

A technical deep dive  
on net zero and  
decarbonisation



CO<sub>2</sub>

CH<sub>4</sub>

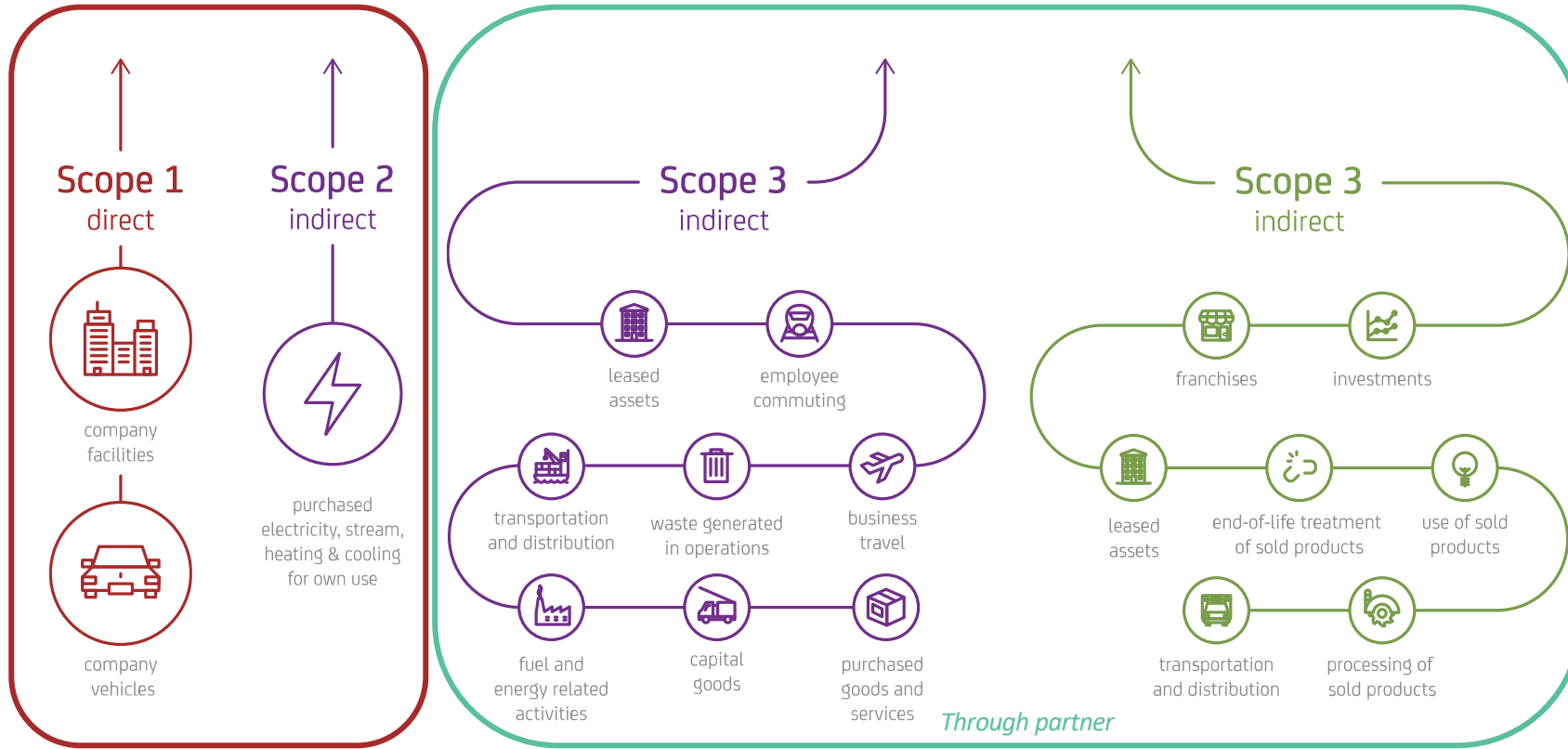
N<sub>2</sub>O

HFCs

PFCs

SF<sub>6</sub>

NF<sub>3</sub>



Reporting company

Upstream activities

Downstream activities

## Key terminology

# Emissions Scopes

### Scope 1

Emissions from operations that are owned or controlled by the reporting company.

### Scope 2

Indirect emissions from the generation of purchased or acquired electricity, steam, heat or cooling consumed by the reporting company.

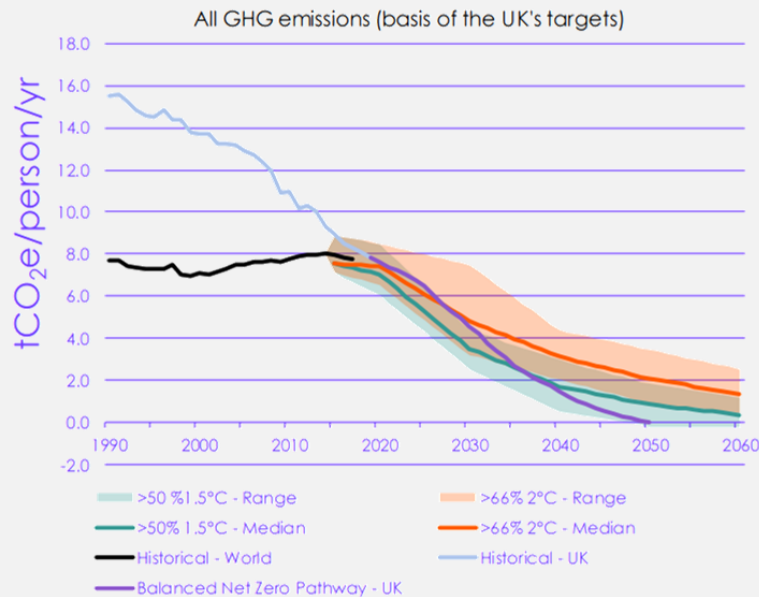
### Scope 3

All indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream & downstream emissions.



## Explaining Net Zero and Science Based Carbon Reduction

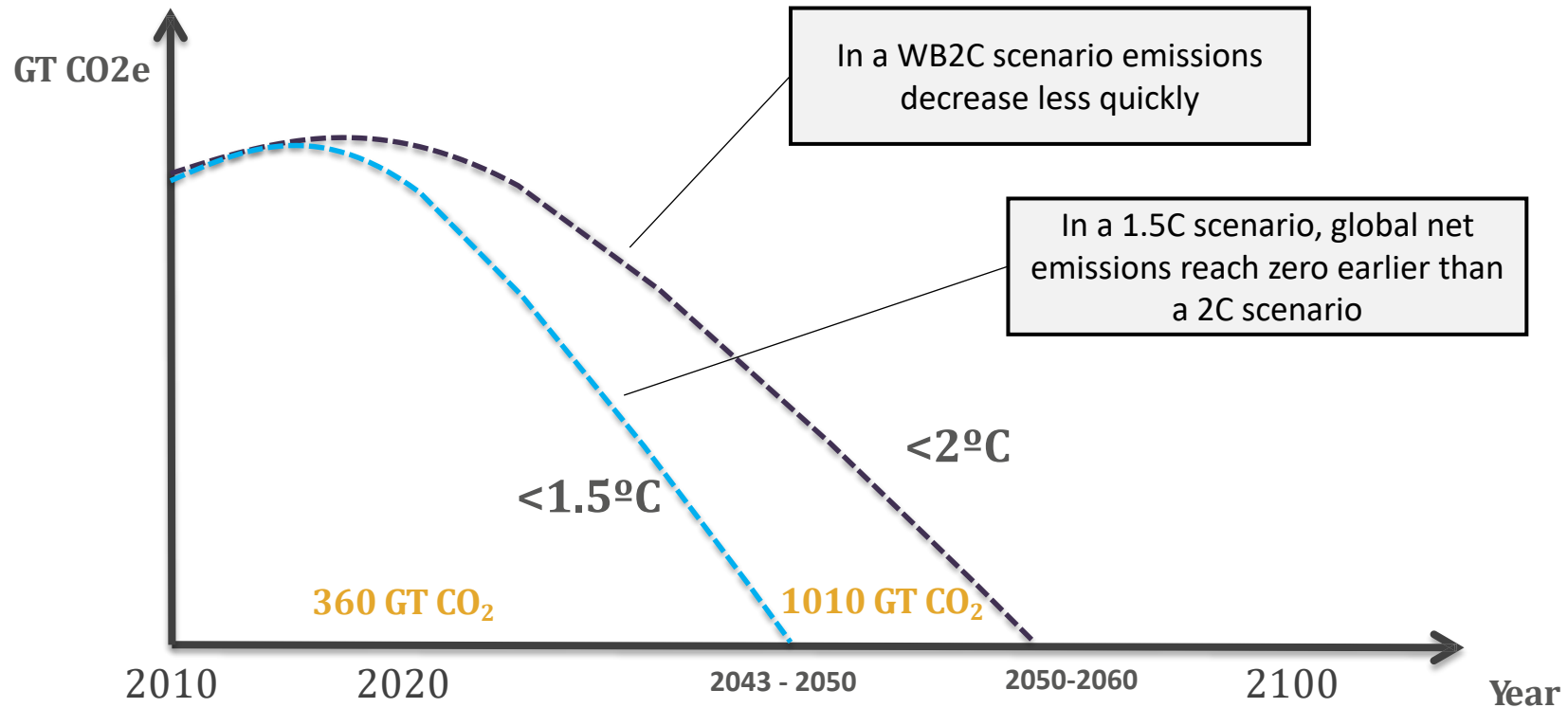
Figure 2 Global emissions pathways (per person) consistent with the Paris Agreement



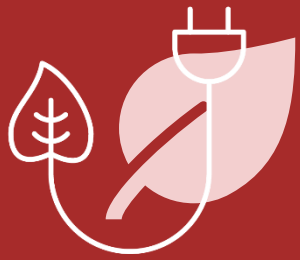
Source: Climate Change Committee – The Sixth Carbon Budget, The UK's Path to Net Zero

- Becoming a **Net Zero** company means reducing carbon emissions from your business operations and value chain as much as technically possible and then offsetting the remainder by removing carbon from the atmosphere through sequestration projects (e.g. afforestation)
- The **Paris Climate Agreement** sets the target of limiting global warming to either 1.5C or well below 2C compared to pre-industrial temperatures
- Its central principles are (1) the planet has a **global carbon budget** which cannot be exceeded if target warming temperatures are to be achieved and (2) **net emissions reductions** must be implemented at the appropriate rate to ensure the budgets are not exceeded
- **Science-based carbon reduction** means the translation of the Paris Agreement's global carbon budget and emissions reduction requirements into carbon reduction plans for industry sectors or individual companies
- An organisation's science-based carbon reduction plan would deliver its **proportionate share of global decarbonisation** to achieve the Paris goals – taking into account company size, geography, industry sector etc.

# Global carbon budgets, emissions trajectories and net zero target dates vary for the different warming scenarios



Corporate climate target setting standards are now applying this methodology and terminology to individual companies' carbon reduction plans, with an emphasis on 1.5C.



Net zero impact

The challenge of tackling climate change is now impacting all organisations globally

Science-based Net Zero targets are informing UK energy policy-making and driving the thinking behind organisational climate target setting

Science-based targets show companies how much and how quickly they need to reduce their greenhouse gas (GHG) emissions to prevent the worst effects of climate change.

Over **9,600** companies submitted climate change reporting responses in 2020, up 15% on the previous year and representing >50% of global market capitalisation.

Source: Climate Disclosure Project

**51% of business leaders** say that an organisation's ability to "lead the debate around environmental issues" was "very influential" in their customers' purchasing decisions

Source: Centrica 2019 research

**Pioneering corporate leaders** on climate change, in **EARLY 2021**:

- **1205** taking action with SBTi
- **593** with science-based targets
- **407** with commitments to 1.5C

Source: Science Based Targets Initiative (SBTi)

From January through November 2020, investors in mutual funds and ETFs **invested \$288 billion globally in sustainable assets, a 96% increase** over the whole of 2019

*"We are asking companies to **disclose a plan for how their business model will be compatible with a net zero economy and how this plan is incorporated into their long-term strategy and reviewed by your board of directors.**"*

Source: BlackRock, Larry Fink CEO

**£81/tonne of carbon** – BEIS projection for the cost of carbon in 2030 (shown in 2018 £ terms) – circa five times 2020 averages and **applied much more widely through the economy** – UK ETS scheduled to align to Net Zero target from 2024 onwards

Source: BEIS

# The Science Based Targets initiative (SBTi) is the most credible of the accredited carbon reduction frameworks



SCIENCE  
BASED  
TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

An initiative by



WORLD  
RESOURCES  
INSTITUTE

In collaboration with



2392

Companies have formally  
committed to set SBTs

1123

Companies have  
approved targets

1197

Ambitions  
for 1.5 °C

Science-based carbon reduction is the translation of the Paris Agreement's global carbon budget and emissions reduction requirements into carbon reduction plans for individual companies. The number of companies has doubled in 6 months.

# There is an integrity hierarchy when it comes to decarbonisation frameworks and target setting

<b>Net Zero</b>	<p>Companies following a <b>net zero</b> framework must have a <b>science-based carbon reduction</b> plan, aligned to a pathway compatible with the Paris Climate Agreement. Although companies can start with Scopes 1-2, the full value chain must be decarbonised (inc. Scope 3).</p> <p>After technically feasible emissions have been abated, hard-to-decarbonise emissions can be offset with certified greenhouse gas removal (GGR) offsets. This could be for the remaining emissions associated with the electrical grid in 2050.</p>
<b>Near Term Science-Based Targets</b>	<p>Companies commit to set a target <b>aligned with either a 1.5C (or well below 2C pathway for Scope 3)</b>. The target is set for between 5 and 10 years of the target date. Companies have two years to set the target. The target is then submitted to the SBTi for accreditation, after which the target is binding.</p>
<b>Long Term Science-Based Targets</b>	<p>Must have a near term target. Long term target that should reach net zero by 2050 at the latest.</p>
<b>Carbon Neutral</b>	<p>Companies following a <b>Carbon Neutral</b> framework must have a carbon reduction plan in place for <b>at least</b> their Scope 1 &amp; 2 emissions. Carbon offsets can then be purchased to bring their final carbon balance to zero emissions.</p>

In CBS we focus on high integrity decarbonisation: defining a client's Net Zero Pathway to inform the setting of a (near term) Science-Based Target.

# 4 stages

Aligning a methodology to the highest standards set by industry bodies like the Science Based Targets Initiative (SBTi) as a proven carbon reduction strategy



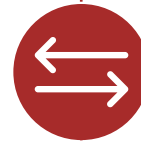
## Plan

Experts will help the business baseline its portfolio's emissions and define their science-based carbon reduction plan.



## Cut

Energy efficiency services will identify and take action on excess usage or waste to streamline their spend and emissions.



## Convert

A wide portfolio of on-site renewable energy solutions will deploy, update or add low carbon infrastructure to power their business.



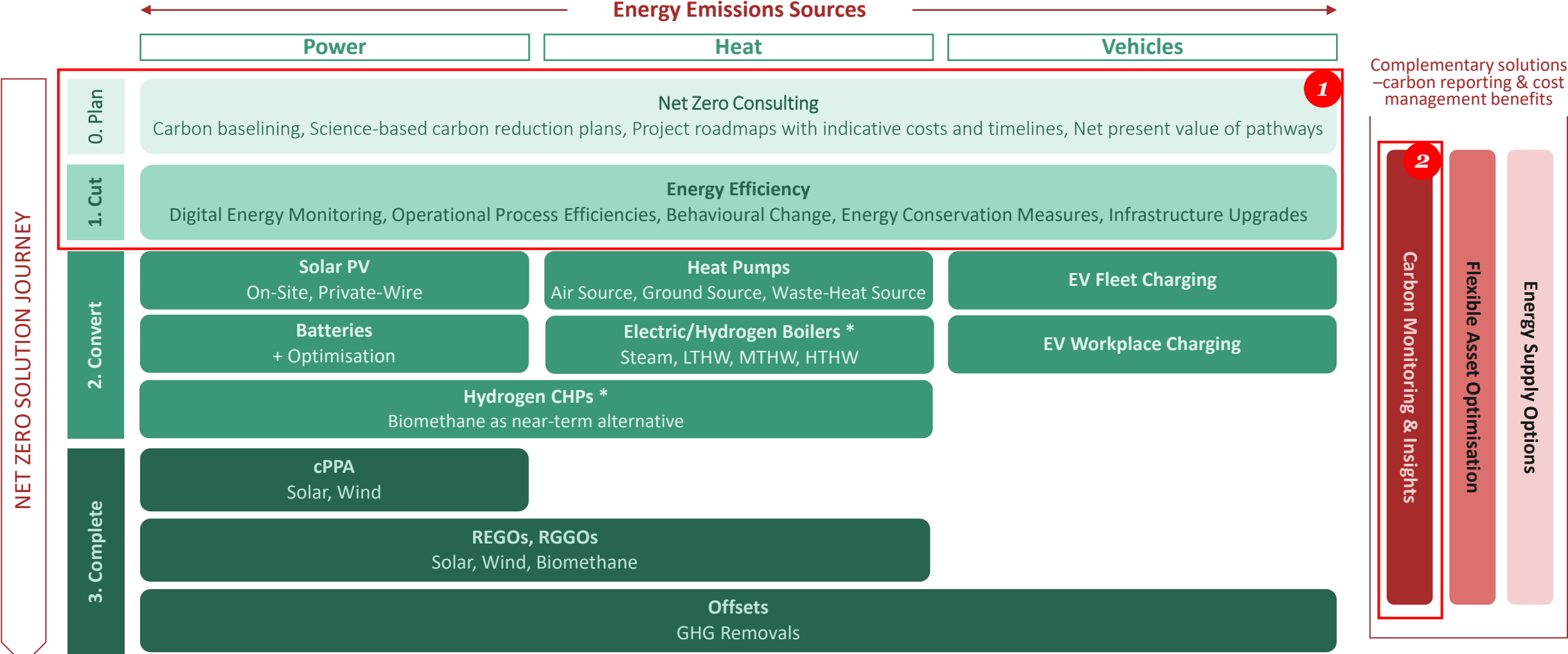
## Complete

Experts complete their pathway with high-quality and accredited off-site renewable instruments and greenhouse gas removal offsets.



Where does high quality granular data fit into the process of building a complete net zero strategy for Scope 1 & 2?

# Using deep energy sector knowledge, customers right through the net zero journey – starting by building the optimal carbon reduction plan for their business



\* Low carbon hydrogen considered to be >5 years from mass market commercialisation and possibly far longer

# The Cut, or energy efficiency, step of a Net Zero Pathway is the first and typically the most financially profitable in the near term

- Cutting consumption will always lead to a reduction in costs all other things being equal. Tackling the Cut phase first provides clients with assurance they're making the right moves
- Reducing consumption gives head room for electrification of heating, and efficiency helps to lower future capital costs
- Examples of energy efficiency which are the easy wins :
  - ✓ Lighting upgrades
  - ✓ HVAC: AC splits, AHU upgrades, VSD, pump replacements
  - ✓ Control BEMS
  - ✓ Insulation

Whether the Cut stage leads to net zero strategy work, or net zero strategy work leads to energy efficiency opportunities, the two now go hand in hand



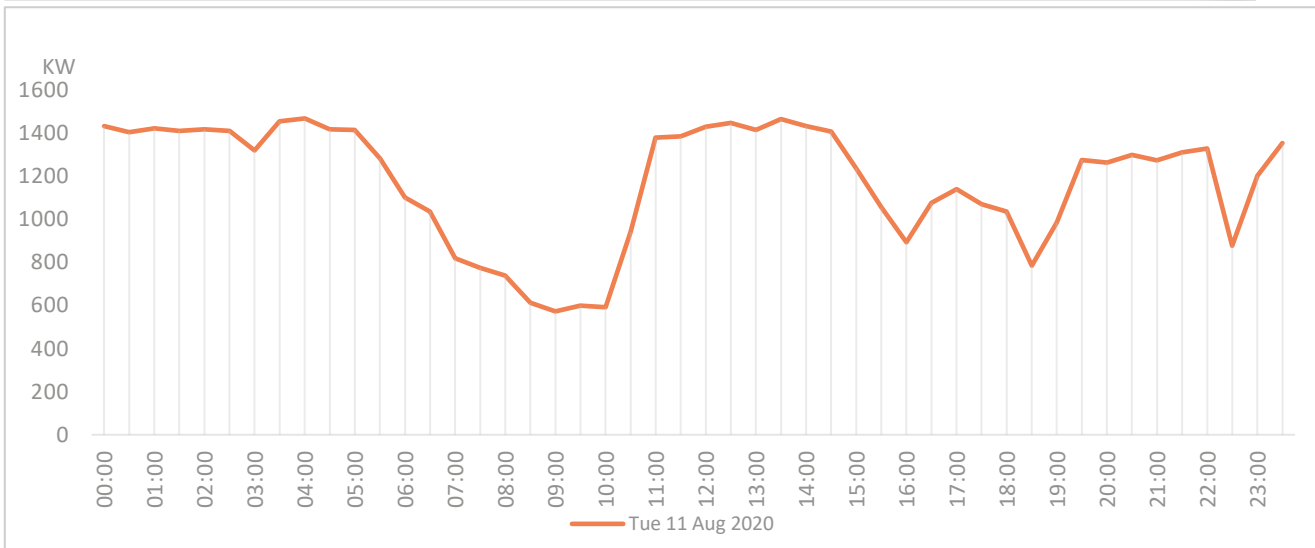
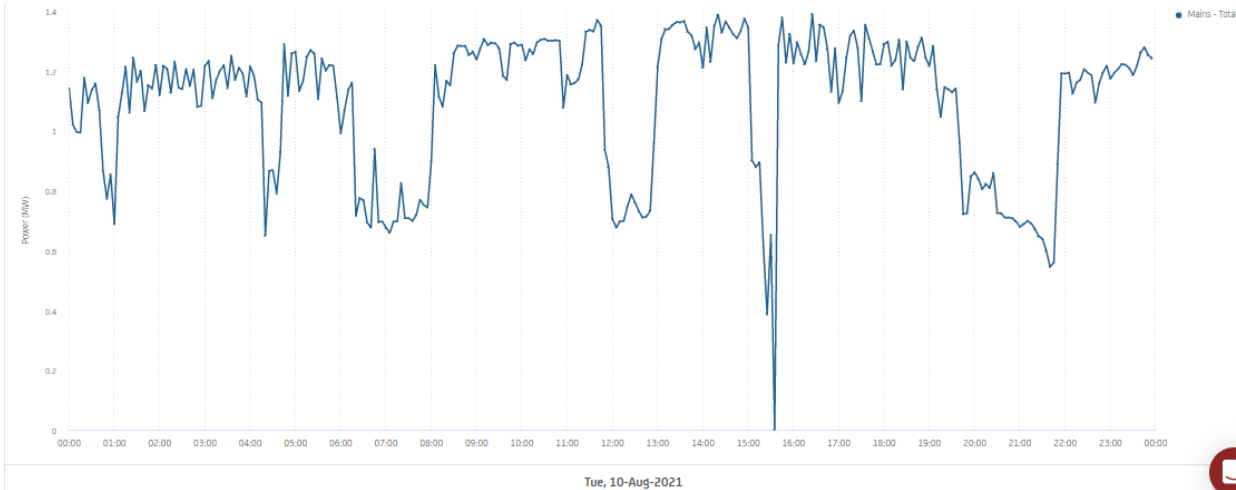
# Granular data from sensors can greatly improve cost analysis for net zero strategies

- Sizing of on site measures (heat pumps, solar, battery etc). An oversized heat pump, for example, will lead to significantly larger (10-20%) higher capital cost in a piece of equipment which is already in the millions of pounds.
- Run time and use time - In most countries we deal with the spark spread is unfavourable for electrification. Detailed data adds a layer of accuracy to the commercial modelling for the client so they know exactly how much they are looking at over a 10-25 year investment given current market conditions
- Smaller confidence intervals when providing scenario analysis to client

The convert stage has three key elements: heating, power and transport. Each of these benefits from granular data over typical data



# Half hourly intervals for power are not sufficient for the digital led age of net zero



Reaching net zero on an optimal pathway demands highly accurate digital based solutions – just look at the UK's EDiT\*. Half hourly data does not provide this, and monthly gas data (as is common) is completely incompatible.

\*Energy Digitalisation Taskforce

# Decarbonising heat is the question du jour for many UK organisations and the above detail is essential to map pathways



Heat pumps

NB

6 MW can be £6m+ so sizing correctly is paramount

Optimal load required

Environmental modelling



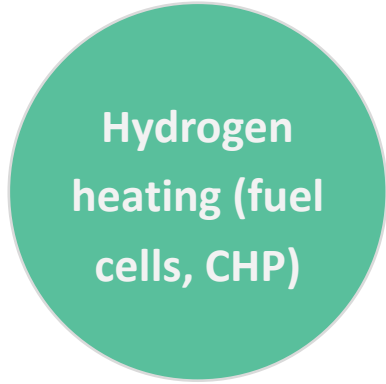
CCS Fossil Fuels

NB

Unproven at small scales

Research projects

Chemistry behind pre or post CC requires accurate flow rates




Hydrogen heating (fuel cells, CHP)

NB

Testing for CHPs underway, fuel cells existing technology

Hydrogen expensive in near term – how much is fuel cost then



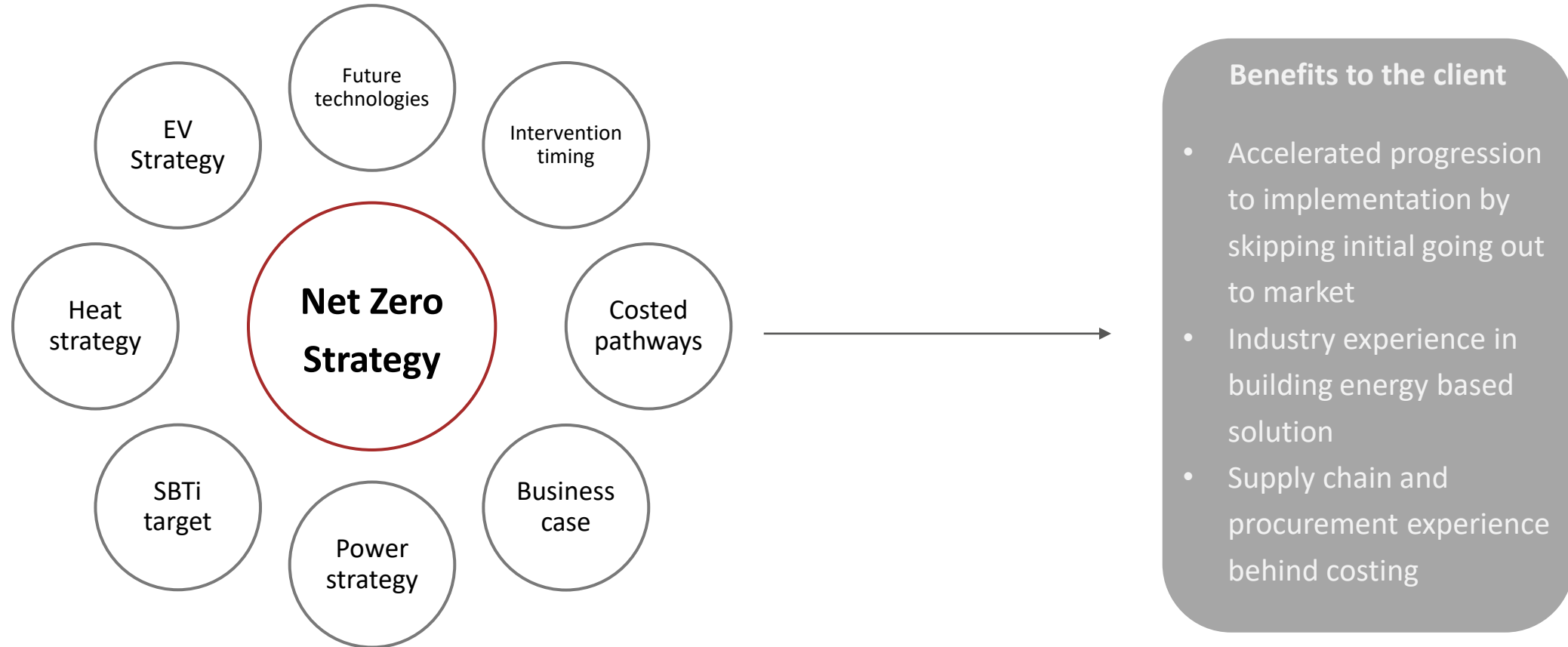
Natural gas heating

NB

Unlikely to meet client's decarbonisation targets unless in countries using diesel

Very accurate interval data needed for resilience systems

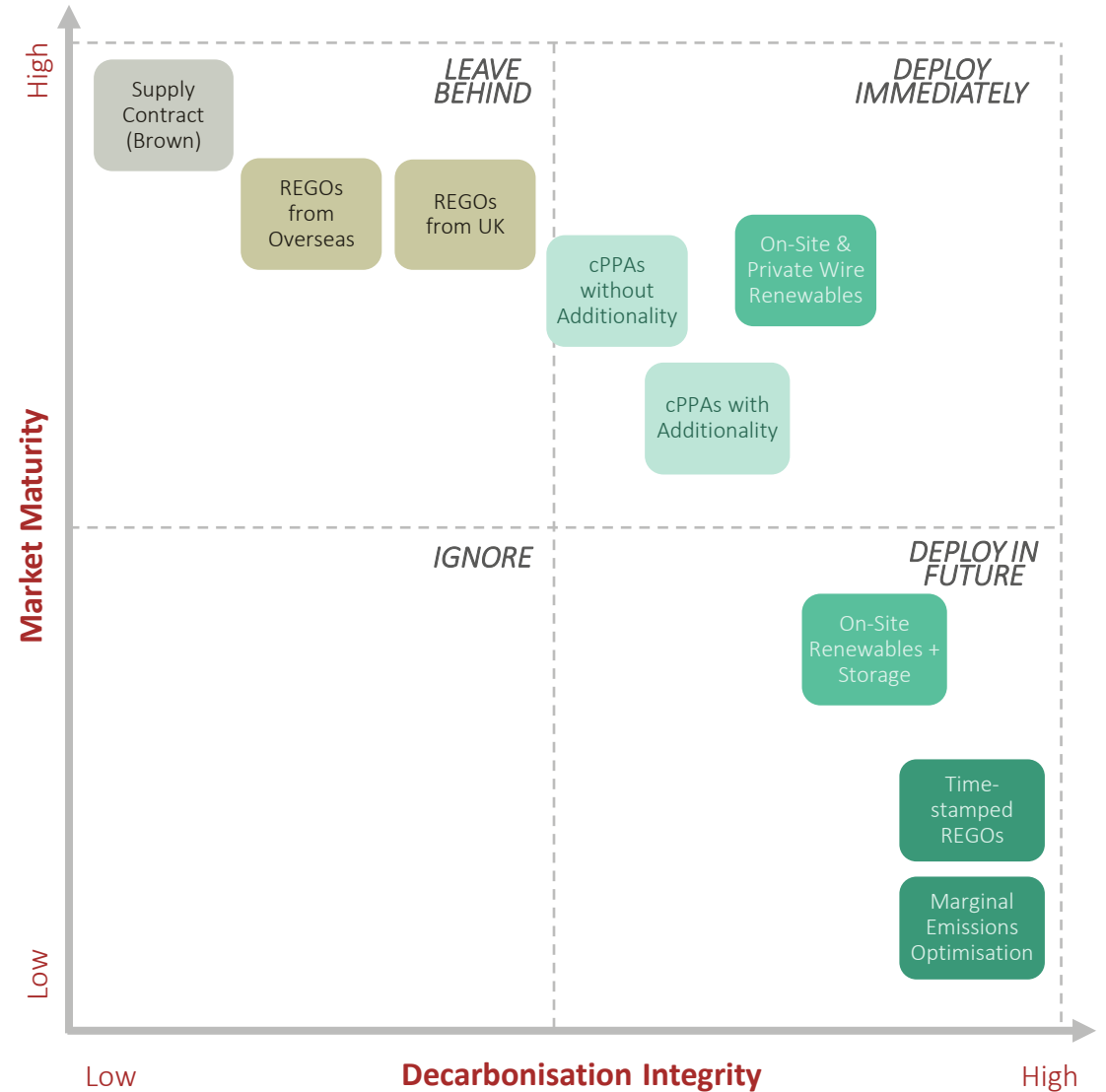
At the end of a net zero consulting project we wrap together all the elements of the project into one cohesive net zero strategy



## To future-proof their renewable electricity procurement through the prioritisation of decarbonisation integrity

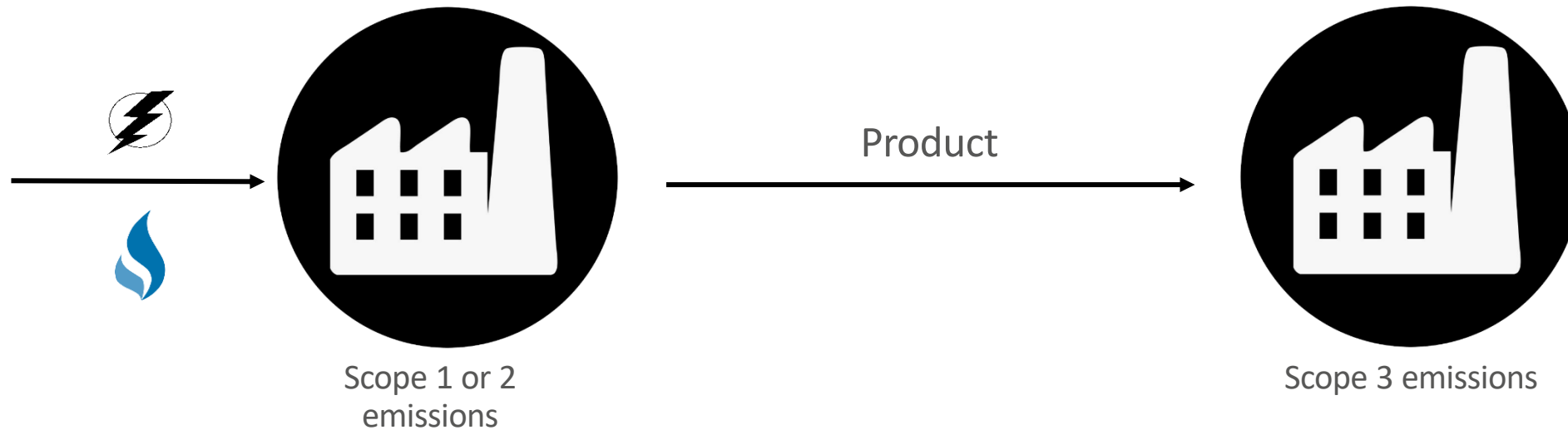
We advise organisations with ambitious sustainability agendas to:

1. Prioritise instruments which deliver additionality of renewable energy
2. Choose energy supply instruments which provide traceability of renewable energy to location and timing of generation
3. Deploy mature high integrity solutions now and keep an eye on emerging innovations





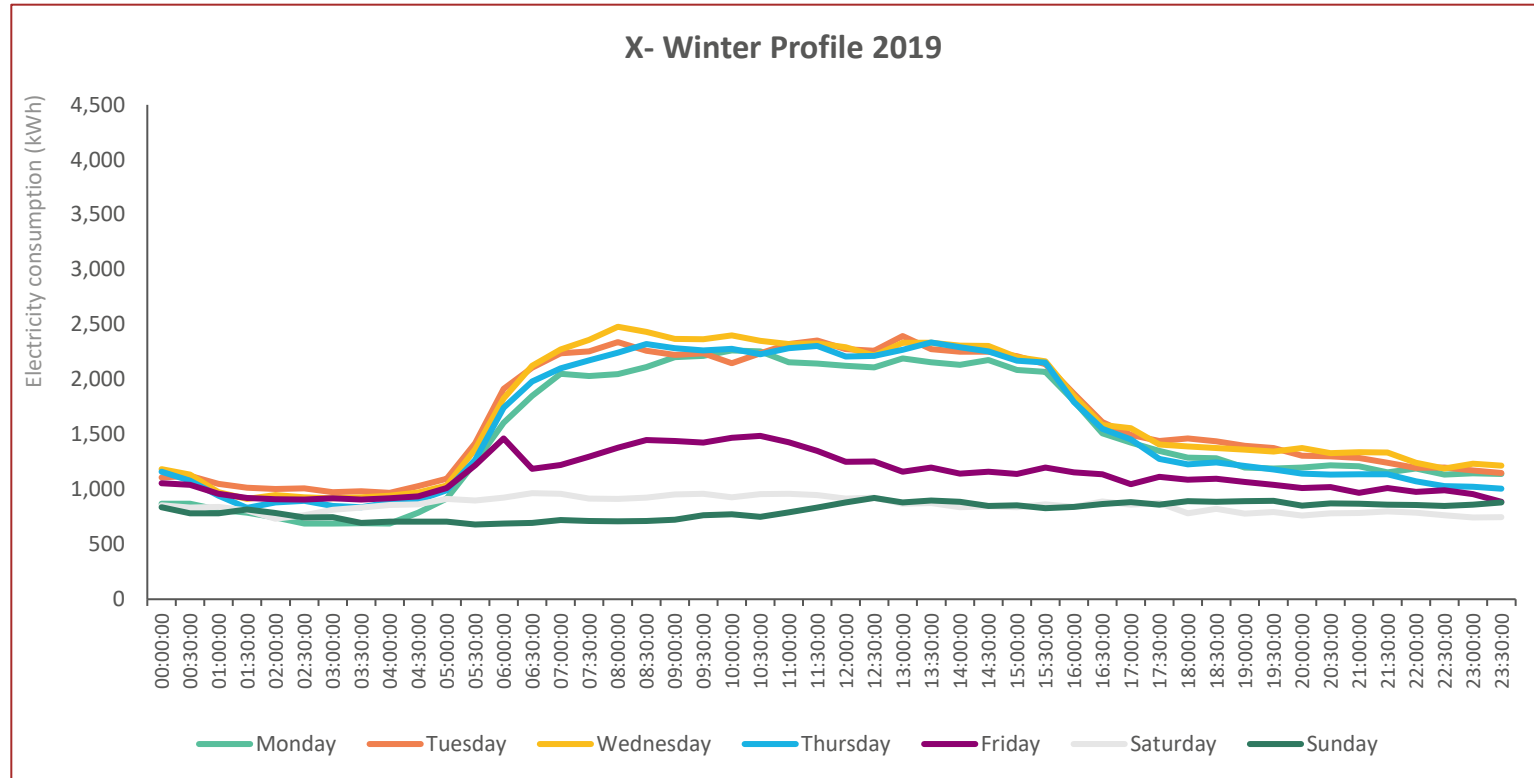
# Sub-meter monitoring with Panoramic Power's accurate sensors can enable customers to better understand their Scope 3 emissions



Monitoring the energy consumption of individual processes or stages of equipment manufacture allows for accurate product level emissions accounting, including for embodied carbon. We are seeing more and more businesses ask their suppliers for the Scope 3 emissions associated with their products as societal and regulatory pressure grows.

Nonetheless, each customer's issues are unique and net zero is tailored to each customer.

# Customer's current import grid connection which will not support a full electrification solution and would need to be upgraded

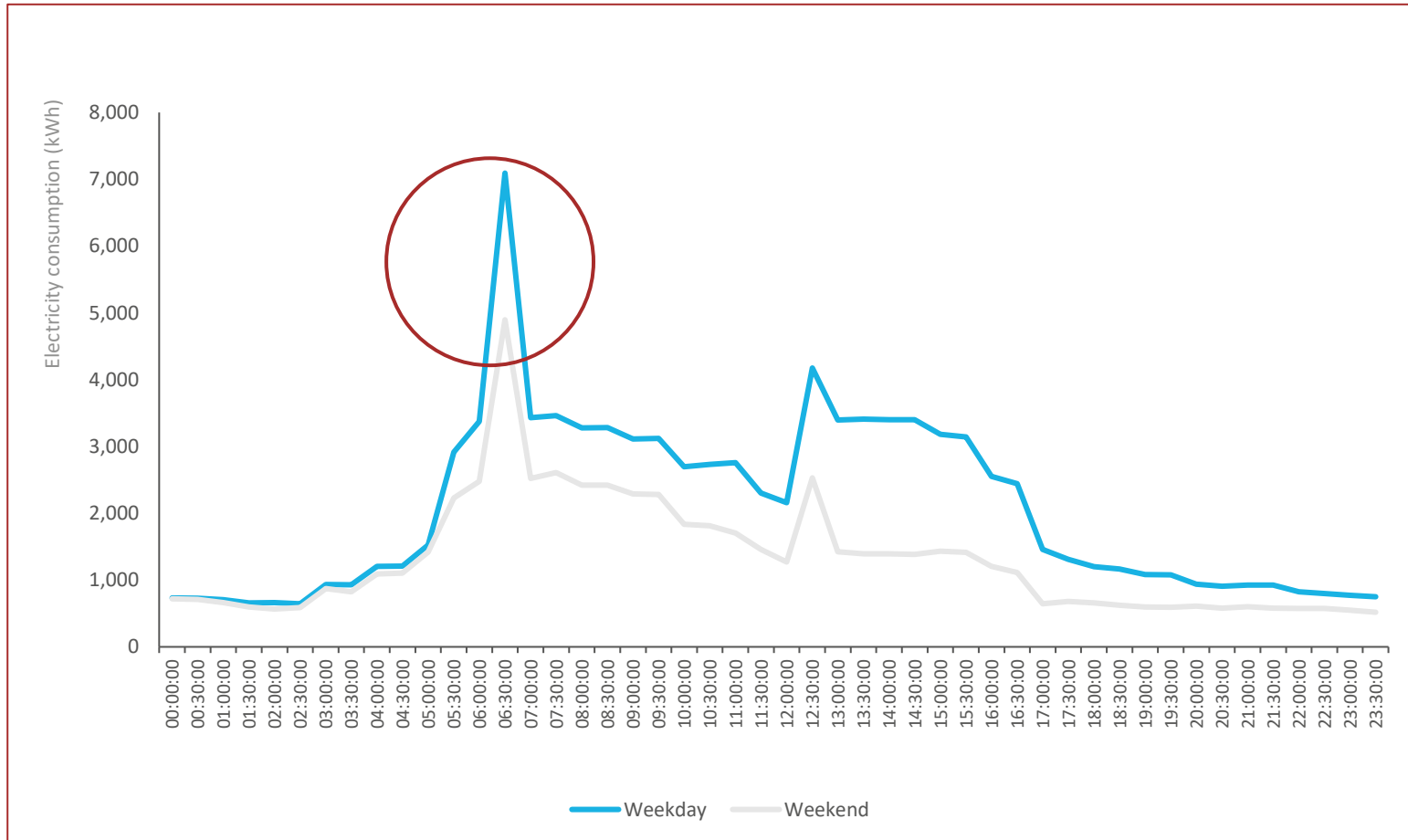


## Considerations for X:

- Expanding a grid connection can be expensive, especially when capacity is constrained in the local area
- Any connection application comes with a mandatory 90 day review period before the DNO delivers a response
- The joint connection consultation will be vital to positioning the site to move to a net zero solution in the future

Without the granular data for assurance on exact split of gas use, we engaged by developing an EV strategy and feeding into the client's yet to start grid connection capacity consultation with the DNO

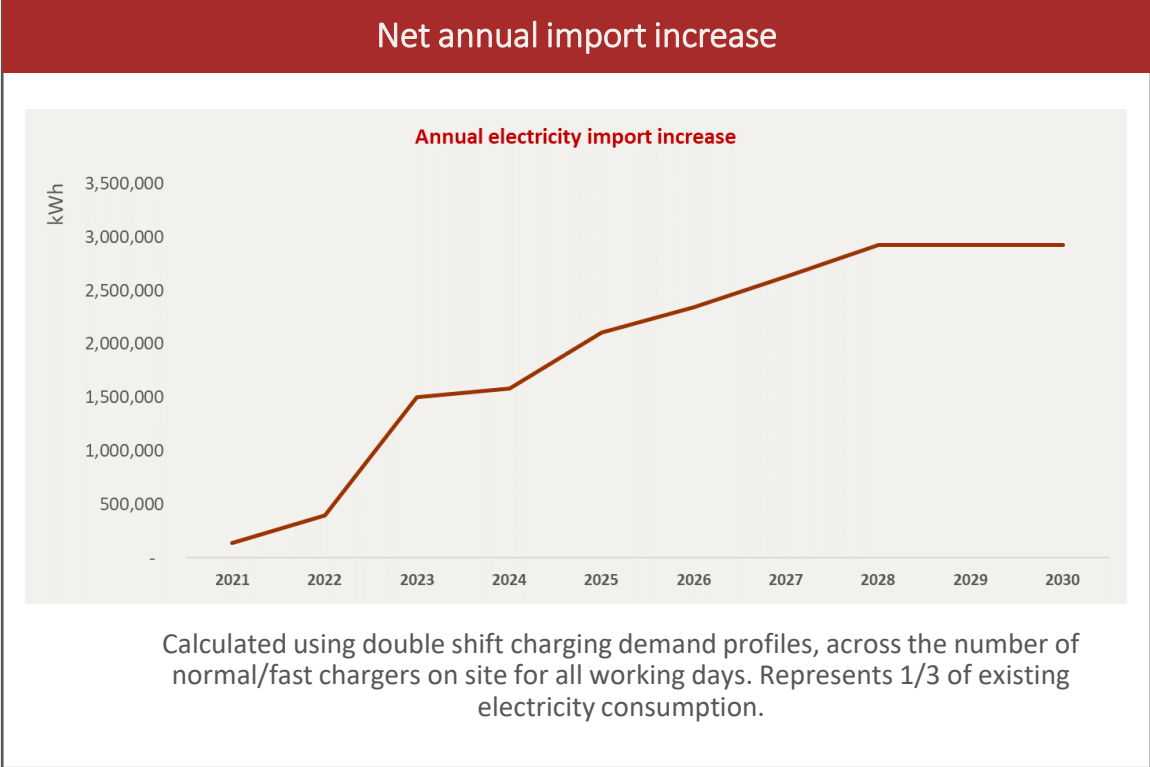
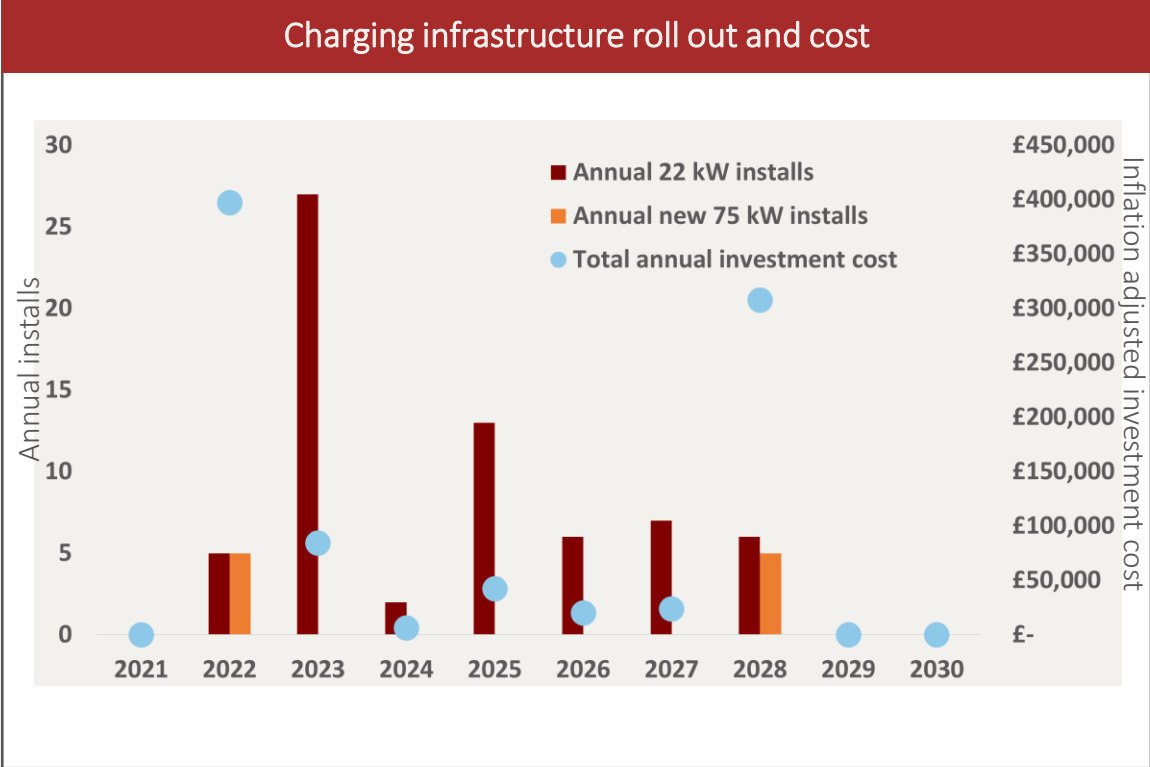
# Due to the existing demand profile, the net zero solution leads to a different profile with significantly increased peak power



## Considerations for X

- The solar power and LED lighting solutions mitigate the impact of the full electrification scenario
- In **summer the average peak** is around **2.2 MW** – the current level – due to solar generation
- The circled peak is driven by two factors
  - EV charging turn on, which can be shifted by software
  - Heating turning on, which likely can't be switched
- **This would leave around 6 MW peak which cannot be shifted** – and this is without increased production capacity
- Increased production could lead to peaks of **9 MW**, of which 1 MW could be shifted

In order to accommodate for staff and visitors who will increasingly switch to EVs, we included an EV charging rollout in all modelling



The EV Strategy has been broken down into a phased approach: civils and a small batch of chargers to start, followed by a steady deployment of AC charging and fast chargers for track use.

Thank you