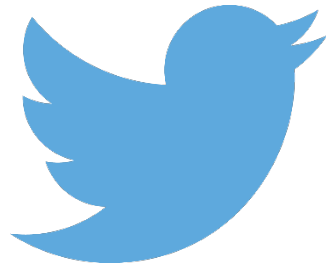


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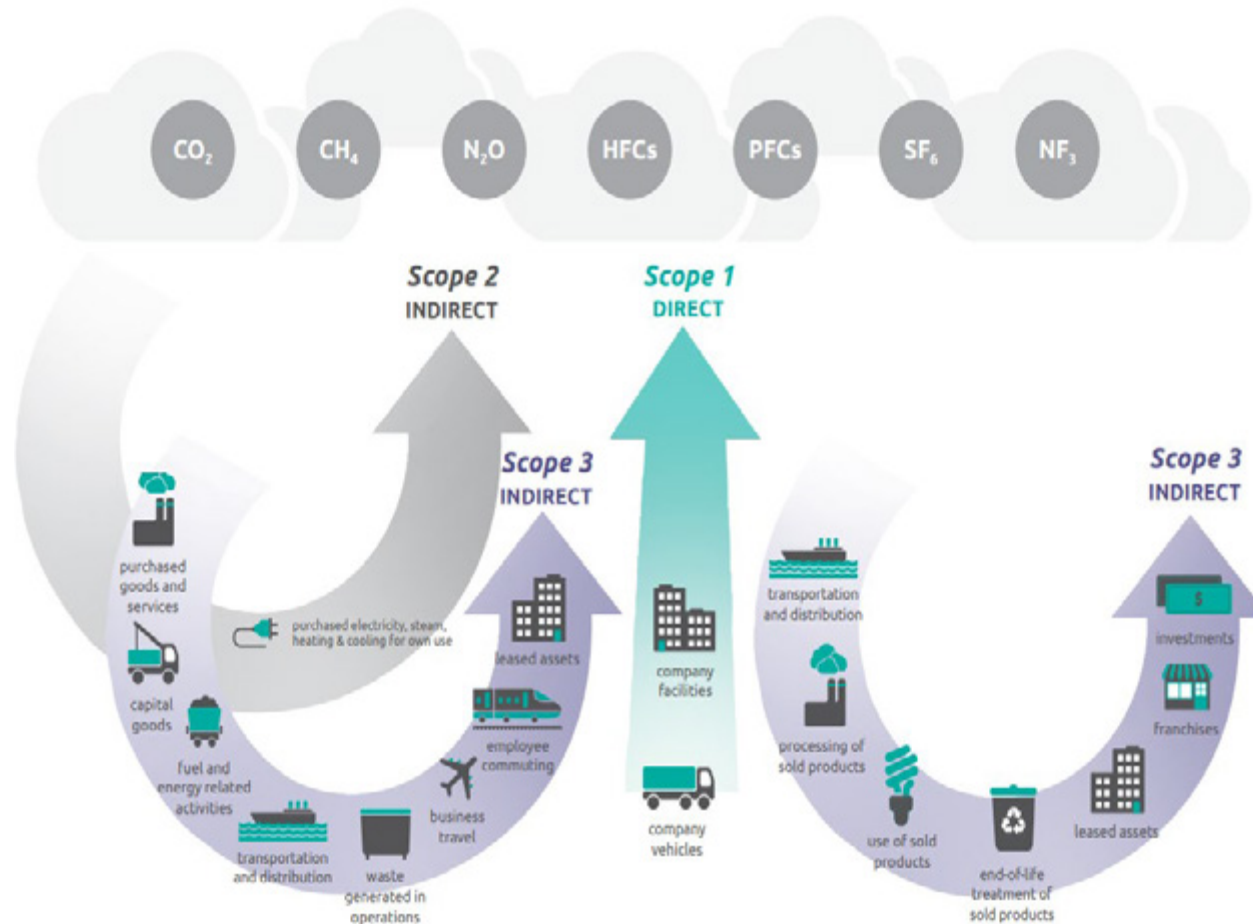
Identifying your emissions, planning your trajectory to net zero and managing your energy

By Alan Barber

APSE Energy Associate and Director of Salvis



Emissions



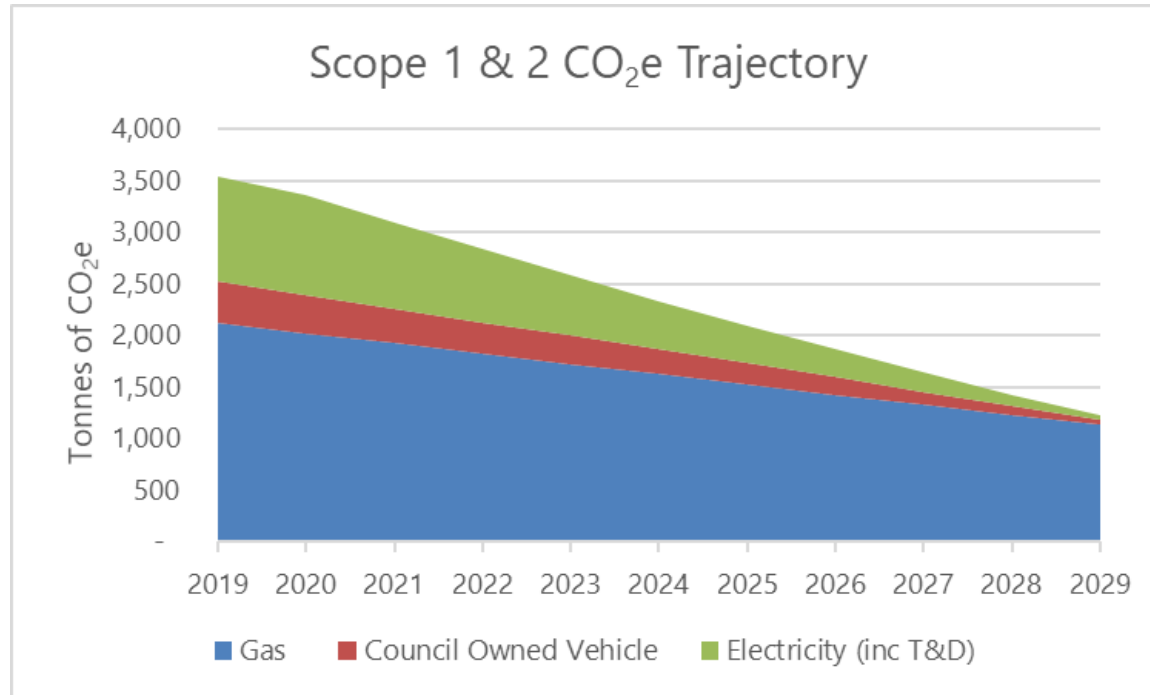
2019 Carbon Conversion Factors

Fuel kWh	kg CO ₂ e
Fuel Oil	0.26782
Grid supplied electricity	0.2556
LPG	0.21447
Natural Gas	0.18385
Biomass wood pellets	0.01563

How to get your estate to be net zero carbon

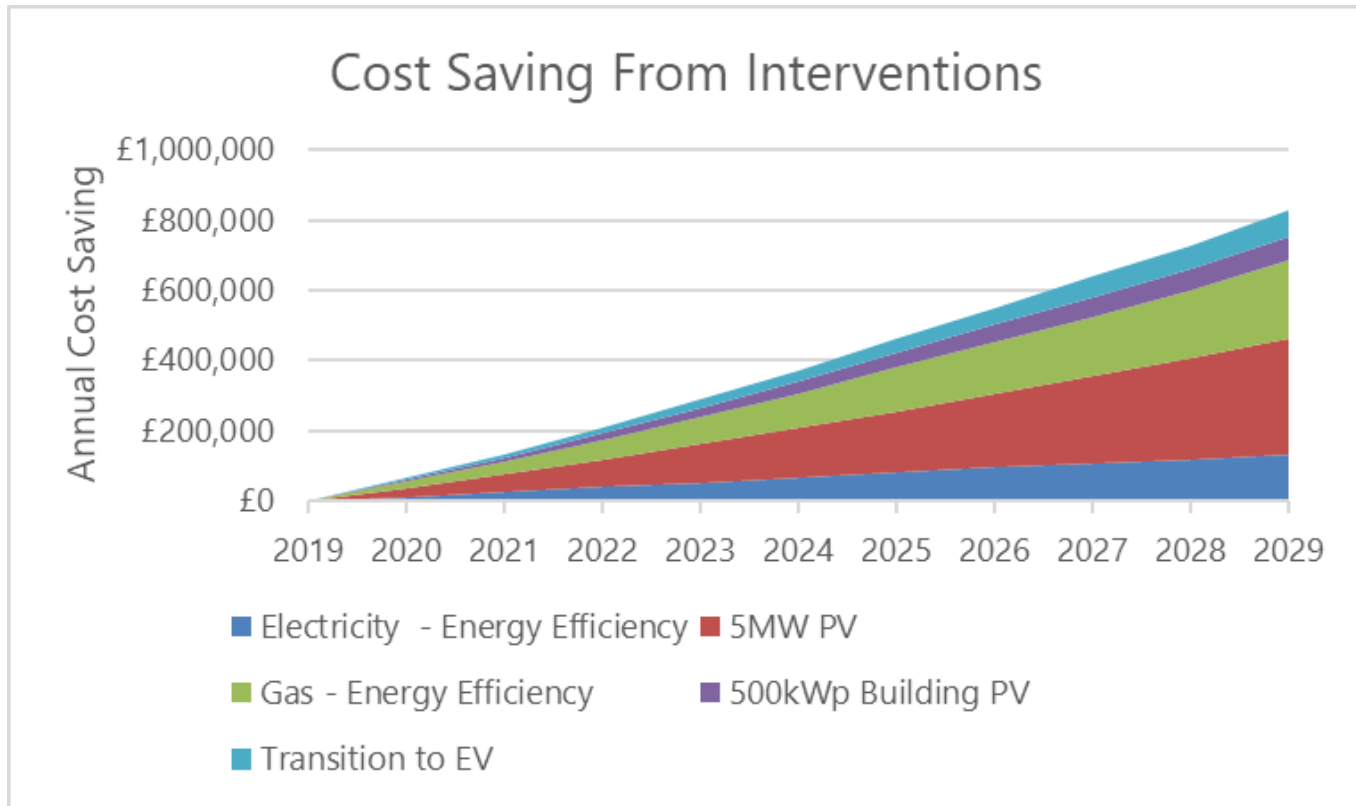
- Identify emissions
- Reduce energy usage and optimise building performance (i.e. energy efficiency)
- Generate renewable local power
- Offset hard to reduce emissions

Carbon Emissions Trajectory 2019 to 2030



If all gas heating systems were replaced with heat pumps with a COP of 3, the carbon emissions in 2030 would change from **1,043 tCO₂e for gas plant to 240 tCO₂e for electric heat pumps.**

Cost savings from interventions between 2019 to 2030



Challenges

- Corporate challenges
- Zero carbon heating
- Grid capacity
- Funding

Identifying your current carbon footprint and baseline

- Usage (kWh)
- Carbon conversion factor
- Cost
- Floor area

Benchmark buildings

Site	Annual Electricity Usage (kWh)	Floor Area (m ²)	kWh/m ²
Office A	500,000	4,000	125
Office B	600,000	5,000	120
Office C	700,000	10,000	70

- kWh/m²
- Display Energy Certificate (DEC)
- Energy Performance Certificate (EPC)
- CIBSE Benchmarking Tool
- Condition surveys

Prioritising projects and feasibility studies

- Analysing existing and proposed building loads
- Comparing technologies
- Maintenance requirements and cost
- Carbon savings
- Cost savings
- Funding opportunities
- Payback and ROI

LED Lighting

Existing			Proposed			Savings			Payback	
Existing luminaire	Annual Running Cost	Carbon (tonne)	Proposed Luminaire	Annual Running Cost	Carbon (tonne)	% saving	Annual cost saving	Carbon saving (tonne)	Payback via energy savings	Payback via energy savings and maintenance
Recessed downlight with 40W ES lamp	£2,315	4.1	LED Equivalent	£347	0.6	85	£1,968	3.5	4.2	3.6
50W halogen spot	£2,894	5.2	LED Equivalent	£579	1.0	80	£2,315	4.1	2.7	2.4
150mm diameter recessed single CFL	£1,730	3.1	LED Equivalent	£347	0.6	80	£1,383	2.5	6.0	4.8
1463mm (5ft) T5 single 35W batten	£2,330	4.1	LED Equivalent	£1,389	2.5	40	£940	1.7	10.4	7.7
1500mm (5ft) T8 single 58W batten	£3,860	6.9	LED Equivalent	£1,389	2.5	64	£2,471	4.4	3.9	3.5
1500mm (5ft) T12 single 65W batten	£4,326	7.7	LED Equivalent	£1,389	2.5	68	£2,937	5.2	3.3	3.0
2D 38W surface mounted bulkhead	£2,529	4.5	LED Equivalent	£752	1.3	70	£1,777	3.2	4.8	4.0
600x600 T5 4 tubes recessed	£1,864	3.3	LED Equivalent	£926	1.6	50	£938	1.7	11.9	8.8
600x600 T8 4 tubes recessed	£4,792	8.5	LED Equivalent	£1,563	2.8	67	£3,229	5.7	3.5	3.1

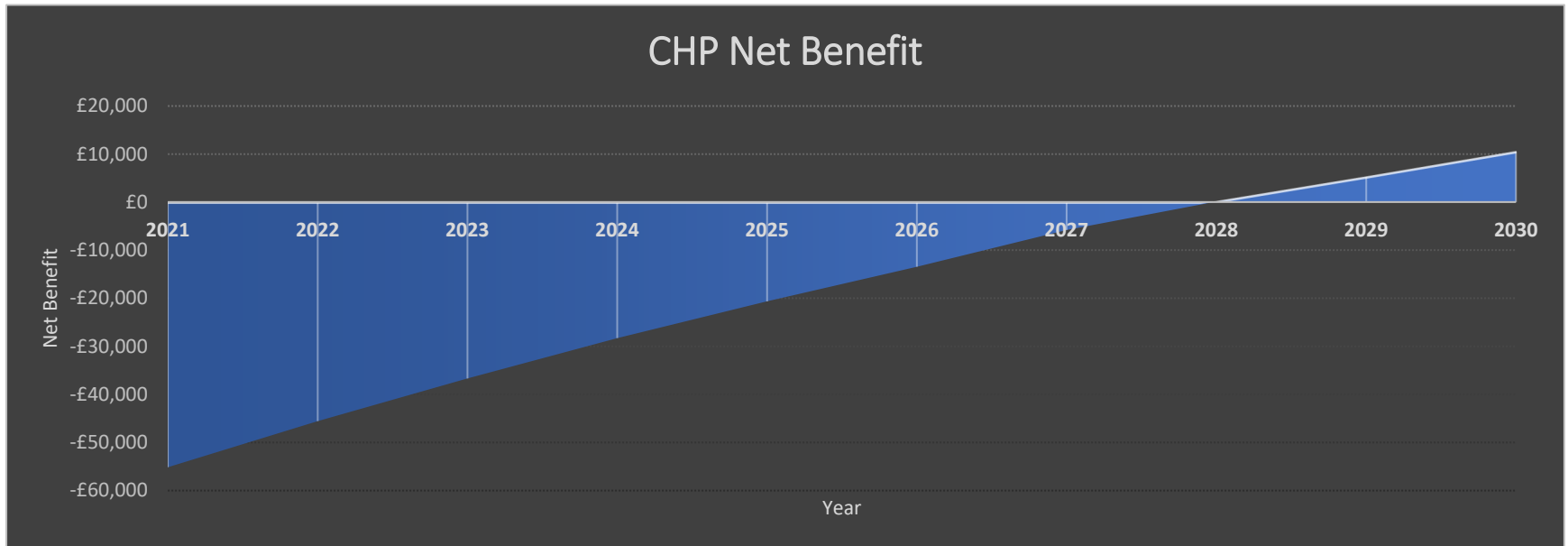
Based on 100no. Luminaires on for 14hours/day, 5 days/week

Building Management System (BMS) Audit

The audit includes:

- Site visit to survey the BMS and building services installations
- Download of the existing BMS control strategy
- Checks of plant operation
- Remote evaluation of the control strategy, including a review of:
 - Occupancy schedule
 - Control setpoints, parameters and loops
 - Controller firmware and system control users
 - Systems alarms
 - Safety circuits and building protection strategies

Review of Leisure Centre CHP Performance



Recommendations

- BMS audit and optimise control strategy
- Install a thermal store
- Calibrate meters and monitor performance

COVID-19 and Carbon Strategies

- Has not impacted the drive for zero carbon and has kick started the green recovery
- How we use buildings will change
- Start your action plan now
- Importance of building control



Contact details

Alan Barber, APSE Energy Associate

Email: alan.barber@salvisgroup.co.uk

Association for Public Service Excellence

3rd floor, Trafford House, Chester Road,
Old Trafford, Manchester M32 0RS.

telephone: 0161 772 1810

web: www.apse.org.uk

