor different settings according to each area's nature. Additionally, installing TRVs and fixing the blocked TRVs will enable individual temperature control in each room.


Photo 142


Photo 143


Photo 144

Ventilation

What kind of ventilation does the school have? Good ventilation is necessary to provide healthy and productive indoor environments throughout the year. This includes lower CO_2 levels, which are linked to cognitive performance, reducing the risk of airborne diseases (such as COVID-19 and influenza) and overheating during the summer season.	Natural and mechanical

Extraction fan located in the pre-school had significant dust build-up. Cleaning these vents will improve efficiency.


Photo 145

Electrical equipment

1 / 7 (14.29%)

Is IT equipment such as PCs, laptops, whiteboards, projectors, and TVs always switched off at the socket when not in use?

Some IT equipment is unplugged, while some is left on standby.

There is one charger trolley identified in the school during the visit. It is likely left plugged in 24/7.

During our previous visits, we have observed that a charging trolley can use about 10W of power, despite all devices being fully charged. This constant power usage could potentially add up to £25 per unit over a year based on the school's current electricity rates. An end of day switch-off (at plug) protocol should be implemented. A smart/plug-in timer would also help to automate this process and ensure they are not plugged in 24/7, where a few hours may suffice for a full charge.

Since the survey was conducted during school hours, we cannot tell for certain whether equipment is fully switched off at the end of the day. The school could carry out further investigation after school hours / during holidays.


Photo 146


Photo 147

How many printers and photocopiers are there? Could this be reduced?

The number of printers/photocopiers could be reduced; especially if they are moved to more communal/accessible areas.

There are two large photocopiers (MFD) in the ICT suite and three desktop printers throughout the school. If appropriate, consider removing the desktop printers and using the MFDs in the communal areas instead. This will encourage device sharing, reducing the overall electrical load.


Photo 148


Photo 149


Photo 150

Are printers and photocopiers switched off overnight / during holiday periods? Or, have printer and photocopier settings been accessed to make the most of sleep, standby and hibernation modes?

Power consumption during these modes may vary based on the device's age and manufacturer. If there is uncertainty regarding the necessity of a power-down process or timer, please refer to the recommendations provided at the end of this report for guidance on adjusting settings and considering the purchase of an appliance monitor.

Printers and photocopiers are programmed to enter sleep, standby, and hibernation modes. However, these settings have not been reviewed to determine if the duration before entering these low-power modes can be reduced.

Since the survey was conducted during office hours, we cannot tell for certain whether equipment is fully switched off at the end of the day. The school could carry out further investigation after office hours / during holidays.

Are classroom fridges and appliances in the staffroom, such as microwaves and kettles, turned off when not in use, for example, over school holidays?

Classroom fridges and staffroom equipment are generally left on, without any 'power-down' process in place.

The classroom fridges and staffroom appliances, including hot water boilers, are typically not switched off during holidays, even during the summer break. Since there are several fridges throughout the school, it may be practical to make only one fridge available to staff during holidays and switch off the other units.

Additionally, to further enhance energy savings, we recommend implementing a holiday shut-down practice for all fridges and freezers. It makes sense to perform a thorough clean-out before the summer holidays and other half-term breaks. Shutting down these fridges and freezers for just 10 weeks of the year (6 weeks holiday and selective half term periods) could reduce running costs by 19%. This will also facilitate regular defrosting for increased efficiency, as we observed significant frost build-up in the icebox inside a fridge and a freezer.


Photo 151


Photo 152


Photo 153


Photo 154


Photo 155


Photo 156


Photo 157


Photo 158


Photo 159


Photo 160


Photo 161


Photo 162

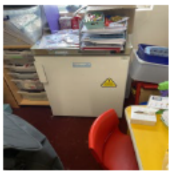
Photo 163


Photo 164


Photo 165


Photo 166


Photo 167


Photo 168


Photo 169


Photo 170


Photo 171


Photo 172


Photo 173


Photo 174


Photo 175

Air-conditioning

0 / 1 (0%)

Is there any air conditioning?

Yes.

How many air conditioning units are there? Where are they?

There are three air conditioning units, located in the pre-school.


Photo 176


Photo 177


Photo 178


Photo 179


Photo 180


Photo 181

What is the kW rating for air-conditioning units?

Requires further investigation

What are the set points/controls? Generally, air conditioning should not operate below temperatures of 24ºC unless there is a specific process requirement.

Air conditioning controls are unrestricted.

All air conditioning units are equipped with remote controls. The school should explore the feasibility of setting limits on heating and cooling setpoints that cannot be overridden by staff or students. Typically, when settings remain unchanged, the system imposes automatic limits, with an upper temperature setting limit of 30°C and a lower temperature setting limit of 18°C.

Adjusting these limits – particularly by increasing the lower limit and decreasing the upper limit – could help reduce unnecessary energy consumption while still allowing for reasonable user adjustments. Ideally, the system should be configured to heat until internal temperatures reach 18°C and to cool only when temperatures exceed 24°C. These settings provide a comfortable 6°C gap where no energy is consumed.

Swimming Pool

Is there a swimming pool?

The school does not have a swimming pool.

Renewables

0 / 1 (0%)

Are there any renewables in place? e.g. solar PV

The school does not have any renewables in place.

The school is interested in installing solar PV and has considered installing systems on two trains on site. One train will be designated for the pre-school, and the other train will serve multiple purposes, such as a library.

We have compiled the following table based on data from 47 ECC Solar PV installations. Tailored to [redacted] School's current electricity rates, the table illustrates potential annual savings on the electricity bill from various array sizes. The average installation size across our estate is 42 kWp. Typically, schools opt for installations just below 50 kWp to avoid more extensive permissions required from the distribution network operator (DNO - UK Power Networks). Permissions are still necessary for installations less than 50 kWp. However, this paperwork is usually handled by the installer with approval required from the DNO both before and after installation. Schools must ensure proper documentation is provided by the installer. Read more on this here (https://www.ukpowernetworks.co.uk/new-electricity-connections/distributed-energy-resources-der-generation/wind-solar-farms-large-scale-storage-what-s-involved).

The estimated annual direct consumption is derived from live data from 31 school-specific installations. Schools have unique energy consumption patterns, notably during extended holiday periods, where surplus solar energy is mostly exported to the grid (at 4p per kWh if signed up for a Smart Export Guarantee), rather than directly offsetting the school's electricity bill at [redacted] p per kWh. Thus, the calculations aim to address these challenges by utilising school-specific data to accurately estimate average consumption rather than solely focusing on generation.

For [redacted], a maximised array at 50 kWp offers a payback period of close to 10 years, with a potential annual saving of almost £8,260 on the electricity bill.

Please note: When evaluating solar quotes and savings calculations, it is crucial to scrutinise panel capacities, overall capacity and direct consumption estimations closely for accurate savings predictions. The figures provided below are indicative and based on average data. Additionally, it is important to consider potential future changes in unit rates, as alterations to the school's unit rate in future contracts may impact savings and extend the payback period. For example, if the school's unit rate were to decrease to 20p per kWh, the payback period could extend to just over 15 years.

It is crucial for the school to minimise its consumption as much as possible prior to the installation of any renewable energy system. The highest priorities of the energy hierarchy involve the prevention of unnecessary energy usage through the elimination of energy wastage (behavioural change/reducing timers, etc.) and enhancing energy efficiency (adopting more energy-efficient equipment, such as installing LEDs). The implementation of stricter building management strategies and shutdown protocols will be key.

System size (kWp)	Estimated capital cost	Estimated annual direct consumption (kWh)	Estimated annual cost saving from array	Estimated annual export (kWh)	Estimated annual SEG payment	Payback in years (excluding SEG)
20	£ 33,389.80	11020.79	£ 3,303.64	6650.82	£ 266.03	10.11
30	£ 50,084.71	16531.18	£ 4,955.45	9976.24	£ 399.05	10.11
40	£ 66,779.61	22041.57	£ 6,607.27	13301.65	£ 532.07	10.11
50	£ 83,474.51	27551.97	£ 8,259.09	16627.06	£ 665.08	10.11

Other: Positive practice, floor plans and any other issues to report

A space for positive practice observed which could be replicated in other schools.

N/A.

A space for any floor plans/drawings found.


Photo 182


Photo 183

Cracking/damp/mechanical faults and any other issues	Nothing to report
Report Summary: Benchmarking and next steps	0 / 2 (0%)

Benchmarking: Insert average energy use per pupil and per SQM according to latest display energy certificate (DEC). In the UK, 110kWh/m2/year is considered good practice for a primary school without a pool. Typical usage is 119kWh/m2/year.

The school uses more energy per sqm than a typical primary school.

Annual electricity use (kWh/m2/year): 35.78
Annual gas use (kWh/m2/year): 138.32
Total energy use (kWh/m2/year): 174.1

Opportunities for carbon reduction and increased energy efficiency

Office/engagement

- [ ] Create a school energy policy: To ensure the success of your energy saving programme, including any of the suggestions below, it is important to develop an action plan with realistic targets which engage everyone in the school community. This will give everyone an active and traceable responsibility for monitoring and reducing energy consumption throughout the school. It will also allow the school to track any progress. There will be a template sent with this survey to help you start a school-wide energy policy. The benchmarks above can be inserted into the template as a starting point. As the school does not currently share/display energy consumption with the whole school, this could be a good first target. The policy should be displayed, updated and any progress sent to governors/parents on a regular basis.
- [ ] Consider purchasing a business energy monitor display. They work by attaching a sensor to your electricity meter, which then monitors your usage by measuring the current that flows through to the meter. This sensor has a transmitter attached, which wirelessly relays this information to your display unit, showing measurements such as costs, power usage, and CO2 emissions. Displaying these monitors to staff and having the site manager logged into an associated app will help to put the school in direct control of electricity usage. Periods of high use/cost can be immediately flagged for investigation.
- [ ] The school could consider setting up an active eco/energy team. The eco/energy team could explore ways to reduce energy consumption within the school by promoting energy-saving practices, such as turning off lights and electronics when not in use. They could also keep track of the school's energy consumption via meter readings; monitoring the difference their initiatives are making. One effective initiative that has been successful in other schools is the creation of an end-of-day checklist for each classroom. The team can develop a checklist that ensures all electrical equipment, such as computers, projectors, and classroom lights, are switched off when not in use. Additionally, they can include closing blinds or curtains to retain heat during the winter, reducing the need for excessive heating. The checklist can be displayed prominently in each classroom, serving as a visual reminder to everyone to switch off devices and conserve energy before leaving the room.

- [ ] This June 7 to 5 July 2024 climate charities are coming together in the "Climate Action Countdown" to create 29 days of climate action events. From holding uniform swap shops, spotlighting green careers, vertical gardening, building bug houses, active travel adventures, petitioning and sustainability bingo there is something for everyone to get involved with. The campaign includes everything schools and communities need in their free to download activity packs, including assemblies, music downloads, posters, quizzes, worksheets and a calendar of daily inspiration. Take part as a whole school, or do the activities as a class, eco-club, or individual student. There is also a chance to win some fantastic sustainability prizes along the way. Sign up here: https://letsgozero.org/climate-action-countdown/

- [ ] Play The Serious Energy Game with students. Find all possible measures of saving energy in the Serious Energy Game and earn as many points as possible by using only the smartest and most economical measures. Will you be at the top of the scoreboard soon? Download the app here: https://www.energychallenges.eu:44300/SeriousGame/

- [ ] Sign up to Better Planet Schools to integrate energy and sustainability into the school curriculum. Better planet schools provides ready-made teacher/student resources on 9 different topics. ECC is currently a sponsor of Better Planet Schools. This means that if you select 'ECC' as a sponsor during sign up, your account creation will be free. Better Planet Schools allows teachers to select one topic per term to teach, which is then divided into easily accessible and planned weekly lessons. https://www.betterplanetschools.org.uk/signupschool

- [ ] As the school has a smart meter, considering signing the school up for Energy Sparks. After signing a letter of authority, Energy Sparks requests access to your live electricity data. The site then displays your data in easy-to-use graphs separating daytime, overnight, weekend and holiday usage. The website gives tailor-made recommendations and student-led activities for reducing consumption. https://energysparks.uk/

Boiler room, BMS/controls, meters and distribution boards

- [ ] See boiler room/BMS controls section above for specific/detailed recommendations.

- [ ] Consider using bespoke removable insulation jackets, foil/fibreglass wrap or tubular sleeves to cover exposed hot surfaces in the plant rooms, some of them may have been left open for maintenance access. Insulation can reduce heat loss from pipes by up to 90%, resulting in a reduction in energy costs. The school could use infrared thermometer to assess the best places to install further insulation when heating is on. The pipework immediately leaving boiler and the pipework surrounding pumps will be key to target.

- [ ] No holiday programmes have been set. This means that the heating/hot water likely run when the school is empty, unless manual shutdown is undertaken. Inputting all holiday dates and bank holidays at the beginning of the year will ensure seamless operation of the boiler and reduce the possibility of providing heat and hot water to an empty building. This will also ensure that the boilers frost protection (if available – please consult the user manual) settings remain in tact as the boilers are not being turned off completely - they are just entering holiday mode.

- [ ] Reduce the schools heating times. Switch off the heating slightly earlier than the last usage, as there will be latent heat within the building and the system itself. A successful policy in other schools has been incorporating a two time on/off programme e.g., 8:00am-11:00am and 1:00pm-3:00pm. Often at lunchtime doors are consistently opening. Therefore, it makes sense to turn the heating off to limit heat loss over this period.

- [ ] Consider reviewing the main BMS to see if the setpoint for heating can be adjusted. Heating should be on in classrooms and general workspaces until internal temperatures reach 18-19°C. The setting for sports hall's and circulation spaces is recommended to be lower than this, at 15°C.

- [ ] Many heating control systems review the outside temperature and have set points at which the system will automatically switch off when it is warm enough outside. This is often called the 'eco summer hold-off' or similar. If this is available, you should set the outside temperature to between 15°C and 17°C to prevent the heating operating on warmer days and open the windows to cool the building down.

- [ ] Consider reducing the schools hot water times. Some schools have found that timing hot water to go off a few hours before it is last needed, or after the catering staff finish, leaves the water warm enough for the last user. For example, switching off the hot water at 1:30pm when the last users leave the building around 5-6pm. Later building users usually have minimal hot water needs (occasional handwashing). If hot water is set to 60°C, it is only needed at 43°C for handwashing. Success will depend on the efficiency and insulation of your hot water store. Timer reductions may require trial and error but could have huge benefits. Reducing heating and hot water times by 1 hour a day can equate to a 10% reduction in bills, while reducing heating by 1°C can reduce bills a further 10%. You do not need to run hot water 24 hours a day, 7 days a week for legionella protection. You can switch off systems overnight and at weekends and should switch them on again in time to heat the water sufficiently before use. For more information on managing legionella risk, read the Health and Safety Executive (HSE) guidance Legionnaires' disease: hot and cold water systems.

- [ ] Where hot water is staying on extremely early/late for cleaning or staff, consider assigning them to one point of use hot water station, or installing one specifically for this purpose. This will mean the entire system will not have to operate when just one assigned location may suffice.

- [ ] If you have a conventional boiler with an indirect hot water cylinder, then you could try turning the boiler's flow temperature down to 65°C. Do not set it any lower than this or the boiler will not be able to heat your hot water cylinder to 60°C. The temperature must be no lower than 65°C to keep your hot water supply to your taps safe, otherwise there's a risk of legionella bacteria growing in the cylinder. Reducing the flow temperature also lowers the return temperature. All boilers are more efficient when the return temperature is low, and this can save you energy and money. It is important to get your heating controls right first before you try to adjust the boiler's flow temperature with your boiler's thermostat. Before you make any adjustments, it is a good idea to take a photo or make a note of how everything is set. That way the school will know what to turn it back to if needed (e.g. if after lowering the flow temperature, the radiators which are furthest away from the plant fail to get hot enough).

- [ ] Continually review staff and student comfort as setpoints, heating times, hot water times and flow temperatures are reduced. If changes are received with little disruption, consider trimming timings and reducing settings further.

- [ ] Room thermostats and temperature sensors, typically integrated into the Building Management System (BMS), rely on unobstructed airflow to accurately sense temperature. Ensure they are not blocked by curtains or furniture, and keep them away from heat sources. It is crucial to position sensors in neutral locations. Placing sensors near frequently opened doors may unnecessarily trigger heating for the entire building. Similarly, if a sensor is obstructed by a display or curtain, it may incorrectly register the school as having reached the desired temperature, causing it to stop calling for heat before other areas reach the desired temperature.

- [ ] Consider consulting your BMS installers to fit further zone controls. This will allow the school to limit over and under heating where structure, orientation, occupation or emitters have different characteristics.

Windows and lighting

- [ ] Implement a rolling programme to replace the school's single glazed windows with energy-efficient double or triple glazed windows. Opt for windows with low U-values to maximise insulation and energy efficiency. Consider frames made of materials like uPVC or wood-aluminium composite, which offer excellent thermal performance and durability. Consult with window experts for guidance on the most suitable options for your school's specific needs.

- [ ] The school should consider implementing a programme to replace blown double glazing and wooden framed doors. Blown double glazing, wherein the seal has failed and moisture accumulates between the panes, greatly diminishes the insulative properties of the window. Especially during the heating season, this can lead to increased heat loss, causing the school's heating system to work harder and increasing energy costs. Upgrading to high-quality, energy-efficient glazing materials, such as low-emissivity (Low-E) coated glass, can help retain heat and minimise energy consumption. Likewise, replacing wooden doors with those made of composite materials or solid wood with proper insulation can further enhance thermal efficiency and security.
- [ ] Where planning or budget issues pose constraints, the school should explore alternative options such as magnetic secondary glazing. This solution typically involves fitting a clear acrylic or polycarbonate sheet, affixed in place with magnetic tape. These sheets effectively prevent draughts, enhance heat retention, and maintain light levels. Additionally, this approach may prove to be more cost-effective.
- [ ] Windows/doors that can be opened, and are generally in good condition, should be draught-stripped. Draught-proofing strips stick around window/door frames and fill the gap between the window and the frame. This reduces cold draughts and ventilation heat loss.
- [ ] Regularly clean all windows, skylights, transparent doors, and lights. This practice improves natural daylight, decreasing the need for energy-intensive lighting during the daytime.
- [ ] Replace fluorescent, halogen, and other outdated lights with LEDs as and when the school can afford. The most underlit areas of the school and those with the highest wattage lighting should be prioritised. When carrying out upgrades, consider adding occupancy, daylight, absence, or motion sensors. These sensors should be timed to switch lights off after short periods of inactivity, such as 5 minutes. Replacements should comply with building regulations and meet the requirements set out in DfE's output specification (Technical Annex 2E). In the UK, phased changes will occur between 1st September 2023 and 1st February 2024. After these dates, all T5, T8, and compact fluorescent lamps will be banned from sale. However, existing stocks from suppliers of these lamps will still be available until they are exhausted. Replacing inefficient lights, such as fluorescent lights, with LED lights, alongside movement and daylight sensors, can reduce your energy consumption from lighting by over 84%.
- [ ] When considering LED quotes, if there is no significant decrease in wattage and the current lighting system is still in good condition, it might be more practical to opt for a phased implementation plan or establish a clear timeline for retrofitting. The higher the decrease in wattage, the greater the potential savings on the electric bill. It is crucial to scrutinise the details of any received quote and compare the wattage of the proposed fittings with what is currently installed. Utilising simple online calculator tools, such as the one available at https://www.thecalculatorsite.com/energy/led-savings-calculator.php can help schools accurately estimate the cost savings before proceeding with the retrofitting process.
- [ ] Consider purchasing some 'traffic light stickers' and appoint students to label all of the light switches. Often, classrooms have multiple light switches and it is easier just to switch all of them on. Labelling will help to reduce unnecessary usage; 'Red' for lights not to be turned on during daylight hours and 'green' for those ok for normal use.
- [ ] The school should consider upgrading controls for exterior lighting. One suggestion is to explore solar dial time switches featuring dual on/off functions or transitioning to digital timers, preferably with a 7-day timer option. This would allow for different settings over weekends, where it should be possible to reduce exterior lighting times or switch exterior lights off completely if no one is on site. Often timers can be coupled with motion sensor control, which would reduce consumption even further as lights will only activate when someone walks past. Certain models provide web-based lighting control, facilitating digital interconnection of all timers. This would streamline shutdown procedures and enable remote access during holiday closures.

- [ ] Reduce timers for outside lights. This will vary with the seasons but as schools are a locked premises the requirement for well-lit areas is relatively low. Set timers, sensors and controls to suit the school's operational needs, including adjustments required for the varying seasons. This is especially important for security lighting, which can be energy intensive. You should not usually leave external lighting on permanently overnight for security reasons. Instead, install motion sensors on the external lighting to alert others in the area of movement around the school overnight.

Kitchen

- [ ] When buying new catering equipment, look at the energy rating and label. In January 2021, this new energy labelling was brought to the UK, giving commercial appliances a rating from 'A+++ to G', with 'A+++' being the most energy efficient to 'G' being the least. Each purchase of a fridge, freezer, dishwasher, washing machine or washer dryer should be considered alongside the products energy label. Energy labels for fridges and freezers will show the expected annual energy consumption. Multiply this number by your school's electricity rate to calculate the annual cost of your purchase.
- [ ] Turn off fridges and freezers during holiday periods, where appropriate. If it is not possible to switch off all appliances, consolidate the contents and check if anything remaining can be frozen so that some can be turned off; freezers operate more efficiently when they are full.
- [ ] Move fridges and freezers into well-ventilated areas away from hot pipework, dishwashers and cooking equipment. At higher temperatures the machines compressors will be working overtime, which can almost double their electricity consumption. This will also reduce the longevity of your appliance.
- [ ] Check dishwasher cycle settings e.g. consider reducing drying times on dishwashers and allowing residual heat to finish the drying process.
- [ ] In the kitchen, add clear stickers to all equipment displaying the preheat times/usage information. A clear sticker stipulating when extraction fans should be used is particularly important. These labels will raise awareness and ensure no equipment is left on unnecessarily. Many modern ovens, fryers and hot cupboards will warm up in under 10 minutes. You should only turn them on at the start of the day if you're using them in the first 15 minutes.
- [ ] Switch hot trollies and dishwashers on shortly before service, not at the start of the day. On average, this can save two hours of operation per day. As a typical hot trolley is rated at 3kW, this measure could equate to £563 in savings on the school electricity bill every year (presumes 190 school days in a year a cost of 49.4p per kWh – this is the average day rate of ECC schools surveyed by the School Energy Team).
- [ ] Switching extractor fans off as soon as cooking has ceased, or not putting the fan on full on arrival, could yield huge savings for the electric bill. Fan speed should be tailored to cooking patterns and not just switched on to full. If just a few items are cooking, creating minimal heat/moisture, consider using a lower fan speed.
- [ ] Implement a regular defrosting programme in the school kitchen to increase the efficiency of freezers. The Carbon Trust recommend defrosting every two months as a minimum or following manufacturers' recommendations.
- [ ] Check that all refrigeration/freezer temperatures are set appropriately. Refrigeration temperatures set 1ºC too low can increase running costs by 2-4% (Always ensure that the temperature setting satisfies the requirements for safe storage of food).
- [ ] Ventilation units and extractor hood grease filters should be cleaned at regular intervals, as recommended by the manufacturer. Energy consumption can increase by up to 60% if regular maintenance is not undertaken. Dirty or faulty fans, air ducts and components directly affect system efficiency and will increase running costs and risk of breakdown.

- ☐ Consider heat recovery from the kitchen. Large volumes of warm air are expelled from catering facilities through the ventilation system. Over 50% of this 'waste' heat can be recovered using heat recovery devices which can significantly reduce energy costs. An air-to-water recovery device is often the most effective method of recovering heat because it can then pre-heat hot water, providing a year-round use.
- ☐ After implementing equipment labelling to ensure ovens/extractors are not on for longer than necessary; review the temperature and comfort of kitchen staff. If the area is still overheating easily, consider an evaporative cooling unit or heat recovery.
- ☐ Consider implementing a 'picnic day' periodically, e.g., once a month or over certain weeks during the summer, where no hot food will be provided. School meals for that day can consist of sandwiches or other ready-to-eat foods. This approach presents an opportunity to reduce the need for cooking, subsequently leading to savings in electricity and gas costs.
- ☐ Consider batch baking. For menus operating on a 2-week rotation, doubling the recipe and baking two batches simultaneously can yield substantial time and energy savings. This approach has proven particularly effective for schools, especially in the preparation of dessert items such as cookies.

Fabric

- ☐ Consider upgrading blinds/curtains to thermal or insulated blinds. They have a close fit around the window and most are designed to trap a layer of air inside the blind, so the blind works in a similar way to double glazing. This makes them great for preventing heat loss, especially when closed overnight.
- ☐ During winter close blinds/curtains where possible, this will stop cold draughts from entering the room and limit heat loss through the windows, especially overnight. During summer, this will prevent any unwanted solar gain. This can be the daily responsibility of a classroom energy monitor.
- ☐ Consider purchasing draught strips/seals for draughty areas with poor insulation or single glazing. These self-adhesive foam strips or brushes will reduce heat loss and can prevent the need for additional heating. After review of the thermal images, decide the best places to add this extra protection. Secondary glazing could also be considered; see the 'windows and lighting' section above.
- ☐ Consider implementing low-emissivity (Low-E) window film on all windows throughout the school. This film enhances heat retention during colder months and reduces glare in the summer. Recent studies have shown promising results, with temperature differentials across windows reduced by up to 6.5 degrees Celsius after application. Additionally, indoor air temperature fluctuations decreased by around 2 to 3 degrees Celsius, contributing to a more comfortable indoor environment year-round. By improving the insulation properties of single or double-glazed windows, Low-E window film approaches the performance level of double or even triple glazing. These upgrades not only enhance comfort but also contribute to significant energy savings.
- ☐ Consider installing reflective foil behind radiators in particularly draughty areas. Foil can be installed behind radiators at any time and is low cost. The foil surface reflects heat back into the room that would otherwise be lost through the wall. As well as reducing heating energy consumption, warm up periods are reduced and better heat distribution can be achieved. This measure is especially effective in intermittently heated areas with uninsulated solid walls.
- ☐ Block up unwanted gaps that let cold air in and warm air out. Seal old extractor fan outlets with bricks or concrete blocks from both the inside and outside, fill in any cracks using cements or hard-setting fillers, fill gaps in floorboards and skirting boards with flexible filler, fill small gaps around pipework with silicone fillers and fill larger gaps with expanding polyurethane foam.
- ☐ Consider implementing a programme to upgrade uPVC wall panel inserts (sandwich panels) to foam filled insulated panels. A U-value as low as 0.3 W/m2K can be achieved compared to a U-value of higher value, e.g., 1.5 for an uninsulated uPVC wall panel. Lower U-values help to reduce heat transfer and improve insulation, ultimately leading to energy savings.

- ☐ The original part of the school is characterised by its solid wall construction, which is typical for buildings of its period. In certain areas, these walls are of a single skin, suggesting a need for additional insulation. Internal wall lining or even the use of modern insulative plasterboard could be considered for this purpose. Another option for insulating the external walls of a Victorian building is to use external wall insulation (EWI). This involves fixing an insulating layer to the outside of the existing walls, followed by a protective layer to provide weather resistance. EWI can help to reduce heat loss and improve energy efficiency, while also improving the appearance of the building. However, it is important to carefully consider the impact of any insulation work on the building's historic fabric, and to ensure that any work is carried out in accordance with the relevant conservation guidelines. Adding insulation to a Victorian building can help to make the building feel warmer and more comfortable, as it can reduce drafts and cold spots, and provide a more consistent internal temperature. Victorian buildings often face challenges with dampness due to their solid construction, so any insulation strategy should consider breathability to prevent moisture build-up.
- ☐ Site staff commented that there is no insulation above the drop ceilings. Consider consulting experts to assess the benefit of adding mineral wool or insulation board on top of the suspended gridwork ceiling. There are many options to explore; ceiling tiles themselves can be purchased as an insulated version, pre-sized mineral wool pads, roll up rockwall quilts or slabs. Adding insulation boosts thermal performance by preventing heat escaping through the ceiling. This helps maintain a consistent room temperature and reduce energy use. Suspended acoustic ceiling solutions provide extra advantages by reducing noise transfer from adjacent dwellings in the same building.
- ☐ 25% of a buildings heat can be lost through the roof in an uninsulated building. Roof/loft insulation generally has a lifespan of 40+ years, by which time the school would have recovered capital costs in energy bills many times over. In the 1980s, it was quite standard to install any thickness from 25 to 50 mm. Then, building regulations stated that homes should have as much as 100 mm of loft insulation. This gradually increased to 200 mm and now stands at 270 mm for new builds and is recommended for other properties. So if there is existing insulation, consider increasing the thickness. Be sure to also insulate the loft hatch. Read the Energy Savings Trusts' guide on roof insulation and consider engaging local experts for advice/quotes https://energysavingtrust.org.uk/advice/roof-and-loft-insulation/
- ☐ About a third of all the heat lost in an uninsulated building escapes through the walls. Consider whether your building has cavity or solid walls and what options there may be for improved insulation (If a brick wall is more than 260mm thick then it probably has a cavity). Payback on wall insulation generally takes longer than other kinds of insulation, or an LED project, but can make more sense financially alongside redecoration. Read the Energy Savings Trusts' guide on wall insulation and consider engaging local experts for advice/quotes https://energysavingtrust.org.uk/advice/cavity-wall-insulation/
- ☐ 10-20% of heat loss from a building can come from the floors if they're not insulated to a reasonable standard. The main source of heat loss from flooring is wooden floors and draughts that come through gaps in between floorboards, skirting boards and around pipes. Both wooden and concrete floors can be insulated. Read the Energy Savings Trusts' guide on floor insulation and consider engaging local experts for advice/quotes https://energysavingtrust.org.uk/advice/floor-insulation/

Heating emitters and point of use hot water

- ☐ Ensure radiators are free of obstruction. There were several partially/fully covered radiators throughout the school, (see photographs). Shelving, desks, coats and furniture against a radiator block heat from being properly distributed throughout the room.
- ☐ TRVs should be maintained so that settings can be adjusted. Consider turning TRVs on-low in rooms that easily overheat or aren't used often.
- ☐ Install thermostatic radiator valves (TRVs) to all radiators which do not have one. TRVs maintain the room at a set temperature and allow local control of heating. TRVs are a simple retrofit solution that you can fix to all existing radiators.

- [ ] The school could consider upgrading to smart TRVs; Smart TRVs allow you to control the temperature of each radiator remotely using a mobile app. They use temperature sensors to adjust the temperature of each radiator based on the temperature in the room and the set temperature. The school should also consider purchasing radiator guards to prevent damage.
- [ ] Radiator pipework should be insulated with foam tubes, or other suitable insulation. Not only will this ensure H+S requirements are met but will improve the heat output of the radiators, ensuring they are working at maximum efficiency. Improved pipework insulation will also mean all the heat being emitted can be controlled via radiator TRVs, rather than allowed to leak into the room unrestricted via pipework.
- [ ] The school should evaluate the potential benefits of installing consumer unit timers within the corresponding distribution boards connected to the POU units. By doing so, the operation times of the units can be synchronised with school occupancy periods. As a cost-effective alternative, the existing switches for these units can be outfitted with digital timer switches, smart plugs, switch bots, or 7-day timers. For operational efficiency, some POU hot water stations could be designated for staff or cleaners who start early or finish late. These can operate for extended hours, allowing the main hot water systems in the plant room to operate minimally. This strategy can maximise the utility of POU hot water stations while reducing the need to run the primary hot water store continuously.
- [ ] Run electric point of use water heaters with low storage volumes (15 litres or less - generally under the sink units) at 50°C, not the 60°C needed for legionella protection in larger storage tanks.
- [ ] Install point of use water heaters in areas where long pipe runs are needed to connect to the central hot water supply. This can help reduce heat loss through the pipework. Additionally, consider installing just one unit for the earliest/latest staff members e.g. cleaning staff. This way the whole system will not have to run at extended hours e.g. 6am-6pm. Hot water could generally be turned off as soon as the kitchen go home (they are usually the biggest users) e.g. 8:30am-1:00pm. If your hot water tank is well insulated, this should leave plenty of hot water for handwashing for the rest of the school day.
- [ ] Consider the possibility of decentralising the provision of hot water in the school. Where the requirement for hot water is small, it may be worth installing instantaneous point-of-use (POU) water heaters, avoiding heat loss from pipework and storage cylinders. If there are already some POU water heaters, consider how many the school would need to add to make the hot water store redundant. Seriously consider if there is a real need for hot water in classrooms. POU heaters should be on strict timers and shut down at the end of the school day.
- [ ] If extra remote heaters are necessary, consider night storage heaters rather than direct electric heaters. Night storage heaters contain ceramic bricks which are heated up overnight, using your cheaper 'night rate tariff'. In the morning, the heat is gradually released into the room.

Ventilation

- [ ] During winter, you can use CO_2 monitors to help balance good ventilation while keeping rooms warm. You do not have to fully open windows or keep ventilation systems on to achieve good ventilation. CO_2 monitors measure and display the CO_2 levels of the space. A higher CO_2 level means you need to increase the ventilation. If your CO_2 monitor is showing levels under 800ppm (green light), you can consider fully or partially closing the windows/vents/trickle vents. Do so gradually and in stages. If your CO_2 monitor is showing levels over 800ppm (amber light), consider opening the windows/vents/trickle vents and doors. Open the higher windows first, then the lower windows and doors, if necessary. If your CO_2 monitor is showing over 1500ppm (red light), your ventilation is poor. Open the windows and doors until the reading lowers.
- [ ] For training on using DfE issued CO_2 monitors, visit https://www.coschools.org.uk/.

- [ ] If your CO2 monitor shows consistent inadequate ventilation then consult with your school leadership team to identify long-term solutions, in the meantime you might want to consider installing an air cleaner, typically just HEPA (high efficiency particulate air) filters. Use the following link for the DFE approved units within educational settings: https://s107t01-webapp-v2-01.azurewebsites.net/list/air-cleaning
- [ ] Regularly clean any extractor fans in bathrooms and kitchens. Check the manufacturer's instructions for any whole building mechanical ventilation system you have and ensure the filters are replaced in line with those instructions, usually this would be annually.

Electrical equipment

- [ ] Consider reviewing the settings of printers and photocopiers regarding sleep mode and hibernation mode/auto-off to determine if the duration before entering these low-power modes can be reduced. Setting the devices to enter these modes after the shortest period of inactivity possible, such as entering sleep mode after 3-5 minutes of idle and entering hibernation mode/auto-off after 2-3 hours of idle, could ensure minimal overnight consumption. Check your printer's user guide for instructions on how to adjust the inactive time before it enters these power-saving modes.
- [ ] Where possible, use 7-day time switches to automatically switch off equipment at the end the school day, weekends and during holiday periods. Digital timer switches or smart plugs are relatively inexpensive and widely available. Equipment that needs to be charged can be timed to do so during your cheaper 'night rate' tariff. This will be particularly important for large storage chargers containing iPads/laptops, printers and photocopiers. For other equipment like smart boards and ICT suite computers, consider appointing energy monitors. These students/staff members will ensure projectors, lights and other electrical equipment is switched off during break-times, lunchtimes and at the end of the day. The same students/staff members can take regular meter reads to quantify the differences they are making. Templates for this will be provided in the email.
- [ ] If you are unsure if equipment left on overnight needs a 7-day-timer, consider purchasing an appliance monitor. Plug it into each appliance to measure how much energy it uses overnight. You could get the pupils involved and run it as a science experiment. Energy Sparks has a pupil activity for this which can be accessed via the following link: https://energysparks.uk/activity_types/77. If you have identified a printer or photocopier which is using lots of electricity overnight, even after adjusting settings as recommended above, then it is generally best if you can automatically turn it off overnight. Some of the more expensive, advanced appliances allow you to do this automatically but others will require you to install a 7-day timer. (7-day timers are better than 24-hour timers because they allow appliances to be turned off all day on Saturdays and Sundays.)
- [ ] Large storage chargers/charger trolleys looked to be operating 24/7 and will be a key target for timers. It is best to set them to charge for 2-3 hours overnight when your electricity tariff is usually cheaper. Generally, these units consume 20W even when all laptops/iPad are fully charged. Over a year this adds to a cost of £76 per charger trolley (Presumes a cost of 43.4p per kWh – this is the average day/night rate of ECC schools surveyed by the School Energy Team).
- [ ] Carry out a printer audit considering the number of printers/photocopiers and their users. See if the number of printers/photocopiers needed can be reduced by simply moving the equipment to more common/shared areas.
- [ ] The server should be reviewed to see if a computer shut down can be programmed into the system e.g. all computers in the ICT suite to power down at 3:30pm. If this is not possible, consider appointing an energy monitor to switch every computer off at the plug at the end of the day. A single, relatively modern, computer using 10W of energy on standby 24/7 can cost £38.02 a year in electricity (Presumes a cost of 43.4p per kWh – this is the average day/night rate of ECC schools surveyed by the School Energy Team).

- [ ] Undertake a technical audit of your ICT assets to identify opportunities to transition to more energy efficient cloud-based services. The school can migrate to cloud-based alternatives to replace energy intensive computing equipment, such as servers – for example, management information systems (MIS) or file storage. For further information, access the following DfE issued guidance: https://www.gov.uk/government/publications/choosing-a-school-management-information-system-mis
- [ ] Replacing desktop computers with laptops or tablets that use less energy could typically reduce energy consumption from the equipment by up to 80%.
- [ ] Consider distribution board/consumer unit timers for any/if not all electrical equipment. e.g. if all your lighting is on one board this can be timed to switch off every night and over weekends.
- [ ] There are several classroom/staff fridges and freezers which have very little contents. The school should consider consolidating these units to reduce the number of appliances needed e.g., one unit in a communal area.

Air-conditioning

- [ ] Check to see if air-conditioning controls can be restricted e.g. temperature adjust restrictions and weekly time programmes. Wall panel controls associated with air-conditioning units typically allow the user to programme such settings. This can be assessed after reviewing the user manual. Ideally, the lower limit for cooling should be no less than 24°C and the upper limit for heating no more than 19°C. This will be crucial to limit excessive heating / cooling where staff/students generally have unlimited control via a remote or wall panel.
- [ ] Consider implementing regular filter cleaning into the maintenance programme. Over time, the air filters in air conditioners collect dust and debris, and eventually restrict air flow. When air flow is interrupted, the AC unit will strain to keep your school cool, and that will make it use more energy. Cleaning and changing them every 30 to 90 days should keep the air flowing smoothly through your unit.
- [ ] Consider reviewing the main BMS to see if the setpoint for air conditioning can be adjusted to reduce the need for manual control. The typical 'set-points' are 24–25°C in summer.
- [ ] Before installing air conditioning, or low energy cooling, consider whether any of the below non-energy consuming steps could be taken first to improve comfort:
- [ ] Solar control film: In the summer solar control window film will work to repel the UV rays and heat from the Sun, in the winter the film will work to keep the interior of the school warm by preventing the heat transfer between the indoors and outdoors.
- [ ] Ventilation: Improving ventilation will help the school maintain a comfortable temperature during summer, this could be natural (opening windows to create a through-draft), or mechanical (solar powered ventilation units where fan speeds can be increased in summer with no extra energy consumption).
- [ ] Shading: Shades, awnings or greenery over south facing classrooms/areas can prevent direct sunlight from entering the building.
- [ ] Solar control/thermal paint: Considering coating the exterior walls or the roof with solar control/thermal paint. This will deflect sunlight and help reduce heat build-up inside buildings.
- [ ] If successful, installing the above measures may prevent the need for air conditioning saving the school money in both installation and running costs.

- [ ] If cooling is still required, consider low energy cooling (without energy intensive refrigerants like in air-conditioning) or solar powered ventilation to improve hot or poorly ventilated areas. Passive ventilation, also called natural ventilation, makes use of natural forces, such as wind and thermal buoyancy, to circulate air to and from an indoor space. These ventilation systems work to regulate the internal air temperature as well as bring fresh air in and send stale air out. These systems can be solar powered. This means that during normal conditions adequate ventilation with no energy consumption is possible and during sunny periods, fan speed can be increased to improve comfort using the sun's energy.

Swimming pool	N/A

Renewables

- [ ] Consider solar water heating. Solar water heating systems, or solar thermal systems, use energy from the sun to warm water for storage in a hot water cylinder or thermal store. The system works all year round, although the site will need to heat the water further with a boiler or immersion heater, especially during the winter months. In the summer, it should provide around 90% of your hot water requirements, dropping to around 25% in the winter. Consider engaging local experts and gathering quotes to see if such a system would be a viable option for the school.
- [ ] Consider the possibility of a solar PV array. Rough estimates of savings can be calculated using the following tool https://www.pvfitcalculator.energysavingtrust.org.uk. Indicative figures, using average data from ECC installs, have also been provided above. There are lots of factors to consider including roof type, structural integrity, electrical capacity, shading and space. Engage experts and figure out the payback for such a project. As electricity prices increase the business case for installing solar PV becomes stronger. Engage local experts and if the investment isn't available currently, create a long-term plan.
- [ ] This main fuse will sometimes need to be upgraded to meet the requirements of a solar PV system. If the fuse is old or lacks labelling, you can verify the requirement by contacting your Distribution Network Operator (DNO) through this link: https://www.energynetworks.org/operating-the-networks/whos-my-network-operator.

  UK Power Networks owns the power cable and main electrical fuse for your property, and they can perform the upgrade. However, your electricity supplier must confirm if the meter wires and meter itself can handle the upgrade. Additionally, as a property owner, you need to ensure that the fuse board and consumer wires can support the increased load.

  The installers should assist in determining if an upgrade is necessary and the appropriate fuse size. If an upgrade is needed, after completing all the necessary checks, you can request a free site visit from UK Power Networks. If everything is in order, they will upgrade the fuse on the same day. However, if the electrical equipment is not up to standard for the upgrade, or if the power cable isn't suitable for the increased load, or if your property shares the same electricity supply as a neighbour, there might be a charge associated with the upgrade.
- [ ] To install a Solar PV array, landlord consent will be necessary. Here is a link to the landlord consent information outlining the process the school will have to follow: https://schools.essex.gov.uk/admin/InfrastructureDelivery/Pages/Project-Notification-and-Landlord-Consent.aspx,

  For any queries in completing this, please contact infrastructure.delivery@essex.gov.uk directly.

- ☐ Smart Export Guarantee (SEG)

  Once installed, an SEG ensures your system is set up to start selling back to the grid if creating excess energy. The school can opt to go with any SEG supplier from the following list: https://www.ofgem.gov.uk/publications/seg-supplier-list

  The school does not have to sign up with the same supplier as their electricity contract; this will be a separate agreement. Generally, for a successful sign up you will need the following: MCS certificate, smart meter or an export meter that can measure the electricity you export and take half-hourly readings, export MPAN registered under the Balancing and Settlement Code, proof of ownership and a G99/DNO approval for the system.

  Check your installer will be able to provide all of the above documentation and correct metering set up on completion and support with the SEG application/process.

Other

- ☐ Consider applying for the Workplace Charging Scheme for state-funded education institutions. This grant is for state-funded schools and education institutions to install electric vehicle chargepoint sockets at their site(s). Schools can get 75% off the cost to buy and install chargepoints. The scheme is open until 31 March 2025, 11:59pm. Access further information at the following link: https://www.find-government-grants.service.gov.uk/grants/workplace-charging-scheme-for-state-funded-education-institutions-1#summary

- ☐ When buying new equipment, factor in energy efficiency as part of your decisions. Consider whether increased costs upfront will be offset by savings over time with more energy efficient equipment. As outlined in the kitchen section above, review any energy labels and scrutinise the annual consumption figures closely.

- ☐ There is a DfE approved procurement framework for school's purchasing renewables such as solar PV. This can be found here: https://find-dfe-approved-framework.service.gov.uk/find/type/buying/what/energy-efficiency/energy-efficiency-categories/energy-audits/energy-audits

- ☐ There is DfE issued guidance on energy purchasing including a set of minimum standards and a DfE approved gas/electric procurement framework. Remember to review this guidance long before your contracts are due to end - switching can take up to 2 months while some contract types are only available 6-12 months in advance. The key to securing the best rates will be to request written quotations from your selected suppliers – if using a broker who offers multiple quotes already you should still ask for quotes from at least one other supplier as opposed to the broker: https://www.gov.uk/guidance/buying-for-schools/energy

- ☐ Schools can access free support from the DfE to use any of the above frameworks. The 'get helping buying for schools' team can give advice, obtain quotes and help with energy purchasing advice after reviewing the school's recent energy bills. Support can be accessed via a quick online form. The team endeavor to reply within two working days: https://www.get-help-buying-for-schools.service.gov.uk/procurement-support?referred_by=UmVjb21tZW5kZWQgZnJhbWV3b3JrIHBhZ2UgaHR0cHM6Ly9maW5kLWRmZS1hcHByb3ZlZC1mcmFtZXdvcmsuc2VydmljZS5nb3YudWsvZmluZC90eXBlL2J1eWluZy93aGF0L2VuZXJneS1lZmZpY2llbmN5L2VuZXJneS1lZmZpY2llbmN5LWNhdGVnb3JpZXMvbGlnaHRpbmctcmVuZXdhYmxlcy9sZWQtbGlnaHRz&session_id=ac566ab8-2c8b-4a17-be19-5cf65e8c1f34

Media summary

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Photo 1

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Photo 2

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Photo 3

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Photo 4

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Photo 5

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Photo 6

Photo 7

Photo 8

Photo 9

Photo 10

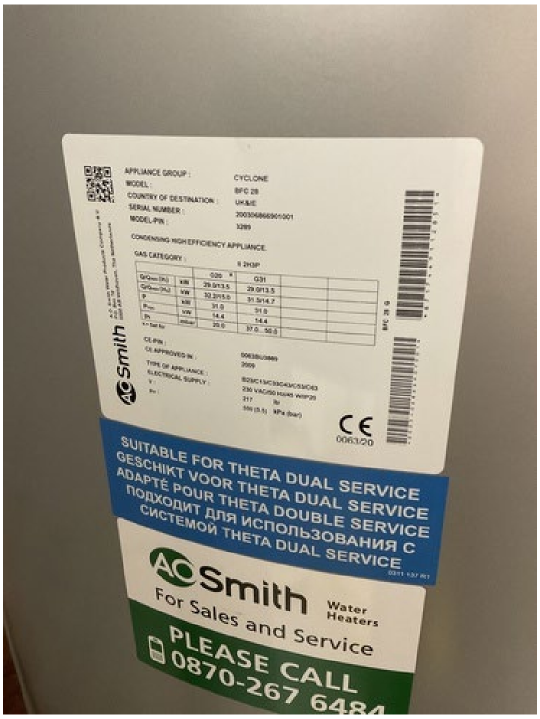

Photo 11

Photo 12

Photo 13

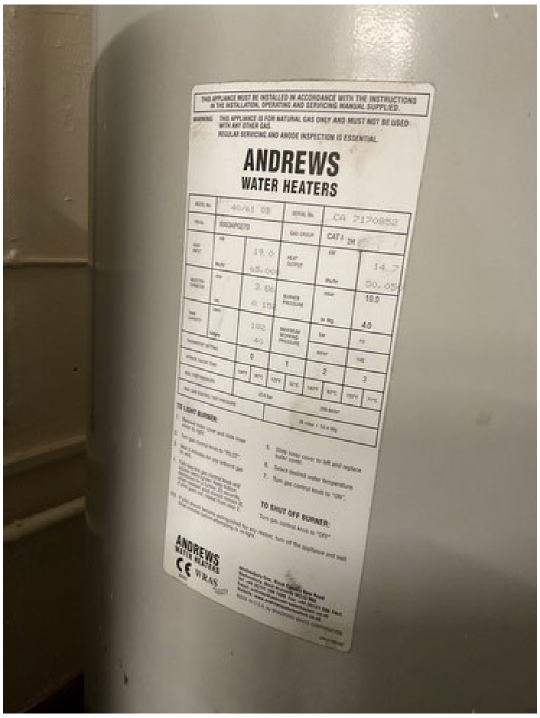

Photo 14

Photo 15

Photo 16

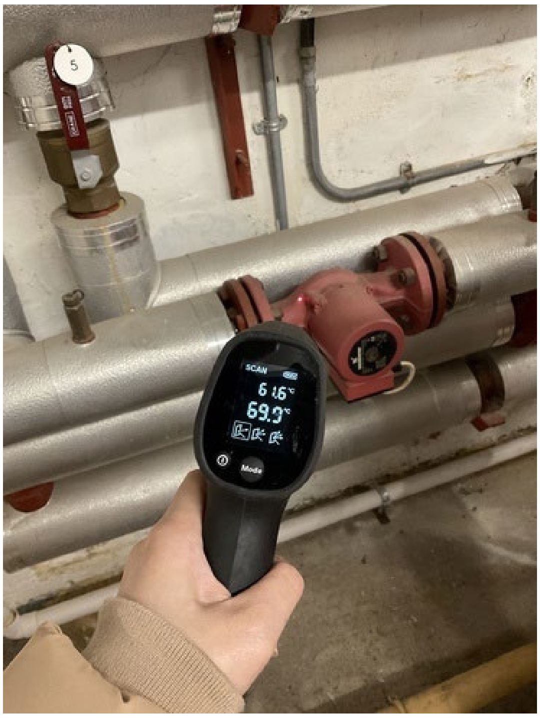

Photo 17

Photo 18

Photo 19

Photo 20

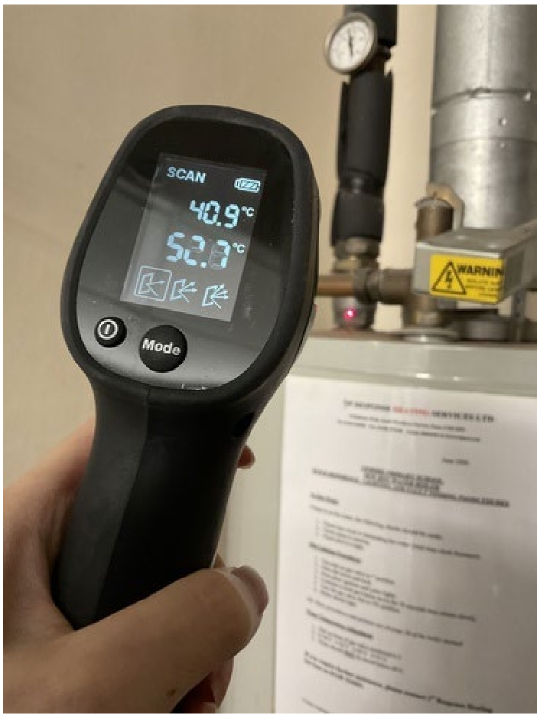

Photo 21

Photo 22

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Photo 25

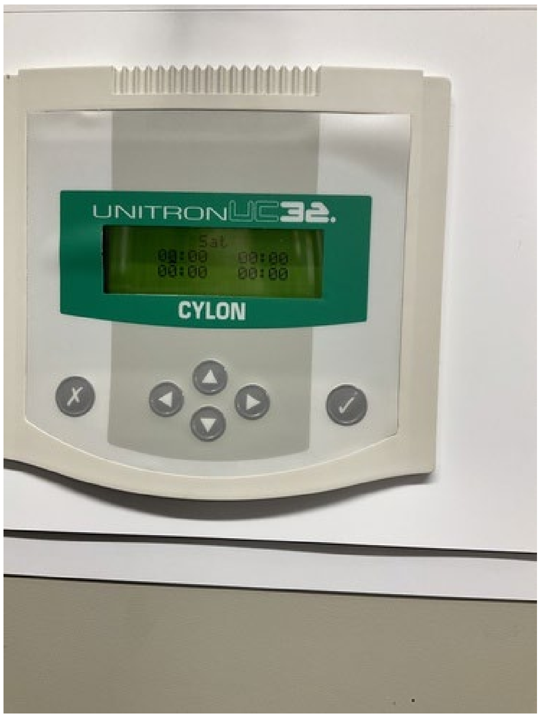

Photo 26

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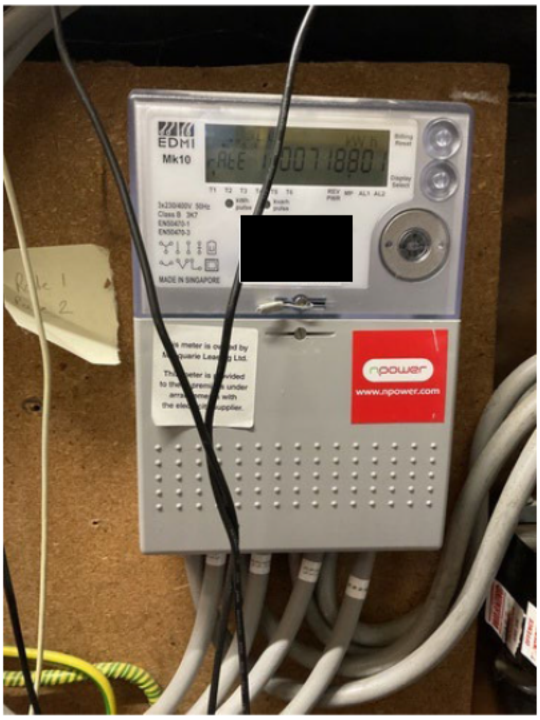
Photo 36



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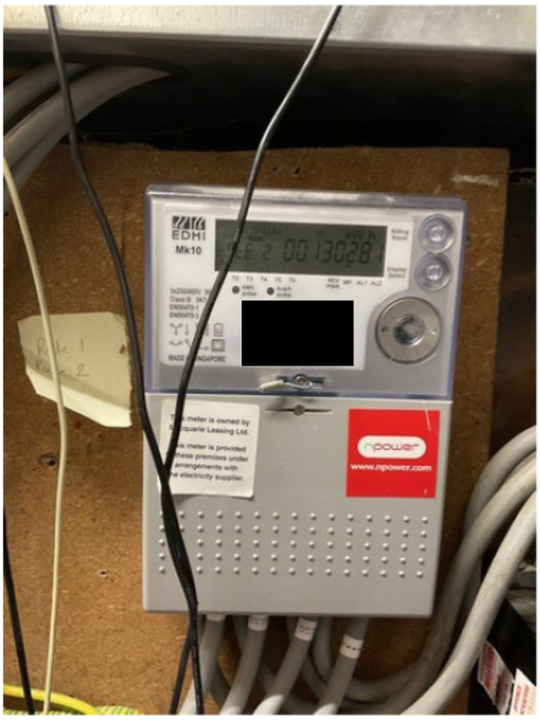

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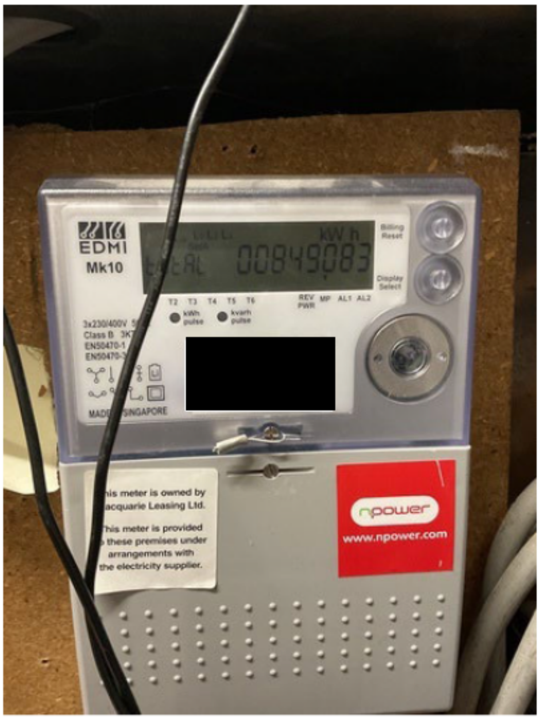

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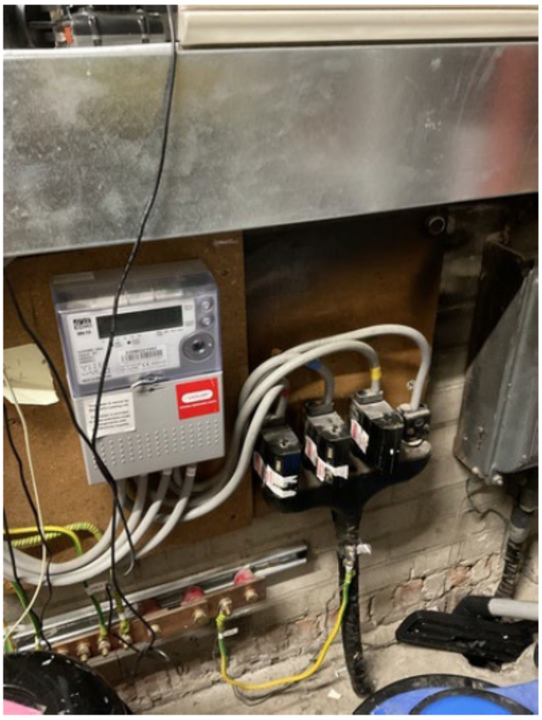

Photo 40

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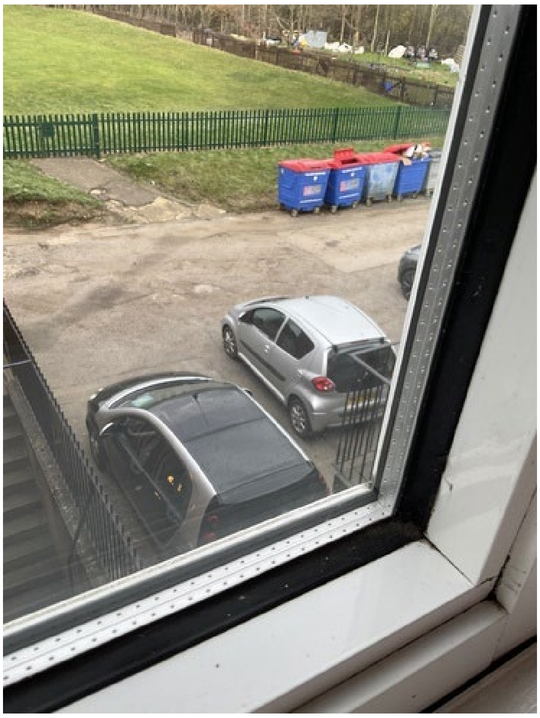
Photo 48



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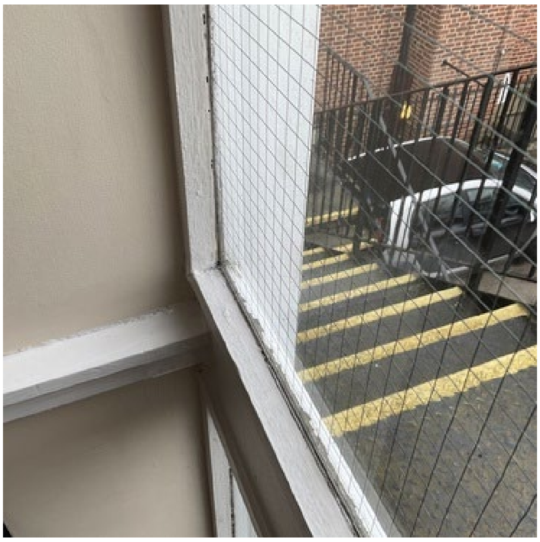

Photo 50

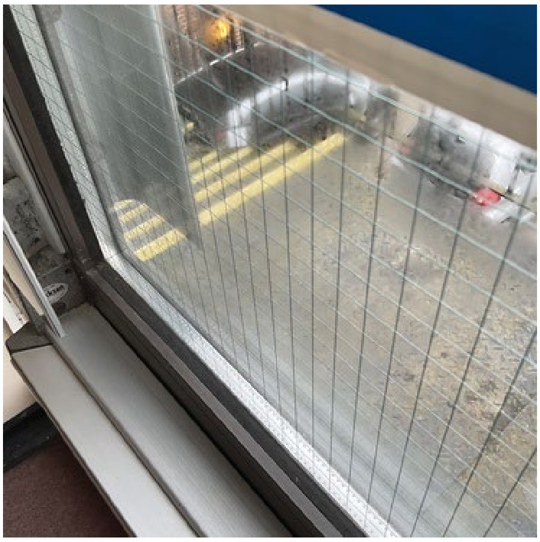

Photo 51

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Photo 59

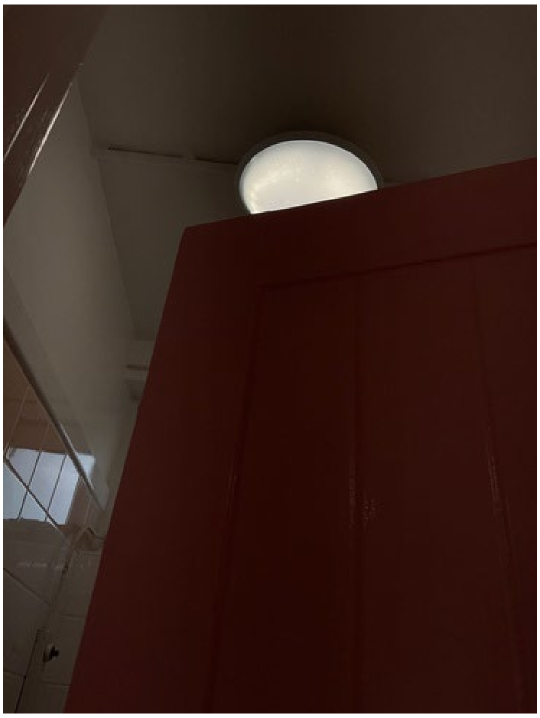
Photo 60

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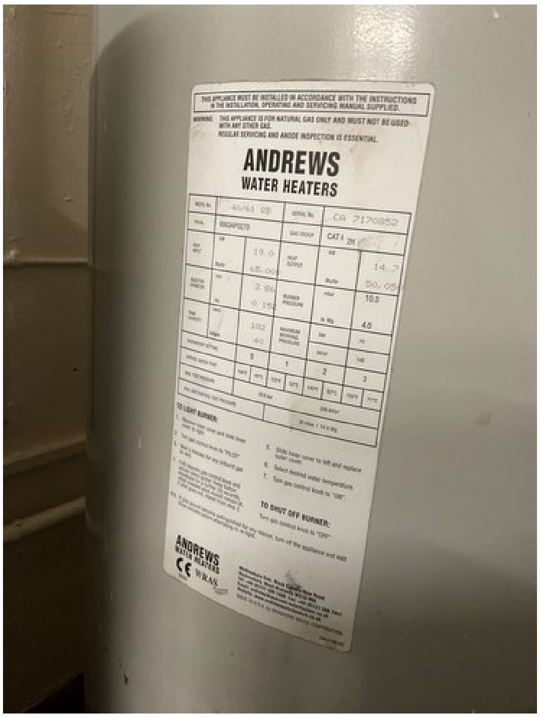

Photo 83

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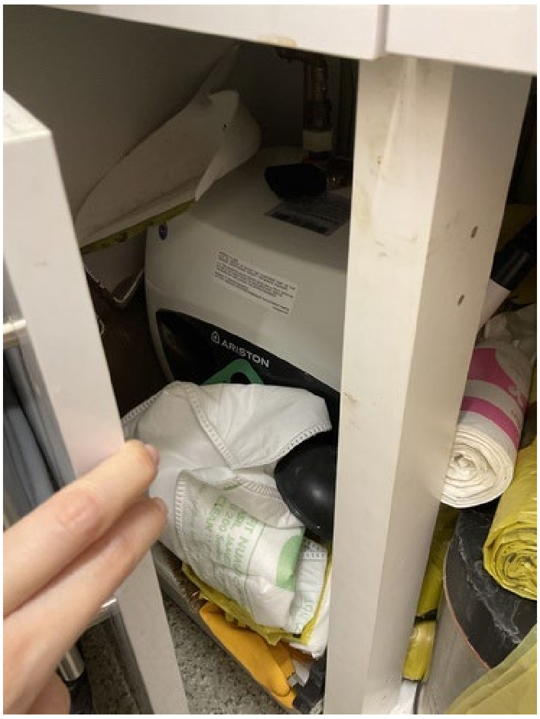

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Photo 105

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Photo 108

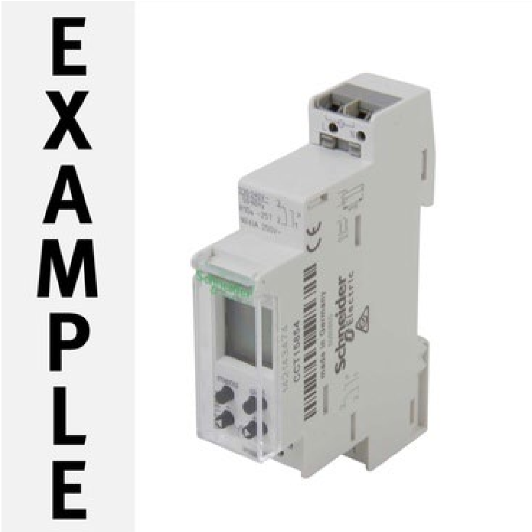

Photo 109

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Photo 120

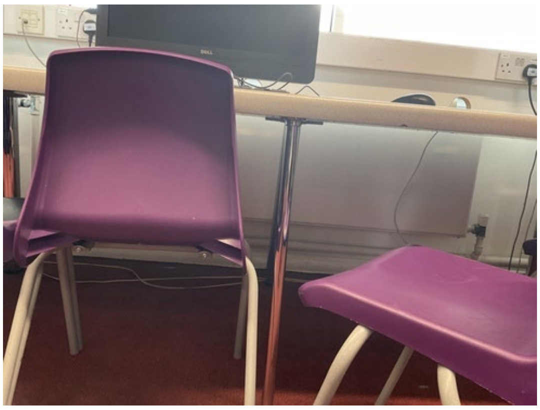

Photo 121

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Photo 123

Photo 124

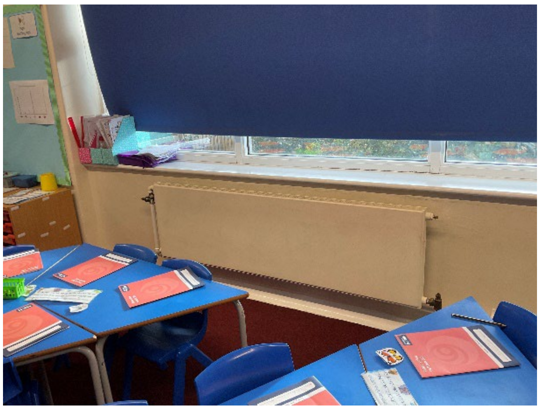

Photo 125

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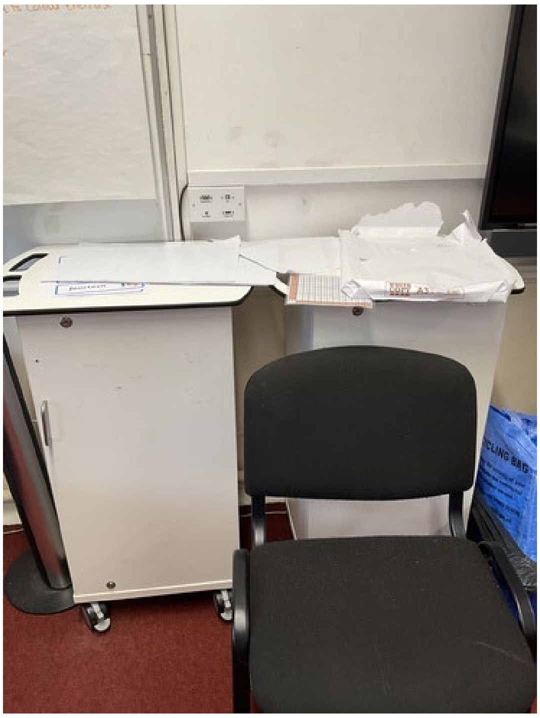

Photo 147

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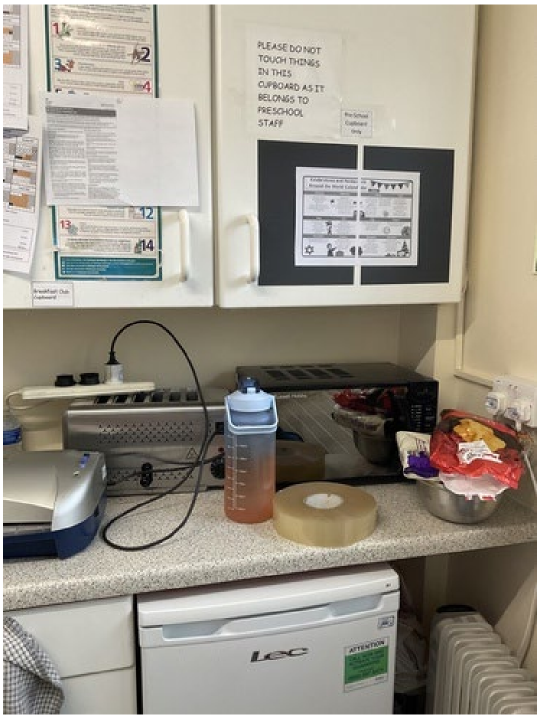

Photo 157

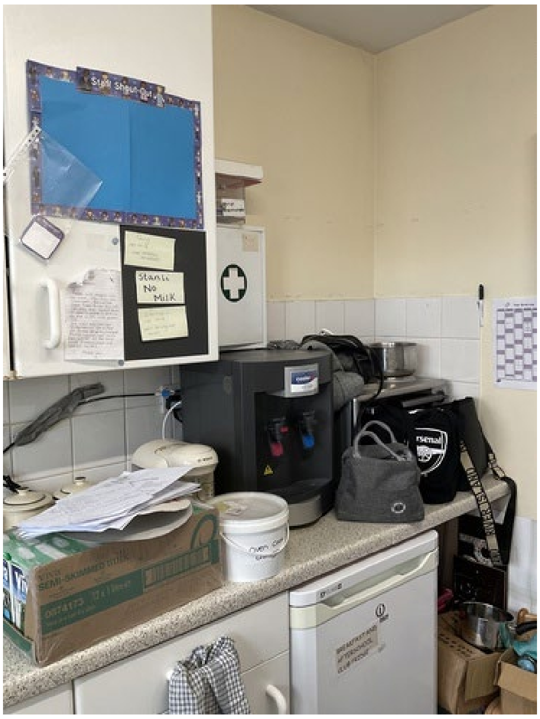

Photo 158

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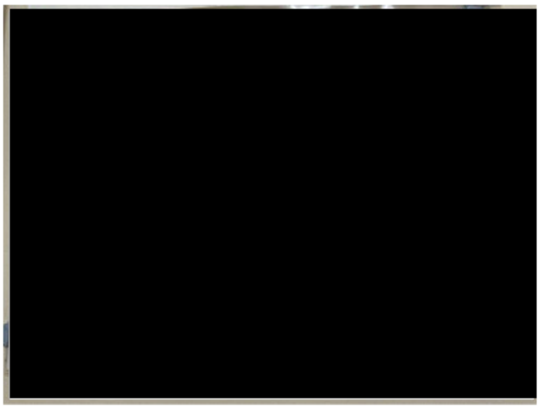

Photo 183