Endeavour Energy Data Strategy

28 October 2022



Executive summary

Endeavour Energy's strategic context is shaped by seven key drivers defining 3 key trends

- Western Sydney regional growth interplay with economic volatility and cost of living pressures will impact our customer base and underlying energy demand
- Climate change and extreme weather events, combined with increased importance of trust, reputation and purpose, and the evolution of grid in transition to low carbon economy change the requirements to the grid drive volatility of consumption from the network, increase the ability to shift load, and changes the requirements to grid resilience
- Customer centricity and expectations of efficient and effective service in digital era drive expectations of digital services hyper-reliability and flawless customer experience, at low cost

To maximise value for our customers, we need to support growth in Western Sydney and maintain reliable supply at the least total cost for our customers, while enabling the highest possible DER uptake and excellent customer experience.

Data should unlock the greater customer outcomes and create value across seven areas:

- Build the right network to support and enable residential, commercial and industrial customer growth and DER uptake in the region, as well as electrification of transport and gas, while avoiding unnecessary network Capex and minimising the need for our customers to invest in behind-the-meter assets (e.g. battery storage)
- Operate the network with high DER penetration, maximising DER utilisation while maintaining supply quality and reliability for customers
- Optimise work on network assets (i.e. 'do the right work, at the right time', solving for target level of risk / supply quality) to reduce network Opex and frequency of power interruptions for our customers
- Reduce manual effort (i.e. 'do the work with the right resources') in design, GIS and ASP to focus the resources on priority projects and speed up connections
- Maximise productivity and safety of our field force (i.e. 'do the work right' to best utilise our resources) to unlock productivity in the field (Opex and Capex savings resulting in direct savings for our customers), whilst embedding safety behaviours to ensure zero fatal or life changing injuries
- Improve customer experience and speed in connections process, planned outage and emergency response
- Make informed Enterprise decisions (incl. HR, Finance, sustainability initiatives) to secure critical resources, reduce external spend and avoid potential increase in cost of debt via access to green financing

To deliver these outcomes, our Data Strategy adopts an approach that is prioritised around measurable packages of deliverable value, building foundational capabilities to set ourselves up for the future, and introduces new ways of working to improve how we leverage data

- Be use case led, value-driven: Unlock returns from data through prioritising effort on use cases that have the highest measurable value
- Build foundational capabilities: Develop the skills, processes and technologies needed to scale and reduce business friction through reuse
- Improve our Delivery model: Create a data-enabled organisation that effectively and consistently uses data in decision making processes across all levels of the organisation



Content



Why data is important to drive better outcomes for Endeavour Energy customers



What do we need to do



Delivery roadmap



1. Why data is important for Endeavour Energy to drive better outcomes for our customers



Our primary goal is to ensure our customers have reliable access to electricity that is affordable, safe and sustainable



Endeavour Energy services over 2.5 million people living and working across Sydney's Greater West, the Blue Mountains, the Southern Highlands, Illawarra and the South Coast of NSW. To do this, we manage a network that spans almost 25,000 square kilometres, from the Blue Mountains to the South Coast and through much of Sydney's Greater West and has a Regulated Asset Base value of \$6.8B.

Our primary goal is to ensure our customers have reliable access to an electricity network that is affordable, safe and sustainable, and that enables access to power in a way that suits them and their energy needs. We work together to adapt quickly to the needs of our customers, and continually strive to find better ways to power our communities. In 2021, Endeavour Energy was proud to be recognised as one of Australia's best performing electricity distribution companies.

As we look to the future, the nature of the energy system and our role within it is changing. The net zero ambitions of our community requires fundamental changes to the way we generate and use electricity. At all levels, this will need investment, innovation, new technology, additional infrastructure, and policy and regulatory reform.

For us, the operation of a more intelligent, integrated and dynamic network will transition us from being a traditional 'poles and wires' business to a central platform, coordinating a clean and equitable energy system, and enabling digital services for our customers. At the same time, we will be supporting significant growth in Western Sydney and enhancing resilience to increasing risks from climate change, cyber security and a more variable and decentralised generation mix.

The next 5 years will be a crucial building block. Our prudent investments must deliver on immediate needs and, use increased data and insights to set the pathway to the future. This will ensure Endeavour Energy continues to meet our customers' expectations while providing safe, sustainable and efficient services.



Our business must keep pace with seven key drivers shaping our future operational landscape



Customer Centricity

A focus on customers' needs and experiences from high energy users to pensioners to empowered prosumers means customers play a more central role in the operation of the network as networks evolve to be platforms of energy services. Underpinned by new technologies, customer expectations and service needs will evolve. Customers will expect to help shape the direction of the business through deep engagement on regulatory proposals and beyond.



Trust, reputation and purpose

The reliable delivery of an affordable crucial service underpins trust and is core to our purpose. Customers also increasingly expect organisations to align with personal and community values for environmental and social governance (ESG). Purposeful decision making, with an emphasis on ESG outcomes, will be essential to retain social licence, attract investment, and to establish and maintain a high-performance culture.



Western Sydney regional growth

The NSW Government is driving the substantial and rapid growth of Western Sydney, at a rate nearly 40% higher than the rest of Metropolitan Sydney. By 2036, half of Sydney's population will reside within the city's west, supporting 200,000 new jobs, a new airport, rail, new industries and manufacturing, and become a high-skill jobs hub. This plan is akin to building a new and smart interconnected city, from scratch.



Economic volatility and cost of living pressures

International and domestic developments have contributed to rapidly rising inflationary pressures, including in energy prices, with rising concerns about a possible slowdown in the Australian economy. Cost of living pressures are increasingly centre of mind now for all customers small and large. Transitioning the grid to ensure long term value for money services as customers make increasing energy choices in the most efficient way requires balancing in the short and long-term.



Climate change and extreme weather events

Climate modelling suggests that extreme weather events will continue to increase in both frequency and intensity over the coming decades. Climate change-related events damage, destroy and/or compromise the performance of infrastructure, and increase risks to the reliable supply of electricity.





The evolving grid within a low carbon economy

The pursuit of a net zero economy will transform the way we generate and consume energy. As customers take up technologies such as solar, batteries and electric vehicles, the network will need to evolve to allow for two-way flows and active participation from customers and third parties. Over time, more sophisticated digital platforms will seek to interact with a more dynamic, integrated network that orchestrates the low carbon energy system.

Efficient and effective service in the digital age

Introduction of digital technologies and enhanced data capabilities create significant operational efficiencies, while transforming the risk, roles, required skills and location of the future workforce. At the same time, cyber-attacks become more frequent and sophisticated, targeted at the disruption of energy supply.



The 7 key business outcomes support to the delivery of the five pillars of Endeavour's strategy

Purp Strategic goa	ose Ils and KF	Pls			S	trategic pillars	3	
Strategic Strategic	pillars enablers	·		Health, safety and environment	Employee engagement	3 Customer & communities	4 Performance	5 Growth and innovation
Ghareu		Build the right network to support	ort growth and DE	R		\checkmark		
		Operate the network with high	DER penetration			\checkmark	Ø	
	\$ ≝=	Optimise work on network asse	timise work on network assets ¹					
Business outcomes	0	Reduce manual effort						
	\bigcirc	Maximize field productivity and	safety	Ø			\checkmark	
		Improve customer experience				♦		
		Make informed Enterprise deci	sions					
						Vigh relevance	of use cases outcome to	strategic pillar



Data will unlock greater benefits for Endeavour's customers via 16 use cases

We will power our communities for a brighter future by ensuring reliable energy supply at the least total cost, while enabling the highest possible DER uptake and utilisation

Business outcomes	Build the right network to support growth and DER	Operate the network with high DER penetration	Subscription Stress St	Reduce manual effort	Maximise field productivity and safety	Improve customer experience	Make informed Enterprise decisions
Data will enable us to:	Deliver the right solutions at the least total cost for all customers in Endeavour Energy area, including Western Sydney. Plan and build the right network at the right time to support the customer growth and infrastructure required over the next 7 years to set-up data centers, the Aerotropolis, 2-3x solar PV MW capacity and >100x growth in EVs ¹ .	Operate network with high penetration of DER / flexible assets behind-the meter while maintaining supply quality and enabling additional value for our customers via unlocking higher utilisation of DER. Improved visibility of DER and low voltage network will also enable better fault detection, improved emergency response prioritisation, remote switching and self-healing. This will help reduce power disruption frequency and duration for our customers	Reduce maintenance spend and optimise replacement capital while minimising the risk of asset failure - via enabling Endeavour's Asset Management Framework and value- based investment prioritisation. This will help reduce frequency of power outages and the cost of maintaining the network for our customers, as well as avoid unnecessary tree cutting and trimming	Reduce unnecessary field visits for design, and optimise costs for data capture and analytics. Reduce admin effort and time for GIS data capture and ASP design validation, saving time in customer connections and enabling focus on high priority projects for our customers Improve public safety and safety of our field operators, productivity and overall engagement via improved GIS data and clarity of field instructions.	Unlock further productivity of our field force, allowing to offset a portion of our contractor costs and reduce Capex spend Embed safety behaviours to ensure zero fatal or life changing injuries, reduce overall incident frequency to best performance industry levels. Ensure an excellent customer experience by supporting our field staff to excel at their jobs	 Improve our customer experience (measured though NPS) by: Better understanding preferences of different groups including ASPs, residential, commercial & industrial customers Reducing effort and time in customer connection process Proactively providing accurate outage information Enabling customer self- service & automation 	 Free up time to focus on key customer priorities and unlock value via: External spend reduction and supply chain resilience to minimise risks for capital program Access to insights to support the right decisions on People, Procure-to-pay, Financial reporting and planning Avoidance of growth in cost of debt via access to Green financing
Main use cases	1. Next-Gen Network Planning, incl. customer needs prediction & data sharing.	 LV and behind-the- meter visibility, simulation and control. Network switching automation and self- healing. 	 4. Veg. management 5. Asset management at asset level (bundle of use cases) 6. Investment prioritisation 	7. Physical network data capture (incl. via Lidar, drones etc.), digital twin/simulation, design & GIS capture automation.	 8. End to end work delivery (bundle of use cases from work planning to intraday). 9. Safety data capture and insights. 	 Customer - Connection speed and self service. Customer - Planned outage management. Customer - Fault response ETA and insights (unplanned). 	 Sustainability impact modelling and reporting. Digital procurement/ procure-to-pay. HR data & reporting. Financial planning & reporting.

1. Based on Endeavour Uptake Forecasts for AEMO Step Change scenario (low end) and AEMO Hydrogen Superpower scenario (high end)



Key Data use cases are prioritised based on estimated financial and nonfinancial (economic) value in line with Endeavour' Value Framework





2. What do we need to do



Four mind-set shifts required to build a data centric organisation

Mindset shifts

From ...

From capturing data without clarity of use of that data...

From duplicated and scattered data locked in individual functional silo...

From decisions based on judgement and intuition ...

From being reactive to challenges with our data ...

То ...

... to understanding and collecting data essential for critical business operations and specific use cases

... to a data platform, with clean, consistent and sharable data available to make informed business decisions at the right level

... to business having high degree of trust in security and accuracy of data to make informed tactical and strategic decisions

... to proactive ownership of business decisions and insights driven by analysis

Will enable...



Useful data



Accessible data



Trusted data



Insight to action



3 areas of our Strategy framework; business use cases, governance & analytics capability and strategy delivery model





Business use cases charters



Business use cases

Charter | Next-Gen network planning

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The why

Ability to support the customer growth (via proactively building the right network and shaping the solutions to maximise DER uptake and utilisation), while avoiding unnecessary Capex., including from improved investment decisions (critical enabler for investment prioritisation initiative). E.g., by selecting the right tech. & customisation level to minimise 'risk of regret' and optimising asset location

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- Network enables uptake of DER and ensures maximum utilisation (e.g., by ensuring the network readiness to aggregate DER at distribution network level)
- Optimised partnerships & tariff structure decisions and transparency for the regulator

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Context

- EE must be proactive in planning network investment to support the high customer growth expected in Endeavour patch (e.g., +50% # households to 2041, emerging C&I demand sources such as data centres; significant EV uptake driving need to upgrade the network)
- These decisions must be made with pace, while allowing for a range of uncertainties (e.g., increasing DER penetration, potential changes in regulation, EV charging behaviours etc)
- Suboptimal or untimely investment decisions may result in unnecessary capex spend, negatively impacting the network utilization and customer bills in the future.
- Regulators will need more transparency & fact-based reasoning to approve future CAPEX in the context of increasing volatility of demand from the grid

Scope¹

- Cycle 1: Understanding and visualisation of current state network (e.g., performance, CO₂ impacts, and constraints)
- Cycle 2: Simulation of future states with a scenario cockpit (e.g., network demand, DER scenarios, utilisation, and capacity); and ability to introduce interventions with a strategic cockpit (e.g., network augmentation, network topology, EV charging locations & behaviours, batteries, microgrids, tariff structures, investment constructs. Impact outputs incl. util., capacity, economics, CO₂)
- [Optional Cycle 3] Interactive regulator tool to facilitate regulator discussions/audits (e.g., regulator able to use it to audit) & interactive customer heat map as entry point for CIC & augmentations process.
- [Optional Cycle 4] Network optimisation engine to generate best set of interventions

Key data & analytics capabilities required

Visualisatio self-service	n & Dynamic analytics self-servi	visualisations for internal use (on current network rs) and external use (for regulator interaction), incl. ce analytics capability for simple scenario analysis
Simulation	modelling Model co (e.g., tari	mplex scenarios and interventions with multiple inputs if structures, customer behaviour, DER penetration))
[Optional] O engine mod	ptimisation elling Engine to configura reliability	generate best set of interventions/optimal network tion based on user-defined objectives (e.g., based on hosting capacity, etc.)
Data ingest storage	on & Internal s satellite c	ource systems (e.g. ADMS) and external data sets (e.g., ata). Inc alignment with technology strategy architecture.
	Critical Data	Domains
	Asset Management	Customer
	Construction	Governance, risk & compliance

1. 'LV and BTM visibility, simulation & control initiative' is a critical pre-requisite of this initiative. They must be implemented in tandem to realise the full suite of benefits associated with both initiatives.';



Charter | LV and behind-the-meter visibility, simulation and control

The why

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- Network able to operate reliably under high DER penetration whilst ensuring maximum possible utilisation of DER and respective customer value (incl. CO₂ impact)
- Improved speed for customers faster and less constrained DER connection process, faster fault recognition and prioritised fault response considering DER impacts
- Avoided risk of power quality issues and equipment constraint violations for customers e.g., defective situations, overloads, imbalances, inversion power flows, or voltage violations

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- Network losses reduction using digital twin to identify non-technical losses and optimise equipment configuration for technical loss reduction) both financial and CO₂ impact
- Inputs for Next-Gen Network planning. avoided CAPEX that would otherwise be required for connections & grid capacity upgrades

Context

- In the future, EE must operate a network which supports customers increasing their DER & flexible Behind-the-meter assets, with an anticipated 2-3x growth in solar PV MW capacity (up to 60% household penetration) and significant EV growth by 2031 (up to 30% household penetration)
- DER management and smart grid deployment can save up to ~20% of Capex for interconnection & grid capacity upgrades. E.g., Smart EV charging to reduce its contribution to peak demand
- To maximise customer value and enable excess solar generation export to the grid, EE must proactively manage network impacts via DER orchestration and management. Market research in Europe shows >90% of consumers would opt for flexible grid and energy solutions if it reduces their energy cost

Scope

Advanced LV Planning & State Estimation and Dynamic Voltage Management System; and DER Management System & enable flexible export offer to customers:

- Dashboard, geographical and single line view to monitor live network state capacity, utilisation, power flows, undervoltage, KPIs, reporting, etc. for LV and behind-the-meter assets (incl. notifications & alerts)
- User interface (UI) and Digital Twin to run power flows and scenario simulations in LV grid. Including simulation of new DER connections, activation of flexibility resources, and increased deployment of load & generation (outputs incl. constraints and losses)
- UI to interact with and control network assets & 3rd party smart devices remotely to flatten daily demand curve, avoid peak overloads, & improve capacity utilisation

Key data & analytics capabilities required

Visualisation & self-service analytics	Dynamic visualisations for i parameters) and external us self-service analytics capab	nternal use (on current network se (for regulator interaction), incl. ility for simple scenario analysis
Simulation modelling	For more complex scenario (incl Digital Twin)	testing based on detailed modelling
Data alerts & notifications	To provide alerts of key and power flows	omalies e.g., under-voltage, abnormal
Data ingestion & storage	From internal source system data sets (e.g., smart meter strategy architecture.	ns (e.g. ADMS & SCADA) and external r data). Inc alignment with technology
Criti	cal Data Domains	
Asset Managemen	t Customer	Governance, risk & compliance
Operate grid in real tir	me ⁵ Maintenance	



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Charter | Vegetation management

The why

- Improved customer experience due to fewer outages caused by vegetation ٠
- Health, safety environment and bushfire risk reduction by focusing investment on the management of priority vegetation areas ٠
- Sustainable reduction in Opex in parallel with reducing CO2 impact from vegetation management activities

Benefit unlock dependant on proactive management of Poles & Wires/Vegetation

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Initiative overview and context -

Context

- Spend on vegetation management is the ٠ largest OPEX line item in network spend
- Climate change is increasing the risk of ٠ bushfires globally, resulting in increased network and public safety risk
- Industry leaders globally have ٠ significantly reduced spend, CO2 impact and risk for the network, by leveraging LiDAR/satellite data, predictive analytics and data-driven schedule optimization to avoid unnecessary tree cutting and field visits
- Current work underway on map structure • enhancement for schedule and treatment management based on individual risk and deployment of vehicle mounted LiDAR for reduced flight usage

Scope

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- Digital network twin for vegetation analytics (LiDAR data processing and clearance identification)
- Predictive models for vegetation growth • and tree fall probability (inc. process for model training)
- Span based Inspection optimisation and • bundlina
- Consequence modelling for bushfire risk (using phoenix models)
- Scenario modelling and optimisation • engine vegetation treatment (cut vs. trim, replace/remove etc.)
- Integration into procurement workflow, ٠ contractor systems, payments and work status

Key data & analytics capabilities required

Visualisation & self-service analytics	Visualise geo-referenced digital twin of the overhe vegetation and allow for business analysis based pre-defined parameters	ad assets and on
Machine Learning	Machine learning capabilities for model optimisation, le	arning and training
Simulation modelling	Perform advanced analysis on probability and cor (e.g. tree fall probability)	sequence failures
Predictive analytics	Design and build of predictive models for specific (required tooling and technology)	time periods
Optimisation engine	Code development of asset and inspections optim (e.g. through Python code)	isation engine
Geospatial Analysis	Ingestion of LiDAR/LiCAR and GIS data for asset descriptive analysis & consequence models	specific
Data ingestion & storage	Internal source systems (e.g. ADMS), external da graphical data (e.g. photos, LiDAR processing, Li alignment to technology strategy.	ta sets and CAR inputs). Inc
Crit	tical Data Domains	
Asset Manageme	ent Customer Service Proc	urement

Workforce Management

Customer Service Maintenance



Charter | End to end work delivery management

Benefits

- Improved customer experience due to reduced re-visits and power outages, reduction of power restoration time
- Freed up field force capacity and offset of contractor costs in CAPEX
- Improved balancing of supply and demand across months, depos, and work groups

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- Frequency of outages reduced through improved job planning, bundling, and avoided maintenance
- · Improved job planning efficiency, mix, and allocation to enable 'start and finish on site' (SAFOS) and thereby decrease travel time and increase time on tools.

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Context

- Endeavour has existing solutions in place for scheduling, dispatching, and handheld on-site work mgmt.
- There is potential to improve E2E work management with greater visibility and forward work planning to get the right mix and amount for work groups, enable schedulers to fill up a full day of work during scheduling.
- Optimising E2E work management will reduce costs and improve our customer experience via avoiding re-visits to the same locations and repeated power outages

Scope

- Digital Works Planning & SAFOS:
 - Planning / scenario module to draft plans (up to 1 year ahead) and change plan (from 1 year ahead by month), to balance supply & demand ('fill up a full day of work'), efficiently bundle work orders, identify and account for work order/tasks dependencies/ precedents (e.g., with inspections), identify job impacts (e.g., ROL roads, commercial customers, schools, OT required work)
 - Analytics/optimisation engine to assist with schedule optimisation (e.g., support work bundling)
- Existing mobile application linked with logistics and maintenance forms and data (e.g., link job, bill of materials, and truck replenishment data)
- Dashboards of current plan (incl. potential scenarios and metrics e.g., productivity, time on tools)

Key data & analytics capabilities required

Visualisation & self-service analytics	View schedules & plans by work order, work group, work order type, status, etc. via a dynamic tool with functionality to manually adjust								
Simulation modelling	Model impacts of various scenarios and plans (e.g., total utilisation, time on tools etc.)								
Optimisation engine	Optimise scheduling to meet a customisable set of parameters (e.g., optimise work mix to maximise time on tools and make use of SAFOS)								
Operational reporting dashboards	Report and visualise field force productivity, utilisation, time on tools, etc.								
Data ingestion & storage	Internal source systems (e.g., SAI strategy architecture.). Inc alignment with technology							
Crit	ical Data Domains								
Asset Mgmt.	Customer Service	Human resources							
Workforce Mgm	. Maintenance	Supply chain							



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Charter | Customer Connection – speed and self service

Benefits

- Improve customer experience for connecting customers by improving speed and ease for new connections, while avoiding unnecessary spend and enabling DER uptake
- Reduce effort spent on administration, quotations, and other manual processes. Potential avoided cost in future (incl. in contact centre) considering asset relocation and future growth in connections & construction activity

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- Enable GIS use case if able to onboard ASPs to a digital platform
- Improved certainty and transparency on timing of new connections

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Initiative overview and context -

Context

- Customer growth in Endeavour Energy area will require us to drive large number of customer connections at speed, while managing the costs and providing positive experience
- Taking a step to improve the connection experience, Endeavour is digitising paper forms into smart PDFs, using the PEGA platform for digital customer interactions
- The PEGA platform (which has replaced CAMS) is currently used for customer complaints, with intent to leverage it in future for other customer touchpoints (e.g., via initial workshopping with the connections team)

Build interactive customer portal to automate/digitise workflows & increase connection speed:

Scope

- Automate and provide on-demand connections assessments (e.g., via customer/load and solar constraints heat map), enabled by 'Next-gen network planning' and 'LV & BTM' use cases (e.g., to understand future potential demand & simulate new load & DER capacity calculations)
- Provide customers /ASPs with automated connection status notifications
- Provide real-time quotation with AI and automate ANS/ACS field bookings / outage bookings
- Neara-ASP interaction (e.g., ability to export Neara network data to support ASP design, and use Neara to automate design compliance checks)

Key data & analytics capabilities required

Customer servic	e Workforce r	mgmt. Workforce management								
Crit	ical Data Domains									
Data ingestion & storage	Data ingestion from exis	isting data sources								
Alerts & notifications	Automated alerts and no and status updates	otifications to provide customers feedbac								
Machine learning Algorithm to automatically generate real-time quotes										
Digital Twin	Digital twin to simulate r support connections pro ingestion and validation	new load & DER capacity implications, to ocess. Digital Twin for electrical designs								
Visualisation & self-service	Dynamic visualisation and self-service tool for ASPs/customers to access (e.g., to extract data to support ASP design), & to digitise/automate current manual processes									



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Governance and analytics

capabilities

Target state Data analytics capabilities area a combination of foundational capabilities and use case enabling capabilities

Foundational capabilities

- Data capabilities that are necessary for the delivery of the data strategy (use case agnostic)
- Centralised management and governance

Use case enabling capabilities

- Data capabilities that are necessary to enable the delivery of enterprise specific use cases
- Central or decentral management (use case dependant)

Core systems

 Out of scope of the data strategy for development however critical dependency for delivery of use cases

Data Analytics capability reference model



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4 uplifts required to deliver the target state data analytics capabilities; delivered through developed inititiaves

Target state uplifts required

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- Establishment of enterprise data governance and management capabilities (inc. tooling and processes) to improve the quality, integrity and coverage of data required to deliver use cases and support critical business operations.
- 2 Development of advanced analytical capabilities (e.g. optimisation engines, simulation models etc.) and methods to build internal analytics culture, drive sustained delivery of high value use cases and enable trust in critical business decisions.
- 3 Operationalisation of enterprise source of truth for high quality data (supported through consistent data architecture, skills and tools) and uplift of business self-service data access & analytics.²
 - **Development of a Data Exchange Hub to connect, share and integrate data** across business functions and with external partners. Critical to delivery is the technology enhancement of DataOps capabilities and appropriate security guardrails for protection of data.²

Data Analytics capability current state assessment¹

1 Data gov. 2 Data Data 4 Sec & Data Analytics and Consumption exchange mgmt Ops Data Analysis Data Modelling & Optimisation Compliance Data Internal Visulation Predictive analytics Op. Geospati delivery & Optimis Data APIs & Self-Digital alerts & Regulatory reporting al Simulat Statistic ation support service Twin ML Master notifcation Analytics dashboard engine ion al mgmt analytics data Sec-External mgmt DevOps APIs Data **Data Domains** profiling Identity & Access Workforce Supply Asset Mgmt Construction Maintenance Procurement API Mgmt Chain Data Customer Security Data protection Service lineage **Business** Governance. Operate grid Human Information dev. & New Finance risk & technology in real time resources Ref. data Network Technology compliance mamt protection Data 3 modelling Data Distribution, Integration & Storage Event API mgmt Monitoring Data Batch Stream Operational Data File storage GIS ingestion Behavior processing processing data store warehouse analytics Data quality Messaging/events & Time series mgmt Data Data Blob storage Data lake exploration data base virtulisation Threat queing Metadata protection API mgmt Portal Core systems Data Cloud Other catalogue Regulator GIS (GNET MES/MSA loT security corporate / SAP ERP CRM ADMS Historian third party & ESRI) TS (ISU) bespoke Integration data sets Doesn't exist Requires material improvement Opportunity for improvement Fit for purpose Not assessed



Governance and analytics capabilities

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Capability uplifts will be supported by implementation of target state data architecture through Technology strategy

Governance and analytics capabilities





Security & Authentication Managers: User access/roles, test/production data management – data masking & encryption



6 initiatives identified to deliver accessibility, trust and insight to actions capabilities to the enterprise

Detailed charters developed for initiative groups

Initiative Category	Outcome	Initiatives	Deliverables	Supports enablement of the 4 mind set shifts
Enhance our collection of data	Use case driven trainin business outcomes.	g and change management to collect e	essential data and understand its associated value to	
Increase accessibility of our data	Business and external data is readily available to support use case delivery, analytics and reporting	Set up the architecture, skills and tools for consistent and self-service access to data Connect and share data across business functions and with external business partners	 Enterprise data storage and visualisation tools deployed Always up-to-date data catalogue Employee self-service reporting Business training and enablement Data exchange hub (internal and external users) Data access/exchange agreements with external parties 	Useful data (delivered via trainings at individual use case level)
Improve trust in our data	Improve the quality, integrity and coverage of data required to deliver use cases	Improve quality and coverage of data by establishing and operationalising data governance capabilities Develop integrity and transparency of data within the organisation through data ownership accountability and data management tooling	 Data governance policies Effective data governance forums Data quality management (KPIs and guardrails) Ownership and accountabilities for data domains Enterprise data model, definitions and data flows Data governance and lifecycle management tooling 	Accessible data
Improve usability	Equip the business with advanced analytical tools and capability to improve	Establish advanced analytics practice and methods (inc. upskilling and recruitment)	 Advanced analytics Centre of Excellence & methods Analytics training and recruitment program 	
of our data	efficiency and effectiveness of decisions	Establish and scale advanced analytical technologies and tooling (aligned to use case delivery)	 Advanced analytics architecture and tooling Data architecture development (join with technology) 	Insight to action



Charter | Increase accessibility of our data

The why

- · Break down of siloed sets of data and provide self service access to data (through data catalogue)
- Easily and securely share data within the organisation and external parties as required
- Enable advanced analytics with integrated data sets (e.g. correlation)
- Develop reusable data storage components for use case delivery and ongoing data activities (e.g. data sources of truth, self service data access and enhanced visualisation)

Context & Scope

- Increasing the accessibility of our data is a foundational requirement for the delivery of our data strategy. Enabling sources of truth and seamless access to data when it is required, not when it is ready.
- High level assessment identified current state challenges with the ability to share data cross the organisation and meet regulatory open data requirements. Additionally siloed data is stored in multiple locations and supported by legacy systems with minimal integration for insight identification.

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 Current state capability assessment identified limited capability and technology for effective data storage and sharing. Technology exists within the organisation however is either in a proof of concept or not implemented effectively within the organisation.

Improving trust in our data will be delivered through two initiatives.

Initiative

Set up the culture, skills and tools for consistent and self-service access to data

Connect and share data across business functions and with external business partners

Deliverables

- · Implementation of enterprise data storage
- Implementation of data catalogue
- Deployment of enhanced visualisation tools (guided by use case)
- · Employee self service reporting and increased capability
- Operationalised data exchange hub (internal & external)
- Implementation of data access and exchange agreements and integration
 with external parties

Key activities

- Mobilisation/Procurement
- Data storage enhancement
- Data catalogue implementation
- Data visualisation enhancement & self-service
- Data exchange hub operationalisation (internal)
- Data exchange hub operationalisation (external)

Data Capabilities³

Target state data capability uplift focused on Data distribution, integration & storage and Data Exchange





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Charter | Improve trust in our data

The why

- · Increased organisation confidence and reduced friction in using data for decision making and external reporting
- Increase consistency and transparency of data being used across the organisation
- Reusable components for use case delivery and ongoing data activities (i.e. data domains, ownership and attributes)

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Context & Scope

- Improving trust in our data through robust Data Governance is a foundational requirement for the delivery of our data strategy.
- High level assessment identified current state challenges with the business in the trust and quality of data and numerous reporting inconsistencies.
- Data is often manually stitched together from disparate sources through one-off activities that are often not repeatable.
- Current state capability assessment identified limited capability and technology to support Data Governance and Data Management activities within the organisation.

Improving trust in our data will be delivered through two initiatives.

Initiative

Improve quality and coverage of data by establishing and operationalising data governance capabilities

Develop integrity and transparency of data within the organisation through data ownership accountability and data management tooling

Deliverables

- · Establishment of data governance bodies and roles
- Development and implementation of enterprise policies
- Design data quality metrics (inc. tracking and reporting)
- Ownership and accountabilities for data domains (inc. detailed development of data domains, families, objects and attributes)
- Develop enterprise data model, definitions and data flows
- Implementation of data governance tooling for data hygiene and advanced data management (Master Data Management)

Key activities

- Mobilisation/Procurement
- Governance bodies and data roles
- Enterprise data policies
- Data quality measurement and tracking
- Data domains and ownership & data model development to support
- Master data management

Data Capabilities³

Target state data capability uplift focused on Data Management and Data Governance capabilities





Charter | Enable action to insight

The why

- Consistent approach for advanced analytics will build reusable components that can accelerate use case delivery (e.g. consequence model logic)
- Reduced risk of over reliance on external resources for advanced analytics through internal knowledge build and culture development

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• Efficient use of scarce resources and in-demand technical skills & knowledge for the organisation through CoE

Context & Scope

- High level assessment identified current state challenges in the deployment and utilisation of advanced analytics. Limited capability available for the analysis of unstructured, high-volume and real time data using advanced analytical techniques (e.g. machine learning). There is a need to move away from generic, judgement-based planning to granular fact-based decision underpinned.
- Advanced analytics is focused forward looking analytics that creates incremental value for the organisation and will be used to specifically support delivery of use cases (i.e., predictive analytics, simulation models, scenario models etc.).
- Advanced analytics will be achieved by building technical capability through training, hiring and resourcing and, implementing a consistent technology stack (i.e., tools, methodologies, algorithms etc.)
 Deliver advanced analytics will be achieved through two initiatives.

Initiative

Establish advanced analytics practice and methods (inc. upskilling and recruitment)

Establish and scale advanced analytical technologies and tooling (aligned to use case delivery)

Deliverables

- Implementation of Advanced Analytics CoE for consistent methods and practices (e.g. programming languages for specific analysis)
- Development of an analytical training and recruitment program
- Definition of architecture for advanced analytics (inc. use case delivery requirements assessment)
- Implementation of enterprise tooling for advanced analytics and use case delivery (e.g. Azure / SAP analytics cloud)

Key activities

- Advanced analytics CoE (inc. knowledge transition from use cases, training development & change management)
- Advanced analytics architecture (inc. technology requirements) & use case assessments
- Use case delivery (through advanced analytical tools, Azure & SAP analytics cloud etc.)

Data Capabilities³

 Target state data capability uplift focused on Data analytics & consumption layer





3. Delivery roadmap



Execution of use cases will be informed by key operational and organisational constraints 0

Critical systems constraints that temporarily delay new capability deployments (e.g., SAP code freeze)



Staffing capacity, incl. specialist analytics skills, headcount limits, SMEs available to support initiatives



Budget limitations, including tooling and systems required to realise the benefits



Ability to absorb operational changes from multiple, concurrent projects (e.g., avail. of SMEs, field force safety)



Long implementation time for some initiatives might limit the number of in-flight initiatives, impose dependencies between initiatives



Use cases will be delivered over the next ~7 years incorporating existing activity and identified high value use cases

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18		>5 Y
ONext gen network planning	Procurem vendor on	ient & iboarding	Cycle 1 &	2: Build and	roll out		Cycle 3 & 4	: Build and ro	oll out		Additional Assets Dig	cycles (e.g. ital Twin)	Community	Resilience	Climate modellin	Threat ng	Uplift cycle (i.e. furthe	es for Next G r enhancem	Sen ents)	
OLV and Behind the meter		Low Vo	oltage pilot	Addition assess	al scope (sm nent, etc)	art data, Ioa	d Advanced and Dyna	d LV Planning mic voltage r	g & State Est managemen	timation It system	DERMS ph customers	ase 1 and F	lexible expo	ort offer to	Communi	ty Battery x	MWh		DERMS roll out phase 2	
Network switching automation and self healing	Fault Loca Restoratio	ation Isolatio	on and Servic	ce																
Vegetation Management	MVP for Li clustering) (inc. data e	iDAR flight, [and build of enablement	Digital Twin (in f consequence by tech team)	c. map models	Refine MVP, b optimisation n e.g. growth)	build internal nodules and	models, predictive mo	dels												
Asset Management							Asset mgm dashboard	t Focus and W	on optimisa /ires	ation of Poles	Asset man platform fo	agement pe r additional (rformance classes	Test and r next asset	efine and roll class	out for	Test and re next asset	efine and roll class	out for Test a	and refine and roll out asset class
Investment prioritisation	CopperLea data & ins	af uplift pro	gram (inc. val ed for enhanc	lidation of ed reporting)																
End to end works delivery	P1: Digital	Works Plann	ning & SAFOS	P2: Truck	stock, mainten ent and depot	ance forms, o operationalisa	change ation	P3: Major I	Event Respo	onse MVP	P4: Major E	Event Respo	nse	P5: Delive	r to Site					
Safety data capture insights	Safety, Haz Speeding d	zards, lashboards	Integrated Systems (Safety Mana SMS) phase	igement 1		Integrated S	SMS phase 2			Safety Prec	liction								
Physical network data capture, digital twin/simulation, design & GIS capture insights	Continued across net	l with mobil twork	ity and enable	ement of Digi	tal Twin	GIS cont Improver	nection Data ments		Image Al	I Analytics	Drone Ins	pections			Drone En Assistanc	nergency Re ce	esponse & Ro	obotic	Drone Emerger Response & Robotic Assistance	ю
Oustomer—Connection speed & self service	Pega digit Digital Ser platform D	al forms (rvice SP)		System r and proc automati	eplacement ess on		Integration network pla E2E works	with next ge anning and delivery	n		ASP to PE	GA Mesh wit	th NEARA							
Customer—Planned Outage management						GIS conn (inc. custo and data	ection Data Im omer data moo flow)	nprovements del design							Planned O	utage Analy	rtics and Digit	talisation		
Customer - Fault response ETA and insights (unplanned)	el										Custon calls pl	ner data inpu notos, videos	ut (fault s etc.)			Fault cau feedback customer	use c to rs		Fault Response ETR Improvemen	nts
Sustainability impact modelling and reporting	high-lev roval		Implemen models ar	tation of sust id new report	ainability and ing	analytics														
Digital procurement	and app			P1·		P2.		P3 [.]		P4·		P5.			Reporting		Continued		Continued	
HR data and reporting	egy case			Reporting build and		Reporting build and		Reporting build and		Reporting build and		Reporting build and			analytics uplift (e.g.		Reporting		Reporting analytics	
Financial planning and reporting	Data strat			deliver		deliver		deliver		deliver		deliver			Al spend cube)		uplift		uplift	

