Customer Connectivity

Regulatory Business Case (RBC) 2024-29

PowerWater

Contents

1. Summary

This business case has been prepared to support the 2024-29 Regulatory Proposal. The business case demonstrates that Power and Water has undertaken appropriate analysis of the need and identified a full suite of credible options that will resolve the need, to ensure that Power and Water continues to meet the National Electricity Objectives and manage the network prudently and efficiently.

The proposed expenditure identified in this business case will undergo further assessment and scrutiny through Power and Water's normal governance processes prior to implementation and delivery.

This business case addresses issues identified with the accuracy and completeness of Power and Water's customer connectivity model which is essential for investment decision making and external compliance reporting.

1.1 Business need

Power and Water's customer connectivity model describes where and how customers are connected to the network. The data in the customer connectivity model is an essential source of information for asset and network investment decision-making, remediation of quality of supply issues, planned outage notifications, and regulatory reporting. The model covers both regulated and non-regulated networks, including minor centres and remote sites. This is to ensure completeness of the model as Power and Water seeks to improve whole of network management.

Power and Water's current connectivity model accuracy and completeness is approximately 85%, which is well below the level required to undertake the following functions effectively:

- Network Management, including emergency management and renewables management
- Asset management
- Compliance to regulatory reporting requirements and audits
- Improved customer and stakeholder communications
- Support of future distribution system operator functionality (LV visibility).
- Improve network data for improved project planning
- Improve planning relating to field device roll out
- Improved work order and scheduling asset location updates
- Audit requirements.

The issues with data quality apply to both regulated and non-regulated networks (with the latter including minor centres and remote sites).

1.2 Options analysis

The primary objective of the project is to rectify the sub-standard data quality of Power and Water's customer connectivity model.

The table below summarises the two options considered. The preferred option is to rectify the quality of the customer connectivity model in Power and Water's networks, including Indigenous Essential Services (IES)[1] networks.

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[1] Indigenous Essential Services is Power and Water's not-for-profit subsidiary, which supports 72 remote communities across the Territory

Table 1 Summary of credible options

Option	Option name	Description	Recommended
1	Do not improve the customer connectivity model	Retain current level of accuracy. Do not improve the quality of the data in the Customer Connectivity Model	No
2	Rectify quality of Customer Connectivity Model	The option involves a combination of desktop activities and field inspections to confirm network connection information	Yes

A cost-benefit analysis was not undertaken because the project is compliance-driven and the financial benefits are relatively small. This project seeks to rectify data omissions and inaccuracies in the customer connectivity model.

1.3 Recommendation

Option 2 (Rectify quality of customer connectivity model) is the recommended option at a total cost of ▓▓ ▓▓▓▓▓▓ al 2021/22) over five years, commencing in FY23 and concluding in FY27. The estimated cost in the current regulatory control period (RCP) is ▓▓▓▓▓▓▓, with the balance of ▓▓▓▓▓▓▓ to be incurred in the 2024-29 RCP (the 'next RCP').

This option strikes the appropriate balance between cost and risk and once completed in FY27 will render the customer connectivity model fit for purpose.

The estimated and forecast expenditure by regulatory period is outlined in Table 2.

Table 2: Estimated and forecast capital and operational expenditure – by regulatory period ($m, real 2021/22)

Item	Current regulatory period FY20 - FY24	Next regulatory period FY25 – FY29	Total
Capex	▓▓▓	▓▓▓	▓▓▓
Opex	0.00	0.00	0.00
Total	▓▓▓	▓▓▓	▓▓▓

The estimated and forecast expenditure by regulatory period that has been allocated to Standard Control Services as per the CAM is outlined in Table 3.

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Table 3: Estimated and forecast capital and operational expenditure – allocated to SCS ($m, real 2021/22)

Item	Current regulatory period FY20 - FY24	Next regulatory period FY25 – FY29	Total
Capex	■	■	■
Opex	■	■	■
Total	■	■	■

The estimated and forecast expenditure by regulatory period that has been allocated to recurrent and non-recurrent categories is outlined in Table 4.

Table 4: Estimated and forecast capital expenditure – recurrent and non-recurrent

Item	Current regulatory period FY20 - FY24	Next regulatory period FY25 – FY29
Recurrent	0.00	0.00
Non-recurrent	100%	100%

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2. Identified need

This section provides the background and context to this business case, identifies the issues that are posing increasing risks to Power and Water and its customers, describes the current mitigation program and its delivery status, and provides a risk assessment of the inherent risk if no investment is undertaken.

2.1 Incomplete connection data

2.1.1 Background

The Customer Connectivity Model includes data to identify where and how customers are connected to the network. This modelling is an essential source of information for asset and network investment decision-making, remediation of quality of supply issues, planned and unplanned outage notifications, and regulatory reporting.

The annual regulatory notices feedback from the external auditor has raised issues in relation to customer connectivity data improvements for the annual submission.[2] This coupled with network performance reporting requires improvement in order to reduce data errors as well as reducing manual intervention to either extract or manage data.

Power and Water's Customer Connectivity Model is only about 85% accurate/complete, which we understand to be well below peer organisations' levels, and which we estimate to be *at least* 10% lower than required for improved operational efficiency, reporting compliance and system planning especially with the current renewable penetration targets.

2.1.2 Impact of incomplete connection data

The current state of connection data means that that Power and Water:

- Cannot accurately report to the AER and the Utilities Commission – for example, customer numbers are an important parameter for network performance and reliability benchmarking indicators such as SAIDI/SAIFI[3]
- Cannot fully comply with Guaranteed Service Level (GSL) and annual reporting requirements – the requirements are specified in the Electricity Industry Performance Code (refer to Appendix C)[4]
- Cannot effectively manage supply interruptions (planned and unplanned) - missing data impacts Power and Water ability to communicate accurately with customers and stakeholders to keep them informed especially during outages. Further to this closely managing supply interruptions with critical or vulnerable customers is central to ensuring these customer groups have all the required notifications to make alternate arrangements when the time arises.
- Cannot efficiently analyse and address power quality issues

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[2] Refer to Appendix D
[3] SAIDI = System Average Interruption Duration Index; SAIFI = System Average Interruption Frequency Index, both of which are industry standard service quality metrics
[4] Where reliability targets in the Code are not met, Power and Water is required to compensate customers

- Cannot fully take advantage of the capabilities of the planned Outage Management System (OMS), Distribution Management System (DMS),[5] and Dynamic Operating Envelope (DOE)[6] initiatives that are planned to be implemented in the next RCP
- Cannot fully comply with Power and Water's market settlement requirements.

2.1.3   Types of missing/inaccurate connection data

In some cases the connection to the meter is not in the Connectivity Model (i.e. the customer is not visible in the Customer Connectivity Model, even though the customer has a meter with an NMI). Further, a missing connection means that the model does not include the phase to which the customer is connected and, where relevant, the cable route. All three sets of data directly impact safety, asset management, and operational productivity:

- Phase connection data is required for planning and operations – for example to help ensure line circuits are not overloaded[7]
- Accurate cable route information is also essential for safety via the Dial before You Dig (DBYD) and for efficient planning and operations more generally.

2.1.4   Estimated scale of the issue

Missing or incorrect information in embedded networks is related to the connection points which are designated by the customer meters that are behind the 'main meter'.

The table below outlines the current state of meter data, which shows that connection data (connection point, phase of connections, and cable routes, if applicable) for approximately 15,000 meter points (15% of the total meters in Power and Water's networks) is incomplete or inaccurate in the connectivity model.

Table 5 Estimated number of connection points with incomplete data

Assessment metrics	Total # connection points [1]	Estimated connection points with incomplete data
Orphan NMI's	119,201	15,000

[1] these are total meter numbers as the de facto count of connection points; the totals include three single phase meters used to meter three phase customers;

2.2 Risk assessment

The figure below shows the current risk rating, inherent rating in 2029 (if no proactive action is taken), and the residual risk ratings. The basis for the rankings is summarised below, with supporting information provided in Appendix B.

- **Current Rating** is 'Medium': it is 'likely' that the inaccuracy and incomplete state of the connectivity model will lead to a relatively 'minor' consequence (regulatory reporting breach; poor management of customer outage). The consequence is therefore likely to be 'Medium'.
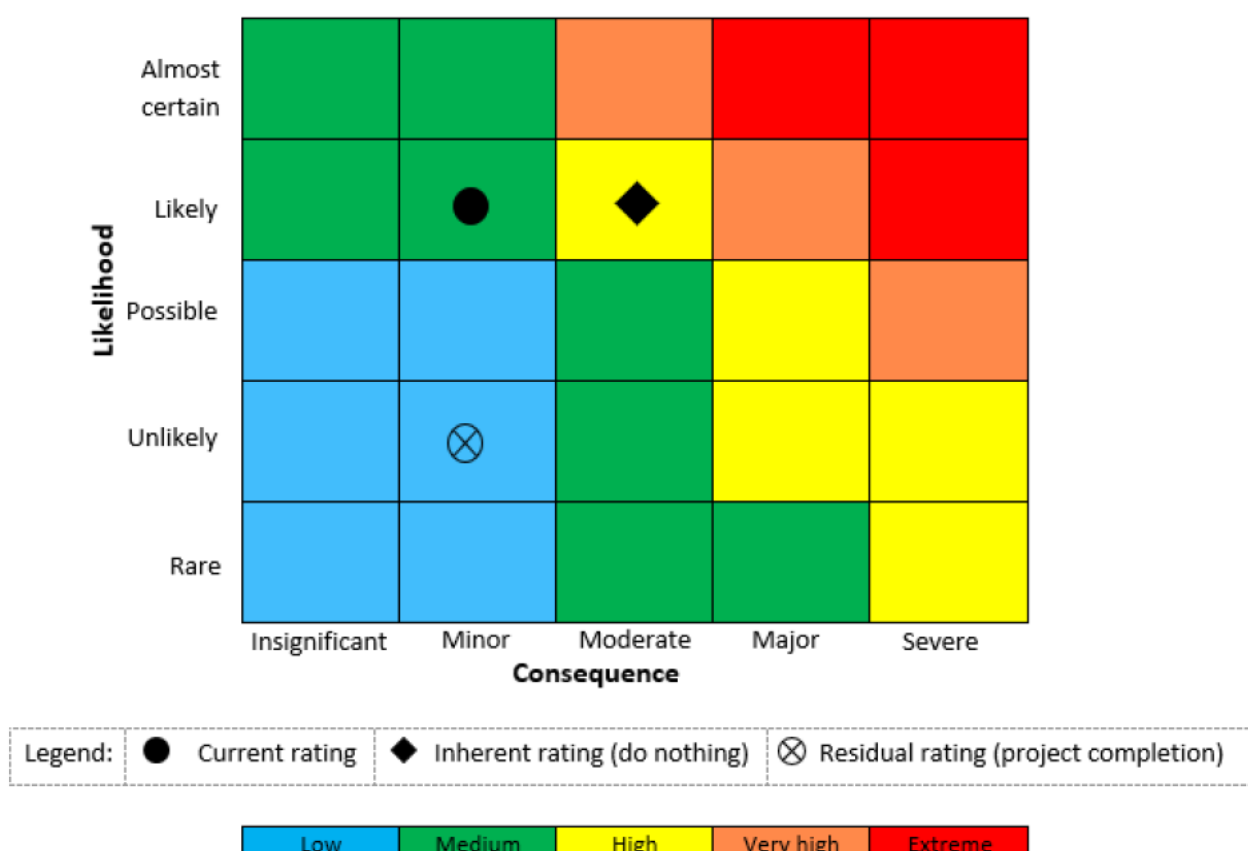
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[5] The upgraded OMS and new DMS capabilities are described in the OT Capability Uplift business case
[6] The DOE project is subject to a separate business case
[7] Single-phase customer connections can be swapped to an alternate phase to help maintain phase balance

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- **Inherent rating** is 'High': this rating is based on no remedial action being implemented over the course of the next RCP. This would be despite Power and Water, the Utilities Commission and the AER all being aware of the connectivity modelling data quality issues and would therefore represent Power and Water wilfully ignoring the commitment to address the issues. It is 'Likely' that in this case Power and Water's reputation will be diminished as a result of corrective action taken by the Utilities Commission due to the ongoing inaccurate reporting and/or the inaccurate data base leading to one or more moderate customer management impact(s). The consequence will initially be 'Minor' but will increase to 'Moderate' by the end of the next RCP, resulting in a 'High' risk rating.
- **Residual rating** is 'Low': the proposed project will improve meter customer connectivity data to better than 95% accuracy, enabling compliant reporting and more efficient and effective customer management. The likelihood of a compliance breach or more than a minor customer impact will be unlikely, resulting in an overall risk rating of 'Low'.

Figure 1: Risk matrix for customer connectivity model data issues

2.3 Summary

Power and Water's current connectivity model accuracy and completeness is approximately 85%, which is well below the level required to undertake the required business functions effectively and not fit for purpose. The issues are considered to represent a High risk.

The issues with data quality apply to both regulated and non-regulated networks (with the latter including minor centres and remote sites).

3. Options analysis

This section describes the various options that were analysed to address the identified need. The options are analysed based on ability to address the identified needs, commercial and technical feasibility, deliverability, benefits whilst seeking to strike an optimal balance between risk and cost.

3.1 Comparison of credible options

Credible options are identified as options that address the identified need, are technically feasible and can be implemented within the required timeframe. The following options have been identified:

- Option 1 – Do not improve the customer connectivity model.
- Option 2 – Rectify quality of Customer Connectivity model.

A comparison of the two identified credible options and the issues they address in the identified need is depicted in Table 6.

These options are described and assessed in detail in the sections below.

Table 6 Summary of options analysis outcomes ($m, real 2022)

Assessment metrics	Option 1	Option 2
NPV (total)	0.00	■
Capex (total)	0.00	■
Capex (next RCP)	0.00	■
BCR	n/a	■
Meets customer expectations	○	◕
Aligns with Asset Objectives	○	◔
Technical viability	○	◑
Deliverability	n/a	●
Preferred	✗	✓
Ranking	2	1

● Fully addresses the issue   ◕ Adequately addresses the issue   ◑ Partially addresses the issue   ○ Does not address the issue

n/a = not applicable (A cost-benefit analysis was not undertaken for this project as it is compliance-driven)

3.1.1 Option 1 – Do not improve the customer connectivity model

This option is premised on not accelerating the rectification of meter data quality issues within the Customer Connectivity Model. Data errors would instead be addressed on an ad hoc basis – typically when

they are identified as part of routine work. This approach is likely to leave significant data omissions/errors in the Model for many years and certainly well beyond the end of the next RCP in FY29.

The main risks associated with doing nothing are described in Section 2. The overall risk by the end of the next RCP is assessed to be 'High' because Power and Water:

- Would not have sought to proactively and promptly address the findings of both the Utilities Commission and the AER that Power and Water needs to improve connection data accuracy (and, in turn, performance reporting accuracy)
- Would be prolonging risks and inefficiencies associated with network management indefinitely.

The option does not align with customers' and stakeholders' expectations that Power and Water acts as a prudent network operator. Similarly, the option is not aligned with Power and Water's asset management, network management, and regulatory management obligations, objectives, and strategies.

This option is not recommended.

3.1.2   Option 2 – Rectify the quality of customer connectivity model

This option will result in increasing the accuracy of the meter-related connection data in Power and Water's Customer Connectivity Model in order to improve system planning or capacity accuracy. The option involves a combination of desktop activities and field inspections to confirm the network connection information.

The total cost of this option is estimated to be ▮▮▮▮▮▮▮▮ over five years, commencing in FY23 and concluding in FY27. The field inspection activities will be sequenced to capture data in the highest priority areas first to reduce risk as rapidly as practicable.

The advantages of this option are:

- Enables compliance with regulatory reporting (including GSL) obligations.
- Enables targeted planning and communications for planned outages.
- Provides greater visibility of the effects of planned and unplanned outages.
- Provides the ability to report on customer demand for services across the network at a more granular level and plan for enhancements.
- Provides system integration, workflows, and reporting to enable the ongoing management and manual update of integration exceptions.
- Enables the underlying data requirements for the proposed OMS and DMS projects.

The disadvantages of this option are (i) the cost, and (ii) it will take an estimated five years to complete the scope of work – but the work will be prioritised to reduce risk from missing data as rapidly as practicable.

This option is recommended.

3.2 Non-credible options

No non-credible options were identified.

4. Recommendation

Option 2 (Rectify the quality of the customer connectivity model) is recommended at a total project capital cost of ███████, commencing in FY23 with a target completion of FY27. An estimated ███ million is required in the next RCP.

This option strikes the appropriate balance between cost and risk and once completed in FY27 will render the customer connectivity model fit for purpose.

The proposed program is consistent with the National Electricity Rules Capital Expenditure Objectives as the expenditure is required to maintain the quality, reliability, and security of supply of standard control services and maintain the safety of the distribution system.

4.1 Strategic alignment

The "Power and Water Corporation Strategic Direction" is to meet the changing needs of the business, our customers and is aligned with the market and future economic conditions of the Northern Territory projected out to 2030. As shown in the table below, this business case is directly linked to three strategic focus areas.

Table 7 Strategic alignment

	Strategic direction focus area	Strategic direction priority
1	Customer and the community at the centre	Enhance Customer Experience and Engagement
2	Always Safe	Improve Public Health and Safety
3	Living within our means	Cost Prudency

4.2 Dependent Projects

No dependent projects have been identified.

4.3 Deliverability

This will be delivered by a combination of field inspection and in-office data management:

- Field inspection: Highest priority (Residential, UTS, Commercial, U/G supplies) then lower priority connections (e.g. parks, government customers), then IES customers
- Office-based:
  - RMS desktop address validation/updates
  - Create/update parent service points and service points more generally in GIS using desktop inspection/geo processing tool

Power and Water will partner with Power Services panel contractors in addition to internal resources:

- ICT will partner with a GIS specialist company to design the form to capture information as well as update the missing or incorrect data in ESRI (GIS mapping software)

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- Internal ICT resources will partner with established ICT contractors to update integration of Maximo (Asset Management system) and the Retail Management System (RMS).

More generally the delivery of this project will be a phased approach with the five year project lifecycle designed to provide appropriate sequencing with related projects and to help ensure adequate internal capacity. Any scheduling issues will be managed by Power and Water, with defined processes in place.

4.4 Stakeholder expectations

Power and Water have an obligation to provide a safe and reliable power network, improving the network data will benefit its customers by delivering safe and continued power. Accessible, accurate information is paramount to the safety of customers. Accurate identification of customer connections will:

- Enable Power and Water to more efficiently and effectively assess the impacts and corrective steps associated with planned outages, faults, or other network events
- Enable Power and Water to notify customers more effectively and efficiently.

4.5 Expenditure profile

The tables below show a summary of the expenditure requirements for the current regulatory period and next regulatory period.

Table 8 Estimated annual capital and operational expenditure – current regulatory period ($'000, real 2021/22)

Item	FY20	FY21	FY22	FY23	FY24	Total
Capex				■	■	■
Opex				-	-	-
Total	n/a	n/a	n/a	■	■	■

Table 9 Forecast annual capital and operational expenditure – next regulatory period ($'000, real 2021/22)

Item	FY25	FY26	FY27	FY28	FY29	Total
Capex	■	■	■	-	-	■
Opex	-	-	-	-	-	-
Total	■	■	■	-	-	■

The tables below show a summary of the expenditure requirements for the current regulatory period and next regulatory period, allocated to Standard Control Services as per the CAM.

Table 10 Estimated annual capital and operational expenditure – current regulatory period – allocated to SCS ($'000, real 2021/22)

Item	FY20	FY21	FY22	FY23	FY24	Total
Capex				■	■	■
Opex				-	-	-
Total	n/a	n/a	n/a	■	■	■

Table 11 Forecast annual capital and operational expenditure – next regulatory period – allocated to SCS ($'000, real 2021/22)

Item	FY25	FY26	FY27	FY28	FY29	Total
Capex	■	■	■	-	-	■
Opex	-	-	-	-	-	-
Total	■	■	■	-	-	■

The tables below show a summary of the expenditure requirements for the current regulatory period and next regulatory period, allocated to recurrent and non-recurrent categories.

Table 12 Estimated annual capital expenditure – current regulatory period – recurrent and non-recurrent

Item	FY20	FY21	FY22	FY23	FY24
Recurrent				-	-
Non-recurrent				100%	100%

Table 13 Forecast annual capital expenditure – next regulatory period – recurrent and non-recurrent

Item	FY25	FY26	FY27	FY28	FY29
Recurrent	-	-	-	-	-
Non-recurrent	100%	100%	100%	-	-

4.6 High-level scope

The project will be delivered by a combination of field inspection and in-office data management:

- Field inspection: inspect the highest priority, then lower priority connections to capture meter connection data, phasing, and cable route data (using cable detectors), as appropriate[8]
- Office-based activities: RMS desktop address validation/updates, create/update parent service points and service points more generally in Maximo and GIS using desktop inspection/geo processing tool.

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[8] Not all connections are underground

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Appendix A.   Cost estimation

Power and Water used past projects of similar size as the basis to extrapolate for the cost estimate.

Table 14 Cost estimate ($k, real 2022)

Resource Type/Role	FY23	FY24	FY25	FY26	FY27	FY28	FY29	Total (Next RCP)	Total
Project Manager	■	■	■	■	■	▮	▮	■	■
ICT Contractors GIS/Maximo/RMS	■	■	■	■	■	▮	▮	■	■
Power Services GIS Team	■	■	■	■	■	▮	▮	■	■
GIS Specialist	■	■	■	■	■	▮	▮	■	■
Total	■	■	■	■	■	▮	▮	■	■

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Appendix B.   Risk analysis

Table 15 Risk analysis

Risk description	Current risk rating			Treatment	Residual risk rating		
	Likelihood	Consequence	Rating		Likelihood	Consequence	Rating
Inaccurate regulatory reporting	Almost certain	Minor	Medium		Rare	Minor	Low
Distributed Energy Resources (DER) future management	Likely	Minor	Medium		Unlikely	Minor	Low
Some customers not informed of planned outages	Almost certain	Minor	Medium	Critical customer connectivity accurately modelled in Maximo/GIS	Unlikely	Minor	Low
Failure to execute AER commitment to deliver improved performance/ reliability initiatives in response the OMS project closure and EPIC audit recommendations	Likely	Minor	Medium		Unlikely	Minor	Low
Underground service cables not identified in DBYD	Possible	Moderate	Medium	Field audit using cable locators and capture in GIS	Rare	Moderate	Low

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Appendix C. Relevant compliance obligations

C.1 Data quality

Section 6 of the Electricity Industry Performance Code ('the Code') is reproduced below. Refer to Appendix D for evidence of issues that the independent auditor, the Utilities Commission, and the AER have found with Power and water's customer data quality.

6.1 Data quality

6.1.1   An *electricity entity* must, in accordance with *good electricity industry practice*:

   (a)   periodically collect and maintain *data* (in connection with *the target standards, performance indicators* or reporting requirements under clause 5), as is reasonably sufficient for the purpose of complying with its obligations under this *Code* and enabling the *Commission* to perform its functions under this *Code*; and

   (b)   make this *data* available on request to the *Commission* and an auditor appointed under clause 6.2 or clause 6.3.

6.2 Periodic audit of data

6.2.1   An *electricity entity* must undertake an independent audit to ensure compliance with clause 6.1.1(a) at least once every three years for each *performance indicator* that the *electricity entity* is required to report against pursuant to clause 5.

6.2.2   The first auditing period will be from 2017-18 to 2019-20, and thereafter every three years.

6.2.3   An independent auditor appointed under this clause 6 must have the necessary technical expertise, be appointed for no longer than a six-year period and not be reappointed for a further three years after a six-year appointment.

6.2.4   An *electricity entity* must consult with the *Commission* in relation to the scope of an audit required by clause 6.2.1 and a list of potential independent auditors before appointing an independent auditor.

6.2.5   If an *electricity entity* fails to appoint an independent auditor under clause 6.2.1 the *Commission* may appoint an independent auditor to undertake an audit of the *electricity entity's* compliance with clause 5.

6.3 Additional audit of data

6.3.1   In addition to the audit required under clause 6.2, the *Commission* may at any time give notice to the *electricity entity* to require it to appoint an independent auditor to undertake an audit of the *electricity entity's* compliance with clause 4 and clause 5.

6.3.2   The audit requirements will be determined by the *Commission* in consultation with the *electricity entity*.

6.3.3   An auditor appointed under this clause 6.3.1 must have the necessary technical expertise determined by the *Commission* and notified to the *electricity entity*.

6.3.4   If the *electricity entity* fails to comply with a notice given by the *Commission* under this clause 6.3 by the date set out in the notice, the *Commission* may appoint an independent auditor to undertake an audit of the *electricity entity's* compliance with clause 4 and clause 5.

6.3.5   An *electricity entity* must meet the costs of any audit under this clause 6 including an audit under clause 6.2.5 or 6.3.4.

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C.2   Guaranteed Service Levels

Guaranteed service levels (GSL) are a service level approved by the Utilities Commission that a network entity must use its best endeavours to meet. If a network entity does not meet a GSL in relation to a small customer it must pay that small customer the associated guaranteed service level payment.

Schedule 1.1 of the Code sets out the standards of service and GSL payments applicable to Power and Water for failure to meet the GSLs.

C.3   Reporting

Section 5 of the Code sets out the obligations on network entities such as Power and Water to report on its actual performance against the performance indicators for the previous financial year. The performance indicators are set out in schedules 1 and 3 of the Code and include:

- Distribution network reliability performance indicators (Table 2), which include SAIDI and SAIFI

  - Poorly performing feeders
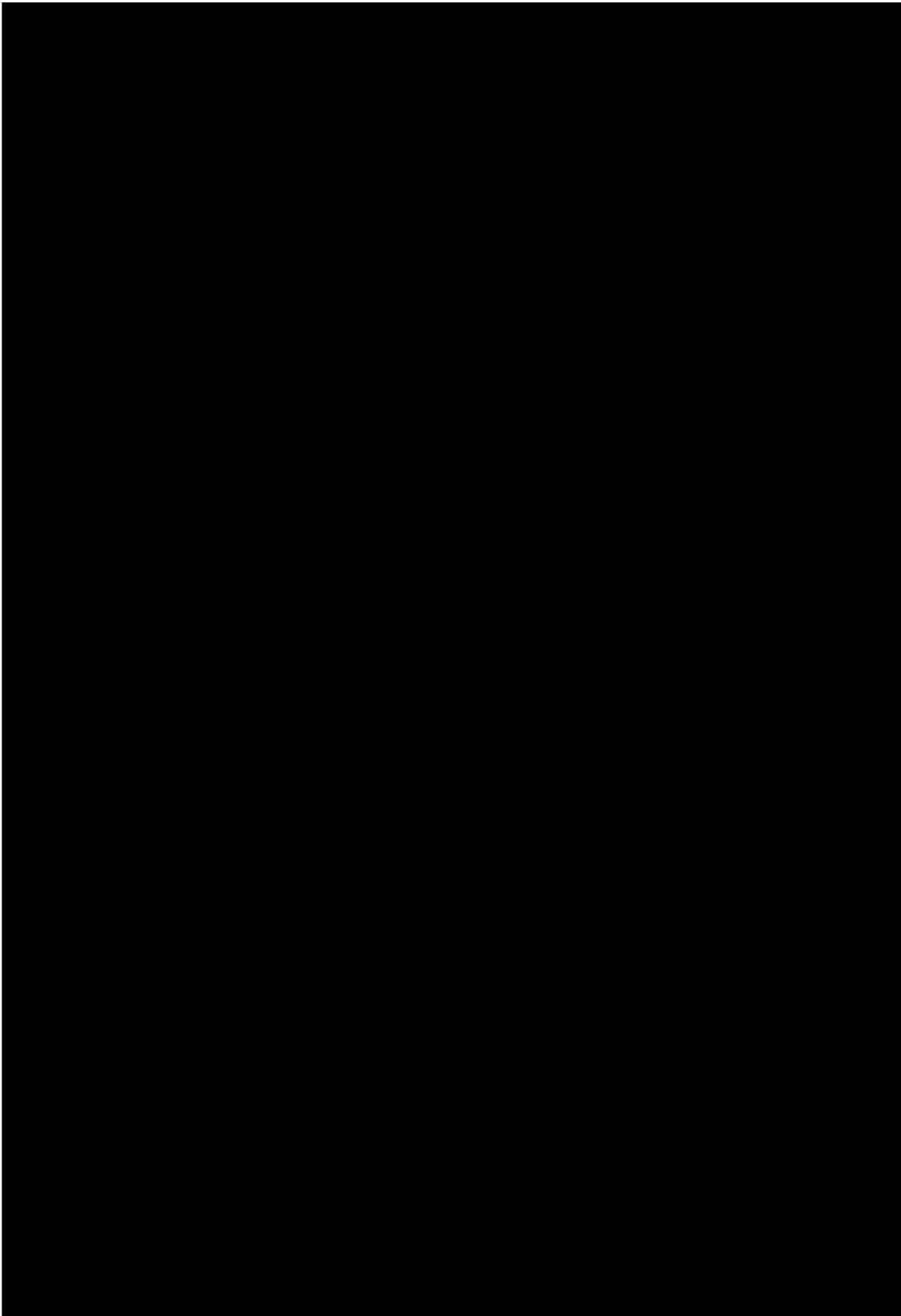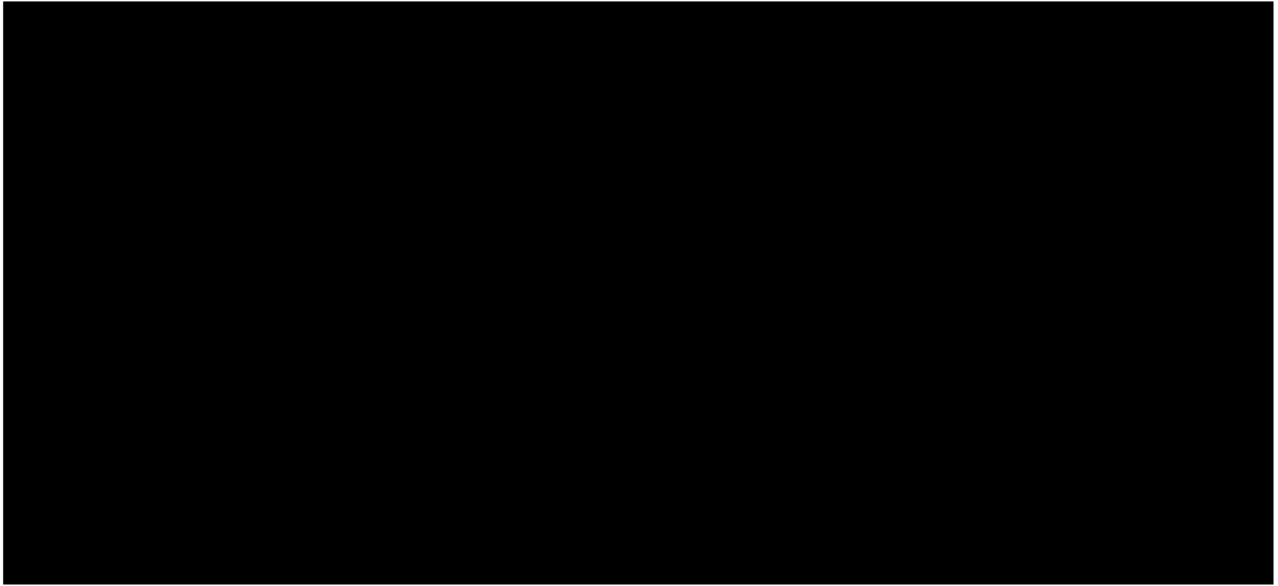 - Customer service performance indicators, including GSLs.

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