# ICT Integrated Grid Planning

## Business Case

25 January 2024

Part of the Energy Queensland Group

# CONTENTS

# 1 EXECUTIVE SUMMARY

| Title | Non-Network ICT – Integrated Grid Planning |
|---|---|
| Application | Energex and Ergon Energy Network |
| Expenditure category | ☐ Replacement ☐ Augmentation ☐ Connections ☐ Tools and Equipment<br>☒ Non-network ICT ☐ Property ☐ Fleet |
| Identified need | ☒ Network resilience ☒ Facilitate customer and community opportunities<br>☒ Evolving grid infrastructure ☒ Safe, efficient and affordable operations<br><br>The Integrated Grid Planning business case addresses the non-network ICT investment required to enable network forecasting, planning, demand flexibility, tariff, and pricing management to support all four key investment drivers.<br><br>Energex and Ergon Energy Network are committed to maintaining the safety, security, and reliability of our network. We aim to empower our customers by providing options for tariff choices and encouraging investments in Distributed Energy Resources (DER). The Integrated Grid Planning business case aligns with the goals of maintaining affordability and sustainability in both Network and Information and Communication Technology (ICT) services. To achieve this, shared data, crucial for our Integrated Grid Planning capabilities, will be carefully managed on secure data platforms. |
| Benefits | This business case realises four benefit categories:<br>• enable planning decisions that sustain network resilience through energy transition and climate change impacts,<br>• enable forecasts and investment decisions that adequately incorporate projected changes, risks, and non-network solution options,<br>• enable improved benefit opportunities, and tariff choices for customers, and<br>• maintain affordability of network services through better quality planning decisions and scalable and secure ICT solutions.<br>The quantitative benefits to be realised from this investment are $49.5M (present value $31.4M). |
| Recommended option | Option 2 ‘Keeping pace with the Industry Transition’ is the most prudent and efficient, and therefore, the recommended option. This option provides the most prudent and efficient long-term investment outcome and has been designed for anticipated change impacts on our distribution networks and our customers in the 2025-30 regulatory control period.<br><br>This option ensures full integration of in-scope forecasting and planning functions, allowing them to share the same data sets, analytics, and visualisation capabilities within Integrated Grid Planning as a platform. This option addresses challenges arising from growing DER penetration, increased electrification, digitalisation (smarter grid and smarter communities), climate change impacts, and other new and emerging risks, as well as changing customer needs and expectations. |
| Expenditure[1] | The total investment costs associated with the recommended option ($M). |

[1] All financial figures have been rounded and shown in dollars million ($M) throughout this document, shown using the costing approach for non-network ICT expenditure described in the Non-network ICT Plan 2025-30 section 7.1.

| Title | Non-Network ICT – Integrated Grid Planning | | | | | |
|---|---|---|---|---|---|---|
| | FY26 | FY27 | FY28 | FY29 | FY30 | Total 2025-30 |
| | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |

# 2 DOCUMENT BACKGROUND

## 2.1 Purpose of Document

The purpose of this document is to outline the Energex and Ergon Energy Network's proposed ICT program of work pertaining to the integrated grid planning business capabilities for the next regulatory control period from 1 July 2025 to 30 June 2030 (2025-30).

## 2.2 References

**Table 1: Related Documents**

| Date | Name | Type |
|---|---|---|
| 19/04/2023 | Energex Business Narrative<br>Ergon Energy Network Business Narrative | Direction |
| 25/01/2024 | Non-network ICT Plan 2025-30 (Attachment 5.8.01) | Document |
| 25/01/2024 | Non-network ICT Common Glossary (Attachment 5.8.10) | Document |
| 31/10/2023 | RDP 2025 Project – Shared Assumptions | Assumptions Document |
| 26/06/2020 | Energy Queensland Low Carbon Future Statement | Document |
| 19/07/2023 | Ergon Energy Network and Energex: Demand Management Plan 2023-24 | Document |
| 25/01/2024 | All other non-network ICT business cases (Attachments 5.8.02 to 5.8.08) | Document |

## 2.3 Document History

**Table 2: Document History**

| Version Number | Change Detail | Date | Updated by |
|---|---|---|---|
| 0.1 | Review and develop initial document templates | July to August 2022 | EY |

| Version Number | Change Detail | Date | Updated by |
|---|---|---|---|
| 0.2 | Scoped proposal, assessed costs and benefits, and developed options<br>Draft 1 completed | September 2022 to January 2023<br>31 January 2023 | Energy Queensland EY |
| 0.3 | Continued refinement of messages, format and content including incorporating feedback from RRG Session 1<br>Draft 2 completed | February to June 2023<br>30 June 2023 | Energy Queensland |
| 0.4 | Updated based on feedback from RRG Session 2, Residential Focus Groups, Draft Plan consultation and Strategic Review by Deloitte<br>Draft 3 completed | July to November 2023<br>24 November 2023 | Energy Queensland |
| 0.5 | Strengthened strategic narrative, benefits and options analysis<br>Draft 4 completed | December 2023 to January 2024<br>25 January 2024 | Energy Queensland Deloitte |
| 1.0 | Final submitted to the Australian Energy Regulator | 31 January 2024 | Energy Queensland |

## 2.4 Approvals

**Table 3: Document Approvals**

| Position | Name/s | Signature | Date |
|---|---|---|---|
| **Approver: General Manager**<br>GM Foundation and Network Platform and Services | | | 30/01/2024 |
| **Final Approval: EGM**<br>A/Chief Information Officer | | | 30/01/2024 |
| **Final Approval: EGM**<br>Chief Engineer | | | 30/01/2024 |

# 3 STRATEGIC CONTEXT

## 3.1 Background

The networks of Energex and Ergon Energy Network provide an essential service to Queenslanders, by ensuring safe, secure, reliable, and affordable supply of electricity. They also play a vital role in the renewable energy transition of Queensland. The increase in electrification, rooftop solar and other Customer / Distributed Energy Resource (DER) adoption, increasing numbers of EVs, severe weather events, changing customer expectations and needs, climate change, and anticipated industry changes present diverse challenges for our networks. The networks of Energex and Ergon Energy Network are expected to adapt to these challenges in a way that enables safe, reliable, affordable, clean, and smart distribution network services to Queenslanders into the future.

Integrated Grid Planning encompasses the Forecasting, Network Modelling, Grid Planning, Demand and Energy Management and Tariff and Pricing business functions that are instrumental in facilitating and making planning and investment decisions impacting our network. These business functions have a large overlap in the data sets they use and require.

Forecasting the demand and energy needs for different areas and levels of our networks is becoming increasingly complex, as the effects of DER and changing customer behaviours lead to more dynamic and less easily predictable patterns of grid usage. An increasing range of inputs for forecast models (e.g., DER, EV uptake, dynamic operating envelope uptake and new demographic and climate data) are required to maintain the accuracy of our forecasts. More granular forecasts deeper into the network are required to understand the impact of distributed energy resources on all voltage levels of our distribution and sub transmission networks.

Grid Planning, Demand and Energy Management, and Tariff and Pricing also have growing interdependencies, as each supports / makes planning decisions that impact the performance and use of our grid in distinct but overlapping ways. For example, a price signal influencing customer behaviour effectively would impact minimum and maximum demand and may therefore be a more efficient alternative to prevent a future network constraint than Grid Planning proposing a network augmentation project. Additionally, the increasing availability of network visibility data deeper into the network provides opportunities to better predict and plan for future conditions.

The ICT capabilities that these business functions have available to them are not sufficient to provide effective support for managing these growing challenges and interdependencies. Interdependent decisions are still made on disparate replications of the same data sets, and integrated decision making is not supported through integrated ICT capabilities. In addition, current capabilities cannot leverage available network visibility data to best effect.

As a tactical, cost-effective response to business needs that the available ICT capabilities could not support, a range of planning tools were created to improve the agility of the business functions and the efficiency and effectiveness of planning processes. These capabilities support specialised engineering functions outside, but integrated with, Enterprise Asset Management system capabilities and data (such as including electric feeder analysis, power quality analysis, connection assessment calculations, LV network balancing etc.) However, these business tools are no longer able to be kept up to date, as their underpinning technologies are now ageing and have not kept up with the renewal of Energex and Ergon Energy Network's Enterprise Asset Management capabilities. Impacts on these tools include loss of automated data feeds from Energex's and

Ergon Energy Network's legacy asset management systems and inability to implement new functionality in response to changing business processes and data. The pending loss of these support tools presents significant challenges and risks for planning functions, and other groups who also depend on these tools.

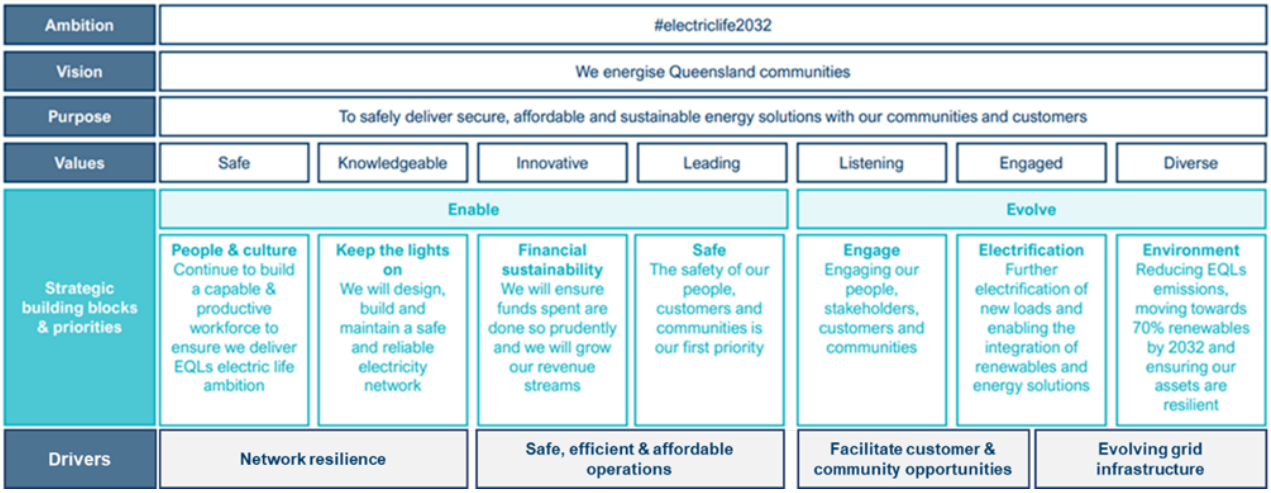
Energex and Ergon Energy Network's demand management programs have been growing in the current regulatory control period. Our 2023-24 Demand Management Plan illustrates that this trend is going to continue. Demand management is also recognised as a key capability to enable an affordable low-emission grid[2]. However, our planning and forecasting teams do not yet have ICT capability to support the effective integration of demand flexibility management in planning decisions.

Tariff planning data sets and reporting are also not integrated with other planning data sets and tools. This does not allow an integrated approach to planning and assessing the effectiveness of price signals through tariffs and demand flexibility programs for purposes of network resilience and customer value opportunities.

## 3.2 Electric Life 2032 and Investment Drivers

There are four investment drivers that underpin Energy Queensland's Electric Life 2032 ambition, vision and strategic priorities which will inform development of our expenditure plans and forecasts for the 2025-30 regulatory control period, as identified in Figure 1 and reflected in our ICT Plan . The investment drivers are reliant on investment in information technology (IT) to deliver the information, infrastructure, security and capability across the breadth of our customer base, and to support the ecosystem of employees, contractors and suppliers who deliver the services that customers expect.

**Figure 1: Energy Queensland's Strategic Framework**




This business case addresses the network, and non-network ICT investment required to support all four key investment drivers 'Network resilience', 'Facilitate customer and community opportunities',

[2] Energy Efficiency Council, URL: EEC Clean Energy Clean Demand - 2023.pdf, 2023

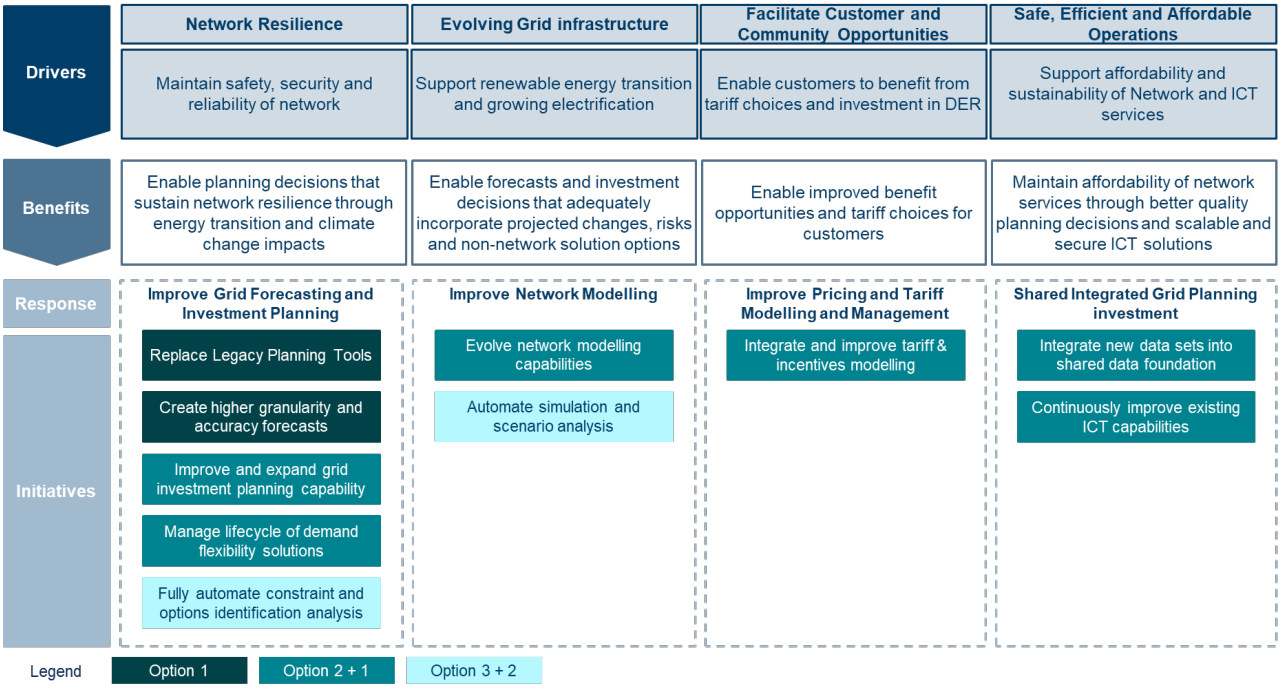
'Evolving grid infrastructure', and enabling 'Safe, efficient and affordable operations'. Energex and Ergon Energy Network are:

- Committed to providing a secure, dynamic and reliable electricity network for a rapidly changing operating environment and increased resilience to external factors that influence our planning decisions, including climate change and severe weather events. The Integrated Grid Planning business case ensures our services are protected against resilience and security threats and provide improved capacity, response and recovery communications for customers and communities.
- Committed to delivering electricity services in the most efficient and affordable way, with consideration for customer, community, and employee health and safety. The ICT business cases provide modern digital capabilities to customers and employees by maintaining compliant systems, securing data access and technology infrastructure, ensuring device resilience, and providing integrated services
- the digitalisation and technological advancement of Energy Queensland customers and employees, maintaining compliant systems, secure data access, secure technology infrastructure, ensuring device resilience, and providing integrated services.
- Committed to facilitating customer opportunities in the transition to renewable energies removing barriers to participation and providing our customers with choice and control, without compromising network security, supply quality or performance. The Integrated Grid Planning business case will enable customers to evolve their digital interaction and experiences with us, and to benefit from our evolving services and tariff choices.

- Planning for an operating environment that is increasingly dominated by the electrification of industrial processes and the integration of renewable energy solutions, including DER. The Integrated Grid Planning business case will enable the technology capability to manage the growing diversity of assets, uptake of DER and the bi-directional flow of electricity throughout our networks.

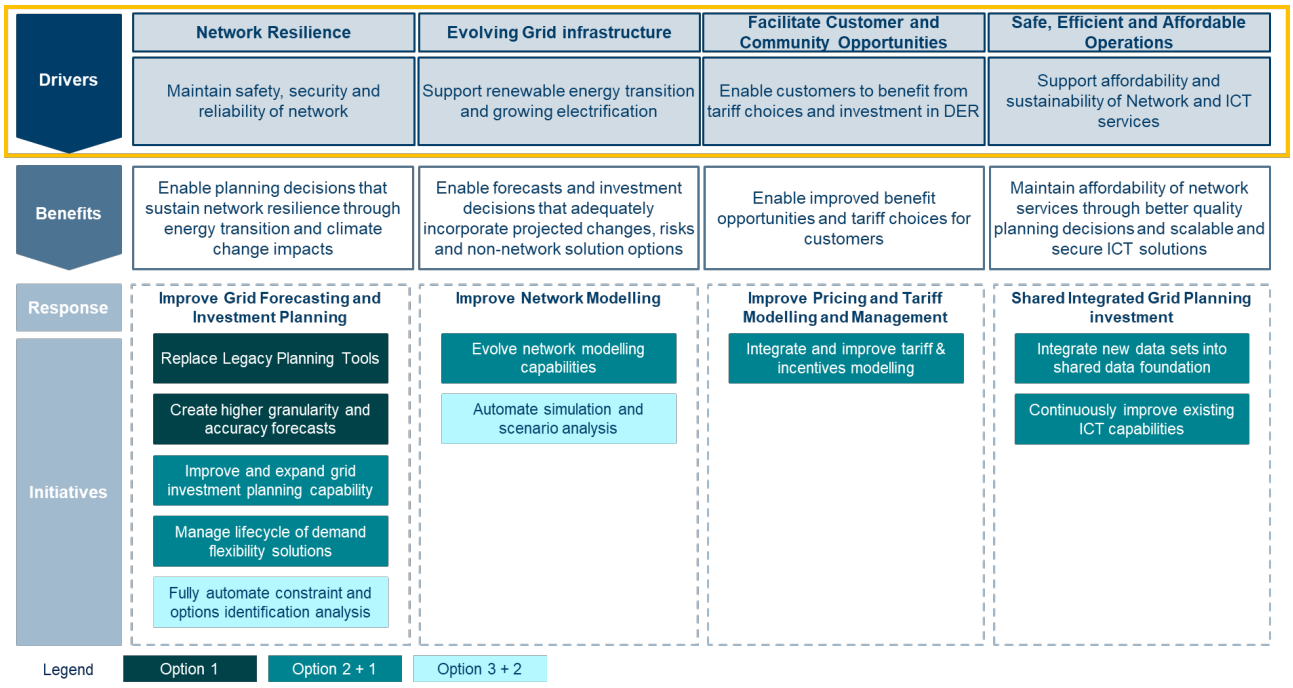
For each of these drivers, we have identified the challenges for investment, the benefits that can be realised, the objectives that can be met and outcomes achieved through the delivery of a strategic response (i.e., programs).

**Figure 2: Investment Logic Map for Integrated Grid Planning business case**



## 3.3 Drivers and Challenges

**Figure 3: Investment Logic Map identifying four key drivers for Integrated Grid Planning business case**



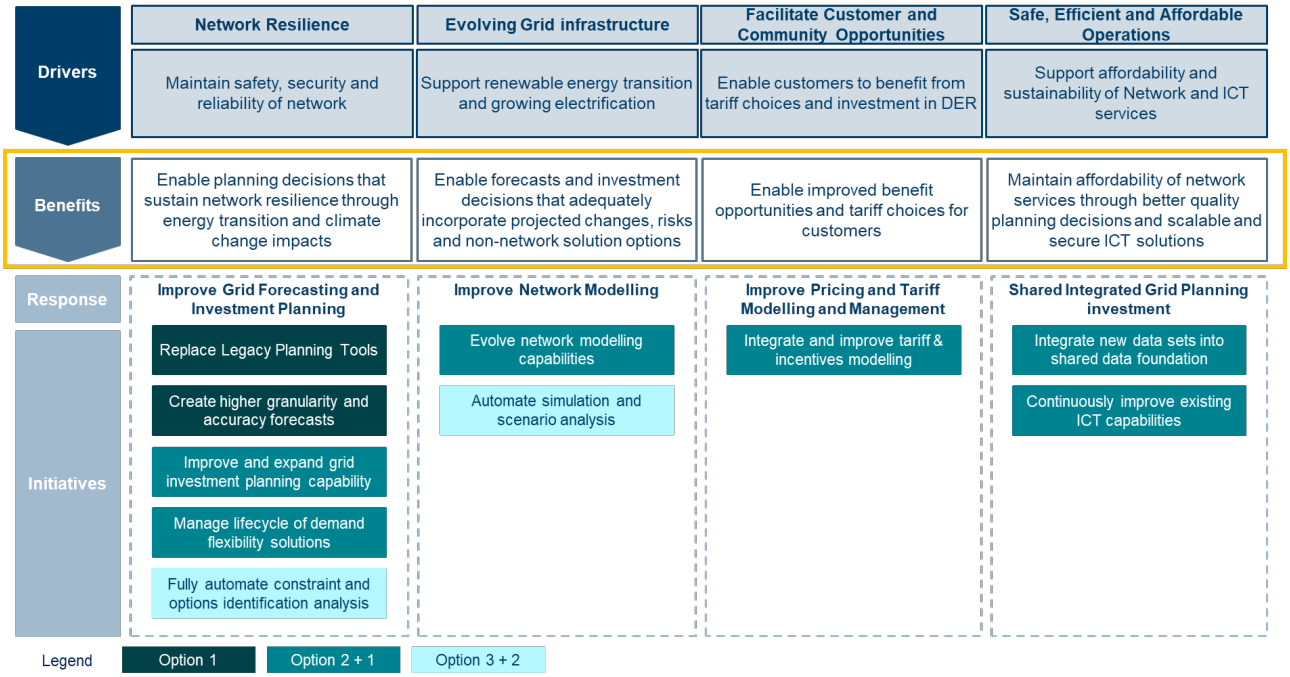

The four sub-drivers for investment for this business cases are:

- **Maintain safety, security and reliability of network.** New customer energy technologies, growing DER penetration, electrification of transport, digitalisation of the grid, and climate change impacts expose the network and our customers to a wider range of growing risk of service disruption. Grid Planning requires improved data and capabilities to identify, model and analyse these new or growing risks to maintain network reliability and resilience.
- **Support renewable energy transition and growing electrification.** Our integrated planning functions are expected to make prudent and efficient planning investment decisions in network and non-network approaches which not only sustain grid performance, but also provide the required DER hosting capacity, in a fast-changing industry context. This requires a better understanding of what is happening, and going to happen in our grid, which Integrated Grid Planning will support through leveraging growing network visibility, richer data, modern analytics, and predictive capabilities.
- **Enable customers to benefit from tariff choices and investment in DER.** To ensure that Energex and Ergon Energy Network's grid, services and tariffs can enable customers and partners to benefit from growing investments in DER, and active participation in the changing energy market and renewable energy transition, Integrated Grid Panning includes investment in enhanced data, predictive, modelling, planning, and pricing capabilities.

- **Support affordability and sustainability of Network and ICT services.** Integrated Grid Planning provides modern digital capabilities and rich, shared data to support our Integrated Grid Planning business functions to continue to perform their roles effectively in an environment of growing complexity and fast paced change, and make investment decisions that, in turn, support the affordability of network services. In addition, prudent and efficient ICT Asset Management and reuse of shared data assets optimise the life-cycle cost of these modern digital capabilities and their operations. Shared data underpinning Integrated Grid Planning capabilities will be managed on well-supported and secure data platforms, and through secure corporate data management practices.

## 3.4 Way Forward and Benefits

**Figure 4: Investment Logic Map identifying four benefit categories that address the drivers**



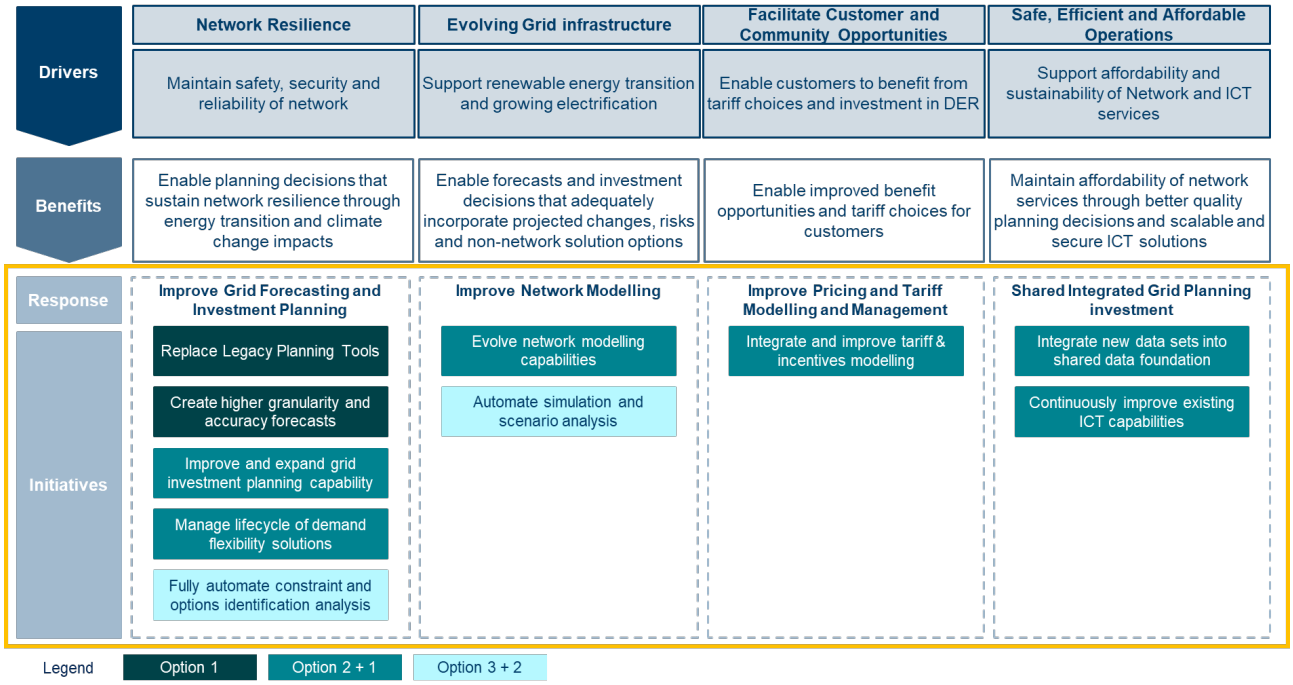

We have identified the following benefit categories for this business cases. Please refer to section 4.3 and 6.2 for an analysis of the quantifiable and qualitative benefits associated with the investment.

It is important to note that many of the benefits attributed directly to a primary driver may also apply to one or more of the other drivers.

- **Enable planning decisions that sustain network resilience through energy transition and climate change impacts**.
  - Resilient and Safe Network Infrastructure: Ensuring the distribution network remains resilient and safe through the energy transition and climate change impacts.
- **Enable forecasts and investment decisions that adequately incorporate projected changes, risks, and non-network solution options.**
  - Targeted Network Investments: Targeted and more timely network investments, based on better understanding of evolving network risks and constraints, resulting in better reliability and power quality outcomes for customers
  - Productivity benefits for in-scope business functions: Improved planning and demand flexibility management productivity and outcomes, enabled through better data, insights and tools.
  - Support of long-term energy and climate change strategies: The initiative supports the Queensland Energy & Jobs Plan, climate-positive Brisbane 2032 Olympic and Paralympic Games, and Australia's climate change strategies.
- **Enable improved benefit opportunities and tariff choices for customers**.
  - Better utilisation of non-network solutions: Improved ability to utilise renewable, non-network alternative solutions will generate opportunities for customers and communities and optimise network asset investment decisions.
  - Customer-Centric Tariff Choices: Enabling better tariff and incentive choices for customers that ultimately aligns with customer preferences.
- **Maintain affordability of network services through better quality planning decisions and scalable and secure ICT solutions**.
  - Improved staff productivity and decision making through higher quality data: Reduced need for manual data manipulation, data entry or data analysis will enable us to redirect and retrain staff to higher value work, reduce data related errors and improve accuracy of automated demand and energy forecasts, reports, and decisions.
  - Maximising Value of Network Visibility: Ability to create better value from investments in increased distribution network visibility
  - Scalable and Secure ICT Solutions: Modernised and well-supported ICT solutions that are scalable, secure, and adaptable efficiently and quickly to future requirements are essential for the organisation.

## 3.5 Initiatives and Outcomes

**Figure 5: Investment Logic Map identifying four responses and ten initiatives that realise the benefits**




The following initiatives are proposed to meet our investment drivers, address the development challenges, and realise the benefits identified:

- **Improve Grid Forecasting and Investment Planning**. A range of requirements have been identified to sustain the effectiveness and productivity of the in-scope business function throughout the changes anticipated in the next regulatory control period. The initiatives within this response include:

  - Replace Legacy Planning Tools: Engineering business functions have developed legacy planning tools, as cost-effective tactical responses to complex and emerging network planning needs requires renewal. They are based on obsolete technologies, lose their automated data updates with renewal of our major enterprise systems, and, in some cases, still require manual data updates or manipulation, which leads to data quality risks or delays for timely provisioning of data. They also do not provide the functionality or extensibility to cater for current and emerging market, regulatory and technological requirements. For these reasons, these tools present a growing business and cyber security risk.

    These capabilities support specialised engineering functions outside (but integrated with) the Enterprise Asset Management system capabilities, including electric feeder analysis, power quality analysis, connection assessment calculations, LV network balancing etc.

This initiative is therefore a prudent ICT asset renewal initiative which will ensure that these initiatives can be sustained and evolved in the future. This initiative is included in all analysed investment options as recurrent capital expenditure.

- Create higher granularity and accuracy forecasts: This initiative will expand digital forecasting capabilities to provide predictive capabilities and data inputs for scenario modelling and analysis of a larger variety of impacts and risks (e.g., increasing uptake of EV and batteries/DER, weather/climate, and demographic impacts), for use in all Integrated Grid Planning functions. This initiative is included in Options 2 and 3, as non-recurrent capital expenditure.
- Improve and expand grid investment planning capability: This initiative will improve and expand upon the following capabilities achieving, synergies in toolsets and enabling better resource utilisation between Energex and Ergon Energy Network planning activities, while taking into account differences in geography, customer profiles, climate and design between Energex's and Ergon Energy Network's distribution areas:
    - grid assessment, visualisation, forward analysis of changes in network requirements and risks,
    - contingency planning and event recovery (including considerations of DER), and
    - economic / investment optimisation (including considerations of customer benefits and shared asset agreements).

  This initiative is included in Options 2 and 3, as non-recurrent capital expenditure.
- Manage lifecycle of demand flexibility solutions: This initiative will:
    - enable optimised procurement and life-cycle management of demand flexibility, integrated with Grid Planning processes,
    - integrate Demand and Flexibility management with Tariff & Pricing management, which will ensure the right mix of price signals to customers to both, enable customer benefits from investments in DER, and incentivise grid usage behaviours that supports the performance and stability of our grid, and
    - deliver capabilities to support demand flexibility planning, modelling, consultation processes, procurement, as well as performance monitoring and management of existing agreements (e.g., Demand Management contracts).

  This initiative is included in Options 2 and 3, as non-recurrent capital expenditure.
- Fully automate constraint and options identification analysis: This initiative builds on the outcomes delivered by all other initiatives, and orchestrates automated forecasting, constraint and option identification, assessment and prioritisation across all network, non-network and pricing interventions. It is complex, and delivery will carry over into the following regulatory control period (2030-35). This initiative is only included in Option 3, as non-recurrent capital expenditure.

- **Improve Network Modelling**. To enable analysis of more complex planning options or scenarios, Energex and Ergon Energy Network require improved network modelling capabilities. The initiatives within this response include:
  - Evolve network modelling capabilities: This initiative sees the evolution of our existing network modelling capabilities, to:
    - support the growing Grid Planning business requirements,
    - leverage new/richer data sets, including expansion of the planning model to include LV networks.
    - achieve a consistent as built and planned grid model data quality across all relevant systems,
    - integrate higher granularity forecasts for more accurate planning studies, and
    - improve technoeconomic assessment capabilities.

    This initiative is included in Options 2 and 3, as non-recurrent capital expenditure.
  - Automate simulation and scenario analysis: This initiative builds on the fully integrated capabilities delivered by the Initiative 3. - Shared Data Foundation and Initiative 6. - Network Modelling initiatives. For this automation to be achievable, high levels of maturity, data quality and automation of grid data model management (as built and future versions) is required.

    This initiative would replace the existing network modelling toolset with a comprehensive functionality that allows easy scenario design, adjustment, and automated scenario analysis across all time horizons. This initiative is only included in Options 3, as non-recurrent capital expenditure.
- **Improve Pricing and Tariff Modelling and Management**. Price signals through tariffs or incentives are increasingly important levers to manage network capacity demand and also enable customer opportunities from DER. In response, the following initiative is proposed:
  - Integrate and improve tariff & incentives modelling: This initiative will provide integration of tariff modelling with other Integrated Grid Planning functions and shared data. It will deliver improved capabilities for customer segmentation and predictive modelling for tariffs and incentives (integrated with Demand Flexibility Management), supporting improved tariff portfolio management and scenario analysis. This initiative is included in Options 2 and 3, as non-recurrent capital expenditure.
- **Shared Integrated Grid Planning investment**. The Integrated Grid Planning approach enables in-scope business functions to share data sets and leverage each other's planning outcomes effectively. In addition, a continuous improvement allocation is included, for minor adjustments, such as compliance related changes.
  - Integrate new data sets into shared data foundation: The Grid Planning and Forecasting renewal activities in the 2020-25 regulatory control period will have delivered an initial shared grid data model of the network and its connected customers. This initiative will:
    - Expand on the shared data foundation through integration with a range of systems and data sources for additional asset, customer, connection, and environments data,

- Expand on capabilities to enable the effective and secure management, use and sharing of this data, and support improved quality, consistency and accessibility this of data and insights derived from it.
- Enable all other non-recurrent investments in this business case. Examples include (and are not limited to): utilising expanded network visibility, shared asset use agreements, demand management agreements, dynamic operating envelope information, sheddable/restorable load per network element, improved low-voltage network model data (derived from smart meter data and other Grid Visibility), connection agreements, embedded and grid connected generator/battery data.

  This initiative is included in Options 2 and 3, as non-recurrent capital expenditure.

- Continuously improve existing ICT capabilities: Continuous improvement funding for ICT assets supporting in-scope business functions will sustain existing capabilities for compliance and continued effectiveness amidst the changing environment.

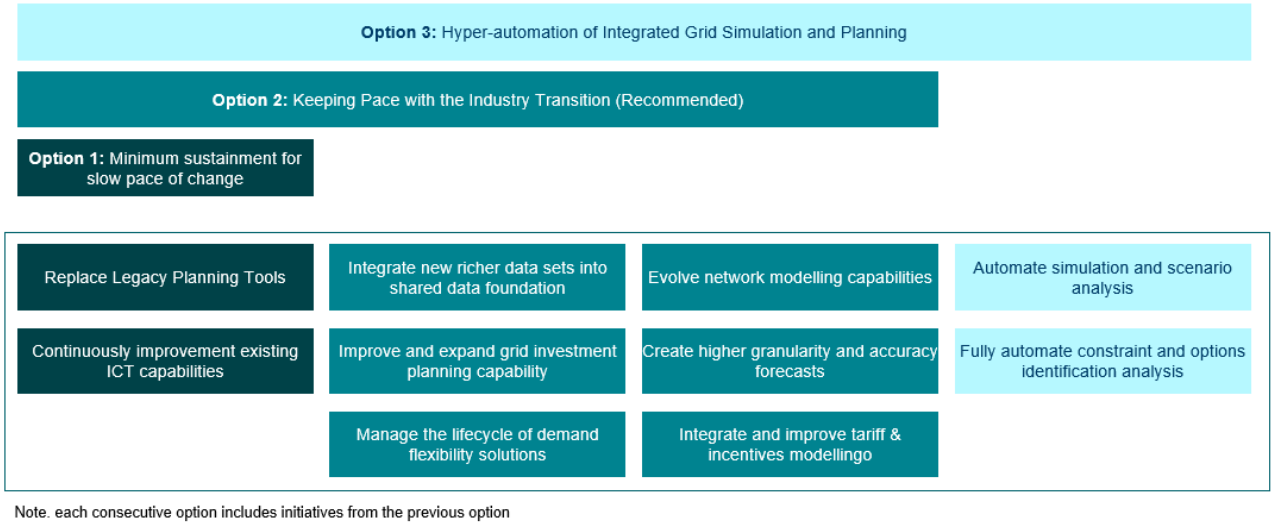
This initiative is included in all analysed investment options as recurrent capital expenditure. However, the cost allocation Option 2 is lower than in Option 1, as we assume that industry change and significant compliance requirements will be covered through the non-recurrent investments in the respective non-recurrent capex initiatives of Option 2. Therefore, the continuous improvement allowance in Option 2 is only covering the ongoing change requirements for capabilities that have already been put in place in the previous regulatory control period.

# 4 INVESTMENT OPTIONS

## 4.1 Options Description

Three options were considered by Energex and Ergon Energy Network to address the drivers outlined in Section 3.3 and deliver on the benefits described in Section 3.4. During the option formation process, consideration was given to the business cases dependent on this business case (See Section 6.6 Dependencies).

**Figure 6: Initiatives Mapped to Options**




Note. each consecutive option includes initiatives from the previous option

### Option 1: Minimum sustainment for slow pace of change

Option 1 has been designed based on an assumption of moderate growth in the evolution and/or adoption of DER, customer energy technologies and slow growth in the energy market. As in-flight industry discussions (e.g., on dynamic operating envelopes and the distribution system operator model), consultations (e.g., on the ESB data strategy [3]) and changes in relevant regulations (e.g., AEMC Review of the regulatory framework for metering services[4], enabling DNSPs to access a base level of Power Quality Data) illustrate, this is highly unlikely to be the case.

Option 1 is focussed on minimum sustainment of existing forecasting, modelling, planning, and tariff and pricing capabilities. This includes ensuring prudent life cycle management of ICT assets and continuous improvement funding for necessary adjustments to digital capabilities to account for changes and compliance requirements.

[3] Energy Security Board, URL: Data Strategy (aemc.gov.au)
[4] Australian Energy Market Commission, URL: Review of the regulatory framework for metering services (https://www.aemc.gov.au/market-reviews-advice/review-regulatory-framework-metering-services)

As this option has been a conservative 'slow pace of change' scenario, it would not result in a significant need to change what the in-scope business functions are doing today. Option 1 addresses the minimum requirements of the identified drivers of 'Safe, efficient & affordable operations' and 'Evolving Grid Infrastructure', through:

- ICT asset renewal of remaining legacy tools, to ensure supportability, cyber security and extensibility of essential digital capabilities.
- Ongoing sustainment and continuous improvement of existing ICT capabilities for compliance and minimum effectiveness of in-scope business functions.

This option leaves significant business risks unmitigated. For an overview of these risks please refer to section 4.3.

### Option 2: Keeping pace with the Industry Transition (recommended)

Option 2 has been designed for anticipated change impacts on our distribution networks and our customers in the 2025-30 regulatory control period, due to industry and energy transition, customer energy technologies, customer choices and climate change impacts.

The focus of Option 2 is to enable Energex and Ergon Energy Network to keep pace with these anticipated changes in the industry transition. In addition to addressing the ICT asset issues resulting from the remaining legacy tools (refer to Option 1), this option also delivers the following:

- In-scope forecasting and planning functions are fully integrated, share the same data sets, analytics, and visualisation capabilities, and
- Integrated Grid Planning, as a platform, will adapt to the challenges resulting from growing DER penetration, increased electrification, digitalisation (smarter grid and smarter communities), climate change impacts and other new and emerging risks and changing customer needs and expectations.

Option 2 addresses all four identified investment drivers, through a range of initiatives that invest in better and richer data and enable all in-scope business functions (refer to section 3.5 for initiative details).

The recurrent continuous improvement assumption in Option 2 is lower than in Option 1, as we assume that industry change and significant compliance requirements will be covered through the non-recurrent investments in the respective initiatives. Therefore, the continuous improvement allowance is only covering the ongoing change requirements for capabilities that have already been put in place in the previous regulatory control period.

### Option 3: Hyper-automation of Integrated Grid Simulation and Planning

Option 3 is designed based on the same assumptions of the magnitude of changes impacting Energex and Ergon Energy networks and customers as Option 2.

In addition to the investments proposed in Option 2, this option includes initiatives that would leverage modern and emerging digital technologies to establish dynamic, fully automated processes across all Integrated Grid Planning functions for:

- simulation and scenario analysis across network, non-network, and pricing options and impacts, and
- constraint identification options identification and analysis across network, non-network and tariff/pricing interventions.

The primary benefits of this investment would be productivity and potentially safety benefits, resulting from faster and consistent decision making, a reduced need for manual intervention, and a potential reduction in human error. These benefits would mainly support the '**Safe, efficient & affordable operations'** investment driver.

However, realising the benefits from this level of hyper-automation requires very high confidence in the quality and completeness of the underpinning data and relative stability of the business processes to be automated, as otherwise manual workarounds and frequent rework of automation are inevitable. Neither is highly likely to be achievable in the next regulatory control period.

## 4.2 Criteria Description

The options were reviewed across the following four criteria to arrive at an overall assessment.

- **Risk mitigation associated with option:** Assesses the qualitative likelihood of mitigating Energex and Ergon Energy Network corporate risks associated with investment for the initiatives associated with each option (i.e., probability of risk occurring). For this criterion, a high / medium / low risk mitigation scoring is provided.
- **Financial benefits associated with option:** Assesses the financial benefits delivered from each option to customers and communities, as well as Energex and Ergon Energy Network. For this criterion, only the total value of the financial benefits is included (if any).
- **Non-financial/non-quantified benefits associated with option:** Assesses the non-financial/not-quantified benefits delivered from each option to customers and communities, as well as Energex and Ergon Energy Network. For this criterion, a limited / partial / full benefit realisation scoring is provided.
- **Costs associated with option:** Assesses the quantitative non-recurrent and recurrent (capital and operating) costs associated with each option. For this criterion, only the total value of expenditure is included.

Table 4 provides a summary of the assessment of the three options, to demonstrate the recommended option for investment.

## 4.3 Summary of Options Analysis

Table 4 provides a summary assessment of criteria across all options. For detail on the options analysis, please refer to Section 6.2.

**Table 4: Summary of Options Analysis**

| Criteria | Option 1: Minimum Sustainment for slow pace of change | Option 2: Keeping pace with the industry transition (recommended) | Option 3: Hyper-automation of Integrated Grid Simulation and Planning |
|---|---|---|---|
| **Risk mitigation associated with the investment** | **Low risk mitigation**<br>Option mitigates risks associated with ICT legacy systems (incl. system reliability, supportability, lack of usability, operational inefficiencies, cyber security and extensibility). However, does not adequately address exposure to significant business risks. | **High risk mitigation**<br>Option mitigates risks associated with ICT legacy systems and reduces the likelihood of significant business risks, accounting for adaptability of delivery to changes in requirements in the industry, regulatory framework, and environment, as they occur.<br>A residual risk of significant disruption through energy market restructure and related compliance requirements on the in-scope business functions remains, and the size of impact of this risk, nor the cost of mitigation, cannot be assessed with any confidence at this stage. | **High risk mitigation**<br>Same as Option 2. |
| **Financial benefits associated with the investment** | No financial benefits associated with Option 1. | Financial benefits include:<br>• Improved network service reliability (VCR, CECV)<br>• Productivity benefits for staff<br>• Productivity benefits for Demand Flexibility Management at growing scale<br>• $49.5M | The same benefits as for Option 2 have been quantified (consequently, total NPV is lower).<br>• $49.5M<br>While Option 3 might yield additional quantifiable benefits in VCR, CECV and productivity, these benefits have not been able to be quantified, due to uncertainty of industry, market, and technology changes in the next 5-7 years. |

| Criteria | Option 1: Minimum Sustainment for slow pace of change | Option 2: Keeping pace with the industry transition (recommended) | Option 3: Hyper-automation of Integrated Grid Simulation and Planning |
|---|---|---|---|
| **Non-financial benefits associated with the investment** | **Partial benefit realisation across all categories**<br>• Legacy tool renewal will result in modern and well-supported ICT solutions that are scalable, secure, and can adapt to growing requirements.<br>• Moderately improved data quality outcomes, supporting improved quality of decisions making | **Full benefit realisation across all categories.**<br>• More resilient and safe network throughout energy transition and climate change impacts<br>• Improved ability to use non-network alternative solutions, generating customer opportunities and reduce network asset investment.<br>• Legacy tool renewal will result in modern and well-supported ICT solutions that are scalable, secure, and can adapt to growing requirements.<br>• Improved data quality outcomes, supporting improved quality of decisions making.<br>• Ability to generate better value from network visibility investments.<br>• Better tariff and incentive choices for customers<br>• Support EQL's, QLD's and Australia's energy transition and climate change strategies, and the 2032 Olympic/Paralympic Games. | **Full benefit realisation across all categories.**<br>The same non-financial benefits as for Option 2 are assumed. |

| Criteria | Option 1: Minimum Sustainment for slow pace of change | Option 2: Keeping pace with the industry transition (recommended) | Option 3: Hyper-automation of Integrated Grid Simulation and Planning |
|---|---|---|---|
| **Costs associated with the investment**<br>***Note, expenditure relates to FY26-FY30, in real terms as at December 2022*** | [redacted] | | |
| **Commercial NPV** | ($16.1M) | ($3.3M) | ($8.5M) |
| **OVERALL ASSESSMENT** | **Not recommended** | **Recommended** | **Not recommended** |

## 4.4 Recommended Option

Option 2 'Keeping pace with the Industry Transition' is the most prudent and efficient, and therefore, the recommended option. The remainder of this section provides the rationale for this recommendation, based on the options descriptions (and underlying assumptions) in section 4.1, the summary of the options assessment in section 4.3. and the Financial Summary in section 5.6.

Option 1 'Base case – Minimum sustainment for slow pace of change' is not recommended because:

- Option 1 lacks investment initiatives to keep pace with the anticipated changes in the industry transition. Therefore, it is highly likely that Option 1 will result in underinvestment in planning capabilities and data in 2025-30.
- While Option 1 mitigates risks associated with ICT legacy tools; it does not address significant business and customer risks.
- Moreover, while this option provides moderate non-financial benefits related to the replacement of legacy tools and the continuous improvement of existing capability within the business function, its benefits are significantly lower than that of Option 2. There are no financial benefits associated with this Option 1.
- Option 1 provides a lower ongoing outlay of expenditure for 2025-30 than Option 2. However, in the long term, it leaves Energy Queensland and its customers exposed to risks of meeting the demands of a scaling and increasingly complex energy network (due to constrained ability of existing tools), negatively impacting grid resilience, the ability to effectively plan, make pricing decisions, and meet compliance obligations, and ultimately, preventing customers from unlocking the full value of their DER investments.

Option 2: 'Keeping pace with the industry transition' is the recommended option because:

- Option 2 includes adequate investment initiatives to keep pace with the anticipated changes in the industry transition.
- Like Option 1, Option 2 mitigates risks associated with ICT legacy tools. In addition, it also mitigates significant business and customer risks.
- Option 2 provides a wide range of non-financial and quantifiable financial benefits, resulting in improved network and customer outcomes and the best NPV of all three options.
- It is important to note that many of the initiatives in Option 2 are *Data & Intelligence use cases* building on the data governance, management, literacy and platform capabilities included in initiatives in the *Non-network ICT Business Case - Data & Intelligence* (recommended option). Particular care has been taken to ensure that the investments between these two business cases are mutually exclusive (e.g., where Data Intelligence provides for growing storage requirements of Smart Meter data, Integrated Grid Planning is leveraging this capability, not building it.).

Option 3 'Hyper-automation of Integrated Grid Simulation and Planning' is based on the same assumptions of anticipated change impacts on our distribution networks and our customers and carries the same documented level of risk mitigation and benefits as Option 2. It is not recommended because:

- The cost of Option 3 is higher, due to the added hyper-automation initiatives for automating simulation and options analysis. Due to high uncertainty, additional benefits have not been able to be quantified for these initiatives, which results in a lower NPV than Option 2.
- Option 3 will see continuation of at least one of the two hyper-automation initiatives into the subsequent regulatory control period, at considerable expenditure, which will be required to enable benefits from this investment. However, the cost that would be incurred in the subsequent regulatory control period has not been able to be quantified, due to considerable forecast uncertainty.
- The additional hyper-automation initiatives also depend on high levels of data quality and stability of processes to be automated to be successful have very high requirements on underpinning data quality and relative stability of the processes to be automated. Neither is highly likely to be achievable in the next regulatory control period, which renders the additional hyper-automation initiatives high uncertainty / risk investments overall.

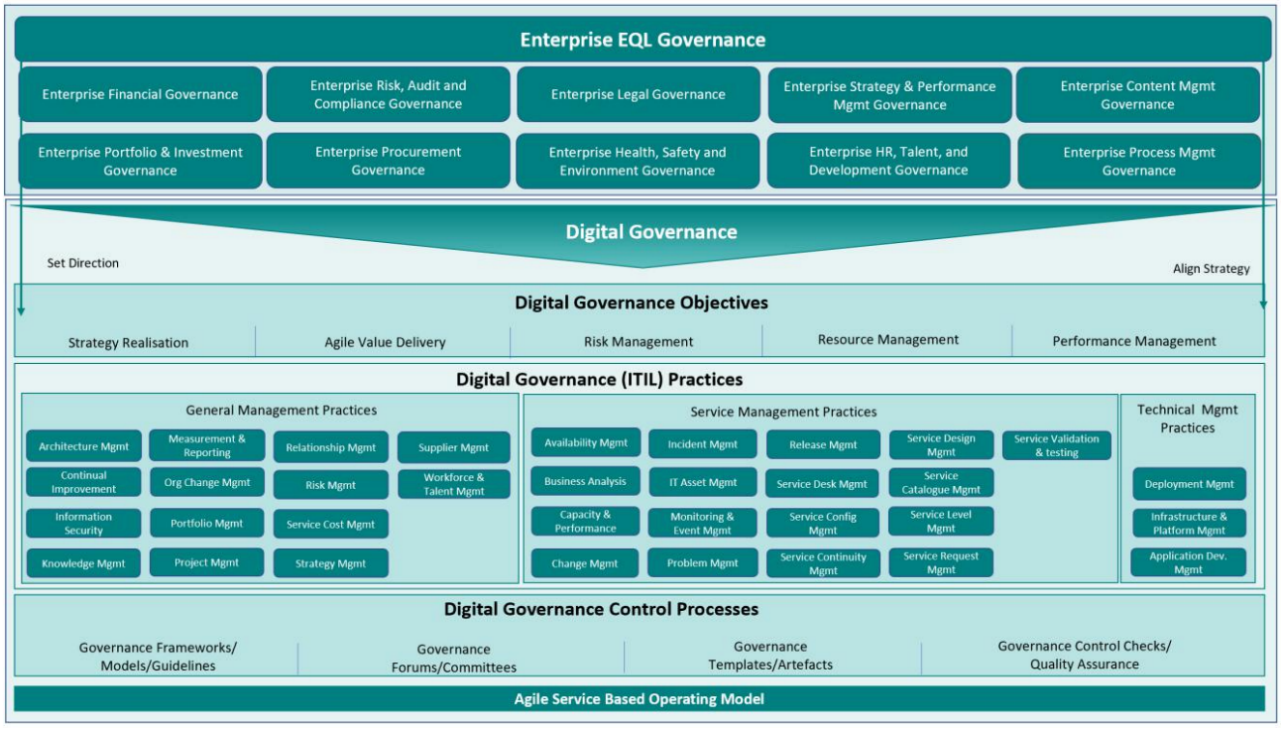
# 5 IMPLEMENTATION OF RECOMMENDED OPTION

To realise the significant benefits identified through Option 2, we will implement this investment in line with our standard governance and operating models, as described below.

## 5.1 Governance Arrangements

The initiatives will comply with the Digital Governance Framework (an element of the Corporate Governance Model). For further details, please refer to the Non-network ICT Plan 2025-30.

**Figure 7: Digital Governance Model**



In addition to this, the Digital Operating Model also incorporates the Scaled Agile Framework ways of working, which provides the approach to the day-to-day delivery of IT services (the how), and incorporates layers of operational governance to Digital planning, prioritisation, and execution activities. This links through to the governance objective of 'Agile Value Delivery'. For further details, please refer to the Non-network ICT Plan 2025-30.

## 5.2 Change Impact

The key change impacts associated with this business case include replacement of bespoke inhouse built grid planning tools, integration of Pricing & Tariff planning with approaches and functions, growth of predictive scenario modelling capability, and other capability enhancements such as process changes and upskilling of affected staff.

These changes are detailed below:

- **Replacement of bespoke in-house built planning tools with supported contemporary capabilities.** As the renewed capabilities are based on the renewed grid planning platform that has already been introduced in 2020-25, this presents a low to medium change impact.
- **Integrating Pricing & Tariff planning with Integrated Grid Planning approaches and Grid Planning functions** presents a medium to large change impact in both business functions and will require process changes and upskilling of staff.
- **Growing our predictive scenario modelling capability** will have lesser change impacts in planning functions where we will have already built skills in 2025 (Strategic Forecasting, Tariff and Pricing Planning) and likely require higher levels of skills uplift in Grid Planning and Demand and Energy Management.
- **Other capability enhancements to keep pace with the industry transition (compliance and new datasets / functionality).** The change impact of these enhancements will depend on the step changes required. We expect that the 2030 state of all involved business functions (Grid Planning, Demand and Energy Management, Strategic Forecasting, Pricing and Tariff, and Network Modelling) will differ significantly from 2025, however, our iterative agile program delivery approach will likely break the step changes down into small to medium change increments, each of which will require process changes and upskilling of affected staff. The integrated design and delivery approach and very close collaboration between engineering and digital functions (refer to section 5.3 for more information on the delivery approach) will support a smooth transition of new capabilities into BAU processes.

## 5.3 Delivery Roadmap

The implementation of the initiatives in Option 2 (as described in Section 4.1) will be delivered using a continuous iterative agile methodology and platform-based approach, as per our *Digital ways of working*. This also requires an integrated design and delivery approach between resources from both digital and engineering divisions, including 'Fusion Teams'[2] and shared accountability, due to the highly specialised and fast-changing nature of the engineering and planning functions.

The planning roadmap below represents the current view of when initiatives in Option 2 will be delivered over 2025-30. It reflects the continuous incremental delivery approach that involves continuous reassessment and refinement over the 2025-30 regulatory control period, in accordance with the dynamics of industry changes, customer needs, business requirements and our agile delivery methodology.

**Figure 8: Planning Roadmap for Integrated Grid Planning**

## 5.4 Investment Benefits

The recommended option delivers all the benefits described in section 3.4.

The quantitative benefits reaped from this investment include improved network reliability, reduced need for export curtailments improved productivity and effectiveness of forecasting, planning and demand flexibility management functions, through better and integrated data, and advanced insights. This will enable sustained effectiveness of these functions amidst more and higher complexity work and also support improved customer service experience and outcomes.

The quantitative benefits to be realised from this investment have been calculated at $49.5M (present value $31.4M). Please refer to Section 6.2 for detailed description of the benefits.

## 5.5 Investment Costs

The categories of investment are shown in Table 5.

**Table 5: Total Costs Overview ($M, real December 2022)**

| Category | Type | FY26 | FY27 | FY28 | FY29 | FY30 | TOTAL | NPV |
|---|---|---|---|---|---|---|---|---|
| ICT capex | Recurrent | | | | | | | |
| ICT capex | Non-recurrent | | | | | | | |
| ICT opex | N/A | | | | | | | |
| **TOTAL** | | | | | | | | |

## 5.6 Financial Summary

Table 6 summarised the overall financial position of the recommended option (Option 2), with NPV sensitivity analysis captured in Table 7 below.

**Table 6: NPV Overview ($M), real December 2022)**

| Net Present Value | Type | Option 2 |
|---|---|---|
| ICT capex | Recurrent | (3.2) |
| ICT capex | Non-recurrent | (25.2) |
| ICT opex | N/A | (6.4) |
| Benefits | N/A | 31.4 |
| **Commercial NPV** | | **(3.3)** |

**Table 7: NPV Sensitivity ($M), real December 2022)**

| Net Present Value | Discount Rate | | Benefits | |
|---|---|---|---|---|
| | +1% | -1% | 125% | 75% |
| Recommended option (Option 2) | (4.8) | (1.4) | 4.6 | (11.2) |

# 6 APPENDICES

## 6.1 Applicable Compliance Requirements

Energex and Ergon Energy Network is required to meet regulatory and compliance obligations within Integrated Grid Planning capabilities in relation to its corporate non-network ICT systems as set out below.

**Table 8: Applicable Compliance Requirements Overview**

| Obligation | Description of Requirement |
|---|---|
| **National Electricity Law (NEL) and National Electricity Rules (NER)** | The NEL requires Energex and Ergon Energy Network to promote efficient investment in, and efficient operation and use of electricity services for the long-term interests of consumers of electricity with respect to price, quality, safety, reliability, and security of supply of electricity as per the National Electricity Objective.<br><br>The operating and capital expenditure objectives set out in the NER require Energex and Ergon Energy Network to maintain both the quality, reliability, and security of supply of standard control services and the reliability and security of the distribution network. |
| ***Electricity Act* 1994/Distribution Authority No1/99** | *Electricity Act* 1994/Distribution Authority No1/99 (Ergon Energy Network) and Distribution Authority No.D07/98 (Energex) – detail our regulatory obligations to manage the reliability performance (Minimum Service Standard (MSS) and Guaranteed Service Levels (GSLs) of the distribution network as well as distribution network security in the forms of Safety Net targets. |
| **Queensland's Electricity Regulation 2006** | Queensland's Electricity Regulation 2006 details Energex and Ergon Energy Network's obligations to manage voltages within the network.<br><br>A noteworthy obligation is that Energex and Ergon Energy Network is required to prepare a demand management plan annually, including Energex and Ergon Energy Network's long-term strategy for demand management and Energex and Ergon Energy Network's proposed initiatives to be carried out. Energex and Ergon Energy Network has to use its best endeavours to comply with the demand management plan it prepared and must report annually on the proposed and actual initiatives carried out in the year. |
| **Electricity Supply (General) Regulations 2001** | Electricity Supply (General) Regulation 2001 is one source of Energex and Ergon Energy Network distribution network service standards in which Energex and Ergon Energy Network needs to report any distribution network failures for small customers. |
| ***Electrical Safety Act* 2002 and Electrical Safety Regulation (2013)** | The *Electrical Safety Act* 2002 and Electrical Safety Regulation (2013) details that we need to run our distribution network within capacity limitations |
| ***Security of Critical Infrastructure* Act 2018** | The *Security of Critical Infrastructure Act* 2018 (SOCI) applies in managing national security risks relating to critical infrastructure. The Security Legislation Amendment (Critical Infrastructure) Bill (SOLI) 2021 introduces new requirements:<br>• additional positive security obligations for critical infrastructure assets, including a risk management program, to be delivered through sector-specific requirements, and mandatory cyber incident reporting;<br>• enhanced cyber security obligations for those assets most important to the nation, described as assets of national significance; and<br>• government assistance to relevant entities for critical infrastructure sector assets in response to significant cyber-attacks that impact on Australia's critical infrastructure assets. |

| | |
|---|---|
| ***Privacy Act* 1988, *Information Privacy Act* 2014** | As specified in the *Privacy Act* 1988, Energex and Ergon Energy Network is required to maintain strong controls and security on the accessibility of customer data as well as ensuring appropriate availability of data. Keeping Energex and Ergon Energy Network's critical systems up to date, supported and secured is a key enabler of maintaining these controls. |
| ***Climate Change Act* 2022** | The *Climate Change Act* 2022 outlines Australia's greenhouse gas emissions reduction targets of a 43% reduction from 2005 levels by 2030 and net zero by 2050; requires the minister to prepare and table an annual climate change statement; requires the Climate Change Authority to give the minister advice in relation to the annual statement and future greenhouse gas emissions reduction targets; and provides for periodic reviews of the operation of the Act. This is implemented through the evolving climate change strategies of the Department of Climate Change, Energy, the Environment and Water (DCCEEW), which include investments and compliance requirements affecting DNSPs. |

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## 6.2 Options Analysis

This section summarises the options against the criteria analysed in defining the investment proposed in this business case. This criterion assesses the non-financial/not-quantified benefits delivered to Energy Queensland, and the broader community from each option. The table below outlines the assessment against the three options.

### Risk mitigation associated with investment

**Table 9: Mitigation of risks across Options**

| Risk | Option 1: Minimum Sustainment for slow pace of change | Option 2: Keeping pace with the industry transition (recommended) | Option 3: Hyper-automation of Integrated Grid Simulation and Planning |
|---|---|---|---|
| **Existing digital tools are no longer fit for purpose and cannot scale** | **Medium contribution to risk mitigation**<br>Renewal of remaining legacy applications will address the ICT and business risk associated with these legacy tools.<br>The capabilities available to staff are unlikely to be sufficient to address the accelerating changes of the energy and market transition. Leading to more manual effort and reduced productivity. | **High contribution to risk mitigation**<br>Renewal of remaining legacy applications will address the ICT and business risk associated with these legacy tools.<br>Enhanced data and capabilities keep pace with the expected changes and sustain staff productivity, despite higher complexity and volume of work. | **High contribution to risk mitigation**<br>Renewal of remaining legacy applications will address the ICT and business risk associated with these legacy tools.<br>Enhanced data and capabilities keep pace with the expected changes and sustain staff productivity, despite higher complexity and volume of work.<br>Hyper-automation will generate additional efficiencies in planning processes. |

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| Risk | Option 1: Minimum Sustainment for slow pace of change | Option 2: Keeping pace with the industry transition (recommended) | Option 3: Hyper-automation of Integrated Grid Simulation and Planning |
|---|---|---|---|
| **The data on which grid planning or investment decisions are based are exposed to data quality risk, due to loss of automated updates (stale data), manual manipulation and data entry.** | **Medium contribution to risk mitigation**<br>Renewal of remaining legacy applications will address the risks around data quality associated with these legacy tools. | **High contribution to risk mitigation**<br>Renewal of remaining legacy applications will address the risks around data quality associated with these legacy tools.<br>The additional investment in shared data and automation will continue to mitigate this risk for more data sets. | **High contribution to risk mitigation**<br>Assumed same as Option 2. |
| **Non-compliance with regulatory and legislative obligations, including accuracy of regulatory reporting** | **Medium contribution to risk mitigation**<br>Recurrent continuous improvement (CI) funding is available to address a moderate level of regulatory and compliance change.<br>Major new obligations may not be met if required investment exceeds sustainment and CI funding allocations. | **High contribution to risk mitigation**<br>Option 2 includes investment to respond to expected industry and network changes resulting from the energy transition.<br>However, it does not cater for major changes in energy market architecture or business models like the shift to DSO, and related compliance requirements, as the nature, timing, and extent of these are unknown at this stage. | **High contribution to risk mitigation**<br>Same as Option 2. |
| **Inefficient or imprudent network investment decisions** | **Medium contribution to risk mitigation**<br>The renewal of legacy tools and CI funding allocation will prevent deterioration of investment decision making.<br>However, with investment in expanded capability limited to CI, engineering and planning staff do not have the right tools and access to data to optimise planning decisions in the fast-changing context of the energy transition. This could result in a range of issues, such as preventing, or not enabling customers to unlock the full value from DER investments. | **High contribution to risk mitigation**<br>Expected that risk is mitigated to the best possible extent through the non-recurrent initiatives in this Option 2. | **High contribution to risk mitigation**<br>Same as Option 2.<br>The additional investment in Hyper-automation of grid investment decision making depends on this risk being nearly fully mitigated. |

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| Risk | Option 1: Minimum Sustainment for slow pace of change | Option 2: Keeping pace with the industry transition (recommended) | Option 3: Hyper-automation of Integrated Grid Simulation and Planning |
|---|---|---|---|
| **Inability to meet customer DER assets connection, integration, pricing, and value expectations** | **Low contribution to risk mitigation**<br>This option does not deliver significant improved capabilities.<br>With increasing complexity of connection assessments, but without much improved digital capabilities, it will lead to connection projects taking longer, potentially leading to application backlogs), and might result in more conservative and expensive requirements or more conservative constraints for DER connections. | **High contribution to risk mitigation**<br>Expected that risk is mitigated to the best possible extent through the non-recurrent initiatives in this Option 2. | **High contribution to risk mitigation**<br>Same as Option 2. |
| **Grid and community resilience negatively impacted** | **Low contribution to risk mitigation**<br>Planning functions will continue to have insufficient capability to effectively and efficiently model and anticipate major changes in frequency, scale or impacts of major events, community resilience needs (e.g. growing dependency on EVs), or recovery opportunities (e.g. through leveraging managed DER). | **Medium contribution to risk mitigation**<br>Expected that this risk is mitigated to the best possible extent through the non-recurrent initiatives in this Option 2.<br>This option will ensure that our planning functions are equipped to anticipate and address these risks in their decisions. A level of uncertainty, especially around climate change impacts, remains. | **High contribution to risk mitigation**<br>Same as Option 2. |
| **Inability to achieve true cost-reflective pricing, resulting in uncertainty for both customers (pricing) and DNSPs (revenue)** | **Low contribution to risk mitigation**<br>With the investment included in this option, Tariff & Pricing planning capability to model and optimise the impact of distribution network tariffs on the grid will be limited, as it will not be integrated with the Grid Planning datasets and capabilities. | **High contribution to risk mitigation**<br>Expected that risk is mitigated to the best possible extent through the non-recurrent initiatives in this Option 2. | **High contribution to risk mitigation**<br>Same as Option 2. |

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| Risk | Option 1: Minimum Sustainment for slow pace of change | Option 2: Keeping pace with the industry transition (recommended) | Option 3: Hyper-automation of Integrated Grid Simulation and Planning |
|---|---|---|---|
| **Staff productivity and process efficiency are impaired** | **Low contribution to risk mitigation**<br>Increasing volume and complexity of modelling, simulation, and planning requirements without effective access to relevant ***new*** data sets and analysis tools will increase manual effort in our panning functions, leading to loss of productivity or the need of resource uplift. | **High contribution to risk mitigation**<br>Expected that risk is mitigated to the best possible extent through the non-recurrent initiatives in this Option 2. | **High contribution to risk mitigation**<br>Same as Option 2.<br>Hyper-automation will generate additional efficiencies in planning processes. |
| **Mitigate against impacts of ageing workforce / skills shortage for engineering staff.** | **Low contribution to risk mitigation**<br>This risk is directly related to the productivity risk above. | **High contribution to risk mitigation**<br>Expected that risk is mitigated to the best possible extent through the non-recurrent initiatives in this Option 2 | **High contribution to risk mitigation**<br>Same as Option 2.<br>Hyper-automation will generate additional efficiencies in planning processes. |
| **Inadequate support for the Queensland Energy & Jobs Plan, climate-positive Brisbane 2032 Olympic and Paralympic Games, Australia's climate change strategies and the energy transition** | **Low contribution to risk mitigation**<br>Grid planning investment decisions impacting the 2030-35 regulatory control period are largely made in the 2025-30 regulatory control period (and then implemented through our network program of work). This also means that infrastructure decisions impacting the energy transition will be implemented largely in the next regulatory control period. With only minimum adjustments to their ICT capabilities, our planning and demand management functions will experience significantly increased workload which they may not be able to absorb within current staff levels. This may also lead to suboptimal outcomes, ultimately not achieving the target requirements for the Climate Change Act 2022. | **High contribution to risk mitigation**<br>Expected that risk is mitigated to the best possible extent through the non-recurrent initiatives in this Option 2. | **High contribution to risk mitigation**<br>Same as Option 2. |

| Risk | Option 1: Minimum Sustainment for slow pace of change | Option 2: Keeping pace with the industry transition (recommended) | Option 3: Hyper-automation of Integrated Grid Simulation and Planning |
|---|---|---|---|
| **Major changes in compliance requirements, e.g., resulting from the post-25 market reform, may lead to changing drivers and requirements during the implementation of Integrated Grid Planning** | **No contribution to risk mitigation**<br>This low-cost option leaves no flexibility for reprioritisation of significant new funding requirements. | **Low contribution to risk mitigation**<br>Option 2 includes investment to respond to expected industry and network changes resulting from the energy transition. However, it does not cater for major changes in energy market architecture or business models like the shift to DSO, and related compliance requirements, as the nature, timing, and extent of these are unknown at this stage | **Medium contribution to risk mitigation**<br>While the initiatives included in this option don't cater for significant compliance changes, the option would allow for re-prioritisation of the hyper-automation funding allocation to such changes. |

## Financial benefits associated with investment

This criterion assesses the financial benefits delivered to Energy Queensland, and the broader community from each option.

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**Table 10: Financial benefits associated with Options**

| Benefit category | Option 1: Minimum Sustainment for slow pace of change | Option 2: Keeping pace with the industry transition (recommended) | Option 3: Hyper-automation of Integrated Grid Simulation and Planning |
|---|---|---|---|
| **Targeted and more timely network investments, based on better understanding of evolving network risks and constraints, resulting in better reliability and power quality outcomes for customers (e.g., reduce number of service issues, reduced need for export curtailment)** | n/a | VCR approx. **$1M** pa<br>CECV approx./ **$44K** pa | Assume same financial value as Option 2.<br><br>Additional benefits might be incurred in the subsequent regulatory control period, but cannot be quantified at this stage |
| **Better data, tools and ability to use information and insights effectively, is expected to sustain staff productivity, despite higher complexity and volume of work. This translates in avoided FTE uplifts for projects customer projects, augmentation projects, power quality complaint investigations, forecast development and tariff development.** | n/a | **$430K** pa | Assume same financial value as Option 2.<br><br>Additional benefits might be incurred in the subsequent regulatory control period, but cannot be quantified at this stage |
| **Supporting the growing complexity and growth of non-network options in Demand Flexibility Management with better and integrated tools and data is expected to lead to a significantly higher workload and new processes in the affected business functions. Better digital capabilities will improve staff productivity and thereby reduce the need for FTE uplifts.** | n/a | **$1.2M** pa | Assume same financial value as Option 2.<br><br>Additional benefits might be incurred in the subsequent regulatory control period, but cannot be quantified at this stage |

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## Non-financial/not-quantified benefits associated with investment

This criterion assesses the non-financial/not-quantified benefits delivered to Energy Queensland, and the broader community from each option. The table below outlines the assessment against the three options.

**Table 11: Non-financial/not-quantified benefits associated with Options**

| Benefit category | Option 1: Minimum Sustainment for slow pace of change | Option 2: Keeping pace with the industry transition (recommended) | Option 3: Hyper-automation of Integrated Grid Simulation and Planning |
|---|---|---|---|
| **Ensure our distribution network remains resilient and safe, throughout the energy transition and climate change impacts** | **Limited benefit realisation**<br>This option will not address the expected increase of network impacts to 2030, as it mainly sustains current capability. | **Partial benefit realisation**<br>This option will ensure that our planning function are equipped to anticipate and address these impacts in their decisions. A level of uncertainty, especially around climate change impacts, remains. | **Full benefit realisation**<br>Same as Option 2. |
| **Improved ability to utilise renewable, non-network alternative solutions will generate opportunities for customers and communities and optimise network asset investment decisions** | **No benefit realisation**<br>This option has no investment in scope that notably improves the ability to utilise renewable, non-network alternative solutions to network investments. | **Full benefit realisation**<br>All non-recurrent investments in this option contribute to this benefit. | **Full benefit realisation**<br>Same as Option 2. |
| **Reduced need for manual data manipulation, data entry or data analysis will enable us to redirect and retrain staff to higher value work, reduce data related errors and improve accuracy of automated demand and energy forecasts, reports, and decisions** | **Partial benefit realisation**<br>Renewal of remaining legacy applications will improve data quality associated with these legacy tools. | **Full benefit realisation**<br>Renewal of remaining legacy applications will improve data quality associated with these legacy tools.<br>The additional investment in shared data and automation will continue to deliver higher levels of data quality. | **Full benefit realisation**<br>Same as Option 2. |
| **Ability to generate better value from investments in increased distribution network visibility** | **Limited benefit realisation**<br>Continuous improvement may see some grid visibility derived benefits, if prioritised. | **Full benefit realisation**<br>Grid Visibility is explicitly integrated and used to generate benefits, through the non-recurrent investments in this option. | **Full benefit realisation**<br>Same as Option 2. |

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| Benefit category | Option 1: Minimum Sustainment for slow pace of change | Option 2: Keeping pace with the industry transition (recommended) | Option 3: Hyper-automation of Integrated Grid Simulation and Planning |
|---|---|---|---|
| **Enable better tariff/incentive choices for customers that ultimately align to their preferences through providing more sophisticated tariffs/incentive offerings and more stable pricing** | **No benefit realisation**<br>This option has no investment in scope that notably improves tariff planning capabilities. | **Partial benefit realisation**<br>This option sees improvement in tariff and pricing modelling and management which are contributing to this benefit. | **Partial benefit realisation**<br>Same as Option 2. |
| **Modernised and well-supported ICT solutions are scalable, secure, and can adapt efficiently, effectively, and quickly to future requirements** | **Full benefit realisation**<br>Renewal of remaining legacy applications will ensure that these applications will be scalable, secure, and adaptable. | **Full benefit realisation**<br>Consistently building on the same Integrated Grid Planning architecture and shared data, we will ensure that all new digital capabilities are scalable, secure, and adaptable. | **Full benefit realisation**<br>Same as Option 2. |
| **Support the Queensland Energy & Jobs Plan, climate-positive Brisbane 2032 Olympic and Paralympic Games, and Australia's climate change strategies** | **Limited benefit realisation**<br>This low-cost option leaves little flexibility for reprioritisation requirements. | **Partial benefit realisation**<br>The non-recurrent investments support these outcomes, as far as they are known today. Specifically, around climate-change policy, there is still a high level of uncertainty, for which this option does not cater. | **Partial benefit realisation**<br>Same as Option 2. |

## Costs associated with investment

This criterion assesses the quantitative non-recurrent and recurrent (capital and operating) costs associated with each option. For this criterion, a low alignment has been allocated for the highest cost option. The table below outlines the assessment against the three options.

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**Table 12: Costs associated with Options ($M, real December 2022)**

| Costs category | Option 1: Minimum Sustainment for slow pace of change | Option 2: Keeping pace with the industry transition (recommended) | Option 3: Hyper-automation of Integrated Grid Simulation and Planning |
|---|---|---|---|
| **Recurrent capital expenditure** | [redacted]<br>Relating to continuous improvement of existing ICT capabilities | [redacted]<br>Relating to continuous improvement of existing ICT capabilities and program management overhead | [redacted]<br>Relating to continuous improvement of existing ICT capabilities and program management overhead |
| **Non-recurrent capital expenditure** | [redacted]<br>Relating to legacy tools replacement | [redacted]<br>Relating to legacy tools replacement and all other in-scope initiatives | [redacted]<br>Relating to legacy tools replacement and all other in-scope initiatives |
| **Operating expenses** | [redacted]<br>Relating to ongoing platform, integration or storage cost *specific to renewed IGP capabilities.* | [redacted]<br>Relating to ongoing platform, integration or storage cost *specific to new IGP* capabilities *and data sets.* | [redacted]<br>Relating to ongoing platform, integration or storage cost *specific to new IGP* capabilities *and data sets.* |
| **TOTAL** | [redacted] | [redacted] | [redacted] |

## 6.3 Alignment with the National Electricity Rules

**Table 13: Recommended Option's Alignment with National Electricity Rules**

| NER capital expenditure objectives | Rationale |
|---|---|
| **A building block proposal must include the total forecast capital expenditure which the DNSP considers is required in order to achieve each of the following (the capital expenditure objectives):** | |
| **6.5.7 (a) (1)**<br>**meet or manage the expected demand for standard control services over that period** | The recommended option strengthens Energex and Ergon Energy Network's end to end Integrated Grid Planning capabilities as an enabler for the consumer-led industry transition and enables it to efficiently manage grid planning activities in light of increasing complexities of the future energy grid. |
| **6.5.7 (a) (2)**<br>**comply with all applicable regulatory obligations or requirements associated with the provision of standard control services;** | The recommended option will ensure Energex and Ergon Energy Network complies with all regulatory obligations due to the greater data granularity as a result of the enhanced Integrated Grid Planning capabilities. |
| **6.5.7 (a) (3)**<br>**to the extent that there is no applicable regulatory obligation or requirement in relation to:**<br>(i) **the quality, reliability or security of supply of standard control services; or**<br>(ii) **the reliability or security of the distribution system through the supply of standard control services,**<br>**to the relevant extent:**<br>(iii) **maintain the quality, reliability and security of supply of standard control services; and**<br>(iv) **maintain the reliability and security of the distribution system through the supply of standard control services** | The recommended option implements modern Integrated Grid Planning capabilities which enables efficient grid planning in light of increasing complexity and risks across the distribution network. It also enables Energex and Ergon Energy Network to remain compliant with its obligations, whilst enabling critical network assets to meet changing energy flow requirements on the grid and changing customer expectations. |
| **6.5.7 (a) (4)**<br>**maintain the safety of the distribution system through the supply of standard control services.** | The recommended option implements Integrated Grid Planning capabilities that provide balanced insights into safety risks associated with |
| **NER capital expenditure criteria** | **Rationale** |
| **6.5.7 (c)**<br>**the AER must be satisfied that the total forecast capital expenditure for the regulatory control period reflects each of the following capital expenditure criteria:** | |
| (1) **the efficient costs of achieving the capital expenditure objectives;**<br>(2) **the costs that a prudent operator would require to achieve the capital expenditure objectives; and**<br>(3) **a realistic expectation of the demand forecast, and cost inputs required to achieve the capital expenditure objectives.** | The recommended option meets the regulatory capital expenditure objectives.<br>A detailed cost-benefit analysis above provides sufficient evidence for Energex and Ergon Energy Network's preference for the recommended option. Costs were estimated using historical costs, knowledge of recent market procurement for equivalent services and products, as well as specialist advice from subject matter experts. |

## 6.4 Assumptions

This section contains the assumptions we have made for the recommended option. The enterprise assumptions on which the need for this business case has been assessed are documented in the 'RDP 2025 Project – Shared Assumptions' document.

**Table 14: Assumptions Overview**

| Assumption Description | Impact if assumption proves invalid | How will the assumption be assessed? |
|---|---|---|
| **Enterprise Assumptions on growth / change rate in our grid (e.g., customer numbers, DER capacity, EVs, dynamic connections and smart meter penetration)** | If the growth rates are significantly faster than assumed, the preferred option may not be able to mitigate business risks as effectively as predicted. | Changes in business needs will be identified through our standard processes for requirements identification, prioritisation, and digital delivery. |
| **The post-2025 market reform, the evolution of the Security of Critical Infrastructure act (SOCI) and Energy Security Board Data Strategy[5] will result in significant new compliance and legal obligations in 2025-30 impacting the in-scope business functions.** | Whilst this is unlikely, it would impact how use cases are prioritised. | Requirements will be identified through our standard processes for requirements identification, prioritisation and digital delivery |

## 6.5 Delivery Risks and Controls

The recommended option (Option 2) has a number of delivery risks and consequences attached. These are detailed below, including associated controls.

**Table 15: Delivery Risks**

| Risk Description | Consequence | Preventative, Detective & Responsive Controls |
|---|---|---|
| **Control of scope risk** | Failure to deliver in line with the intent and commitments within this business case | • Program Delivery Approach (see section 5) includes continuous prioritisation and integrated design and delivery approach between resources from both digital and engineering divisions, ensuring shared accountability and focus on the right business and customer outcomes.<br>• Agile delivery method focusses on incremental and continuous value delivery. |
| **Delivery of scope risk** | | • Program Delivery Approach (see section 5) follows our Digital planning, delivery and governance frameworks which put appropriate controls in place for ensuring design quality and delivery. |
| **Critical personnel and third-party risk** | | • Continue established project team from this regulatory control period.<br>• Ensure adequate knowledge management and transfer.<br>• Resource planning across technology platform and delivery teams through our Digital planning approaches. |

[5] Energy Security Board, URL: Data Strategy (aemc.gov.au)

| Risk Description | Consequence | Preventative, Detective & Responsive Controls |
|---|---|---|
| **Data Quality risk** | Impaired ability to automate and use predictive algorithms | • Ensure alignment with initiatives that support data quality in other non-network ICT business cases (see section 6.6) through our Digital planning, delivery and governance framework.<br>• Ensure that data quality requirements are well understood and can be met when designing / procuring solution(s), supported through Digital design governance processes. |
| **Business engagement risk**<br>**Embedding of business change risk** | Failure to deliver expected customer and benefits and mitigate business risks | • Program Delivery Approach (see section 5) inherently and deliberately facilitates business engagement through shared accountability for outcomes and 'Fusion Teams'.<br>• Incremental delivery of change will reduce change risk and establish healthy change cadence.<br>• Proposal includes funding for a level of change management and skills uplifts specific to the in-scope business capabilities. This is complementary to, and depends upon, the data literacy program in the *Non-network ICT Business Case - Data & Intelligence.* |

## 6.6 Dependencies

The Integrated Grid Planning business case is dependent on foundational capabilities being delivered by other ICT business cases.

**Table 16 Dependencies Overview**

| Dependency Description | Dependent upon |
|---|---|
| Integrated Grid Planning depends strongly on technology and data governance, management (including data quality management) and data sharing capabilities, as well as the data literacy program delivered by the Data & Intelligence business case. | Data & Intelligence |
| Improved / richer / higher quality data and customer insights will enable better automated decisions for Integrated Grid Planning, especially Network and Asset Data, and Customer and Connection data.<br><br>Integrated Grid Planning will be dependent on spatial views and assessments, and as such be dependent on the spatial system initiatives in the Asset and Works Management business case also. | Asset and Works Management<br>Customer |
| All non-network ICT and network investments are dependent on the investments in the Cyber Security business case. | Cyber Security |
| Digital Foundations delivers the infrastructure, cloud capabilities, technologies, integration and service management platforms for the delivery and operations of all digital capabilities. | Digital Foundations |
| Integrated Grid Planning requires improved network visibility data and information. Demand flexibility management requires integration with DERMS. | Network Business Cases for acquisition and management of Smart Meter data and telemetry |

## 6.7 Reconciliation Table

**Table 17: Financial Reconciliation ($M)**

| Capital Expenditure | Entity | FY26 | FY27 | FY28 | FY29 | FY30 | Total 2025-30 |
|---|---|---|---|---|---|---|---|
| **Expenditure in business case $M, real December 2022** | Energy Queensland | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| **Allocation to entity (where applicable)** | | | | | | | |
| **$M, real December 2022** | Energex | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| **$M, real December 2022** | Ergon Energy Network | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| **$M, real December 2022** | Other | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| **Allocation to SCS capex** | | | | | | | |
| **$M, real December 2022** | Energex | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| **$M, real December 2022** | Ergon Energy Network | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| **Add escalation adjustments** | | | | | | | |
| **Escalation from $M, real December 2022 to $M, real June 2025** | Energex | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| **Escalation from $M, real December 2022 to $M, real June 2025** | Ergon Energy Network | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| **Expenditure in AER capex model/Reset RIN $M, real June 2025** | Energex | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
| **Expenditure in AER capex model/Reset RIN $M, real June 2025** | Ergon Energy Network | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |