

Education, Children & Families Committee

10am, Tuesday, 5 March 2013

Schools Energy Report

Item number	7.5
Report number	
Wards	City wide

Links

Coalition pledges	P50
Council outcomes	CO18, CO25
Single Outcome Agreement	SO3, SO4

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Executive summary

Schools Energy Report

Summary

The Children and Families estate is the largest part of the Council's estate and the highest energy user accounting for half of the Council's total carbon footprint and an annual energy spend of £4.7m. Last year the 12 Council managed high schools and 6 Private Public Partnership 2 (PPP2) high schools accounted for 24% of the total footprint. The 75 Council managed primary schools and 2 PPP2 primary schools accounted for 19% of the total footprint. These figures do not include schools operated by Edinburgh Schools Partnership. Council run nursery schools accounted for less than 1% of the total carbon footprint. Targeted energy reduction across the school estate will be critical in helping the Council to meet carbon reduction targets.

Following the introduction of smart metering and the reporting requirements set out under the mandatory Carbon Reduction Commitment (CRC) there has been a significant improvement in data quality. To capitalise on this improvement in data, monitoring of energy consumption across the school estate has been reset to bring it in line with the start of the CRC in 10/11.

Sustainability and carbon reduction is a key workstream under the Integrated Property and Facilities Management (iPFM) programme. The integration of services under the iPFM programme offers a significant opportunity for Corporate Property to work with Children and Families to improve the energy efficiency of the Council's school estate.

Engaging with all property users to raise awareness of energy use is a key strategy to deliver energy savings. This will be supported by targeted investment in energy efficient technologies. Greater collaborative working enabled by the new iPFM structure will ensure that opportunities to integrate energy efficiency into property improvements are taken and maximum reductions are realised. This will include adopting an approach to recognise and prioritise energy within our repairs and maintenance strategy. Through the delivery of a comprehensive Computer Aided Facilities Management (CAFM) system there will be greater data visibility and process management enabling a more strategic and targeted approach to energy management within the school estate.

School Business Managers in all Council operated schools now have online access to energy invoice and consumption data giving budget holders greater accessibility and clarity over current and historic consumption. In addition to this, Business Managers are also able to review their smart meter. Smart meters are funded from energy efficiencies

and associated budgets. In order to deliver these efficiencies technical support and guidance is provided to school Business Managers.

Recommendations

1. Committee is asked to note the content of this report; and
2. It is recommended that a further report is submitted to committee on progress made and future plans on energy management within schools through the Integrated Property and Facilities Management (iPFM) programme.

Measures of success

The Council continues to meet legislative requirements as set out in the Energy Performance of Buildings Directive.

The Council continues to meet the reporting requirements as set out in the mandatory Carbon Reduction Commitment Energy Efficiency Scheme (CRC).

The Council maintains the improved energy data quality realised through the processes adopted to manage the CRC reporting requirements.

The Council demonstrates a reduction in energy consumption across the school estate.

Financial impact

Although condition focused, energy improvement works are included as within the £32.7m in Asset Management works over the period 2012-16.

Energy saving targets for the Council will be detailed in the Sustainability and Carbon Reduction work stream Business Case in iPFM.

Equalities impact

There are no negative equalities impacts arising as a result of this report.

Sustainability impact

There will be significant benefits arising directly from this report through investment in increased building efficiency.

Consultation and engagement

Consultation is regularly undertaken with our Sustainable Development Unit to collaborate on shared objectives.

Consultation with Eco-schools representatives is ongoing to develop ways to support the raising of energy awareness in the school curriculum.

Engagement has taken place with Business Managers through the introduction of a new Energy and Water Homepage on the Council's internal website and through the recently introduced Energy and Water Portal.

Background reading / external references

Energy Performance in Buildings Directive (Scotland) Amendment Regulations 2012 – This directive covers the requirements for Energy Performance Certificates in Scotland.

Carbon Reduction Commitment Energy Efficiency Scheme (CRC)-

(www.decc.gov.uk/en/content/cms/emissions/crc_efficiency/crc_efficiency.aspx)

This website provides guidance on the CRC scheme.

Schools Energy Report

1. Background

- 2.1 Education, Children and Families Committee considered a detailed report on the [Children and Families Asset Management Plan](#) in 15 June 2010 (Item 10). This report provided a comprehensive statement on the condition, sufficiency and suitability of schools across the city. The school estate is large and diverse, ranging from very modern to Victorian buildings, and this diversity presents a number of challenges in improving energy efficiency. While a number of programmes have been undertaken to reduce energy consumption and improve CO2 emissions the variability in size, age, occupancy levels, operating patterns and condition of the estate has meant that energy reduction strategies cannot be uniformly applied. The Council has therefore had to target the areas of greatest efficiency gain where funding has allowed and opportunities have presented themselves. The Council recently achieved the Carbon Trust Standard in acknowledgement of its commitment to reducing carbon emissions.

2. Main report

- 2.1 Council wide monitoring of the energy efficiency of buildings, and energy usage and carbon emissions is undertaken by Services for Communities and the Sustainable Development Unit. The information presented in table 1 below details consumption across the school estate from 2010/11 (the baseline year for CRC).

Table 1 Electricity and gas usage 2010/11 – 2011/12

Property Type	2010/11			2011/12						
	Electricity (MWh)	Gas (MWh)	Oil (MWh)	Electricity (MWh)	% Change Electricity	Gas (MWh)	% Change Gas	Oil (MWh)	% Change Oil	
High Schools	13,249	45,627		12,811	-3.30%	41,619	-8.80%			
Primary Schools	9,856	34,835	2,363	9,736	-1.20%	31,028	10.90%	1,750	-26%	
Nursery Schools	1,368	3,901		1,331	-2.70%	3,709	-4.90%			
Special Schools	487	1,605	1,364	472	-3.10%	1,168	27.20%	1,070	-22%	
Total	24,960	85,968	3,727	24,350	-2.40%	77,524	-9.80%	2,820	-24%	
Degree Days*	2735			2308						-15.6%

*Degree days are a measure of the difference between a baseline temperature and actual outdoor temperature multiplied by the number of days. In the UK the standard baseline temperature is 15.5°C.

2.2 Between 2010/11 and 2011/12 consumption of electricity reduced by 2.5% and consumption of gas reduced by 10% across the school estate. In a standard school over 50% of energy use is derived from heating requirement. Therefore, in order to take these figures in context it is necessary to consider the difference in the severity of the weather. Using the standard degree day metric, the winter in 2010/11 was 10% colder than the 20 year average whilst the winter in 2011/12 was 7% milder. The majority of reduction in consumption between 2010/11 and 2011/12 will be the result of the milder winter and therefore a reduced requirement for heat. The influence of weather on consumption will depend on how the heating is controlled and managed in individual buildings therefore it is not possible to derive a direct correlation across a wide range of sites.

2.3 Following the introduction of smart metering and the reporting requirements set out under the mandatory Carbon Reduction Commitment (CRC) there has been a significant improvement in data quality. The Council has invested resource in

its energy data validation and reporting, resulting in a greater level of assurance over data quality. To reflect this, the baseline for the school energy report has been set at 2010/11 providing a full audit trail on which to monitor future consumption in school properties.

- 2.4 The remainder of this report sets out the action that has been taken to reduce energy usage across the Council's schools since the last report and details the further works planned.

Energy Performance Certificates (EPC)

- 2.5 Energy Performance Certificates became a statutory requirement under the EU Energy Performance of Buildings Directive which took effect from 4 January 2009. When the directive first came into force, all public buildings over 1000m² that are regularly accessed by members of the public were required to display a current EPC. This limit has reduced to 500m² and is scheduled to reduce further to 250m² in 2015. The initial surveys commissioned by the Council targeted buildings down to a floor area of 500m² in anticipation of the change to requirements. In order to ensure future compliance a new wave of EPC surveys will be required for public buildings down to 250m². The information obtained from an EPC relates specifically to design of the building based on a simplified model. The certificate includes a section on recommendations to improve the efficiency of the building. This assessment has been incorporated into the asset management process to inform and direct the current programme of investment. The works undertaken are focused on delivering improvements that will allow reduced energy consumption.

Energy Investment Programme

- 2.6 Since 2007/08 the Council has invested over £3m in energy investment and water conservation measures. The investment made in energy related projects since 2007/08 is shown in table 2 below.

Table 2 Investment Works in Schools 2007/08 - 2011/12

Table 2	2007/08	2008/09	2009/10	2010/11	2011/12	Total
	£	£	£	£	£	£
Investment Works	1.613m	0.429m	0.709m	0.287m	0.104m	3.142m

- 2.7 Works included upgrading boiler plant, the conversion of a coal fired boiler to a gas fired boiler at Liberton High school, estate wide thermostatic controls, lighting controls, swimming pool heat recovery plant, loft insulation and water conservation measures. The 2007/8 Schools Energy Investment Programme won a Green Apple Award for Energy Efficiency. To inform this energy improvement programme 86 schools have been audited for energy efficiency

and thermal imaging was used for the first time in the Council's schools to identify building inefficiencies and inform the investment programme. This was the first time that this information was available on this scale and it forms the basis of current investment programmes.

Integrated Property Facilities Management (iPFM)

- 2.8 Sustainability and carbon reduction is a key workstream under the Integrated Property and Facilities Management (iPFM) programme. The integration of services under the iPFM programme offers a tangible opportunity for Corporate Property to work with Children and Families to improve the energy efficiency of the Council's school estate. Central to the iPFM programme, the delivery of a comprehensive computer aided facilities management (CAFM) system will allow greater data visibility and process management. This will enable a more strategic and targeted approach to energy management within the school estate.
- 2.9 Engaging with all property users to raise awareness of energy use is a key strategy to deliver energy savings. The Council have signed up to the Carbon Trust's Carbon Management Awareness Campaign to help support and guide our awareness campaign. To aid the campaign we will draw on support from across the Council. This will include integrating the campaign into the eco-schools programme.
- 2.10 Continuing to target investment in energy efficient technologies will be integral to reducing consumption. Greater collaborative working enabled by the new iPFM structure will facilitate the integration of energy efficiency into property improvements. This will include recognising and prioritising energy within our repairs and maintenance strategy. To support this, energy use across schools is monitored against key performance indicators.

Future Asset Management Works

- 2.11 Asset Management works for Children and Families in the Capital Investment programme 2012-16 total £32.7m. A number of major projects including the new Boroughmuir, James Gillespie's and Portobello high schools and extensions to Towerbank and Corstorphine primary schools are also included in the capital programme. Each of these projects will, through the replacement, extension and upgrading of buildings, make a major contribution to improved energy efficiency.
- 2.12 Future planned energy improvement works across the school estate over the next 3 years include projects to upgrade mechanical and electrical plant, wiring and pipe work, and enhance the fabric of schools. Recent boiler works have included the replacement of the boilers at South Morningside, Towerbank, Tollcross, Buckstone and St Margaret's primary schools and Pilrig Park special school. Work is underway to finalise the replacement programme for 13/14.

Smart Metering Programme

- 2.13 During 2010/11 a programme of smart metering was approved by the Finance and Resources committee. There are now 129 smart electricity meters across 103 schools, 91 smart gas meters across 68 schools and 108 smart water meters across 85 schools providing half hourly profile consumption data and monthly actual reads for invoices. Smart meters have greatly reduced the number of estimated invoices given greater visibility over actual consumption at a property helping to identify and monitor the inefficient operation of plant and equipment. It has benefited our invoice validation process and reduced the uplift charges for reporting estimated consumption under the CRC.
- 2.14 Smart meters are funded from energy efficiencies and associated budgets. In order to deliver these efficiencies access to technical support and guidance is available to school Business Managers. Properties are able to access smart metering data can be through the Council's Energy and Water Portal (see paragraph 2.17).
- 2.15 It has not been possible to install smart meters in every building. In some instances the supply or meter would require significant investment before it would be able to accommodate a smart meter. There are alternative ways to monitor consumption in more detail. Periodic meter reads can inform detailed consumption analysis. Investing in sub metering or monitoring consumption through the Building Environmental Management System (BEMS) can also add value.

Central Energy Efficiency Fund (CEEF)

- 2.16 The Council has access to a £1.2m revolving fund from the Scottish Government. This fund can be used to invest in energy and carbon reduction projects across the Council's operational portfolio. The funding is in the form of a loan and is paid back over a maximum of 5 years from the savings accrued through the investment. The school estate has been a major beneficiary from the fund and since 2007/8 the Council has invested £0.888m using the fund.

Energy and Water Portal

- 2.17 School Business Managers in all Council operated schools now have online access to energy invoice and consumption data. This provides budget holders with greater accessibility and clarity over current and historic consumption. Going forward, it also offers Business Managers the opportunity to track monthly consumption against set targets. Meter reads can be submitted through the portal allow properties to improve the accuracy of their invoicing and consumption monitoring.

Building Energy Management Systems (BEMS)

- 2.18 The Council has an extensive portfolio of BEMS systems covering all the major properties in the Council operational portfolio. All high schools and the majority of primary schools have these systems. It is widely accepted that automated controls systems are the most effective way of controlling heating within buildings and Building Standards require that optimised control equipment is fitted as a minimum standard.
- 2.19 BEMS are an automated intelligent controls system pre programmed to manage the heating for an individual property. The system and controls are located within individual schools. BEMS systems are monitored remotely by an external contractor. As service delivery patterns change the control systems can be adjusted to reflect these changes. In a number of schools an element of local control is available through the application of thermostatic radiator valves (TRV's) though this is not suitable for all properties.
- 2.20 The Council's BEMS systems are in urgent need of upgrading to reflect changes in technology, in particular a change to open protocol systems that can use a variety of components from different suppliers. Many systems are now obsolete making it difficult to source replacement components. Improving the communication links for BEMS from dial up phone lines to Ethernet connections, as part of a wider upgrade strategy, would offer greater resilience and monitoring capabilities. The Council does operate some modern systems within newer and refurbished schools within the estate. Going forward, there is a need to modernise and standardise the Council's approach to BEMS. A BEMS strategy is currently under development. This will give an over view on the best way forward for existing systems and outline requirements for new systems.

Wave 3 Schools

- 2.21 The new Wave 3 schools will have an environmental responsibility, not just in terms of resources and materials used in their construction, but also in terms of operation and maintenance during their lifetime. Ideally, the building will become a learning tool, demonstrating sustainable principles and promoting environmental awareness. The achievement of a minimum of Building Research Establishment Environmental Assessment Method (BREEAM) 'very good' is now a Council priority for all new building projects.

Energy Contracts

- 2.22 Utility contracts are now procured through Procurement Scotland under Scottish Government guidelines. The Council is a partner in the Procurement Scotland Electricity, Gas and Water contracts. The contracts came into force in August 2010, June 2010 and April 2011 respectively and are renewed periodically.

Feed in Tariffs

- 2.23 Legislation came into force in July 2010 that allows local authorities to supply electricity to the national grid. The UK government, in common with other EU governments, introduced a Feed in Tariff (FiT) scheme that applies to renewable energy generation. The predominant method of generation is Solar PV, though the tariff applies to generation using any renewable source e.g. wind, water or combined heat and power.
- 2.24 The UK Government revised the feed in tariffs available for Solar PV. This impacted significantly on the financial viability of Solar PV. Further restrictions that determine the level of feed in tariff available to a property based on the energy efficiency rating further restricts the scope for the Council at this stage. Whilst it is expected that micro renewables will help deliver the Councils long term energy needs targeting inefficient use of energy in properties will deliver greater financial and carbon efficiencies over the short term.

Alternative Financial Mechanisms

- 2.25 There are alternate financial mechanisms that the Council could utilise to invest in energy efficient technologies. The Green Deal is a scheme that allows loans to be taken out against energy efficiency measures with repayments made against energy bills. Instalment payments will be inline with the expected energy saving and will attach to the property rather than the individual. The scheme is open to the domestic, commercial and public sector. Interest rates on loans are expected to be around 7.5%. As such currently prudential borrowing provides a more cost effective financing solution for schools.
- 2.26 An Energy Service Company (ESCo) is a commercial organisation that provides energy solutions including energy efficiency and power generation projects. ESCos will deliver complete solutions from design and installation to ongoing maintenance and operation. Energy savings are usually used to payback the capital investment through a fee levied by the ESCo. Often the risk of a shortfall in predicted savings is borne by the ESCo. Both the Green Deal and ESCos offer opportunities for large scale investment; however, borrowing would likely be higher than that otherwise available to the Council.

3. Recommendations

- 3.1 Committee is asked to note the content of this report; and
- 3.2 It is recommended that a further report is submitted to committee on progress made and future plans on energy management within schools through the Integrated Property and Facilities Management (iPFM) programme.

Mark Turley

Director of Services for Communities

Links

Coalition pledges	P50. Meet greenhouse gas targets, including the national target of 42% by 2020
Council outcomes	CO18. Green – We reduce the local environmental impact of our consumption and production CO25. The Council has efficient and effective services that deliver on objectives
Single Outcome Agreement	SO3. Edinburgh’s children and young people enjoy their childhood and fulfil their potential SO4. Edinburgh’s communities are safer and have improved physical and social fabric
Appendices	None