evoenergy

Appendix 3.5: Connection and metering forecast methodology

Access Arrangement Information

ACT and Queanbeyan-Palerang gas network 2026–31

Submission to the Australian Energy Regulator

June 2025

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Glossary

4-year average unit rates	The 4-year average of our average unit rates.
Average unit rates	The average cost per meter of main, service or meter. This captures all costs we incur.
Capex	Capital expenditure
Commercial	The market segment that captures the cost of non-residential and non-contract customers.
Connections forecast	The connection forecast prepared by CIE for the 2026-31 period.
Contract unit rates	The unit rates specified in our contracts with our contractors. These contract unit rates are distinct from our average unit rates which capture all of our costs (of which contractor costs are only one part).
CIE	The Centre for International Economics
CMF	Construction Management Fee
Electricity to gas	The market segment that captures the cost of connecting existing homes.
I&C	Industrial and Commercial
Market segment	We group our connections into the following categories: new homes, medium density / high-rise, commercial, electricity to gas, Industrial & Commercial (i.e., I&C Tariff + I&C Contract).
MDL	Meter Data Logger
Medium density / high-rise	The market segment that captures the costs of dwellings with more than two dwellings per site (townhouse, high-rise buildings etc).
New homes	The market segment that captures the costs of connecting new homes.
Opex	Operating expenditure
RIN	Regulatory Information Notice
Unit rates	The cost per metre of main, per service and per meter.
Volume forecast	The forecast number of mains, services and meters we will connect.
Volume mix	The average number of mains, service and meters installed per connection.

Overview

The purpose of this document is to provide additional information on our approach to forecasting new connections and meter replacement capital expenditure (**capex**). Our forecasting methodologies, outlined in this document, are consistent with the methodologies used in the 2021-26 access arrangement.[1] This document is structured as follows:

Section 1 provides a detailed description of our new connections capex forecasting method with the aim of supporting the new connections capex forecast model by explaining the approach and calculations.

Section 2 provides a detailed description of our meter replacement capex forecasting method with the aim of supporting the meter replacement capex forecast model by explaining the approach and calculations.

All financial numbers have been presented in unescalated, direct real 2025–26 dollars, excluding overheads. These align with the figures in the meter replacement and new connections capex forecast models. The figures presented in the Reset RIN templates include overheads, derived from the capex forecast model.[2]

Forecast principles

Our forecast based is based on the same principles used in the 2021-26 forecast. We use the revealed historical costs as the basis for the future costs because it is simple to understand, transparent and relies on consistent data which is representative of the expected future cost of connecting customers and replacing meters.

Revealed historical cost

The foundation of the Australian regulatory regime is to provide network businesses with incentives to only incur efficient costs.[3] Incentives work by introducing financial repercussions for cost increases and rewards for finding ways to lower costs. The rewards from cost savings finance the investment (in terms of money and risk) required to trial new ways of working and find continuous improvement.

To provide customers and the AER with confidence in our forecast, we have built our forecast primarily on our actual revealed historical costs (incurred with the incentive to reduce and constrain costs). This approach ensures the efficiencies we have achieved in the past flow through into our forecast costs. Where we do not have actual costs for a particular activity, such as the installation of a new meter technology, we have built a specific project estimate on a case-by-case basis.

This approach is consistent with the AER's approach for forecasting our connection and meter replacement costs for the 2026-31 period and its preferred method for forecasting operating expenditure (**opex**) for all network businesses.

Simple and transparent

We sought to adopt a simple and transparent approach to ensure that the forecast can be easily reviewed and verified. To do this we have based our forecasting approach on the AER's top-down method for the 2026-31 period as much as possible.

Consistent data

To address the AER's past concerns about combining different data sets we have sought to rely on consistent data. We primarily rely on data submitted as part of our RIN response, disaggregated RIN data or data reconciled to the RIN data. This data is presented in AER RIN templates and has been audited, in line with the quality

1 Connection and metering forecast methodology – June 2020

2 Costs are reconciled to the reset RIN data, inclusive of the Construction Management Fee (CMF).

3 Depending on the market forces and cost pressures this could either lead to cost reductions or constrained cost increases.

assurance requirements set out in the RIN. Where additional data was required we sought to use the most consistent data possible from our new SAP financial information system to avoid using data from different information sources.

Interaction between our models

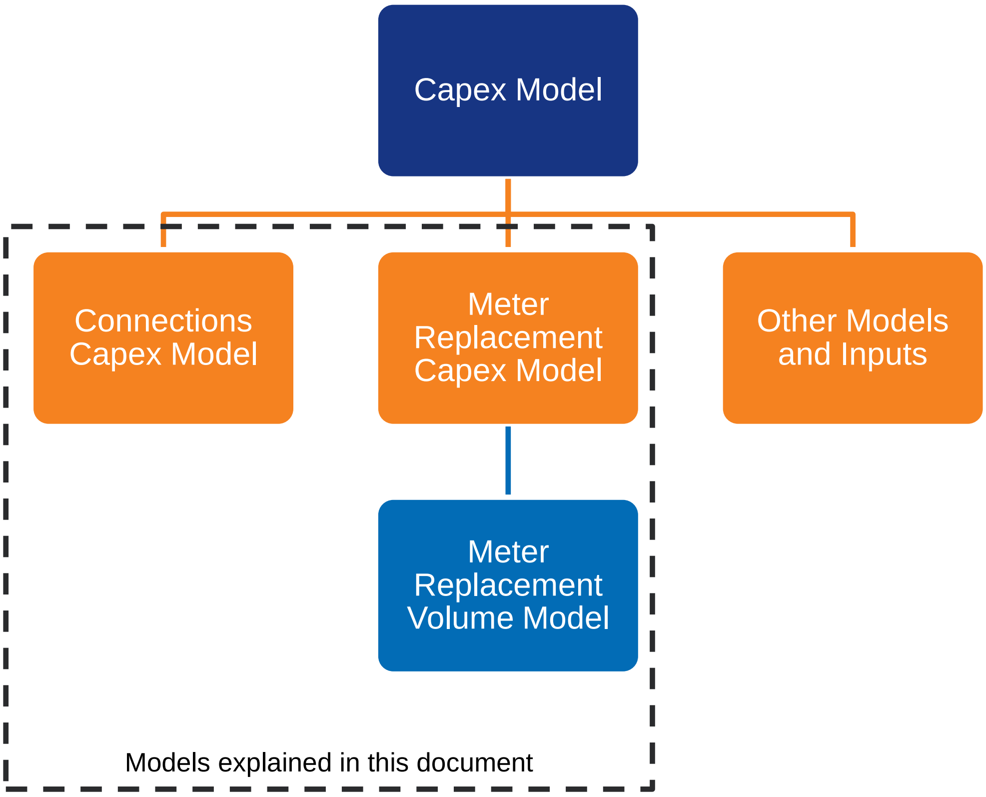
Our total capex forecast relies on a single model (the Capex Model) submitted to the AER. This contains the full forecast that is entered into the proposed Post Tax Revenue Model (PTRM). It is important to note that the Capex Model centrally:

1. calculates the real cost escalation component of our capex forecast,
2. calculates the capitalised overhead costs (i.e. Indirect costs) included in our forecast, and
3. allocates the capitalised overhead costs to each project or program in our capex forecast.

The Capex Model depends on a number of inputs, including other models. This document explains how three of those models work, they are:

- **New Connections Capex Model**: which calculates our forecast connections capex and is described in section 1.
- **Meter Replacement Capex Model**: which calculates our meter replacement capex and is described in section 2.
- **Meter Replacement Volume Model**: which calculates the quantity of meters forecast to be replaced and is described in section 2.

Figure OV–1: Capex Model Hierarchy



1. New connections capex

1.1 Forecast principles

This section provides a detailed description of our connections capex forecasting methods. It aims to support the connections capex forecast model[4] by explaining its calculations and underlying methodology.

Our forecast is based on the same principles used in the 2021-26 forecast. We use the revealed historical costs as the basis for the future costs because it is simple to understand, transparent and relies on consistent data which is representative of the expected future cost of connecting customers.

1.2 Forecasting methods

We have applied a single forecasting method to the majority of the new connections capex, with modifications for some connection types to address specific issues (discussed below).

1.2.1 Primary forecasting method (average historical unit rates)

Our primary forecasting method uses an average cost per connection method. At a high level this approach can be summarised as:

Forecast capex = average historical unit rates x volume forecast

Where:

- **Average historical unit rates** (cost per metre of main, per service and per meter) is the historical unit rates calculated from the actual cost of installing new connections. It is important to note that our methodology is calculated as follows:
    - First, we calculated the sum of the direct cost (excludes capitalised overheads) of connecting customers over the last 4 years (2020-21 to 2023-24). We have adjusted the nominal amounts into the same real dollars.
    - Second, we calculated the number of new connections and the associated volume of assets installed over the same 4 years (2020-21 to 2023-24).
    - Finally, we divided the sum of the costs from the first step, by the sum of the volumes of assets installed calculated in the second step to derive a unit cost associated with the volume of assets installed.

  This method accounts for situations where costs are recognised in one year but the volumes were entered into the system in the following year and vice versa. We modified the calculation of unit rates for medium density & high-rise connections capex as we expect there will not be any new high-rise connections in the future, therefore we removed the impact of the higher cost of installing meters in high-rise dwellings (discussed below).

- **Volume forecast** – is the length of mains, number of services and number of meters we expect to install. We calculate this as:
    - First, we calculate the historical average volume mix from the same 4-year period (2020-21 to 2023-24) as the costs in the unit rates. That is, we calculated the average length of mains, number of services and number of meters installed per connection.

[4] Evoenergy - Appendix 3.2 Connection capex forecast model - June 2025_Confidential.

- Second, we multiply the volume mix by the number of connections forecast by CIE[5]. This is based on the assumption that each connection type in the forecast period will continue to have the same average mix of assets installed to connect new customers for the past 4 years.

We modified the forecast volume mix for our 'medium density & high-rise' category because we expect the mix of assets to be installed will vary as we do not anticipate any new high-rise connections (discussed below).

1.2.2 Medium density & high-rise connections

As noted above, we expect that there will be no new high-rise connections in the forecast period. As a result, we should not use historical data that includes the connection of new high-rise dwellings.

There are two main changes we have adjusted for. First, every new medium density connection will require a meter so 100% of forecast new connections includes the cost of installing a meter. Secondly, about 50% of new connections will require the installation of a new service pipe when only medium density dwelling are being connected. In contrast, the historical average was 18% of new connections required a new service when including both medium density and high-rise dwellings in the analysis. Therefore, we have replaced the historical average volume mix in the medium density and high-rise category with assumptions of 100% for meters and 50% for new service pipes.

The cost per service pipe and the cost per metre of mains installed when making a new connection is not expected to vary with the type of dwelling being connected. However, the metering configurations and type of meters installed when connecting medium density and high-rise dwellings are different. We have adjusted the unit rate to reflect the typical meter configuration costs required to connection a new medium density dwelling only.

1.2.3 Industrial & commercial (contract) forecasting methodology

The number of new industrial & commercial connections on a contract is routinely a small number and we cannot meaningfully forecast the new connections in the future. In the last access arrangement proposal, we forecast the cost of the new connections by using the historical average expenditure. In this proposal, we have not forecast any new industrial and commercial demand contract connections, so we have assumed zero capital expenditure.

1.3 Connections capex forecast

1.3.1 Average unit rates

The average unit rates used to forecast the direct capex required to connect the new customers are based on the audited actual costs reported in template E5.1 in the RIN response.[6] The data presented in our response to the AER's RIN provides unit rate data[7] – annual costs for mains (per metre), services (per service) and meters (per meter) by market segment. These RIN unit rates capture all direct costs including contractor costs, restorations, internal labour and materials, which are different to the contract unit rates which we pay our contractors.

Unit rates vary from year-to-year due to:

- Accruals that occur from year to year due to the timing of invoices for work completed between the service provider Jemena and Evoenergy which is trued-up to actuals.
- Timing differences of non-routine costs like restoration work can often be paid several months after the work is completed.

[5] Centre for International Economics - Appendix 2.1 Gas demand forecast report - June 2025_Public.

[6] Presented in the historical RIN template E5.

[7] Presented in the historical RIN template E5.

- Natural variation in the type of jobs that are performed – for example costs are higher when we connect more customers in higher density areas due to the greater traffic management requirements.

To account for this natural variation and to smooth these fluctuations, we take the sum of the last four-year costs divided by the sum of the last four-year volumes, as described in section 1.2.1.[8] While we adjust for inflation, we do not take into account movements in real cost escalation. This results in 4-year average unit rates per metre of main, per service and per meter installed for each market segment.

Table 1–1: Average unit rates ($2025-26, direct unescalated)

Customer segment & asset	Units	2020-21	2021-22	2022-23	2023-24	Forecast unit rate
New Homes						
Distribution mains	$ / metre of mains	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Inlet service pipes	$ / service	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Meters	$ / meter	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Electricity to Gas						
Distribution mains	$ / metre of mains	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Inlet service pipes	$ / service	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Meters	$ / meter	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Medium Density & High Rise						
Distribution mains	$ / metre of mains	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Inlet service pipes	$ / service	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Meters	$ / meter	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Industrial & Commercial Tariff						
Distribution mains	$ / metre of mains	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Inlet service pipes	$ / service		[redacted]	[redacted]	[redacted]	[redacted]
Meters	$ / meter	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

(1) The unit rate for the forecast is set based on the cost of installing meters for new medium density dwellings only.

[8] While taking a longer sample provides greater smoothing out of cost fluctuations, it has the disadvantage of using older information which may not reflects the costs of delivering services. For example, in an environment where real costs are rising, this method does not capture the real cost increases during the 4-year period and results in an underestimation of the true unit cost.

1.3.2 Volume forecast

Evoenergy engaged CIE to forecast demand for gas across our network for the forecast access arrangement period. As part of this forecast, it developed a forecast number of new connections by each customer segment that allows us to forecast the new connections capex.

Table 1–2: Number of forecast new connections (CIE forecast[9])

Customer segment	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31
New Homes	266	257	245	250	250	247
Electricity to Gas	0	0	0	0	0	0
Medium Density & High Rise	25	24	23	24	24	23
Industrial & Commercial Tariff	9	9	9	9	9	9
Total	301	290	278	283	283	280

To forecast the total connections cost, we estimated the quantity of assets that will be commissioned per connection based on historical information. We used 4-years (2020-21 to 2023-24) of actual data to calculate the average quantity of assets for each connection commissioned in that period as shown in Table 1–3 Historical average volume mix.

Table 1–3: Historical average volume mix[(2)]

	2020-21	2021-22	2022-23	2023-24	Forecast
New Homes					
Metres of mains per connection	16.3	29.3	13.4	14.2	**18.6**
Number of services per connection	1.0	1.0	1.0	0.9	**1.0**
Number of meters per connection	1.0	1.0	1.0	0.9	**1.0**
Electricity to Gas					
Metres of mains per connection	0.0	0.0	265.0	0.0	**265.0**
Number of services per connection	0.0	0.0	2.0	0.0	**7.0**
Number of meters per connection	0.0	0.0	3.0	0.0	**10.0**
Medium Density & High Rise					
Metres of mains per connection	0.7	1.8	1.2	1.4	**1.2**
Number of services per connection	0.1	0.2	0.1	0.2	**0.5**[10]
Number of meters per connection	0.1	0.3	0.2	0.2	**1.0**[11]
Industrial & Commercial Tariff					
Metres of mains per connection	14.1	25.5	2.2	7.4	**12.6**
Number of services per connection	0.9	0.9	1.0	0.6	**0.9**
Number of meters per connection	1.0	1.0	1.0	0.9	**1.0**

(2) Rounded to 1 decimal place.

9 CIE March version.

10 Ratio assumption as explained in section 1.2.2.

11 Ratio assumption as explained in section 1.2.2.

1.3.3 Average cost per connection

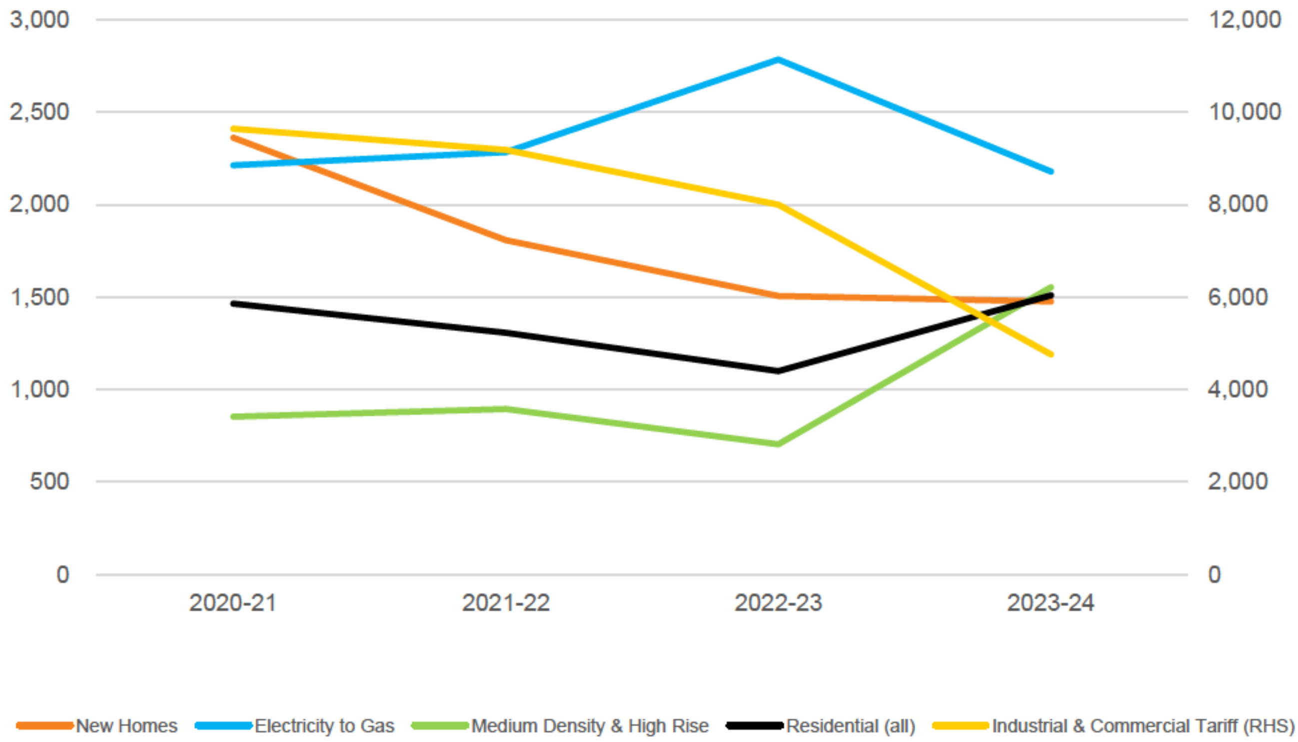
Using the **volume mix** means that this method is effectively an average cost per connection approach. The average cost per connection can be seen by applying the unit rates directly to the volume mix. This average unit rate can be applied to the connection forecast to obtain the capex forecast.

In line with the AER's determination for the 2021-26 period, we used RIN data. To be consistent with our approach for unit rates we take a 4-year average to smooth out year-to-year variations, consistent with the approach for the unit rates.

Table 1–4: Average cost per connection (real $ 2025-26, direct unescalated)

Customer segment	2020-21	2021-22	2022-23	2023-24	4-year average
New Homes	2,381	1,871	1,623	1,541	1,880
Electricity to Gas	2,231	2,363	3,002	2,277	2,453
Medium Density & High Rise	861	927	760	1,652	907
Industrial & Commercial Tariff	9,721	10,761	11,358	5,627	9,352

Figure 1–1: Average connection costs[12] by market segment (real $ 2025-26, direct unescalated)[13]



12 Costs are reconciled to the RIN data, excluding the Construction Management Fee (CMF).

13 As connecting industrial and commercial customers is higher than residential customers we have graphed these costs on the secondary right hand side (RHS) axis.

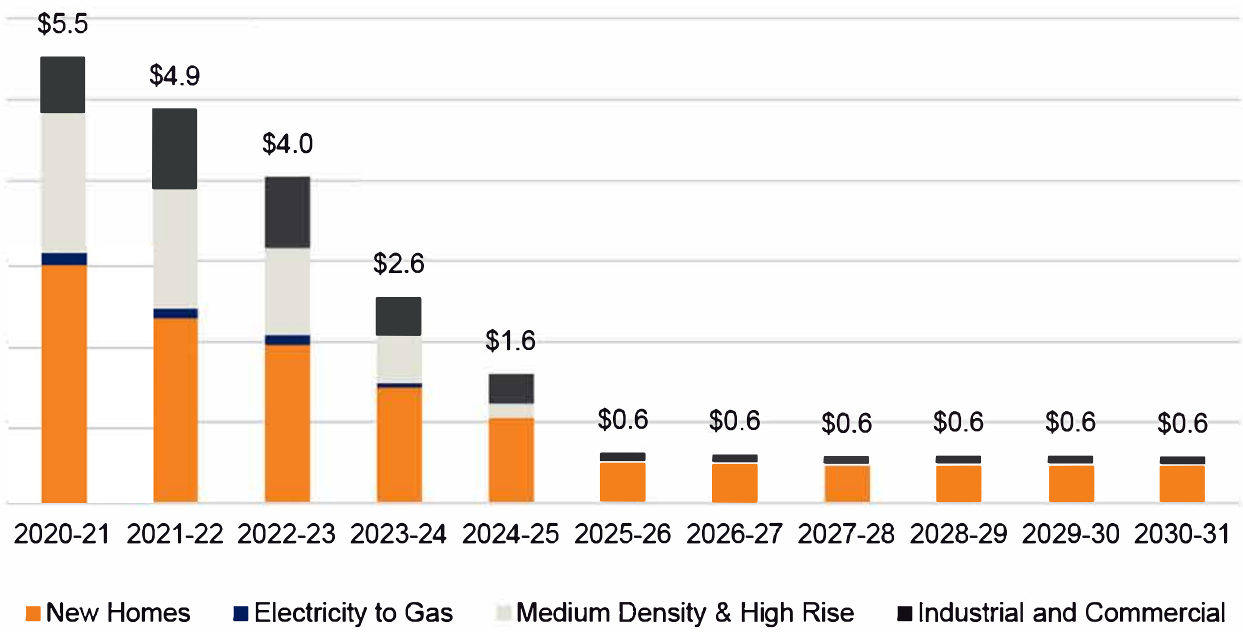
1.3.4 Capex forecast

The last step is to combine the **unit rates** and the **volume forecast**. These connection costs flow through to our capex forecast model, which then applies real cost escalation (only to the labour component).[14] The following table shows the total direct costs including the impact of labour cost escalation.

Table 1–5: New connections capex (Real $'000 2025-26, direct unescalated)

Customer segment	2026-27	2027-28	2028-29	2029-30	2030-31
New Homes	482.4	461.5	469.2	469.2	463.7
Electricity to Gas	0.0	0.0	0.0	0.0	0.0
Medium Density & High Rise	30.7	28.4	28.9	29.9	29.5
Industrial & Commercial Tariff	87.9	87.9	87.9	87.9	87.9
Industrial & Commercial Contract	0.0	0.0	0.0	0.0	0.0
Total capex	601.0	578.7	586.9	586.9	581.1

Figure 1–2: New connections capex (Real $'m 2025-26, direct unescalated)



[14] Evoenergy - Appendix 3.1 Capex forecast model - June 2025_Public.

2. Metering capex forecast

2.1 Forecast principles

This section provides a detailed description of our meter replacement capex forecasting methods. It aims to support the meter replacement capex forecast model[15] by explaining the calculation of our capex forecast and the underlying approach.

Our forecast is based on the same principles used in the 2021-26 forecast. We use the revealed historical costs as the basis for the future costs because it is simple to understand, transparent and relies on consistent data which is representative of the expected future cost of connecting customers. Where it was not possible or not appropriate to use this method, we have explained the method adopted below.

2.2 Our forecasting methods

We forecast the capex required for each of our metering programs using one of the following methods:

1. **Average Historical Unit Rates** – Consistent with our new connections forecasting approach, we calculate average unit rates based on historical data. These unit rates are then applied to a separately derived volume forecast.

   As with our connections forecasting method (discussed in section 2) this approach ensures that the efficiencies we have made in the past flow into our forecast. We do not re-explain the details in this section on Meter Replacement.

   The “per unit” nature of this method is best for areas of our program where the volumes of work varies year-to- year but the scope of work remains relatively constant.

2. **Unit Rate Estimate** – where it did not make sense to adopt the unit rate from historical costs and the project was driven by volume of work, we have developed a standalone estimate of the unit cost.

   We use this method where historical unit rates will not provide the best forecast, typically when we do not have historical data or the scope of work changes over time.

3. **Average Historical Capex** – a simple average of historical annual costs.

   This approach is applied where volumes are not expected to significantly change. As with the historical unit rate approach, this method relies on revealed costs producing a forecast that ensures that the efficiencies we have made flow into our forecast.

4. **Annual Project Estimate** – a standalone estimate of the annual average costs. This approach is applied where the average historical capex is not suitable.

2.3 Applying our forecasting approaches to our metering program

Applying our forecasting methodology varies for each program. The following sections provide an explanation of which methods have been applied to each of the meter replacement programs. The meter replacement programs have been broadly categorised as:

- Planned residential
- Planned industrial & commercial

15 Evoenergy - Appendix 3.3 Meter replacement capex forecast model - June 2025_Confidential.

- Defective / meter upgrades
- MDL / metreteks

2.3.1 Planned residential

In accordance with the regulatory obligations[16], our planned residential meter replacement programs involve replacing gas and hot water meters when they reach the end of life. It also includes replacing a sample of the gas meter population for accuracy testing.

If the sample is determined to read accurately then the population of meters is assumed to be fit for purpose for another 5 years. If it is not measuring gas consumption accurately, then the population is also considered to be inaccurate and is therefore at the end of its life and will be replaced.

The planned residential meter replacement program involves replacing large volumes of meters every year so using the historical unit costs is a reliable method to forecast the expected cost of replacing meters in the forecast access arrangement period.

Accordingly, the capex forecast is based on two components:

- Unit rates based on historical unit rates, calculated by summing direct costs over the last four years and dividing by total volumes.
- Applying the historical unit rates to expected volumes, from our meter replacement volume forecast model.

A small part of the program capex for quality assurance testing has been forecast by using an annual average capex estimate.

2.3.2 Planned industrial & commercial

Like the planned residential meter replacement programs, our planned industrial & commercial meter replacement programs involve replacing gas meters when they reach the end of life and replacing a sample of meters for testing.

Unlike residential meters, there is variability in the size and type of our industrial and commercial meters we replace with either new or refurbished meters. In turn, our planned replacement program costs change over time depending on the mix of meters in our program. Our industrial & commercial meter replacement program also includes other testing to allow our meters to have longer service lives. For example, we undertake throughput analysis on some meters, which allows us to leave some meters in service beyond their standard lives.

However, we apply the historical average unit rates approach to forecast, the same method as for the planned residential meter replacement program. Based on the historical data, we believe this is reasonable to address the variability in the industrial & commercial meter replacement programs, assuming a similar mix of meters replaced over time.

We have applied the historical average unit rate approach for the replacement of the sample for testing as these costs are steady over time.

[16] Utilities (Technical Regulation) (Gas Metering Code) Approval 2021.

2.3.3 Defective / meter upgrades

These programs include the replacement of defective meters, regulators and associated equipment. It also includes replacing meters that need to be upgraded to reflect their increased or decreased gas demand or usage. We forecast these costs using the average historical capex approach.

To forecast our capex in these programs, we use the average of annual costs incurred over the last four years. This approach captures the historical failure rate and the historical average unit costs. We consider that this represents a conservative forecast as it does not take into account the expected rise in failure rates as our meters age and wear. Similarly, it captures the volume of customers whose gas usage has changed and they required a meter upgrade/downgrade.

2.3.4 MDL / Metreteks

This program includes the replacement of Meter Data Logger (MDL) and Metretek devices that help with storing and communicating the gas consumption data. It also includes the costs associated with replacing ancillary components of these devices, such as the batteries in MDLs.

These programs are not driven by customer demand and the price of the devices change as technology evolves. Therefore, we have developed unit rate estimates on a case-by-case basis through analysis of the works involved.

2.4 Forecast capex program

Table 2–1: Meter replacement capex program ($'000 2025-26, unescalated direct)

ID	Project	2026-27	2027-28	2028-29	2029-30	2030-31
Planned residential						
R-RAQ	Planned Replacement of Residential Hot Water Meters	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RAS	Planned Statistical Sampling of Residential Aged Gas Meters	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RAZ-30	Planned Replacement of Residential Aged Gas Meters	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RAZ-20	Planned Quality Assurance Testing of New Gas Water Meters & Regulators	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Subtotal		1,086.2	1,274.1	1,212.0	1,463.2	1,523.8
Planned Industrial & Commercial						
R-RA2	Planned Statistical Sampling of I&C Diaphragm Meters	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RA7	Planned Replacement of I&C Turbine Gas Meters	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RAF-30	Planned Replacement of I&C Diaphragm Gas Meters & Regulators	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RAM	Planned Replacement of I&C Rotary Gas Meters & Regulators	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Subtotal		216.0	442.4	491.0	435.3	836.3
Defective / meter upgrades						
R-RAE	Meter Upgrades Non-Residential	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RA4	Defective Replacement of Residential Hot Water Meters	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RAJ	Defective Replacement of Residential Regulators	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RAN	Defective Replacement of I&C Turbine Gas Meters	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RAO	Defective Replacement of I&C Diaphragm Gas Meters	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RAP	Defective Replacement of I&C Rotary Gas Meters	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

ID	Project	2026-27	2027-28	2028-29	2029-30	2030-31
R-RAV	Defective Replacement of Residential Gas Meters	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RAI	Defective MDLs	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RAG	Defective I&C Metretek	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Subtotal		703.9	703.9	703.9	703.9	703.9
	MDL / Metreteks					
R-RA1	Planned Replacement of MDL Batteries (52H)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RA5	Planned Replacement of MDL - new digital datalogger rollout	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
R-RA6	Planned Replacement of Metreteks - obsolete	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Subtotal		433.9	166.3	148.1	163.9	179.0
Meter Replacement Capex		**2,439.9**	**2,586.8**	**2,554.9**	**2,766.2**	**3,243.0**

2.5 Forecast meter volumes model

To forecast the volume of meters to be replaced we have developed a meter replacement volume forecast model. We use this model for the following programs:

- Residential gas meters replacement and statistical sampling programs.
- Residential hot water meters replacement program.
- Industrial and commercial meters (diaphragm, turbine and rotary) replacement and the diaphragm statistical sampling programs.

We monitor the performance of our meters by 'lots' – a group of meters manufactured under the same set of conditions.

The meter replacement volume forecast model takes the age profile of our meters (by lot) and projects forward an age profile. Each year the model adjusts the meter population for the expected number of defective meters, meters removed for statistical sampling and meters replaced by our planned replacement program.

2.5.1 Residential gas meters and statistical sampling programs

We test residential gas meters in accordance with Australian Standards[17] to identify the accuracy and leak tightness of meters installed in the network.

We first test meters at the age of 13 years so that we can make a decision on whether to extend or replace the specific lot of meters by the time they reach 15 years of age. If the meter readings are accurate to ±2% we extend their life by five years.

We then subsequently test these meters again two years prior to the end of their life extension.

The meter replacement volume model takes into account the statistical sampling test results (at 13, 18 and 23 years) of each lot of meters. If the meters:

A. Fail – they are scheduled for replacement two years out from when replacement is due.

[17] AS/NZS 4944:2006 Gas Meters – In-service compliance testing.

B. Pass – another statistical test is scheduled in five years[18] and the meters to be tested are removed from the meter population to ensure they are not double counted.

Where we don't have actual testing results, based on the latest meter performance results we make an assumption in our model about when they will fail accuracy testing, and therefore we forecast their replacement.

2.5.2 Residential hot water meters

Hot water meter replacement volumes are based on field failure information and initial purchase specifications including Original Equipment Manufacturer (**OEM**) recommendations. Our approach is to replace:

C. Mechanical hot water meters at 25 years. This reflects the historical field failure data.

D. Hot water meters with a Cyble head[19] at 10 years, reflecting the battery life of 10 years, field performance and as indicated by the OEM.

E. All other hot water meters with a battery at 15 years. This reflects the battery life of 15 years as indicated by the OEM.

Unlike gas meters we are unable to extend the lives of hot water meters using statistical sampling. This is due to the communication components of the hot water meters (which send signals to a central MDL) requiring a battery.

We have not forecast any cold water meter replacements reflecting our strategy to run these meters to failure and they are all replaced in the defective program.

2.5.3 Industrial and commercial gas meters

The testing approach is very similar[20] to residential meters. We test I&C diaphragm gas meters at the age of 13 meters (before they reach 15 years of age). If the meter readings are accurate to ±2% we extend their life by five years. We then subsequently test them again two years prior to the end of their life extension.

If we don't have test results we make assumptions about when these lots are expected to fail accuracy testing and therefore their replacement is required.

We do not statistically test our rotary or turbine meters given the volume of gas that is measured by these meters. Instead we periodically take these meters out of service and test their performance. We generally refurbish the meters and reuse the meter. We replace rotary and turbine meters at 10 and five years in line with OEM recommendations.

[18] The number of meters we test is determined by the lot size and is set out in the meter replacement volume forecast model.

[19] The Cyble is a device attached to a hot water meter. It sends pulses to a Meter Data Logger (MDL) to communicate how much hot water has been used.

[20] We test our larger meters using the 'attribute method' which consists of counting the number of non-conformities found in a random sample consistent with AS/NZS 4944:2006. This differs to the 'variable method' used with residential gas meters where a pass or fail depends on the average and variability of the measurements obtained.