Project Initiation Document (PID)

Regional Development Programme

MW Dispatch (WPD)

Contents

1. Purpose and Scope of this Document

The purpose of this document is to outline the overall project scope, key deliverables, milestones, and estimated timelines for delivery of the 'MW Dispatch' project between National Grid Electricity System Operator (NGESO) and partner Distribution Network Operator (DNO), WPD. The scope of this document will focus solely on the MW Dispatch project and any aspects relating to its successful delivery.

2. Project Purpose, Background and Vision Statement

The increased growth of Distributed Energy Resources (DER), across specific areas of the transmission and distribution has traditionally been facilitated by Transmission Owner build solutions. The MW Dispatch project will deliver a whole system operational solution which will enable a coordinated approach to managing transmission network constraints between NGESO and each partner DNO. To ensure continued regional operability of the transmission system, the dispatch of non-BM DER in real time will be developed in conjunction with an appropriate commercial arrangement to provide a curtailment service to manage transmission thermal constraints.

The dispatch service will initially be a reduction in active power when exporting for pre fault transmission system conditions in real time, meeting a predefined turn-to-zero instruction. The service will then be further refined (as part of future releases), for example, to enable dispatch during post fault scenarios on the transmission network.

3. Whole system approach

The principles of the MW Dispatch project are to build on the deployment of Distributed Energy Resources Management System (DERMS) technology across various distribution networks in GB, with the aim of providing an alternative route for DER to assist the NGESO in managing an increasing number of regional transmission constraints. Due to the volume of new connections across distribution networks, for example the South Coast, under certain scenarios (e.g. times of low regional demand and high renewable DER output), there may be a need to curtail distribution-connected plant if transmission constraint management options are limited or uneconomic.

A supplementary benefit in deploying DERMS technology across the transmission network will provide a 'technical conduit' for DER to provide transmission constraint management services to the NGESO. The aim here is to cater for those smaller DER that may not wish to provide high levels of flexibility in markets such as full BM or Wider Access API, whilst making use of the infrastructure that the DNO is rolling out.

Additional whole system benefits that will be realised as a result of this project include:

- The development of coordination processes between the NGESO and partner DNO to ensure economic and efficient dispatch of T and D services.
- The definition, and sharing of, enhanced data across a number of time horizons to benefit existing planning, scheduling, dispatch, and settlement processes.
- The development of systems and processes to provide a foundational test bed for the implementation of Primacy Rules between the NGESO and partner DNOs. The provision of increased operational visibility and situational awareness to the ENCC for DER providing the MW Dispatch service.

More broadly, it is expected that RDP projects in general will benefit DER by:

- Enabling faster connections for DER
- Reducing costs of connection
- Providing potential financial benefits for new services provided

The following table outlines key benefits for ESO that have been recorded for the project. This will be regularly reviewed and tracked during the project and post implementation.

ID	Benefit	Type	Description
B001	Ensure Network Operability through implementation of DER MW dispatch	Regulatory Compliance	ESO has a licence obligation to provide economic and efficient connection offers to Customers. These connections are offered under the 'Connect and Manage' regime whereby certain criteria must be met. The Cost Benefit Analysis showed that the most economic outcome for GB consumers was to utilise a 'Whole System' approach to operationally manage DER, as opposed to building expensive new transmission infrastructure. By completing this work, we will continue to meet our regulatory obligations.
B002	Ensure Network Operability through implementation of DER MW dispatch	Financial: Reduce expenditure	Provision of a system to dispatch DER MW output will enhance the current situational awareness and provide flexibility to the Electricity National Control Centre (ENCC). Improved situational awareness and flexibility service will lead to more informed real-time decisions, which will ultimately drive down the overall cost of operating the network.
B003	Ensure Network Operability through implementation MW dispatch	Financial: Reduce OPEX spend	DER MW dispatch will increase the pool of participants providing transmission constraint management services to the NGESO, leading to better market liquidity (thus reducing control centre constraint costs for the NGESO and, ultimately, the end consumer).
B004	Ensure Network Operability through implementation DER MW dispatch	Enables NGESO 2025 Ambition (Non-Financial)	Application of 'Whole System' approach to enabling low carbon connections in a timely and controllable manner will ensure the NGESO meets the ambition of being able to operate a 'carbon free' network by 2025.
B005	Improved "Whole System" Outcomes	NGESO Forward Plan commitment (Financial – Principle 5 incentive)	Delivery of the RDPs will improve coordination of planning and operational data/decisions between NGESO and the respective DNO. This will ultimately lead to more efficient and timely connections for Customers, and improved utilisation of existing network assets.

4. Project Scope

1) The definition of the commercial service, ensuring commitment of DNOs, DERs and NGESO organisations in agreeing to the technical and commercial service as well as agreeing to develop the technical dispatch solution and contractual framework.

2) Work to deliver a technical solution incorporating process, data, software and hardware systems, and industry communications according to the service architecture designed and developed internally and with industry partners.

3) To deliver a new service that delivers increased options to the NGESO Control Room to provide enhanced System security.

This project needs to have a technical IT delivery team of IT, NGESO/DNO and Legal experts, to put in place the technical tools, data architecture, Commercial Contracts and stakeholder communications required to enable the end-to-end solution. Additionally, to put in place the necessary information exchange, information models and system adaptations to enable NGESO/DNO commercial and network security analysis tools to successfully evaluate and utilise the service.

Initially, it is proposed that a minimum viable product (MVP) is implemented. The MVP is a version of IT delivery with enough features to be usable as an initial phase to facilitate the operational requirements and allows for stakeholders to provide feedback for future product development. Future enhancements are considered in scope for the project, however the scope and delivery of enhancements will be defined and refined following agreement of the MVP requirements & design.

Commercial service design:

Thermal Export Constraint

Where the increased connection of DER (in the form of generation assets and/or storage that is exporting MWs onto the distribution network) results in the coincident occurrence of low demand and high renewable output periods, the NGESO will need additional tools to take appropriate curtailment actions on these units. Initially the service will be used to manage high power flows across specific areas of the transmission system which is related to immediate system need.

DER have an existing contractual requirement to give visibility and technical control to their DNO. This project will extend that visibility to NGESO and enable additional commercial control options for NGESO. There are existing technical and commercial ways for NGESO to do this is (i.e. through the Balancing Mechanism[1] or Wider Access[2]), however these options require substantial capital investment from smaller DERs in addition to the frequent submission of commercial operating parameters.

To provide a lower cost option for DER to fulfil the BCA obligations, a simplistic, thermal Transmission Constraint Management service is required. The design of this service therefore needs to be kept simple to suit the capabilities of these smaller providers, DNO SCADA systems and ongoing administrative responsibilities. The initial design proposal of a service to meet these criteria is therefore a turn to 0MW approach. This would require any exporting assets to reduce their output from current operating levels to 0MW within a reasonable timescale (in the case of storage assets this would, as a minimum bring them back to a ‘float’ position). This was proposed to DER during joint DNO/NGESO webinars in July 2021 and was broadly supported.

Fundamental Service Parameters

- DER obliged by their connection terms and conditions must indicate which market route they intend to follow in order to satisfy these terms and conditions. They must not provide thermal constraint management service through multiple market routes.
- If choosing this basic MW Dispatch route, DER will need to follow a registration process set out by the NGESO and DNOs. This will collect basic technical and commercial information to enable the service to function and, as a minimum will include: Provider details, location, effective GSP, payment information and price.

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1 https://www.elexon.co.uk/operations-settlement/balancing-mechanism-units/

2 https://www.nationalgrideso.com/balancing-services/wider-access

- The MVP will require the service to be used to manage pre-fault thermal loading across the required constraint boundaries. The ability to instruct units in post-fault timescales (i.e. within 10 minutes) will be explored as an enhancement once the basic systems' functionality is in place.
- The design will be a basic thermal constraint management service and will only pay for utilisation (i.e. no availability payment will be provided). The price structure will not employ a cap.
- The minimum unit size will be 1MW. Each unit will need to be able to receive individual instructions via DNO SCADA systems.
- The service will operate as a continuous market, much in the same way as the Balancing Mechanism (BM) operates today, with providers able to update their prices regularly. DER who choose the basic MW Dispatch service route will be encouraged to provide a price and any updates to that price will be at the discretion of the DER. For those DER that do not choose a route to market (e.g. either BM, Wider Access, or MW Dispatch) then there is a likelihood they may be curtailed for free.
- DER can update their prices (with the aim of aligning this with BM timescales).
- It will be assumed that DER are available 24/7 to provide the service (unless the DNO declares the unit unavailable via the appropriate process).
- Basic service coordination activities will take place between the NGESO and DNO ahead of real-time to ensure service deliverability.
- The instruction format will always instruct a participant from their actual current MW output fully to zero MWs. There will be no incremental instructions as part of the MVP.
- A minimum instruction time of 5 minutes will be used, with a maximum of 89 minutes to align with existing BM parameters.
- Systems and providers should be able to deliver and respond to the instruction within 2 minutes (i.e. instruction communication time + instruction processing time + unit response time (ramp rate) ≤ 2 minutes). These response delivery timescales will be compatible for both the initial pre-fault thermal use of the service and the anticipated enhanced post-fault use of the service
- Instructions will be issued from the NGESO, via the DNO SCADA or DERMS systems.
- Issued instructions will be in the form of MW setpoint values (i.e. 0MW in the MVP), with a minimum settlement volume calculated over a time period of 5 minutes.
- For the MVP, DER will be settled against their metered output at the start of a dispatch instruction with the respective DNO.
- These same systems will gather appropriate metering data for the purposes of settlement and performance monitoring, which will be carried out by the NGESO.

Example Instruction

Figure 1 below shows an example of what the basic MVP instruction to DER will look like.

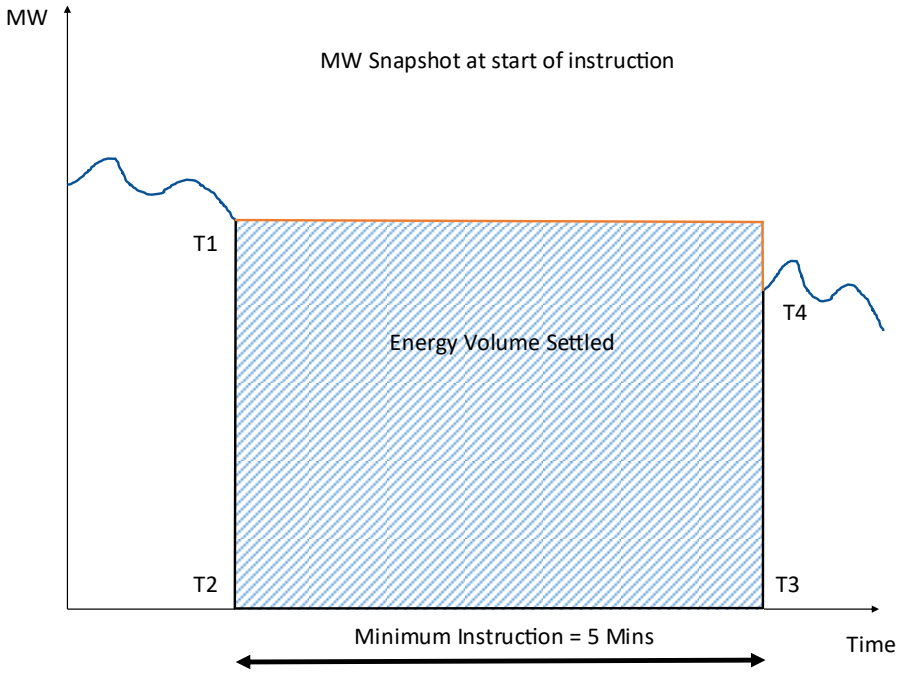


Figure 1 - Basic MW Dispatch Service Instruction

It is anticipated that this type of instruction, although simple, will ensure that even the most inflexible DER have a means of meeting their connection terms and conditions as part of the MVP.

Further development of the service may include coordination with additional third-party systems and capabilities as this will likely see the basic service design improved. However, this will follow the release of the MVP that will focus on delivering an integrated dispatch approach with RDP partner DNOs.

In addition, consideration will be given to more complex forms of instruction to that shown in Figure 1 (e.g. non-zero MW instructions to either curtail DER or request an increase in DER output). Again, this will likely follow the release of the MVP.

In scope for day-1 of IT delivery:

- Development of an end-to-end service for the full life-cycle from registration to decommissioning for Thermal Constraints ('System') purposes only
- Connectivity of metering and instruction pathway through NGESO IT systems to the DNO DERMS and DER
- Appropriate exchange of network data with NGESO and DNO
- Approach internal derivation of forecast information and external provision of planning/market data to determine baseline position of DER
- Appropriate exchange and use of external contingency information and its expected impact on wider network and balancing conditions
- Definition of the NGESO/DNO planning, scheduling, and dispatch processes, ensuring that these processes do not adversely impact other dispatch processes (e.g. BM and WA).
- Settlement information and payment process for the NGESO TCM
- Market information publication of all DER instructed congestion management activities via appropriate market reports (to be determined).

Out of Scope for day-1 of IT delivery:

- Reactive power services
- Demand turn up
- Thermal Import Constraint for Storage DER (see below)
- Joint procurement of services between NGESO/DNO
- Use of the service for distribution constraints
- Management of non-'System' (non-Thermal Constraints) purposes (e.g. Frequency Response, Reserve Services)

Thermal Import Constraint

At certain GSPs, there has been an increase in interest from storage applicants wishing to connect to the distribution network. If all of these applications materialise then this could lead to demand non-compliance issues at the GSP itself, if the storage providers choose to import active power from the transmission system close to peak demand periods (often referred to as the 'shoulders' before and after the actual peak).

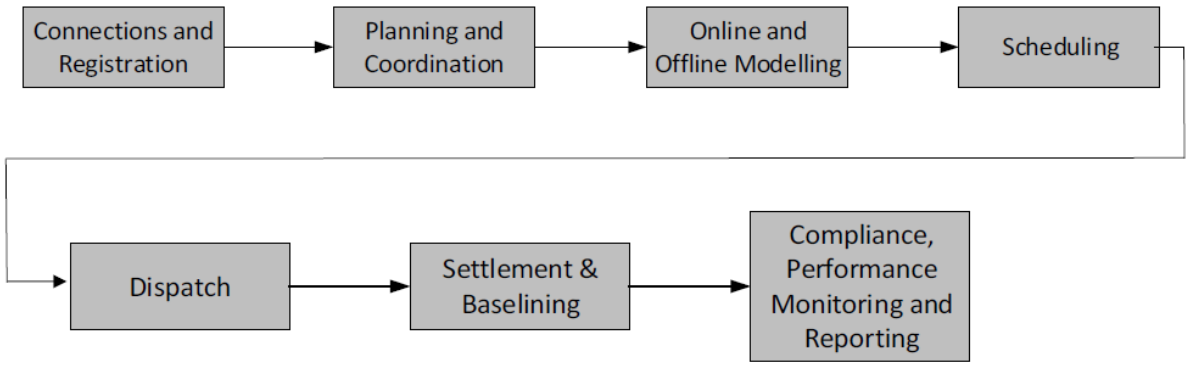
This operability issue is likely to increase over time as more GSPs become congested across various cardinal points, thus changes to the basic thermal Transmission Constraint Management service noted for Thermal Export Constraints is expected to be sufficient to provide the NGESO and DSO with the right tools to manage a Thermal Import Constraints service. The basic service design could therefore be altered to offer a turn up towards 0MW approach for those assets that happen to be importing MWs close to the peak consumer demand. This would require these assets to stop acting as demand and (as a minimum) move their units to a 'float' position.

At the time of writing, there are potential candidate sites that may need to take forward this addition to the underlying service design however, this will continue to be monitored as part of the connections process.

While Thermal Import Constraints may be closely aligned to Thermal Export Constraints, it has a different needs case and will be progressed via a separate RDP project, hence is being considered out of scope for this project.

Scope of the Minimum Viable Product

The MVP for the project has been outlined by defining the minimum features across all the end-to-end service process steps. The end-to-end service process steps are shown and described below, along with the scope and relative priorities for deliverables.



The table below highlights the proposed deliverables required to successfully deliver the overall end-to-end MVP:

Process Area	Deliverable	Priority
Connections and Registration	Using existing data, processes, and systems (where possible), a simple registration process should be created between the NGESO, DNOs and DER to ensure the information relevant to test the service is available for downstream processes.	Medium
Planning and Coordination	Existing planning processes should be updated to take account of the basic RDP TCM service. This should, as a minimum use the data gathered at the registration stage to assess the pre-fault effectiveness of DER on regional constraints. It should also deliver a basic coordination process that ensures the service can be dispatched, taking account of DSO flexibility services, and forecast ANM operating periods.	Medium
Online and Offline Modelling	A basic model of those DER taking part in the initial trial phase of the MVP should be available to ensure the impact of the service can be accounted for in existing processes.	Medium
Scheduling	Existing scheduling processes and systems should be updated to take account of the DER taking part in the deployment of the MVP. This information should feed into existing control room processes/systems to provide awareness of the service providers and their dispatch capabilities. In addition, a coordination process should be defined between the NGESO and DNO to take account of any operational changes that have occurred since planning activities were handed over.	High
Dispatch	Processes and systems should be developed to ensure a basic dispatch capability can be proven across the NGESO, DNO and DER infrastructure. A simple display should be available for the control engineer to be able to select DER, understand the available MW volumes and pricing information and provide situational awareness of successful service delivery. In addition, appropriate indications should be made available whereby there is a likelihood that the service may not be fulfilled (e.g. as a result of ANM operation).	High
Settlement and Baselining	A baselining approach should be designed, agreed, and implemented in order to settle the TCM service. Appropriate data to enable settlement should also be defined and made available via the necessary systems and/or processes. NGESO should be able to settle with individual providers for any element of service provision, post-event.	High
Compliance, Performance Monitoring and Reporting	Necessary reporting/audit requirements for the service should be met in order for the MVP to be tested. A performance monitoring policy is not required as part of the MVP and can be designed as part of a later phase.	Low

Future Enhancements to the product

After the MVP end-to-end service has been delivered, there are several potential enhancements to the service that are to be considered

Process Area	Enhanced Product Deliverable
Service coordination with DNOs	• Further development of primacy rules within the relevant IT systems • Further integration with broader IT systems • DNO access to the MW Dispatch service • Alternative routes to participate in the MW Dispatch service
Connections and Registration	• Further digitisation and automation of existing data gathering processes (e.g. Appendix G, Week 24 etc) • Implementation of the registration process with new platforms (e.g. Single Market Platform, Digital Engagement Platform and/or Connections Portal)

Planning and Coordination	• Development of the basic coordination processes to ensure both ESO and DSO understand which services are likely to be dispatched under certain network outage conditions • Further improvement of data exchange activities to make better use of systems and platforms • Improvements in forecasting information and network study capability to make better use of DER service provision
Online and Offline Modelling	• Further development of how DER are modelled for the provision of different services • Improved and automated scripting of DER dispatch for different services, under a different outage/fault combination. • Development of post-fault capability within the MW Dispatch service and appropriate modelling of this within offline and online systems • Further modelling refinements associated with automated control schemes and dispatch advice to control engineers
Scheduling	• Extension to the technical capabilities of the MW Dispatch service to take account of storage providers switching to demand • Additional automatic sharing of scheduling information between the ESO and DSO to give improved visibility of service requirements ahead of real-time
Dispatch	• Expansion of dispatch systems to include improvements to the service design (e.g. MW decrements other than 'to zero') • Ability to incorporate storage acting as demand (for export constraints) • Enhancements to real-time data exchange allowing customised dispatch advice based on ANM activity and changes in DNO network topology • Refinement of new/existing dispatch algorithms to take account of DER services
Settlement and Baselining	• Improvement of the basic baselining approach based on work from Open Networks and improved data exchange techniques • Automation of the settlement process (depending on progress for the MVP release) • Enhanced publication (to the market) of displaced volumes and constraints information
Compliance, Performance Monitoring and Reporting	• Refinement and automation of the performance monitoring process • Integration with other platforms (where appropriate) to enable increased customer self-service for information on the services they've provided • Improved and more refined reporting information

5. Project Approval and Governance Structure

Key Roles and Responsibilities

- Project Manager
- Product Owner
- Key SMEs
- IT Resources (including IT Project Managers, Business Analysts, Solution Architects, Data Architects, Test Leads for both the RDP Project and any ESO System Products that require change to be implemented to deliver the RDP Project)
- DNO-specific resources

6. Delivery Methodology and how we will work together

Overview of Agile approach

The project will employ an Agile way of working (where possible) and involves defining, planning, and completing tasks within a short time window called a sprint. An end-to-end process for the MW Dispatch service will be defined that will form a high-level view of the individual elements and constituent parts. These high-level elements are then further refined, developed, and validated with all stakeholders on a continuous basis throughout the project to ensure requirements are being met at each stage.

The project will initially deliver an MVP, which will subsequently be extended via Enhanced releases to deliver additional features which will be prioritised by impacted stakeholders.

7. Governance structure and use of existing DNO meetings and Joint Forum

The DNO and ESO will hold regular bilateral meetings to monitor progress of the project. These meetings will also highlight any policy or stakeholder topics that may have an impact or need to be considered within the development stages of the project. Joint PMB meetings will be also considered during the project in order to engage senior DNO/NGESO management for prompt key decision making.

In addition, key outcomes from the bilateral meetings will be shared with all DNOs that are currently not part of this RDP, during monthly Joint Forums. This will provide visibility of technical and commercial developments, invite an open discussion on whether consistent technical approaches can be employed, and agree the best way forward across the group.

8. How does this project fit with wider RDP work/other projects?

The first cross boundary project linking distribution smart grid schemes and traditional transmission control systems was to develop N-3 operational tripping schemes. The N-3 intertripping scheme with UKPN has gone live in November 2020 for the South East Coast. The work on N-3 intertripping schemes with SSEN and WPD in the South Coast are underway and the go live dates are anticipated ahead of the MW Dispatch MVP release. Under N-3 scenarios, DER will be curtailed to secure double circuit events if the network is already depleted by an outage. The intertripping system is only utilised post fault under N-3 conditions across the South Coast. This allows generation to operate freely pre-fault virtually all the time, because the probability of the fault is exceptionally low. The maximum generation intertrip will be set by the agreed largest system infeed for which primary and secondary response plant is scheduled. From a project delivery perspective, the MW Dispatch project may have some dependencies on N-3 for deliverables such as the ICCP implementation for UKPN and WPD. Operationally, MW Dispatch may have some interaction with N-3 as part of Primacy Rules considerations.

Also, for South West of Scotland of the RDP team are developing the Generator Export Management System (GEMS) scheme to manage nested transmission constraints boundaries, by autonomously issuing dispatch instructions to transmission connected and DER units. DER units will be integrated under the control of the SPD ANM, to be deployed during 2022 in Dumfries and Galloway part of the network. The MW dispatch operational principles identified in this document will be used to ensure an integration into the GEMS functionality, to facilitate a ‘pass through’ of dispatch instruction to the relevant DER unit. This is to ensure a consistent approach in instructing small DER units, across GB.

In the future, a proposed RDP project will be assessed for Storage DER. This project is expected to benefit from many aspects of MW Dispatch; however, the needs case of this RDP differs sufficiently that this should be considered as an independent RDP project.

9. Joint Project Plan and risks

The project plan for MW Dispatch has been developed and agreed jointly between NGESO and partner DNO, WPD. It reflects the design and implementation phases for IT delivery and the associated activities that are required to produce the initial MVP and subsequent Enhanced service (see Appendix 1-3). Presently, planning is focused on delivery of the MVP. Detailed planning for Enhanced releases will be progressed during the project. Consequently, a key milestone is the delivery of the MVP which is planned to be in place in July 2022.

The scope and delivery planning for Storage Import dispatch provisioning is yet to be defined and links to the work being developed under RDP3.

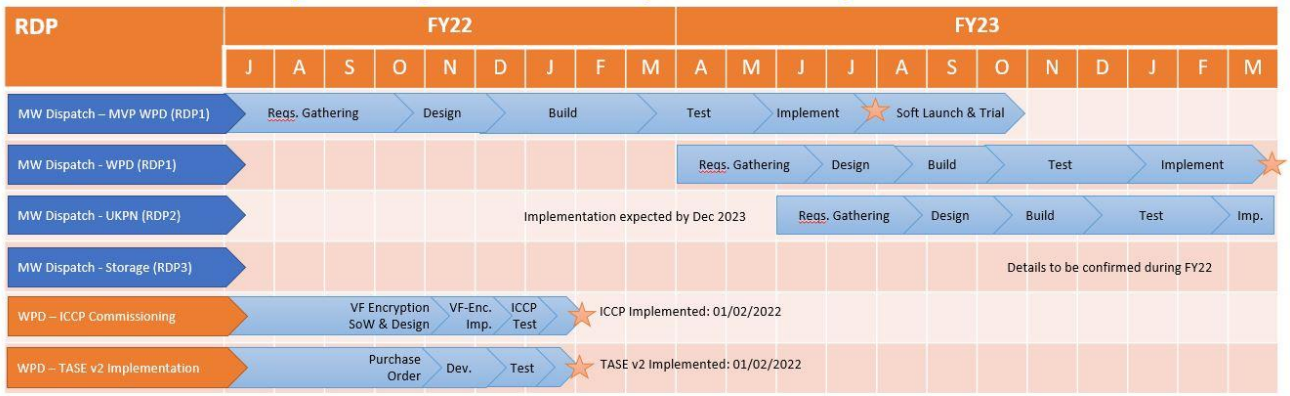
A list of high-level risks currently identified are shown in Appendix 4.

10. Document Version and Tracking

The table below outlines current and previous document version, including appropriate sign-off from all parties.

Version	Date	Change Overview	NGESO Approved (Name and Signature)	WPD Approved (Name and Signature)
V001		Initial draft of PID		
V0.5	05/09/2021	Updated Timelines		
V0.6	13/10/2021	Updates following review by NGESO business		
V0.7/V1.0	01/11/2021	Updates from WPD incorporated and PID issued as v1.0		
V1.1	02/12/2021	Plan progress updates (Dec 2021)		

Appendix 1: MW Dispatch (and Dependencies) Roadmap

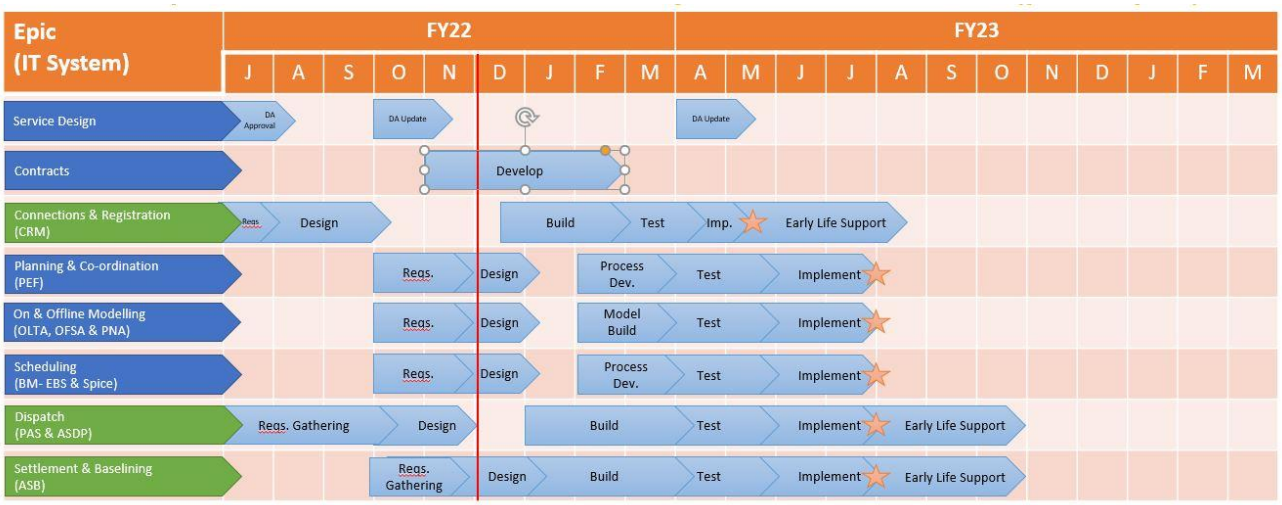


Delivery Roadmap Key

RIIO-2 BP1 Deliverable | NG IT Delivery Phase | Production Release

nationalgridESO

Appendix 2: MW Dispatch MVP Delivery Plan (ESO IT Implementation View)

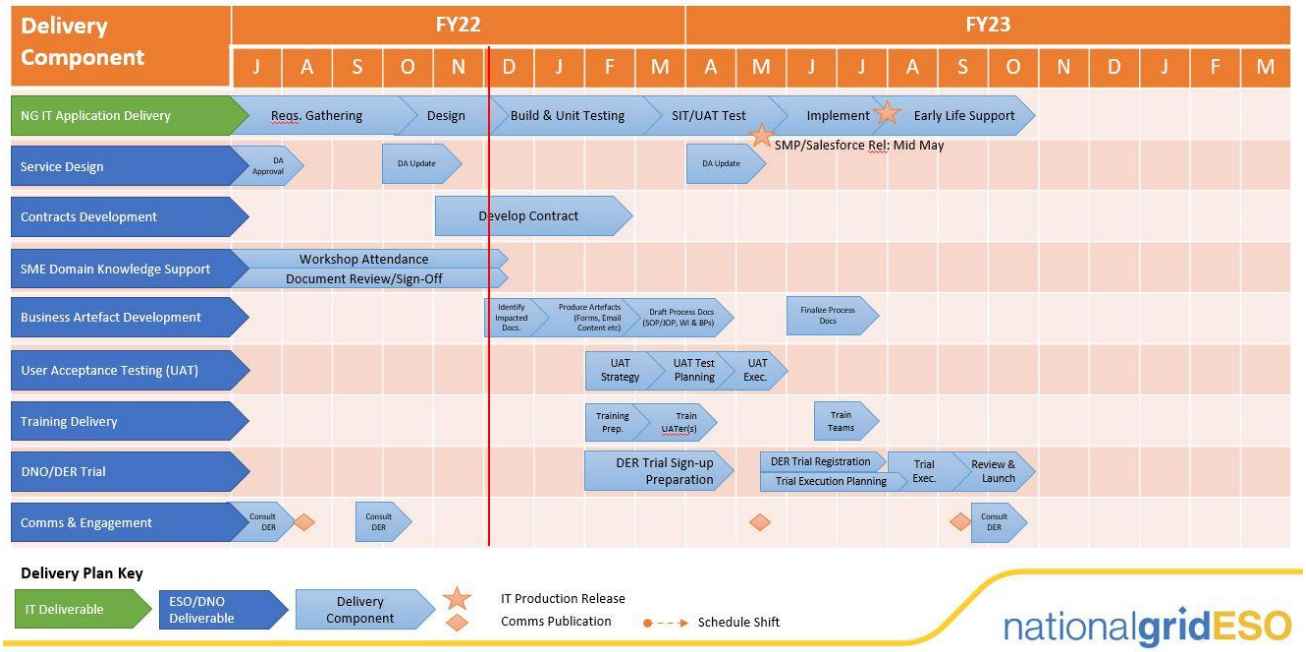


Delivery Plan Key

IT Deliverable | ESO/DNO Deliverable | IT Delivery Phase | IT Production Release | Schedule Shift

nationalgridESO

Appendix 3: MW Dispatch MVP Delivery Plan (Business Change View)



Appendix 4: MW Dispatch project risks

Significant ESO risks identified at time of writing:

Risk	Risk Category	Probability (1-5)	Impact (1-5)	Risk Strategy
There is a risk that it is not possible to get consistent agreement on the content and format of the commercial contract structure for Dispatch Management, leading to impacts on other workstreams (dependent on contract terms), delays in the project or ultimately inability to deliver the project.	Commercial	3	4	Accept/Mitigate: Activities will be carefully tracked and where possible related details will be provided to other workstreams independently of contract finalisation.
There is a risk that the proposed technical design significantly changes due to feedback from DNO, DER and ESO stakeholder engagement which may highlight the need to modify the technical design leading to project rework and delays	Commercial	1	4	Mitigate: Regular DNO and ESO stakeholder engagements and close collaboration. Regular DER engagement to provide updates and seek feedback on proposals. Delivery of an MVP, to then be expanded in enhanced releases to reflect stakeholder feedback.
There is a risk that each DNO (WPD & UKPN) requires a different IT interface and service design leading to significantly increase complexity, costs, and timescales to deliver	Delivery	2	4	Accept/Mitigate: Actions to be taken to mitigate this risk and secure a common solution between WPD/UKPN, however ultimately some differences between solutions may be accepted.
There is a risk that resource requirements for the project cannot be secured leading to project delays and/or deliverable quality issues.	Delivery	3	4	Accept/Mitigate: Forward planning and early engagement with key resources will be employed to minimise this risk. ESO have secured dedicated RDP business and IT teams to drive the RDP projects and prioritisation calls to mitigate this risk for specific project needs will be employed where necessary.
There is a risk of DER confusion regarding the proposed service leading to a lack of participation	Commercial	2	2	Mitigate: ESO/WPD to undertake regular Webinars to provide DER with information and project updates throughout the project duration.
There is a risk that ABSVD reporting requirement may apply to MW Dispatch such that additional requirements will need to be captured within the solution to comply with the necessary obligations leading to additional complexity for the MVP	Regulatory	2	4	Mitigate: ESO to progress discussions with relevant ESO leads and identify requirements

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