

Education, Children and Families Committee

10.00am, Tuesday, 15 December 2020

Energy in Schools - Annual Report

Executive/routine	Routine
Wards	All
Council Commitments	18

1. Recommendations

1.1 That Committee:

- 1.1.1 Notes the content of the report and the detail on current and historic energy use across the Council's learning estate;
- 1.1.2 Notes that natural gas use across the learning estate is becoming the predominant source of carbon emissions;
- 1.1.3 Notes that in order to meet 2030 net zero carbon targets, significant improvements will be required to the learning estate to improve thermal efficiencies and decarbonise heat sources; and,
- 1.1.4 Notes that the decarbonisation of the learning estate cannot be achieved in isolation and that wider alignment with city-wide strategies are essential.

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Energy in Schools - Annual Report

2. Executive Summary

- 2.1 This report follows on from the [Energy in Schools Report](#) in December 2019 and presents an overview of 2019/20 energy use, associated carbon emissions and energy expenditure across the Council's Learning Estate. The report provides detail on key initiatives to improve energy management and reduce energy and carbon emissions across the Learning estate.
- 2.2 The report also outlines how the current strategic focus for the decarbonisation of the Council's Learning estate lays the foundations for future delivery of net zero carbon schools and aligns the school estate with the Council's city-wide net zero target.

3. Background

- 3.1 The Council spent £9.7m energy across operational buildings in 2019/20, an increase of 7% on 2018/19 costs.
- 3.2 Electricity prices increased by just under 10% and gas prices increased by 15% between 2018/19 and 2019/20 placing further pressure on energy budgets and emphasising the continuing importance of appropriate energy management. Whilst there has been a reduction in wholesale energy costs as a result of falling demand for energy, wholesale costs only form a portion of end user costs and the overall pattern of rising cost is expected to continue.
- 3.3 The Council has set a city-wide net zero carbon target for 2030 with a Government net zero carbon target set for 2040. The Council is working with partners, including the independent Edinburgh Climate Commission which the Council co-sponsors, to develop a new 2030 Sustainability Strategy for Edinburgh. Further engagement is planned over the coming months as part of formal consultation on the sustainability strategy. Following agreement of a draft strategy by the Policy and Sustainability Committee in the new year, public consultation on a draft strategy will take place in spring/summer 2021 ahead of the final strategy being formally launched in autumn 2021 to coincide with [CoP26](#) being hosted in Scotland.

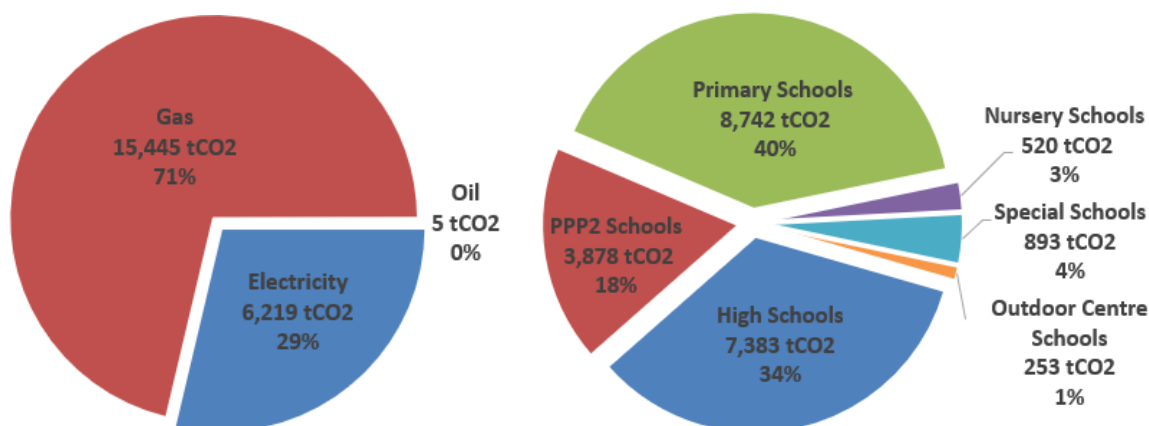
- 3.4 Property and Facilities Management (P&FM) are working with colleagues in Strategy and Communications to support the development of the 2030 Sustainability Strategy for Edinburgh. This includes leading on property related improvement priorities identified under the [Short Window Improvement Plan](#).
- 3.5 In July 2020, the [Council approved](#) the use of up to £0.295m from the former Central Energy Efficiency Fund (CEEF) to enable investment in key energy efficiency initiatives. This included an initial draw down of up to £0.200m to support a deep energy retrofit pilot and the installation of solar photovoltaic (PV) panels on Council buildings.

4. Main report

Consumption Monitoring

- 4.1 This section of the report gives an overview of energy consumption, and associated carbon emissions across the school estate in 2019/20. The data includes details on the Council's PPP2 estate, where the Council pays directly for energy consumed, but excludes detail from Edinburgh Partnership schools (PPP1), as energy costs are factored into the unitary charge.
- 4.2 Additional detail on energy consumption across the school estate can be found in Appendix 1.

Graph 1: 2019/20 Carbon Emissions by Fuel and Property Type

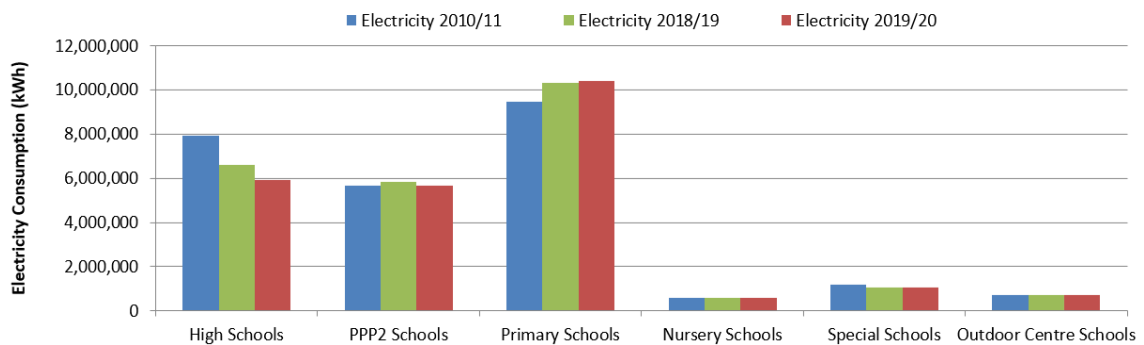


- 4.3 The charts above provide a breakdown of energy related carbon emissions across the Council's learning estate. In total, energy consumption in the learning estate accounts for 21,609 tonnes of CO₂ equivalent (CO₂e), This is a decrease of 1,034 tonnes or just under 5% on 2018/19 emissions and accounts for around 62% of total Council emissions from operational buildings.
- 4.4 The carbon emission factor for grid electricity has reduced by around 16%, further contributing to the emissions drop in electricity observed in recent years. Natural gas use will be the predominant component of carbon emissions in the learning estate in future years. Five years ago, in 2014/15, carbon emissions associated with

gas use in the school estate accounted for 54% of total school related carbon emissions compared with 71% of total carbon emissions in 2019/20.

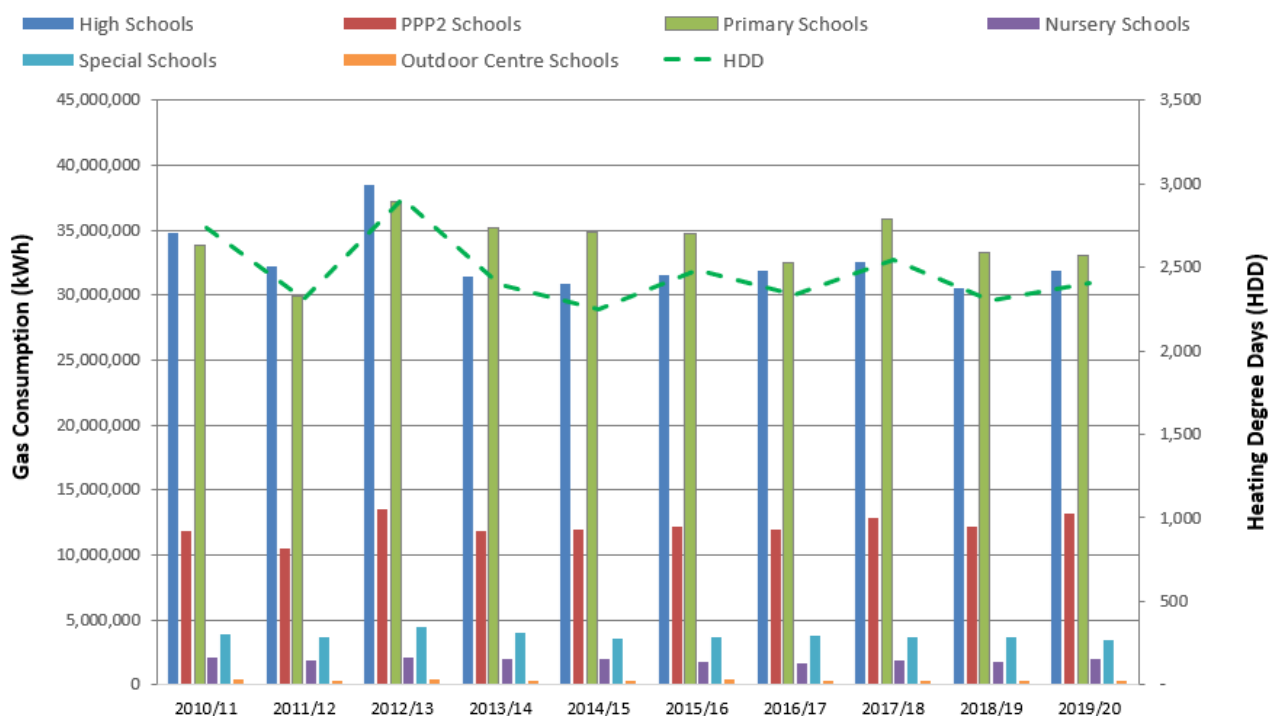
4.5 Just under £6m was spent on energy across the learning estate in 2019/20, an increase of around 13% on 2018/19. A significant portion of this increase relates to higher climate change levy charges which were increased in April 2019 as a result of the closure of the [Carbon Reduction Commitment Energy Efficiency Scheme](#).

Graph 2: 2019/20 Grid Electricity Consumption against 2018/19 & 2010/11 Baseline



4.6 The graph above compares 2019/20 grid electricity consumption against both the 2010/11 baseline and 2018/19 consumption. As with last year, there has been a continued reduction in grid electricity use across High School Properties in 2019/20 which can predominantly be attributed to on site generation through combined heat and power engines and targeted efficiency works. Primary school electricity use continues to increase largely due to the increased footprint of the school estate and corresponding electrification of heat.

Graph 3: 2010/11 to 2019/20 Gas Consumption correlated against Heating Degree Days



4.7 The graph above details 2019/20 gas use against recent years and the 2010/11 baseline year. Data has been correlated against heating degree days (HDD), which is a metric for quantifying the severity of weather conditions in relation to space heating requirements. Whilst there are annual variations in gas use due to weather, there has been no consistent trend of reduction over the last 10 years. There are incidences where improved efficiency of plant and controls have had a demonstrable impact at a building level but estate wide, the impact is marginal. The school estate remains heavily dependent on gas as a means of meeting thermal demand. With 2030 net zero ambitions less than 10 years away and with no clear pathway yet to the decarbonisation of the gas grid, the need to have clear strategies in place to reduce thermal demand and decarbonise heat is evident.

Aligning Council Schools with the 2030 Net Zero Carbon Target

- 4.8 As highlighted in 4.4 and 4.7, the Council's learning estate is heavily reliant on natural gas for space heating and domestic hot water. Whilst forecasts indicate that the electricity grid will not be carbon free by 2030, emission levels will be significantly lower than present levels reducing associated carbon emissions across the learning estate. The route for decarbonising natural gas is less clear, and therefore the Council needs to consider the strategies that will both reduce reliance on natural gas through demand reduction as well provide an environment that facilitates decarbonisation of heat. Over the long term, local routes to the decarbonisation of the gas network could include increased use of hydrogen or biomethane. Whilst both offer potential for contributing to the widescale decarbonisation of the grid, there are practical barriers that need to be overcome.
- 4.9 The decarbonisation of the Council's learning estate cannot be achieved in isolation and must be considered in the context of city-wide strategies. There are fundamental uncertainties, such as the scale of future availability of low carbon district heating in Edinburgh or decarbonisation of the gas grid. Clarity on such issues will not be immediate and therefore focus must be given to positive and complimentary actions which are detailed in 4.10, that can be taken now to ready the learning estate for alignment with wider 2030 strategies.
- 4.10 The current strategy to the decarbonisation of the learning estate splits into three key areas of action as defined in the Council's Energy Policy and captured in the Council's [Short Window Improvement Plan](#) which details the immediate improvement priorities for the Council's Sustainability Approach.
- 4.10.1 **Building better** – Ensuring that new build schools are delivered to the best possible standard is critical. The Council has committed to Passivhaus being the default standard for Council new build. This is captured under En13 of the Council's Short Window Improvement Plan. At present 4 Passivhaus schools are under development comprising 1 high school and 3 primary schools. Passivhaus is a proven standard that delivers high efficiency buildings that minimise thermal demand and address the performance gap between projected new building energy consumption and delivered performance.

4.10.2 Improving our estate – Whilst Passivhaus will deliver best practice energy efficiency for new build Council schools, only a small portion of the 2030 school estate will consist of new builds built to this standard. The ability of the Council to reduce demand and decarbonise their existing estate is central to reaching 2030 targets. Developing a strategy for the energy efficient retrofit of the Council's operational buildings is a priority focus for P&FM. This is captured under EN11 of the Council's Short Window Improvement Plan with funding of £100k secured to support this agenda. Proposals are underway to execute a pilot on a small sample of buildings, which will include school properties, utilising the Passivhaus [Enerphit](#) standard. This work will place the Council to the fore of current retrofit practice and inform future property lifecycle and refurbishment works. This work will also inform the best value balance between decarbonisation of heat (such as through electrification of heat) and demand reduction through fabric improvements.

4.10.3 Generating renewable power – P&FM's renewables strategy (captured under En10 of the Short Window Improvement Plan) focusses on targeting the best opportunities to increase the Council's renewable generation. Solar PV is the most suitable technology for the Council's operational estate due to its compatibility with the urban environment and relatively low maintenance requirements. P&FM is targeting increased solar generation on new build schools and aligning retrofit solar PV projects with roof works being carried out through the Asset Management Works Programme. The additional £100k of funding secured will support enabling/survey works and provide contingency to existing [SALIX](#) funds (which are based on payback). The Council has also supported the expansion of community renewables across the school estate through the installation of community owned panels on [Duddingston Primary School](#). The Council now has over 1.6MW of installed solar capacity across its operational estate, the majority of which are on schools, with capacity set to grow further during 2020/21.

4.11 Whilst para. 4.10 outlines the key actions currently being progressed, this is not a static approach, and consultation with both internal and external parties is an ongoing priority to ensure the Council remains well placed to deliver market leading solutions for the Council's operational estate, including schools.

4.12 Current strategies are orientated towards demand reduction. The electrification of heat offers a credible route to future decarbonisation of heat, but based on current utility costs, electric heat has higher running costs and is generally better suited to well insulated, efficient buildings. Therefore, prioritising demand reduction as a first step is justified. Similarly, whilst there is little certainty on the technical characteristics of any future district heating schemes, low carbon district heating will generally operate at lower temperatures and therefore will be best suited to efficient buildings.

5. Next Steps

- 5.1 With adoption of Passivhaus standard by the Council and subsequent progress with projects entering design, the main strategic objective is to develop an approach for demand reduction and decarbonisation across the Council's existing operational estate that reflects the ambition of the Council's 2030 target. As such, the pilot into Enerphit will be a key focus over the next year.
- 5.2 Work will continue on retaining ISO50001 certification of P&FM's Energy Management System. This system provides the framework through which objectives are set and performance reviewed.
- 5.3 Opportunities for external funding will continue to be pursued where they align with strategic objectives and complimentary benefits can be realised.

6. Financial impact

- 6.1 Financial efficiencies are a clear driver for energy management and energy efficiency projects. Whilst this will remain the case in future years, the net zero challenge will require investment in properties that may not offer a conventional payback and in some instances may lead to increased running costs.
- 6.2 Natural gas remains a cheap source of energy, and therefore offers a cost-effective means of providing space heating. This may not always be the case and costs could rise significantly, either through increased levies or as a result of actions to reduce associated carbon emissions.

7. Stakeholder/Community Impact

- 7.1 The Energy and Sustainability Team works closely with colleagues in both P&FM and across the wider Council on carbon reduction projects. In addition, the team works with a wide range of stakeholders, suppliers and organisations to ensure that the Council's practices are focussed towards delivering best practice.
- 7.2 By following best practice and delivering effective energy management, the Council can demonstrate carbon reduction and set a positive example for organisations within Edinburgh and more widely.

8. Background reading/external references

- 8.1 [Education, Children and Families Committee, 10 December 2019, Energy in Schools Annual Report](#)
- 8.2 [Policy and Sustainability Committee, Tuesday 6 August 2019, Energy Management Policy for Operational Buildings](#)

- 8.3 [City of Edinburgh Council, Tuesday 28 July 2020, Revenue Budget 2020/21 Update – referral from the Policy and Sustainability Committee](#)
- 8.4 [Finance and Resources Committee, Friday 6 December 2019, The Friends of Duddingston Primary School Solar PV Proposal](#)
- 8.5 [Policy and Sustainability Committee, Tuesday 10 November 2020, Short Window Improvement Plan Progress Update](#)

9. Appendices

- 9.1 Appendix 1. Energy Consumption and Baseline Data

Appendix 1 – Energy Consumption and Baseline Data

Property Type	2019/20						Heating Degree Days	
	Electricity		Gas		Oil			
	MWh	% Change (Baseline)	kWh	% Change (Baseline)	MWh	% Change (Baseline)		
High School	5,917	-25%	31,931	-8%	0	0%	2010/11	2735
PPP2	5,668	0%	13,211	12%	0	0%		
Primary Schools	10,385	10%	33,111	-2%	0	-100%	2019/20	2406
Nursery Schools	587	-3%	2,014	-3%	0	0%		
Special Schools	1,049	-11%	3,398	-13%	0	0%	% Change	-12%
Outdoor Centres	724	0%	342	-16%	20	-50%		
TOTAL	24,330	-5%	84,007	-3%	20	-99%		