Technology Deep Dive

Pre-reading pack

23 May 2019

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1. Overview

Purpose of this deep dive

- **The purpose of this session is to:**
  - **share** information, including the rationale underpinning our proposal
  - **test** customers' and stakeholders' views on our program of proposed (lifecycle replacement) technology expenditure
  - **explore** preferences on two proposals that will help meet known customer preferences – outage management and customer information management

What is technology expenditure?

- **Technology expenditure includes:**
  - operating costs to keep our existing technology assets working
  - capital expenditure (capex) to replace our technology assets (including software) as their conditions deteriorate and risks rise

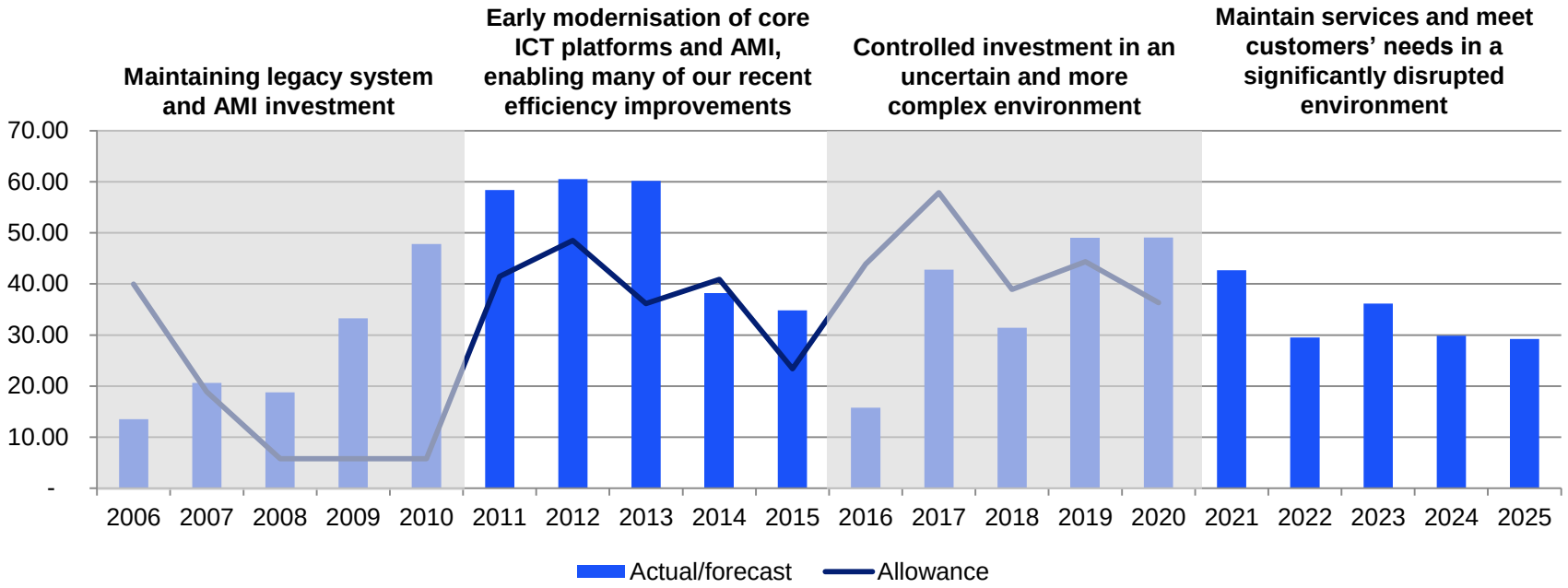
- **It is driven by a number of factors including:**
  - customer preferences
  - risk
  - asset performance
  - industry and technology change

- **The demands on technology services is growing fast, not least due to an increasingly complex environment, with changing customer needs, and an increasing number of users, devices, territories and cyber threats which must be addressed if we are to keep delivering our current level of distribution service**

- **We also need new technology expenditure to meet new regulatory demands:**
  - 5 minute settlement
  - Cyber Security

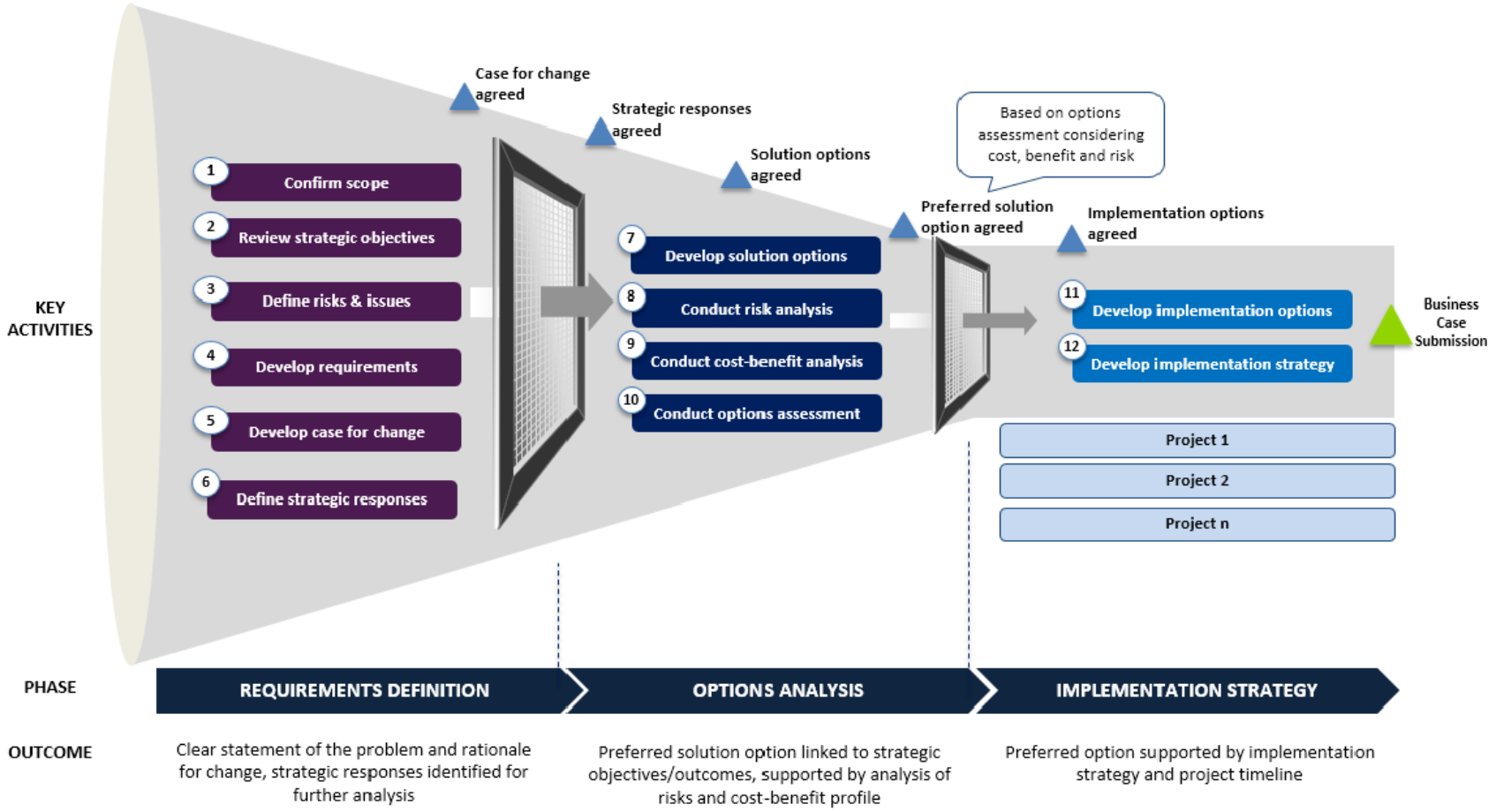
Our proposed technology capex

- **Our proposed technology capex is $167m (real $2020) for the 2021-25 period. This represents around 11% of total capex. This expenditure is also around 11% lower than the technology capex we expect to incur in the current regulatory period.**
  - Our proposed technology operating expenditure (opex) has previously been discussed with the Customer Forum



We note that the profile of the spend in the 2016-20 period differs to that highlighted in the Draft Proposal. While we expect to underspend our technology allowance in that period, the deferral of some projects has translated to relatively greater technology expenditure in 2019 and 2020.

Our approach to identifying a need, assessing options and implementing is rigorous

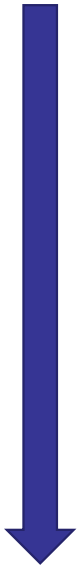


Our approach and our proposals have already been subject to several different reviews

- Our approach was developed with Deloitte Consulting

Deloitte was (among other things) satisfied that:

- The drivers of expenditure reflect reasonable business requirements and are directly related to the provision of distribution services
- Each Technology expenditure program is required to enable the delivery of distribution services and that this was assessed through conducting workshops with AusNet Services' team members and assessing each component of the technology forecast against AusNet Services' current technology landscape and the current and anticipated regulatory requirements, vendor changes and customer needs
- The cost forecasts were developed with reference to benchmark drivers and elements of expenditure. In particular, Deloitte assisted AusNet Services to develop the assumptions underpinning the forecast costs for each program



Review	Capex/$m
May 2018	225
June 2018	216
Draft proposal	168
Our current proposal	167

- Several internal reviews, covering our strategy, options and costs, were also undertaken
- Another consultant was engaged to undertake a further review of our proposal
- **Our proposal has therefore been subject to a high level of scrutiny**

Our proposed technology spend is classified into 13 programs

Program	Description	Proposed expenditure ($2020, real)
1. Infrastructure (Capacity, Lifecycle & Operational Enhancements (CLCOE))	Ensures the business has sufficient capacity, performance and service levels (including data centre assets) to maintain technology systems operations.	25.1
2. Applications (CLCOE)	We have ~200 systems that require periodic patching to align with our asset management support requirements. This program ensures ongoing vendor support, patches and bug fixes, limits downtime, ensures operating effectiveness and underpins the reliability of critical operations.	7.0
3. Corporate Communications	Ensures the lifecycle management of corporate communications including technology networking devices (i.e. Wi-Fi, routers), internet services provision and gateways, as well as data centre interconnectivity, covering both systems and assets.	8.4
4. Metering Lifecycle	We have systems that operate and coordinate metering functions with the rest of the distribution business. In the upcoming regulatory period these systems will require replacement and patching to ensure they remain supported and well maintained, underpinning reliability of critical operations across the business.	11.1
5. Corporate Enablement	We run a number of enterprise applications to support day-to-day operations. These underpin the continuity of all operational processes. We must ensure that these core functionalities remain adaptable in an increasingly changeable environment while also being robust, and reliable solutions for all employees. In alignment with the business shift to cloud (where prudent), core business functions such as HR and Payroll systems will move to the cloud after 2025 recognising that some pre-work is required to prepare for this	9.8

Our proposed technology spend is classified into 13 programs

Program	Description	Proposed expenditure ($2020, real)
6. Cyber Security	Investment to ensure ongoing compliance to current and emerging regulations and laws, including the (pending) regulatory obligations under AEMO's Australian Energy Sector Cyber Security Framework. This program aims to protect our assets, including information, applications, systems, networks and end user devices from internal and external threats. A key element of our proposal is an uplift in our capability to respond to increasing complexity and sophistication of cybersecurity attacks.	21.9
7. Workforce collaboration	Over time, employees acquire knowledge which is specialised to our operations, structure and culture. This program will make these unique insights more readily accessible regardless of workforce location or business area, helping to drive the operating efficiency improvements embedded in our forecasts.	7.7
8. Future distribution network management	As the network continues to evolve, core technology platforms must continue to support, orchestrate and manage the network. There are also rising customer expectations for improved network performance in terms of smart control/integration of DER and the ability to proactively manage customers' demand. This foundation program ensures that we can continue to monitor network system centrally.	31.0
9. Information Management (IM)	Technology will extend the IM platform, with the capability to analyse network performance, supported by advanced automation on near real time data, underpinning better internal decision making, more effective operations and continued levels of high reliability. Outcomes that will help meet customers' expectations.	12.3
10. 5 minute settlement	There is a requirement from AEMO to provide consumption data at the meter level on specific time intervals. Currently this interval is 30 minutes. In the 2021-25 regulatory period this will change to 5 minutes, creating the need to store and manage a sixfold increase in the volume of data within our network. There are a number of critical meter data management and customer data bases and systems which must be modified and upgraded to meet this new regulatory requirement.	6.9

Our proposed technology spend is classified into 13 programs

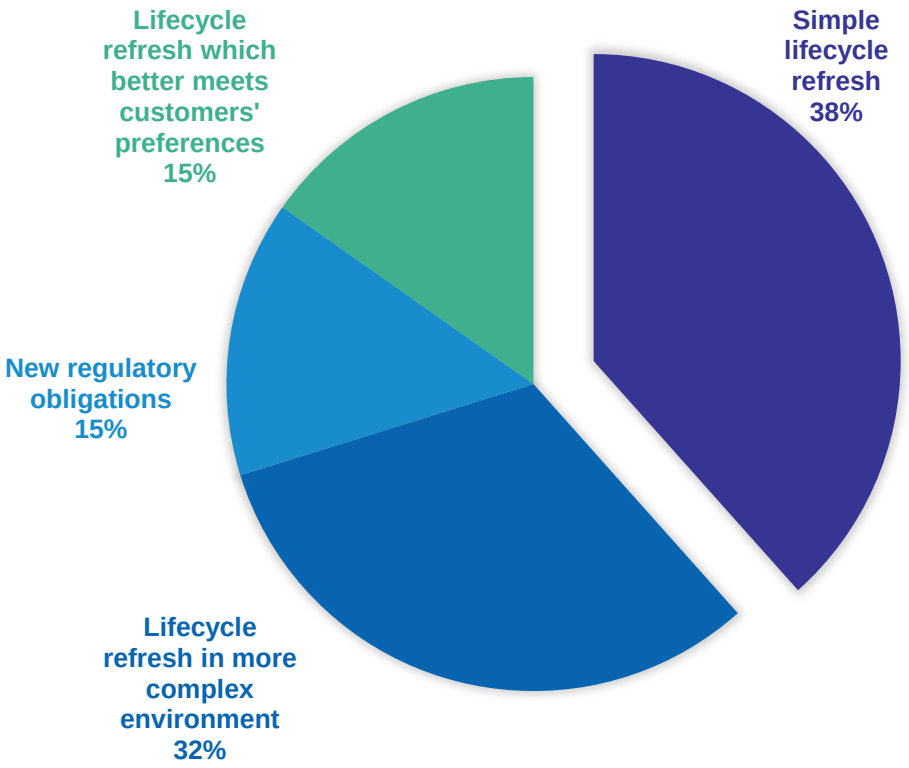
Program	Description	Proposed expenditure ($2020, real)
11. Outage Management	The business will integrate disparate sources of asset, maintenance and interconnectivity data required to better plan outages and provide more accurate information to customers, including on outage restoration times (an outcome we know that customers will value). This will be achieved by simplifying outage management, optimising field crews with automated reports/live data/dashboards, and support network controllers with advanced automation and analytics.	9.3
12. Customer Information Management	This program will enable us to better track and understand evolving interactions with our customers as the network is increasingly used for two-way energy flows. Implementing an effective CIM will enable us to provide appropriate advice to both assist customers in maximising their generation (if they are connected with DER), as well as provide the more personalised and tailored customer service our customers have told us they would value, including enhanced outage information.	6.5
13. DER enablement	Drive improvements in forecasting and modelling capability, to more accurately forecast DER uptake and better understand the impact of DER to the network and existing connected customers. This will underpin more accurate monitoring and understanding of the constraints arising from network and DER operations, ultimately increasing the network's ability to manage DER. This responds directly to the customer feedback we have heard indicating that our customers expect to be able to fully leverage their investments in DER.	10.2

Our proposal looks to replace assets to maintain services while also addressing customers' preferences

- **Unlike our approach for EDPR 2016-20, which looked to provide new capabilities for the core business, the next period's focus is on maintaining services in a changing business environment while also meeting customers' preferences and our regulatory requirements**

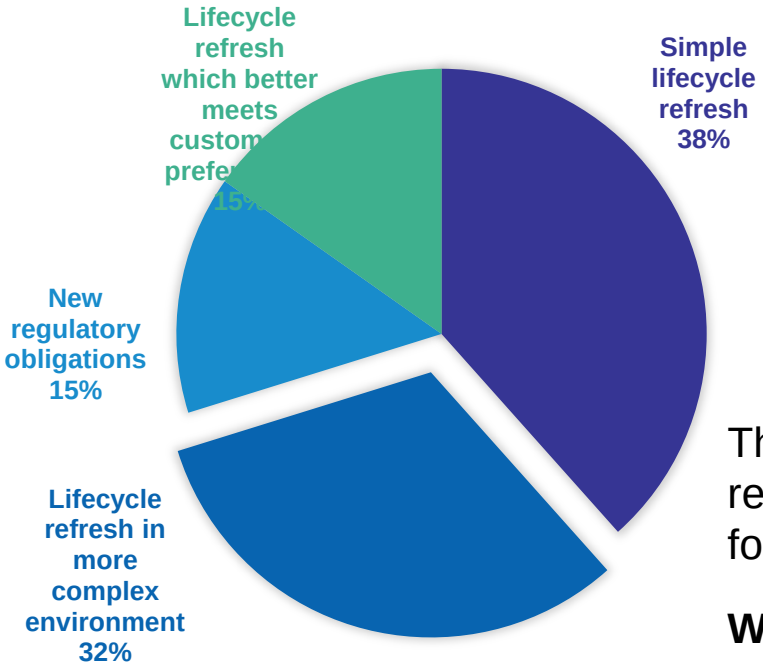
Category	Program	Customer benefit
Maintain existing services	CLCOE Infrastructure CLCOE Applications Corporate Communications Metering Lifecycle Corporate Enablement	Managing risk of not meeting expected demand for distribution services by replacing assets within vendor support windows (lifecycle replacement)
	Workforce Collaboration Future Distribution Network Management	Meet expected demand for distribution services where operating environment is more complex than in the past (new capabilities to do the same job)
Maintain existing services while meeting customers' preferences and new regulatory requirements	5 Minute Settlement Cyber Security	Meet new regulatory obligations (new capabilities to do a new job)
	Outage Management Customer Information Management Integration of DER	Addressing the concerns of customers (new capabilities to do the same job better and new things)
	Information Management	To allow DNSP to further develop decision making and condition based asset management (new capabilities to support our Asset Management strategy)

38% of our proposed technology capex is recurrent and is a straightforward like-for-like replacement



- This covers like-for-like replacement of current functionality for Infrastructure (CLCOE), Infrastructure management (CLCOE applications), Corporate Communications, Metering Lifecycle and Corporate Enablement technology services. No material new functionality is required from these technology services
- We have explored opportunities that cloud computing offers an alternative way of delivering these services. However, our analysis suggests that we would minimise the risks and the costs of delivering these services by:
  - keeping these assets in service until they need replacing; and
  - more economic cloud opportunities likely in the period 2026-30

32% of our proposed technology capex is recurrent and replaces assets to maintain services in an increasingly complex environment



- The three projects that fit into this category are:
  - workforce collaboration
  - future distribution network management; and
  - information management

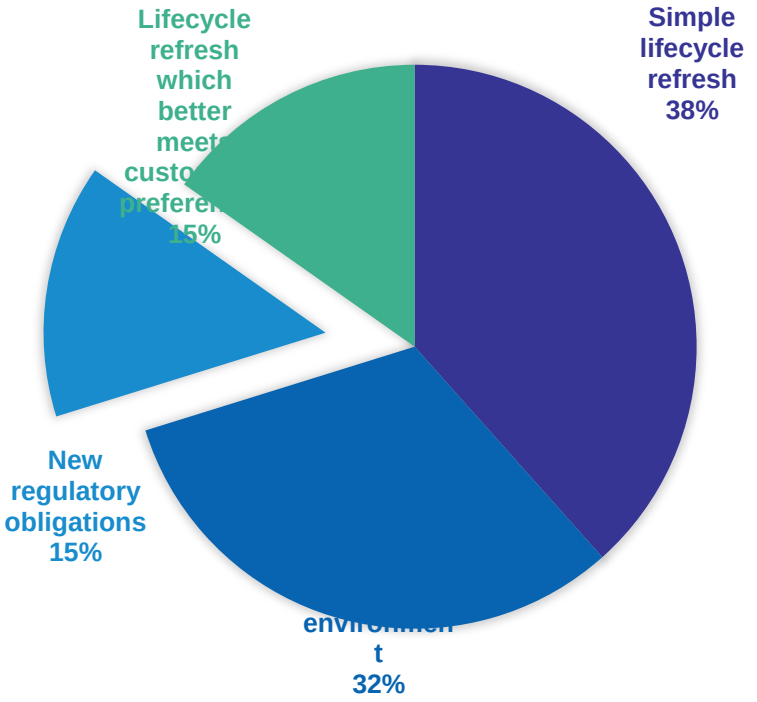
These project take advantage of routine lifecycle replacements to deliver improved technology support for our business

Workforce Collaboration – this extends our digital resources to all workers, regardless of location

Future Distribution Network Management – this allows real time monitoring and control of LV network and embedded DER (infrastructure required to support DER integration)

Information Management – an integrated (and more granular) company-wide asset information and analytics tool to support condition and risk based network investment and maintenance

15% of our technology capex is necessary to meet new regulatory obligations



- **This spend is required for:**
  - 5 Minute Settlement
  - Cyber Security

5 minute settlement: This is required to meet the AEMC's changes to the NER to align operational dispatch and financial settlement at five minutes. This will reduce the time interval for financial settlement in the NEM from 30 minutes to five minutes. This is a national change.

In developing our proposal for 5 minute settlement, we considered three options. However, our $8.3 million proposal delivers the minimum compliance solution at the lowest cost and risk and also leverages our existing investment.

Cyber Security

- **Cyber threats have increased dramatically in the past 5 years and we are proposing a $21.9 million spend in this area.**
- **Our proposal looks to:**
  - identify, detect, protect, and respond to internal and external threats to our assets
  - uplift our capability with respect to people, processes and technology (including 3rd party services) to respond to increasing complexity and sophistication of the cybersecurity attacks;
  - protect critical assets and our ability to supply energy to customers;
  - protect critical data relating to customers and critical operations; and
  - comply with (pending) regulatory obligations under AEMO's Australian Energy Sector Cyber Security Framework (AES-CSF). The impact of this is that we will need to improve our current security by 2 levels to 'Maturity Indicator Level, MIL:3' and all indications are that this must be reached by 2024
- **In developing our proposal we considered three options. However, we consider that our $21.9 million proposal offers the best possibility for achieving our business and customer objectives in the required time frame.**

The remaining 15% of our technology capex involves 3 programs that also meet customers' preferences

The two capex programs that we would like to discuss in detail are:

Program	Why we are discussing it	Proposed capex ($2020, real)
Outage Management	Improves our ability to forecast and communicate outage restoration	$9.3 million
Customer Information Management	Gives us a joined-up record of every interaction we have with each customer	$6.5 million

The third program that fits into this category is the DER enablement program. This issue is not being discussed in this deep dive as it was discussed during the DER deep dive.

Questions

- **Do you require further information on:**
  - our proposed spend
  - our proposed programs
  - how we have categorised our proposed spend
  - the two programs we wish to discuss?

2. Our strategy and how we have used customers' preferences to shape our proposal

Our technology strategy

- **Our technology strategy sets the direction and defines an actionable technology program of work for the 2021–25 period. It outlines the key drivers underpinning our proposals while recognising that our proposed program of work has been developed during a time of unprecedented change. It also ensures that we comply with our regulatory obligations, taking into account our key drivers which include:**
  - *Customer expectations:* to '**deliver on the basics**', '**keep me posted**', '**make it affordable**', '**be ready for the future**', and '**always safe**', which have been obtained from customer consultation (see next 2 slides);
  - *Industry and Technology:* technology is playing an increasing role in electricity networks and we rely on digital technologies to control expenditure and improve overall performance and reliability where our customers demand it.;
  - *Cyber threats:* responding to increasing cyber threats to maintain a safe and secure network and working environment, and protect customers' privacy.

Customer expectations and insights

- **Prior to the development of our expenditure plans, we undertook extensive research to understand the needs and wants of our customers.**
- **Key themes and insights used to inform our ICT plans are outlined below**

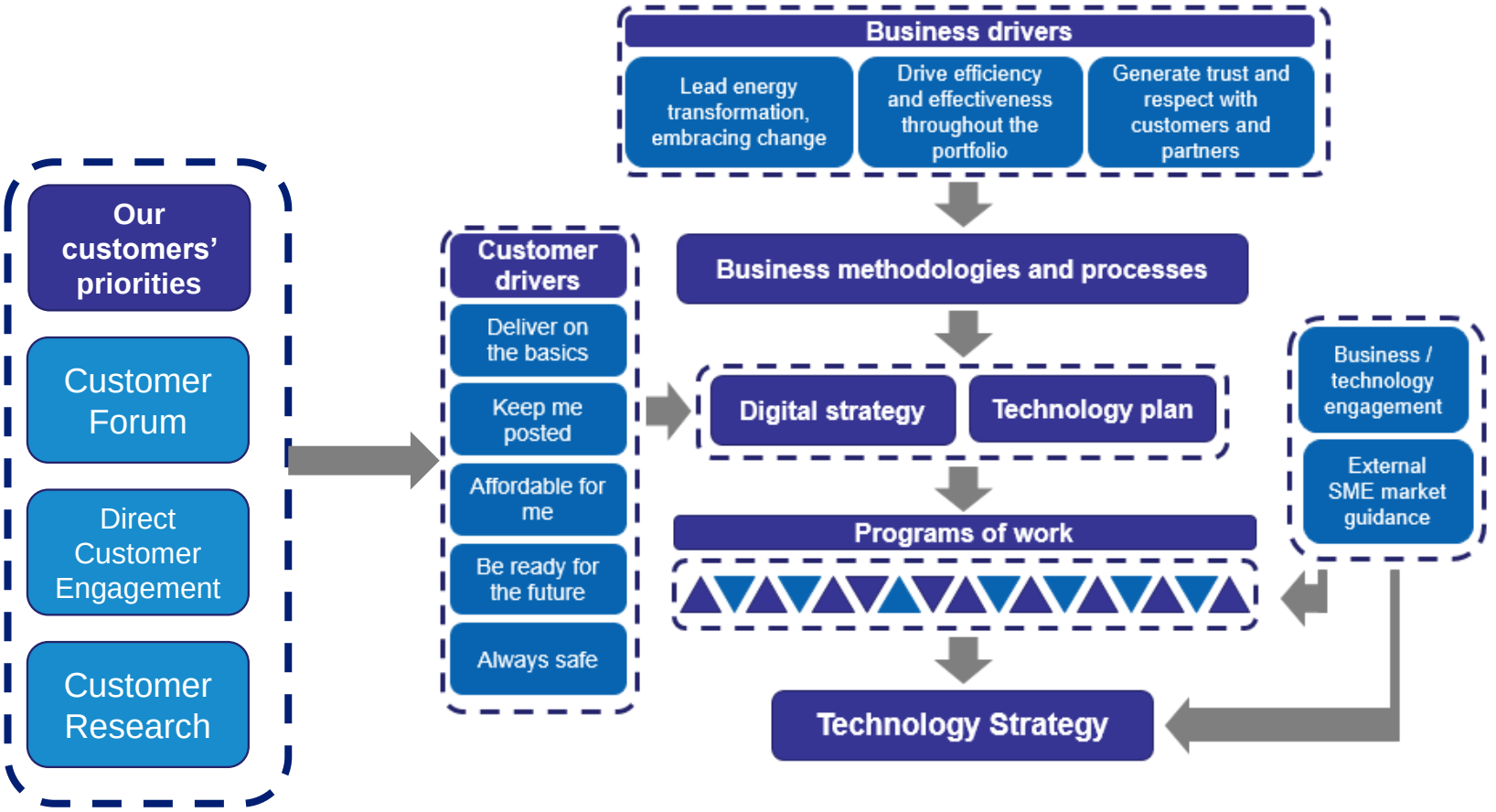
Customer expectations (themes)	Customer insights
'Deliver on the basics'	• Customers perceive our core services as being 'essential services' (as distinct from being a luxury). • They expect us to deliver on these services as they are required for customers to function from day-to-day • They perceive our core services to represent our social licence to operate
'Keep me posted'	• All customer groups want better outage information (i.e., more accurate restoration timeframes) • A key driver of dissatisfaction among customers who have experienced an outage is a lack of proactive communication during and after the outage • Customers across all groups want timely, proactive, simple and unbiased information and advice from us • Customers are seeking a multi-channel communication approach to communication

Customer expectations and insights (cont.)

Customer expectations (themes)	Customer insights
'Make it affordable'	• Electricity price, in terms of both affordability and value for money, remains a key concern for all customers • ~2/3 of customers feel that their electricity bills have increased in the past 2 years • ~1/3 of customers think their bills are 'poor' in terms of affordability • ~2/3 of customers believe that their electricity provides poor value for money
'Be ready for the future'	• Awareness of, and interest in, new energy technologies has grown across all customer groups • There is strong support for modernising the grid to accommodate more solar connections. It is seen as a essential energy sector responsibility, and often a national priority • Customers generally feel that the costs associated with upgrades to the network to allow more solar connections should be shared by all because solar is in everyone's interest
'Always safe'	• Customers link safety measures of bushfire prevention, vegetation management and undergrounding electrical wires, and feel that safety is not merely an important service, but a core AusNet Services responsibility

For further information can also be found through 'AusNet Services EDPR Customer Forum – Interim Engagement Report', which is available on our website.

The importance of our customer engagement in shaping our strategy is illustrated below



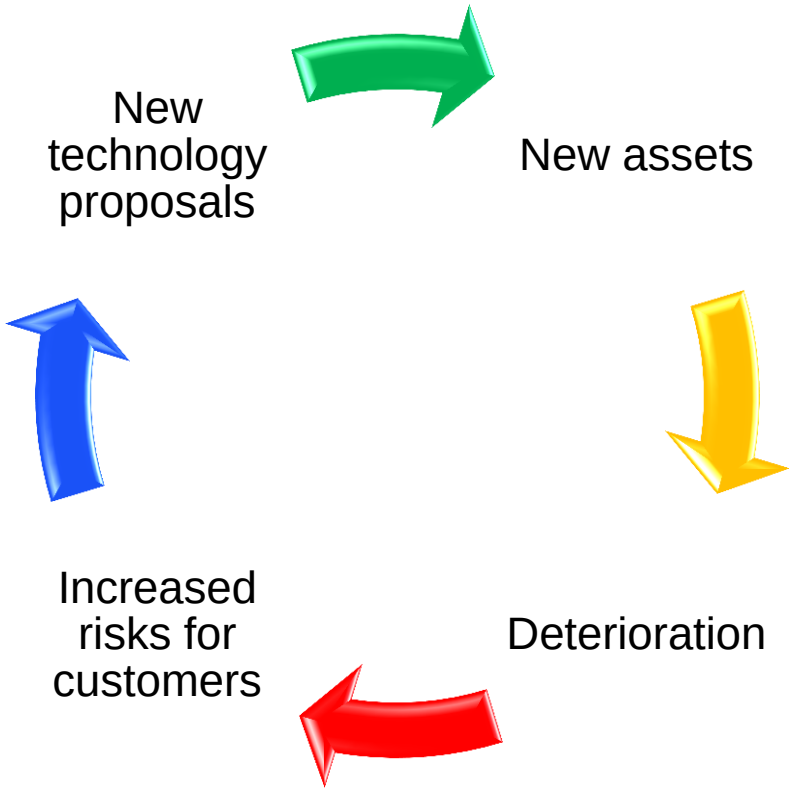
Questions

- Do you need further information on how we developed our strategy?
- Are there any issue that you consider we have missed?
- Are there any questions on our strategy?

Background

New technology assets are replaced regularly (typically as part of a lifecycle refresh)

- **Technology assets need to be maintained just like an electricity network. We assess reliability, capacity and cost of maintenance versus replacement regularly to ensure that assets align to our risk appetite as stated in our Asset Management Policy. Assets are therefore replaced regularly**



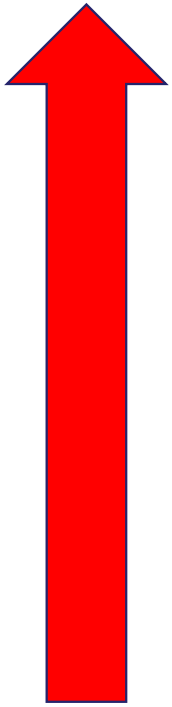
How regularly replacement needs to occur

Our policy is to maintain technology hardware and software to align with our Asset Management Policy

This means managing the technology through its lifecycle and replacing it with a modern equivalent where risks rise and/or performance deteriorates

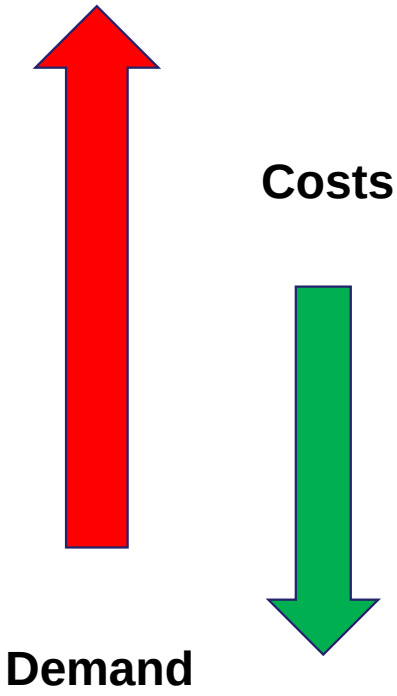
- **Digital technology improves quickly and the most effective way of maintaining services is typically to replace them before their performance degrades**
  - Vendors provide support for their technology products on normal terms as long as they are reasonably up to date (within a certain number of releases of current versions)
  - If our technology products age beyond vendors' standard support terms, they will generally offer "best endeavours" to get them working at **premium rates.**
  - Not replacing technology assets can therefore be very costly for us and potentially for the customer too
  - There is also additional risks in failure rates, accessibility of parts and/or security patches

Modern assets are usually better than the ones being replaced



- **Unlike electricity network components, the rate of change in technology assets is very high**
  - › Hardware is generally more powerful (in speed or capacity terms) per $ invested in the asset it is replacing
- **Equally the rate of growth in demand for technology services is higher than the rate of growth in demand on the electricity network**
  - › Digitisation of business processes means a rapid increase in the volume of data being captured, stored and processed which all increases our like-for-like technology hardware replacement needs

Increasing challenges means that more is needed just to keep pace



- The result of these two effects is that while the cost of our like-for-like hardware falls the cost remains constant due to the increase in demand

- Most business processes depend on digital technology tools – if we didn't keep our technology infrastructure up-to-date and sized to meet future demand, our effectiveness would decline and there would be more risks that we need to manage, including potentially adverse customer impacts

Software also needs to be replaced regularly but this can bring additional functionality

- **As with hardware, we apply our policy of maintaining software in alignment with our risk appetite and Asset Management Policy.**
  - However, modern software releases don't do exactly the same things as older versions or what other vendors' substitutes do
  - This makes it difficult to maintain like-for-like capability as we replace our computer software

- **Some of our proposed software investment for the next regulatory period will, in addition to keeping our systems up-to-date, provide greater functionality. This functionality increases the scope for us to meet standard control services and/or meet new customer demands**
  - This additional functionality is not something that can be removed. However, we only look to deploy new functionality if it is justified (for example, customers preferences indicate that this new functionality would be of use) as there are direct costs of implementation (configuration, testing, data migration, change management, user training)

Cloud computing is an increasingly necessary option

- **Over the past 5 years, many technology vendors have provided "cloud services" as alternatives to selling assets for customers to own and maintain**
  - A subscription to an infrastructure service provided by a third party (like Amazon Web Services) can a substitute for owning, maintaining and operating our own servers and, storing and housing them in datacentres

- **Even software is now available as a "service"** – where some vendors such as Microsoft and SAP run their software on their own hardware and make it available to subscribers over the internet
- **Switching to cloud services can bring benefits,** including increased agility and flexibility. **But, migration also has costs and risks**, just like life cycling assets
- We have looked at cloud alternatives to all our technology needs and aim to **use cloud in specific areas to meet requirements for capacity, scalability or agility at lower costs than the equivalent on-premise solutions.** For this regulatory period, we will not scrap the technology assets we own but will explore alternatives where appropriate.

Time to transition everything to the cloud? Not quite yet …

- **Although the cloud offers some options for us to consider, most of the projects in our proposal replace existing hardware and software assets for the period**
  - › It avoids the cost of stranding assets before they need to be replaced
  - › We won't avoid the cost of our datacentres and the infrastructure that they house until they are actually decommissioned
  - › Many of our technology services share common enabling infrastructure. We can only switch these off when all of the services have moved into the cloud
  - › We consider the risk of moving all our technology assets into the cloud in a five year period to be unacceptably high with no corresponding benefit
- **We do, however, expect come cloud related opex in the 2021-25 period for the customer focussed CIM and outage management projects (see later)** – this issue has been discussed previously with the Customer Forum
- **Going forward, we will continue to evaluate cloud options before we start work on projects so that we chose the option that minimises risks and costs. Our current estimate is that it will be optimal to move many of our technology services into the cloud in EDPR 2026-30**

Questions

- Do you need further information on our approach to replacing technology capex?

- Any comments on the movement towards cloud based IT solutions?

5. Customer driven technology capex

As identified by our engagement and research, customers want:

More rapid and accurate resolution of customer requests and issues

- The Customer Information Management (CIM) program builds on the lifecycle replacement of our current suite of customer management systems (which are currently implemented for particular types of customer contact)
- We intend to integrate tactical disparate data source into a Company-wide CIM capability **providing a seamless customer platform** holding all customer communication and their history of our interactions in a consistent way. This will allow proactive and reactive customer communications
- Where we have used this capability for individual customer requests and issues, it has proven to be an effective way of delivering quick and accurate resolution which will be available across the entire company

Provision of more accurate and timely communication with affected customers about restoration times

- The Outage Management program aims to improve our forecasting, coordination and management of supply restoration
- We are taking advantage of lifecycle replacement to our existing Outage Management to deploy these new capabilities and so improve our service to customers when they experience outages

Customer Information Management System (CIM)

- **This ($6.5 million, $2020, real) proposal will enable us to better track and understand evolving interactions with our customers.**
- **It will:**
  - address a number of the limitations associated with our current approach (see next slide)
  - enable us to provide appropriate advice to assist customers in maximising their generation (if they are connected with DER) and provide the more personalised and tailored customer service our customers have told us they would value, including enhanced outage information
  - allow us to better understand our customer base
  - allow for better targeted and meaningful communication, including enabling more accurate notifications during outages

Limitations of our current systems

We use multiple systems to manage customer data, customer interactions, customer issue resolution and financial services. This means slow, manual processing steps with greater scope for errors.

End-customer data received from retailers is often incomplete or is not current. We are therefore unable to tailor messages or information to customers or offer specific services geared towards different types of customers.

Customers' expectations and needs are changing and if we are unable to gain visibility around changing customer consumption patterns and their resultant network requirements, we will be unable to appropriately plan/respond.

Customer information is not integrated with asset information. It is therefore difficult to utilise customer information to inform decisions around the optimisation of maintenance and delivery of asset works in line with customer priorities.

Options considered

Option 1: Business as usual	This option involves managing customer information through current systems, strategically making incremental improvements where possible. Key initiatives includes improving third-party access to customer data in line with the AEMO rule change to be implemented in the upcoming regulatory period.
Option 2: Integration of Customer Information Management (CIM) for key services	This option involves integrating key customer information in a central repository to provide a seamless customer interface. This option will allow: • Collection and validation of information about the end consumer via a central customer information management solution • a single view of the customer • employees to track and manage customer feedback • proactive, centralised, outbound customer communications for outages and energy usage • provision of digital self-service presentation of usage information to customers • campaign management to influence energy demand and supply
Option 3: Fully integrated CIM solution	This option involves implementing an enterprise-wide CIM solution with the benefits outlined in option 2 where customer reference and transactional data, where relevant to business decisions, is stored in a central CIM system. In addition to the key initiatives outlined in options 1 and 2, other initiatives include: • implementing an enterprise-wide CIM solution • upgrading of the customer web portal for AusNet Services to engage with customers in a modern manner; • transitioning from a multi-channel focus to an omni-channel focus with customers

Our assessment

	$ estimate (m, $2018)	Costs/Risks	Benefits	Preferred option
Option 1	4.5	**Limited benefits** due to a number of constraints, such as: • no integration or centralisation of existing or new data; and • no advanced collection of information, prior to regulatory requirements. **High risk**	Some easing of pressure on our customer interactions, both in terms of employee productivity and customer efficiency.	✘
Option 2	6.1	Involves a subscription to a CIM and costs associated with meeting third-party access related regulatory rule changes, and support DER related initiatives. But, as it is **not a fully integrated CIM system** – see option 3. **Medium Risk**	**Productivity increase for employees** as implementation of subscription-based CIM solution and tactical solutions reduces that amount of time spent on manual processes Subscription-based CIM solution and tactical solutions **improve the effectiveness of customer interactions, increasing customer satisfaction**. **Most project objectives met**	✓*
Option 3	27.6	**Cost is significant** and will involve a fully integrated system, and costs associated with creating an omni-channel experience with customers, and meeting third-party access related regulatory rule changes and DER related initiatives. **Medium Risk**	• **Cost reductions** for employees with less time being spent on manual processes • **Customers able to address issues via a web portal**. This decreases our call centre costs and potentially increases customer satisfaction. • **Increasingly integrated view of customers and visibility of key customer information** • Well placed to meet increasingly sophisticated, regulatory driven data requirements	✘

* The associated opex step change for our preferred option is $458 337 per annum. This spend has been discussed with the Consumer Forum.

Questions

- **Are there any questions on:**
  - our approach
  - the options we considered
  - the costs/risks and/or benefits of those options
  - our preferred option?

Outage management

- **This ($9.3 million, $2020, real) proposal aims to minimise the impact of planned outages on customers, by using advanced analytics and automation across the workflow to improve processes for planned works.**

- **Our proposal looks to deliver an efficient planned outage management process and to improve the capability of the workflow including:**
  - Data mapping to correctly attribute customers' locations to substations;
  - Maintaining the data quality input by field workers;
  - Utilising data for analytics (predictive maintenance);
  - Automation of works planning based on assets identified for maintenance;
  - Automation to draft switching instructions based on approved switching plan;
  - Automation to identify customers within identified outage area; and
  - Automation to notify customer (via physical letter, email or text message).

- **Our proposal helps '*deliver the basics*' as it will result in improved processes around network related works which will, in turn, enhance the resilience of the network and ensure consistent power supply. It will also '*keep me posted*' by delivering timely and accurate information on works and completion status.**

Limitations of our current systems

We receive limited end-customer information from retailers, so we are unable to notify customers, with accuracy, when a planned outage will affect them, and can not optimise maintenance and delivery of network related works in line with customer priorities.

We often lack sufficient integrated third party data which could be used to more accurately predict work completion and avoid rescheduling e.g. weather data to plan around rain / lightening.

Numerous systems currently need to be used to complete tasks associated with planned outages. This is time consuming and introduces a risk of human error in processing.

Field workers are unable to access real time information on network assets and/ or when they are dispatched when an outage occurs. Efficiency could be improved if real time information was available

We are unable to gain visibility of asset performance specifically at a LV level. We therefore lack the ability to proactively plan at short notice or on a rolling basis and provide efficient service response.

Options considered

Option 1: Data Quality Improvement	This option centers around maintaining current systems with mandatory technical upgrades only and investing in foundational work to improve accuracy of both customer and asset data used to formulate and execute planned outages.
Option 2: Process Automation	This option involves using data to create accurate models and incorporate these into automated processes, commencing with highest value based on cost and customer impact. To deliver this option, Option 1 must be completed in conjunction with Option 2.
Option 3: Integrated Solution (Intelligent Automation)	This option is a fully integrated solution, with automations as outlined in opportunity assessment. Integrated use of field mobility solution to maintain data quality and receive communications from the operations teams. This option builds on the capabilities delivered in Options 1 and 2.

Our assessment

	$ estimate (m, $2018)	Costs/Risks	Benefits	Preferred option
Option 1	6.8	**High risk** as it does not: • provide a solution to maintain the ongoing data quality input by field workers • allow us to perform predictive analysis to optimise works planning and scheduling, improving asset maintenance • allow us to increase automation of our end to end processes	**Some, albeit limited, improvements seen**, including: • customer and asset data integrity, allowing analysis on consistent data across systems • outage management through increased oversight and monitoring of asset performance gives the ability to maintain assets based on real time information • accuracy and safety for both Life Support and Sensitive customers through improved notifications • customer experience, including progress of work updates	✘
Option 2	8.8	This project assumes that the automation platform will be established prior to 2021. Greater expenditure in the initial years of the next regulatory period is required to incorporate the data quality enhancements outlined in option one and to conduct opportunity analysis across all process areas of the function. **Low risk**	• **Reduced unplanned outages** through improved asset management and outage planning • **Improved customer satisfaction** through asset, network and service reliability and accurate notification and progress of work updates • **Improved insights** into unplanned outages and why reasons jobs are cancelled • **Increased oversight** and monitoring of asset performance gives the ability to maintain assets based on real time information • **Improved asset utilisation** and increased asset life • **Reduced number of cancelled, rerouted jobs** • **Improved asset lifespan** due to optimised maintenance schedule	✓*

* The associated opex step change with our preferred option is $50 926 per annum. This amount has been discussed with the Consumer Forum.

Our assessment

	Initial $ estimate (m, $2018)	Costs/Risks	Benefits	Preferred option
Option 3	9.3	**Highest level of investment (cost) to capture and consolidate the data.** Additionally, much of the work is dependent on implementation of more advanced network management solutions. We have also taken a cautious approach in terms of technology spend in anticipation of the requirements on the network in the future. **Low (but not the lowest) risk**	• **Improved operational effort** associated with the planning of network outages. • **Increased oversight and monitoring** of asset performance due to real time information • **Better scenario analysis** to prevent the risk of failure of assets, as performance is known and tracked allowing for reconfiguration of the network to support optimum asset performance • **Improved accuracy** and safety for both Life Support and Sensitive customers through improved notifications • **Improved customer experience** through accurate notification and progress of work updates • **Improved output quality** of Access Coordinator/s and reduces the umber of cancelled, rerouted jobs • **Increase reliability** in staffing field worker skills with maintenance required • **Improved asset lifespan** due to optimised maintenance.	✘

Option 2 is the recommended option as it delivers the outcomes required, reduces our exposure to risks, while remaining realistic based on the number of dependent projects required to deliver extensive automations. Option 1 does not provide enough additional capability to allow us to efficiently deliver services to customers. While Option 3 also delivers the outcomes required it's a more complex and costly approach.

Questions

- **Are there any questions on:**
  - our approach
  - the options we considered
  - the costs/risks and/or benefits of those options
  - our preferred option?