Annex

A20.04 Ellipse Engineering Justification Paper

December 2019

As a part of the NGGT Business Plan Submission

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Name of Project	*Ellipse (Enterprise Asset Management)*
Scheme Reference	*GT_T2_006*
Primary Investment Driver	*Technology Health*
Project Initiation Year	*FY23*
Project Close Out Year	*FY24*
Total Installed Cost Estimate (£)	██████ *(NGG Share)* *This is a shared investment NGET, who contribute towards the remaining the costs (*████*)*
Cost Estimate Accuracy (%)	*We have benchmarked our investment with Gartner and are within their recommended cost.*
Project Spend to date (£)	*N/A*
Current Project Stage Gate	*N/A*
Reporting Table Ref	*N/A*
Outputs included in RIIO-1 Business Plan	*N/A*

Spend apportionment	**RIIO-1**	**RIIO-2**	**RIIO-3**
		████	

Project Status and Request Summary

In the RIIO-2 period the support contract for our Enterprise Asset Management system, Ellipse, will come to an end. The system in its current version will also be nearing its end of life. A project will therefore need to commence in RIIO-2 to refresh or replace Ellipse.

This Justification Report outlines the need for the investment, the options that have been considered and the recommended approach. This is a shared investment with NGET and is accompanied by CBA reference number A20.05.

Problem/Opportunity Statement

Ellipse is a business-critical Enterprise Asset Management application, provided by ABB, and is the master data source for all National Grid Transmission Assets. It is fundamental to the safe and efficient delivery of maintenance plans to enable asset health initiatives that support us in maintaining an efficient, reliable and safe network for our stakeholders. The application manages the:

a) Registry of the transmission assets
b) Maintenance and other work associated with those assets
c) Inventory relationship for MRO (Maintenance, Repair and Operations)
d) Some elements of work scheduling
e) Some elements of faults and defects
f) Cost and time information across capital and maintenance work
g) Wayleave information
h) Field worker's timesheets and feeds into the SAP payroll system

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The current version of Ellipse will be nearing its end of life, following its last technical upgrade in National Grid which completed in 2017. Contingent with our IT asset health policy we have adopted the assumption that Ellipse will, at a minimum, require a refresh in 2022-24.[1] After this point it is likely NGG will see an increase in RTB and challenges with ongoing operation & support, without either a significant upgrade or replacement of Ellipse and a review of existing support, development and maintenance arrangements. This presents an opportunity to reassess the market, take advantage of IT industry trends of new solution deployment models, development techniques and modular architecture and continue the transformation of our architecture. It also enables National Grid to optimally align our suppliers with our IT operating model.

Our Ellipse system and Enterprise Asset Management capability is shared with NGET due to similar requirements for both business units. The shared capability delivers synergies and allows us to leverage economies of scale, that deliver more efficient delivery and running costs.

In 2013-14 an options analysis, carried out under the Transmission Technology Change Roadmap (TCR) Programme, recommended a technical upgrade of Ellipse from version 6 to 8 across both Electricity Transmission (ET) and Gas Transmission (GT). Other options explored but discounted included a replacement of Ellipse with either Maximo or SAP, deferral of investment altogether and separation of the ET and GT instances of Ellipse. Each of these options were rejected because at that time they either increased the total cost of ownership, were deemed too risky or did not fit with the business's requirements. At that time asset management system vendors typically sold tightly integrated product suites that delivered elements of investment planning and performance management.

The upgrade took place in 2015-2017 under the Transmission IS Major Projects Programme (TIMSP). Ellipse was upgraded from version 6 to version 8 for both ET and GT. The main driver was to address the health of version 6 but to also improve integration with other systems, reduce overall cost to run the system and reduce dependency on AMT-Sybex to develop functionality and interfaces in the future.

Since the upgrade, we have introduced a new technology and vendor in to the current architecture for asset investment planning (Copperleaf C55) which has been integrated in to the existing environment. Our system landscape and architecture has also continued to develop in asset performance management. But we are yet to define any clear product or vendor strategy in this area due to most vendors still having not defined clear direction and roadmap in this area, in the timescales we are looking at (2022-24).

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[1] We define a refresh as the replacement of hardware with comparable, supportable hardware and / or an upgrade to a current (supported) version of system software and application software. Upgrading to a current version of software ensures the availability of maintenance and security patches, it may also bring increased system capability, but that will be a by-product of the upgrade and not its primary purpose.

A full replacement differs from a refresh, in that the usual trigger for a full replacement of an IT system with a new system will be to develop new or changed business capabilities. The business requirements will have changed to an extent that it is not considered possible or cost effective to accommodate the new and changed requirements through changes to the existing system and the procurement of an entirely new system is considered the best option in terms of the business benefits delivered versus the cost. The business requirements that drive such a replacement may be functional (e.g. a new process has to be supported) or non-functional (e.g. a substantial increase in user numbers, resilience required or transaction throughput).
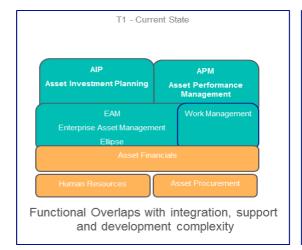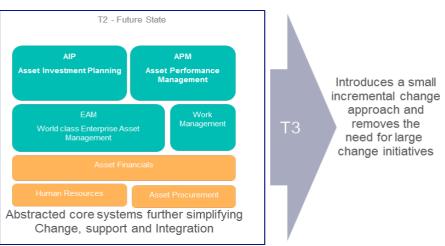
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Project Definition

Project Scope Summary

The new solution must be able to accommodate changes to NGG's business requirements including enabling reliability centred maintenance, increased digitalisation of business processes, the extension of condition monitoring and the increasing reliance on an Asset Investment Planning tooling to optimise our investments. Equally, it must be a good functional fit with broader National Grid systems in HR, Procurement and Finance for improved efficiency. Additionally, it should have a robust product roadmap, and as the core works and asset management system, continue to provide key asset management functionality.

An updated solution coupled with a transformed architecture will enable systems to meet the changing demands of the energy market whilst removing the need for major upgrades in future regulatory periods, this will reduce the overall cost of future change and ongoing maintenance. The diagram below shows the evolution of the architecture and system landscape across regulatory periods.

Work has started in the RIIO-1 regulatory period to simplify the architecture, integration and system landscape through updates and abstraction of work management and simplification of core asset management integration during system upgrades. To complete the transition, additional investment is required.

To meet stakeholder's expectations of a safe, efficient and reliable network, we will therefore look to move to a fully supported, integrated, market leading asset management solution that supports NGG with monetised risk and delivering asset interventions to maintain the required health of our transmission assets. Given the new architectural and deployment options from asset management systems we would also like to explore the possibility and potential benefit of remaining on a common platform and vendor across Gas and Electricity Transmission but separating instances, this would benefit IT from a commercial and operational perspective but may present opportunities and efficiencies to both transmission businesses, this option had been discounted from previous assessments due to those limited architecture and deployment options.

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Options Considered

Options Summary

Based on technology options known about today, the following three options are to be considered:

A. Minimal asset health investment – Run systems past end of life dates and use third party support in RIIO-2 Period (Deferral of a larger upgrade of Ellipse until RIIO-3)
B. Upgrade current system to supported levels in line with manufacturer support roadmaps (move to the latest version of Ellipse, if/once available)
C. Replace current solution and move to a market leading Asset Management system (e.g. ███████████)

Option	Total Cost of Ownership	Capacity to Deliver	Business / Strategic Fit	Risk	Overall
A) Minimal asset health investment – Run systems past end of life dates and use third party support in RIIO-2 Period (Deferral of a larger upgrade of Ellipse until RIIO-3)	**RED** • Likely increase in ongoing Opex costs for support.[2] • Likely increase in year on year remediation investment. • Likely increase in parallel IT costs such as integration.	N/A	**RED** • Would place core business processes at risk as system ages. NGG staff productivity impacted through poor user experience as stated in our IT Strategy submission • Would not support future NGG requirements for adoption of monetised risk and asset investment planning.	**HIGH** • All software components will exceed end of life. Product will reach end of life and ABB will withdraw support for all components. • System health issues would increase and would become a serious risk to the business. • Would expect cyber risk to increase year on year.[3] NGG 2 / 3 times more at risk of system failure and exposure to cyber threat as cited in our IT strategy • Ellipse is fundamental to the safe and efficient delivery of the capital plan and maintenance programmes.	**REJECTED**
B) Upgrade current system to supported levels in line with manufacturer support roadmaps (move to the latest version of Ellipse,	**AMBER** • Capex investment required, £3m - £6m [4] • Ongoing Opex costs projected to remain similar to today	**GREEN** • Standard migration approach with history in NG • Likely most cost-effective Capex approach minimising technical complexity	**AMBER** • Unlikely to meet future NGG requirements for adoption of monetised risk and asset investment planning • Would not align with NG IT Enterprise Architecture policies[5]	**MEDIUM** • May increase risk of vendor lock in • May not meet NGG's future business requirements • Would not address inefficiencies identified in cost management between Ellipse and SAP. • Would address all projected system health issues.	**REJECTED**

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[2] 2013 options analysis identified and increase in ongoing Opex per year for similar option

[3] To satisfy Digital Cyber Risk & Security requirements, regular updates of the Ellipse application must be applied to ensure that the Ellipse Appliance OS is up to date in terms of ABB recommendations for the specific version in place

[4] Based on cost of v6 to v8 upgrade

[5] Leverage and reuse applications and technology where National Grid has made a significant investment (HR and Finance – SAP, Asset Management – Maximo)

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		and re-work. • Processes remain largely unchanged and users require familiarisation training only.		• Would not address business feedback of difficulty to use and expense and inflexibility in making changes to the system	
C) Replace with other market leading Asset Management System (e.g. Maximo, SAP)	**GREEN** • Capex project costs likely higher, at £8.5m, than an upgrade[6] • Reduced investment over RIIO-3 period due to complexity being removed from the architecture • Expect Opex reduction incurred from licensing and support rationalisation, along with consolidation across Asset Management system landscape	**AMBER** • Migration away from Ellipse would be more complex than an upgrade • Still activity that is done regularly across industry	**GREEN** • Simplified NG wide architecture and lower platform cost. • Reduced NG customisations. • Enabler for future NGG requirements	**LOW** • Would address all projected system health issues. • Improved integration, reduced cost with other NG systems such as SAP • Reduced reliance on AMT Sybex • Need to proactively manage delivery as expected to be more complex	**RECOMMENDED**

Business Case Outline and Discussion

Key Business Case Drivers Description

National Grid's strategy is to continue to mature our IT architecture to support rapid change as cost effectively as possible. We started our transformation journey in RIIO T1 performing major upgrades to our core asset management system, bringing in new solutions for investment planning and performance management and simplifying the surrounding systems, integration and support model. We now need to continue this transformation to take advantage of developments in the IT market and to optimise changes in our IT operating model.

This paper and its recommendation underpin NGG's responsibility to provide a safe, reliable and cost effective network for its stakeholders that can quickly adapt to the changing needs of the UK energy market. When implemented, it will drive the following benefits:

- Reduction in ongoing Opex incurred from licensing and support rationalisation
- Simplified NG wide architecture and lower platform cost
- Remove need for large, costly future change programmes
- Reduced NG customisations
- Increased ability to rapidly and cost effectively change the IT landscape to support future GT requirements – e.g. digitalisation, monetised risk and optimisation of asset investment planning
- Address all projected system health issues
- Improved integration with other NG systems such as SAP
- Reduced reliance on AMT Sybex

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[6] Benchmarked with Gartner

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Preferred Option Scope and Project Plan

Preferred Option for this Request

The recommended solution is to replace the current solution and move to a market leading Asset Management system (e.g. Maximo or SAP).

Project Spend Profile (RIIO-2)

Enterprise Asset Management (Ellipse) – GT Share						
Investment (£m)	FY21/22	FY22/23	FY23/24	FY24/25	FY25/26	Totals
CAPEX						

Efficient Cost

The cost projections are based on;

- Programme cost analysis from previous projects of a similar size, of which the key input was the 2015-2017 upgrade of Ellipse and supporting collateral. Other inputs included similar projects in wider National Grid.
- Relevant investment sanction and closure papers
- Current cost and commercial arrangements with application development and maintenance partners
- Stakeholder interviews and wider IT knowledge

We have benchmarked our IT asset health policies and investments with an independent IT consultant, Gartner, to test and assure that these are efficient investments and provide best value for consumers. We have benchmarked both option B and C with Gartner and their recommended range for option C is between ▮▮ and ▮▮ which we are within.

Below shows a summary of the output from the CBA covering both ET and GT. The baseline "do nothing" option has the lowest forecast expenditure but incurs additional cost through the risks that it creates for the business.

Option B and C both have higher levels of investment, but additional costs are not faced, leading to a lower NPV. Our recommended option's Total NPV is ▮▮, which is lower than the option to replace and significantly lower than deferring investment until RIIO-3.

Option No.	Desc. Of Option	Preferred Option	Total Forecast Expenditure (£m)	Total NPV
1	Minimal asset health investment – Run systems past end of life dates and use third party support in RIIO-2 Period (Deferral of a larger upgrade of Ellipse until RIIO-3)	N	-£	
2	Upgrade current system to supported levels in line with manufacturer support roadmaps (move to the latest version of Ellipse, if/once available)	N	-£	
3	Replace current solution and move to a market leading Asset Management system (e.g. Maximo or SAP)	Y	-£	

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Project Plan

Our plan and deliverability is based on previous assessments conducted in RIIO-1 during TISMP, along with experience of delivering major system replacement programmes in the ET and GT portfolio. This is underpinned by the following core principles of our change delivery model:

- Partnership approach across the core business functions, IT, UK Change and our eco-system of experienced delivery partners
- Agility in our ways of working
- Efficient use of people, process and technology
- Customer centric and benefits led approach to delivery
- Effective governance, risk management and delivery models

Please refer to our IT Annex A20.03, section 4: 'How We Deliver Our RIIO-2 Plan', for further details.

The key milestones include:

- A detailed assessment of the current estate and options analysis at the start of the project, in FY23.
- The project to replace Ellipse will run from FY23 until its completion in FY24
- The project will conclude with the implementation of a fully supported, integrated, market leading asset management solution that supports GT with monetised risk and delivering maintenance programmes to support health of transmission assets.

Key Business Risks, Assumptions and Opportunities

We regularly meet with existing and potential vendors to assess the Enterprise Asset Management market, based on these conversations and research with industry analysts we have based our recommendation on the following assumptions:

- There are alternative vendors in the market that have been assessed and scored higher in their vision for asset management and their ability to deliver a world class solution.
- Solution vendors are rearchitecting their solutions and platforms to modern architecture patterns.
- Solution vendors are adopting modern development practices to enable smaller incremental function updates and release
- Asset management solution vendors are offering commercial terms where customers can purchase discrete functional elements of their platforms to avoid overlap and duplication.
- Most solution vendors offer several deployment models to suit customer needs
- Key business capability requirements will remain generally unaltered
- NGG and NGET will continue to share a common solution in RIIO-2

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We have also identified key risks in the table below and are actively mitigating these to prepare for the successful delivery our recommendation and commitments in the RIIO-2 regulatory period.

Risk	Actions Taken
Gas Transmission and Electricity Transmission may choose different EAM solutions/timelines.	Actively working with ET business, regulation and IT teams to ensure that best outcome is met for both businesses and for IT to run, manage and maintain the resulting system landscape.
Increased complexity of migrating away from Ellipse may significantly increase costs and timelines of implementation	Benchmarking by Gartner of plan has shown a premium of 20%-30% in implementation costs which we have included in overall cost.
Increased risk of cyber and security breaches in early RIIO-T2	Ensure all systems are maintained to latest vendor released versions in a timely manner (proposed). Maintain a strong cyber capability within National Grid which regularly assesses the IT landscape for vulnerabilities
Continuation of longer technology health cycles leading to large upgrades with increased complexity and cost throughout RIIO-2/3	Ensure we rationalise platforms and implement shorter technology health cycles to reduce complexity, cost and risk
Limited internal or external talent - lack of enablement	Ensure a program of continual improvement is implemented to help retain talent and knowledge within National grid and ensure that National Grid IT retains the most appropriate application development and maintenance partners.
Business imperatives may necessitate a change in the implementation timeframes	We will continue partnering closely with the ET and GT business, ensuring all initiatives are aligned, and we will manage any business need to, for example, bring forward the implementation of the new solution.

Dependencies
- Reliance upon the business change transformation agenda to align changes in business process, culture and behaviours, to support in leveraging the new technology
- Reliance upon data enhancement strategy in parallel with new system and processes
- Reliance upon vendor product development delivering against roadmaps

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