



STROMA

Improving Energy
Performance –
Integration of DEC and EPC
Calculations



Our Remit

- Employed by the Local Authority to Assess their existing stock of schools and model various scenarios based on energy saving measures.

- SBEM Calculation used for running scenarios and ORCcalc used as the operating rating



- The Energy Performance Certificate (Asset Rating) requires the modelling of the building, incorporating:
 - Building fabric construction,
 - Heating,
 - Cooling,
 - Ventilation
 - Domestic Hot Water systems,
 - Lighting use and control,
- Once all the information has been collected the SBEM simulation calculated energy usage based on several set points for heating and Occupancy.



- The Display Energy Certificate (Operational Rating) requires the Actual Energy Usage to be entered into the ORcalc Software :
- Energy usage is inputted in Kwh and based against a benchmark energy usage for the Typical Stock



- **Phasing Of the assessment**

Phase 1: As Existing EPC & DEC

Provides indicator of Energy Performance of the building in its existing state

Phase 2: EPC as proposed improvements

Provides an indication of the level of performance that can be achieved through the introduction of various improvements.



- **Phasing Of the assessment**

Phase 3: Implementation of Improvement works

This may take the form of implementation of LZC technologies, replacing existing heating plant, introduction of added insulation.

Phase 4: Final EPC upon Completion of Improvements

Provides a final indicator to show the simulated energy performance of the School with the improvements in place



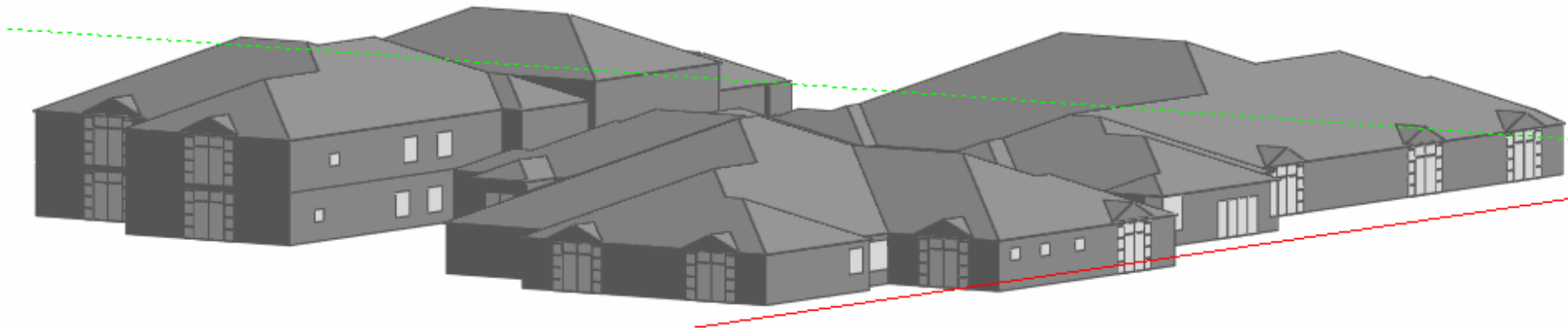
- **Phasing Of the assessment**

- Phase 5: DEC for 12 months after improvements**

- Provides performance indicator for actual energy used since the implementation of the improvements as a direct comparison against previous energy use.

- When viewed in conjunction with the EPC, if the performance has not improved by similar amounts this may reflect poor operational practices which can be rectified with improved user knowledge.

- **Case Study – Scenarios and efficiency gains**





Phase 2 Results

Outline of Improvement Proposals

The improvements proposed within this assessment are intended to show the effects of different energy performance measures that could be applied to the school.

As we have made reference to the importance of air tightness previously, we have included improving the schools air tightness to a standard of 10m³/hr/m² within each of the scenarios set out.



Scenario 1: Reduced air tightness result of 10m³/hr/m² intended to show the improvement in energy performance purely from improved air tightness.

Scenario 2: Air tightness @ 10m³/hr/m² and installation of a new energy efficient boilers to feed the existing radiators and Hot water demand.

Scenario 3: Air tightness @ 10m³/hr/m² & introduction of Solar Thermal with the existing boilers.

The Solar Thermal considered here is intended only for hot water usage and has been sized very approximately based upon the occupancy levels of the school. Further investigation and design should be considered before implementation.



Scenario 4: Air tightness @ 10m³/hr/m² & replacement of old boiler combined with the introduction of Solar thermal from scenario 3.

Scenario 5: Air tightness @ 10m³/hr/m², replacement of old boiler with Biomass type boiler.

In this instance, both boilers on the site have been replaced with Biomass (woodchip) type boilers.

Scenario 6: Air tightness @ 10m³/hr/m², replacement of old boiler and introduction of Ground Source Heat Pump feeding an under floor heating system.



School EPC Rating Prior To Commencement of Works

- As Existing 62C
- New Build Benchmark 42B
- Existing Stock Benchmark 83D



School EPC Rating For separate Scenarios

Scenario 1 – 61 C

Scenario 2 – 57 C

Scenario 3 – 60 C

Scenario 4 – 56 C

Scenario 5 – 31 B

Scenario 6 – 33 B