

ZCSP Report – Buildings

WORK IN PROGRESS - This document may be incomplete and not peer reviewed.

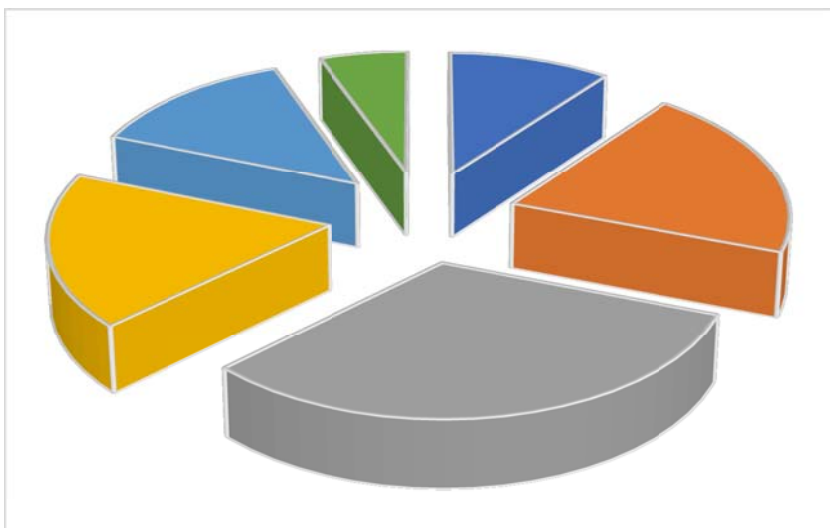
Comments and corrections are welcome.

Building- Education (B3) Sub Report (Possibly on-line only)

A/ Current situation

There are some 233 schools and colleges in Shropshire representing a significant contribution to total carbon emissions

1. 168 Primary
2. 55 Secondary
3. 5 Further college groups
4. 5 Higher education establishments



Education accounts for 6% of building emissions

It is assessed that these sites produce some 98,000 tones of carbon emissions annually of which at least 38,000 could be saved by moving away from fossil fuels.,

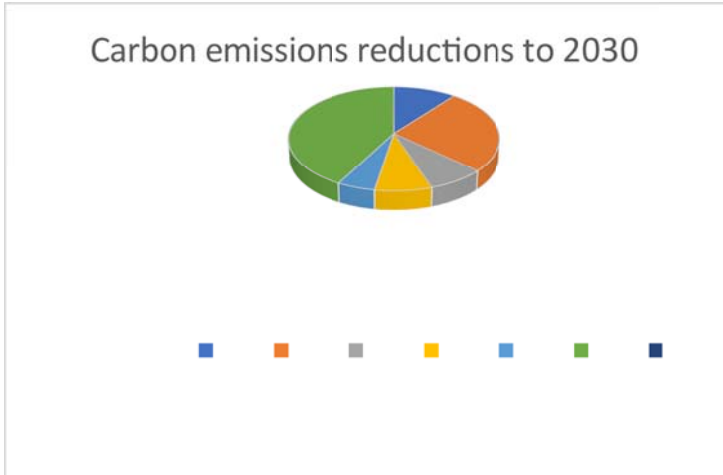
Existing providers plans and policies are being evaluated with active carbon reduction plans in place by many. A key next step is to ensure all sites are made aware of routes to reduce carbon.

A particular characteristic of the sector is the relatively low occupancy level and the intermittent nature of the use of some spaces. Examples are tabulated below :

XLocation	Annual occupancy hours	Percentage occupancy hours
Primary school classroom block	1,890	22%
Secondary school main building	2,520	29%
Higher education general teaching	,450	39%
Leisure centre	4,320	49%
Office building	3,744	43%

B/ Potential Reductions

1. If all reach DEC A or B , overall energy reduction assessed as 25%
2. If balance of heat from non fossil carbon reduction assessed as 12% at current carbon emission factors



C. Impact on Carbon Emissions

Case		Thermal	Electric
Baseline MWh		189,6	258,60
Baseline t CO2		58	0
		38,1	60,2
		21	54
Reduction through efficiency measures	To 2025	12%	20%
Effect of shift away from fossil fuels	To 2025	25%	0%
Impact of use, occupancy and behavioural change	To 2025	10%	10%
Effect of new build	To 2025	-10%	-10%
Effect of disposals	To 2025	0%	0%
Sub total		37%	20%
Effect of changes in carbon factors Cat 2, elec only	To 2025	0%	29%
Overall	To 2025	37%	43%
Reduction through efficiency measures	To 2030	20%	30%
Effect of shift away from fossil fuels	To 2030	50%	0%
Impact of use, occupancy and behavioural change	To 2030	15%	15%
Effect of new build	To 2030	-15%	-15%
Effect of disposals	To 2030	10%	10%
Sub total		80%	40%
Effect of changes in carbon factors, 57% cat 2, 8% Cat 1	To 2030	0%	57%
Overall	To 2030	80%	74%

Routes to energy reduction.

The following measures are considered appropriate for most schools XMeasure	Typical energy reduction			Cost range	Typical payback
	%	Energy kWh	Carbon CO2	£	Years
LED					
Controls to reflect occupancy					
Space utilisation					
Thermal insulation and draft proofing					
Controlled ventilation					
New build and disposals					

Because schools have a low occupancy level, payback periods are extended, The Plan currently requires an annual emissions reduction in the education sector of some 75,000 tCO₂.

Routes to non fossil fuel operations

The following technologies are well established with the exception of hydrogen as a home heating fuel but that is listed to reflect continuing development work, Other options, most significantly heat pumps, are mature technologies but are still continuing to offer steady incremental performance improvements.

XTechnology	Typical energy reduction			Cost Range	Typical payback
	%	Energy kWh	Carbon CO2	£	Years
Air source heat pumps	35%			£6,000 - £12,000	
Ground source heat pumps	45%			£8,000 - £20,000	
Ground source heat pumps via shared heat networks	45%			£2,000 - £5,000 direct cost to each property	
Low carbon heat and energy networks	Up to 80%			£50 - £100	
Direct electric heating	10%			£300 - £1000	
Hydrogen fuels	45%			£2,000 - £8,000	
Bio- mass fuels	40%			£1200 - £4000	

Note

The cost tabulated for low heat networks relates only to costs associated with each property connecting to a network but excludes network costs. The figure given for heat pumps and shared networks includes network costs apportioned cross the properties served.

There is no reason why in 2020 any school in Shropshire should still have non- LED lighting, no effective heating or lighting controls or poor thermal insulation. Funding is available and with most schools the

skills needed to define what is needed and arrange funding is available. An urgent review of those sites with poor DEC ratings should be undertaken in 2021 and these basic measures implemented everywhere.

D. Timescales

Timelines are determined by:

1. Regulation
2. Site team ambition
3. Availability of expertise
4. Availability of funding

E. Funding mechanisms

Commercial finance, grants and loans , SALIX

F Barriers

1. Funding
2. Motivation
3. Skills

G References

The following further reading is suggested

www.se-2.co.uk/files/se2/casestudies/Carbon%20Management%20Strategy_As%20published.pdf

[isbl.org.uk/documents/132110.2911645PA%20Carbon%20Challenge%20Schools%20Leaflet\[195343\].pdf](http://isbl.org.uk/documents/132110.2911645PA%20Carbon%20Challenge%20Schools%20Leaflet[195343].pdf)

[UK Schools Carbon Footprinting Study \(se-ed.co.uk\)](http://UK Schools Carbon Footprinting Study (se-ed.co.uk))

www.telegraph.co.uk/education-and-careers/2020/11/03/schools-asked-go-zero-carbon-realistic-aim/

H What is the potential reduction schools can make ?

If the identified reductions are achieved it would result in a reduction of **75,032** tonnes of CO₂ annually

This is what 1 tonne looks like

