



Large Scale ESS Market Overview Europe

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Business Cases

Assessment of business cases in European countries

Business case		short term	mid term	long term
Behind the meter	Optimization of Self-Consumption	++	+++	++
	Peak Shaving	+	+	0
	Demand Response	+	+++	0
	Backup Power	-	+	+
	Time-of-use Bill Reduction	+	++	+++
	Limitation of Grid Feed-in	-	+	++
	Optimization of electricity supply	+	++	+++
	Energy generation	+	+++	+++
Front of the meter	Supply of reserve power	++	+++	+
	Frequency regulation	++	+++	+
	Limitation of Grid Connection	+	+++	++
	Black start	-	+	+
	Energy Arbitrage	depending on regulation		
	Micro grid (island)	+	+++	++
	Locally shared storage systems	-	+	+++

best [+++] worse [-] no assessment [0]



Market Overview – Germany

Most important projects (since 2015) (I/II)

- Since 2015 around 30 storage systems over 1 MW net capacity with an cumulated capacity of over 400 MWh were installed in Germany.

Segmentation	Status	Project title	Operator	Net Capacity	Power	Installation	Technology	Location
grid stabilization	operational	Regionale Regelkraftwerk Feldheim (RRKW)	Enercon	10,8 MWh	10,0 MW	2015	Lithium Ion	Feldheim
reserve power	operational	BESS Neuhardenberg	Upside Group	5,0 MWh	5,0 MW	2015	Lithium Ion	Neuhardenberg
reserve power	operational	Project 2nd life	Vattenfall/ Bosch/ BMW	2,8 MWh	2,0 MW	2016	Lithium Ion	Hamburg
grid stabilization	operational	M5BAT	Aachen University of Technology (RWTH)	5,0 MWh	5,0 MW	2016	5 different battery technologies	Aachen
reserve power	operational		Steag	120,0 MWh	90,0 MW	2016/ 2017	Lithium Ion	6 sites
grid stabilization	operational	Daimler 2nd Life Storage	Daimler AG	13,0 MWh	5,0 MW	2016	Lithium Ion	Lünen
energy generation	operational	RedoxWind	Fraunhofer ICT	20,0 MWh	2,0 MW	2017	Redox Flow	Pfinztal
grid stabilization	operational		SWB	15,0 MWh	20,0 MW	2017	Hybrid (Lithium-Ion & Power-to-Heat)	Bremen



Market Overview – Germany

Most important projects (since 2015) (II/II)

- Until today several large scale ESS projects have been announced to be completed in 2018.

Segmentation	Status	Project title	Operator	Net Capacity	Power	Installation	Technology	Location
grid stabilization/ reserve power	operational		Utility "Eins Energie"	16,0 MWh	10,0 MW	2017	Lithium Ion	Chemnitz
reserve power	operational		Coulomb	18,0 MWh	17,0 MW	2017	Lithium Ion	Elverlingsen
reserve power	announced		ENERTRAG	33,0 MWh	22,0 MW	2018	Lithium Ion	Cremzow
grid stabilization	under construction	EnspireME	Eneco/Mitsubishi	50,0 MWh	48,0 MW	2018	Lithium Ion	Jardelund
reserve power/ peak shaving	under construction			4,0 MWh	8,5 MW	2018	Lithium Ion	Vöhringen
energy generation	under construction		Utility	8,0 MWh	16,0 MW	2018	Lithium Ion	Kempton
grid stabilization	under construction		VBB	15,0 MWh	10,0 MW	2018	Lithium Ion	Bordesholm
peak shaving	under construction		Baywa r.e.	0,3 MWh	0,1 MW	2018	Lithium Ion	Berlin
reserve power	announced		LUNA Group		40 - 60 MW	2018	Lithium Ion	2 sites



Market Overview – United Kingdom

Most important projects (since 2015) (I/II)

- Based on first EFR tender in 2016 we see a strong growth in ESS installations in the UK

Segmentation	Status	Project title	Operator	Net Capacity	Power	Installation	Technology	Location
reserve power	operational	AES Kilroot Advancion Energy Storage Array	AES	5,0 MWh	10,0 MW	2015	Lithium Ion	Carrickfergus
energy generation	operational	EPSRC Grid Connected	ABB	1,0 MWh	2,0 MW	2016	Lithium Ion	Willenhall
reserve power	operational	Low Carbon Battery Park	Low Carbon	28,0 MWh	40,0 MW	2016	Lithium Ion	Glassenbury
reserve power	operational	Low Carbon Battery Park	Low Carbon	7,0 MWh	10,0 MW	2016	Lithium Ion	Cleator
reserve power	operational	Clayhill solar farm		3,3 MWh	6,0 MW	2017	Lithium Ion	Flitwick
grid stabilization	operational	Blackburn Meadows EFR battery	E.ON	7,2 MWh	10,0 MW	2017	Lithium Ion	Sheffield
grid stabilization	operational		Foresight Group	3,3 MWh	10,0 MW	2017	Lithium Ion	Nevendon
grid stabilization	operational	Noriker Power Staunch project	Hazel Capital	10,0 MWh	20,0 MW	2017	4 MW Lithium Ion/ 16 MW VRLA	Bristol



Market Overview – United Kingdom

Most important projects (since 2015) (II/II)

Segmentation	Status	Project title	Operator	Net Capacity	Power	Installation	Technology	Location
energy generation	operational	Northern Powergrid CLNR EES1, Rise Carr		5,0 MWh	2,0 MW	2017	Lithium Ion	Rise Carr
grid stabilization	under construction	Bank Offshore Wind Farm	Dong Energy	4,4 MWh	2,0 MW	2017	Lithium Ion	Liverpool Bay
grid stabilization	operational		RES Group	16,0 MWh	20,0 MW	2017	Lithium Ion	Broxburn
energy generation	under construction		Arenko		41,0 MW	2018	Lithium Ion	Midlands
grid stabilization	under construction		RES Group	23,0 MWh	35,0 MW	2018	Lithium Ion	Port of Tyne
grid stabilization	operational		NEC Energy	80,0 MWh	40,0 MW	2018	Lithium Ion	Kent
grid stabilization	operational		NEC Energy	20,0 MWh	10,0 MW	2018	Lithium Ion	Cumbria
grid stabilization	under construction		Centrica	24,5 MWh	49,0 MW	2018	Lithium Ion	Cumbria
grid stabilization	announced		EDF Energy Renewables Limited UK	25,0 MWh	49,0 MW	2018	Lithium Ion	not specified
grid stabilization	announced		Vattenfall	29,0 MWh	22,0 MW	2018	Lithium Ion	Pen y Cymoedd wind farm
grid stabilization	operational		KiWi Power	4,8 MWh	4,0 MW	2018	Lithium Ion	South Wales



Market Volume

ESS Installations 2017

- All over Europe we estimate new large scale ESS installations for power/electricity generation of around 250 MWh net capacity in 2017.

