

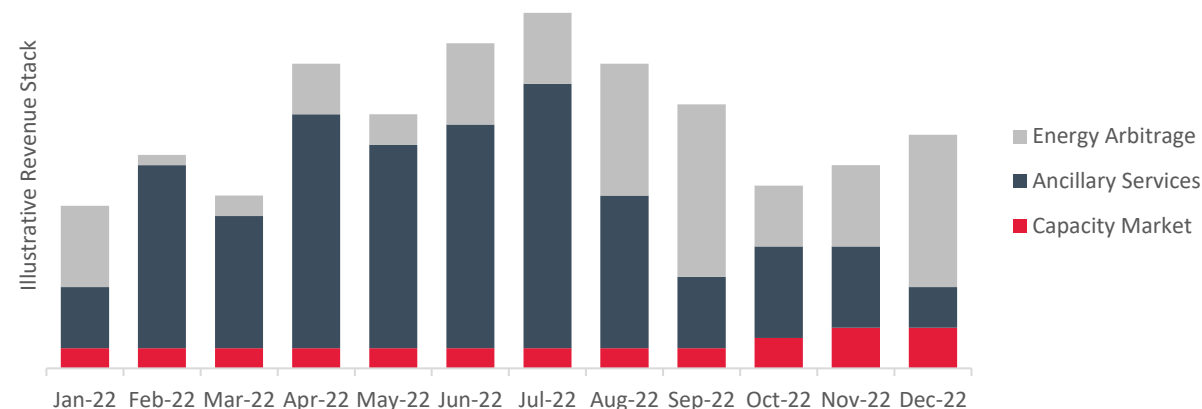
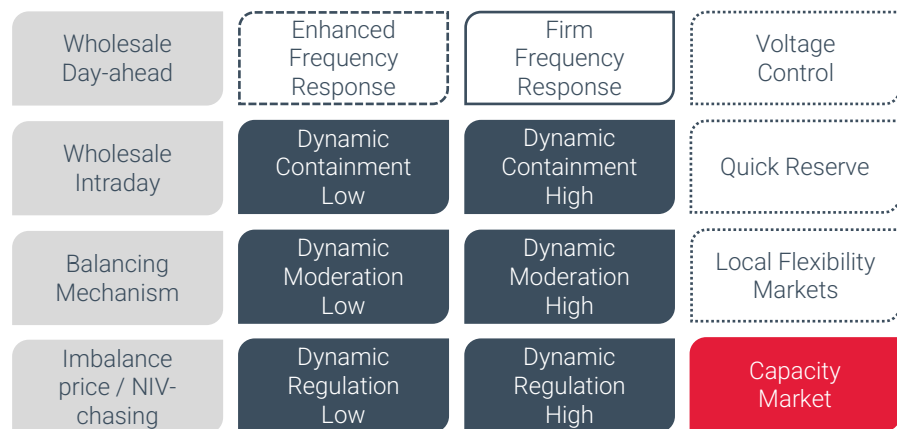


Pioneering a better future

# BESS in Great Britain: Lessons Learnt in Regulation & Market Design //Toledo-March 2023

Why has Great Britain become a popular market for energy storage?

## //Great Britain's innovative market solutions have unlocked subsidy-free value pools for flexible assets to support the country's Net Zero ambitions



### Capacity Market hits the price cap

The T-1 auction for Delivery Year 2022/23 cleared at 75 GBP/kW/y, the price cap, as a result of wider security of supply concerns. Increased revenues are observed since October 2022

### New Ancillary Services

National Grid ESO introduced Dynamic Regulation and Dynamic Moderation, completing the new suite of dynamic frequency services to support GB's transition to a Net-Zero system

### Gas price spikes

The geopolitical situation led to high gas prices through 2022, one of the key drivers of intraday price spreads. The most profitable strategy combined charging in DRH and discharging at wholesale/imbalance prices

### Cheaper gas, lower revenues

Mild temperatures, lower demand and high storage levels resulted in lower gas prices. In turn, power market volatility and BESS revenues were reduced vs expectations

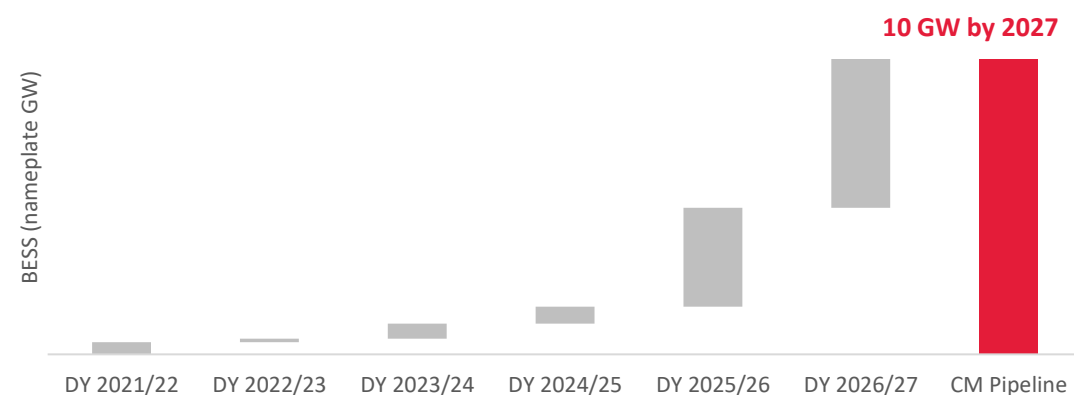
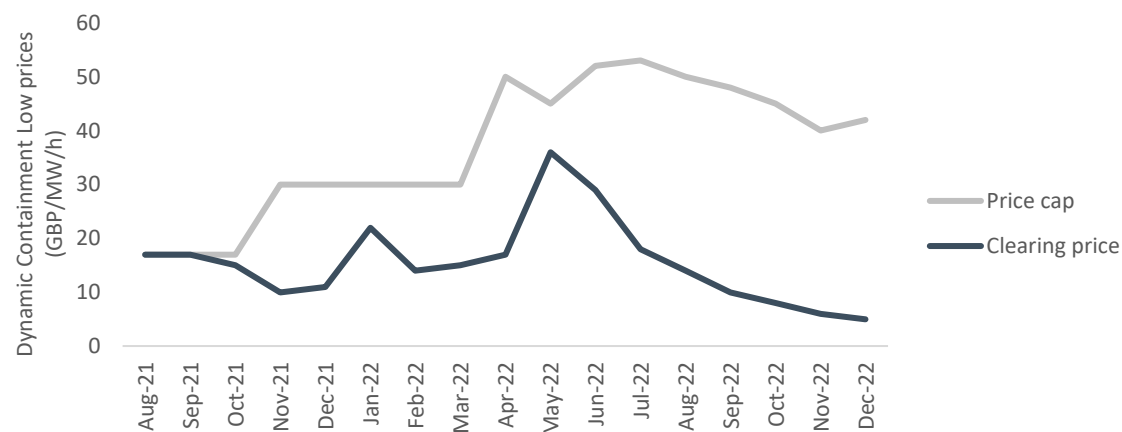
Q1 2022

Q2 2022

Q3 2022

Q4 2022

//The BESS pipeline remains strong despite 2 GW of operational assets saturating Great Britain's ancillary services and the uncertainty of REMA in the horizon



### Opportunity cost bidding

Ancillary Services have been largely saturated. Arbitrage potential in deeper markets (i.e. wholesale) sets the opportunity cost for most BESS

### Enduring Auction Capability

Further co-optimization, negative pricing and more complex stacking/splitting strategies can be expected later this year, according to National Grid ESO

### Regulatory changes in the horizon

Review of Electricity Market Arrangements (REMA) presents a myriad of possibilities to achieve Great Britain's Net Zero targets

### Capacity Market pipeline

The latest T-4 auction secured long-term contracts for c. 5 GW of BESS (>80% success rate), mostly 2h assets with a captured price of ~15 GBP/kW/y post de-rating

2023-...

2023-...

2025-...

2027-...



//Structural changes may be required to comply with Net Zero targets.  
Regardless of the market design, flexibility and BESS will play a significant role

Wholesale Market – Location	National pricing		Zonal pricing		Nodal pricing		
Wholesale Market – Technologies	Unified market			Split by characteristic			
Wholesale Market – Balancing	National			Local then national			
Wholesale Market – Price formation	Pay-as-clear			Pay-as-bid			
Wholesale Market – Dispatch	Self-dispatch			Central dispatch			
Mass low carbon power	Existing CfD	CfD + exposure	Deemed gen. CfD	Supplier obligation	Revenue cap and floor	Dutch subsidy	Equiv. firm power auction
Flexibility	Optimized Capacity Market	CM + flex enhanc.	Supplier obligation (inc. CPS)		Targeted tender	Stat. reserve	
Capacity adequacy		Capacity payment	CRO	DRO			
Operability	BAU	BAU+	Local markets	Changes to CfD/CM	Co-optimisation	Dedicated scheme	

Source: Department for Business, Energy and Industrial Strategy (BEIS).

## //FRV's Contego Case Study: 34 MW / 68 MWh

### A resilient asset design: location, duration

REMA may introduce structural changes such as nodal pricing. By using a fundamentals-driven design, the asset may be able to better navigate the regulatory uncertainty in the long-term, even with a merchant business model

### World-class optimization

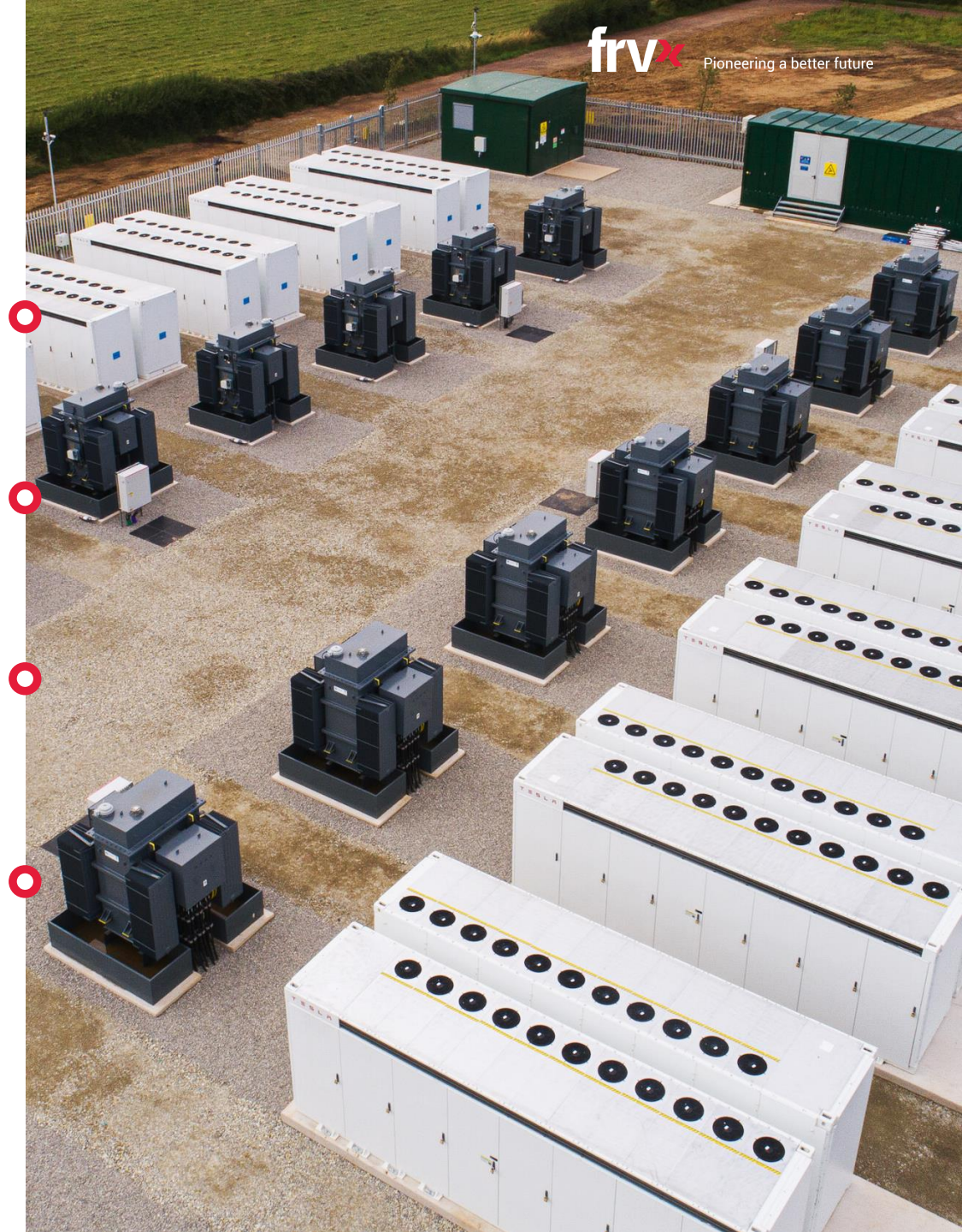
An experienced and flexible optimizer makes the difference. Coordination between the optimizer and the asset owner is key: asset degradation, trading policy, other auctions (Reactive Power, Capacity Market, LFM...), etc.

### Bankability & merchant volatility

Banks are gaining confidence to provide meaningful gearing for merchant BESS via project finance for technically sound assets  
In addition, revenue floors are being offered by bankable offtakers, and forward hedges of the intraday spreads have been seen in 2022

### A pioneering journey

First movers into new markets, such as Dynamic Regulation, have captured extraordinary returns. At the same time, the asset owners need to play a more active and challenging role across the value chain: closing contracts, raising debt, unlocking revenue pools (e.g. Balancing Mechanism), etc.





## //Beyond NextGenerationEU: Shaping BESS economics



Defining **technology agnostic mechanisms** to reach PNIEC targets and operate a Net Zero system in Spain



Providing continuity to the BESS business model: unlocking value pools to **support subsidy-free economics**



**Co-optimization of Storage and TSOs/DSOs**: Local Flexibility Markets, Circulares 5-6/2019, and Grid Connections



Regulatory evolution: **building investor confidence in an uncertain environment** to lower the cost of capital



**Revenue agility**: a flexible optimization software makes the difference, particularly in shallow markets





Pioneering a better future