

# PAPER TECHNOLOGY INTERNATIONAL

THE JOURNAL OF THE BIOFOREST PRODUCTS SECTOR



## PITA PAPER *matters!* 2018 Conference & Exhibition at Lancaster University

The Rewards of Innovation through Energy Storage

Jason Hunter (Dale Power Solutions)

## The Rewards of Innovation through Energy Storage

Presented by Jason Hunter

Energy Storage | UPS | Generators | Service



## The Rewards of Innovation through Energy Storage

- Reduce energy bills by 9% to 25% plus
- Create a brand new revenue/income stream to the organisation
- Without any requirement for up front capital expenditure

Energy Storage | UPS | Generators | Service



### The Rewards of Innovation through Energy Storage



**► PROVEN TECHNOLOGY**  
DSS product based on NEC Proven technology employed in Grid Storage Systems since 2009

**► NATIONAL COVERAGE**  
Experienced national installation and service provider

**► FINANCIAL SOLUTION**  
Flexible financial funding including self-financing options

**► AGGREGATOR RELATIONSHIP**  
Providing revenue generation and reduced energy costs

**DALE**  
POWER SOLUTIONS

Energy Storage | UPS | Generators | Service 



UPS | Energy Storage | Generators | Service  
[www.dalepowersolutions.com](http://www.dalepowersolutions.com)



### The Rewards of Innovation through Energy Storage

**Electricity invoice**  
For [redacted]  
New charges - 1 November 2016 to 30 November 2016

Meter	kWh used	Pence per kWh	Total charge
<b>Charges</b>			
All Days	233,164.20	4.932	£11,499.66
All Nights	93,657.00	4.846	£4,538.62
<b>Site Charge</b>			<b>£18.63</b>
<b>Other charges</b>			
Monthly Capacity Market Charge			£37.49
Monthly Triad Charge			£3,622.18
Distributor Use of System charges - see breakdown			£3,980.42
Renewables Obligation Charge	326,821.20	1.558	£5,091.87
BSUoS Charge	326,821.20	0.425	£1,388.99
Feed in Tariff Charge	326,821.20	0.446	£1,457.62
EMR CfD Payments	326,821.20	0.069	£225.51
<b>Total excluding Climate change levy</b>			<b>£31,880.99</b>

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### The Rewards of Innovation through Energy Storage

#### Distributor Use of System charges

For [REDACTED]

New charges - 1 November 2016 to 30 November 2016

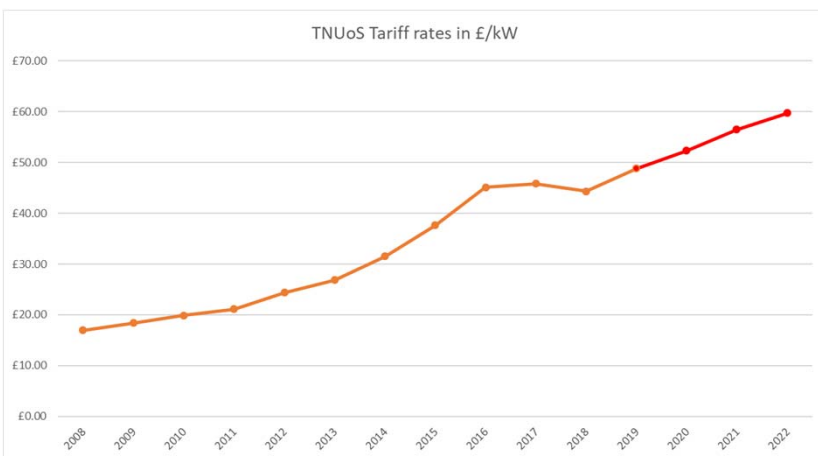
	kWh used	Pence per kWh	Total charge
Consumption charge			
RED	33,171.49	7.723	£2,561.83
AMBER	101,176.70	0.469	£494.75
GREEN	192,473.10	0.058	£111.63
Agreed Supply Capacity Charge 1000.0 at 2.6200p per kVA for 30 days			£786.00
Standing charge			£28.21
<b>Distributor Use of System charges - excluding VAT</b>			<b>£3,980.42</b>



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### The Rewards of Innovation through Energy Storage



**nationalgrid**

Source: Five Year Forecast of TNUs Tariffs for 2018/19 – 2022/23

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Additional Insights | Innovation *Plus*

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### Smart Energy Storage - Distributed Storage Solution (DSS®)

The DSS® platform is a pre-configured, fully-integrated AC energy storage platform optimized to support advanced energy services creation at the grid edge, whether behind the meter for C&I enterprises or in front of the meter for distribution utilities.

2 BAY UNIT		4 BAY UNIT		6 BAY UNIT	
ENERGY (kWh)	POWER (kW)	ENERGY (kWh)	POWER (kW)	ENERGY (kWh)	POWER (kW)
85	30	255	30	425	100
	100		100		280
	30		280		710
170	30	340	100	510	100
	100		280		280
	280		710		710



"Front-of-the-meter" DSS® deployments smooth intermittent renewable generation, shave demand peaks, improve system utilization, and help manage distributed assets

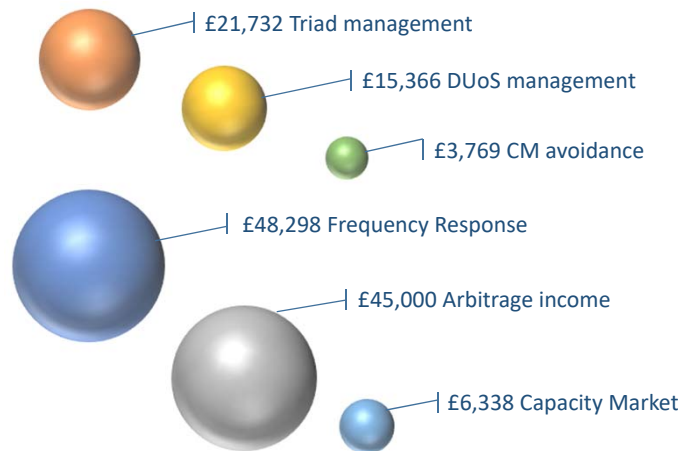


### The revenue stack

Behind the meter battery based energy storage solutions can provide energy bill savings (1) while also creating new revenue streams (2) from the sale of ancillary services to National Grid.

1. Energy Bills can be reduced in a number of ways, through Triad management during the Winter, through managing the time of day of purchase of energy and managing capacity mechanism charges on energy bills
2. Revenue can be generated by selling frequency response services to National Grid, by participation in the Capacity Market and energy trading and arbitrage

For a typical 1MW/1MWh solution the potential savings achievable could look like this:



## Explanation of revenue stack

**Triad charges**, also known as TNUoS charges can be significant and are calculated based upon peaks in demand at 3 HH points between November and February. Charges range across regions with forecast increases to over £59/kWh by 2022

**Distribution Use of System charges**, also known as DUoS are costs added to a bill for the distribution of energy to your location. These charges vary depending on the time of day and region. Savings can be achieved by buying cheaper electricity during off peak hours, storing and then consuming later.

**Frequency Response** auctions are held each month by National Grid to acquire capacity to help manage frequency. Your energy storage system allows the System Operator to maintain supply within 1% of 50Hz. These services are vital to providing resilience and a valuable source of income to asset owners.

**Capacity Mechanism** charges are added to consumers bills in order to help fund baseload generation. Some of these charges can be avoided through an energy storage system, although they are not as significant as other savings.

**Capacity Market** auctions are held each year to add to the baseload generation capability of the System Operator. Your energy storage solution can be managed to participate in these auctions by providing additional power when needed.

**Energy Arbitrage** is where your partner aggregator access the balancing mechanism and trades electricity stored in your system. With access to the System, the Day Ahead and the Intraday markets, this is an additional source of revenue generation from your new energy storage solution.



## Capital Cost

There are two main elements to an energy storage solution; the cost of the equipment and the cost of installation and commissioning. The following is an example contents of a 1MW/1MWh solution;

### Main system costs include;

- Grid battery system
- Power conversion system
- HVAC cooling systems
- AEROS control, communication, and DPS RMS Insight
- Step-up transformer procurement as appropriate
- MV Ring main unit procurement
- Shipping to site
- Installation, commissioning and training
- Standard 2 year preventative maintenance and warranty

### EPC equipment and services include;

- Civil works and foundation materials and labour
- Rigging and installation
- DC and AC cabling procurement and installation
- Construction management
- Fire suppressant NOVEC 1230 and associated works
- Communications links
- On site commissioning, testing, energisation
- Liaising with aggregator partner





## Finance options

Finding the right balance between risk and reward is never a straightforward decision; Dale Power Solutions have identified a portfolio of financier and funding partners that will help you make the right decision for your organisation.

**Straight up Capex.** Some organisations have cash allocated in their capital expenditure budgets for the acquisition of an energy storage system. In this event, we accept a staged payment profile ranging from 25% of value with purchase order through to the final 15% upon commissioning of the system.

**Revenue Sharing Agreement.** If you would prefer a third party to pay for the system on your site and pass off any potential risks our RSA allows you to still participate in the revenue streams although at a lower amount. You never own the system but could receive 10%-20% of the full revenue stack.

**Other forms of finance are available;** such as Battery Storage as a Service, Energy Savings Agreements, Energy Services Agreements, Power Purchase Agreements, structured receivables finance and more. We will talk through the options and identify the most relevant for your organisation.

**Vanilla Finance.** Traditional finance can be arranged such as hire purchase or finance leasing through our partners. This allows you to match the payments for the system to the revenue generated and the savings made. This can be from 2 to 10 years and indicative interest rates from 5 to 10%.

**Land leasing.** If you have land or space with a grid connection in place you could generate a fixed income stream from an energy storage solution on your property. A third party would buy the system from us and pay you a fixed annual fee for the use of your land and grid connection.



## Why Dale Power Solutions?

### Smart Energy - Distributed Storage Solution (DSS®)

- **Why choose Dale for DSS?** Simple...
- **Approved** by NEC Energy Solutions as their first qualified integrator, supplier and maintenance partner
- Established UK based company maintaining battery based power supplies since 1935
- **True national coverage** with 24/7/365 maintenance including Dale Remote Monitoring
- Smart technology to give you a **fast return on your investment**





**Accreditations – 2017 Audited Results**

**Oil & Gas Market**



**FPAL Supplier ID No: 10040683**

<input checked="" type="checkbox"/> Quality	9.0
<input checked="" type="checkbox"/> Health & Safety	9.1
<input checked="" type="checkbox"/> Environment	8.8
<input checked="" type="checkbox"/> Competence & Training	8.6

Verification Visit Date: 20 July 2017  
 Verification Expiry Date: 19 July 2019  
 Location Visited: Scarborough

**Utility Market**



Supplier Number: 061134

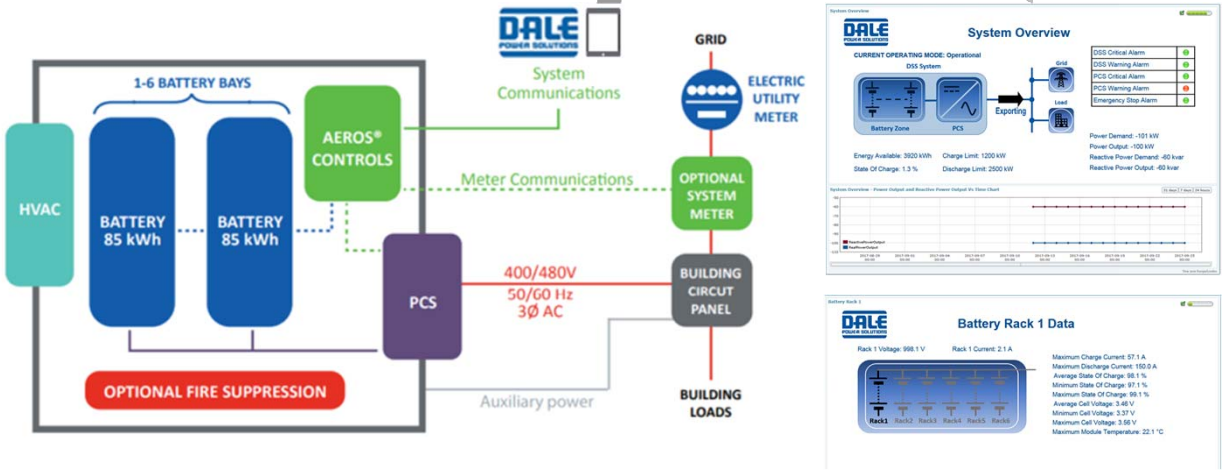
Has achieved the following standards through assessment for Safety, Health, Environmental & Quality practices and procedures as a registered supplier on Verify

**Category B2**

Management System Evaluation		Onsite Assessment	
Health and Safety	100%	Health and Safety	99%
Environment	98%	Environment	100%
Quality	93%	Quality	100%
Corporate Social Responsibility	92%	Corporate Social Responsibility	100%



### Case Study – Liverpool, UK



- Enhanced 5 year maintenance with Dale Insight Remote Monitoring and extended warranty protection & 24/7 engineer call out.



### Next steps?

In order to progress a more formal proposal for your organisation we need some base data to work from;

If you provide us with your half hourly data, maximum import and export capacity on your site grid connection along with your postcode then we can show the specific revenue stack, system cost and indicative finance repayments.

Please provide to our Head of Sales – Energy Storage via email to [Jason.hunter@dalepowersolutions.com](mailto:Jason.hunter@dalepowersolutions.com) and we will be in touch.

