



Department for
Business, Energy
& Industrial Strategy

EMISSIONS REDUCTION PLEDGE 2020 – POTENTIAL ASSESSMENT

A high level assessment examining the potential to reduce carbon emissions across the wider public and higher education sectors in the UK.



INTRODUCTION

1. The UK is committed to a 57% reduction in emissions by 2032 and an 80% reduction by 2050. The government wants the public and higher education sectors to lead by example through reducing bills and driving decarbonisation across the UK economy.
2. The wider public and higher education sectors which are made up of sub-sectors including health services, education institutions, local authorities and emergency services, are responsible for around 90% of the UK's public sector carbon emissions, with the central government estate responsible for the remaining 10%. As such, in the Clean Growth Strategy, the government made a commitment to introduce a wider public and higher education sectors voluntary target to reduce carbon emissions by 30% by 2020/21 compared to a 2009/10 baseline¹.
3. The introduction of the voluntary target and reporting framework is intended to standardise wider public and higher education sectors reporting, engage sector leaders in providing accurate and consistent emissions data through the Emissions Reduction Pledge 2020. It will also provide a set of overarching principles that organisations are encouraged to sign up to, publicly stating their commitment to reducing carbon emissions and reporting their data on an annual basis.
4. The objectives of the voluntary target and reporting framework are to:
 - Develop familiarisation with reporting frameworks to pave the way for future mandatory reporting over the next decade
 - Embedding good practise in organisations to monitor energy use and carbon emissions
 - Contribute to the Government's Carbon Budget (CB) commitments by encouraging the reduction of carbon emissions in the short run (whilst potentially mandating it in the longer term), and developing markets for energy efficiency products.
 - Reduce bills in the wider public and higher education sectors through targets to reduce carbon emissions.
5. Energy efficiency measures present a significant opportunity for the wider public and higher education sectors to reduce their energy use, delivering both carbon emissions and bill savings.
6. When looking at measures which pay back within three years, (based on 2015 prices and emissions) there is the potential to:
 - reduce carbon emissions by 2.5Mt of CO₂e
 - reduce bills by almost £500m a year
 - at a capital cost of just under £1bn
7. Most of this potential can be found in the health and education sectors, with carbon and energy management, and building instrumentation and control measures constituting the majority of the potential.

¹ Whilst this document applies to the UK, the voluntary target policy only applies to England.

8. This document also summarises the potential for carbon reduction and bill savings through energy efficiency measures, to the sub-sectors which constitute the wider public and higher education sectors. The document will consider the following:

- **Past, current and future performance** - Carbon emissions in the wider public and higher education sectors between 2009/10 until 2020/21. The years following 2016/17 will be forecasts from the latest Energy and Emissions Projections² (EEP).
- **Potential** – The potential to reduce carbon emissions and bills associated with energy use, between now and 2020/21, according to the Buildings Energy and Emissions Survey (BEES) 2015. This section will look at the short term abatement potential using energy efficiency measures, and the long term potential from heating measures.

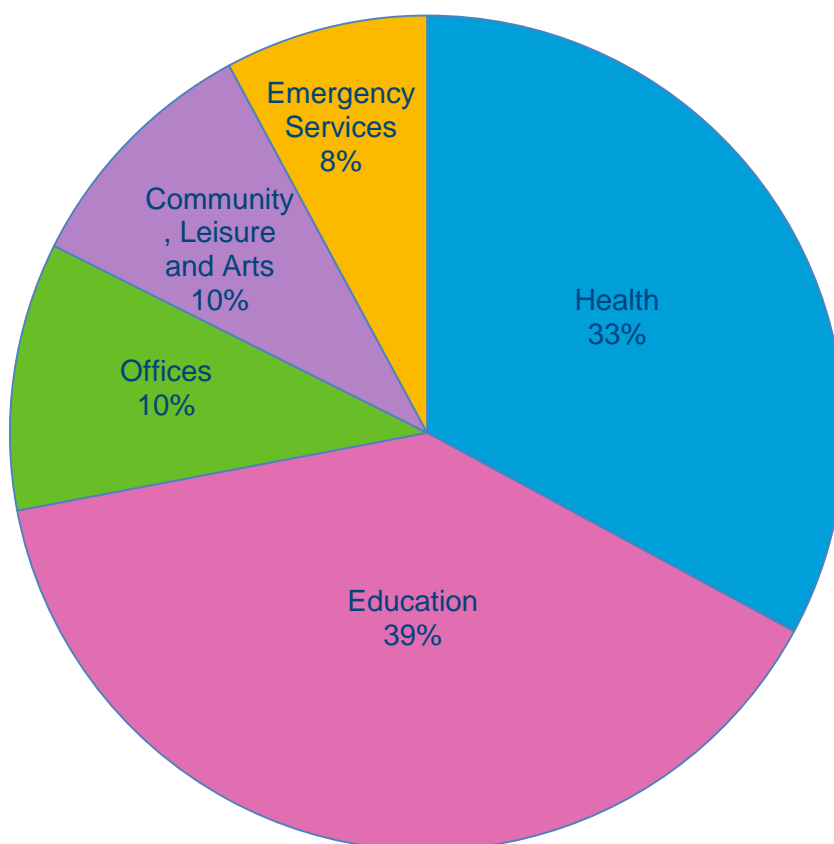
This analysis only considers energy use and associated direct and indirect carbon emissions from buildings, so does not include emissions from activities such as transport.

² [Energy and Emissions Projections 2017](#)

PAST, CURRENT AND FUTURE PERFORMANCE

9. The UK wider public and higher education sectors consume about 58MWh of energy per year. Almost three quarters of this is made up of non-electric energy, such as energy generated by oil and gas, mainly used for the purposes of heating and hot water. The health and education³ sectors constitute the majority of all consumption, jointly responsible for over 70% of total energy consumption. Figures 1 and 2 below illustrate the breakdown of the wider public and higher education sectors by energy consumption⁴, and the breakdown of energy use across the wider public and higher education sectors by end-use, respectively.

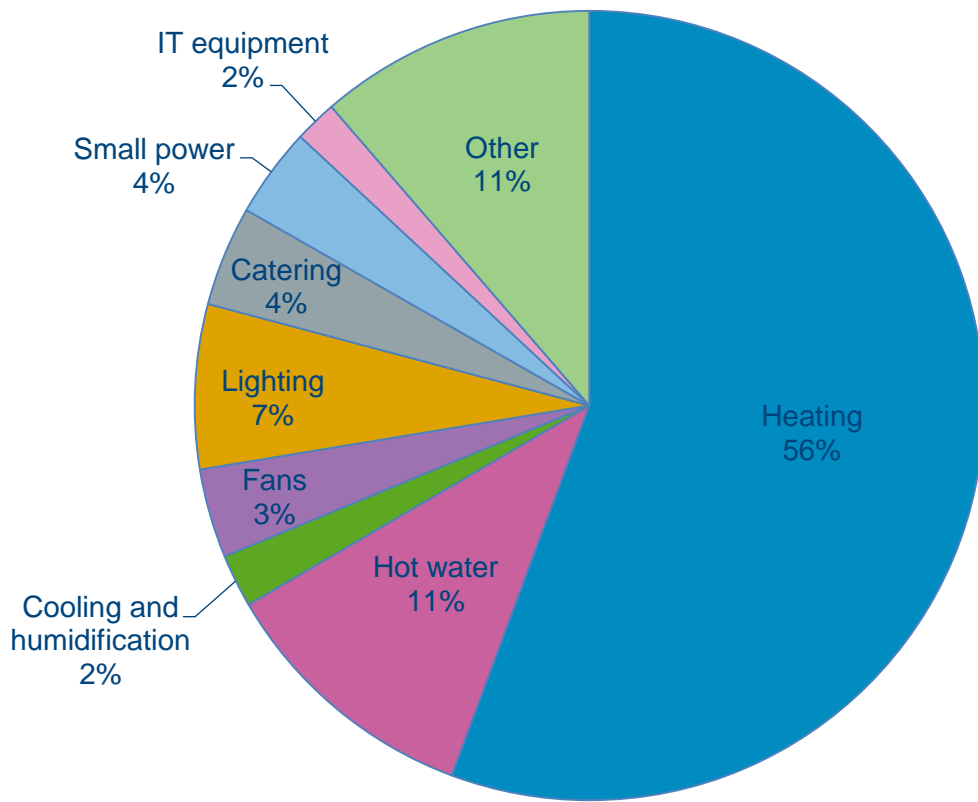
Figure 1: Total UK Wider Public and Higher Education Sectors Energy Consumption by Sub-sector



³ Including primary and secondary schools and higher and further education.

⁴ Based on BEES 2015, however, we assume these proportions are largely representative of current consumption.

Figure 2: Wider Public and Higher Education Sectors Energy Use by End-use



POTENTIAL TO REDUCE CARBON EMISSIONS

10. The Buildings Energy and Efficiency Survey (BEES) was carried out in 2015 and surveyed 3,690 organisations to understand how energy was being used across the UK and what potential there was to reduce energy consumption. This was a comprehensive survey covering buildings from all sectors, both public and private. By combining a number of key metrics, such as consumption data and data on available technologies, the survey has been able to develop the abatement potential available across the UK. Whilst this is a snapshot in time of the UK picture, it has provided some very useful insights for future policy design.

Rapid Payback Potential – under 3 years

11. Figure 4 illustrates the total energy efficiency abatement potential across the UK wider public and higher education sectors, identified by BEES, to reduce carbon emissions within the next 3 years, considering energy efficiency measures which have a payback period of up to 3 years, whilst most pay back within 2 years. These could be considered the ‘quick wins’ as financial benefits can be achieved fairly quickly. These measures have a total capital cost of £933m and reap the benefits described in Figure 2.

Figure 4: Wider Public and Higher Education Sectors Annual Abatement Potential for Measures with a Payback Period up to 3 Years (2015 prices and emissions factors)

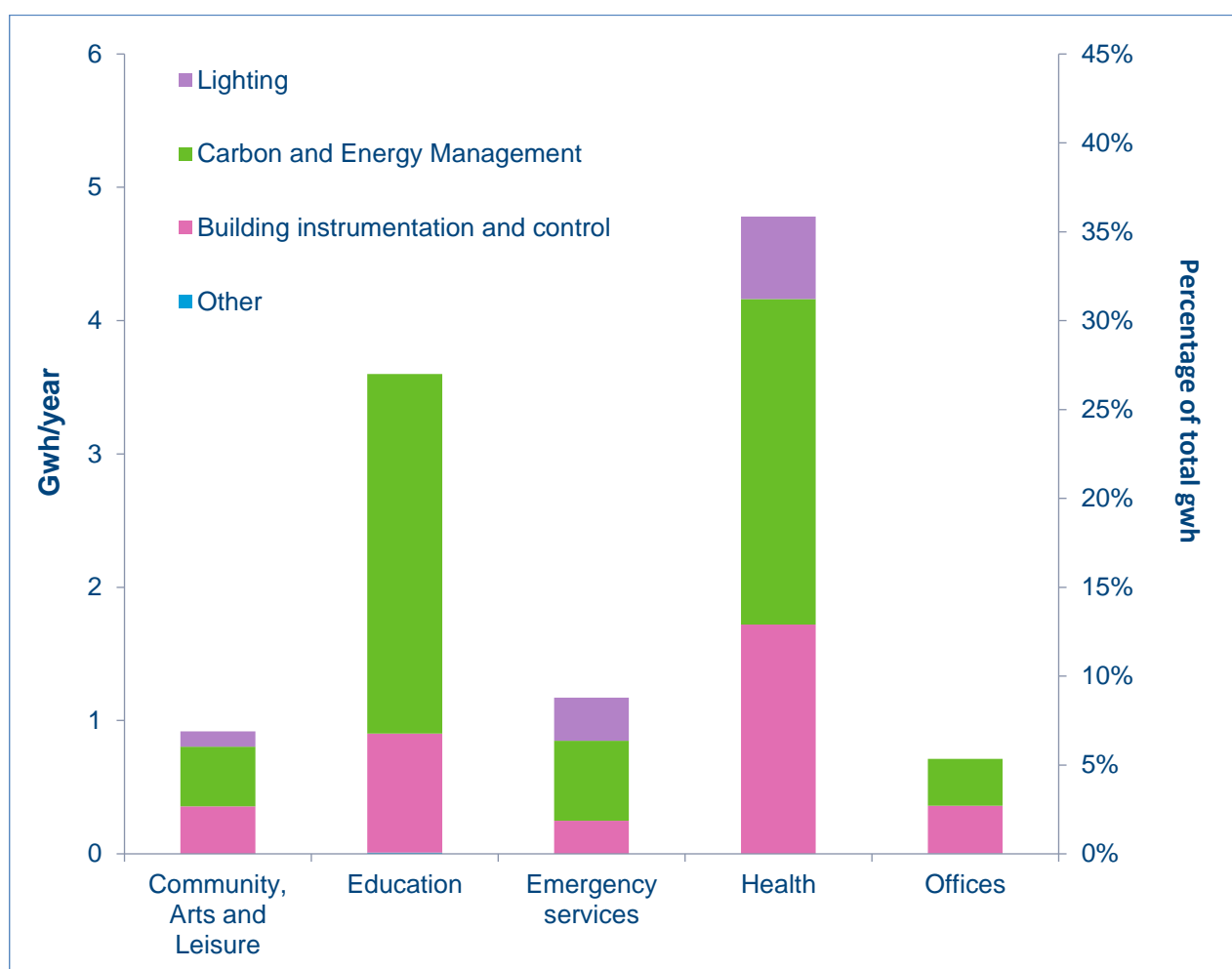
| | Electric | Non-electric | Total |
|---|----------|--------------|-------------|
| Energy Savings (TWh) | 2.7 | 8.5 | 11.2 |
| Carbon Savings (MtCO₂e) | 0.9 | 1.6 | 2.5 |
| Bill Savings (£m) | £270 | £220 | £490 |

12. Since the health and education sectors are the highest consumers of energy, it is unsurprising that these sectors are where most of the abatement potential is available. This is illustrated below in Figure 5, whilst Figure 6 breaks down the potential by the sub-sectors and specific energy efficiency measures which are responsible for generating it. These savings can only be achieved in full, if 100% of the wider public and higher education sector organisations participate in the voluntary target scheme.

Figure 5: Breakdown of Abatement Potential by Sub-sector for Measures with a Payback Period of up to 3 Years (2015)

| Sub-sector | Capital cost (£m) | Bill savings (£m/year) | Abatement potential (TWh /year) | Carbon savings (MTCO ₂ e /year) |
|---------------------------|-------------------|------------------------|---------------------------------|--|
| Education | £220 | £130 | 3.6 | 740 |
| Health | £430 | £220 | 4.8 | 1,100 |
| Emergency services | £150 | £60 | 1.2 | 280 |
| Offices | £60 | £30 | 0.7 | 160 |
| Community, Arts & Leisure | £80 | £40 | 0.9 | 200 |
| Total | £930 | £490 | 11.2 | 2,500 |

Figure 6: Breakdown of Abatement Potential for Measures with a Payback Period of up to 3 Years, by Sub-sector and Measure Type



13. The health and education sectors, are collectively responsible for the majority of the abatement potential, accounting for a share of 43% and 32% respectively (75% in total).

14. Carbon and energy management measures (these include measures such as energy efficiency awareness campaigns and minor behavioural changes), building instrumentation and control (measures such as installing energy meters and time controls for heating and hot water), and lighting measures, make up almost all of the abatement potential. Most of the carbon and energy management measures have a payback period of less than 1 year whilst most building instrumentation and control measures pay back within 2 years. Organisations implementing these measures are more than likely to start seeing savings before the end of the voluntary target scheme.

Longer Payback Potential – over three years

15. The longer term potential (over three years), if all energy efficiency measures are implemented, regardless of payback periods (which includes the measures with a payback period of 3 years or less), will cost £7.7bn in capital expenditure, and result in the savings described in Figure 7:

Figure 7: Total Wider Public Sector Annual Abatement Potential (2015 prices and emissions factors)

| | Electric | Non-electric | Total |
|---|----------|--------------|---------------|
| Energy Savings (TWh) | 6 | 22 | 28 |
| Carbon Savings (MtCO₂e) | 2 | 4 | 6 |
| Bill Savings (£m) | £600 | £560 | £1,200 |

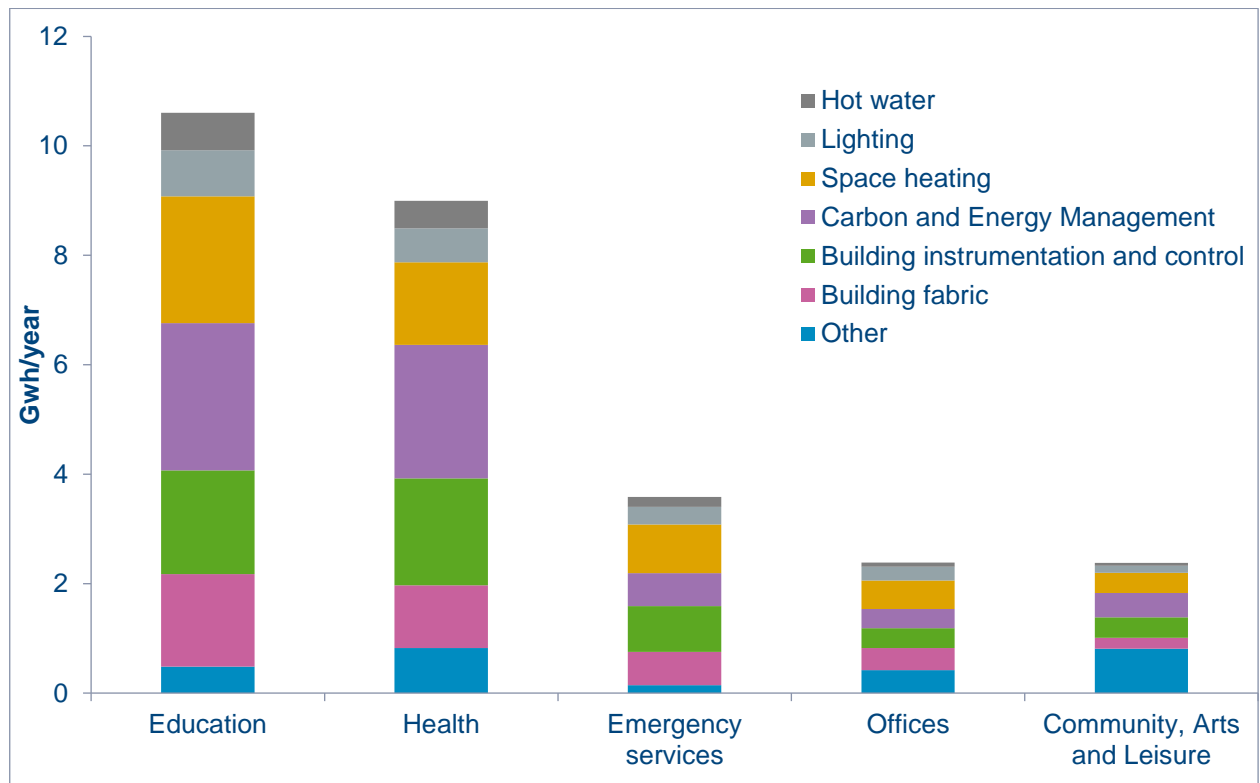
16. If these benefits are split equally between the 3 years until 2020/21, the new potential trajectory for wider public and higher education sector carbon emissions, achieves a 51% reduction in 2020/21 compared to 2009/10 levels.

17. Figures 8 and 9 break down the long term potential demonstrated in Figure 7 by the sub-sectors and specific energy efficiency measures. To achieve these levels of savings, the wider public and higher education sector organisations will need to continue implementing measures, even once the voluntary scheme has ended in 2020/21.

Figure 8: Total Wider Public and Higher Education Sectors Abatement Potential by Sub-sector

| Sub-sector | Capital cost (£bn) | Bill savings (£m/year) | Abatement potential (TWh /year) | Carbon savings (MTCO ₂ e /year) |
|--------------------------------------|--------------------|------------------------|---------------------------------|--|
| Education | £2.9 | £410 | 10.6 | 2,200 |
| Health | £2.1 | £400 | 9.0 | 2,000 |
| Emergency services | £9.4 | £140 | 3.6 | 750 |
| Offices | £1.1 | £130 | 2.4 | 570 |
| Community, Arts & Leisure | £0.7 | £100 | 2.4 | 500 |
| Total | £930 | £1,200 | 28.0 | 6,000 |

Figure 9: Breakdown of Total Wider Public Sector Abatement Potential by Sub-Sector and Measure Type



18. As illustrated by Figure 9, the greatest potential for emissions reductions are within the health and education sectors, with both sectors collectively making up over 70% of the abatement potential.
19. Carbon and energy management, alongside space heating and building instrumentation and control measures each account for around 20% of the abatement potential – collectively over 60% of the total.
20. These savings could only be achieved if the wider public and higher education sectors implemented *all* energy efficiency measures, and were not concerned about payback periods, as a number of these measures have significantly long payback periods. This level of investment would require that organisations plan for the very long term future.

Beyond Energy Efficiency

21. Moving beyond 2020/21, our focus will be on achieving our CB 4 and 5 commitments. Working closely with wider public sector organisations we will consider longer term, potentially mandatory, targets for carbon reduction and the set-up of robust reporting frameworks will be key to achieving this. And whilst energy efficiency measures present a great opportunity to reduce carbon emissions, there is further potential to reduce emissions through low carbon heating measures, such as creating and extending district heat networks, and decarbonising heating through a variety of means. In order to meet our decarbonisation commitments, heat decarbonisation will play a significant role.