

Fractal Energy System

Karbon Homes
April 23

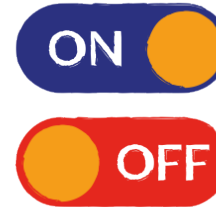
Why: Fractal Energy System?



Net Zero focus to help achieve EPC targets – all homes EPC C by 2030 and all new build homes EPC A by 2050



Rising energy costs and volatility of energy markets driven by global crisis



To ensure future grid security need to use capacity renewables and innovate where possible

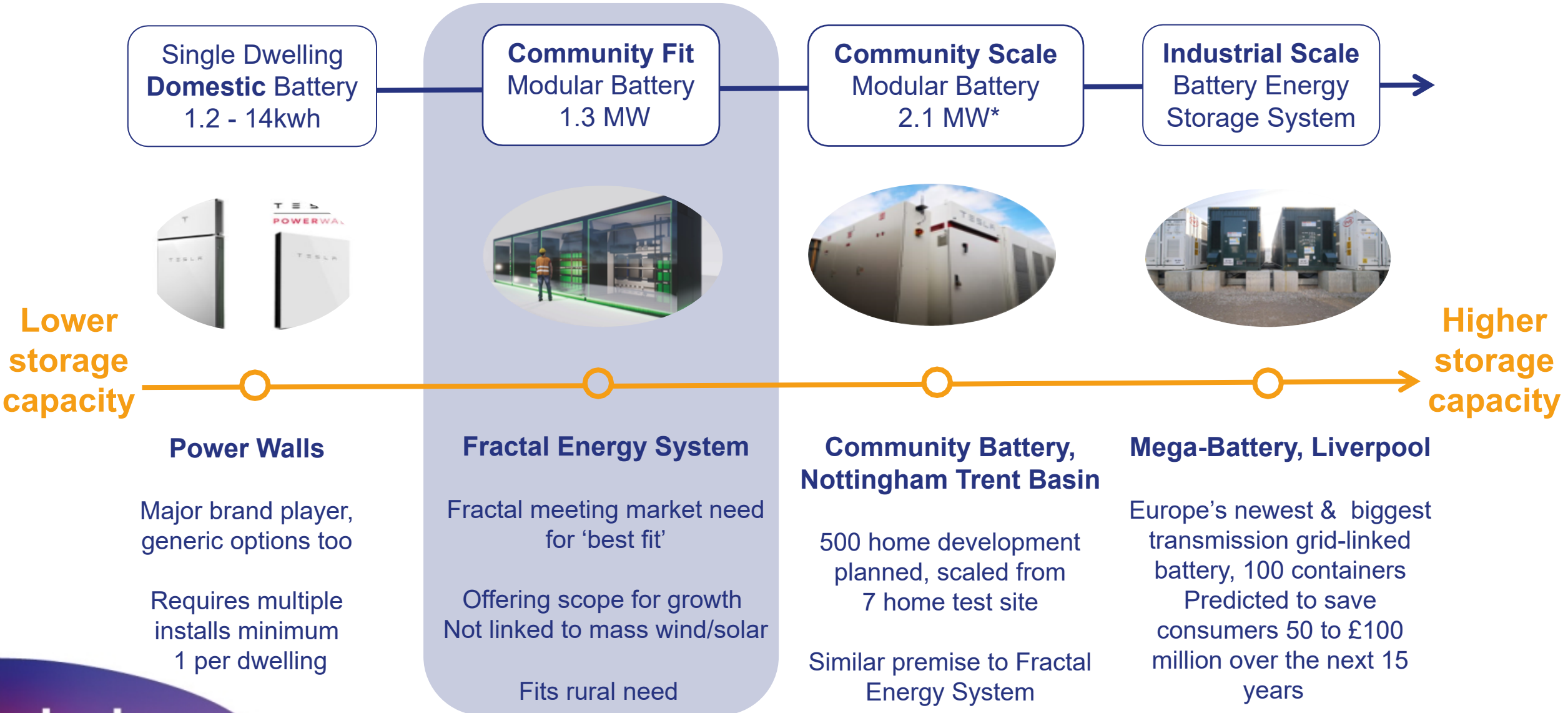


Limitations on single dwelling batteries to deliver needed capacity

EV charging & lower EPC homes will challenge demand

Fractal delivers a Community Fit BESS improved off-grid resilience better value for money

What else is happening with Battery Energy Storage?



What does a 'Community Fit' BESS Size system deliver?



Community Fit Capacity

Delivered to location

Ability for expansion
if EV demand increases

Optimises energy usage and
storage



One Stop Maintenance

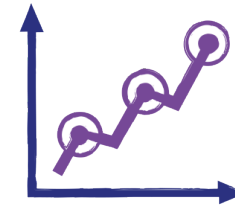
No in home access needed

Less customer impact

Smart meter link

Cloud monitoring

Remote shut down on cells



Resilience

Latent supply if mains grid
failure

Optimises storage of solar
PV energy (smooths
demand)

Longevity of supply (20 year
model)



Customer Centric

Value for Money

Easy customer
communication

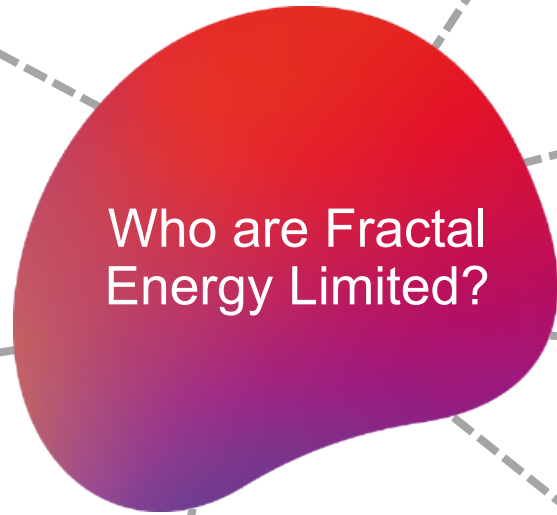
Customer app

Deliver energy
education over and above



Renewable Energy
Innovation start up based
in Scotland

Expertise in App
development



Opportunity to
deliver great
customer value

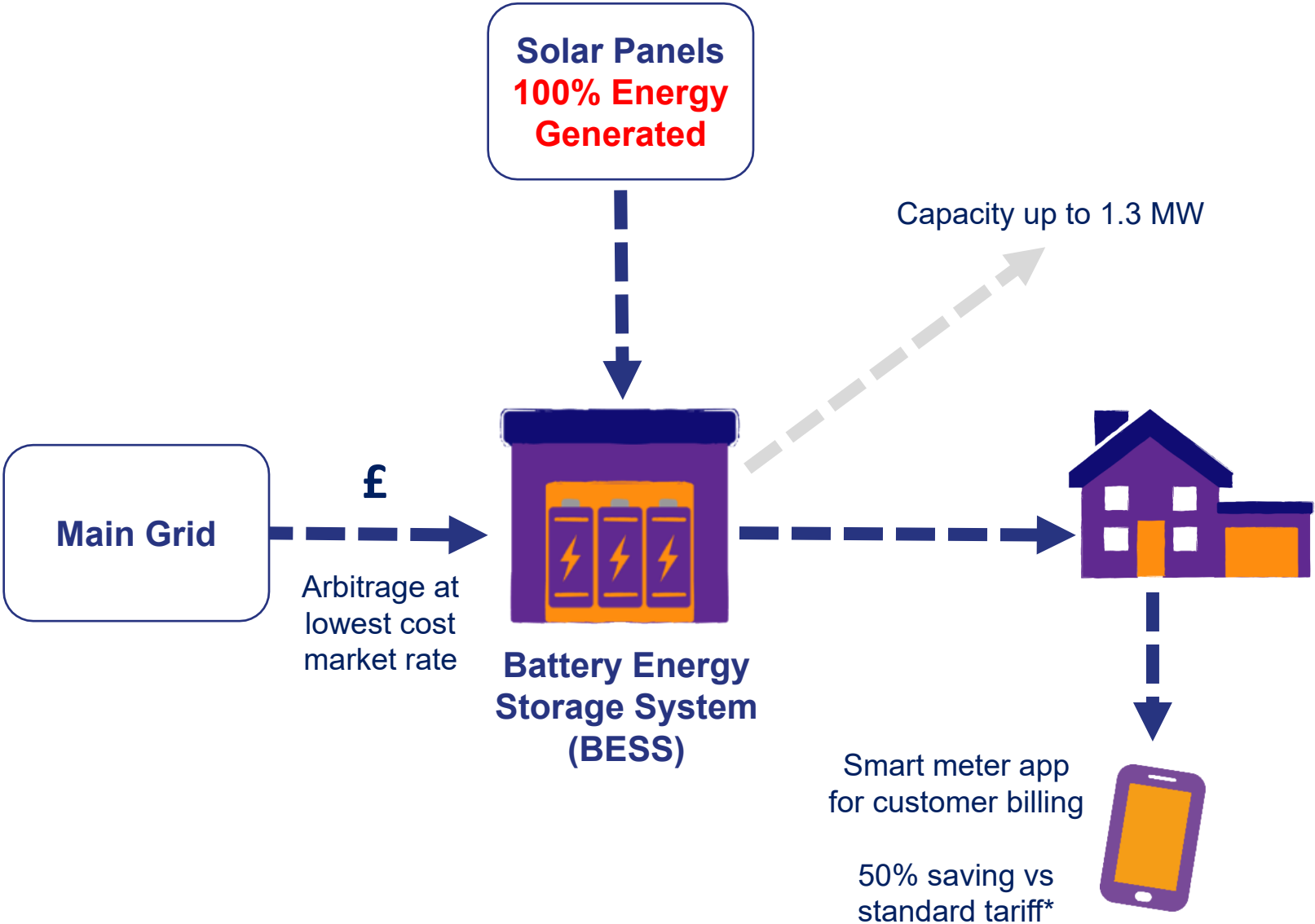
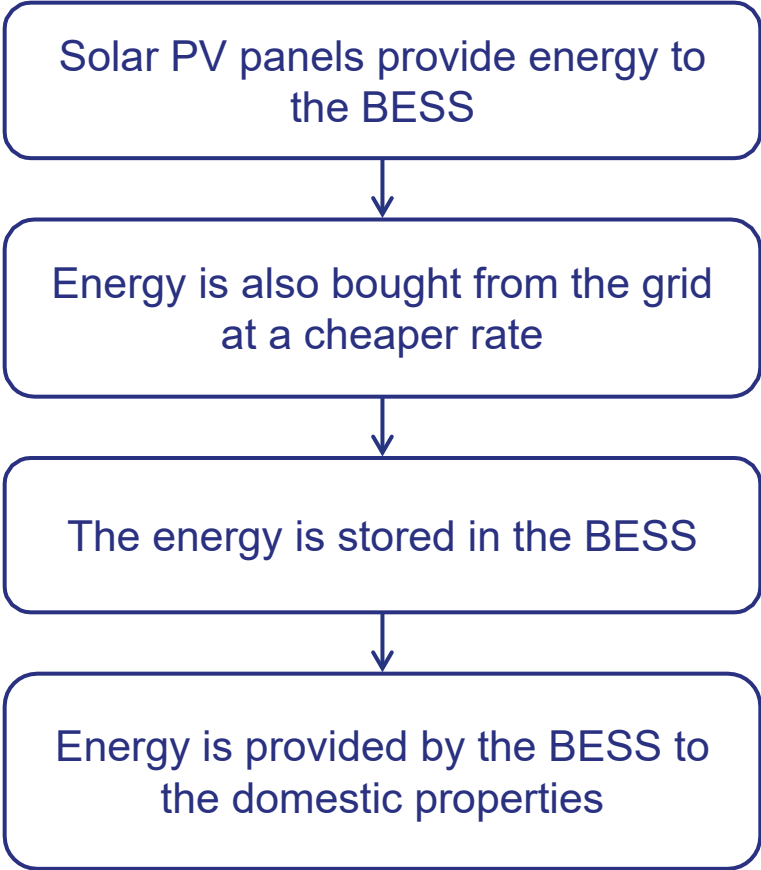
Currently working with
Karbon Homes to implement
'Community Fit' Battery
Energy Storage System
(BESS) in a new-build
residential development

First test site up and running
in Port of Rotterdam
Lessons learnt applied to
future developments

Linking into
Octopus Energy
for renewable
energy supply



How: Fractal Energy System?



*Fractal cost/usage scenario modelling Mar 23

Customer Benefit

- ✔ Significant reduction forecast on energy bills
- ✔ Variable cost model, pay what you use, rather than single service charge
- ✔ Offers better off grid resilience for customers vs. mains outages
- ✔ Easy to navigate service, all done via smart meter/app
 - Opportunity to enhance visibility/budgeting for customers and link into other benefits
- ✔ Enhances other energy saving measures they may already have in their homes
- ✔ Offers a fully 'green' energy route (buying Octopus renewable energy from grid too)

Innovation opportunity: Initial Site



- ✓ Fractal energy uses aspects of renewable innovation already known (Solar PV & Battery)
- Delivers innovation by adding capacity needed, over and above individual batteries.
- ✓ Opportunity to deliver tangible customer benefit (value for money 'green' energy), but also understand the customer experience and impact
- ✓ Opportunity to deliver customer experience potentially better than mainstream providers
- ✓ Opportunity for N Yorks Council to be a partner to this innovative format in a rural locality
- ✓ Able to share insight, from Case Study, with N Yorks, from customer, Karbon and Fractal perspective and deliver iterations for future projects

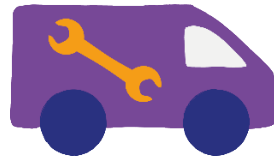
Single Dwelling Battery Storage VS 'Community Fit' Modular Battery



Mass storage of energy generated – optimizes usage on-site



Leveraging lowest cost energy and enhanced storage to be used when needed



Increases resilience and off-grid capability for entire community



Creation of a 'community' fit BESS

Delivers 630KW/h Capability



Opportunity with app development to enhance visibility of usage and improve budgeting

System Comparison



Capacity

Number of households (**19**)
 x
 Storage capacity of domestic battery (**14 kWh**)
 =
266 kWh

**Increases
 storage
 capability by
 364 kWh**

Current capacity of Fractal System
 =
630 kWh

Resilience

Battery offers 13.5kWh back up power at time of outage (if backup storage requirement anticipated)

**More resilient
 to outages**

Individual backup power capacity – 6.6 - 26 kWh (using 20-80% of total capacity)

Asset Management

Access to individual property required for cyclical upgrades, maintenances and repairs

Safety checks completed as part of EICR

Capacity begins to drop from 10 years, but battery can last up to 20 years

**Easier to
 repair,
 upgrade and
 replace**

Asset managed by third party with no access to property required.

Metering by smart meter, owned and managed by third party

Capacity maintained as part of business model

Customer Benefit Comparison



Cost (Value for Money)

Access to time of use tariff allows access to low-cost energy

Lower costs and increased value for money for customer

Offers flat rate energy price, below standard rate

Ease of Use

No interaction with the battery required. Power continues to be supplied by energy provider

App advising power levels and consumption is available from Tesla, separate to any app from electricity provider

Energy consumption information available in a single place

Billing via a customer app

App will also enable education and information to be shared with customers

Opportunity to add value to customer e.g. budgeting tools/outage information etc

Customer Service

Installation warrantee – typically 5 years
 TESLA warrantee – 10 years
 Customer service provided by Karbon Homes
 Billing through standard electricity supplier

Longevity, Service & Customer Impact

Customer service from Fractal – 20 year guarantee

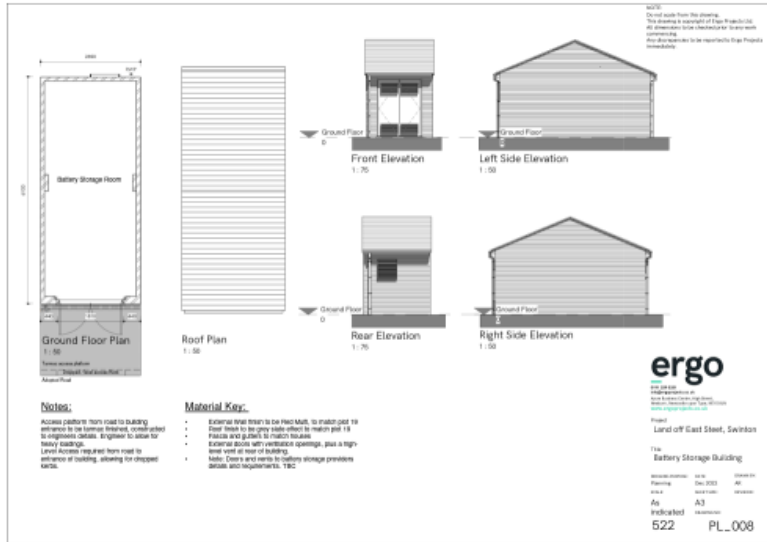
Less in home access needed

First Site Proposal and Unit Design

✔ Sited at new build development in Swinton, North Yorkshire

✔ Battery units housed in brick building to compliment aesthetics of development and sited discretely to minimise impact

✔ Stand alone building with easy access for maintenance/fire safety





Quality

Specification

- Cloud monitored battery cell shutdown
- Bespoke building design
- Noise level less than 40 db
- Fire protection measures
 - Smoke/heat detection
 - Water deluge
 - Dry risers

Sourcing

- Due Diligence
- Traceability/ROHS
- Lithium-ion batteries
- Future move to sodium-ion

Governance

- Insurance
- Regulatory compliance
- Data Protection
- Risk Mitigation
- Contract/Legal Framework
- 20-year framework

Expertise

- Building & Fire Safety Regs compliance
- Development Team
- Fire Safety consultants
- Innovation Team
- Asset Management

Battery Supply Roadmap

2024

Lithium-Ion Battery

Current mainstream battery type

Far East Supply, extended lead times

Global Supply Pressures

Fast Charging

2025

Sodium - Ion Battery

Scaled up manufacture in Scotland by AMTE Power

Benefits to supply capacity & lead times

Suitable for static battery usage e.g. BESS

Potential improved safety benefits



Planned switchover without customer disruption

Customer Touch Points



Pre-Sign Up

Explain the benefits of the system to potential customers

Customer centric information



Settling In

Survey after settling in to understand customer experience

Gathering insight and allowing iteration



Settled In

Longer term feedback on customer experience living with the system

Ease of use
Value for Money

Key Timescales



Phase 1

Phase 2

Phase 3

Specification

- Bespoke Building Design
- Fire Protection Measures
- Battery Supply
- Contract framework
- Customer app & billing

Build, Commission and Install

- Construction of building
- Delivery of system
- Install of system on site
- Customer information

Evaluation

- Customer Insight
- Quantitative Data
- Customer Satisfaction

Any Questions?

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