

**The new world
of Net Zero Carbon.
New development,
new approach.**

GREG JONES & LAURENCE JOHNSON

DESIGN, UNLEASHED



Welcome.

Net zero carbon.

New development, new approach.



Facilitator
Ashley Bateson
Partner



Presenter
Greg Jones
Associate Director



Presenter
Laurence Johnson
Partner

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

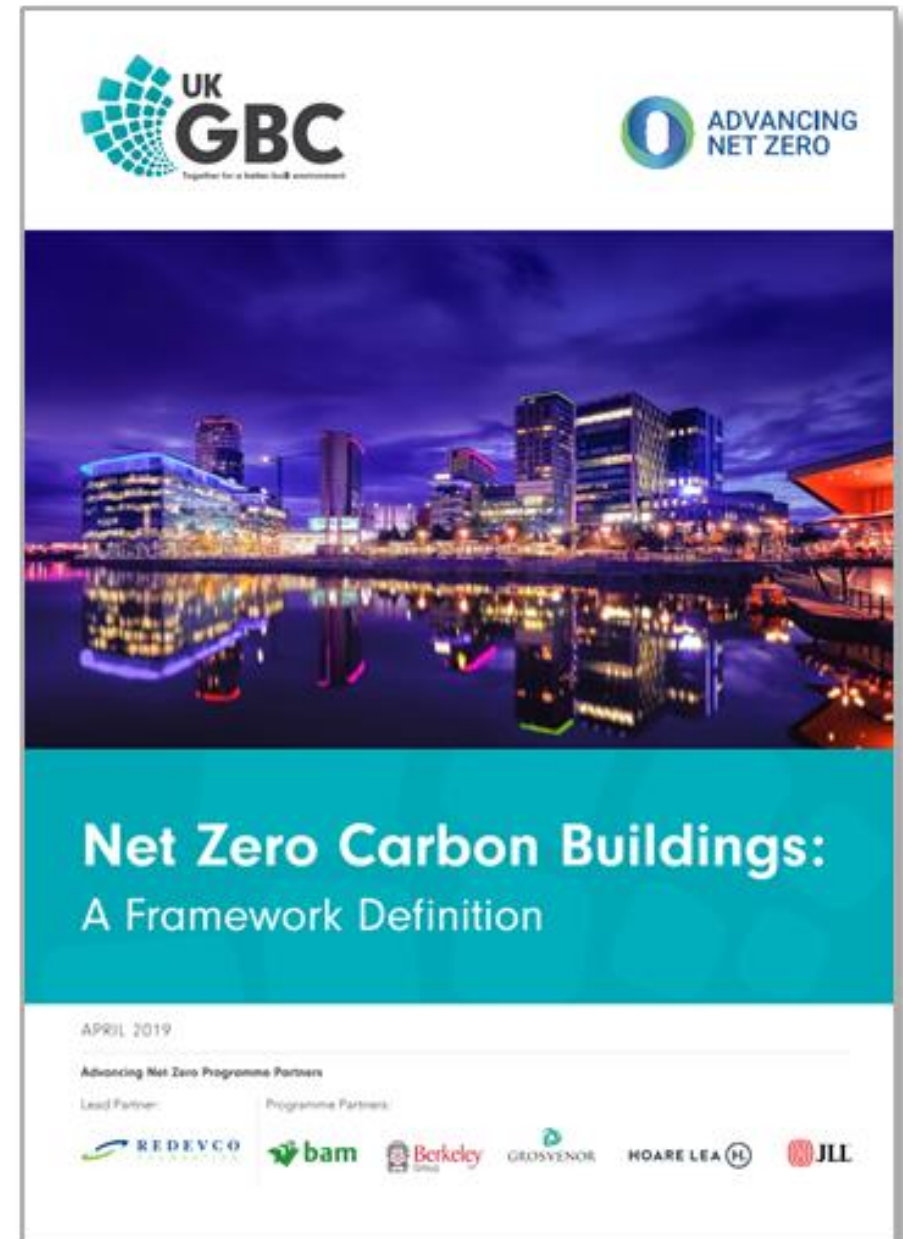
Tuesday 18 August

09.30 Keeping track: governance & management

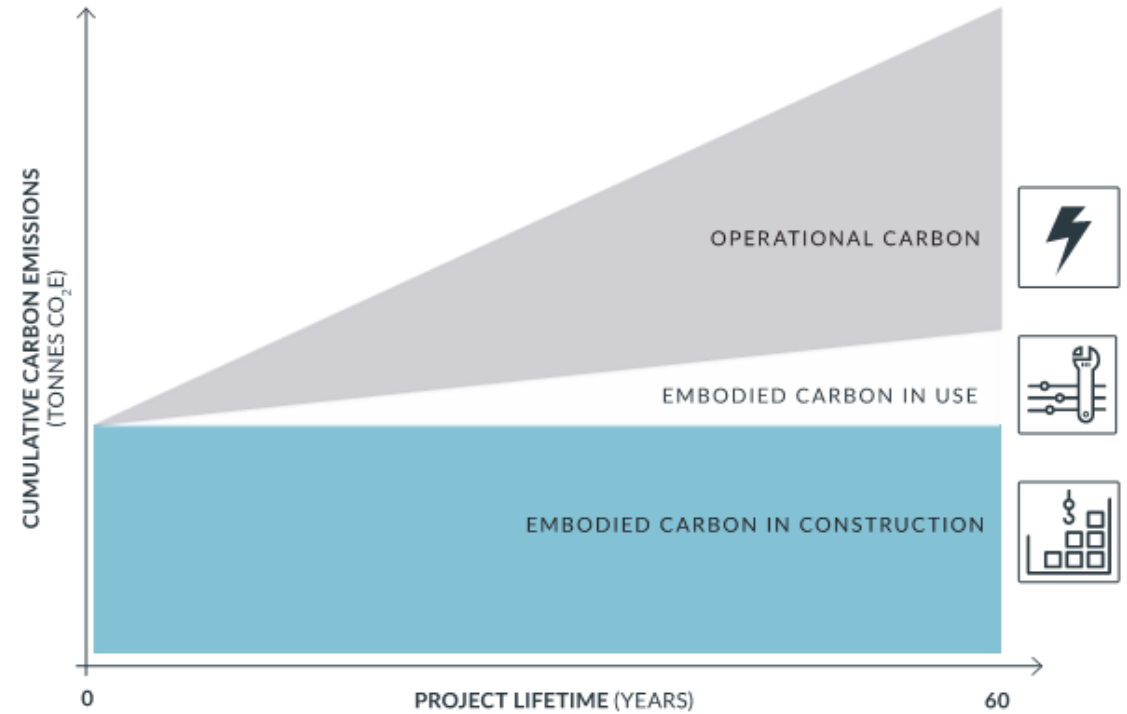
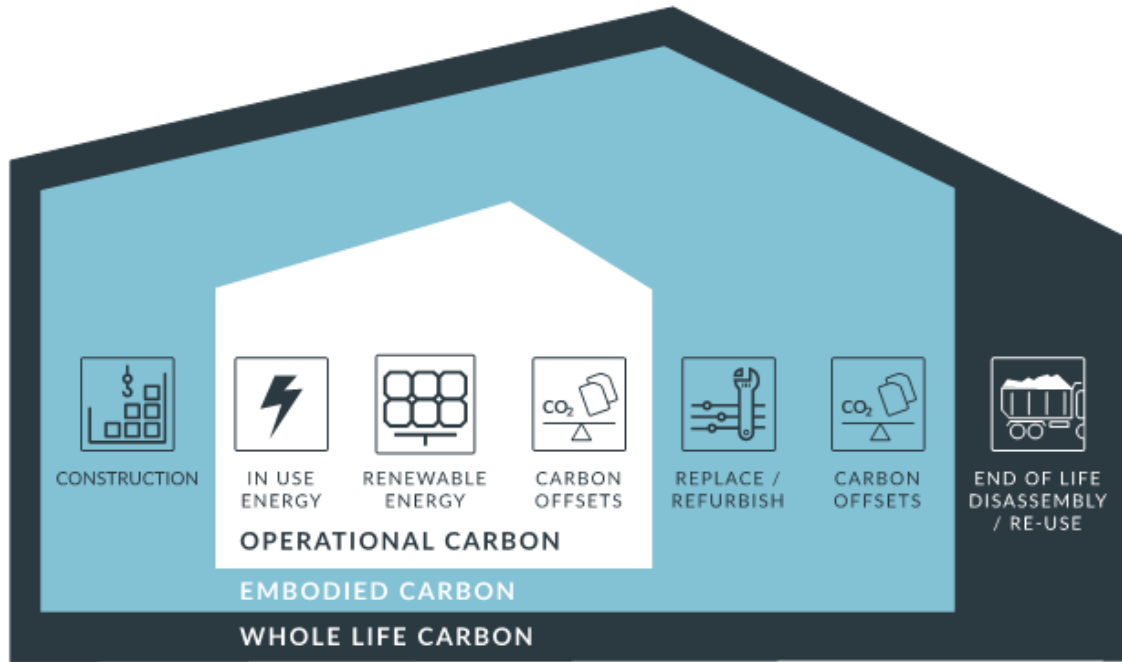
UK-GBC. Advancing Net Zero.

- Hoare Lea are sponsors and steering group partners for the UK-GBC Advancing Net Zero programme.
- Advocating all **new buildings** to be net zero carbon in operation by 2030.

<https://www.ukgbc.org/ukgbc-work/advancing-net-zero/>



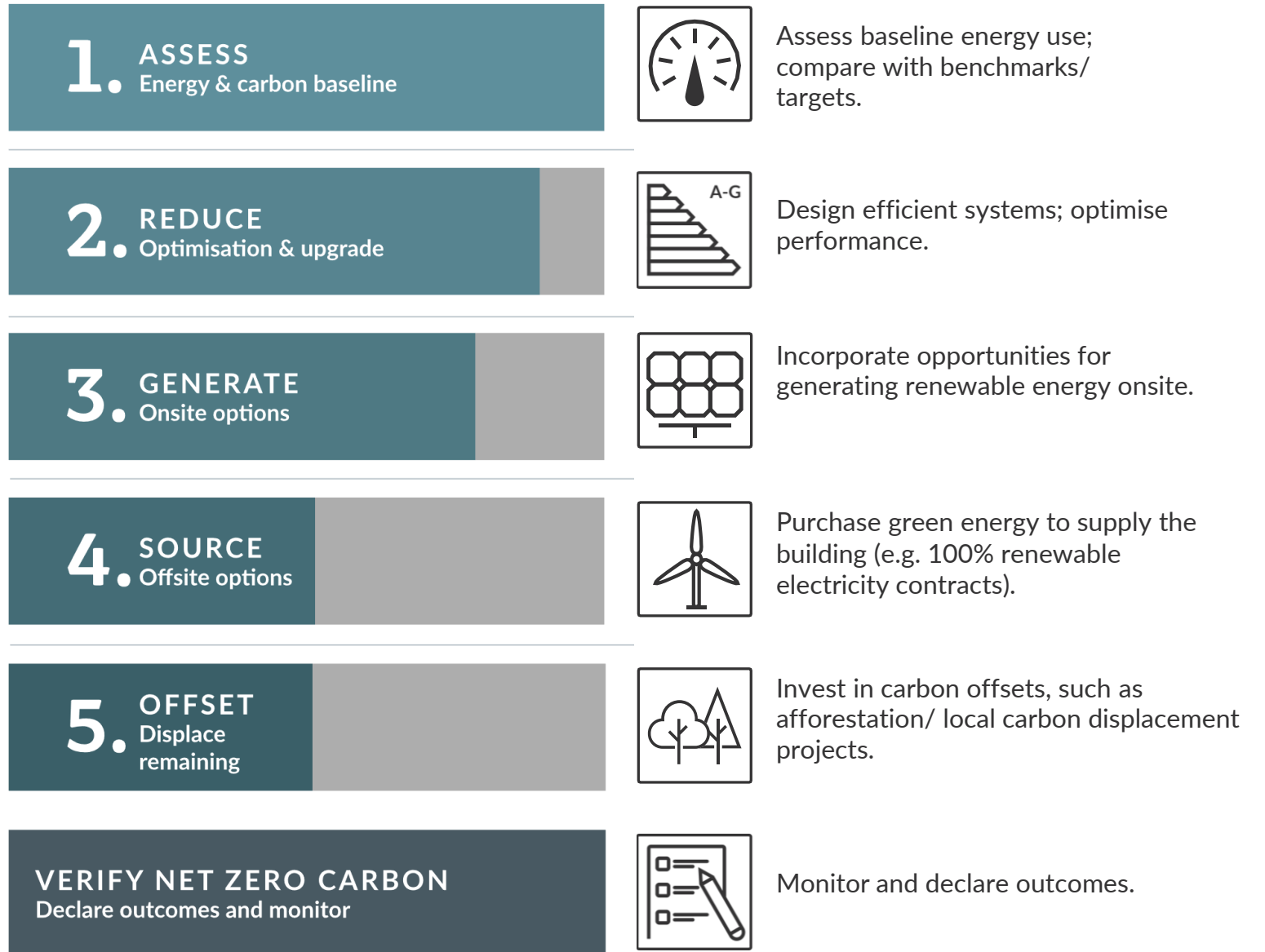
Net Zero Carbon. Our approach.



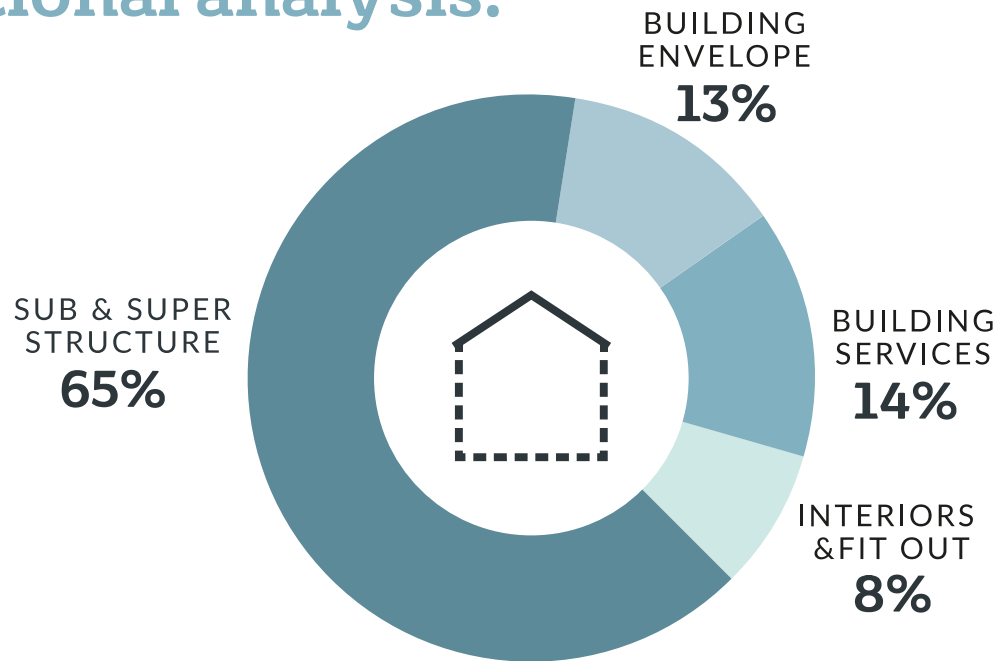
<https://hoarelea.com/specialism/net-zero-carbon/>

Getting to zero in operation.

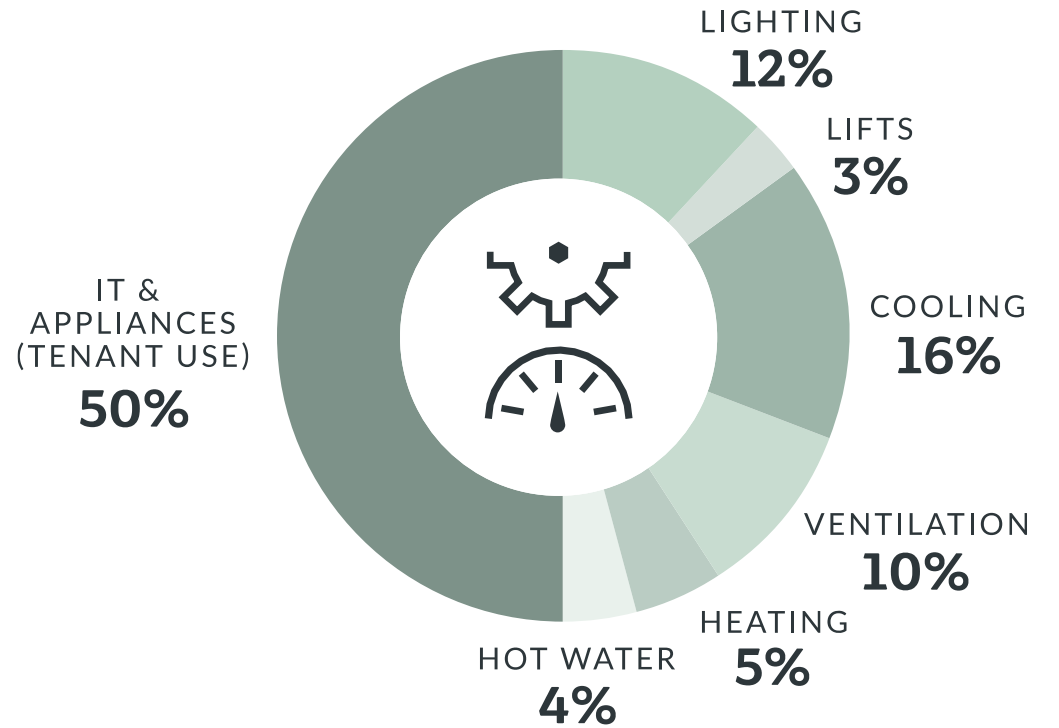
Follow the energy hierarchy.



Net Zero Carbon. Embodied and operational analysis.



Embodied carbon




Operational carbon

RIBA 2030 Climate Challenge.

RIBA 2030 Climate Challenge target metrics for domestic buildings

RIBA Sustainable Outcome Metrics	Current Benchmarks	2020 Targets	2025 Targets	2030 Targets
Operational Energy kWh/m ² /y 	146 kWh/m ² /y (Ofgem benchmark)	< 105 kWh/m ² /y	< 70 kWh/m ² /y	< 0 to 35 kWh/m ² /y
Embodied Carbon kgCO ₂ e/m ² 	1000 kgCO ₂ e/m ² (M4i benchmark)	< 600 kgCO ₂ e/m ²	< 450 kgCO ₂ e/m ²	< 300 kgCO ₂ e/m ²


RIBA 2030 Climate Challenge target metrics for non-domestic buildings

RIBA Sustainable Outcome Metrics	Current Benchmarks	2020 Targets	2025 Targets	2030 Targets
Operational Energy kWh/m ² /y 	225 kWh/m ² /y DEC D rated (CIBSE TM46 benchmark)	< 170 kWh/m ² /y DEC C rating	< 110 kWh/m ² /y DEC B rating	< 0 to 55 kWh/m ² /y DEC A rating
Embodied Carbon kgCO ₂ e/m ² 	1100 kgCO ₂ e/m ² (M4i benchmark)	< 800 kgCO ₂ e/m ²	< 650 kgCO ₂ e/m ²	< 500 kgCO ₂ e/m ²

RIBA
2030
CLIMATE
CHALLENGE



Sign up to take the RIBA 2030 Climate Challenge at www.architecture.com/2030challenge

RIBA 
Architecture.com

LETI.

London Energy Transformation Initiative.

Ten key requirements for new buildings

By 2030 all new buildings must operate at net zero to meet our climate change targets. This means that by 2025 all new buildings will need to be designed to meet these targets. This page sets out the approach to operational carbon that will be necessary to deliver zero carbon buildings. For more information about any of these requirements and how to meet them, please refer to the: UKGBC - Net Zero Carbon Buildings Framework; BBP - Design for Performance initiative; RIBA - 2030 Climate Challenge; GH A - Net Zero Housing Project Map; CIBSE - Climate Action Plan; and, LETI - Climate Emergency Design Guide.

Low energy use

- 1** Total Energy Use Intensity (EUI) - Energy use measured at the meter should be equal to or less than:

 - **35 kWh/m²/yr** (GIA) for residential¹

For non-domestic buildings a minimum DEC B (40) rating should be achieved and/or an EUI equal or less than:

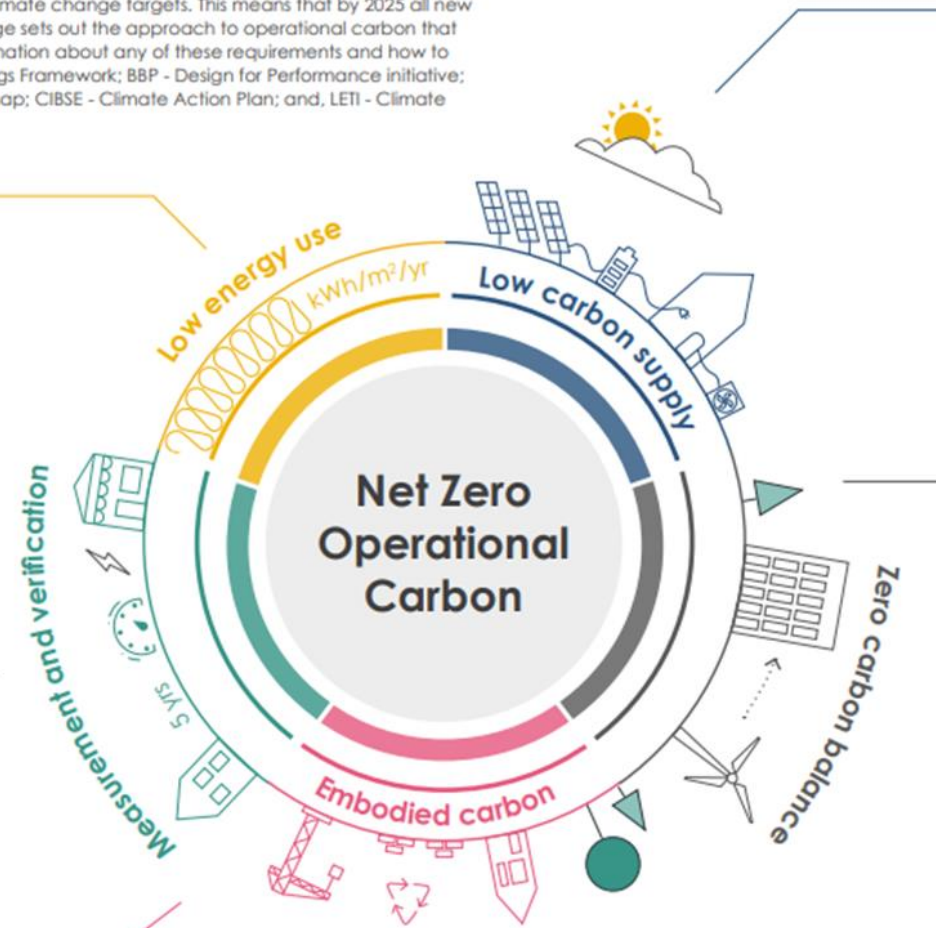
 - **65 kWh/m²/yr** (GIA) for schools¹
 - **70 kWh/m²/yr** (NLA) or **55 kWh/m²/yr** (GIA) for commercial offices^{1,2}
- 2** Building fabric is very important therefore space heating demand should be less than **15 kWh/m²/yr** for all building types.

Measurement and verification

- 3** Annual energy use and renewable energy generation on-site must be reported and independently verified in-use each year for the first 5 years. This can be done on an aggregated and anonymised basis for residential buildings.

Reducing construction impacts

- 4** Embodied carbon should be assessed, reduced and verified post-construction.³



Low carbon energy supply

- 5** Heating and hot water should not be generated using fossil fuels.
- 6** The average annual carbon content of the heat supplied (gCO₂/kWh) should be reported.
- 7** On-site renewable electricity should be maximised.
- 8** Energy demand response and storage measures should be incorporated and the building annual peak energy demand should be reported.

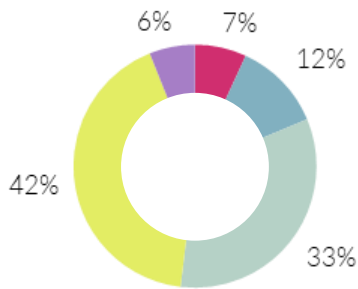
Zero carbon balance

- 9** A carbon balance calculation (on an annual basis) should be undertaken and it should be demonstrated that the building achieves a net zero carbon balance.
- 10** Any energy use not met by on-site renewables should be met by an investment into additional renewable energy capacity off-site OR a minimum 15 year renewable energy power purchase agreement (PPA). A green tariff is not robust enough and does not provide 'additional' renewables.

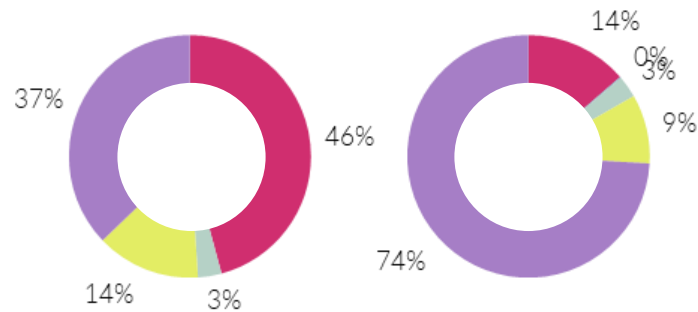
Net Zero Carbon Operational.

Understanding the challenge (regulated carbon emissions):

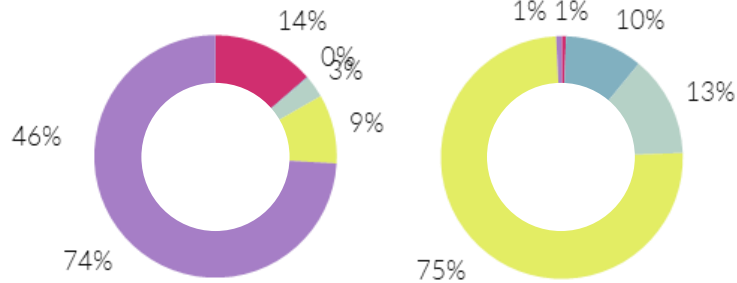
- Heating
- Cooling
- Auxiliary
- Lighting
- Hot Water



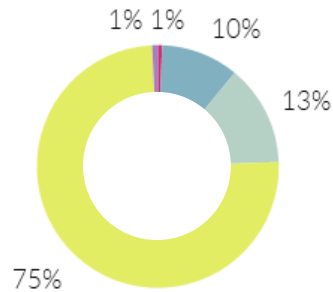
Offices



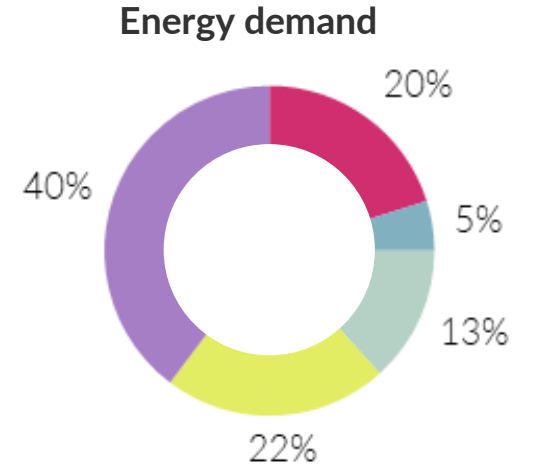
Residential



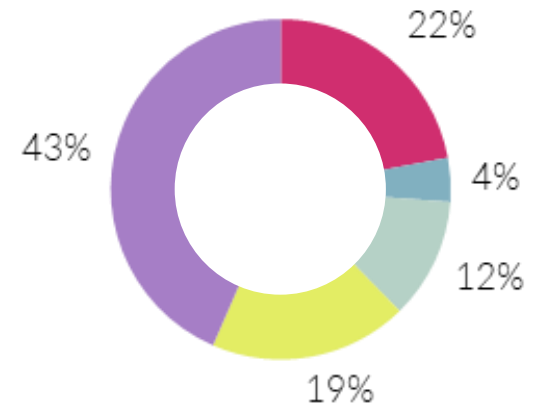
Hotel



Retail (A1)



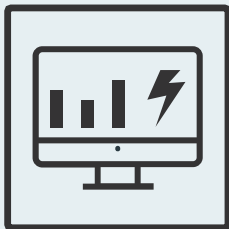
Carbon emissions



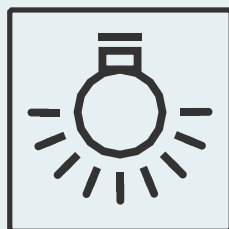
Net Zero Carbon Operational.

Key opportunities:

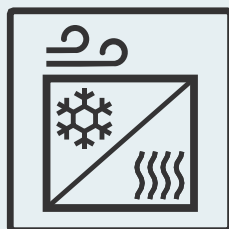
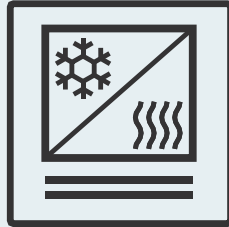
Source &
management



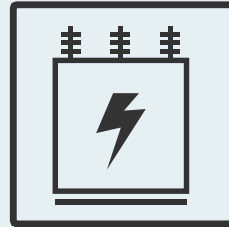
Demand
reduction



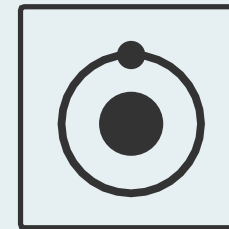
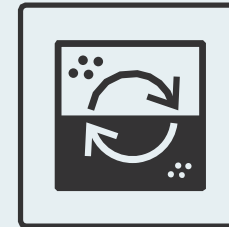
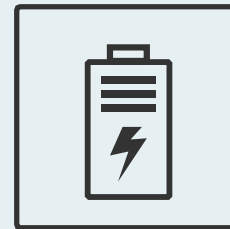
Heat
pumps



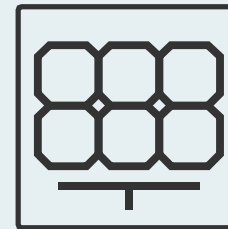
Reclaim &
sharing



Energy storage
options



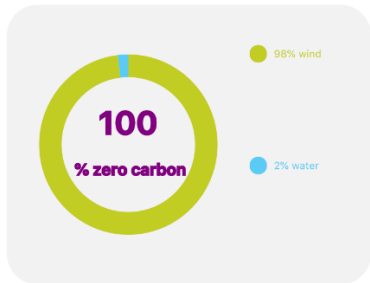
Buildings as
generators



Grid performance. Today.

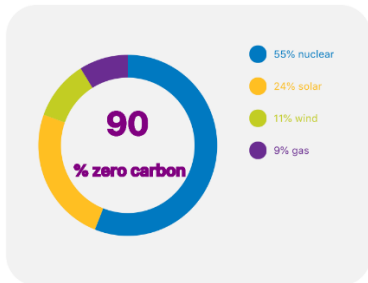
North Scotland

Current Carbon Intensity
0
gCO₂/kWh



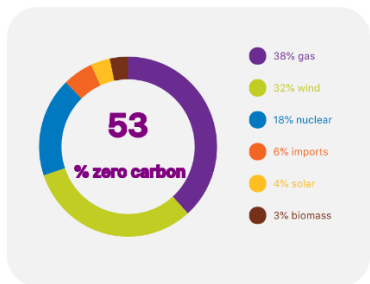
South West England

Current Carbon Intensity
37
gCO₂/kWh



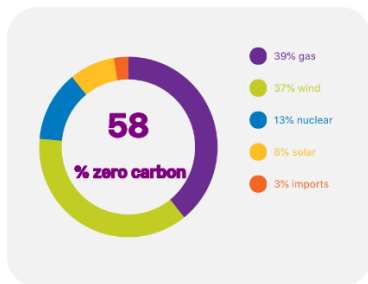
London





Current Carbon Intensity
159
gCO₂/kWh



South Wales

Current Carbon Intensity
163
gCO₂/kWh

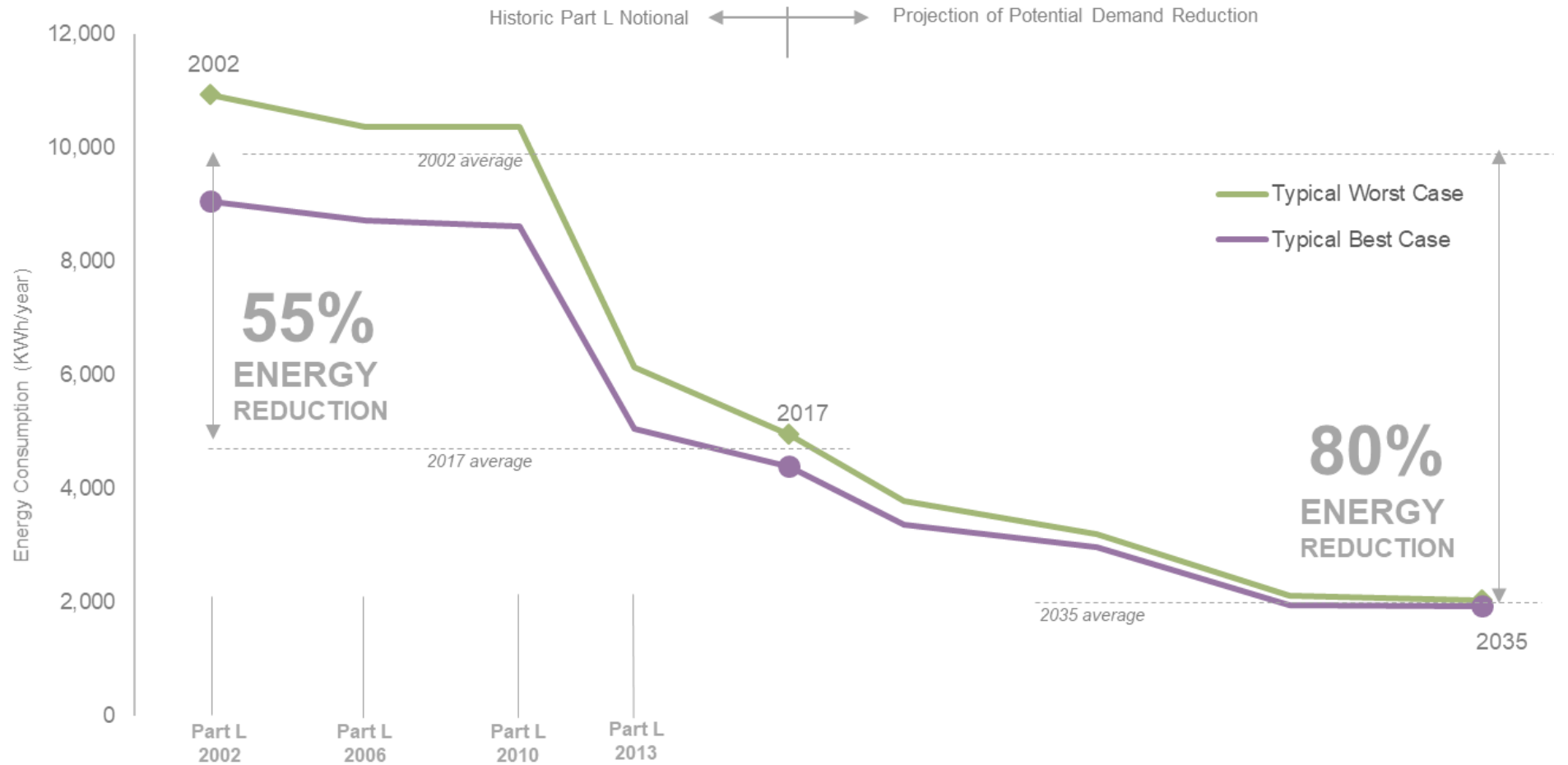


	Record	Date	Value
	Max Wind	Jan 02 2020	17129 MW
	Max Solar	Apr 20 2020	9680 MW
	Max No Coal	May 21 2020	1007 Hours
	Min Gas	Oct 24 2013	1556 MW
	Min Carbon Intensity	Aug 17 2019	57 gCO ₂ /kWh
	Low Carbon	Aug 17 2019	87.9 %



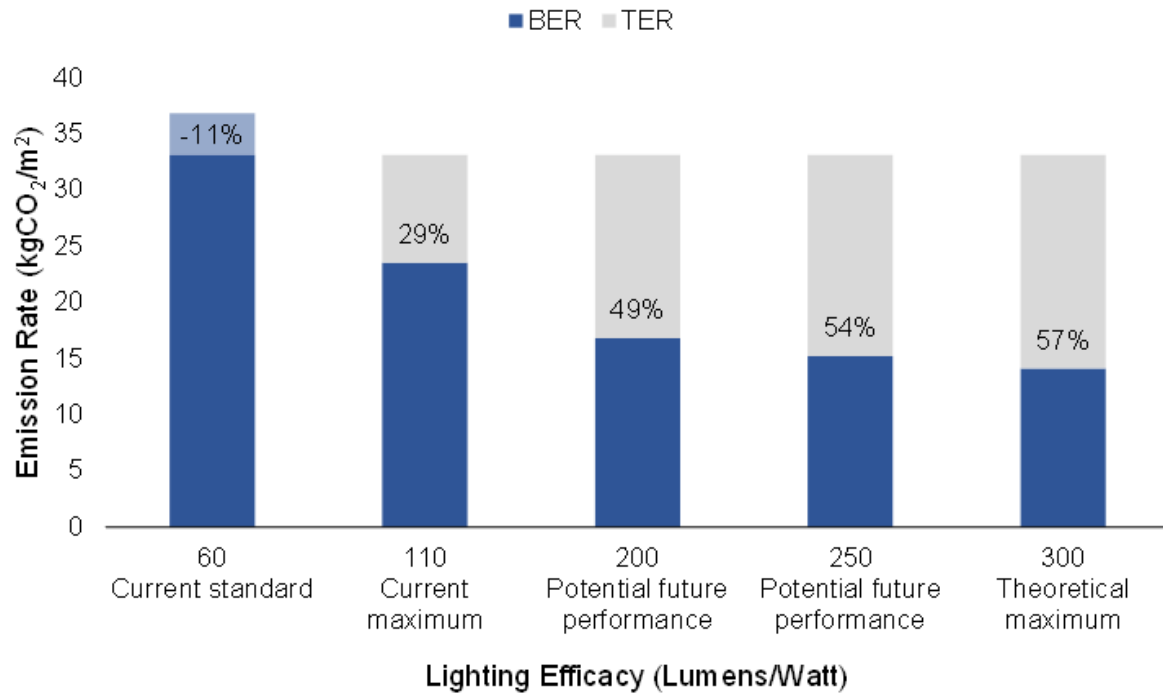
Net Zero Carbon. Demand reduction.

Fabric efficiency.



Net Zero Carbon. Demand reduction.

Lighting.



Office/Retail

LEDs potential to achieve

20-50%

reduction in CO₂ emissions

Net Zero Carbon. Design for Performance (DfP).

A new approach to the design, construction & handover of new office buildings, to deliver low energy outcomes in practice.

http://www.betterbuildingspartnership.co.uk/sites/default/files/media/attachment/BBP_Design%20for%20Performance_A%20new%20approach%20to%20deliver%20energy%20efficient%20offices.pdf

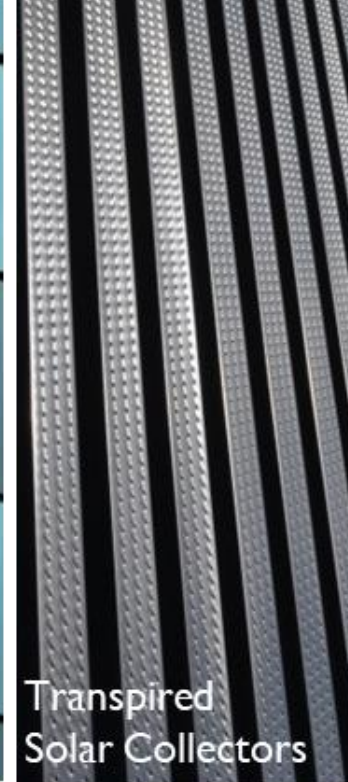


Net Zero Carbon. Operational.

Buildings as generators.



PV cladding



Transpired
Solar Collectors



Piezo-electric system



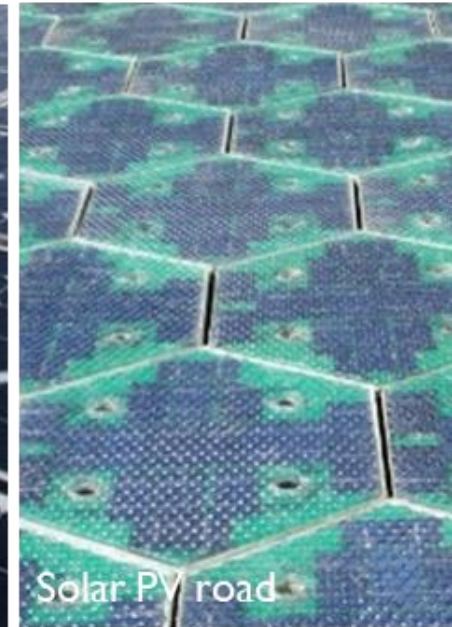
Solar walkway



Organic PV



Traditional PV



Solar PV road

Getting to net zero - carbon offset options.



Peatland restoration



Afforestation



Retrofits



Off-site solar-PV



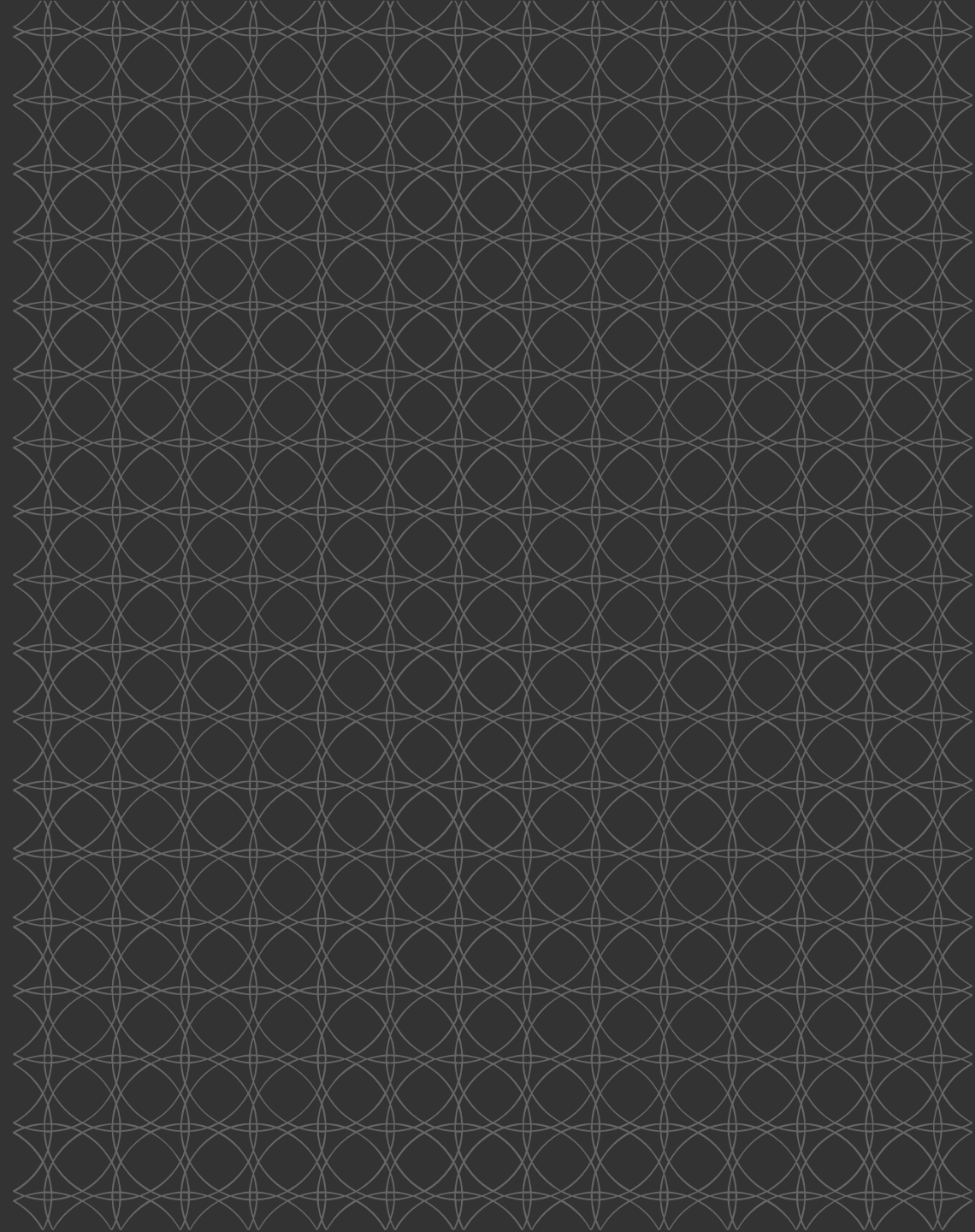
Wind farms



Green Finance

Net Zero Carbon.

An integrated strategy.

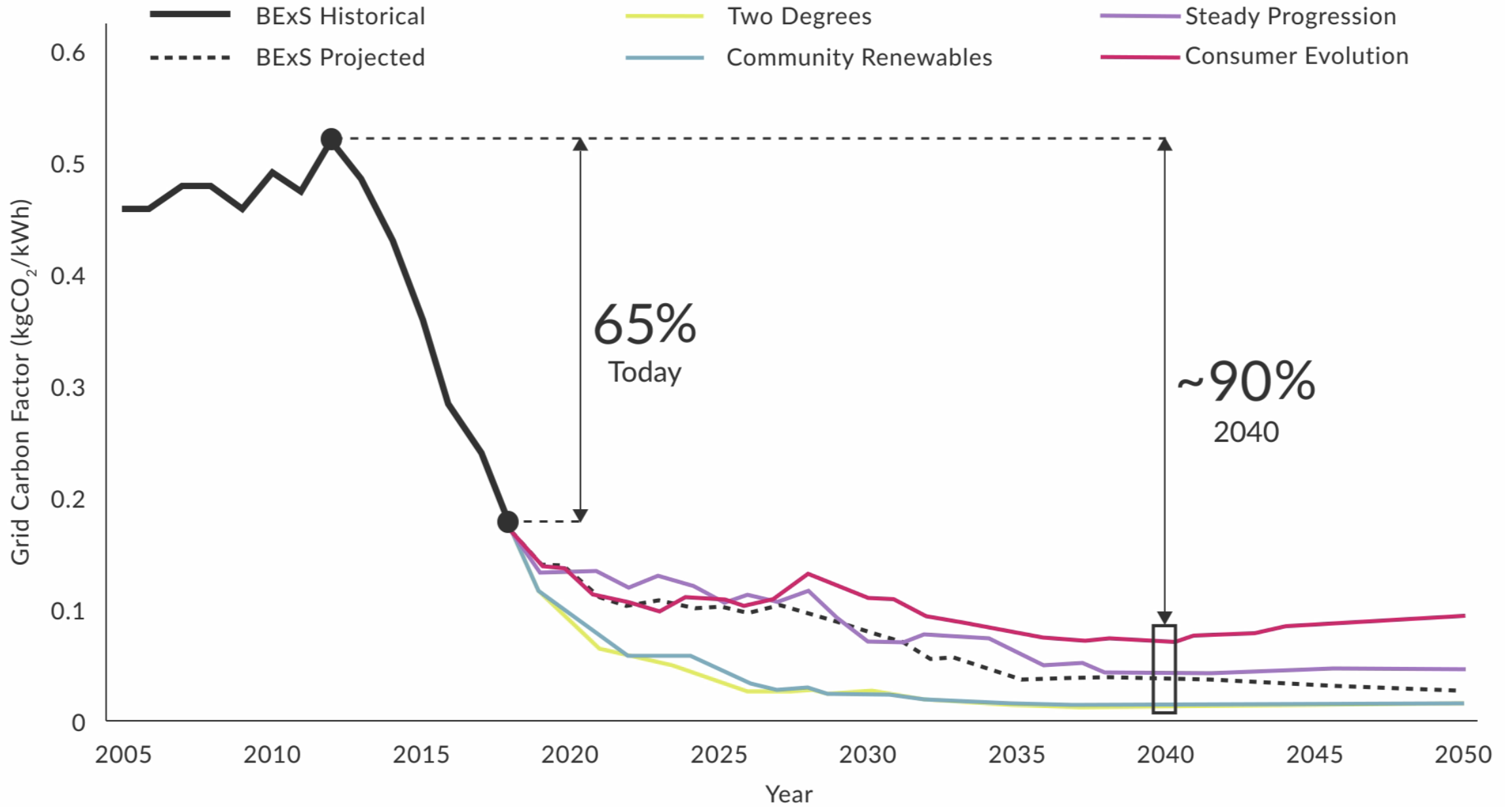


72%

of carbon emissions associated with energy,
half is linked to the built environment.

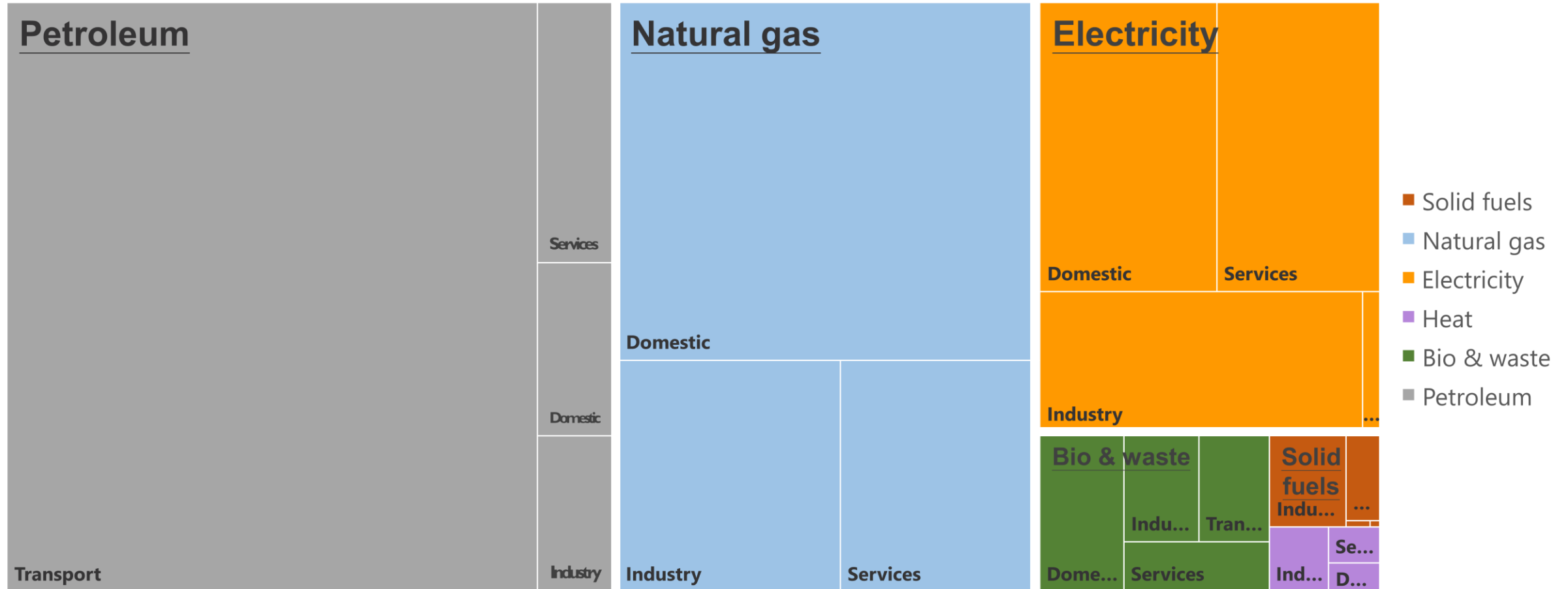
The future is electric.

And zero carbon.

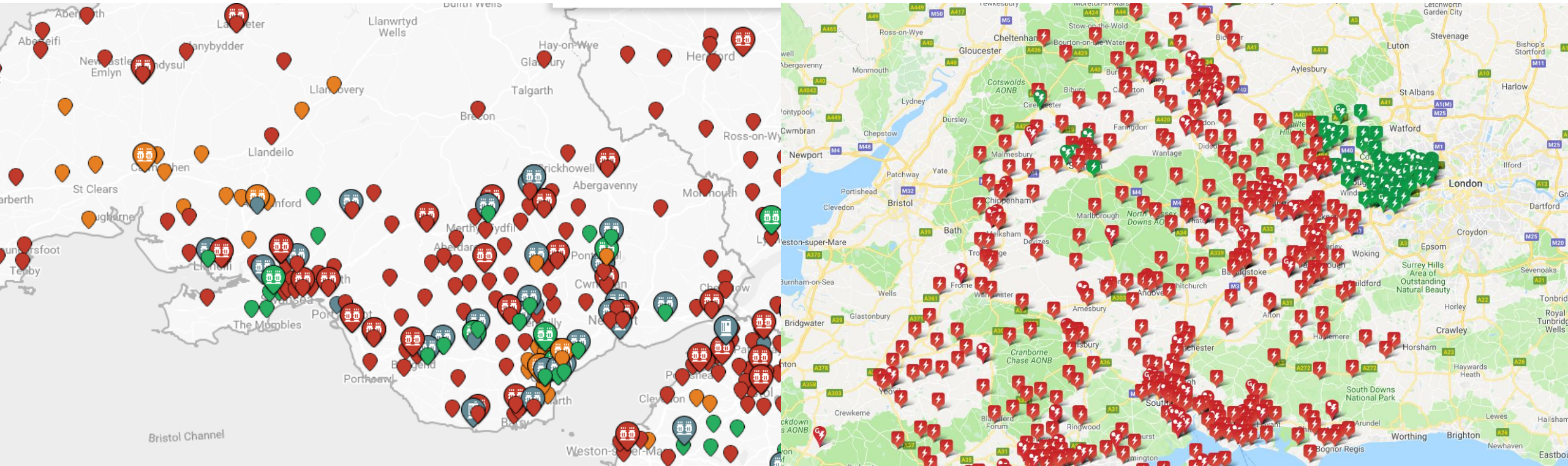




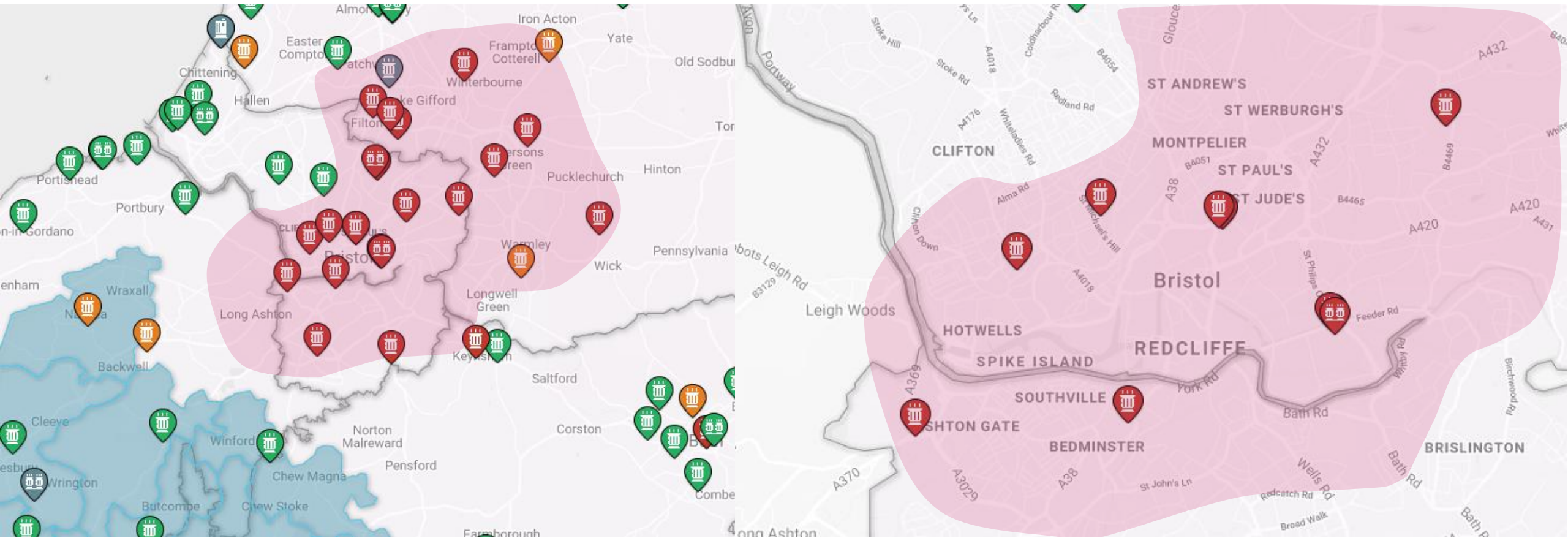
2018 consumption by fuel.



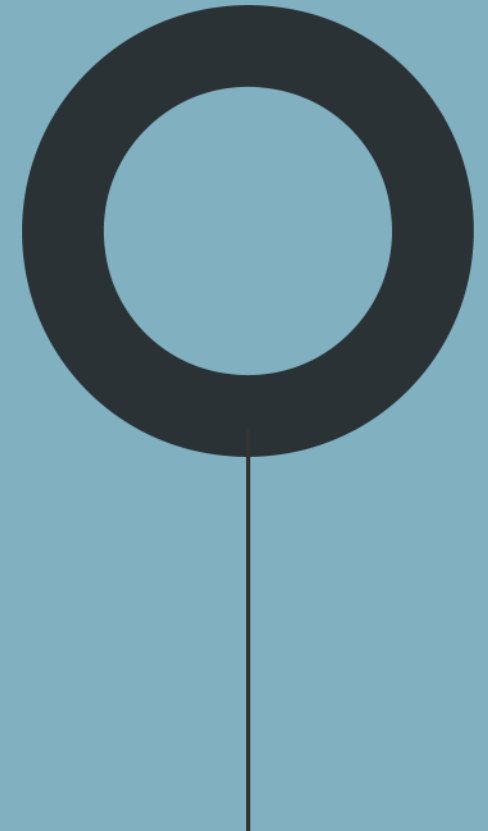
Infrastructure with limited capacity.



Typical constrained city.



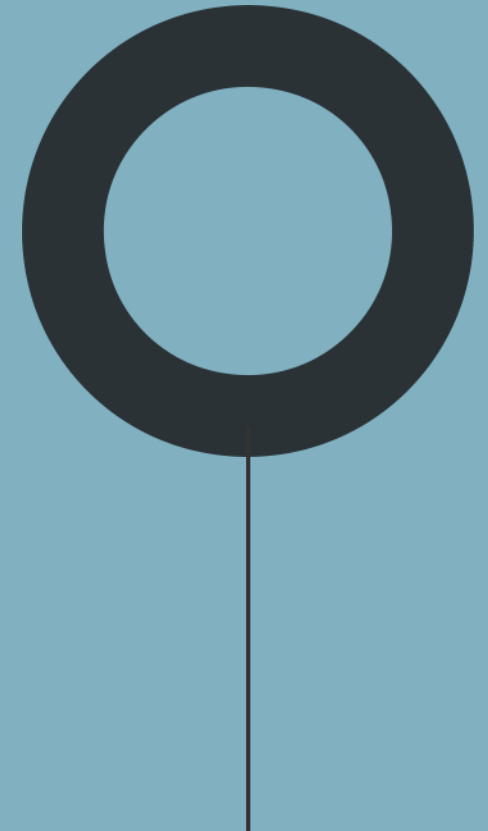
**Our network is
under strain let's be
smart in using it.**



A radical change to our networks.

The DNO to DSO Evolution.

Distribution Network Operator becomes a
Distribution System Operator.



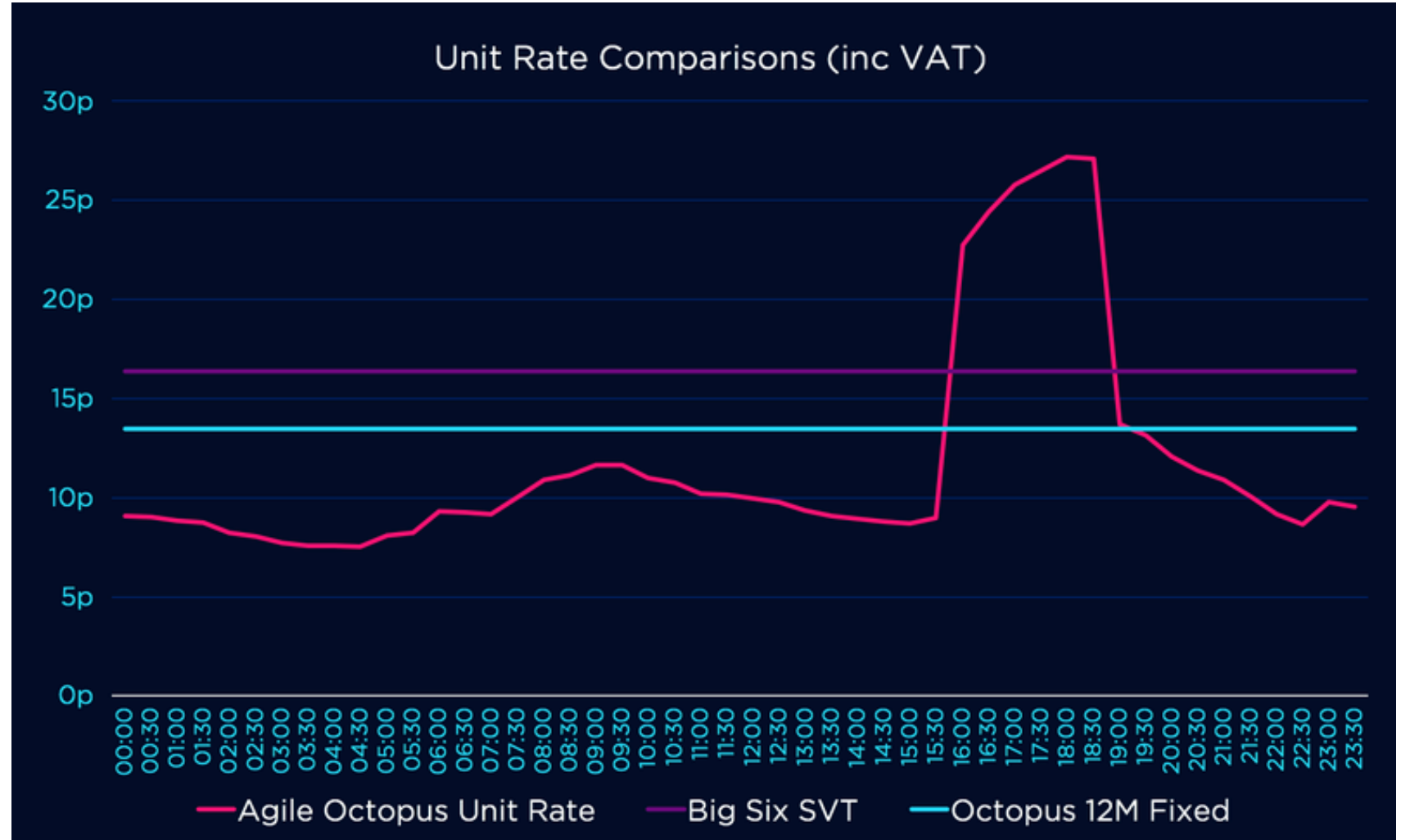
HOARE LEA (H.)

Time of use tariffs. Economy 7 for the twenty first century.

ELECTRIC STORAGE HEATER



Time of use rate tariffs.



Smart meters. A small part of the story but an important one.

ROLLOUT OF SMART METERS IS UNDERWAY

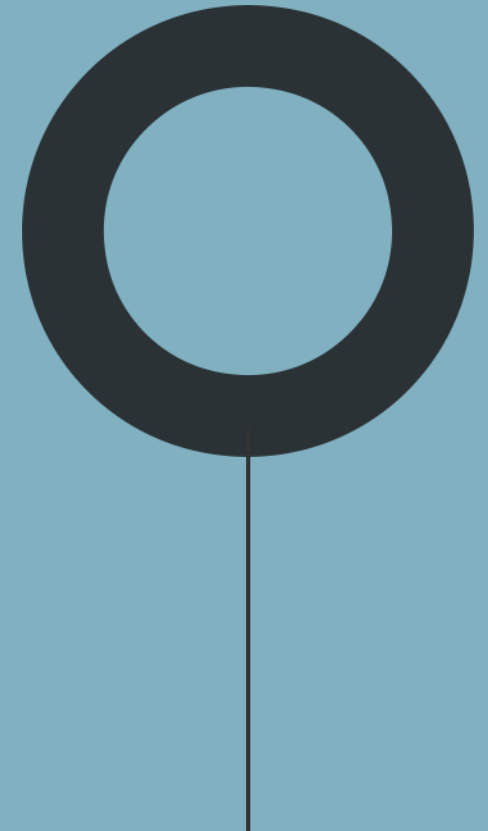


Networks will talk.
Your white goods
will work in sync
with our grid and its
generation.

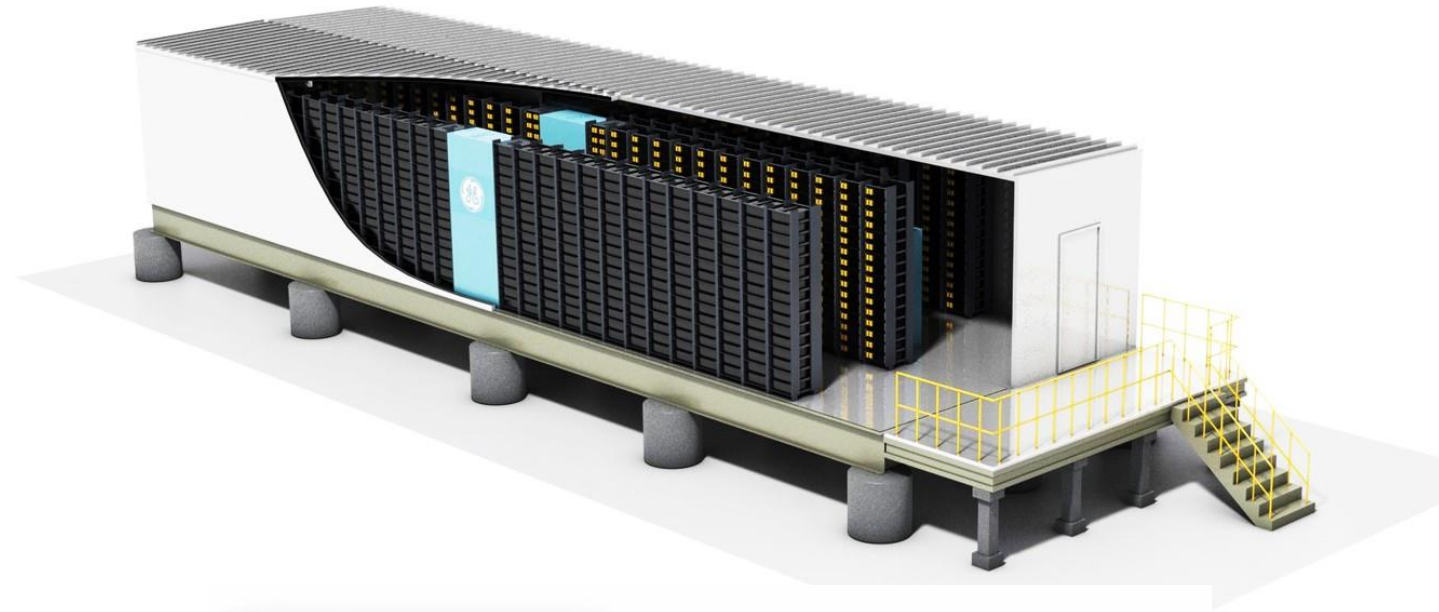
IOT-ENABLED DOMESTIC DEVICES



**The future:
As much about
storage as supply.**



Why not ditch the boiler and the CHP?
Go electric and put in a better storage device instead?

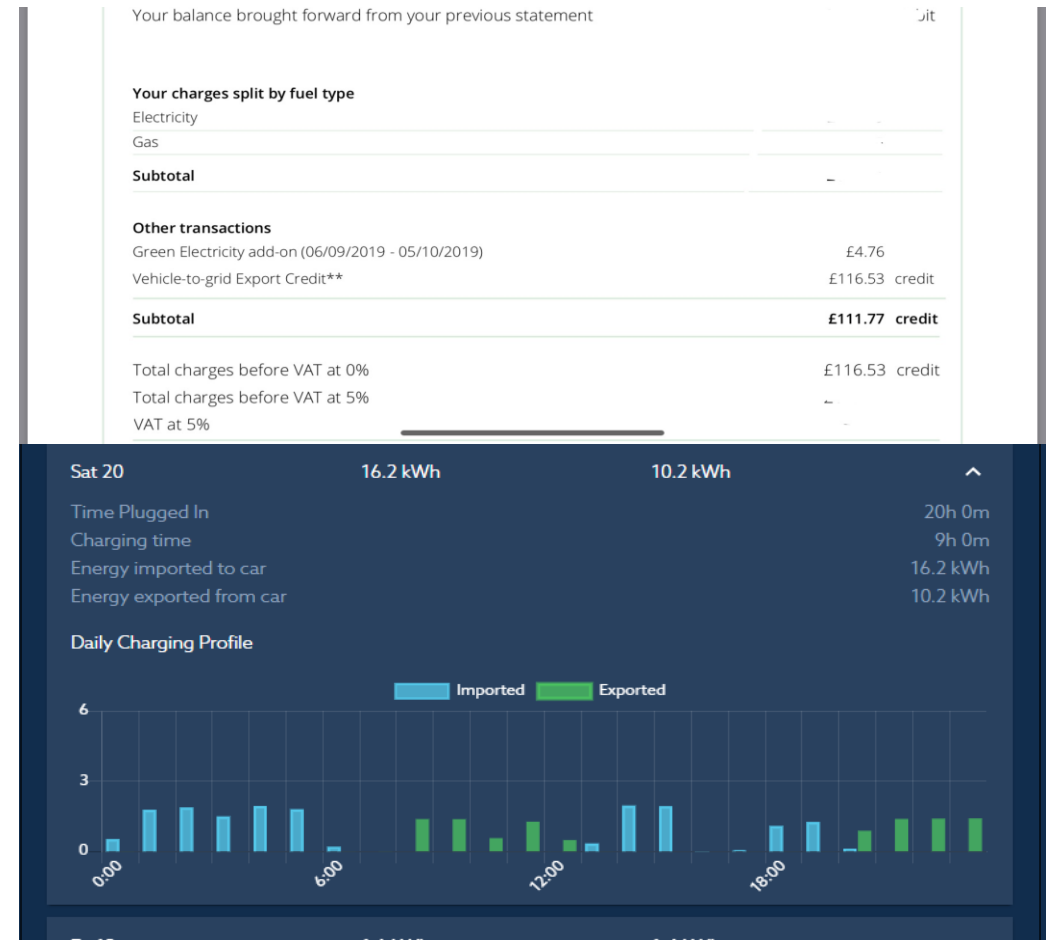
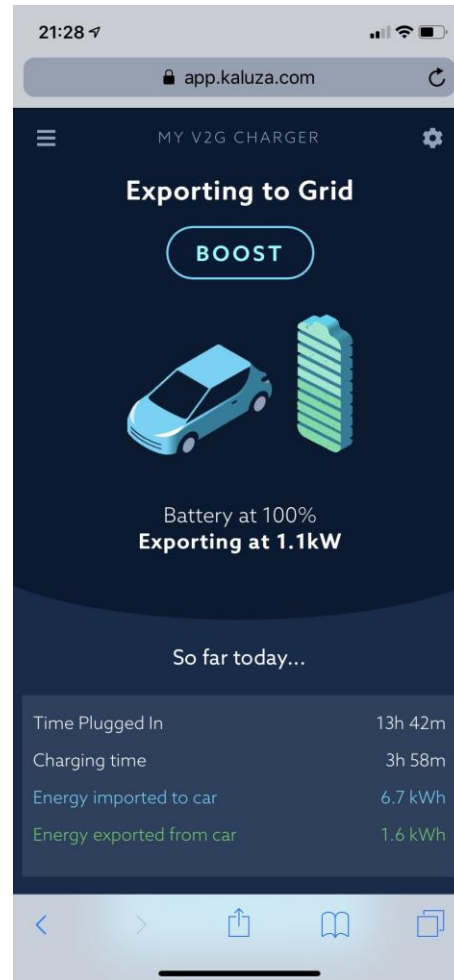


POWERWALL



**Your car could store enough energy
to run an all-electric home for three days.**

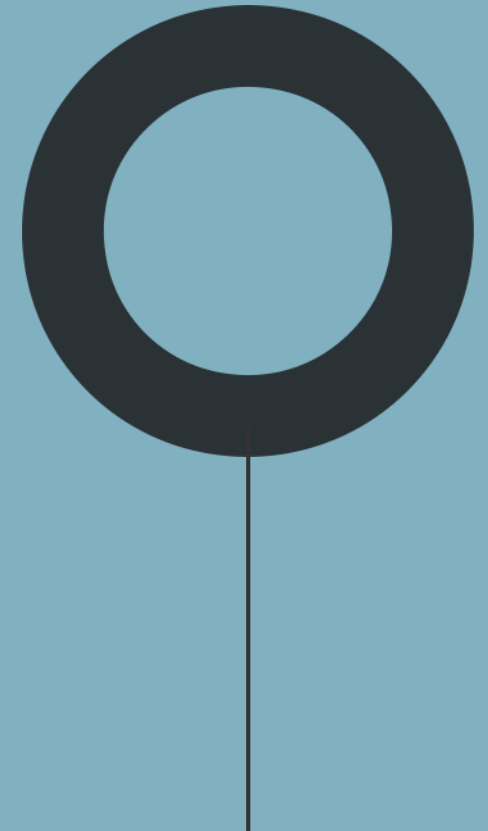
Revenue from your car.

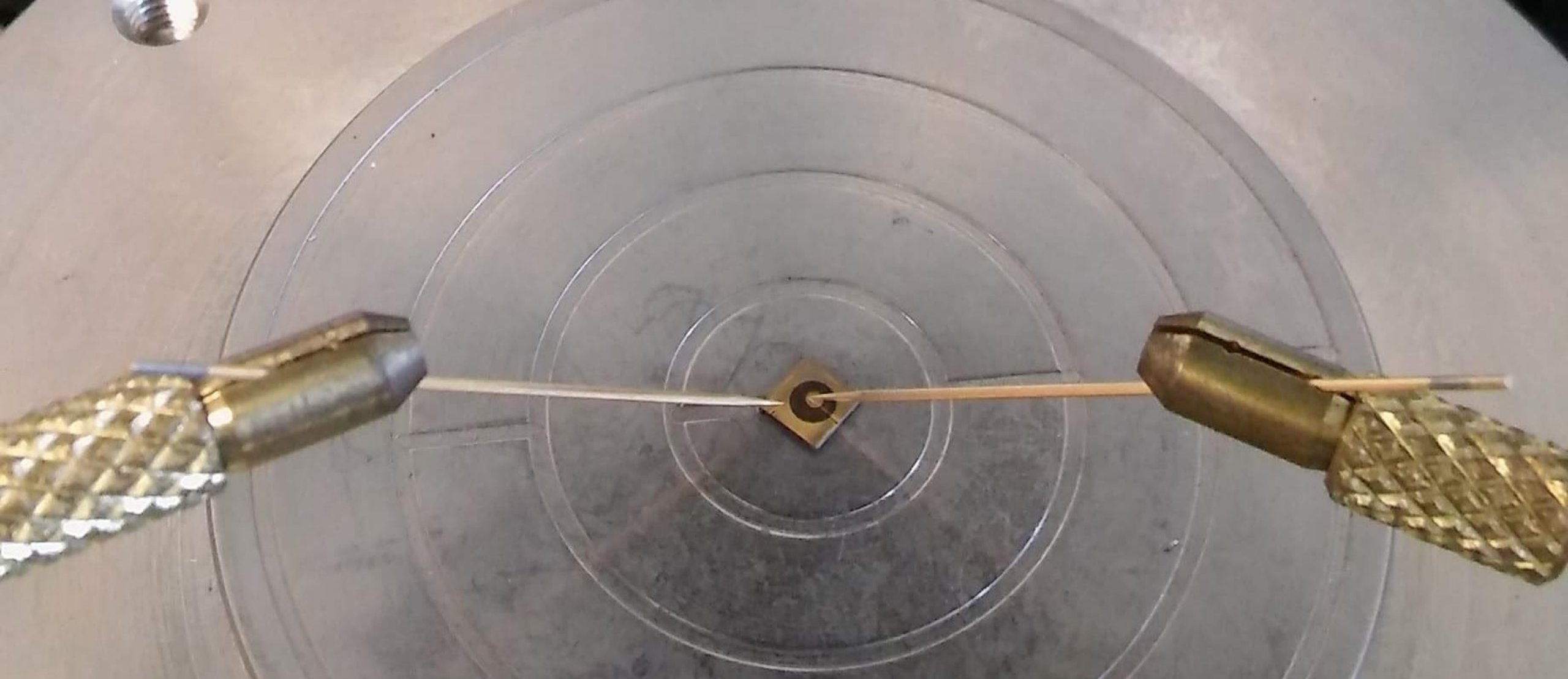


We will all
play a part in
community
energy.

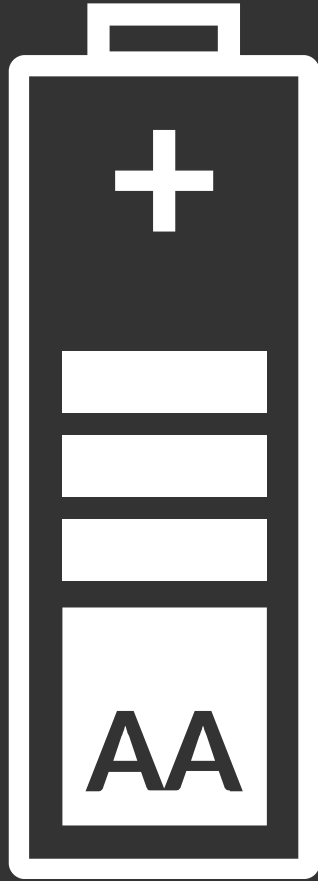


**“Our reliance on
Electricity is increasing.
The cost of electricity is
increasing. We need to be
smart in the way we use it
and smart in exploiting
its value”.**





The diamond battery.



X 371,000



Thank you.
hoarelea.com