

GLOSSARY OF TERMS

North East & Yorkshire Net Zero Hub
Public Sector Estate Decarbonisation Programme



OUR PARTNERS

Hull & East Yorkshire LEP,
North East LEP, South
Yorkshire Mayoral Combined
Authority, Tees Valley
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Building Energy Management System (BEMS)

A Building Energy Management System (BEMS) is a computer-based system installed to control and monitor a building's energy-consuming equipment such as ventilation, lighting, energy, fire systems, and security systems. It consists of a network of sensors and controls and software packages to provide operational control and monitoring of consumption and maintenance.

Carbon baseline

A greenhouse gas or carbon emissions baseline is the estimate of the emissions over a set period that can be used to measure progress. Any year can be used, the more data that is available and the earlier the baseline, the better.

Carbon equivalent (CO₂e)

There are seven main greenhouse gases (GHGs) that contribute to climate change, as covered by the Kyoto Protocol. These are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃). Different activities emit different gases.

Each of the GHGs has different properties, a different global warming potential (GWP) and, as such, each has a different impact on climate change.

Carbon dioxide equivalent, CO₂e, is the universal unit of measurement to indicate the GWP of GHGs, expressed in terms of the GWP of one unit of carbon dioxide.

Carbon dioxide equivalent is regularly misinterpreted or misreported as “carbon” or “carbon dioxide” – whereas it is likely that most of the time, the measure being referred to is CO₂e. A simple way to refer to carbon equivalent emissions would be “greenhouse gas emissions”.

Carbon negative (and carbon positive)

When the balance of carbon emissions exceeds zero, indicating the process of absorbing or offsetting more CO₂e than is emitted. There is no official definition, and the term “carbon positive” is confusingly sometimes used to mean “carbon negative” where corporate communications attempt to avoid the use of the word “negative”.

Carbon neutral

Carbon neutrality means that an organisation no longer emits greenhouse gas emissions to the atmosphere. This is typically achieved through reducing consumption, moving to renewables, and moving away from fossil fuel use. Any residual emissions must be offset by absorbing the equivalent amount from the atmosphere, for example through carbon capture and storage, or purchasing of carbon credits.

Carbon offsetting

A carbon offset allows organisations to compensate for emissions they cannot reduce. By funding an equivalent saving in carbon emissions elsewhere, residual emissions can be balanced. Example projects include organisations that “sequester” or take CO₂e out of the atmosphere and store it. One of the most common examples is reforestation.

Decarbonisation

Reducing and ultimately eliminating related carbon emissions from upstream, operational, and downstream activities.

Direct carbon

It means carbon emissions that are emitted either directly within an organisation’s site boundary from combustion of fossil fuel, or where district heat networks are used are emitted from combustion of fossil fuel in a district heating plant room. For most public sector organisations this will primarily be fossil fuels (gas, oil and coal) which are combusted on site. This is sometimes referred to as “non-traded carbon” which means emissions that fall outside of the scope of the EU emissions trading scheme (EU ETS).

Distribution Network Operator (DNO)

A district network operator (DNO) owns and operates the network of pylons, transformers, cables, and meters that distribute electricity from the National Grid across Great Britain. There are currently 11 DNOs covering 14 regions across Great Britain.

You can find out who is your local DNO on the Energy Networks Association website: <https://www.energynetworks.org/customers/find-my-network-operator>

District heating

Is where heating for several buildings in a local area is provided from a centralised plant room or energy centre(s). The heating is typically transmitted to each building via a network of highly insulated underground hot water or steam pipes, forming a heat network. Customers will typically pay per unit of heat (kWth) used in their buildings.

The energy centre gives flexibility to change the heat generation technology as future innovation allows.

Domestic hot water

A Domestic Hot Water (DHW) System delivers hot water to fixtures used by people at the sink, shower, tub and any other appliance where water may contact humans.

In both Commercial and Residential systems, the definition of DHW is the same.

Electrical loading

Is the electrical power required by an appliance to operate.

Energy efficiency

Energy efficiency is the use of less energy to perform the same task or produce the same result. Energy-efficient homes and buildings use less energy to heat, cool, and run appliances and electronics, and energy-efficient manufacturing facilities use less energy to produce goods.

Energy performance benchmark

Energy benchmarking is a way to compare the current energy performance of a building against past data from buildings of a similar size and occupancy. Typically, this process helps identify those buildings which are performing below an expected energy use/performance to help address areas of improvement.

Fabric first approach

This approach maximises the performance of the materials and components of the building during the design phase. This approach minimises the need for energy consumption and improves the energy efficiency of the building. A Heat Decarbonisation Plan with a fabric-first approach will consider the following:

- Prioritising insulation
- Airtightness
- Managing solar gain
- Optimising air flow and ventilation
- Considering the thermal mass of the building fabric

Feasibility study

A feasibility study aims to: holistically appraise the strengths and weaknesses of an existing system; deduce opportunities and risks present in different solutions; consider the resources required to complete the project; and conclude the best course of action or likelihood of success.

Green Book

Supplementary guidance on the valuation of energy use and greenhouse gas emissions is used to quantify proposals that impact direct and indirect carbon

emissions. The guidance includes data tables that model carbon emissions by fuel source out into and beyond the 2050s.

More information can be found here on the government website:
<https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal>

Green House Gas Protocol Standard

This Greenhouse Gas (GHG) Protocol Corporate Standard provides standards and guidance for companies and other types of organizations preparing a GHG emissions inventory. It covers the accounting and reporting of the six greenhouse gases covered by the Kyoto Protocol — carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆).

Heat demand

The quantity of heat needed to maintain the desired internal temperature of a building during the external variable temperatures in a year.

Heat loss calculation

Heat transfer is the transfer of heat energy due to a difference in temperature across two points. A heat loss calculation allows for the assessment of the heat flow in a building and the overall heat demand needed to meet the desired room temperature. This assessment requires knowledge of the building size, fabric condition and internal/external temperatures.

Heating degree day

Heating degree days are a measure of how much (in degrees), and for how long (in days), the outside air temperature was below a certain level. It is commonly used in calculations relating to the energy consumption required to heat buildings.

The base temperature of a building is the temperature below which it needs heating; this will depend on the building type and use.

So for example, if the base temperature of a building is 21 degrees, and the outside air temperature is 12 degrees for eight hours (one third of a day), then that represents 3 heating degree days ($(21-12) \times 1/3 = 3$).

Adding up heating degree days can give a weekly, monthly, or annual heating degree day figures.

Indirect carbon

It means carbon emissions from power generated off site by another organisation. For the vast majority of public sector organisations this will primarily be carbon emissions arising from grid electricity use. This is sometimes referred to as “traded

carbon” which means emissions covered by the EU emissions trading scheme (EU ETS).

Kilowatt hours (kWh)

A unit of energy equal to one kilowatt (kW) of power sustained for one hour. This is the standard unit for measuring energy usage in small-medium consuming sites. You might here single appliances referred to in their wattages, or larger organisations referred to in Megawatts. These are incremental scales of 1,000 used to describe the same information:

- 1,000,000,000 Watt
- 1,000,000 Kilo watt
- 1,000 Mega watt
- 1 Giga watt

Local network demands

Is the increased pressure placed on a District Network Operator (DNO) by the added electrical loading of appliances such as heat pumps and solar PV.

Low carbon

Technology, energy, sources, and services that yield minimal output of greenhouse gases.

Low carbon heating

It is one where little or no carbon is emitted to provide the heating. Electric heat pumps are considered to be low carbon heating, and whilst there can be carbon emissions associated with the electricity used to power them, these emissions will reduce over time to zero as the power grid decarbonises. This includes the following measures: Air Source Heat Pump, Water Source Heat Pump, Ground Source Heat Pump, Electric Heating and Connect to Existing District Heating.

M&E Engineer

Mechanical and Electrical systems engineers can also be referred to as building services engineers. They are responsible for the heating, water, electrical and telecoms systems inside a building. These engineers are typically involved in the design and installation of building systems or oversee their maintenance and operation.

Measurement and verification (M&V)

Measurement and Verification (M&V) is the process of planning, measuring, collecting and, analysing data for the purpose of verifying and reporting energy savings within an individual facility resulting from the implementation of energy conservation measures (ECMs). Savings cannot be directly measured since they represent the

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absence of energy use. Instead, savings are determined by comparing measured use before and after implementation of a project, making appropriate adjustments for changes in conditions.

Net Zero

A target to achieve a state in which the activities of an organisation result in no net impact on the climate from the release of greenhouse gas emissions. This is achieved by reducing greenhouse gas emissions, in line 1.5°C pathways or time-based targets, and by balancing the impact of any remaining greenhouse gas emissions with an appropriate amount of carbon sequestration.

Operational efficiency and behaviour change

Operational efficiency is the ability of an organization, building, or person to reduce waste in time, effort, and materials as much as possible, while still producing equivalent high-quality service or product. Financially, operational efficiency can be defined as the ratio between the input required to keep the organization, building, or person going and the output it provides. Input refers to what is put into a business to operate properly, such as costs, employees and time while output refers to what is put out or gained, such as rapid development times, quality, revenue, customer acquisition and customer retention.

Public Sector Decarbonisation Scheme (PSDS)

The Public Sector Decarbonisation Scheme provides grants for public sector bodies to fund heat decarbonisation and energy efficiency measures to supports the aim of reducing emissions from public sector buildings by 75% by 2037, compared to a 2017 baseline.

The latest information about the scheme can be found on the government website: <https://www.gov.uk/government/collections/public-sector-decarbonisation-scheme>

Retrofit

Retrofitting is the process of modifying something after it has been manufactured.

Retrofitting a building involves changing its systems or structure after its initial construction and occupation. This work can be an act of fitting new systems designed for high energy efficiency and low energy consumption to buildings previously built without them to improve its energy consumption performance. As technology develops, building retrofits can significantly reduce energy and water usage.

Scope of emissions (1,2 & 3)

Greenhouse gas emissions are categorised into three groups or 'Scopes'.

Scope 1 Emissions

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Scope 1 covers direct emissions from owned or controlled sources, including combustion of fuels and fugitive emissions.

Scope 2 Emissions

Scope 2 covers the indirect emissions of an organisation from the generation of purchased electricity, steam or heating and cooling.

Scope 3 Emissions

Scope 3 includes all other indirect emissions that occur in a company's value chain, for example, emissions associated with and including the supply chain, transport and distribution, business travel and commuting, use of products, waste, investments and other leased assets or franchises.

Seasonal efficiency and coefficient of performance

Seasonal efficiency and coefficient of performance is a way of measuring the true energy efficiency of heating and cooling technology, over an entire year. This measure gives a more realistic indication of the energy efficiency and environmental impact of a system.

The higher the seasonal efficiency and coefficient of performance ratio is, the more efficient your cooling or heating system will be.

This method of rating energy efficiency is driven by the EU's Energy Related Products (ErP) Directive (the Eco-design Directive) which specifies the minimum Eco-design requirements that manufacturers must integrate into their energy-using products.

U Value

The rate of transfer of heat through a material (watts per square metre-kelvin), typically through the fabric of a building (e.g., roof, walls and windows). A lower U-value indicates the slower rate of heat transfer across a material.

Wet system

In this system, the heating medium used to reach the desired internal temperature of a building is a liquid and in most cases water. The heating medium is distributed via a pipe network and heat is emitted through radiators or under floor heating. The heating medium then flows back to the heat source.

Whole Building Approach

Taking a system-based approach is to consider the demands and interactions between different elements of a building in the context of a site or campus. 'Whole building' approach - It is where all the factors that contribute to a building's energy consumption are considered together to identify the most cost-effective way to achieve the objective. For example, investment in improving the insulation levels of the building fabric will reduce the overall size of low carbon heating plant required,

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as well as save on fuel bills. Also, investment in reducing the peak electricity consumption, such as through installation of LED lighting, can reduce the need to upgrade a building's electrical infrastructure to accommodate the installation of a heat pump.

