

**The new world  
of Net Zero Carbon.**  
**Existing stock: delivering  
the transformation.**

ROGER MACKLIN & EIMEAR MOLONEY

DESIGN, UNLEASHED



# Welcome.

## Net zero carbon.

### Delivering the transformation.



Facilitator  
**Ashley Bateson**  
Partner



Presenter  
**Roger Macklin**  
Associate Director



Presenter  
**Eimear Moloney**  
Associate Director

**Talking:**

▼ Questions

Type question here.

Any questions?  
Use the panel provided.

# The new world of Net Zero Carbon. Virtual event series programme.

## Tuesday 4 August

09.30 Making it possible: the Net Zero Carbon challenge & opportunity

## Thursday 6 August

09.30 New development, new approach

## Tuesday 11 August

09.30 Existing stock: delivering the transformation

## Thursday 13 August

09.30 Embodied carbon & climate-conscious construction

## Tuesday 18 August

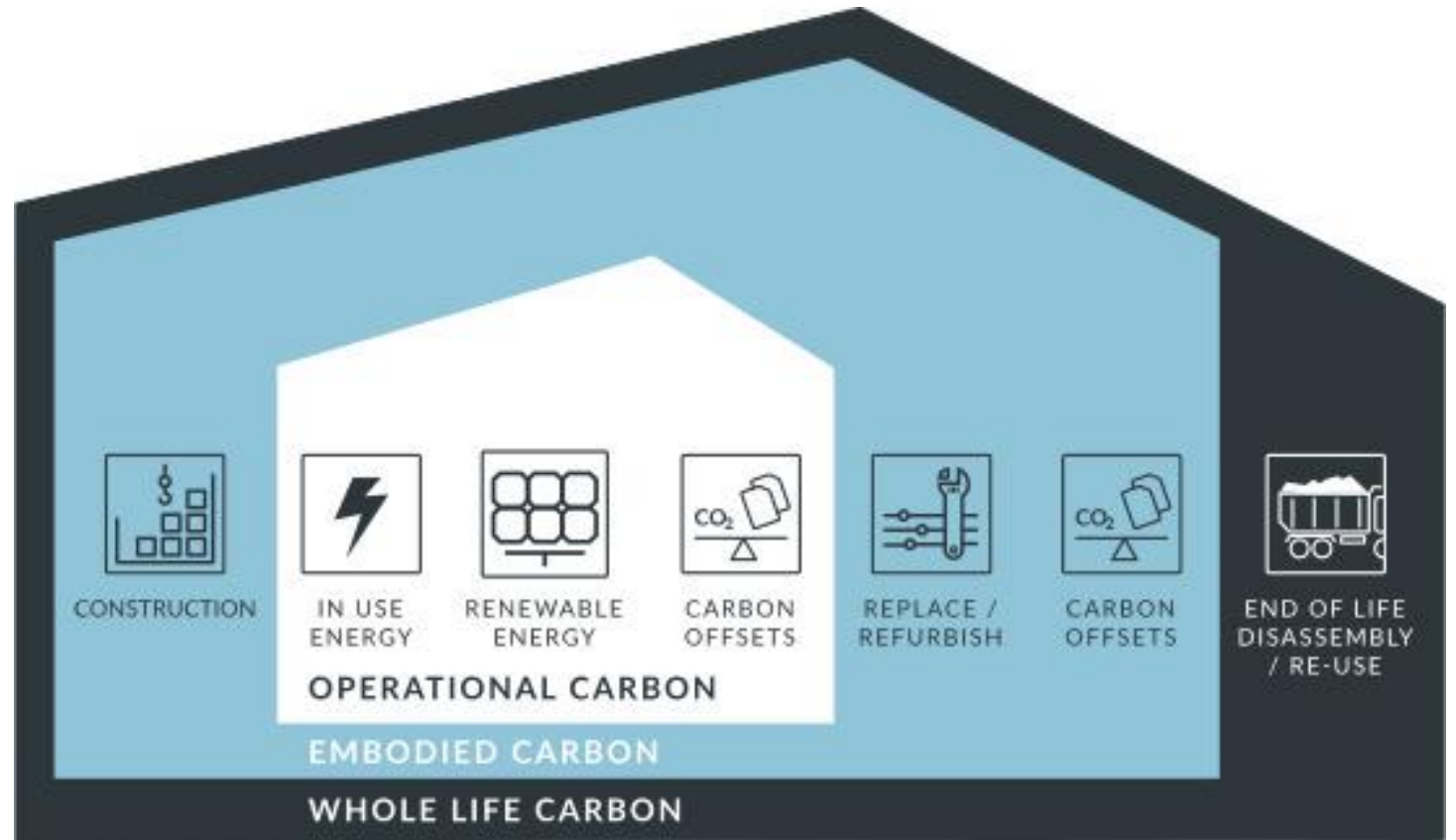
09.30 Keeping track: governance & management

# What is zero carbon development?

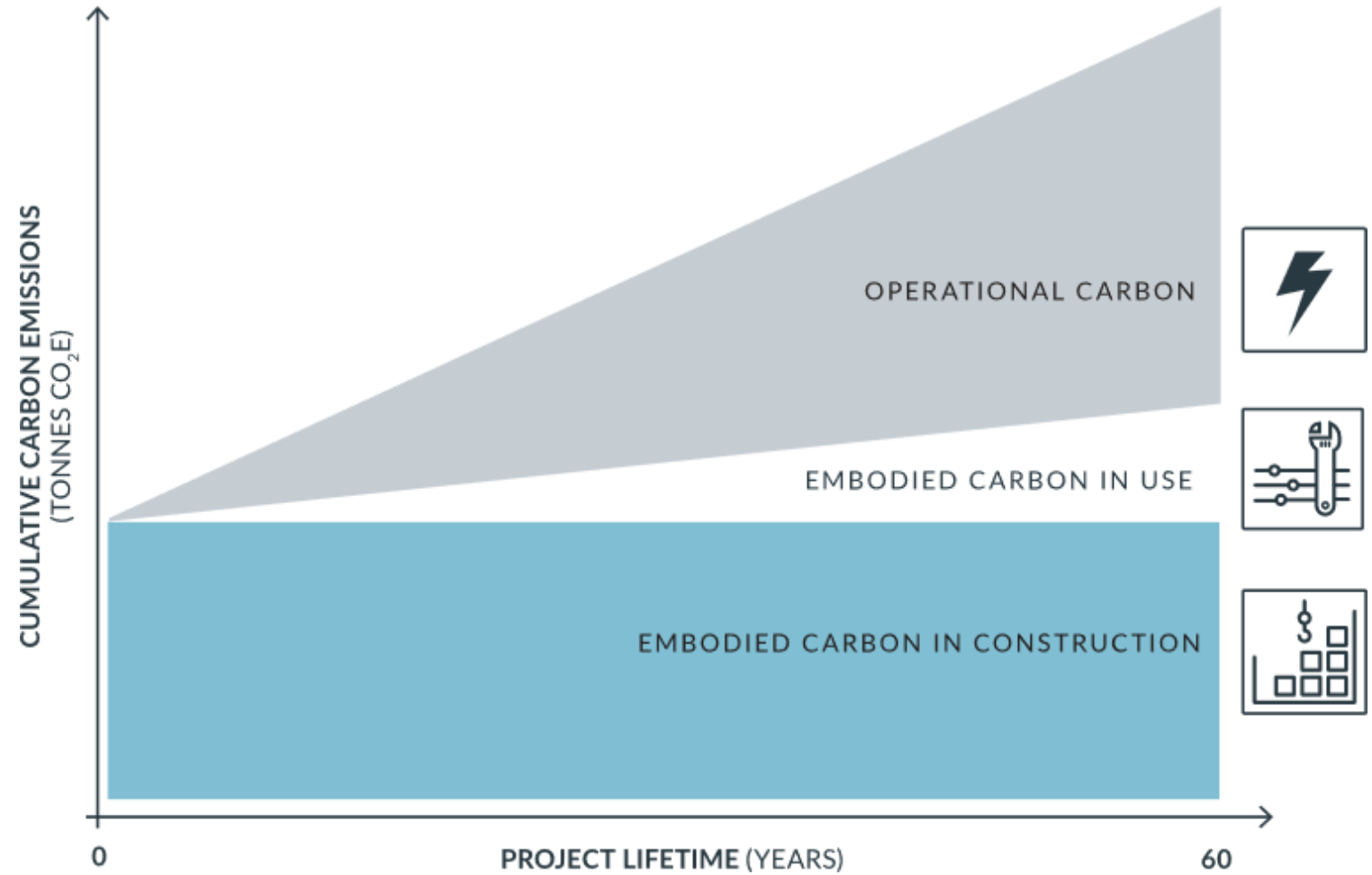
## Defining the scope.

UK-GBC framework defines two potential targets for net zero:

- Net zero carbon in Construction
- Net zero carbon in Operation



# Net Zero Carbon. Whole life assessment.





**‘80% of buildings  
that will exist in  
2050 have already  
been built’.**

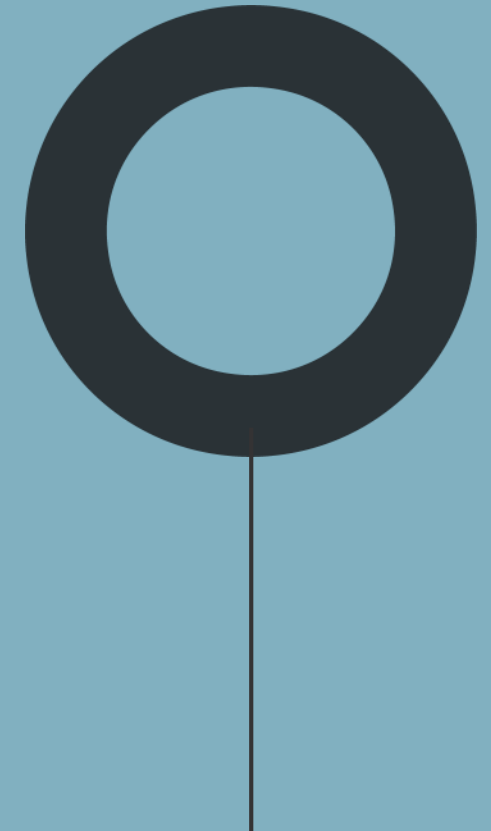
UK GREEN BUILDING COUNCIL

<https://www.ukgbc.org/climate-change/>



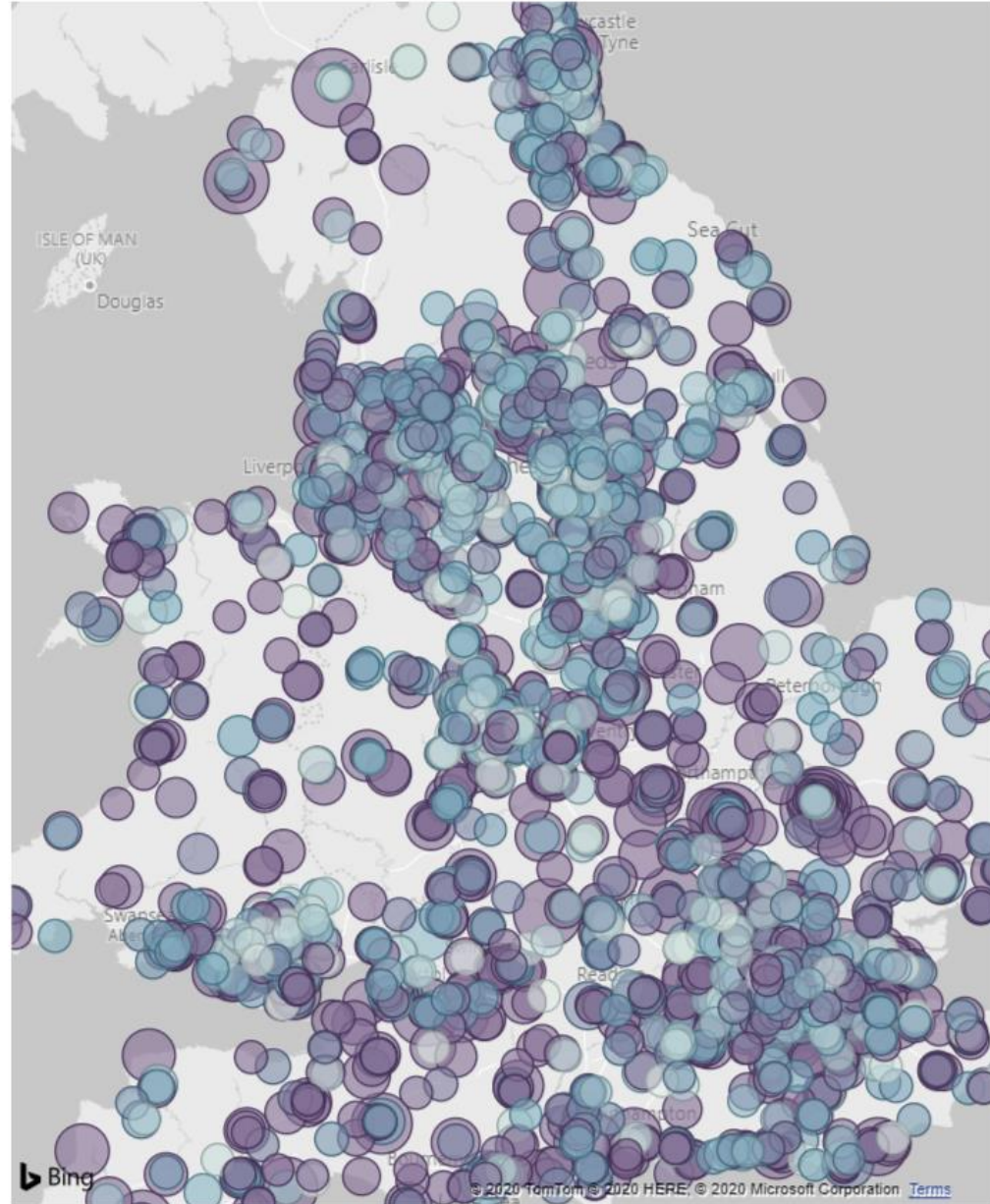
# The scale of the problem.

National Display Energy Certificate Data





H0



Total Floor Area

250.80 280,912.00



Main Benchmark

- Bar, Pub Or Licensed Club
- Clinic
- Covered Car Park
- Cultural Activities
- Dry Sports And Leisure Facility
- Emergency Services
- Entertainment Halls
- Fitness And Health Centre
- General Accommodation
- General Office
- General Retail
- High Street Agency
- Hospital - Clinical And Research
- Hotel
- Laboratory Or Operating Theatre
- Large Non-Food Shop
- Long Term Residential
- Public Buildings With Light Usage
- Public waiting or circulation
- Restaurant
- Schools And Seasonal Public Buildings
- Storage Facility
- Swimming Pool Centre
- Terminal
- University Campus
- Workshop

Main heating Fuel

- Anthracite
- Biogas
- Biomass
- Coal
- District Heating
- Grid Supplied Electricity
- LPG
- Natural Gas
- Oil
- Other

**3.32K**

Average of Total Floor Area

**204.64**

Average of Total Energy Usage (kWh/m2/yr)

**65.28**

Average of Electrical Fuel Usage (kWh/m2/yr)

**139.36**

Average of Thermal Fuel Usage (kWh/m2/yr)

**1.55**

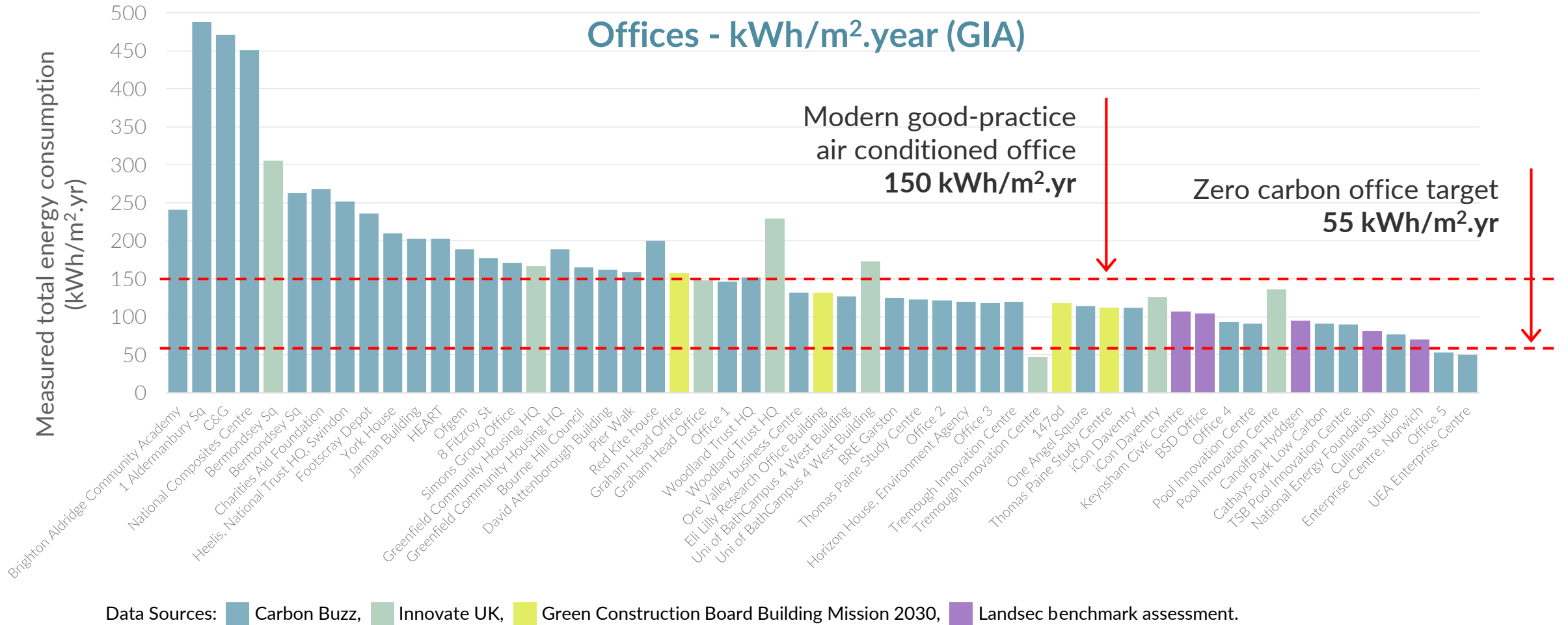
Average of Electric Renewables (kWh/m2/yr)

**0.32**

Average of Thermal Renewables (kWh/m2/yr)

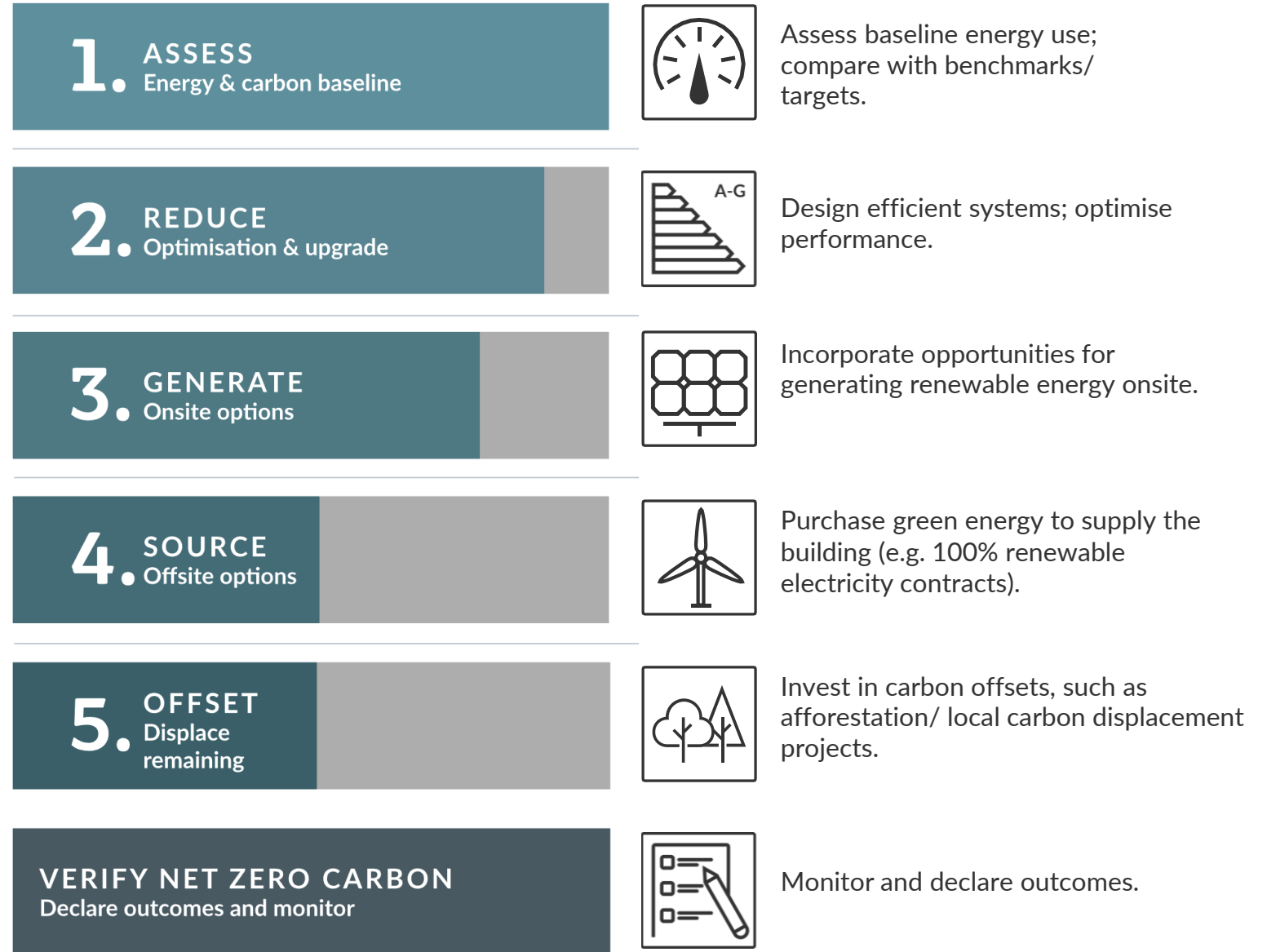


# Office buildings – evidence review of measured energy.



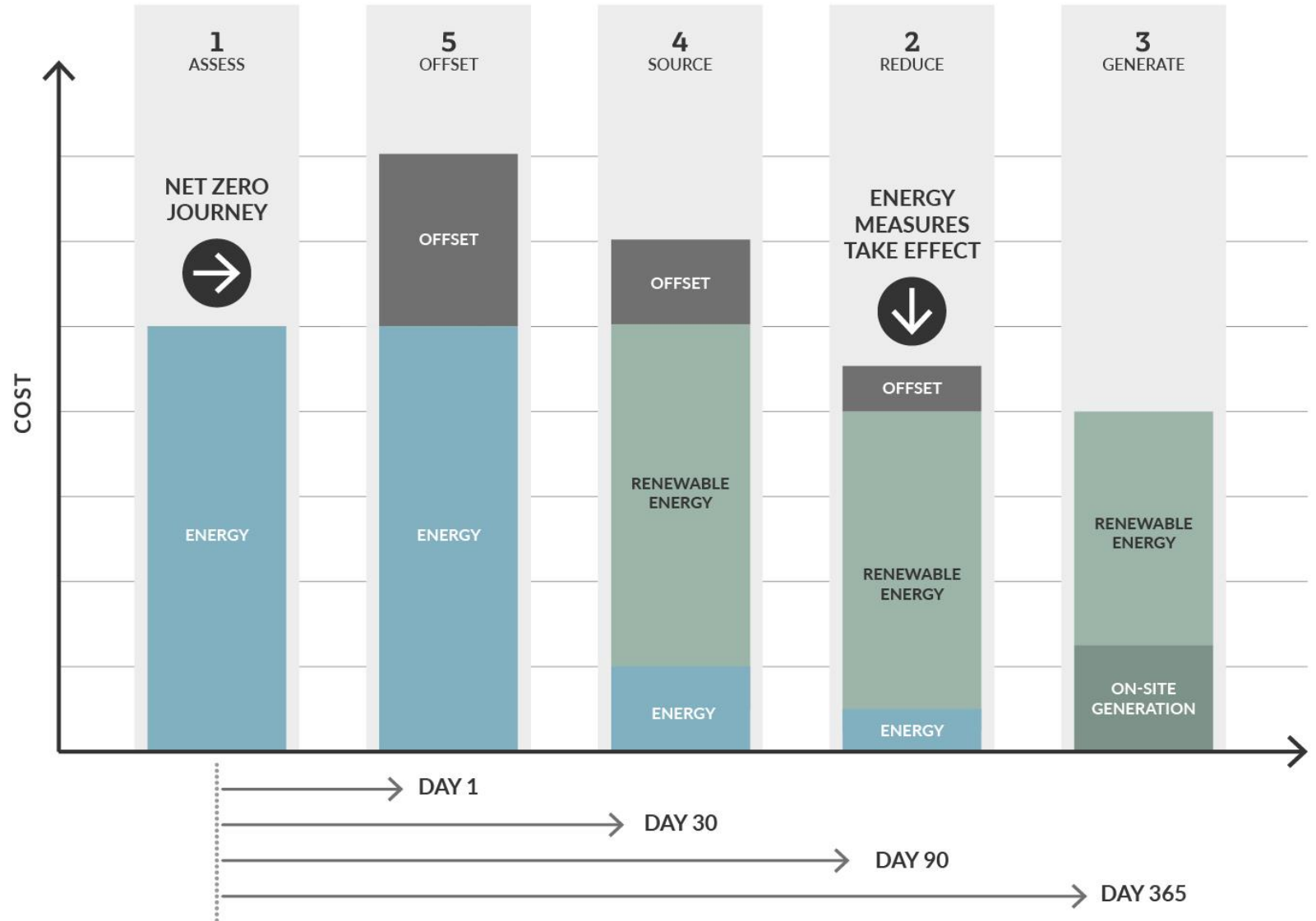
# Getting to zero in operation.

## Follow the process, but...

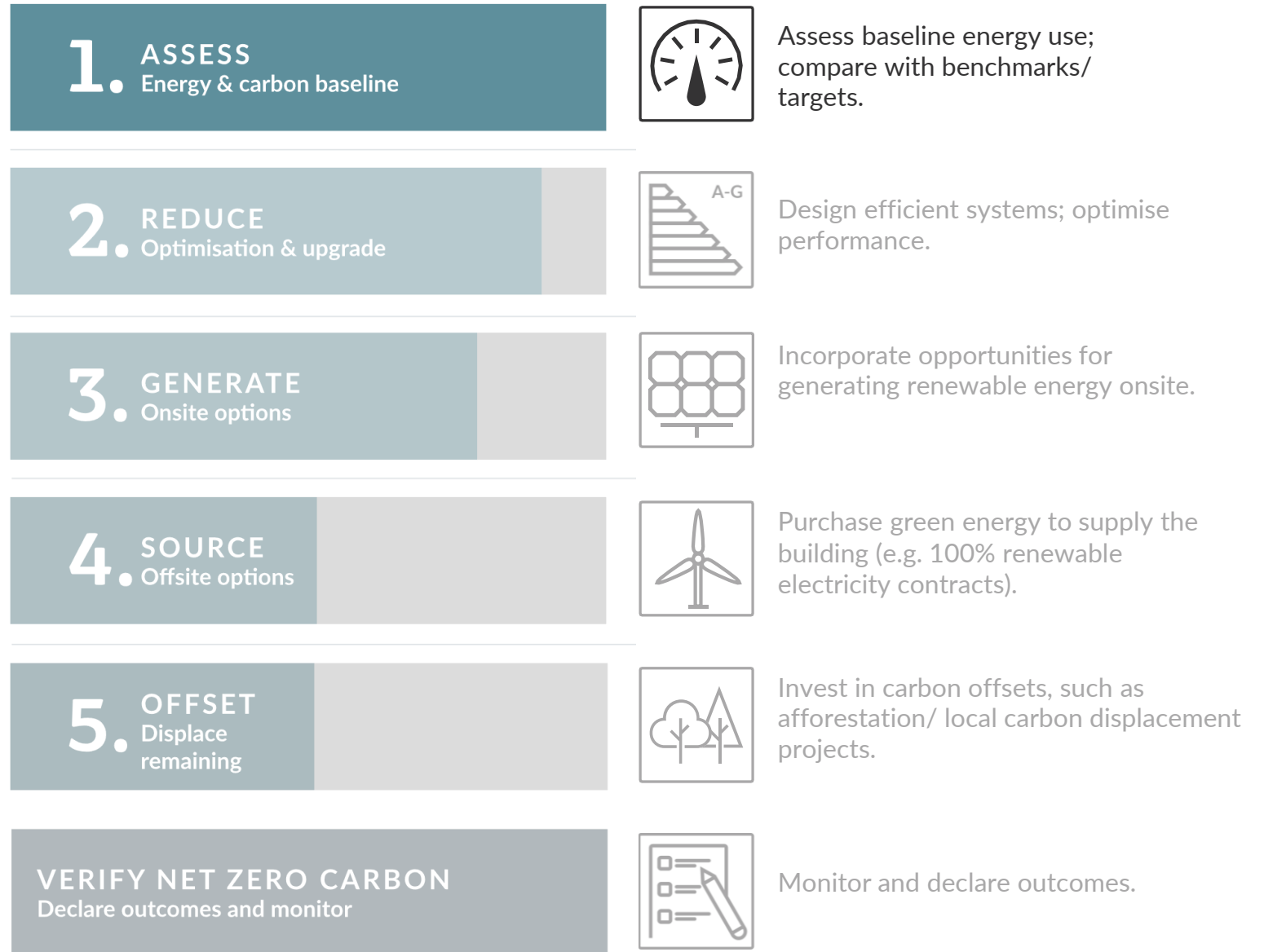


Getting to zero  
in operation.

But not necessarily  
in that order.



# Day 0. Measurement, verification and data analysis.





**Measure, verify & analyse.**  
This will expedite the route  
to net zero & might even  
save you money.

Measured peak load

**21W/m<sup>2</sup>**



Peak power requested

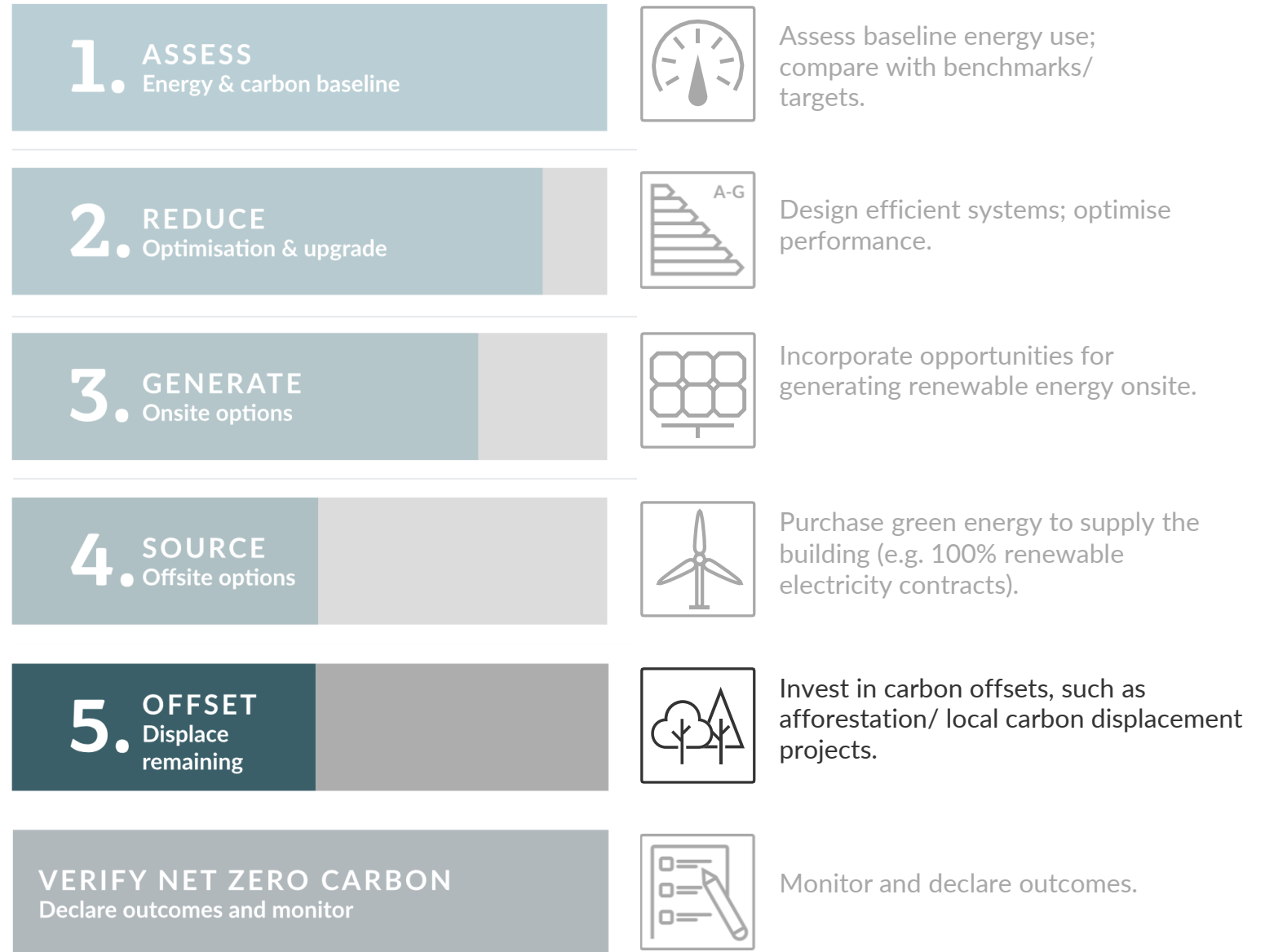
**48W/m<sup>2</sup>**

# Measurement, verification and data analysis.

Metering is **never** perfect at Practical Completion.  
It has to be worked on.



# Day 1. Offsetting.



# Offsetting. Verification.

## Gold Standard

<https://www.goldstandard.org/>

## Verified Carbon Standard

<https://verra.org/project/vcs-program/>

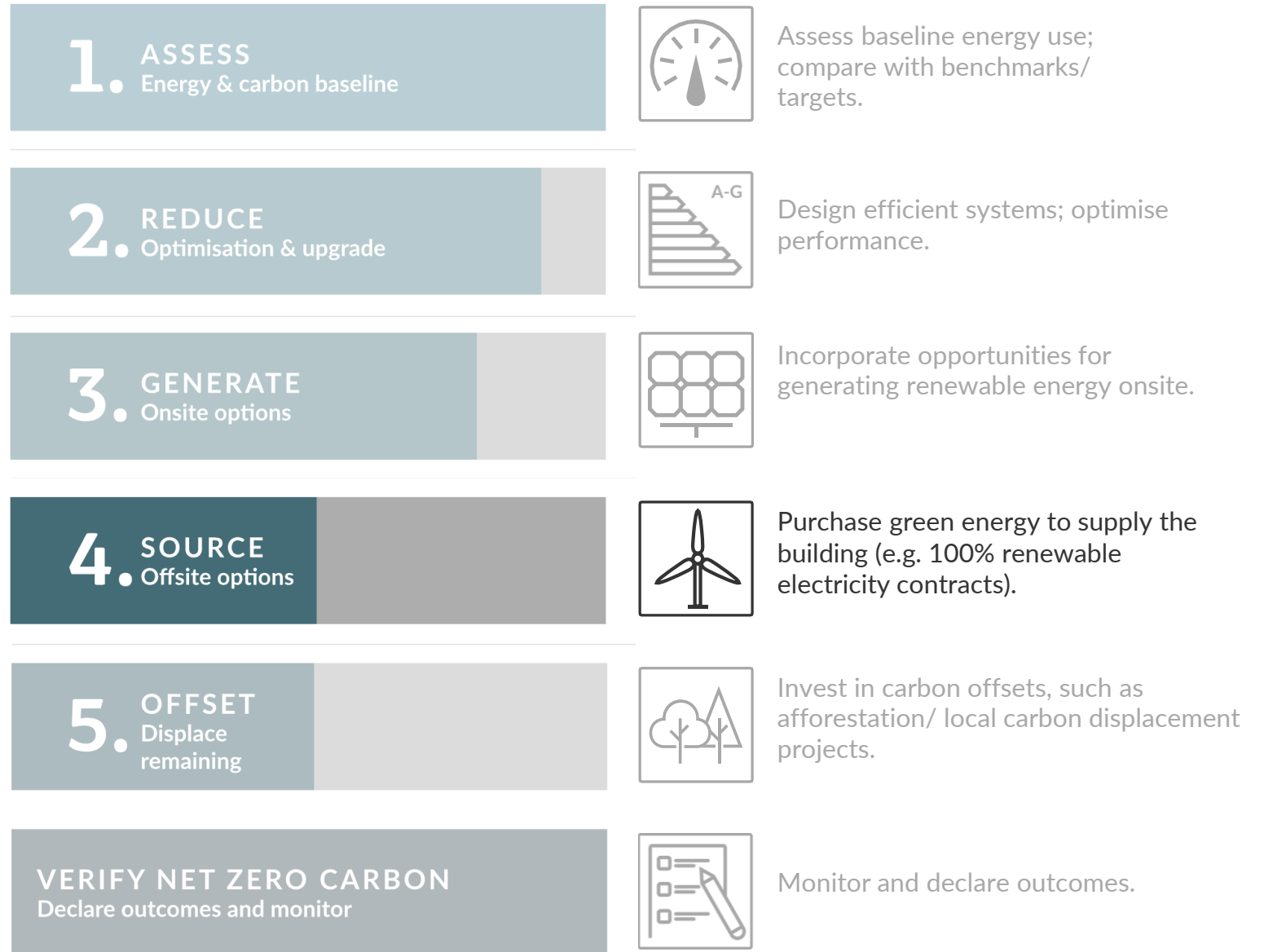




# Offsetting. London plan.



# Day 1 – 30. Renewable energy.





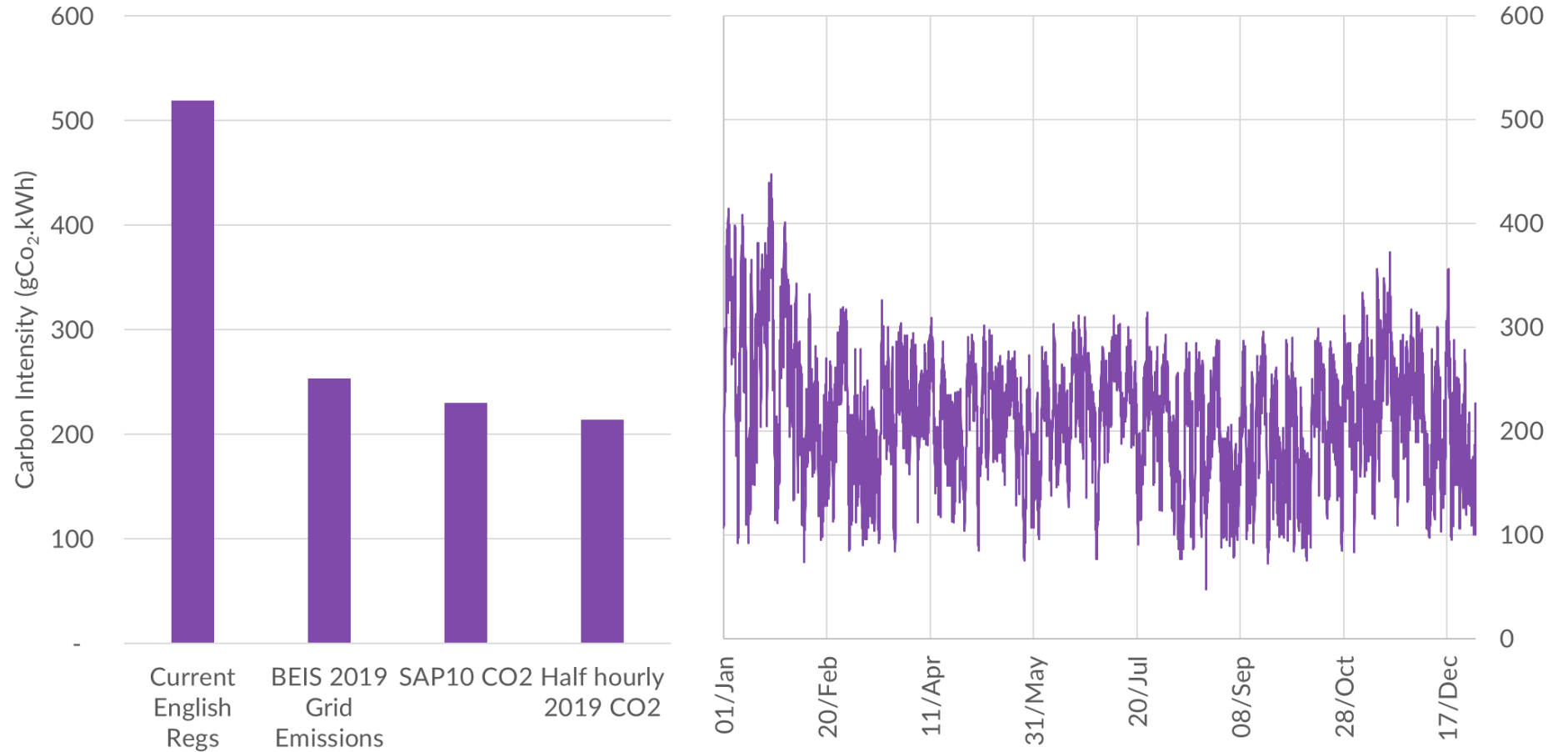
# Renewable energy.

Renewable tariffs

Power purchasing agreements



# Variation in Grid Carbon Intensity.

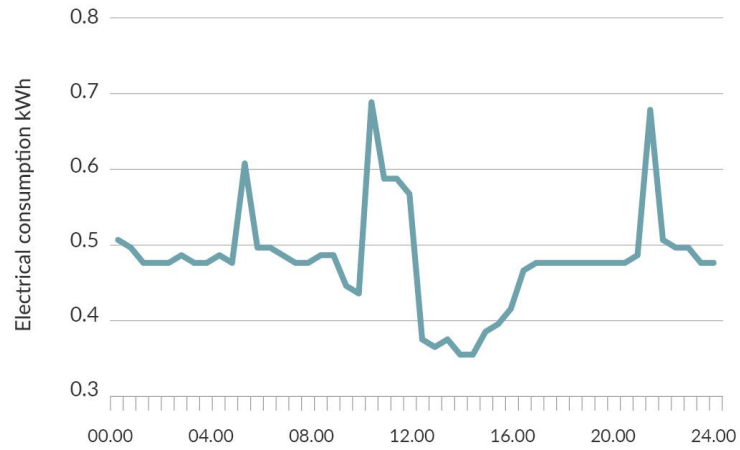


<https://carbonintensity.org.uk/>

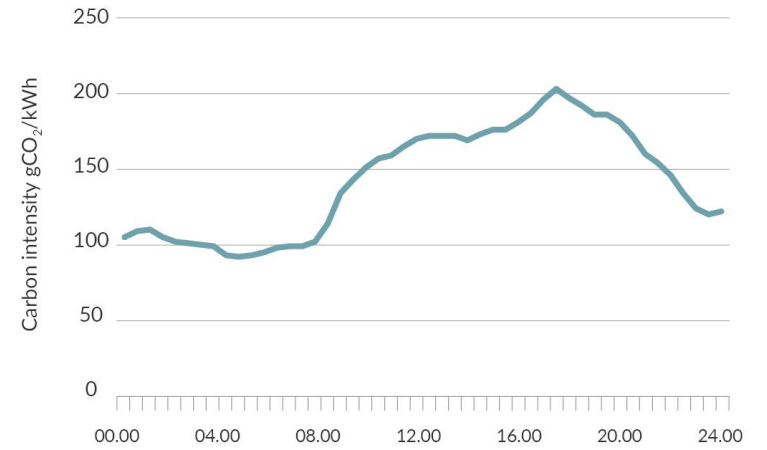


# Grid Carbon Intensity. Load shifting.

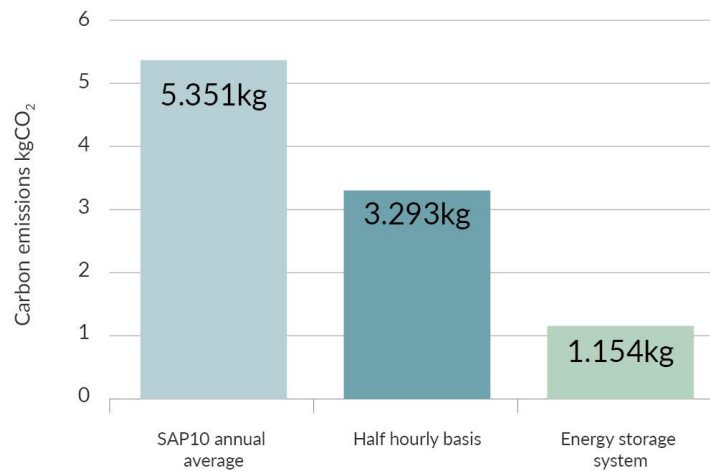
CONSUMPTION



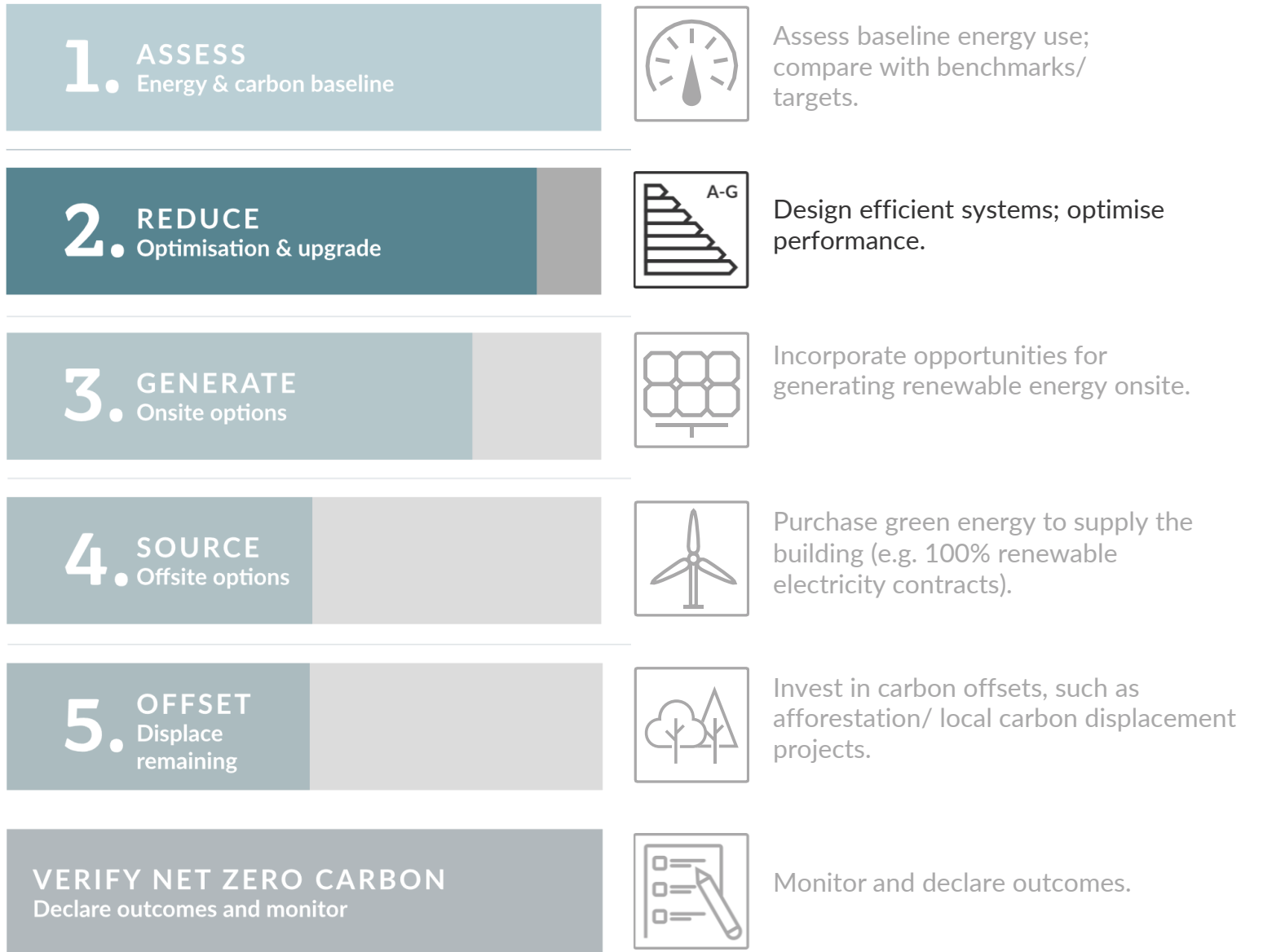
CARBON INTENSITY



CARBON EMITTED IN THE 24HR PERIOD



# Day 1 – 90. Implementing optimisations and upgrades.

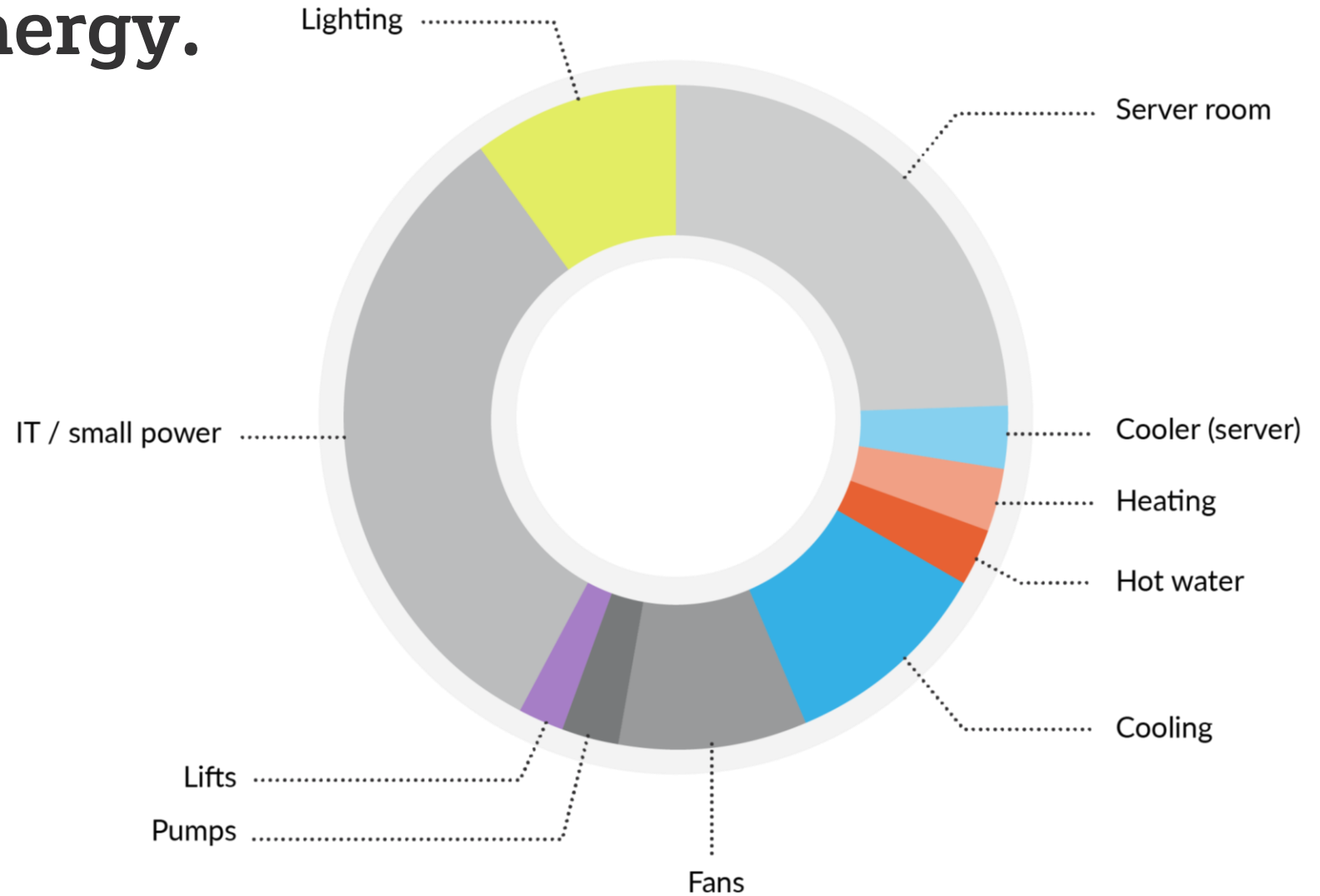


# Don't underestimate the gas grid.

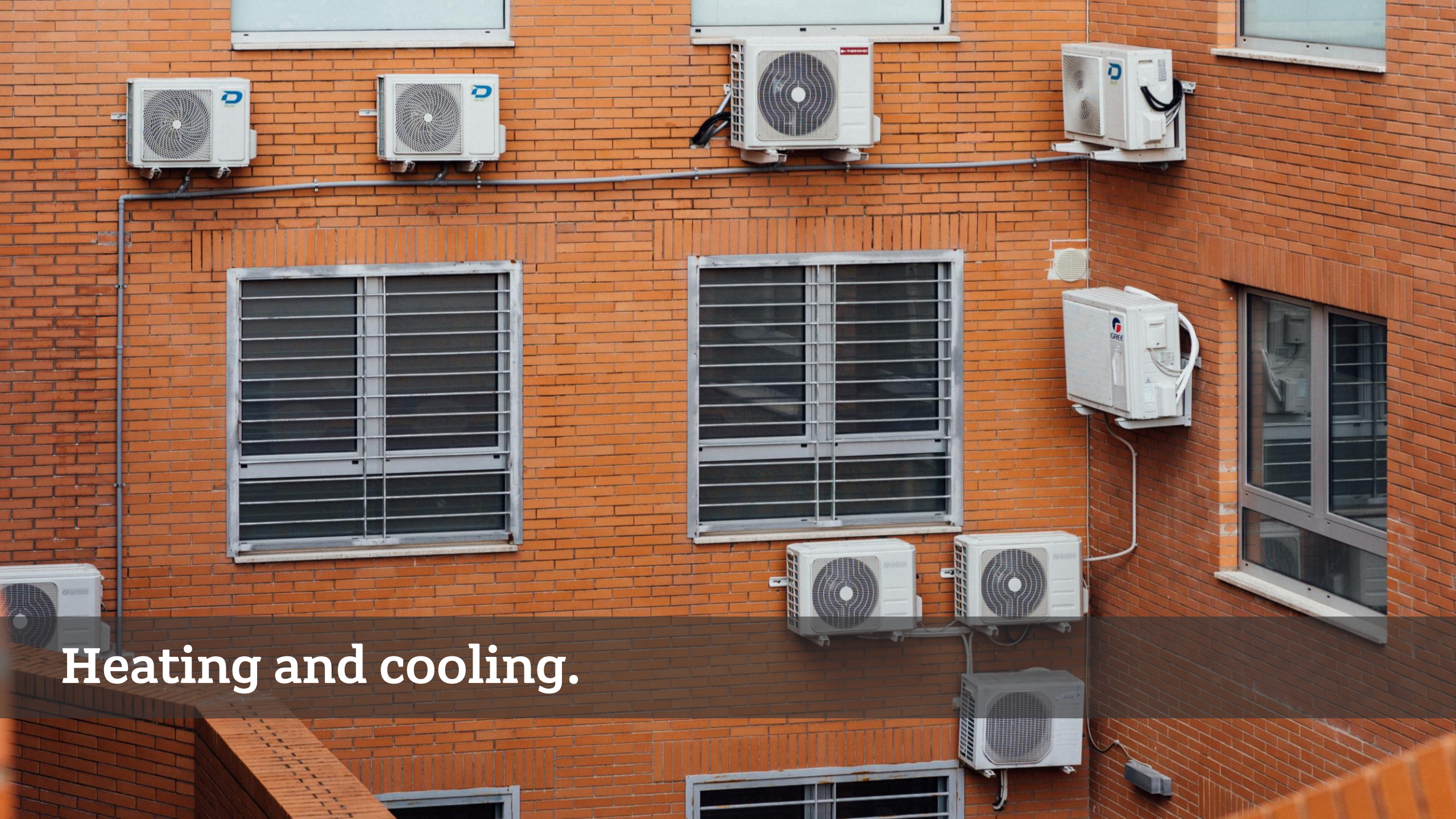
'National Grid plans £10m project to  
test hydrogen heating for UK homes'.



# Operational energy. Office space.

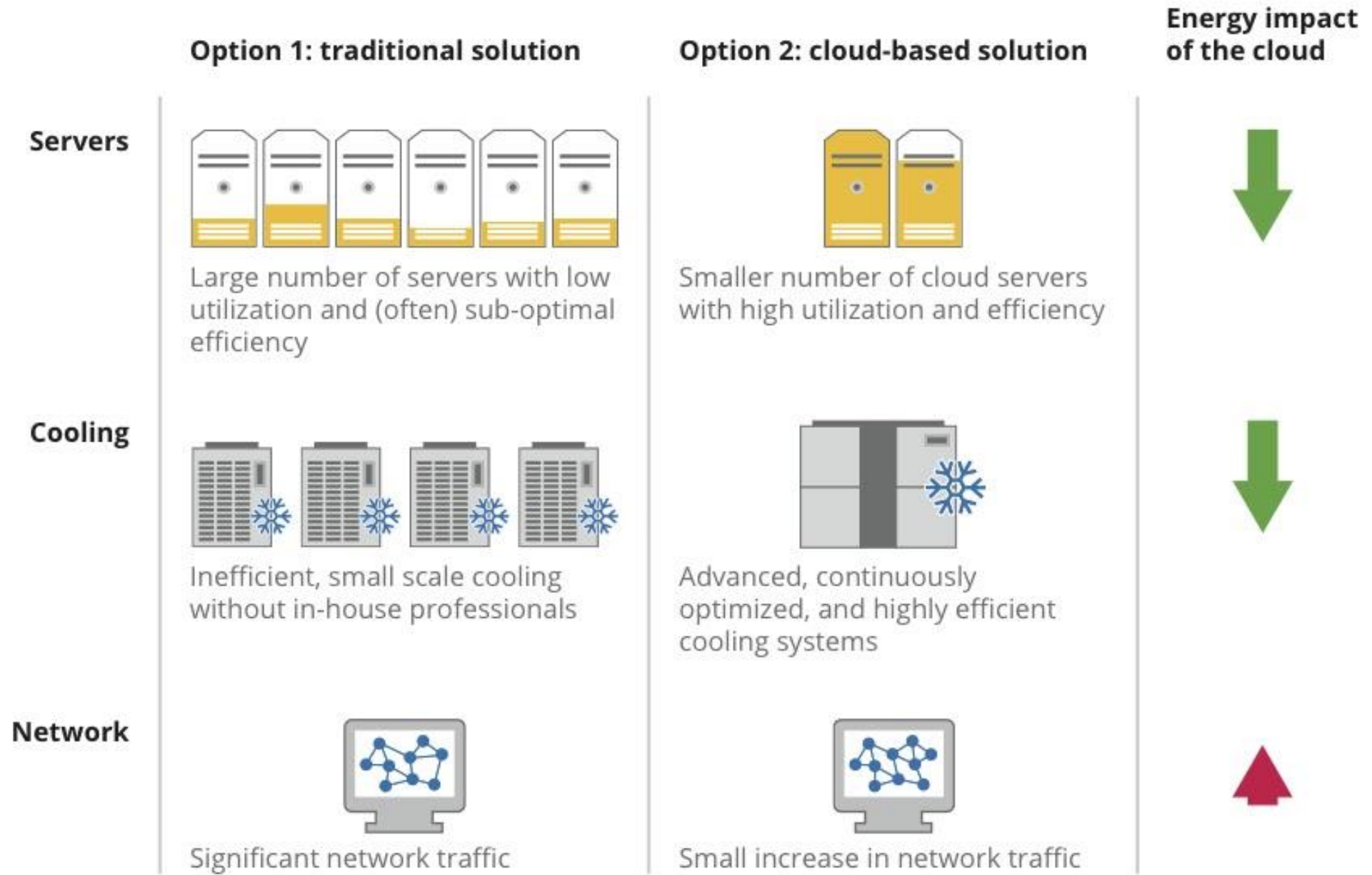




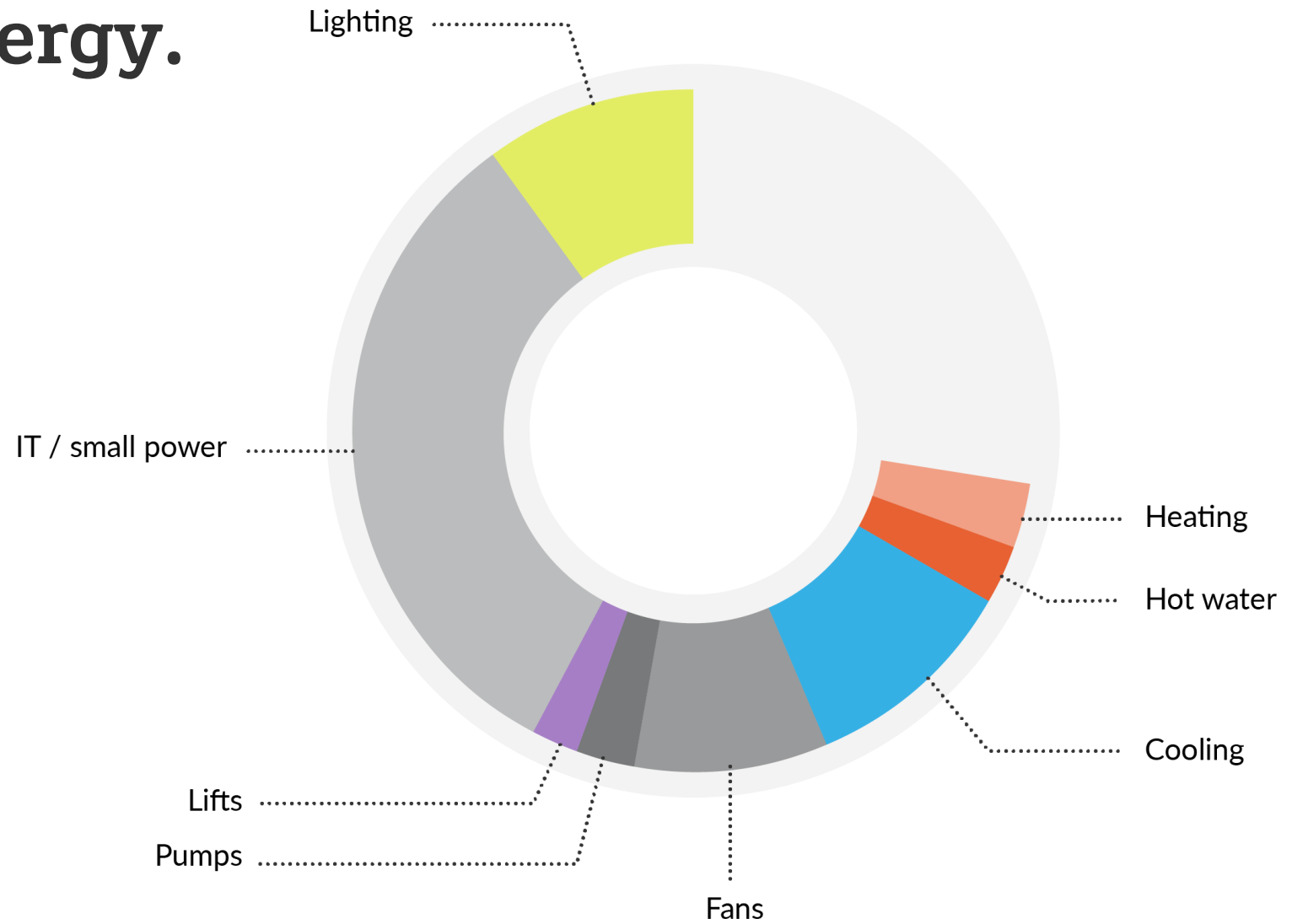


Heating and cooling.

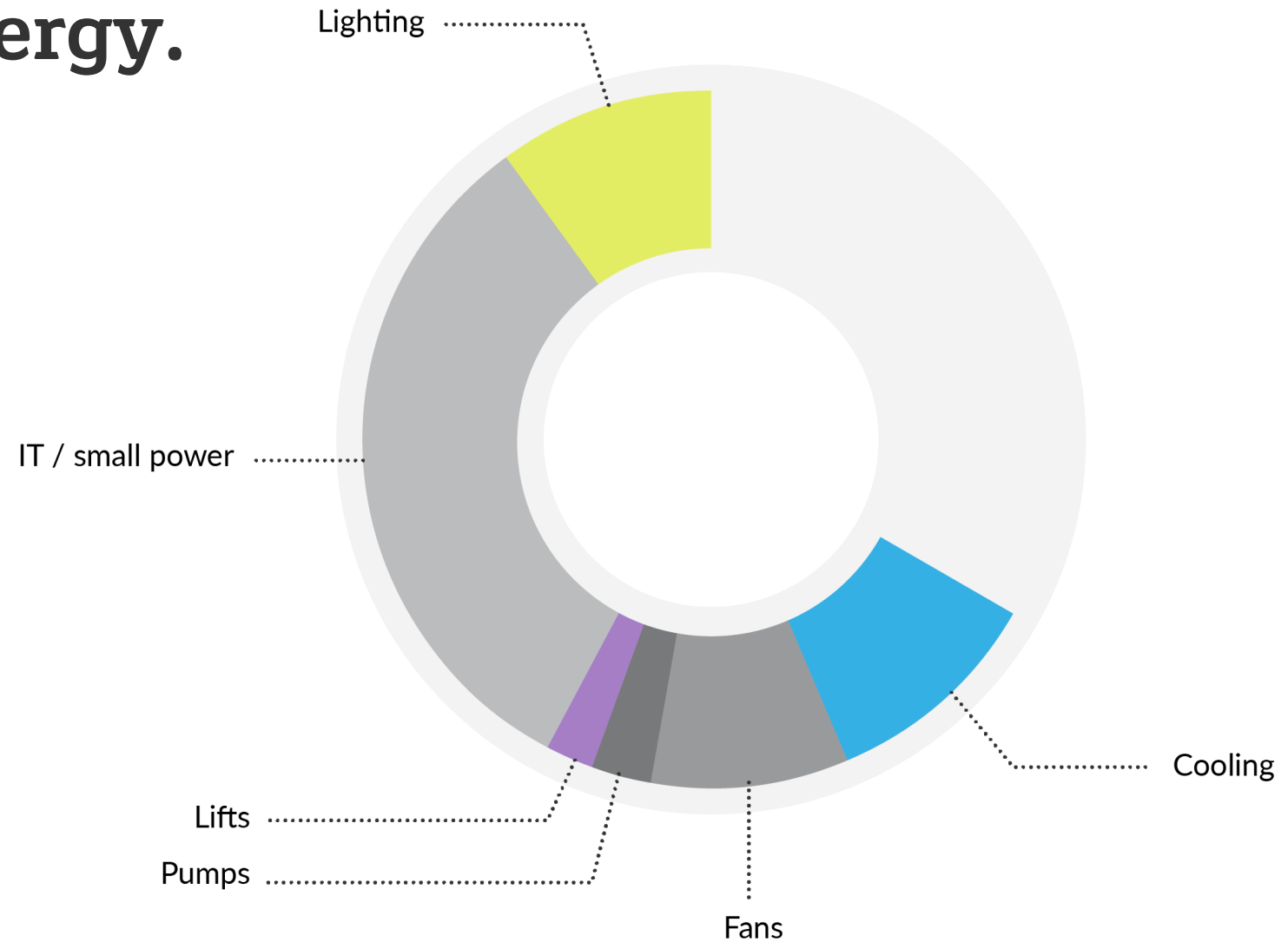




# Operational energy. Office space.



# Operational energy. Office space.



# Moving fluid around a building.

Power  $\propto$  (flow rate)<sup>3</sup>

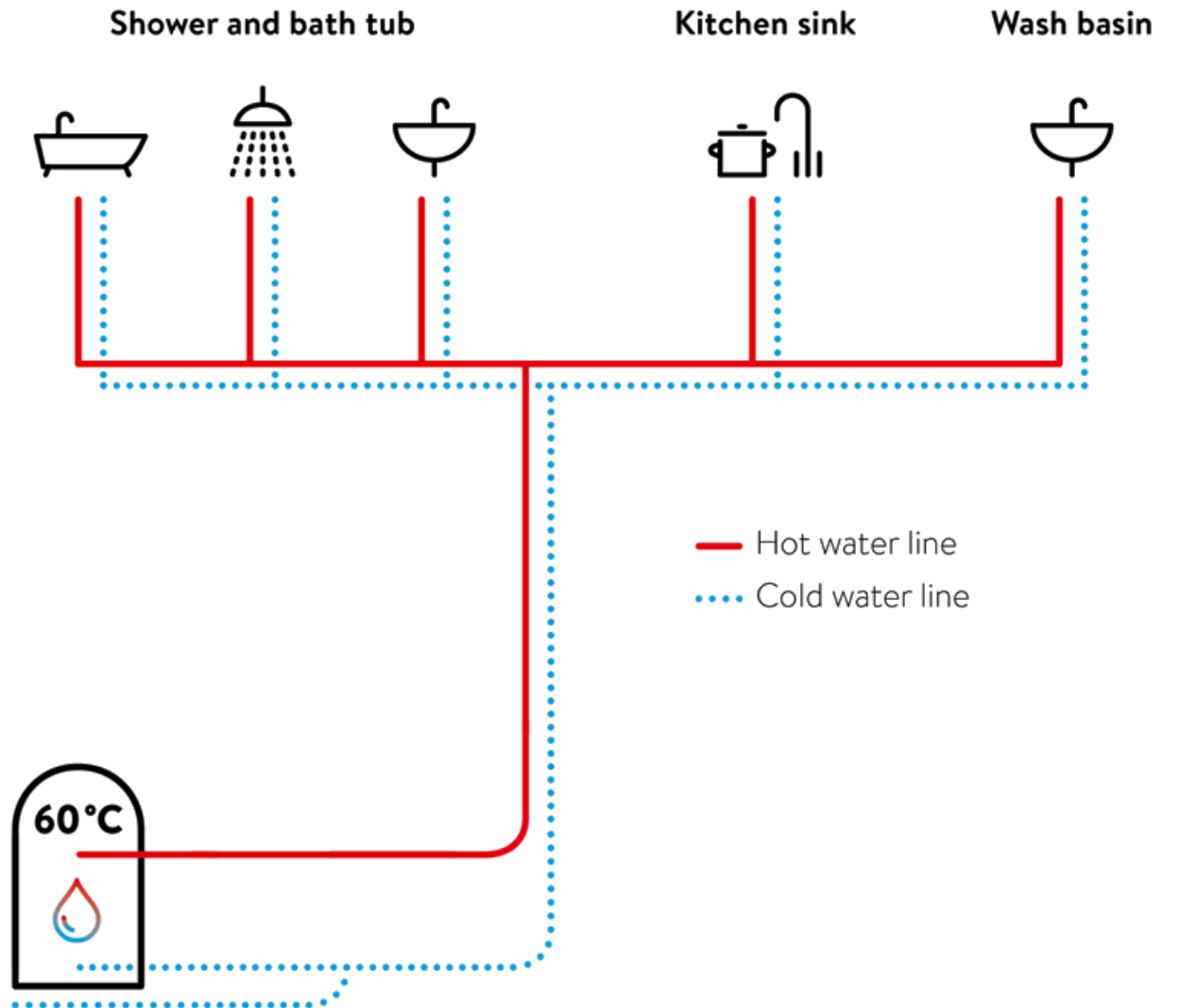
Half flow rate is eighth power.





# Central hot water production.

Not often monitored for efficiency.  
80% of energy can be lost.



## Lifts.

Hall call allocation.



# BURN CALORIES NOT ELECTRICITY

Taking the stairs keeps  
you fit and helps the  
environment!

# Controls.

Key considerations:

- Human-centric approach.
- Optimise CONTINUOUSLY.
- Capture the data.







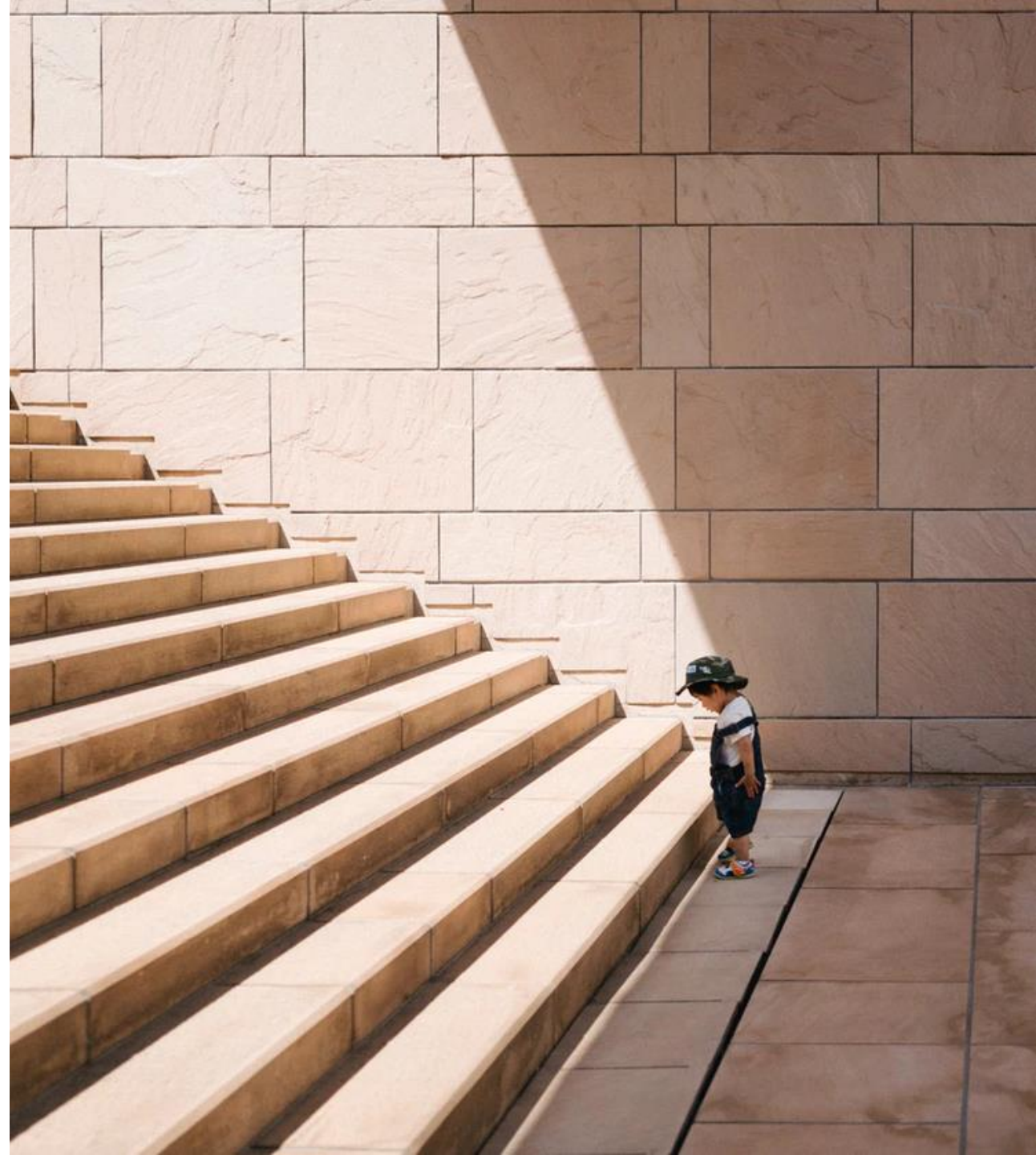
**Day 1 – 365.**  
**On-site generation.**



# Targeting net zero in existing stock.

## Recap.

- Assess the baseline.
- Decide and implement strategy.
- Capture data.
- Optimise continuously.
- Verify.







**Thank you.**  
**hoarelea.com**