

# Modernising Ausgrid's Operational Control System

NOTICE ON SCREENING FOR NON-NETWORK OPTIONS REPORT

MAY 2018



# Modernising Ausgrid’s Control System Environment

Notice on screening for non-network options – May 2018

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## Disclaimer

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# 1 Introduction

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This notice has been prepared under cl. 5.17.4(d) of the NER and summarises Ausgrid's determination that no non-network option is, or forms a significant part of, any potential credible option for this RIT-D related to the replacement of Ausgrid's operational technology systems with an Advanced Distribution Management System (ADMS). In particular, it sets out the reasons for Ausgrid's determination, including the methodologies and assumptions used.

Ausgrid's operational technology (OT) systems include the existing Distribution Network Management System (DNMS), Outage Management System (OMS), and a range of supporting legacy applications. These are in need of replacement with a modern Advanced Distribution Management System (ADMS) in order to meet Ausgrid's license conditions and to address the issue of vendor support going forwards.

Ausgrid's current DNMS is a bespoke vendor and in-house developed hybrid system dating from the 1990s. It incorporates network Supervisory Control and Data Acquisition (SCADA) and visualisation components. The product is obsolete, with limited support, no roadmap for development and limited knowledge of the underlying software code. This is likely to result in difficulties in resolving data & functionality issues when they arise.

It also lacks the functionality required to deliver the operational management in a modern utility environment, a critical shortcoming considering the need to have the flexibility and sophistication to respond to the significant advances in industry benchmarks enabled by more recent technology. The current system is unable to make the transition to deliver support for the core functions required by modern distribution utilities.

An ADMS provides an integrated set of tools to remotely monitor and control the network, manage system outages, improve planned and emergency event management, optimise power-flow management and provide fault location analysis, fault isolation and restoration capabilities. It is a key enabling tool for the integration of distributed energy resources and network optimisation capabilities. An ADMS enables digitised field operations to streamline day-to-day management of the network, including intelligent field crew dispatch. It is a platform to integrate core, ancillary network and corporate systems to deliver best practice asset management.

This system will reduce the risks associated with the existing systems and enable Ausgrid to take advantage of future industry and technological developments in order to better serve its customers and stakeholders. The replacement of the existing system with an ADMS will, over time, permit the rationalisation and integration of a number of legacy ancillary systems which support operations, planning and design. This will lead to more efficient and effective processes, service improvement and reduction in future expenditure requirements.

An ADMS is a necessary platform for delivering the services expected by customers and stakeholders in a rapidly changing industry, with increasing levels of distributed generation, customer engagement and the need to keep downward pressure on energy prices. The ability to support and integrate new generation, storage and network technologies is a driving need to have a modern and adaptive control system.

Since early-2017, Ausgrid has been planning to replace components of its current control system infrastructure and has already undertaken a significant pre-implementation phase. This process has narrowed down two suitable vendors who are currently in the process of submitting final offers. Ausgrid is now seeking to select an experienced and dynamic vendor, capable of working with Ausgrid as it transforms its Operational Technology (OT) environment, utilising proven, current and adaptable, ADMS capable of providing required services throughout the contract term. Ausgrid expects that a preferred vendor will be identified in June 2018.

Rule changes to the National Electricity Rules (NER) in July 2017 have meant that the replacement plan for the existing OT systems is now subject to a RIT-D. Accordingly, Ausgrid has initiated this RIT-D for replacing the identified OT Control Systems in order to investigate and consult on options to ensure Ausgrid is able to satisfy the reliability and performance standards that it is obliged to meet (and for which the OT systems covered by this RIT-D are crucial to providing).

Under the new rules, this type of replacement expenditure is now subject to a RIT-D, however we note that there are no feasible non-network solutions for this system. Investment efficiency is achieved through a competitive proposal and tender process for an ADMS. This was discussed at the recent AER Public Forum on the RIT-T and RIT-D and we understand the issue of applying the RIT-D (and RIT-T) to these types of programs is being considered as part of the AER updating its Application Guidelines.

More details on the identified need and options considered for this RIT-D can be found in the Draft Project Assessment Report (DPAR) which will be published on the Ausgrid website and written submissions in response to the DPAR are due on or before 6 weeks from the date of publication.

## 2 Identified need and credible options

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### 2.1 Identified need

The identified need to replace the existing systems is predicated on two key assumptions/facts – namely:

- Ausgrid’s distributor license conditions that set out sets out requirements that Ausgrid is obligated to meet; and
- availability of long term support and Vendor roadmap for Ausgrid’s existing DNMS going forward.

Each of these are discussed in detail below.

#### 2.1.1 Ausgrid’s distributor licence conditions

Ausgrid operates assets that constitute ‘critical infrastructure’ being those physical facilities, supply chains, information technologies and communications networks which, if destroyed, degraded or rendered unavailable for an extended period, would significantly impact on the security, social or economic wellbeing of NSW and other states and territories which are from time to time electrically interconnected.

Consequently, in recognition of the critical importance of the its network, Ausgrid’s distributor license imposed by the NSW government contains conditions with respect to OT infrastructure that obliges Ausgrid to certain conditions, including that it:<sup>1</sup>

*must, by using best industry practice for electricity network control systems, ensure that operation and control of its distribution system, including all associated ICT infrastructure, can be accessed, operated and controlled only from within Australia, and that its distribution system is not connected to any other infrastructure or network which could enable it to be controlled or operated by persons outside Australia.*

In practice, this condition imposes responsibility on Ausgrid to:<sup>2</sup>

- deliver the SCADA capability required to safely and reliably operate the distribution system;
- develop and implement strategies to manage cyber security and other threats affecting the network operational technology environment; and
- develop systems for effectively managing assets remotely, including but not limited to network switches, condition monitoring and remote interrogation or operation of protection systems and relays.

Ausgrid’s current DNMS was developed in the 1990s as a bespoke product customised to Ausgrid’s needs at the time. Since then, best industry practice has evolved as OT technologies advanced but Ausgrid’s DNMS has not. Core parts of the system have not been updated since its inception, preventing implementation of best practice security tooling and appropriate access management. Furthermore, modern OT systems provide capabilities to safely and reliably operate the distribution system manage cyber security and other threats and remotely manage assets more effectively and efficiently than Ausgrid’s DNMS.

Transitory arrangements for OT systems provide some accommodation for legacy systems such as Ausgrid’s DNMS, but transitory arrangements will eventually end as industry best practices standards are refreshed, which will cause Ausgrid to become non-compliant with best industry practice and its licensing conditions. It follows that there is an identified need to undertake action and invest in an ADMS to ensure future compliance with its distributor license conditions.

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<sup>1</sup> Ministerially imposed license conditions – Ausgrid to operate a distribution system, Condition 9.2(a). Available at: <https://www.ipart.nsw.gov.au/Home/Industries/Energy/Energy-Networks-Safety-Reliability-and-Compliance/Electricity-networks/Licence-Conditions-and-Regulatory-Instruments/Ministerially-imposed-licence-conditions-Ausgrid-to-operate-a-distribution-system>

<sup>2</sup> Condition 9.3

### **2.1.2 Availability of support for Ausgrid's existing DNMS**

The DNMS requires continued support from the current vendor to ensure the distribution network can be accessed, operated and controlled safely and reliably. Without vendor support, Ausgrid cannot guarantee it can operate its distribution network safely and reliably over time given the critical nature of OT in modern distribution systems.

The bespoke nature of this solution means that it is unable to meet ongoing requirements with regards to Ausgrid's critical infrastructure licence conditions. Condition 9 of Ausgrid's critical infrastructure licence conditions requires Ausgrid to follow best industry practice for its control system environment including appropriate vendor support, access and security (including cyber security) is aligned with industry best practice. The vendor supporting the current system has advised Ausgrid that they regard the DNMS as a legacy 'Beta' product and this places hard constraints on what can be achieved. Hence there are no expectations that the current DNMS can enable Ausgrid to continue to achieve full compliance as required by our obligations. The support model for the DNMS determines a practical end of life for the DNMS of 2021.

It follows that there is an identified need to undertake corrective action in the form of implementing a new ADMS to ensure Ausgrid's OT applications remain supportable and compliant with its distribution license conditions.

## **2.2 Credible options**

Ausgrid considers there to be only one credible option to address the identified business requirements within the identified timeframes. This option involves replacing Ausgrid's DNMS and other supporting legacy systems within the control system environment with a commercially available off the shelf ADMS product.

This option enables the simplification and modernisation of the Operational Technology and control system environment to comply with our regulatory obligations, including management of escalating cyber security threats to critical infrastructure as required by our distribution license conditions and anticipated federal legislative requirements.

Whilst our initial driver for an ADMS was to maintain the existing system and prepare for replacement, changes in recent years to customer expectations, product support, regulatory requirements and emerging security issues required a reassessment of the strategy. Critical risks emerged with the existing system, namely:

- low native cyber security capabilities to manage emerging threats and compliance with state and federal legislative requirements;
- significant risks for legacy software and hardware at end of life and without on-going vendor support; and
- limited ability to undertake enhancements to the DNMS to leverage and support the transformative changes in the electricity industry such as Distributed Energy Resources (DER), automation and smart metering.

The core features of a modern network management system to address these risks require an integrated application framework which runs with current operating systems and operates on vendor supported hardware. It should also utilise contemporary testing, maintenance and patching processes. The ADMS does this and will result in key benefits such as:

- a simplified and modernised Operational Technology environment to comply with regulatory obligations, including management of escalating cyber security threats to critical infrastructure as required by Ausgrid's distribution license conditions and anticipated federal legislative requirements;
- streamlined and standardised industry best practice processes;
- aligned data between corporate and operational systems to maximise operational and capital delivery efficiencies; and
- an adaptable platform with advanced capability to support the needs of a rapidly changing network and technology landscape as expected from customers.

This option involves the replacement and consolidation of current SCADA, DNMS, OMS, dispatch and scheduling systems into a new ADMS that integrates and performs the functions of the previous four broad systems. Associated implementation, integration, governance and reporting services will be required for successful delivery of the ADMS, with support and maintenance of the implemented systems over the longer term.

### 3 Assessment of non-network options

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Demand management as a non-network option targets reducing network peak demand and/or reducing the risk associated with unserved energy relating to the electricity supply to customers from a specific network asset (eg. zone substation, 11kV feeder). Non-network options can potentially change the electricity demand characteristics to allow cost-effective deferral or avoidance of network investments.

The identified need for this network investment is not related to electricity demand characteristics and is related to the modernisation of Ausgrid's current control system which is an operational technology platform. It is not reasonable to expect that non-network options can form part of a solution to address this need.

The modernisation of Ausgrid's control system with an ADMS has the potential to enable non-network options to be used more efficiently to address specific network investments in the future, particularly through the integration, optimisation and orchestration of distributed energy resources.

Going forward, Ausgrid considers that advanced forms of network system architecture will be employed to reengineer the overall system to incorporate the diversity of future connected equipment and to provide the platforms for effective customer interaction and orchestration of distributed energy resources. This was identified as a key finding in Electricity Network Transformation Roadmap developed in 2017 jointly between the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Energy Networks Australia (ENA).

In particular, the CSIRO and ENA Roadmap highlighted a number of examples where this is likely to occur in the near future<sup>3</sup>.

- Active network management – far greater levels of monitoring and control will be required to allow active management of the distribution network to meet its increasingly complex operational needs.
- Network visibility – all future scenarios investigated by CSIRO and the ENA indicate the involvement of third parties in a variety of roles interacting with the grid in real time, responding to price signals or operational incentives.

The CSIRO and ENA Roadmap outline a series of milestones that provide markers of progress over the coming decade toward a more resilient 2027 future state with milestones targeting Advanced Network Optimisation functions that introduce more sophisticated techniques for the utilisation and orchestration of distributed energy resources.

Ausgrid considers that implementing an ADMS is consistent with the key findings of the Electricity Network Transformation Roadmap. In particular, a key element of this roadmap is a pivot to a customer focused and intelligent network – enabled by advanced network management systems to facilitate a distributed energy resources market, network optimisation, and further real time communication and control.

### 4 Conclusion

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We consider that there are no feasible non-network options that would be able to address the need to retire and modernise the Ausgrid control system and determine that no non-network option is, or forms a significant part of, any potential credible option for this RIT-D.

Consequently, a Non-Network Options Report has not been prepared in accordance with rule 5.17.4(c) of the National Electricity Rules.

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<sup>3</sup> CSIRO and Energy Networks Australia 2017, *Electricity Network Transformation Roadmap*, Final Report, pp. 58-59 – available at: [http://www.energynetworks.com.au/sites/default/files/entr\\_final\\_report\\_web.pdf](http://www.energynetworks.com.au/sites/default/files/entr_final_report_web.pdf)



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