
Connected Energy
Advanced Energy Storage Solutions

Introduction

Connected Energy – Advanced Energy Storage Specialists

This document outlines

- Connected Energy's award winning battery storage technology
- The benefits of battery storage
- A detailed case study with indicative financial payback
- Our technology and control system
- Key contact details to get in touch

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Connected Energy

Giving second life batteries a new life

- Delivering benefits to our customers
  - The Hold building, Suffolk County Council
    - 300kW / 360kWh
    - Grid Services / Energy bill saving
  - Umicore Recycling, Belgium
    - 1200kW/720kWh
    - Grid Services

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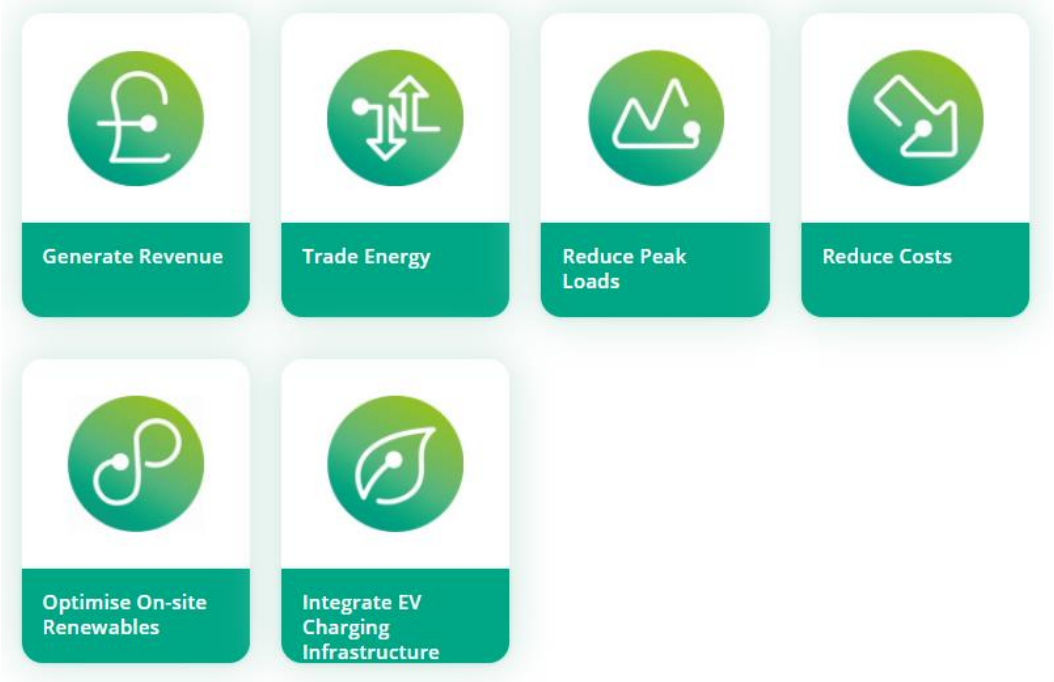
The Benefits of Energy Storage

Energy storage can help reduce energy cost, generate new revenue, optimise the use of on-site renewables and manage peak loads.



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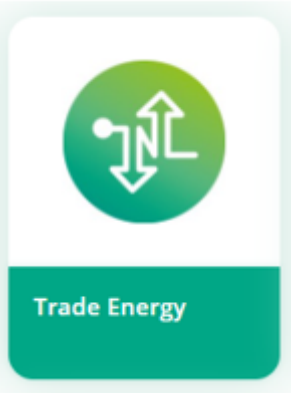
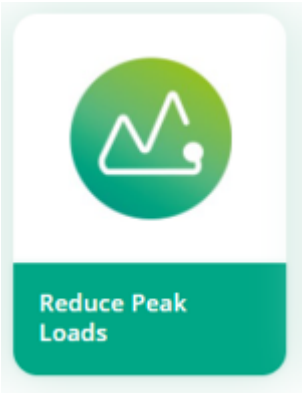
Energy Storage benefits explained

- Grid Services energy balancing
- Dynamic Firm Frequency Response
- Revenue generation through aggregator
- TRIAD and DUoS avoidance



- Charging for wholesale trading.
- Bidding for both generation reductions and demand increases.
- Provided for the Electricity System Operator (ESO)



- Site expansion creates greater electrical usage that our E-STOR can manage.
- E-STOR can track site energy load and discharge power to reduce the peaks.
- E-STOR automatically recharges the system when spare capacity is available and ensures it is ready for the next load peak.

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Energy Storage benefits explained (2)

- Energy pricing fluctuates throughout the day and can increase due to time of day, seasonality, or peak usage.
- E-STOR time shifts energy usage by charging when energy is low cost and discharging back to site when the cost is higher.

- E-STORs track site load and generation from renewable energy sources.
- The system identifies surplus energy generation, actively charges and stores this energy.for site usage

- E-STOR manage EV chargers load by discharging to flatten load spikes when chargers are in use.
- Integrated with on site renewables to manage load spikes and decarbonize EV charging.

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Who we are……

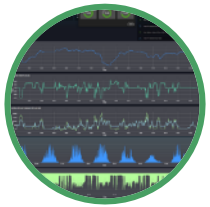
World leading innovators in energy storage & circular economy

- Dedicated to the design, manufacture and operation of world class energy storage systems.
- Management team with mature experience from automotive and energy sectors.
- Aiming to achieve ambitious international growth

Hardware and software system integrators

Manufacturing supply chain developers

Sales, operation and customer service providers



Project development and finance

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UK Wide capability providing a full range of services

Technical Centre
R&D, production, supply chain
Norfolk

Head Office
Sales and commercial services
Newcastle upon Tyne

Micro-grid demonstrations site
Norfolk

- Site data and feasibility assessment
- Energy storage system supply, installation and support
- Operation, monitoring, optimisation and reporting
- Project finance & bespoke solutions

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The E-STOR energy storage system

E-STOR uses second life EV batteries.

- Installed, operational and proven technology
- Modular, flexible design for low cost scalability
- Battery/OEM agnostic
- Integrates existing, reliable technologies
- Operating system monitors performance and optimises system
- Simple, low cost installation and maintenance

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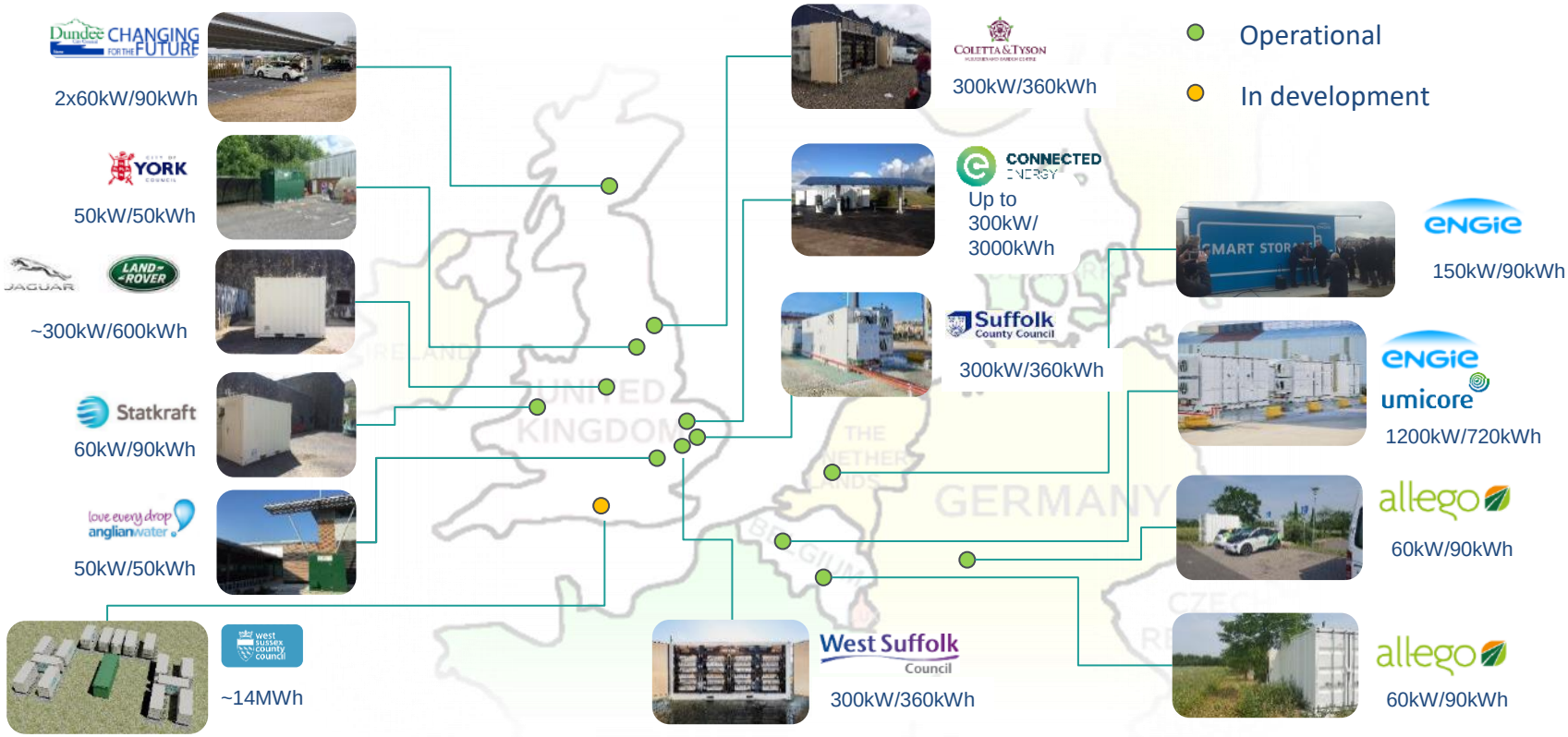
Systems in Operation and Development

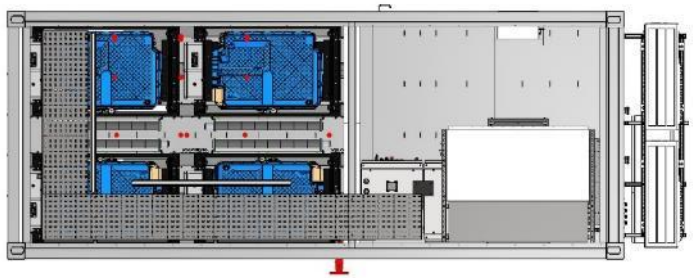


ESaaS – Connected Energy Assets, Engie & Sumitomo finance

Medium scale I&C

300kW / 360kWh

- 20’ container modules
- 300kW & 360kWh (Renault Kangoo)
- BtM systems
- Site integration
- Multi-function – multi-value stream



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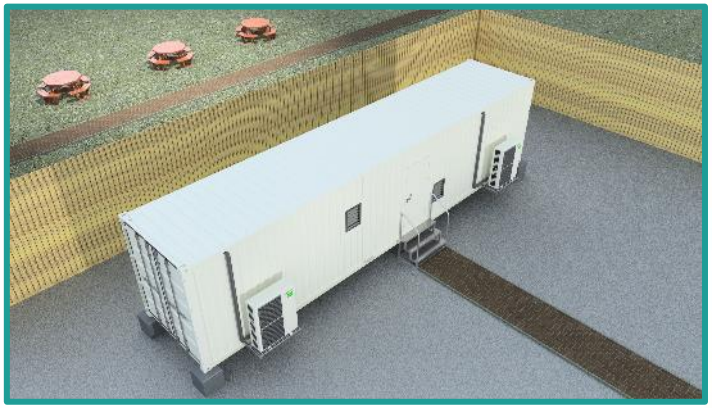
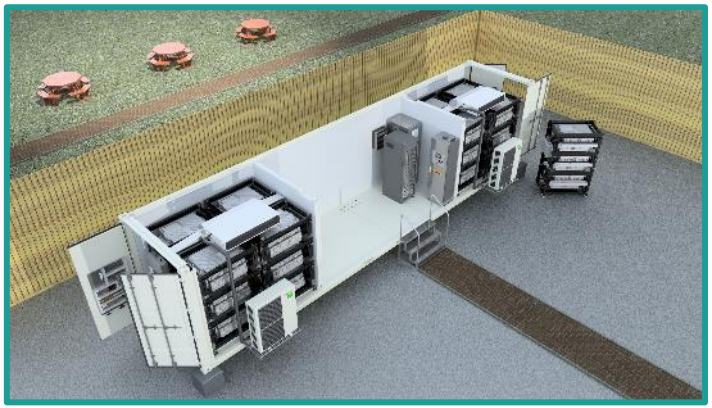
Medium scale I&C

600kW / 720kWh

- 36’ container modules
- 600kW & 720kWh (Renault Kangoo)
- BtM systems
- Site integration
- Multi-function – multi-value stream





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Large scale multi MWh

2.5MW +

Split systems

- Designed for high volume cost benefits
- Low cost logistics, maintenance & upgrade
- Battery type flexibility
- Flexible power:energy ratios

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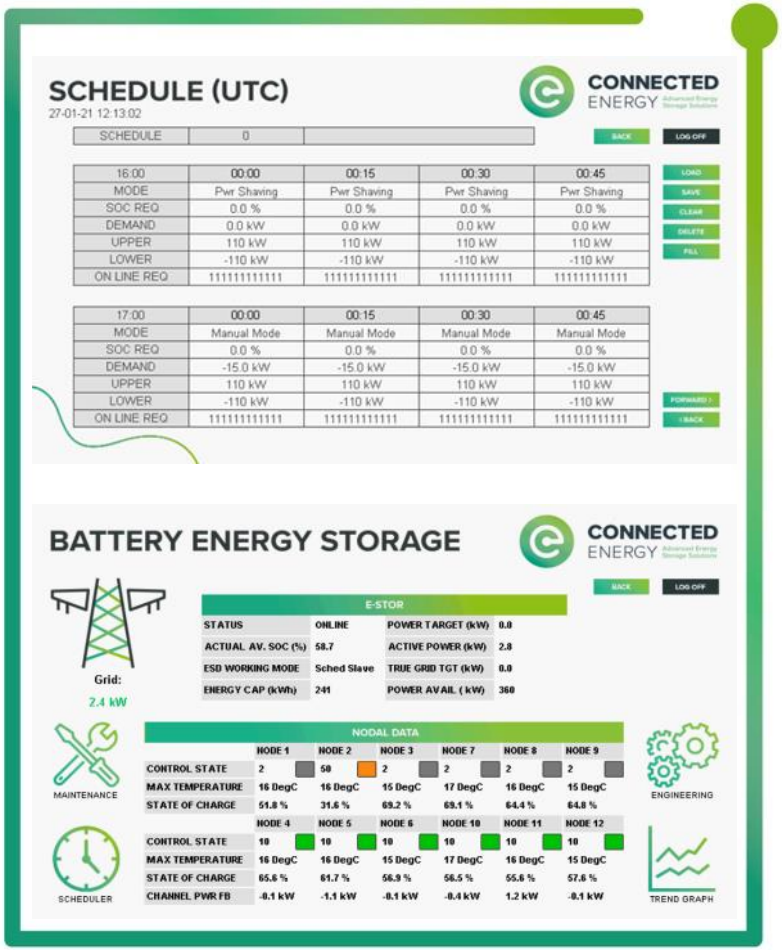
Control and monitoring

Local and cloud level resilience

- Site specific control parameters, operating regimes, performance tracking and multi site aggregation.
- Ability to schedule charging and discharging to ensure optimal peak load avoidance.
- Maintenance monitoring and scheduling to ensure optimal performance of the system.
- Battery cell monitoring and balancing to increase efficiency of systems



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Operating an E-STOR

Reduce costs and generate revenue

- Optimised control to improve energy use.
- Direct aggregator or Virtual Power Plant integration through API
- Track metered source to provide real time constraint management.
- Provide resilient back up supply.

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Supply chain

A business built on strong partnerships

- OEMs supply low cost 2nd life batteries to spec
- Collaborative product development with ABB
- Contract assemblers build production prototypes
- IPA provide low cost volume manufacture
- Collaborative R&D with multiple partners
- Project finance partners

RENAULT

NISSAN JAGUAR LAND ROVER

ABB

IPA Interconnect Product Assembly AS

WMG THE UNIVERSITY OF WARWICK Lancaster University Newcastle University

UKRI Innovate UK

National Innovation Centre Data - Powered by Newcastle University

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MACQUARIE

Summary

E-STOR second life battery system can provide the following benefits

- Generate revenue through the national grid balancing services
- Reduction in your fixed energy costs by using battery power
- Trade your battery in the market
- Reduce peak loads and manage potential import capacity constraints
- Optimise on-site renewables
- Reduce costs by charging battery when electricity cost is low and using when cost is high
- Integrate and enable EV charging infrastructure.

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TURQUOISE Finance | Energy, Environment, Efficiency

Sumitomo Corporation

MACQUARIE

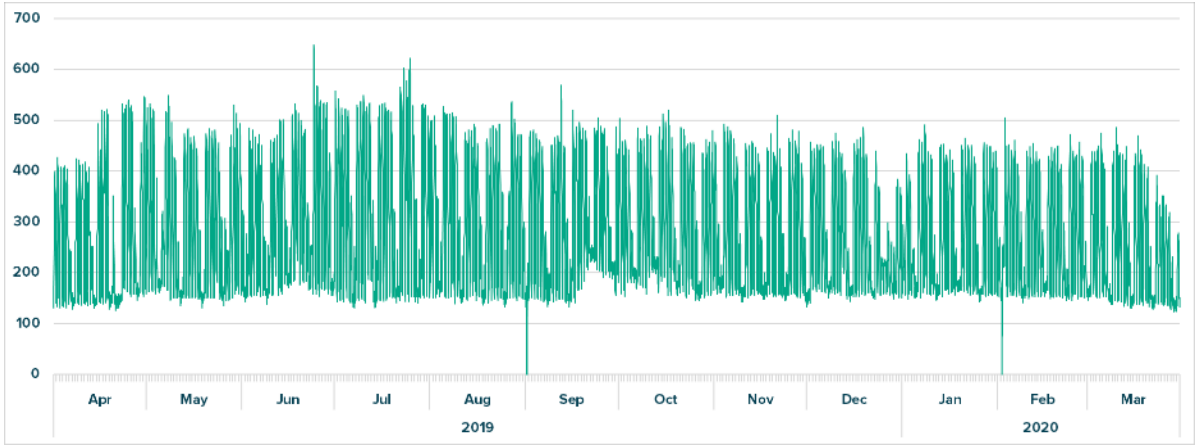
ENGIE

Example Business Case

Site Profile Analysis

Site Details	
Site Name	Council County Hall
MPAN Region	20
DNO Code	Southern
Import Capacity	750 kVA
Export Capacity	300 kVA

Consumption	
Peak Demand	648 kW
Triad Estimate	365 kW
Annual Consumption	2,417 MWh/year
Average Day	391 kW
Average Night	186 kW
Average Weekend	186 kW



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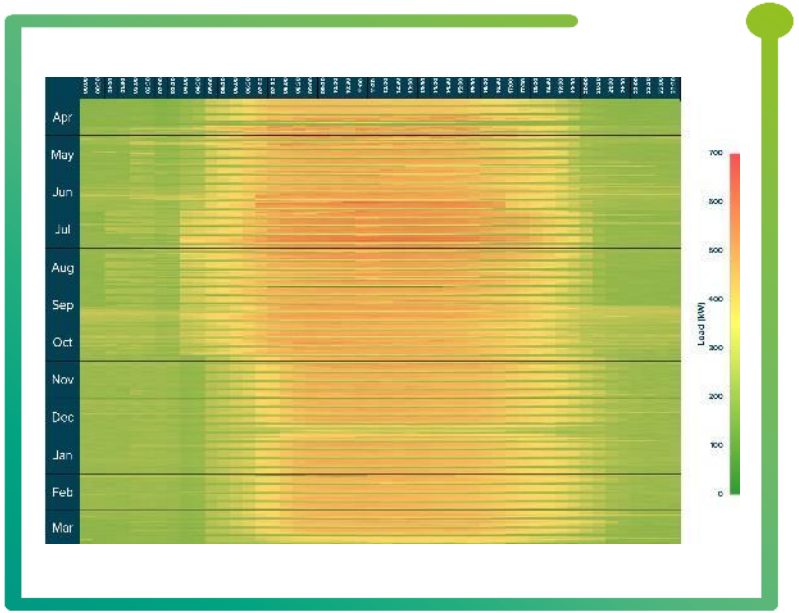
Sizing a Battery

Proposed System	
System	**E-STOR 300/360**
Max Power	**300 kW**
Installed Capacity	**360 kWh**
Size	**1 x 20” Container**

- The load profile of the site is a stable daytime office shape
- A stable baseload throughout the year of 120 kW
- No visible trend of increase over the year’s data
- An increase to the import connection would be needed to allow the battery to charge at full power at any time of the year



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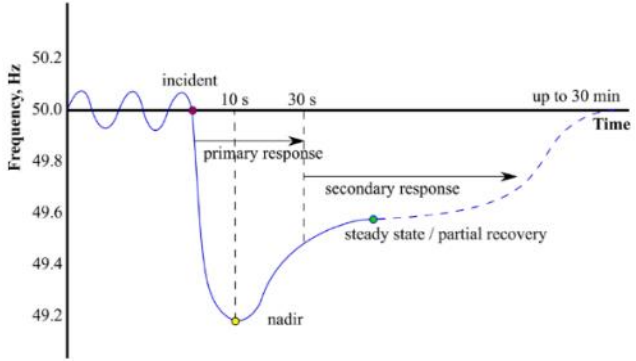
Aggregator Portfolio

- CE Recommend using an aggregator to control the system to access grid services
- Currently the most lucrative market are **Frequency Response** and **Capacity Market**
- The normal operation of a system will be small charges and discharges to meet the grids needs
- Batteries get paid for being available for these services



Additional Benefit of an Aggregator

- Allows smaller systems access to the market
- Provides protection for non delivery
- Portfolios are dynamic and will track different revenue streams

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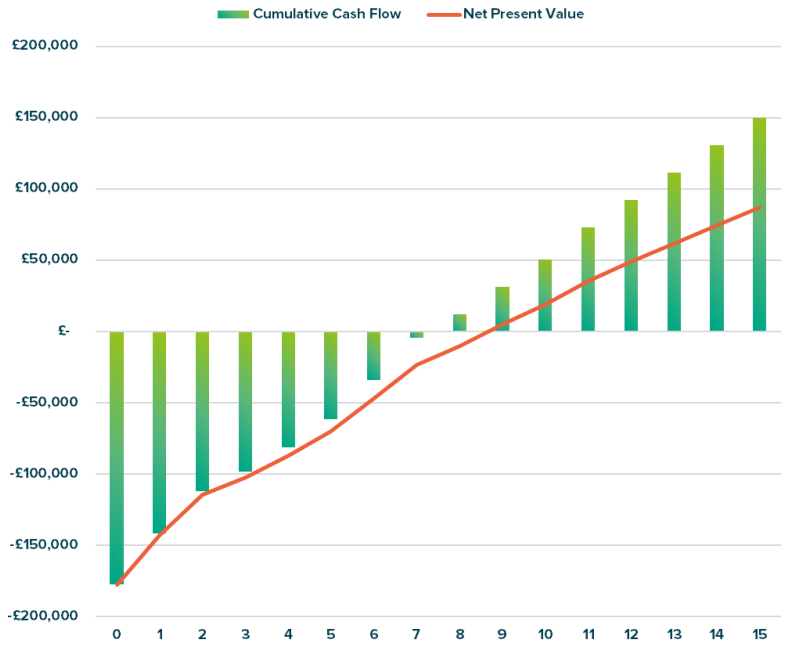
Business Case Estimate

CAPEX	
System Cost	£ 155,000
Estimated Installation	£ 25,000

OPEX	
PPM	£ 1,500 pa
Energy Balancing	£ 1,927 pa

REVENUE	
Behind the Meter	£ 1,760 pa
Aggregator Portfolio	£ 29,176 pa

RESULTS	
Payback Period	5 Years 3 Months
Cumulative Cash Flow (15 years)	£ 240,992
Net Present Value (DR@3%)	£ 161,107
Internal Rate of Return	15.73 %



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* Revenue averaged over 15 years
** Revenues taken from an analysis from Grid Beyond. CE recommend getting a direct quote from an aggregator

Thank you

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