

Enabling Renewable Electricity

by developing the lowest cost, grid-level energy storage battery

Nick Kitchin, CEO

14/10/2016

The Problem - Wind

nationalgrid

£90m



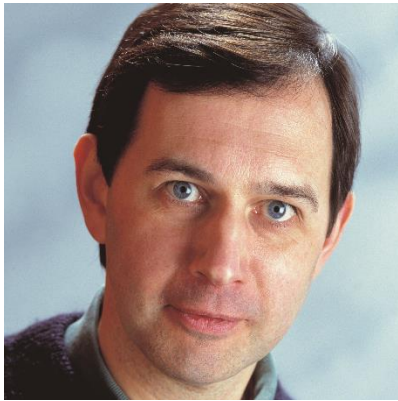
National Grid paid £90m to wind farm operators in 2015 curtailment charges (£53m in 2014) because the electricity would have been generated at the wrong time.

Source: www.ref.org.uk

Milestones

- ▶ Jun 14: £800k DECC grant
- ▶ Sep 14: £250k seed
- ▶ Dec 14: UK patent granted, 2015: 9 international applied for and 4 new patents to file in May 2016.
- ▶ Jan 15: Customer Interest Group established
- ▶ Oct 15: Grid-connected 2kWh battery
- ▶ Nov 15: £1.1m second seed.
- ▶ Apr 16: £1m A round. 12 employees, 12,500sq.ft. facilities Sheffield and San Francisco

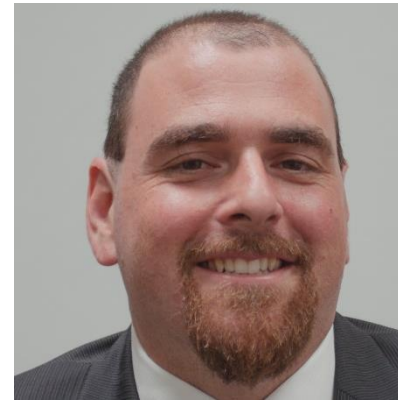
Management Team



CEO
Nick Kitchin



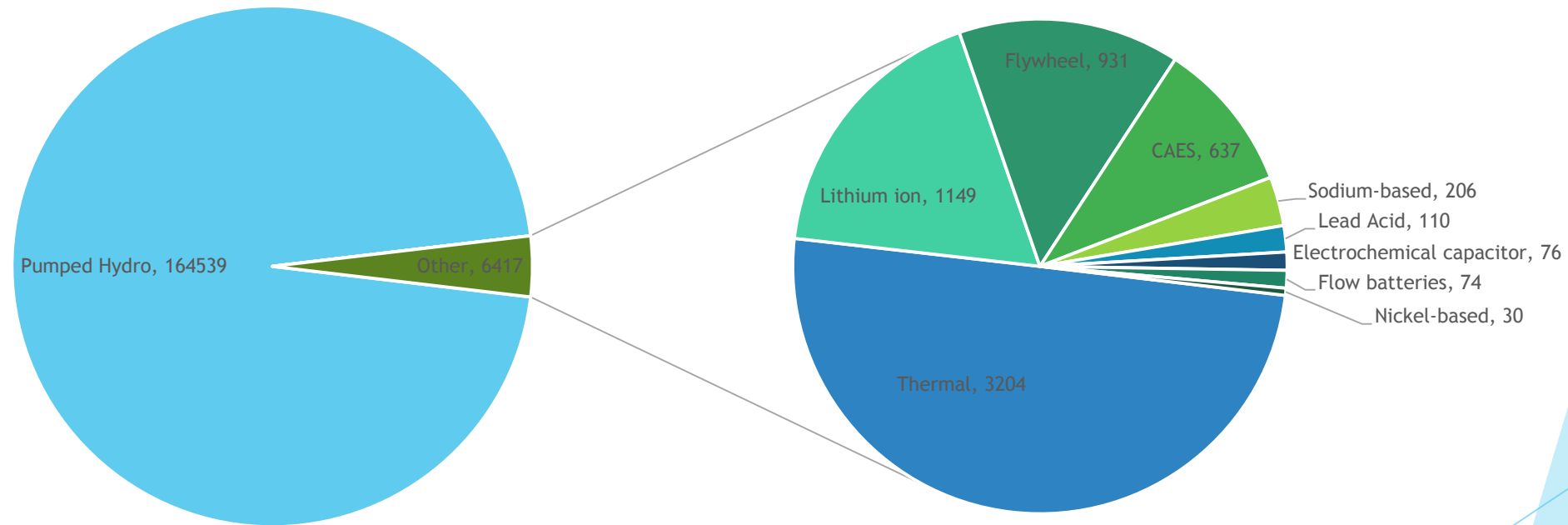
COO
Darron Brackenbury



CTO
Mike Hurwitz

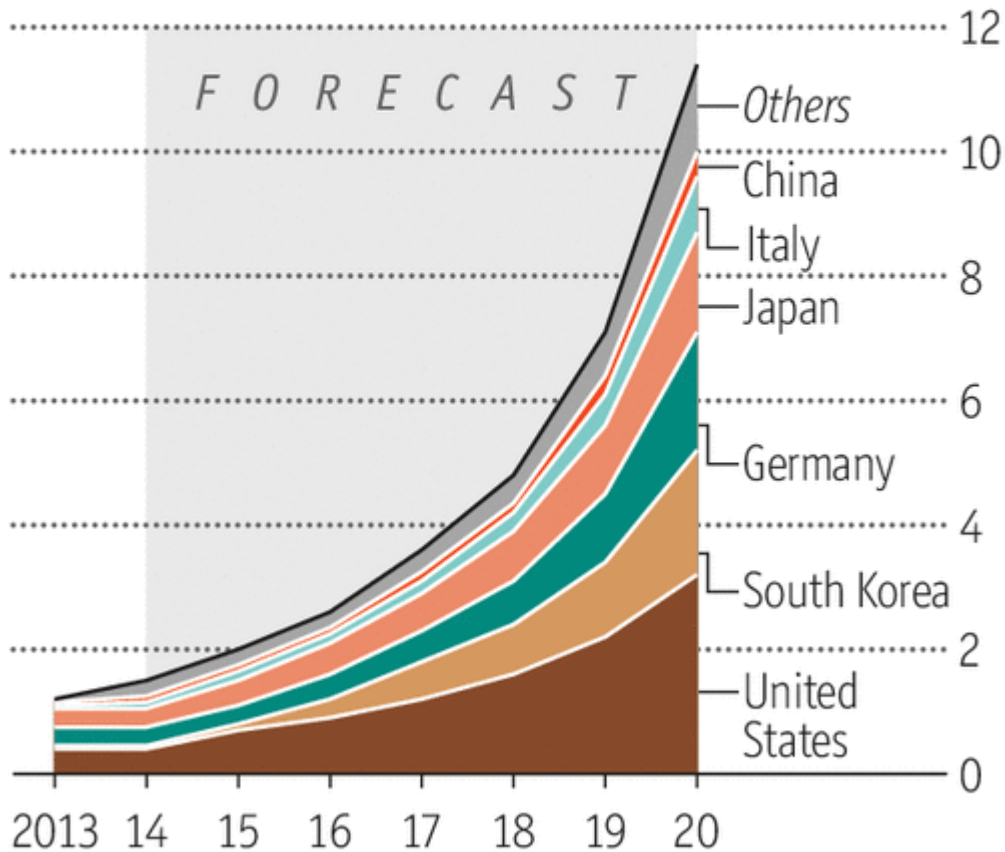
Energy Storage Technologies

DOE Global Energy Storage Database: Total Operational Energy Storage (MW) July 2016



What's in store

Worldwide energy storage, gigawatts

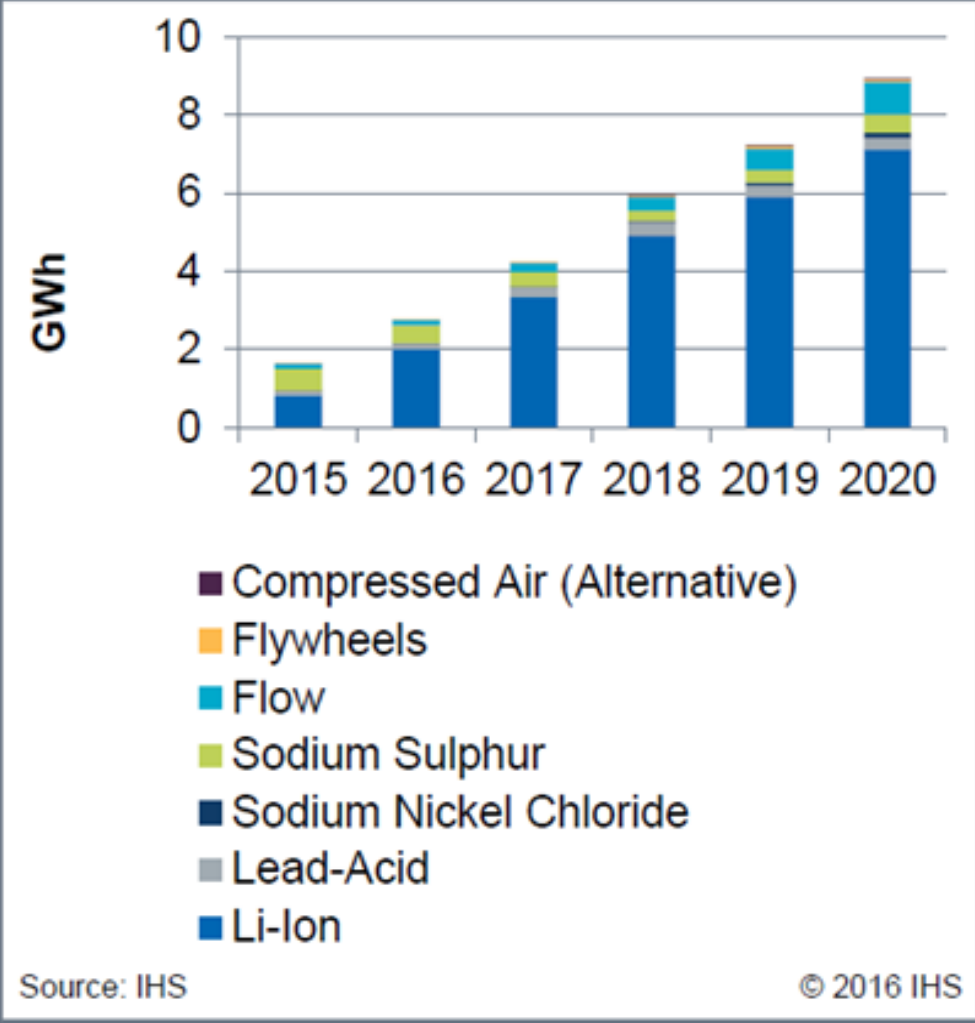


Source: Bloomberg New Energy Finance

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Global energy storage installed capacity by technology



Source: IHS

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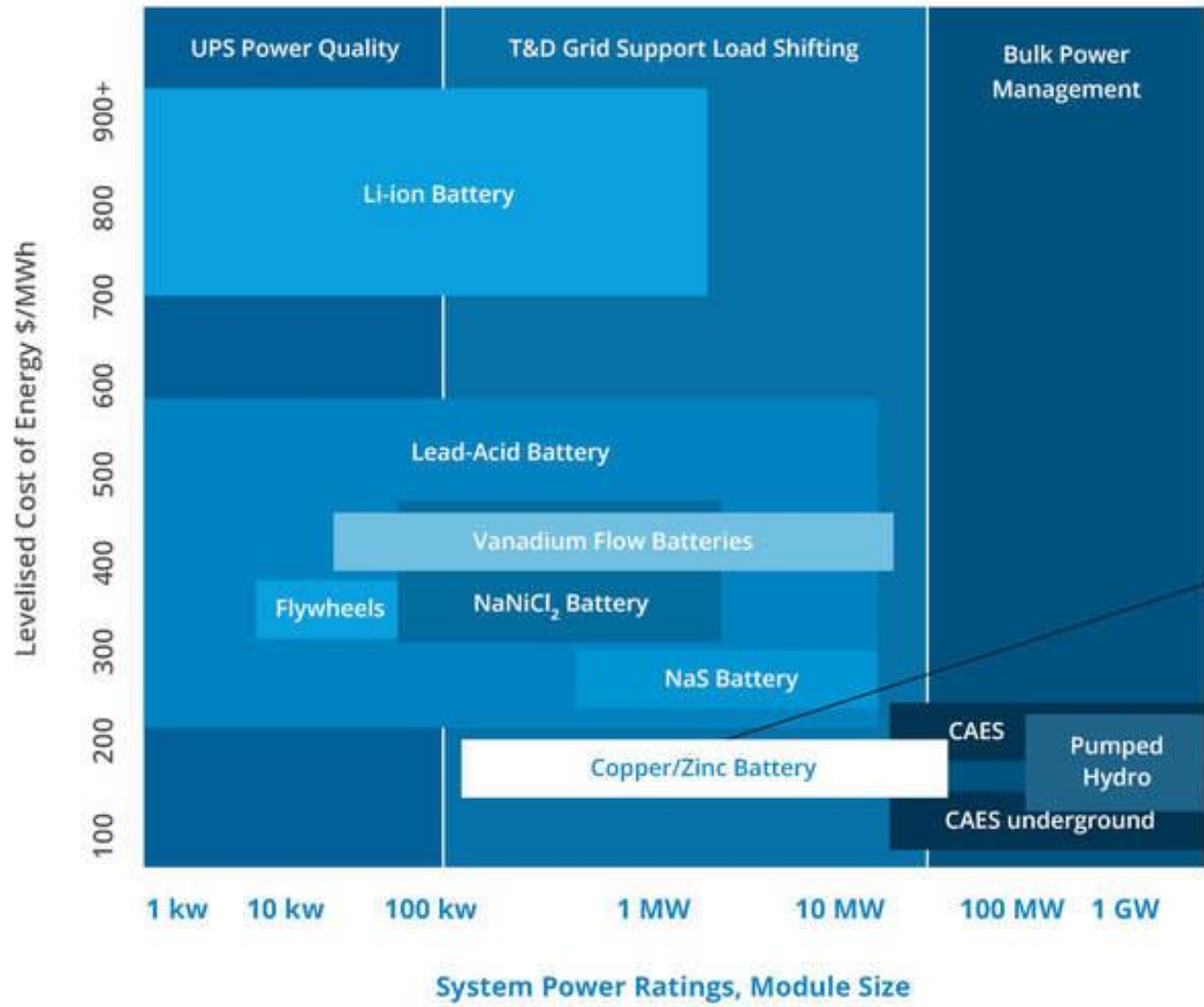
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Addressable Market

- ▶ Time-shift (4-6hrs) = 50% (1.3GW/year)
- ▶ Cumulus: £0.7m T/O 2017 (£325m 2021)
- ▶ Cumulus: £(2.8m) EBITDA 2017 (£107m 2021)
- ▶ Based on £350/kWh 2017 (£275/kWh 2020)
- ▶ LCOE £120/MWh (Li-ion £465-£765/MWh, reducing)

Monetisation

- ▶ CAPEX + Maintenance
- ▶ Storage as a Service model
- ▶ Rolling maintenance contracts
- ▶ Licence agreements



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Levelised Cost of Energy (LCOE) \$/MWh

Source: DOE/EPRI 2013 Electricity Storage handbook July 2013

DOE/EPRI Data with Cumulus projections added



1MWh

Technology



100MWh

Our patent granted Copper/Zinc battery will look like...

Copper/Zinc battery

Safe &
Reliable

- Proven chemistry
- Scaling down
- Ambient operation

Lowest
Projected
LCOE
(£120/MWh)

- Abundant, low-cost materials
- Scalable
- Maintainable - 30 year life
- Round trip efficiency 80%+

Target Markets



Renewables

Time shifting

1MWh +



Industrial

Energy
management

1MWh +



Infrastructure

Grid, Rail,
Electric Vehicle
recharging

10-20 MWh +



SHEFFIELD FORGEMASTERS
INTERNATIONAL



nationalgrid



The
University
Of
Sheffield.



SIEMENS



S&C ELECTRIC COMPANY
Excellence Through Innovation



PARSONS
BRINCKERHOFF

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Customer Interest Group

The logo for Cumulus Energy Storage is centered in the upper half of the slide. It consists of the word "Cumulus" in a large, white, sans-serif font with a registered trademark symbol (®) to its upper right. Below it, the words "Energy Storage" are written in a smaller, white, sans-serif font. The entire logo is set against a dark blue square background that has a gradient from dark blue at the top to a lighter blue at the bottom.

Cumulus[®] Energy Storage

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