

Understand Building Energy Needs & Use

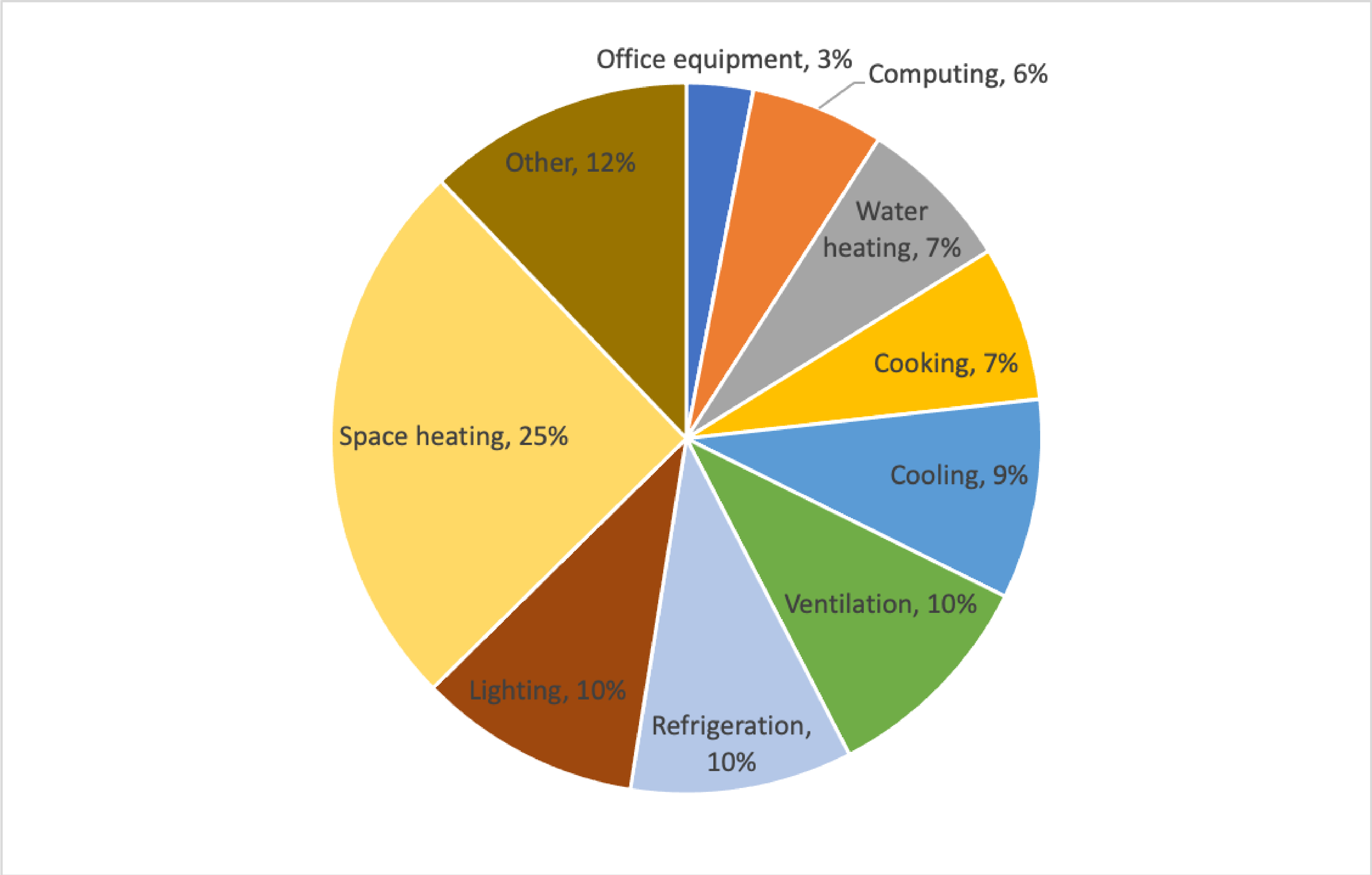
Julie's Bicycle
CREATIVE • CLIMATE • ACTION



Drivers of Your Organisation's Building Energy Use

1. **What you do** as an organisation
2. How what you do is **anticipated to change** (ensure alignment with your business development plans)
3. The **buildings** you occupy (e.g., Your infrastructure, the fabric of your building)
4. The **equipment** you have (e.g., AC units, gas heating, etc.)
5. Your **management and procedures**.
6. The **behaviour** in your buildings (e.g. Do people turn off the lights or set thermostat controls?)
7. The **geography** of your buildings (e.g., Where in the country it is located, the position or orientation in relation to the sun and wind).

Example of Energy Use in a Building



Units of Energy Measurement

| Unit | Description |
|------------------|---|
| Watt (W) | The rate at which energy is changed from one form to another |
| 1000 Watts | 1 kW |
| kWh | 1 kW for 1 hour |
| Power in W or kW | What a piece of equipment requires to run, what wires can cope with |
| Energy in kWh | What we pay for |

Energy Audits

An energy audit is a review of the following:

- What equipment there is in a building
- The age and efficiency of that equipment
- How the equipment is used
- How effective the equipment is
- How energy is used in a building
- What alternatives are there to reduce energy use in a building

What is Involved in an Energy Audit?

Simple Audit:

- Walk around of buildings
- Written notes on each room
- Written notes on equipment

Intermediate Audit:

- Analysis of energy use data from energy meters to see energy use by fuel and area
- Recommendations for efficiency, costings, savings opportunities

What is Involved in an Energy Audit?

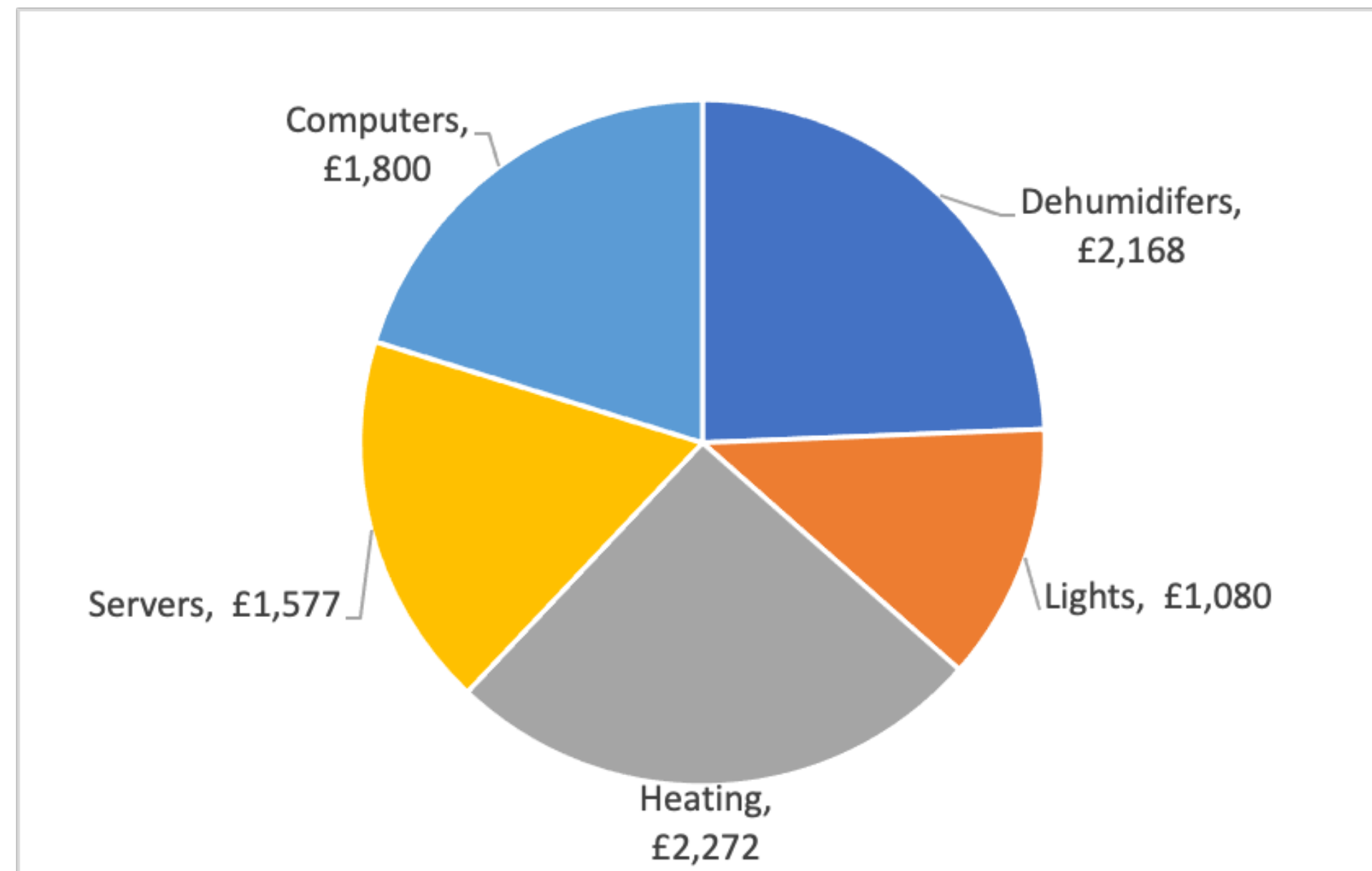
Night Audits:

- Visiting buildings out of hours
- Assess what is left on overnight (e.g., lights, computers).

(An advanced capital investment grade audit would involve a specialist to assess feasibility, cost, and savings of specific opportunities, e.g., Replacing gas boilers with heat pumps).

Example of Energy Use Findings from Audit

Annual Energy Cost by End Use, £



| | Power (kW) | Annual use (kWh) | Annual use £ |
|---------------|------------|------------------|--------------|
| dehumidifiers | 1.65 | 14,454 | 2,168 |
| lights | 2.40 | 7,200 | 1,080 |
| heating | | 56,800 | 2,272 |
| servers | 1.20 | 10,512 | 1,577 |
| computers | 4 | 12,000 | 1,800 |

Energy Analysis

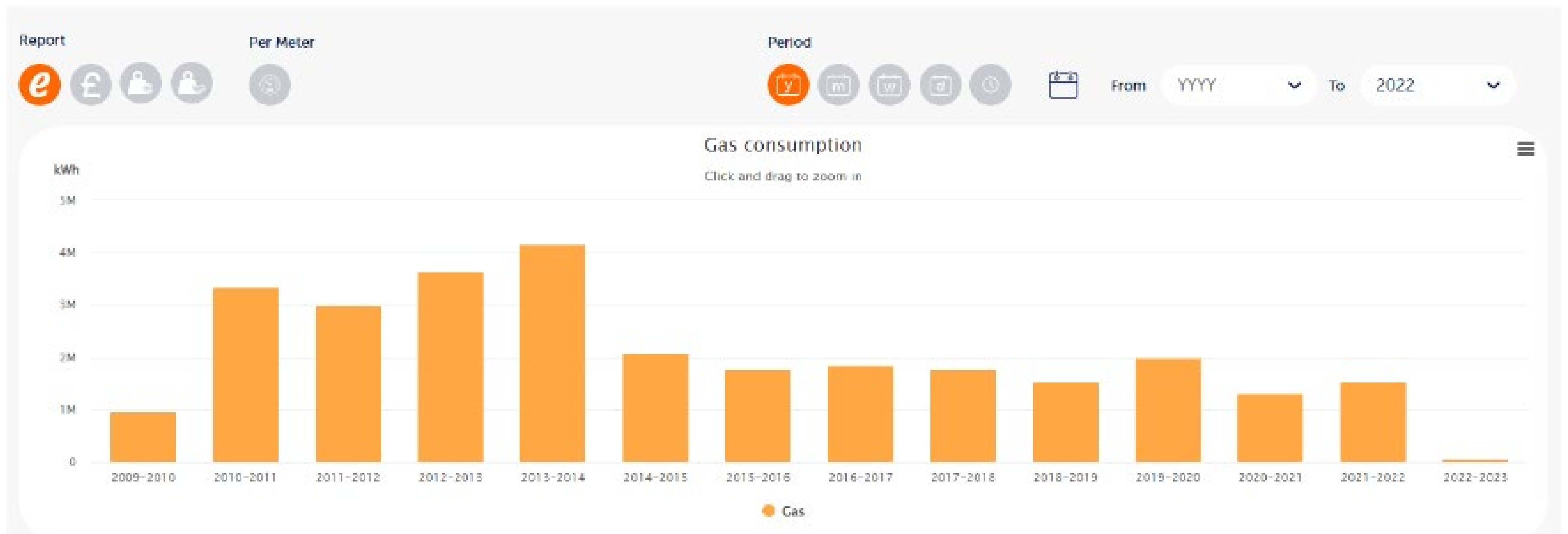
Steps to energy analysis:

- Data is collected from invoices or meter readings and is broken down by fuel type (e.g., electricity, gas, renewables)
- Convert these invoices into kWh

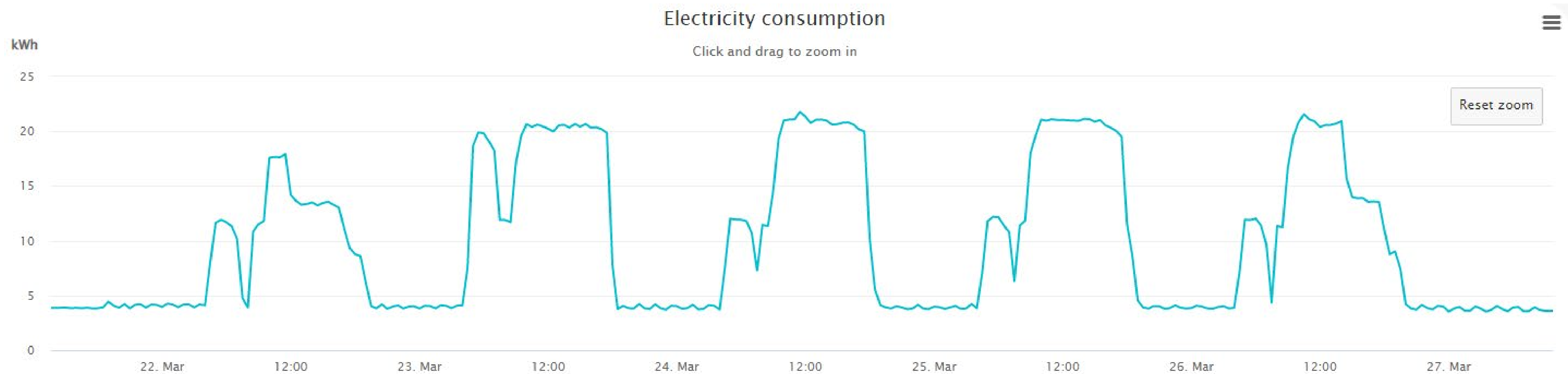
An energy analysis aims to measure how much energy is being used each year by fuel type. It is recommended to collect this data on a monthly, weekly, daily basis, and where possible with meters a half-hourly basis.

Comparison

To see variation, range, patterns, and significant changes, it is important to compare periods of energy use such as month-to-month to see seasonal variation, and year-to-year to track improvements. E.g., year-to-year use:



Example of Energy Consumption Data



Daily electricity use profile for 5-day period

Every peak is showing daytime day use. The dropped flat lines is showing overnight. The small peaks is likely to be when the first group of people come into the building before full opening - e.g. if this were a museum 8-10am is when staff come in and then 10am being when doors open and visitors come in.

Benchmarks

It is useful to look at data results per meter squared of your building in order to understand:

- How your building compares to another similar building
- Your other buildings
- Your building's performance year-to-year

This means it is important to collect data on your floor area when gathering information.

To start measuring your energy impacts and track annual progress, access our Creative Climate Tools [here](#).