

Electrical Energy Storage Systems Market perspectives, considerations and opportunities for the Electrotechnical contractor



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Who should EESS be pitched at?

- Early markets focused on:
 - Clients with PV coupled systems
 - Clients wanting a 'back-up' power supply
 - Areas of sporadic supply
 - Mission critical / health critical applications
- Changing world and changing energy systems
 - Time of Use tariffs (ToU)
 - Virtual Power Plants (VPP), Energy Aggregators, Distributed Energy Resources (DER), Demand Side response (DSR)
 - Energy Prosumer concept





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Who should EESS be pitched at?

- Firstly lets focus on:
 - Clients with PV coupled systems





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Will an energy generating client benefit from EESS?

- Need to explore the use case
- Is the building in use during the day?
 - Office, factory etc
- Is an energy divertor in use
- Is high energy equipment set to work on timers during generation?







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Will an energy generating client benefit from EESS?

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Potentially no case for increased self usage





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Real world Examples



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Use case 1: Occupied office with 30kW PV array

- Typical weekday
- 98% all energy generated is consumed

System Production: 132.5	9 kWh	Consumption: 3	58.48 kWh
98%	2%	36%	64%
Self-consumption:	Export.	Self-consumption:	Import:
130.29 kWh	2.3 kWh	130.29 kWh	228.19 kWh

• <u>No</u>benefit in having an EESS for increased self usage





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Use case 2: Light usage home with 4kW solar PV



Use case 3: Domestic user with 5kW solar PV and EV



Financial model- ToU- Time of Use Tariffs





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Financial model- BTM Arbitrage / VPP

- Arbitrage- same as stock market- buy low, sell high
 - 'Gaming' the energy system
 - Automatic through aggregation companies or conducted independently
 - Aids grid balancing
- Virtual Power Plants
 - Aggregation by third party company
 - Generation assets as well as storage
 - Fully automatic







Luke Osborne Energy and Emerging Technology Solutions Advisor



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Costs vs benefits



Expanding market

- Not only for increased self usage (old model)
- ToU and VPP
- Reduced cost and size of grid connections for new estates
 - Designers are calculating that EESS on new housing and commercial estates can reduce the size and cost of connections to the grid, through mitigating against short demand spikes which would have triggered oversized connections.



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Prosumer – who, what and why?

- October 2018 new standard was published-IEC 60364-8-2
- Introduced new terminology:
 - Prosumer
 - Prosumer's Electrical Installations (PEI)
- Enhance end user experience
- Push forward decentralisation of energy generation

EC.	IEC 60364-8-2
INTERNATIONA STANDARD	Edition 1.0 2018-10
NORME INTERNATIONA	
Low voltage electrical installations – Part 8-2: Prosumer's low-voltage elect Installations électriques à basse tensi Partie 8-2: Installations électriques à b	rical installations on – vasse tension du prosommateur

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Prosumer – who, what and why?

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Energy and Emerging Technologies Solutions Advisor

Example architecture

Key	
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- 1 Public network
- 2 Power supplies
- 3-1 Load 1
- 3-2 Load 2
- 3-3 Load 3
- 3-4 Load 4
- 4 Storage units
- 7 Prosumer
- 8 Origin of installation
- 10 Electrical energy management system (EEMS)
- M Energy meter/Measuring equipment (M)
- ↔ Direction of energy flow





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Example architecture

New Design considerations for the installer and client

- Providing energy for whole building or specific loads?
 - Earthing considerations if 'islanding'
- Integration with load shifting devices?
- Integration with EV V2G?





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EESS training and qualifications- UK

- Currently no standardised industry training or qualification
- In the main- delivered through manufacturers training
 - authorised installer programs
- ECA were involved in the IET Code of Practice for EESS (released December 2020)
 - Extensive guidance
 - Components, Specification, Design, Safety, Commissioning, inspection and testing
- Soon to be released: MCS EESS training course

1	The Institution of Engineering and Technology
	Code of Practice Electrical Energy Storage Systems 2nd Edition



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EESS training and qualifications- UK

- For the future?
- We are advocating including training for 'green technologies' within apprenticeships
- EESS installations are in the main simply final circuits with additional integrations for monitoring and integration.
- Short courses to upskill installers should be provided
 - Build upon existing skills and competency
- This is a function for existing installers and we need to take them on this journey



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Closing Remarks

We need a flexible, stable electricity grid going forward

- EESS (and potentially V2G) will:
 - Aid in smoothing fluctuations from renewable energy generation
 - Promote self generation and the advancement of the Prosumer
 - Allow customers to benefit from ToU tariffs and VPP offerings
- EESS will be an essential tool for helping to get us to Net Zero Carbon by 2050
 - It is part of the solution to the problem of climate change
- Messaging is key regarding the solutions and opportunities this provides
- Other technological solutions will continue to evolve but renewable generation, storage and infinite application of use- IS HERE NOW



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Thank you



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