Developing an Interoperable Standard for the Dispatch of Flexibility Services

ENA Open Networks

Dr Avi Aithal, ENA;
Tim Manandhar, UK Power Networks;
Joe Davey, National Grid

19th October 2024

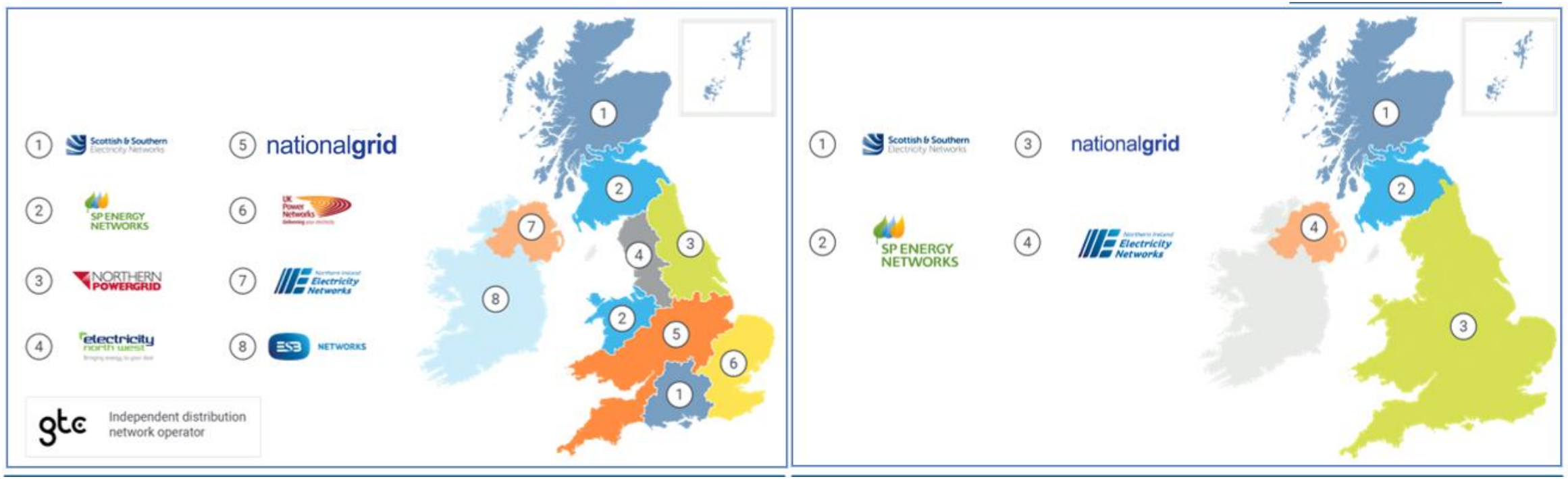
Overview

Agenda	Duration	Speaker
Intro of Energy Networks Association and Open Networks Outline of Flexibility Plans	30 mins	Dr Avi Aithal
Q & A	10 mins	
Implementation Roadmap and Hurdles	30 mins	Joe Davey Tim Manandhar
Flex Service Provider Onboarding – Open Discussions	10 mins	

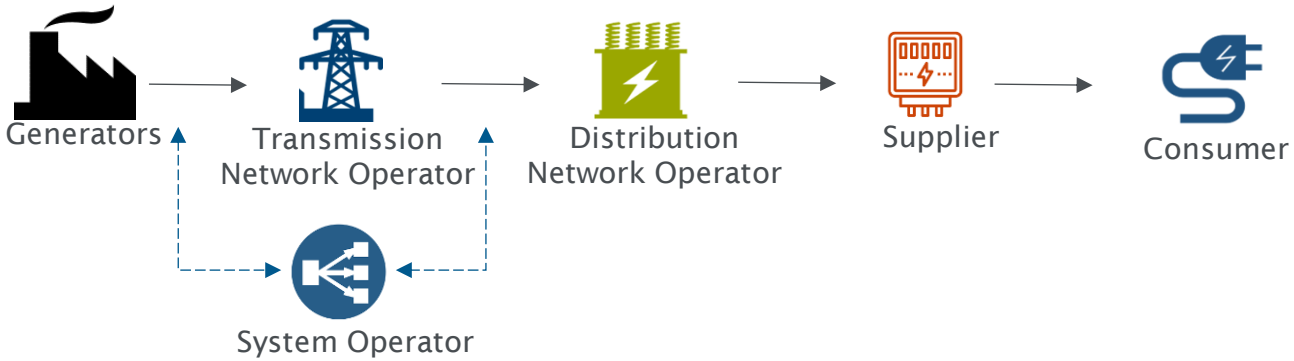
Introduction to ENA and Open Networks

Avi Aithal (ENA)

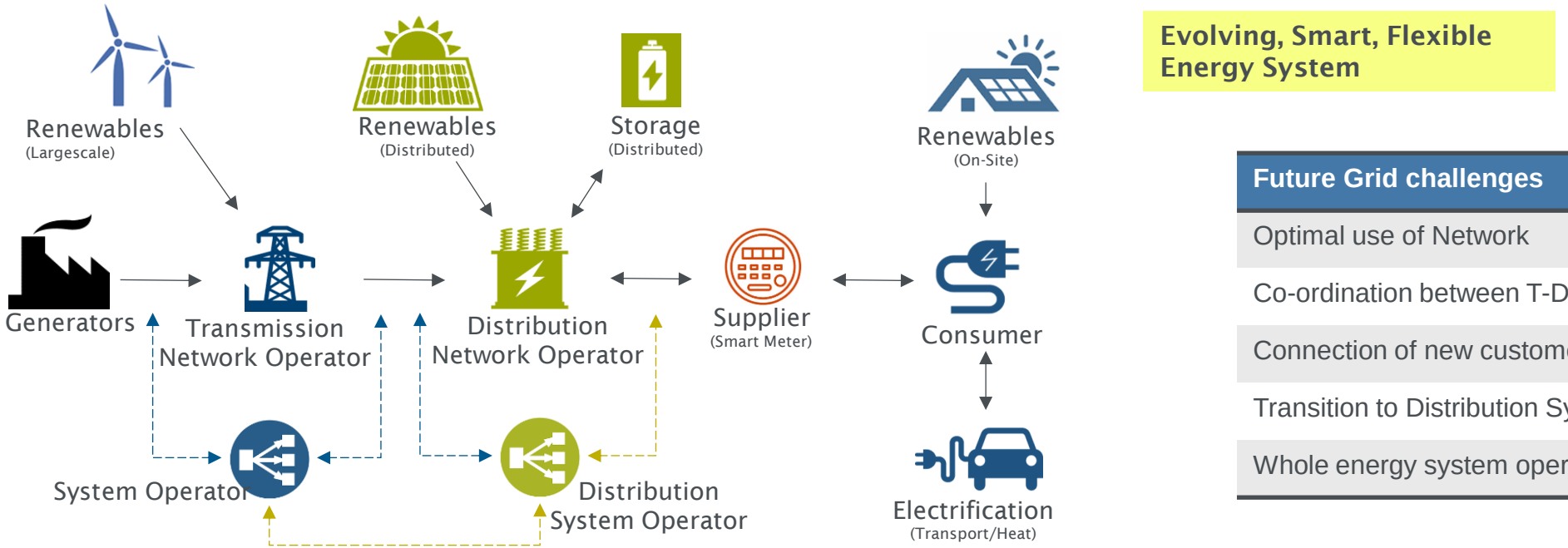
Introduction to ENA- The voice of the networks



Key Challenges



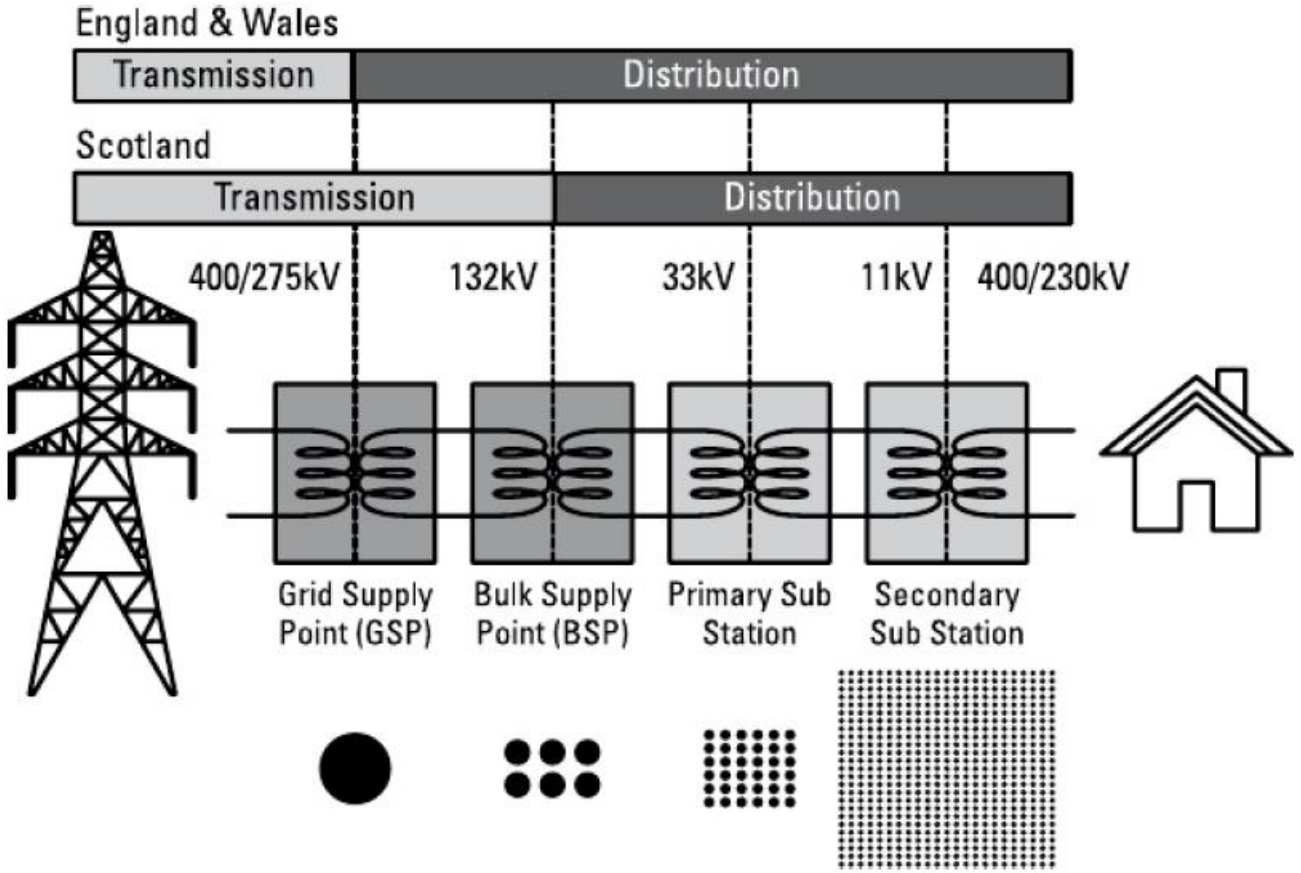
Traditional Power System



Evolving, Smart, Flexible Energy System

Future Grid challenges
Optimal use of Network
Co-ordination between T-D
Connection of new customers
Transition to Distribution System Operation
Whole energy system operation

UK Power System

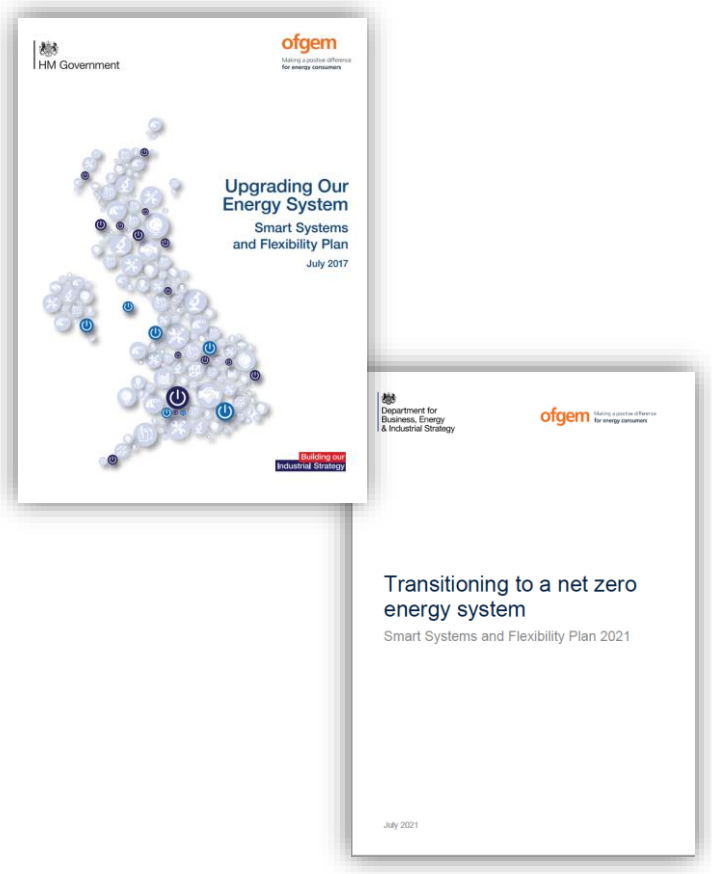


Open Networks

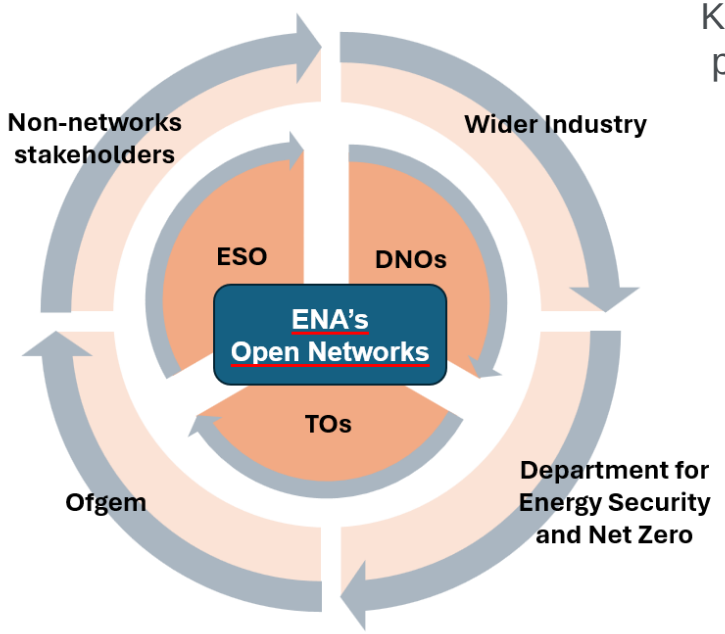
Started in 2017, the Open Networks programme is working with the networks and industry to lead the transition to a smart and flexible energy system that will enable net zero.

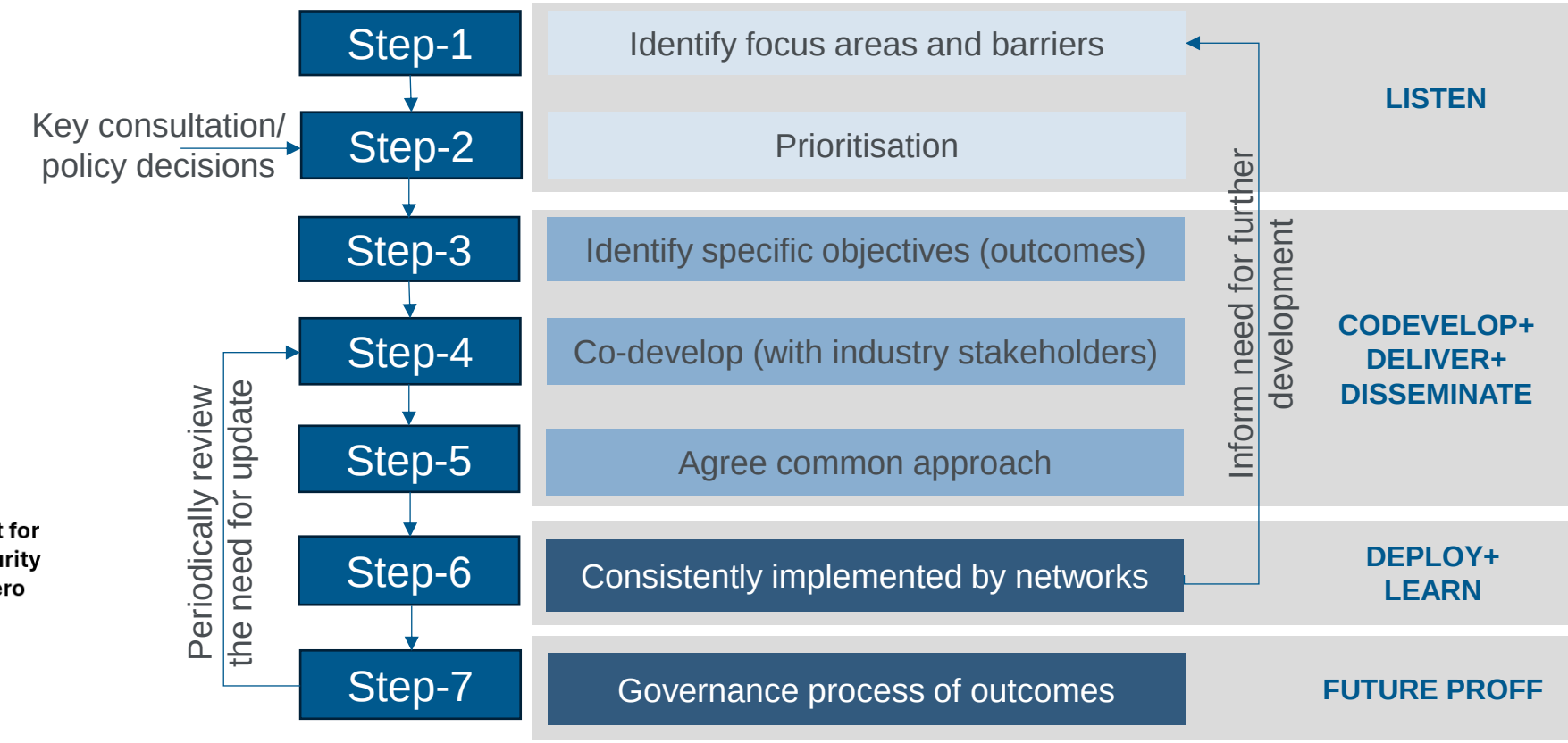
- Key drivers
  - Net Zero mandate
  - Smart Systems & Flexibility Plan
  - Stakeholder feedback
  - Ofgem, DESNZ & Steering Group input

- ✓ Informing the transition to Distribution System operation
- ✓ Opening local flexibility markets to demand response and renewable energy
- ✓ Helping customers connect faster
- ✓ Opening data to enable customers to identify best locations to invest
- ✓ Delivering efficiencies between network companies to operate secure and efficient networks

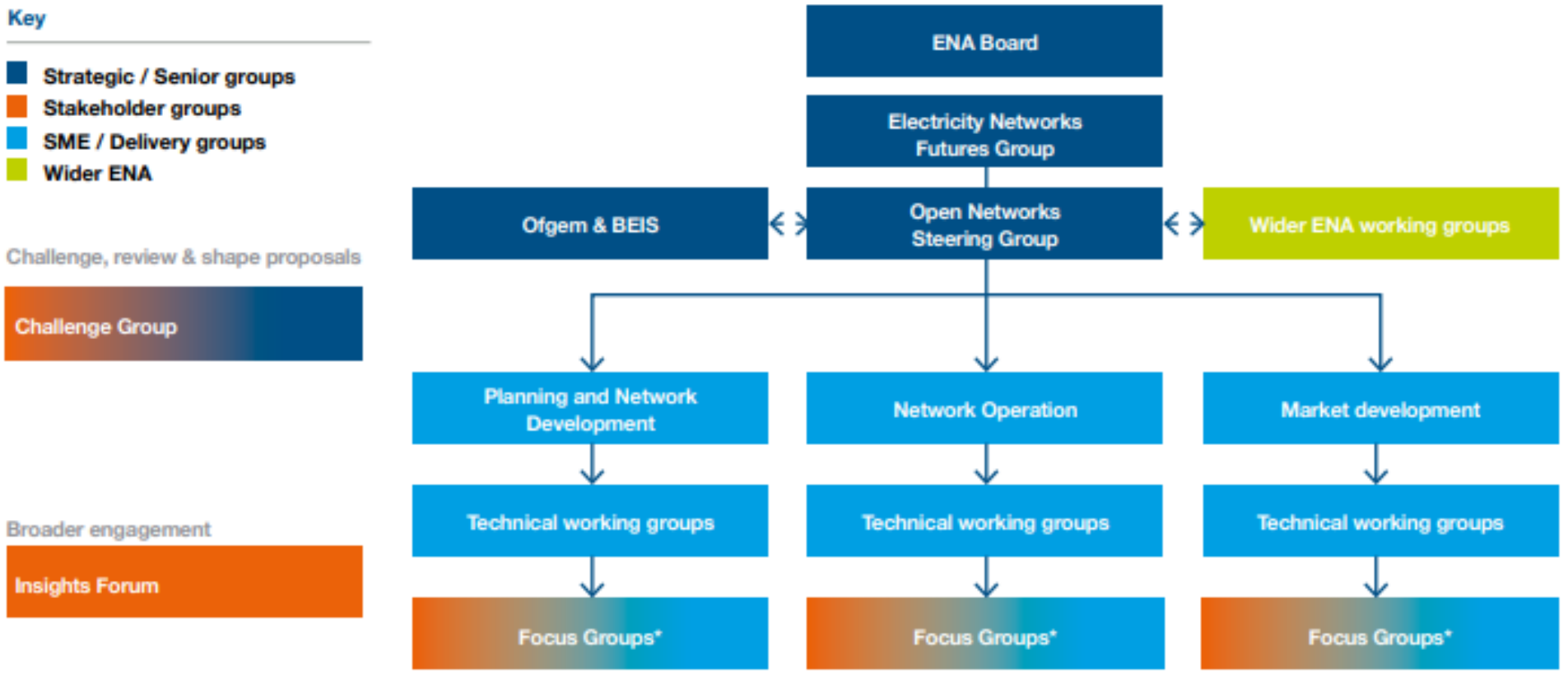


Open Networks- Our delivery approach

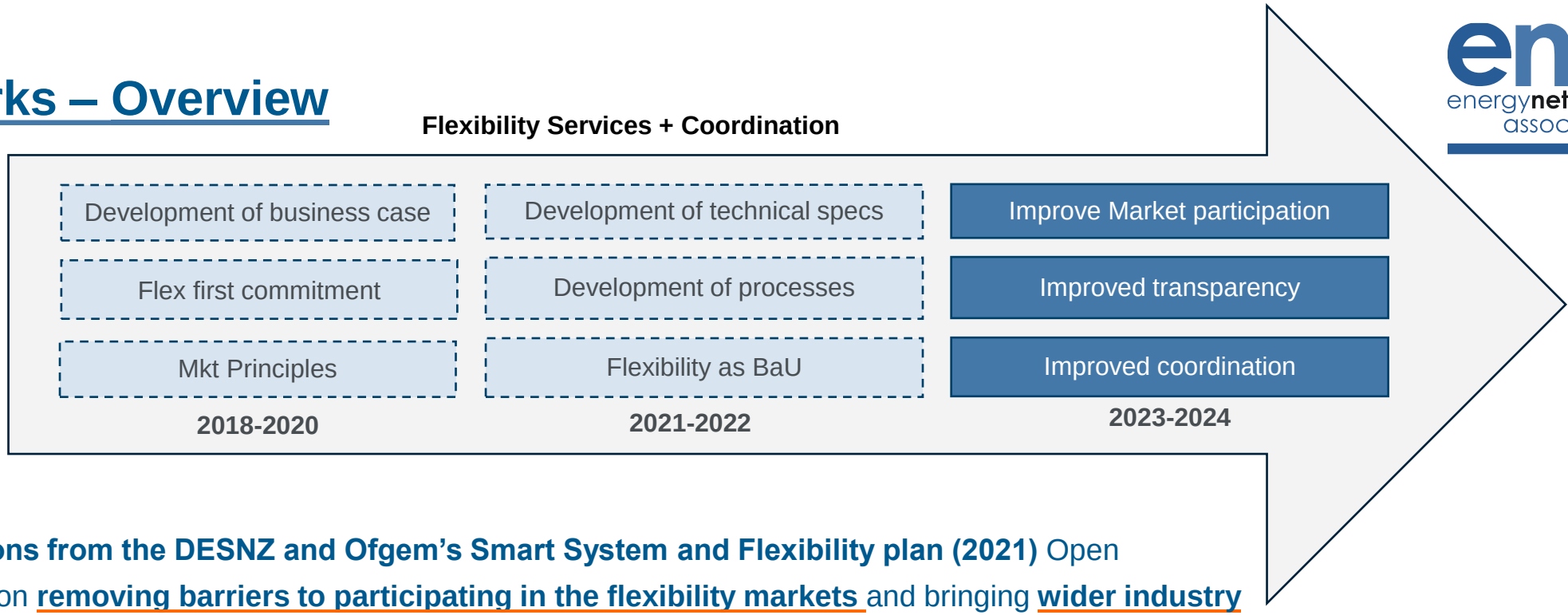




Open Networks Governance



Open Networks – Overview



In line with the actions from the DESNZ and Ofgem's Smart System and Flexibility plan (2021) Open Networks is focused on **removing barriers to participating in the flexibility markets** and bringing **wider industry stakeholders into the decision-making process.**

Objective: Open Networks will be to increase participation and volume in the local flexibility market.

- Making it easier for flexibility service providers to participate in the flexibility market by standardising products, processes and contracts,
- Improving operational coordination between networks and companies to remove barriers to dispatch of services,
- Putting in measures to improve transparency of processes and decision-making.

Flexibility Markets in Great Britain

- **Flexibility is about renumerating a change in where or when electricity is consumed or generated**

Explicit Flexibility

Ancillary Service

- Balancing mechanism
- Frequency response
- Operating reserve
- Black start
- Inertia
- Short circuit
- Reactive power

Capacity Market

- T-1
- T-4

National Markets

Congestion Management

- Peak Reduction
- Scheduled Utilisation
- Operational utilisation
- Operational utilisation +variable availability
- Operational utilisation +Scheduled availability

Local Markets

Regional Development programme (RDPs)

Secondary trading

Implicit Flexibility

- Locational Pricing
- Time of Use

Retail Markets

Peer-to-Peer trading

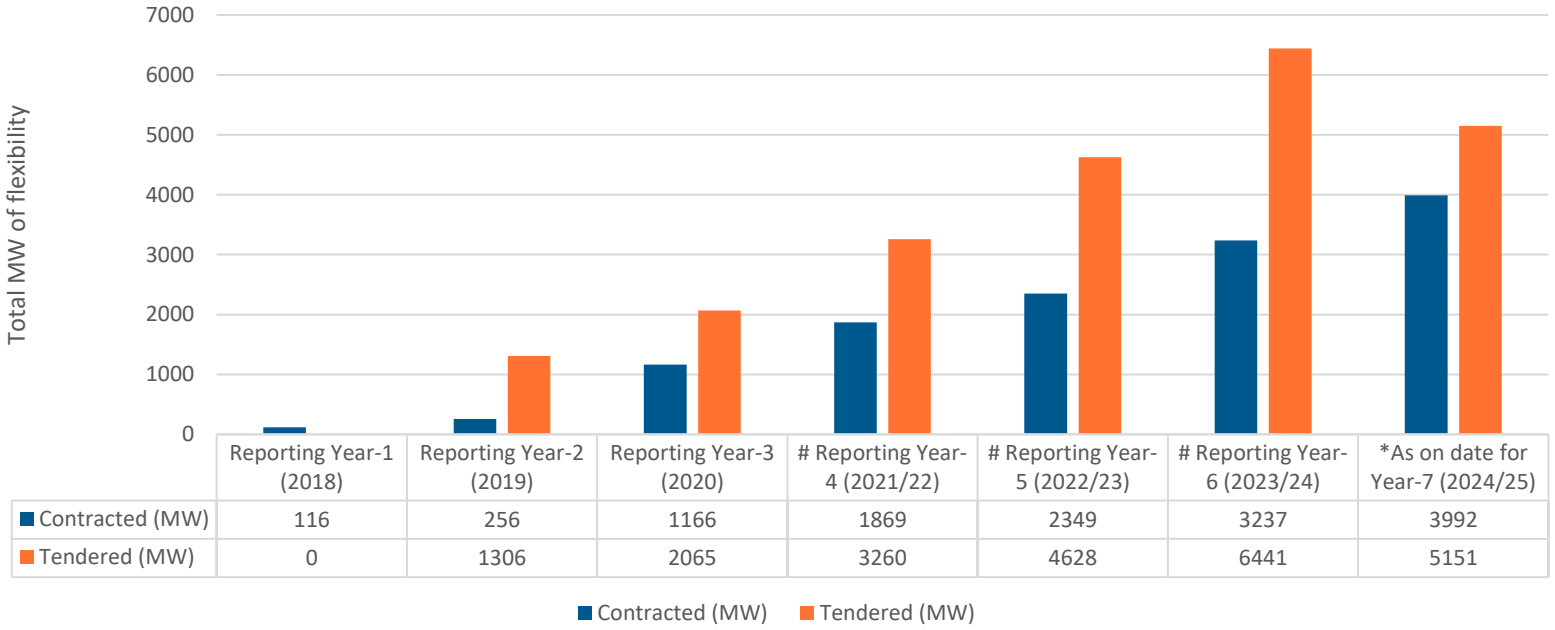
- Open Networks is facilitating the development of local markets and looking at their interaction with national markets.
- GB energy regulator is leading reforms to improve implicit (price driven) flexibility.

Flexibility state of play – Flex figures

Objective: Open Networks will be to increase participation and volume in the local flexibility market.

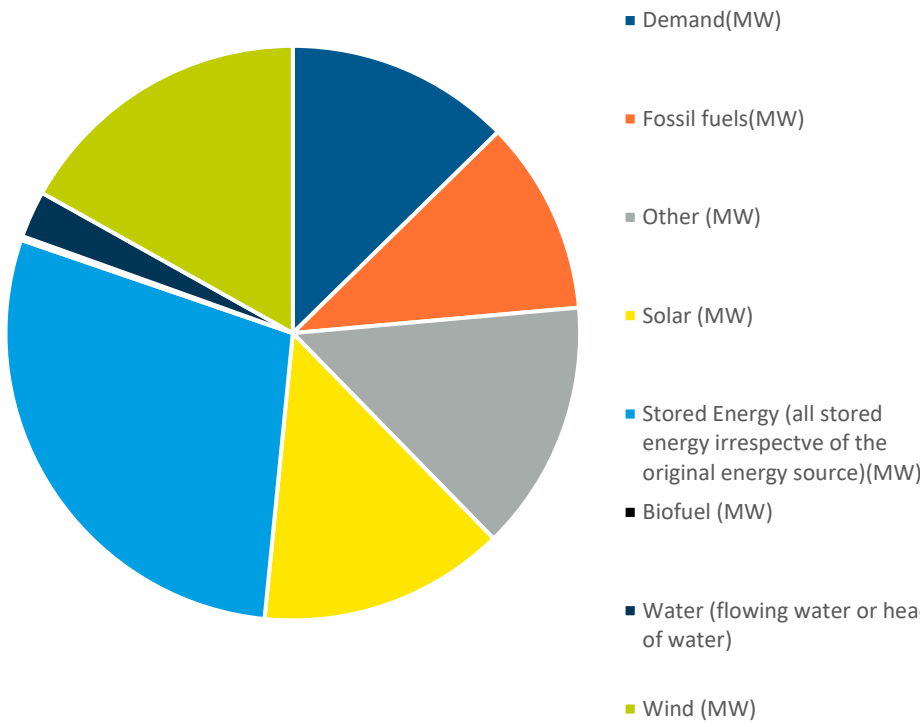
Flexibility Services in GB

(Tendered and Contracted Services for delivery in the reporting year)



	Reporting Year-1 (2018)	Reporting Year-2 (2019)	Reporting Year-3 (2020)	# Reporting Year-4 (2021/22)	# Reporting Year-5 (2022/23)	# Reporting Year-6 (2023/24)	*As on date for Year-7 (2024/25)
Contracted (MW)	116	256	1166	1869	2349	3237	3992
Tendered (MW)	0	1306	2065	3260	4628	6441	5151

DSO Contracted flexibility fuel sources for delivery in 2023/24



Overview of outcomes

Objective	**Increase participation and volume in the local flexibility market**		
Focus areas	**Easier to participate**	**Improved transparency**	**Improved coordination**
Main outcomes	Standardisation of Flex products	Implementation of Primacy rules	Common Evaluation Methodology
	Standardisation of Pre-qualification	Harmonisation of data shared between DNO-ESOs	Consistent Network development plans
	Standardisation of Flexibility contracts	Harmonise DER visibility Information	Consistent Network co-ordination activities
	Standardisation of Dispatch API	Implementation of Stackability rules	Consistent Carbon Reporting
	Standardisation of Settlement process	Harmonise DFES Building blocks	Consistent Flex Reporting
	Standardisation of Baselining		

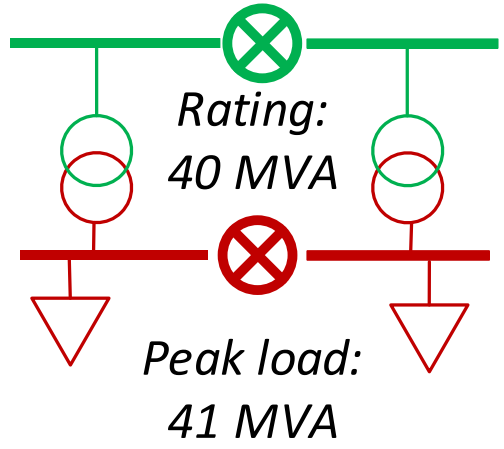
Delivered through technical working groups, that have **120 subject matter experts from 8 network companies**, supported by over 400 wider industry stakeholders. This includes **20 key sector representatives through the challenge group**, **80 industry practitioners helping us shape our outputs via focus groups** and over **100 national and international delegates** feeding into the development of the programme **via our insights forum**

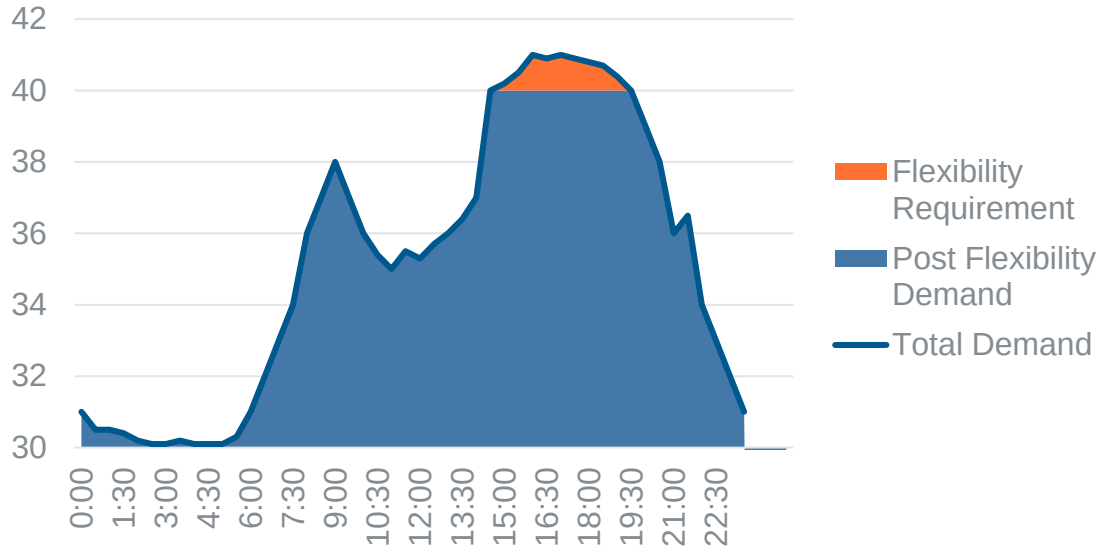
Implementation Roadmap and Hurdles

Joe Davey (NGED)

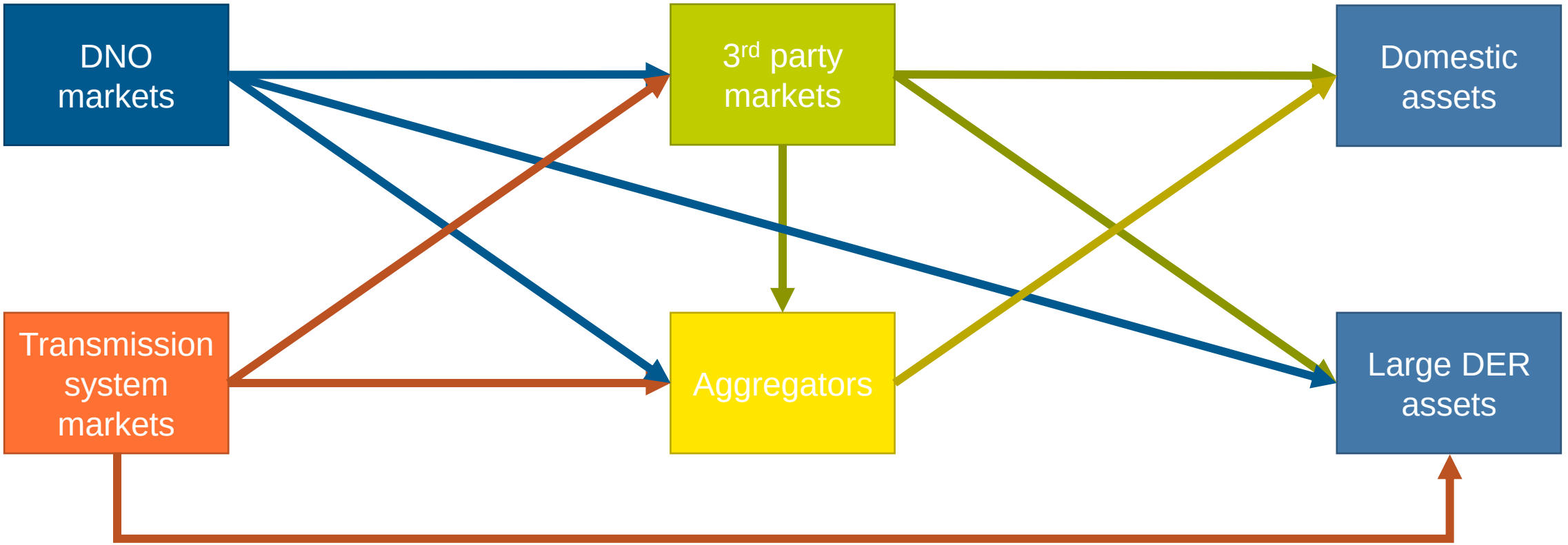
Congestion Management Flexibility Services

- Consider a substation with a installed asset capacity of 40 MVA
- The peak load connected at that substation may grow to be above the asset rating, but only for part of a day and at certain times of year
- By procuring Congestion Management Flexibility Services System Operators can defer building of new assets at this substation



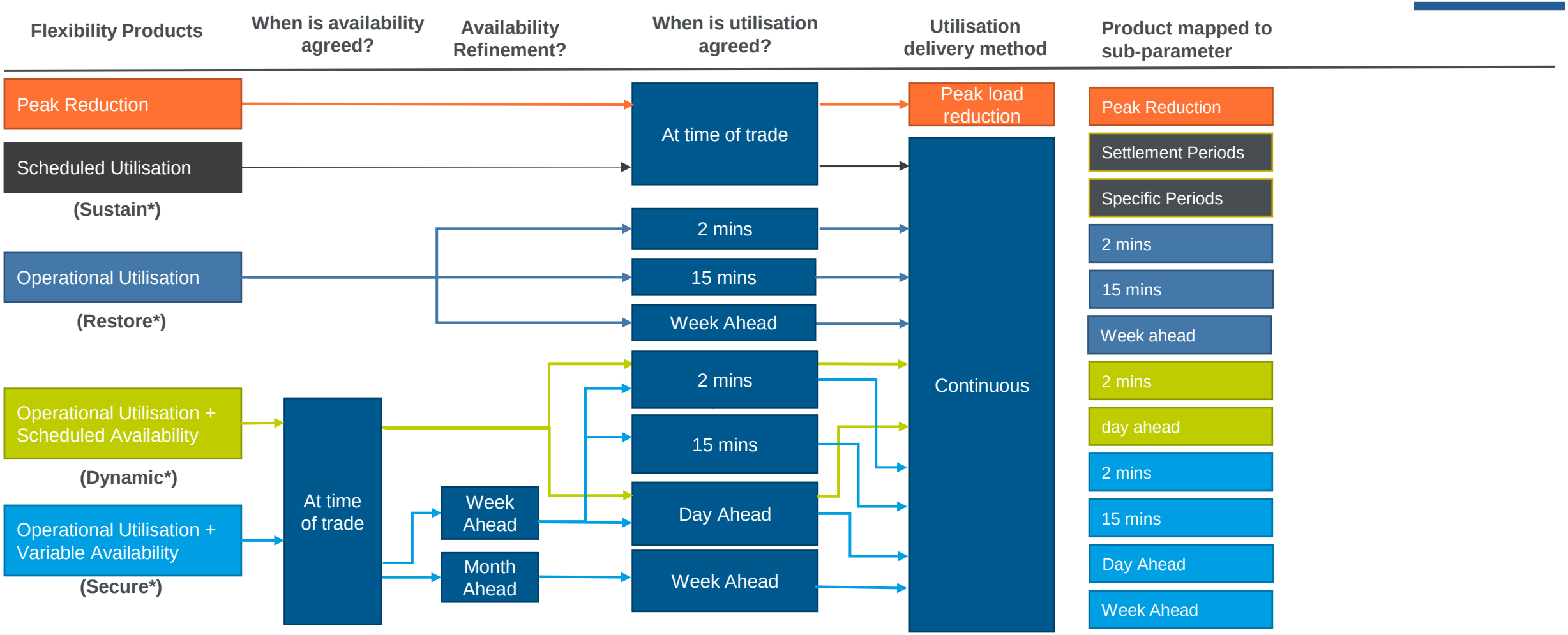


UK Flexibility Service Markets



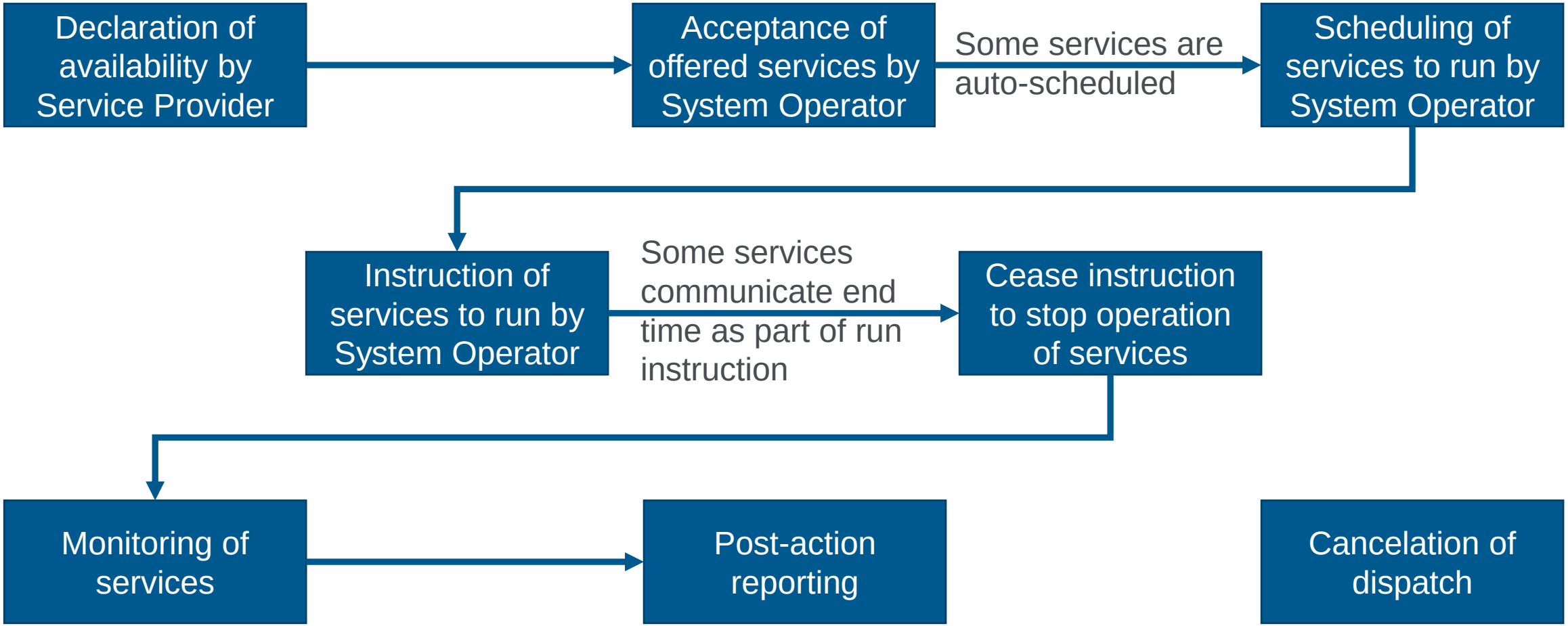
Standardisation of Flexibility products

Flexibility products in operation



*The new products are not a 'like-for-like' rebranding of old products. The mapping is for better understanding only.

2022 – initial gap analysis identifies alignment of underlying process for UK System Operators

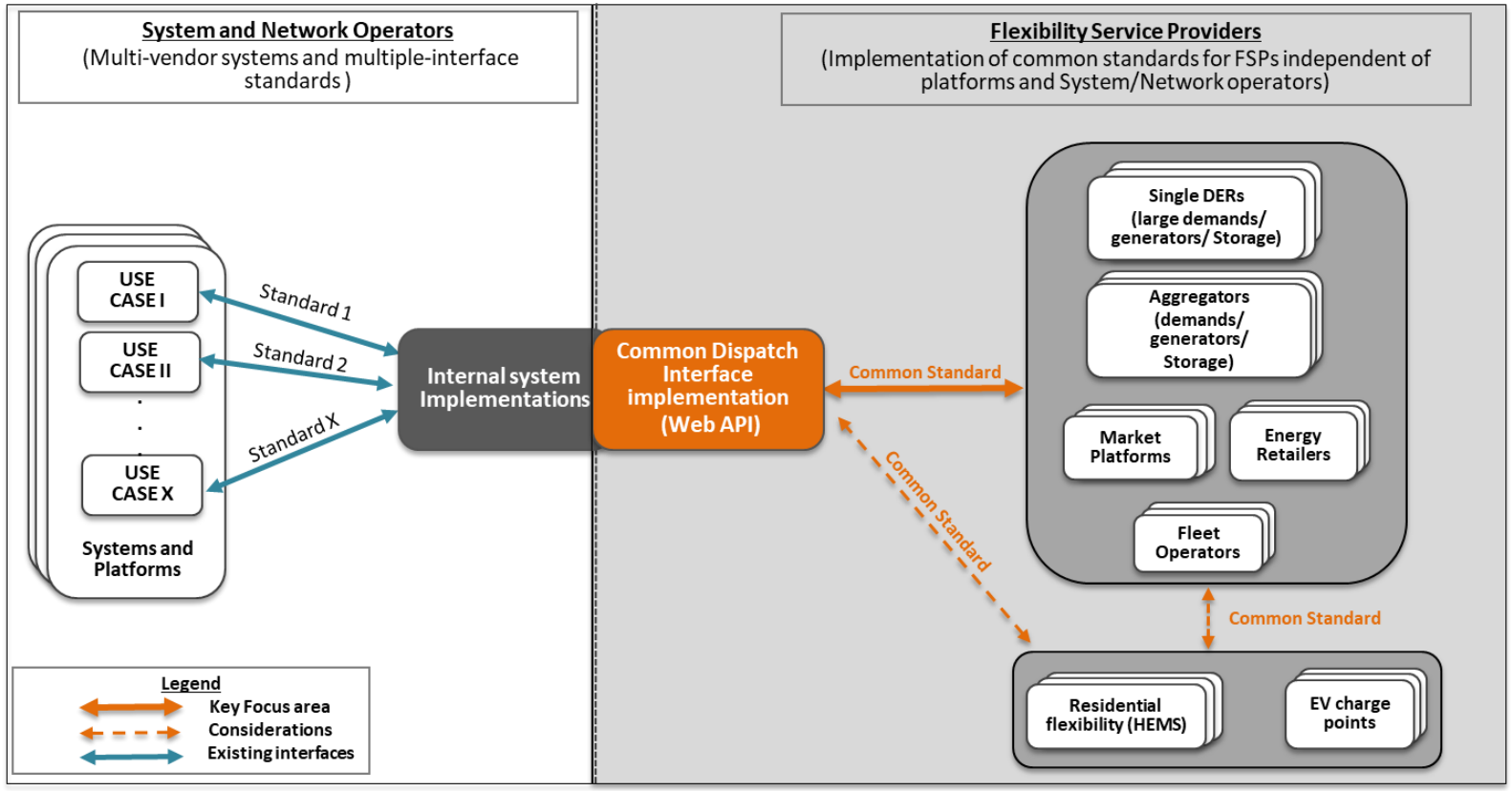


Differences identified in 2022 gap analysis

	Difference	Mitigation
Flexibility Products	Different System Operators offer different products and operate the same named products in different ways	Decouple products from dispatching process as much as possible. Another Open Networks working group is addressing alignment on product name and usage
Method of communication	System Operators currently using a mix of APIs, phone, email and SCADA. However agree that in the long term APIs will be the main way of communicating	Focus on development of a common API for dispatch of services, but consider that other methods of communication may remain in service

Conclusion: UK System Operators should align on a single common API standard for managing dispatch of flexibility services. If possible this should align to an existing standard.

Scope of the Standard & wider context



Key Focus area is the network operator ➔ Flexibility Services interface standard

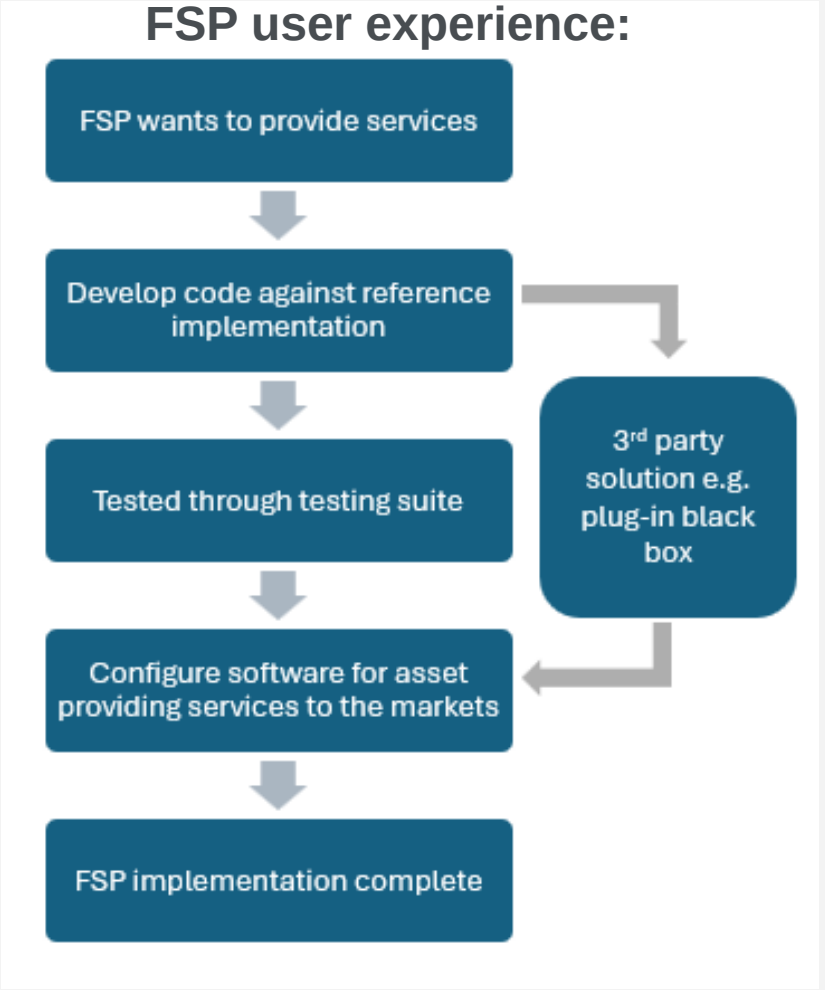
2023 – learning from stakeholder engagement and alignment of requirements

- **FSPs prefer working with modern tech stacks (e.g. HTTP REST over XML SOAP)**
- **FSPs value trial sandboxes over documentation**
- **Stakeholders want fast delivery, but want to avoid re-work**
- An iterative approach was generally preferred but maintaining backwards compatibility
- **FSPs recognised the importance of Cyber Security, but mostly considered this a platform issue**
- **Platform independence is necessary to ensure long term value for bill-payers (i.e. avoid vendor lock in for both FSPs and System Operators)**
- True interoperability enables System Operators to switch dispatch platforms / operate with multiple platforms in addition to FSPs

The outcomes and benefits of an Interoperable Dispatch API

- **FSP will be able to build one dispatch interface and use this to be able to integrate with all the network companies**

- **Resulting in more services being available to the network as the barriers to entry will have been reduced, due to the reduced time and complexity for integration with the network**



Considered Options

Option	Outcome/ Findings
All network operators to adopt a single existing dispatch platform	Not viable – significant commercial problems, and all of today's dispatch platforms are likely to require changes for future ENA products.
All networks to have their dispatch platform vendor adopt an existing platform vendor API specification	Not viable – in short timescales, effectively the same as option A, due to short-term adoption pressure favouring an existing platform vendor.
Develop a UK dispatch standard based on an existing standard (IEC CIM, USEF & UMEI, OpenADR 2.0 & OpenADR 3.0)	Viable – can deliver an interoperable solution.
Build a UK standard with platform vendors and industry	Viable – can deliver an interoperable solution.

Dispatch System Interoperability – Our Journey so far

OADR 3.0

Dispatch Alignment Recommendations **June 2022**

Industry consultation **Sep 2022**

Technical Working Group kick-off **Mar 2023**

Proposal paper and Scope of Works **Apr 2023**

PNDC on-boarded **July 2023**

Focus group engagement **Aug – Sep 2023**

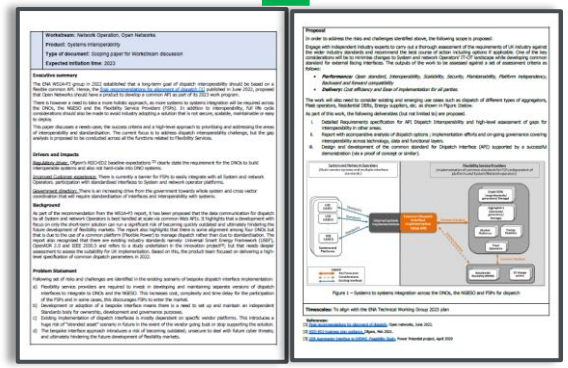
PNDC findings report **Nov 2023**

Detailed tech options analysis **Jan – Apr 2024**

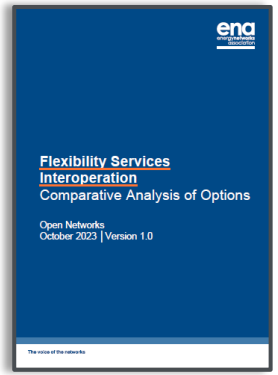
MVP scope proposal **(May 2024)**

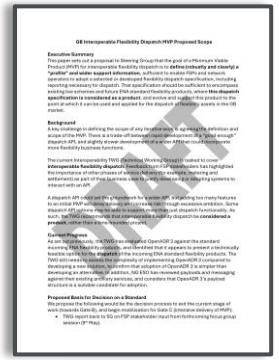
Mobilise Delivery **(Oct 2024)**

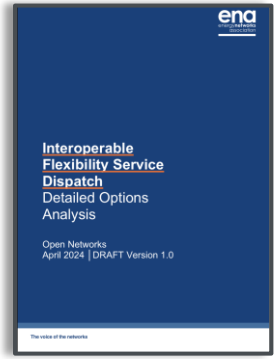
2022 report



2 page paper







Options Comparison

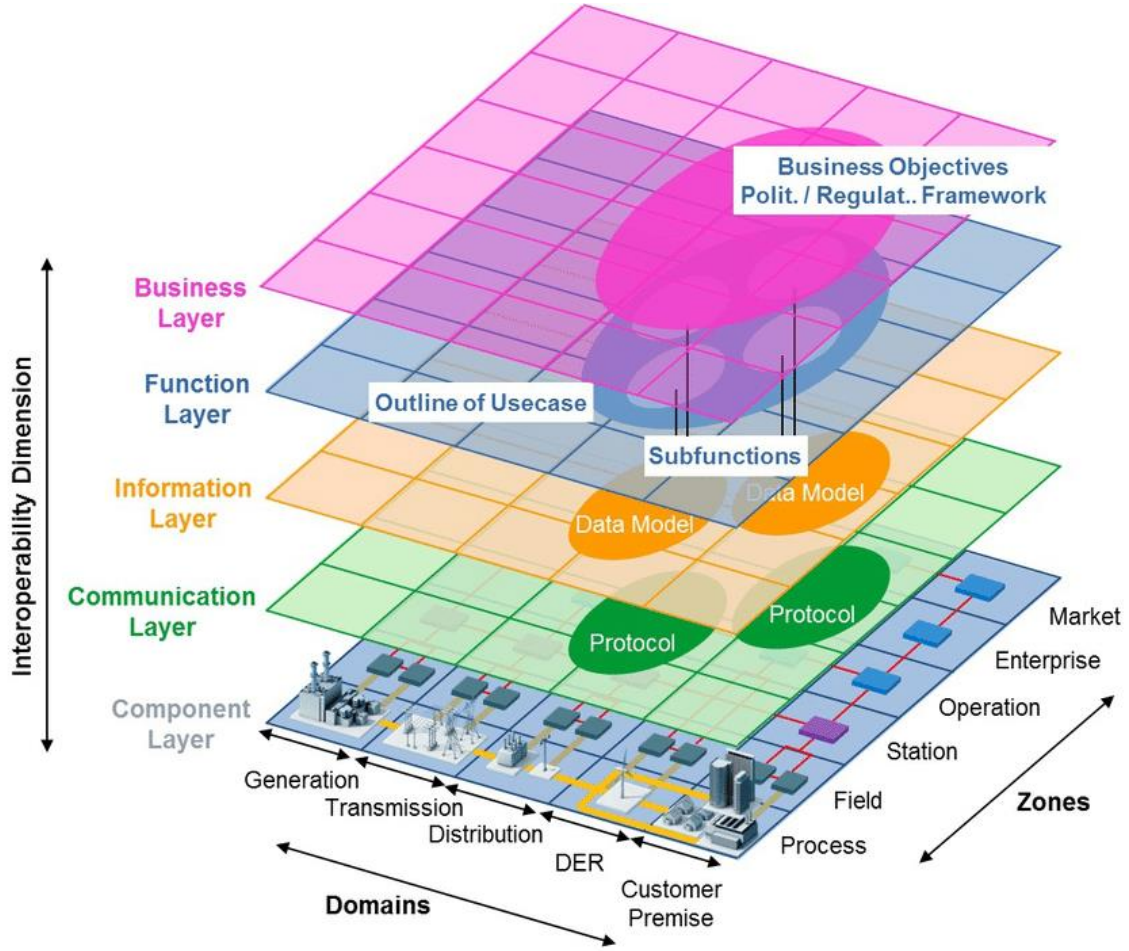
Implementation Roadmap and Hurdles

Tim Manandhar (UK Power Networks)

Interoperability via layers: SGAM view

ENA delivers a GB standard

GB Industry adopts the standard



SGAM (Smart Grid Architecture Model)

Delivery Approach (20-30 weeks)

1. Programme Management, Governance & Stakeholder Engagement

2. Technical Standard Delivery

- Technical & Security Architecture
- Product Dispatch Profiles
- Reporting Profiles
- Product to report mappings
- Endpoint Behaviour Definitions
- Reference Implementation

3. Independent Security (Cyber) Assessment

Architecture

Technical & Security Architecture	High-level overall technical solution architecture facing FSPs
	Security posture & threat model
	High-level system architecture
	Network operator facing architecture

Dispatch profiles

Product Dispatch Profiles	Common enablers and requirements (i.e. asset identifiers, etc.)
	Peak Reduction
	Scheduled Utilisation
	Operational Utilisation
	OU + Scheduled Availability
	OU + Variable Availability
	MW Dispatch
	Demand turn-down
	Suitable subset of ESO services

5. Current Activity Plan

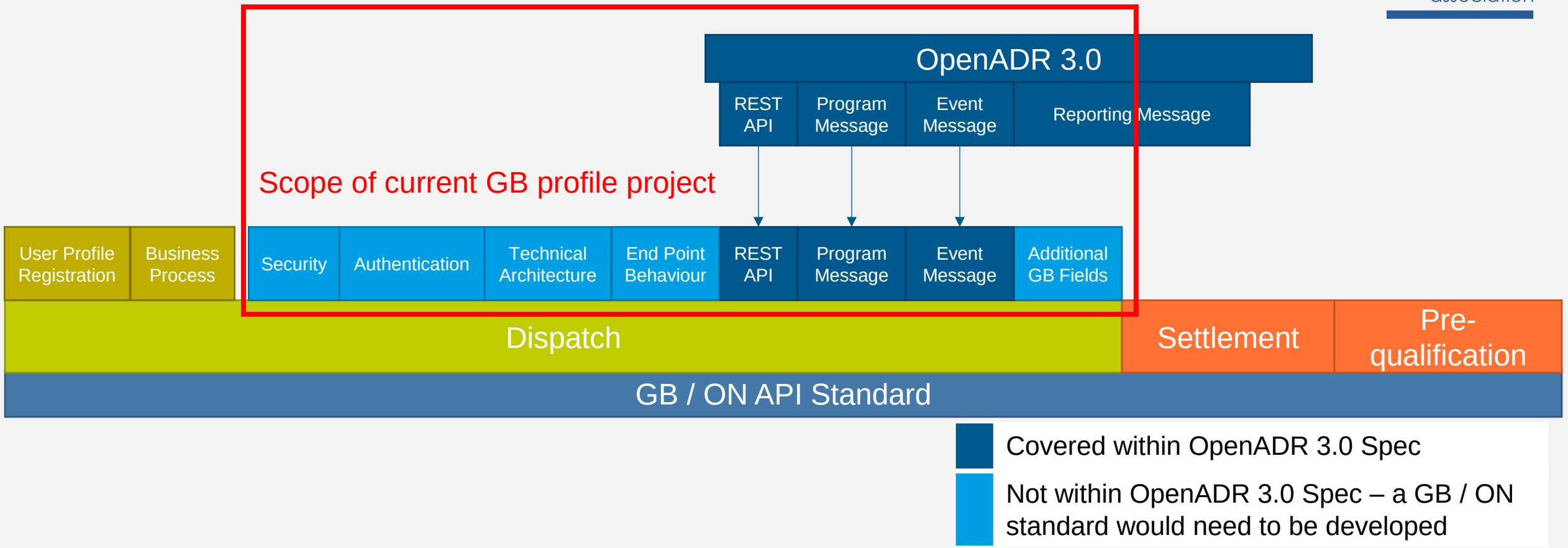
Reporting Profiles	Common enablers and requirements (i.e. asset identifiers, etc.)
	A series of report profiles, identified based on the services needed

Product to report mappings	(For each product, one or more reporting profiles selected)

Endpoint Behaviour Definitions

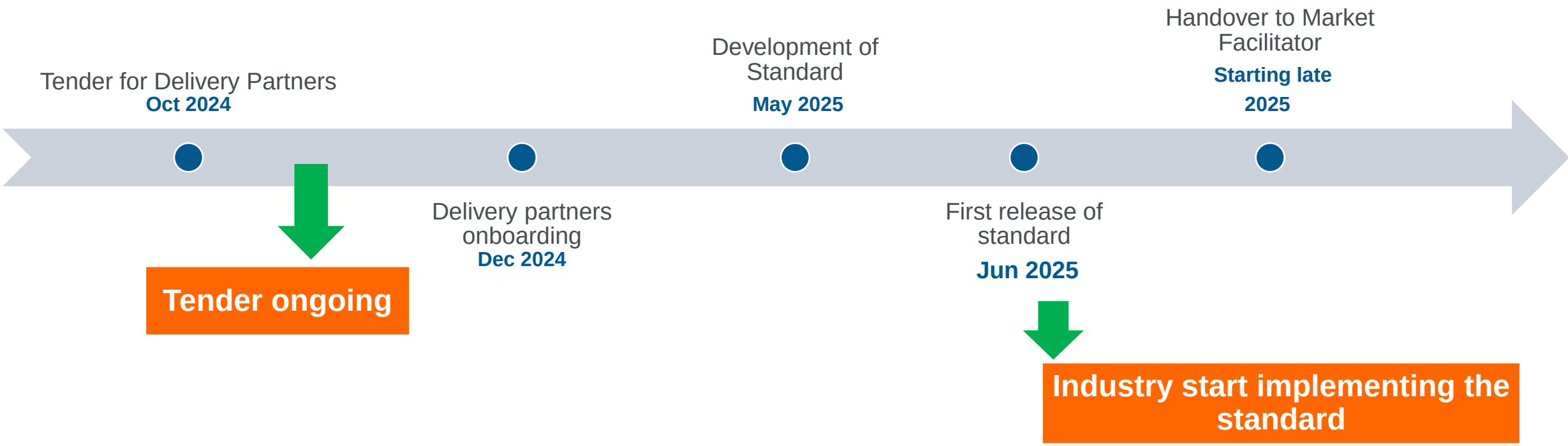
Endpoint Behaviour Definitions	High level architecture and specification of **FSP/ aggregator** endpoint (VEN) **behaviours**
	Definition of endpoint (VEN) **state machine logic**
	Technical **security** specifications of VEN implementations and scale/aggregation requirements
	Define VEN default **state** on **initialisation**
	Define VEN **state retention** requirements
	Define VEN **onboarding** process & behaviours
	Technical journey mapping for **migrating a VEN** to provide services to another network operator
	Cryptographic **key management** and re-keying
	Crypto **algorithm agility** uplift journey mapping
	Definition of standard, unambiguous fallback behaviours in the event of a **loss of comms**
	Definition of VEN **manual override** requirements

Our interpretation on how it maps to OADR 3.0



Note: This is indicative of how a GB profile could be built and is not intended to be a definitive view of what is and is not covered in OpenADR 3.0 or any other standard

ENA Dispatch System Interoperability – Roadmap



Key Principles

Reduce barrier to Market: Enhance FSP customer experience

PACE

Alignment of outputs with the original standard assessment criteria

Performance: *Open standard, Interoperability, Scalability, Security, Maintainability, Platform independency, Backward and forward compatibility*

Delivery: *Cost efficiency and Ease of implementation for all parties.*

Security by Design

Maintenance & Governance – The Afterlife

Goal - Interoperability via a standard “GB profile”

Industry Actions Beyond the delivery of GB profile

- FSP Onboarding
- Standard Governance
- Network operator to VTN integration
- FSP to VEN integration

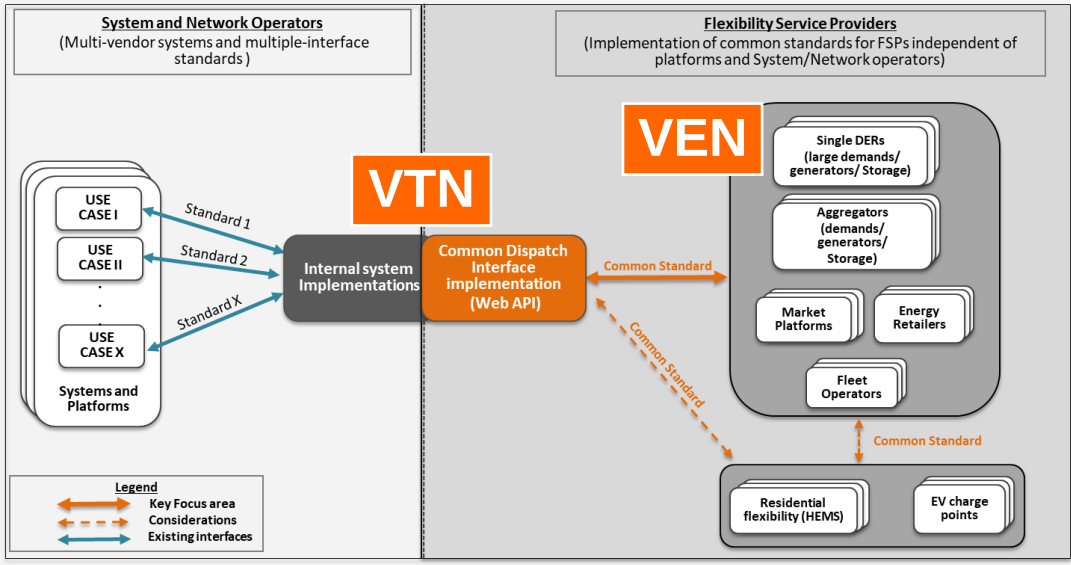
True Interoperability

needs to be End to End from Market, Business to Technology Layers

Flex Service Provider (FSP) Onboarding: Open Discussions

Key Questions – FSP Onboarding & Industry adoption

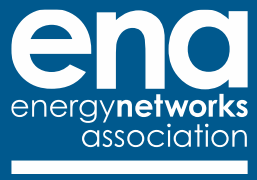
1. How can we reduce time and cost in VEN implementation for the FSP?
2. How can we reduce time and cost in FSP integration and onboarding to Network Operators?
3. How does FSP maintain interfaces (VENs) to multiple network operators?
4. How can the OADR 3.0 GB profile be maintained and governed?
5. What challenges do you see in our journey of implementing a GB profile?
6. What else we should be considering?



Dispatch Platform suppliers

FSP Technology providers

Integration partners



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The voice of the networks