

Public

System service interactions

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Requirements and system needs are identified by the Operability Strategy Report
and by the Frequency Risk and Control Report

Operational Area	Frequency	Thermal	Voltage	Stability	Restoration
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The Markets Roadmap outlines different markets and products to address these system needs

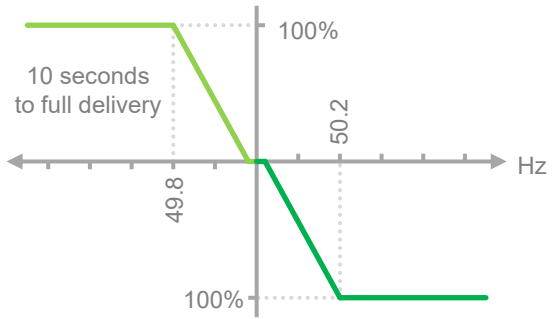
Market Areas	Response	Reserve	Thermal	Voltage	Stability			Restoration
	Balancing Mechanism (BM)							
Market Products	Dynamic Containment (DC)	Quick Reserve	Megawatt Dispatch	Voltage Pathfinders	Short-term (D-1) Stability Market	Bids & Offers	Electricity System Restoration Events (ESRE)	
	Dynamic Moderation (DM)	Slow Reserve	Local Constraint Management (LCM)	Reactive power market	Mid-term (Y-1) Stability Market	Trading	Distributed Restart	
	Dynamic Regulation (DR)	Balancing Reserve	Constraint Management Intertrip Service (CMIS)		Long-term (Y-4) Stability Market	Demand Flexibility Service (DFS)		
	Mandatory Frequency Response	STOR	Constraints Collaboration Project					
	Static Firm Frequency Response	Optional Fast Reserve						
				KEY	Existing markets/ products	Markets/products in development		

KEY

Existing markets/
products

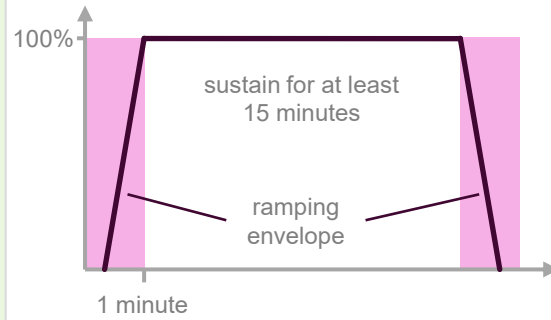
Markets/products
in development

Dynamic Regulation



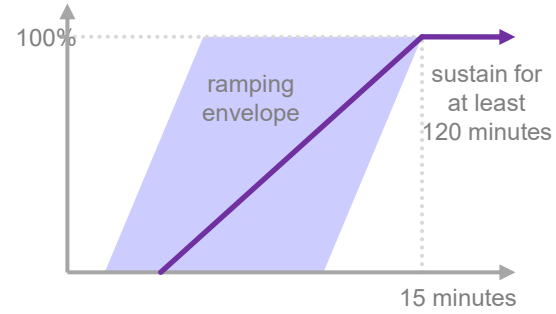
Assist in keeping frequency near to 50Hz during normal conditions

Quick Reserve



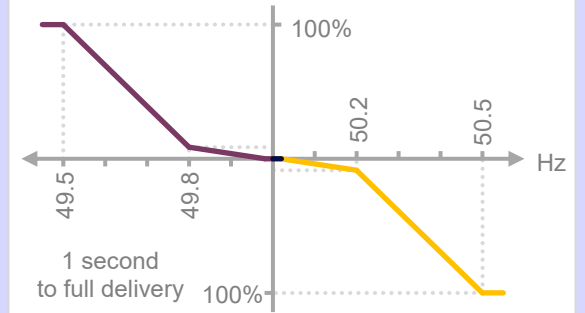
Recover frequency back towards 50Hz, mainly during normal conditions

Slow Reserve



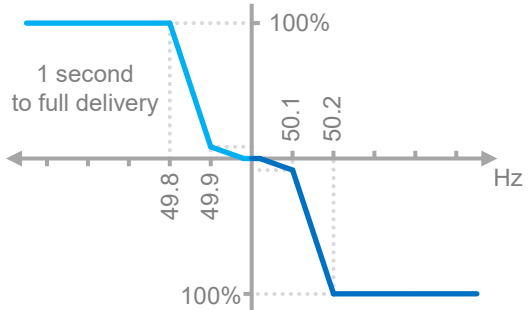
Recover frequency back to 0.2Hz within 15 minutes

Dynamic Containment



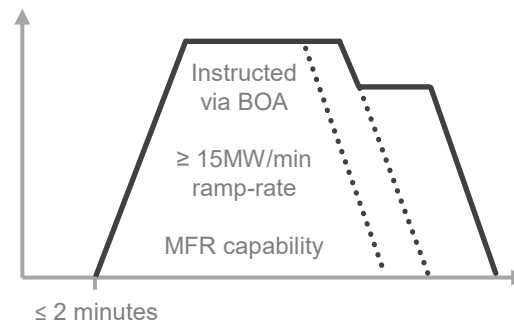
Prevent frequency deviations outside -0.8Hz / +0.5Hz following large losses

Dynamic Moderation



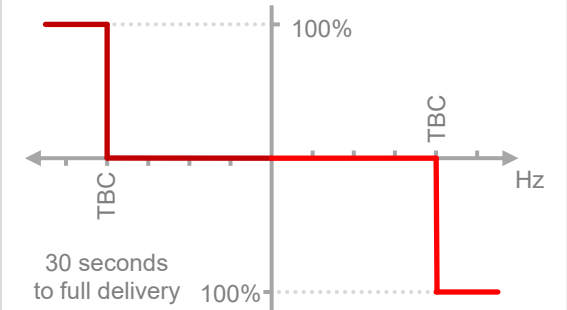
Assist in keeping frequency within 0.2Hz, especially during more volatile conditions

Balancing Reserve

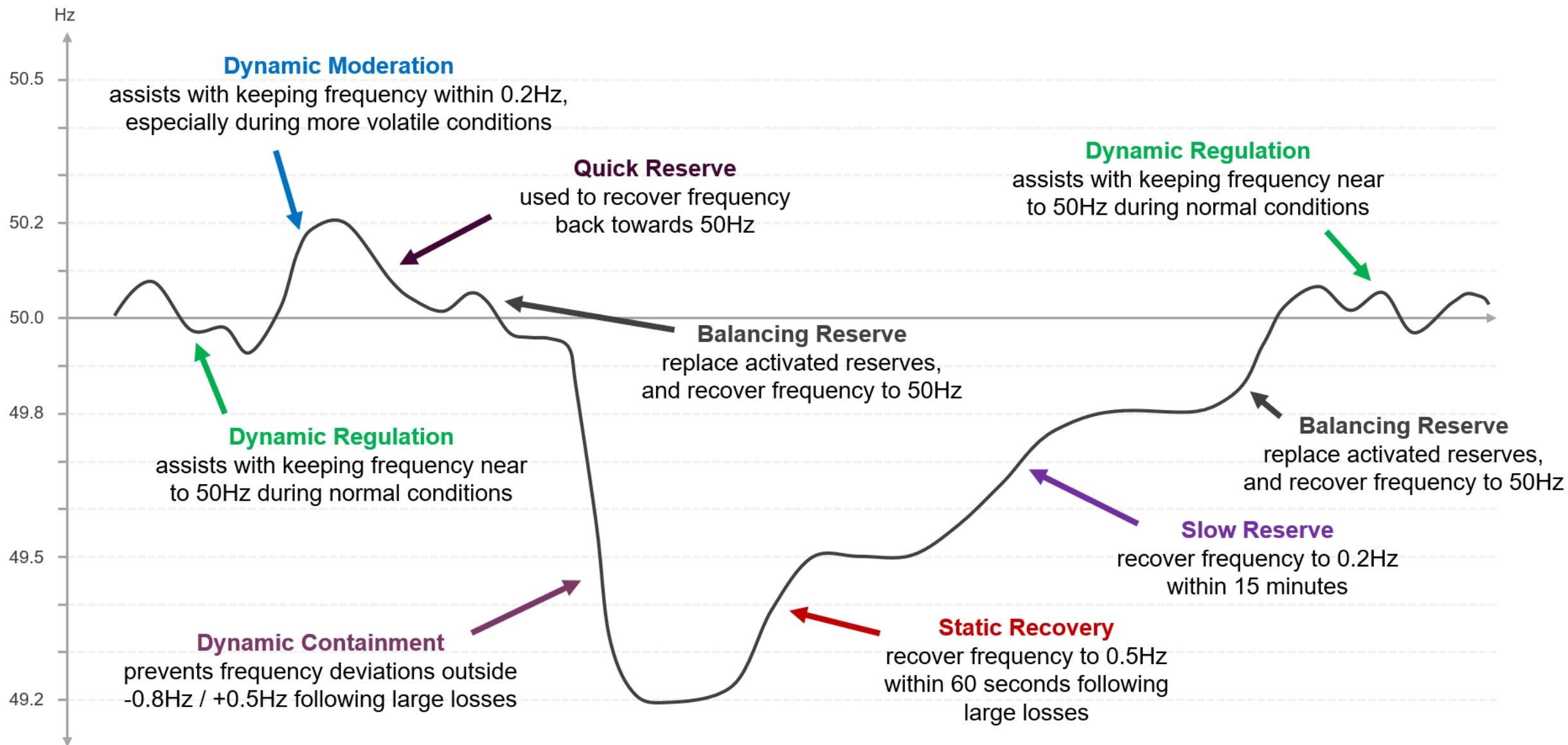


Manage real-time imbalances, and replace activated reserves

Static Recovery



Recover frequency to 0.5Hz within 60 seconds following large losses



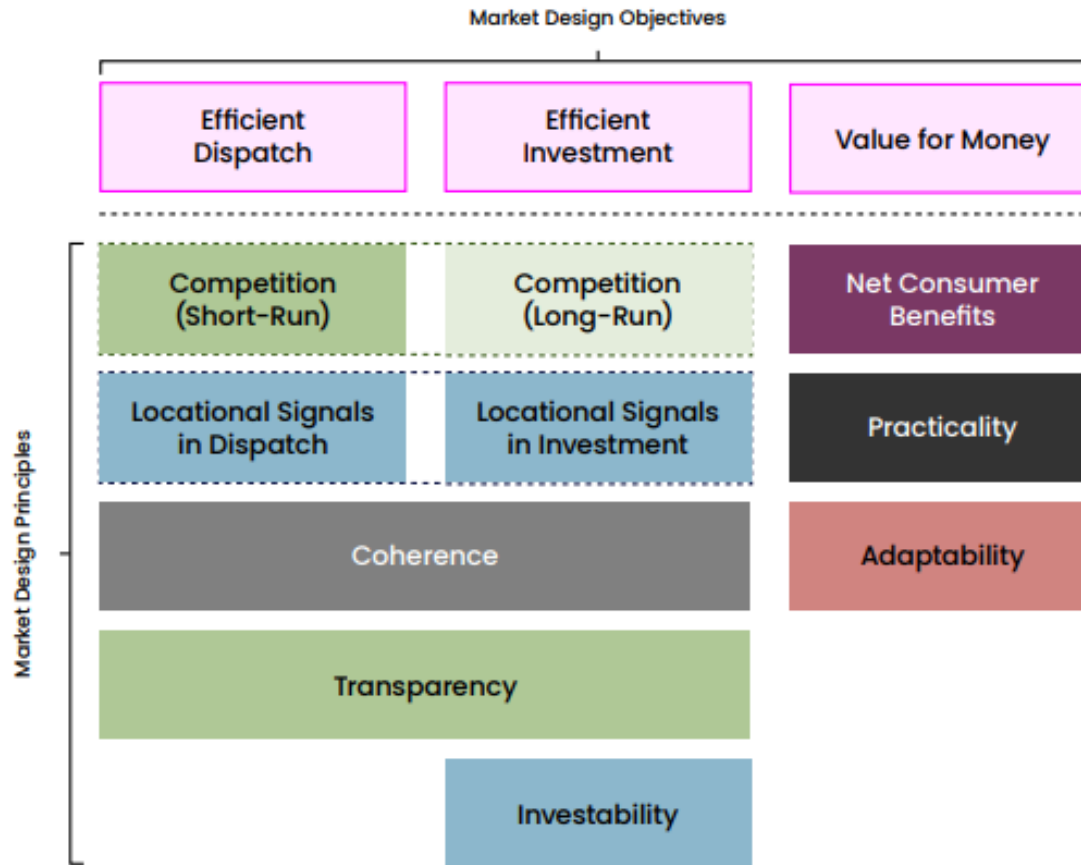
Service interactions (SO perspectives)

- Within the same operational area
 - Different frequency services, Quantity optimization
- Across different operational areas
 - Frequency Vs Stability : oscillations, inertia Vs response
 - Frequency Vs Thermal Constrains
 - Voltage Vs Thermal Constrains
- Overall system needs Vs local needs

Service interactions (User perspectives)

- Services and revenue stacking
 - What is the right process
 - How to validate the performance for each services

Overall challenges



- System needs
- Service specification and qualification
- Optimization

<https://www.neso.energy/publications/markets-roadmap>