IPART Independent Pricing and Regulatory Tribunal | NSW

Embedded Networks

Draft Report

December 2023

Energy »

Acknowledgment of Country

IPART acknowledges the Traditional Custodians of the lands where we work and live. We pay respect to Elders both past and present.

We recognise the unique cultural and spiritual relationship and celebrate the contributions of First Nations peoples.

Tribunal Members

The Tribunal members for this review are:
Carmel Donnelly PSM, Chair
Sandra Gamble

Enquiries regarding this document should be directed to a staff member:

Jessica Robinson (02) 9290 8405

Albert Jean (02) 9290 8413

Invitation for submissions

IPART invites comment on this document and encourages all interested parties to provide submissions addressing the matters discussed.

Submissions are due by Select date

We prefer to receive them electronically via our online submission form.

You can also send comments by mail to:

Embedded Networks
Independent Pricing and Regulatory Tribunal
PO Box K35
Haymarket Post Shop, Sydney NSW 1240

If you require assistance to make a submission (for example, if you would like to make a verbal submission) please contact one of the staff members listed above.

Late submissions may not be accepted at the discretion of the Tribunal. Our normal practice is to make submissions publicly available on our website as soon as possible after the closing date for submissions. If you wish to view copies of submissions but do not have access to the website, you can make alternative arrangements by telephoning one of the staff members listed above.

We may decide not to publish a submission, for example, if we consider it contains offensive or potentially defamatory information. We generally do not publish sensitive information. If your submission contains information that you do not wish to be publicly disclosed, please let us know when you make the submission. However, it could be disclosed under the *Government Information (Public Access) Act 2009* (NSW) or the *Independent Pricing and Regulatory Tribunal Act 1992* (NSW), or where otherwise required by law.

If you would like further information on making a submission, IPART's submission policy is available on our website.

The Independent Pricing and Regulatory Tribunal

IPART's independence is underpinned by an Act of Parliament. Further information on IPART can be obtained from IPART's website.

Executive Summary

Embedded networks are private energy networks for services such as electricity, hot and chilled water, and gas. They are typically found in apartment buildings, shopping centres and caravan parks.

As the number of embedded networks has rapidly increased, regulatory gaps in customer protection frameworks have emerged. There are also currently very few limits on prices for customers in embedded networks and it is difficult for these customers to change retailers if they are unhappy.

The NSW Government has introduced the *NSW Embedded Network Action Plan* with the objective that outcomes for embedded network customers are in line with those in traditional energy supply arrangements by addressing these gaps.[1]

As one of the actions in this plan, the NSW Government issued IPART *The future of embedded networks in NSW* Terms of Reference. This asked IPART to make recommendations on how maximum prices should be set for electricity, gas, and hot and chilled water supplied through embedded networks. We have also been asked to make recommendations on a compliance and enforcement framework for new price protections, and whether new hot and chilled water embedded networks should be prohibited.

To do this, we have consulted widely with industry and consumer stakeholders. We released consultation papers and a consumer survey and held an online stakeholder workshop. We have incorporated the feedback and insights from a range of different stakeholders into our draft recommendations.

Overview of our draft recommendations

Maximum prices based on the prices paid by on-market customers

Our draft recommendations are that maximum gas and electricity prices should be set by benchmarking them to retail offers being advertised on the Australian Energy Regulator's (AER) Energy Made Easy website. Our draft methodology proposes that the maximum prices for electricity and gas to be determined by the median of the lowest tariffs, fixed and consumption, of all active retailers. These would be updated six monthly. Our draft pricing methodologies for hot and chilled water would also be based on these prices.

Our draft methodology for hot water maximum prices is based on the gas price benchmark. To ensure that customers are not penalised for inefficient systems, our draft methodology involves setting a standard for the efficiency of systems through the maximum price. Embedded network sellers would be able to charge customers in water units or the equivalent energy units.

We found that chilled water is mainly used for the purposes of providing centralised air-conditioning. We consider that the issues faced by chilled water customers are likely to be faced more broadly by all customers being supplied and billed for separately for centralised air-conditioning. Therefore, we have made a draft recommendation that our price protections for chilled water customers be extended to protect all centralised air-conditioning customers.

For chilled water, our draft recommendation is that sellers could continue to charge based on usage or a fixed daily rate. Where customers are billed for their electricity usage, sellers could not charge more than the benchmark electricity usage tariff. Where sellers bill using a fixed rate, our draft methodology uses the benchmark electricity tariff and a benchmark consumption level to set a maximum daily charge.

Compared to other price setting options, we consider that these draft pricing methodologies best meet our key price setting objective of ensuring that embedded network customers do not pay more than non-embedded network customers. They also address the other price setting objectives, including ensuring that prices are simple, transparent and easily understood, they recover the efficient costs of supplying the underlying energy, and that the costs of regulation are not disproportionate.

The DMO is not an appropriate cap for embedded network customers

We do not consider that the Australian Energy Regulator's "default market offer" or DMO is an appropriate price cap for embedded network electricity customers. It does not meet our key objective to ensure that embedded network customers are not paying more than non-embedded network customers because it is typically higher than most offers available in the market. Setting a maximum price at the DMO would penalise many embedded network customers who cannot influence the price that they pay in the same way that on-market customers are able to.

The Default Market Offer is set higher than the efficient costs of supplying electricity to maintain incentives for competition, innovation and investment by retailers. This also incentivises consumers to engage in the market. A price cap that is set to achieve competition outcomes is not suitable where customers cannot easily shop around.

Our draft recommendations would help ensure compliance with pricing requirements

We considered how to ensure that embedded network sellers comply with the maximum prices. Our draft recommendations would provide authority for the regulator to investigate suspected non-compliances, and to impose penalties where the maximum price is exceeded. They would also provide authority to the Energy and Water Ombudsman to refer suspected breaches identified from customer complaints to the regulator for investigation. We have also made a draft recommendation that sellers would be required to publish their prices on their website.

Hot and chilled water embedded networks should not be prohibited

Our draft recommendation is that new hot and chilled water embedded networks should not be prohibited because they can generate substantial benefits for customers. Allowing for hot water embedded networks increases the likelihood that developers and building owners install low-carbon emission centralised electric hot water systems, which can be provided at a significantly lower life-cycle cost compared centralised gas systems. Where maximum prices are in place, there are greater incentives to ensure that the system is efficient, compared to a non-embedded hot water system.

Centralised hot and chilled water systems can also produce other non-monetary benefits such as better use of space, improved aesthetics and noise control.

We consider that the proposed new maximum prices under our proposed price methodologies — in combination with some new transparency requirements for chilled water embedded networks — would protect hot and chilled water embedded network customers from unreasonably high prices.

We are seeking your feedback

We are seeking your feedback on our draft recommendations. Please submit your feedback on our website, submissions are due by 22 January 2024.

Have your say

Your input is critical to our review process.

You can get involved by making a submission, submitting feedback.

Submit feedback »

Seeking comment

1.	Are embedded network sellers currently using time-of-use tariffs, demand tariffs, or any other innovative tariff designs?	48
2.	How are embedded network sellers charging for electric vehicle charging at the site? What are the prices?	48
3.	Would a complaints-based compliance system deliver the right level of consumer protection?	78
4.	Should new non-centralised hot water embedded networks be banned?	91
5.	Should embedded networks using gas hot water systems be prohibited in new developments to assist in addressing cost of living pressures and assist in the NSW Government meeting its net-zero policy?	92

Draft findings

1.	The Default Market Offer is not an appropriate maximum price for electricity embedded networks.	28

Draft decisions

1. That the pricing methodologies be assessed according to the following objectives. That the pricing methodology: 20
   a. Ensures that embedded network customers are not paying more than non-embedded network customers 20
   b. Provides price stability for customers 20
   c. Is transparent, simple for customers to understand and easy to apply 20
   d. Ensures that an embedded network seller is able to recover its efficient costs of supply 21
   e. Is responsive to changes in the efficient costs of supplying customers 21
   f. Incentivises embedded network sellers to supply energy efficiently and enable the efficient use of energy 21
   g. Allows for cost-reflective pricing 21
   h. Encourages sustainable energy solutions and accommodates innovation and investment in the energy sector 21
   i. Involves regulatory costs that are proportionate to the problem 21
   j. Results in prices that are enforceable and capable of being monitored 21

2. Setting maximum prices by benchmarking them to what on-market customers are paying best protects embedded network customers and meets our draft pricing objectives. 37

Draft recommendations

1. Maximum gas and electricity pricing methodology for embedded networks comprise: 47
   - A consumption charge set equal to the median consumption charge of each active retailers' lowest consumption charge (inclusive of discounts and GST) for their generally available offers 47
   - A fixed rate set equal to the median supply charge of each active retailers' lowest fixed charges (inclusive of discounts and GST) for their generally available offers. 47

   A separate price should be set for each distribution district, and for small business and residential customers separately. 47

   An active retailer is defined as any retailer with at least 1000 customers in NSW that has an active offer available at the time the benchmark is calculated. 47

2. For electricity embedded networks, an embedded network seller be permitted to apply different consumption tariffs for different time periods (i.e. time-of-use tariffs), as long as the average price does not exceed the determined consumption charge when it is weighted by the AER's Default Market Offer model annual usage profiles. 48

3. Where customers are billed in cents/Litre, the maximum price for hot water be determined by multiplying the maximum gas consumption charge (as applicable to the customer's distribution district and whether the customer is a small business or residential customer) by the maximum common factor of 0.4MJ/L. 61

4. The pricing methodology for hot water permit embedded network sellers to charge for the consumption of hot water in either units of water (cents/Litre) or units of energy (cents/kWh or cents/MJ). 63

5.	Where customers are billed in cents/MJ or cents/kWh, that the energy price charged, multiplied by the common factor, cannot exceed the maximum price of hot water as determined by the pricing methodology specified in draft recommendation 3.	63
6.	Regulated maximum prices for chilled water be extended to all centralised air conditioning services sold by an embedded network seller.	66
7.	Embedded network sellers of chilled water embedded networks be permitted to bill customers using either a consumption charge or a fixed daily rate. Sellers must use the same charging approach for all customers at a given site.	66
8.	Where an embedded network seller imposes a consumption charge for chilled water embedded networks:	68
	a. the maximum consumption charge in kWh is equal to the maximum electricity tariff for embedded networks, and	68
	b. no additional fixed rate charge is permitted.	68
9.	Where an embedded network seller imposes a consumption charge for chilled water embedded networks, the seller must provide information on the efficiency of the centralised air-conditioning system on the seller's website. The information must include:	68
	– The Energy Efficiency Ratio (EER)	68
	– The Coefficient of Performance (COP)	68
	– The energy input for the last financial year	68
	– The energy output for the last financial year	68
	– The system's brand name or model number, where available.	68
10.	Where an embedded network seller imposes a fixed daily rate for centralised air-conditioning, the maximum fixed daily rate be determined by:	71
	– taking the annual consumption benchmark for a comparable individual air-conditioning unit (i.e. for a given system size and star rating as per the products listed on the Commonwealth Government's Energy Rating website)	71
	– dividing it by 365	71
	– multiplying it by the benchmark electricity consumption charge.	71
11.	That the NSW Government enact legislation to authorise IPART to determine maximum prices for the sale of electricity, gas, hot and chilled water to customers in embedded networks in NSW.	79
12.	That the NSW Government authorises the Energy and Water Ombudsman NSW (EWON) to:	79
	a. refer to the regulator any complaints that EWON reasonably suspects indicate an embedded network seller may have breached an embedded network pricing determination, and	79
	b. provide to the regulator any supporting information or documentation regarding customer complaints it receives related to embedded network sellers not complying with the maximum price.	79
13.	That the statutory framework:	79
	a. authorise the regulator to investigate whether an embedded network seller has complied with an embedded network pricing determination	79
	b. authorise the regulator, by notice in writing, to require an embedded network seller to provide information, documents or evidence for the purposes of an investigation	79

Contents

Chapter 1

Introduction

01

IPART has been asked to make recommendations on maximum price methodologies for embedded network customers. This chapter sets out the key context for this review. It explains:

- What embedded networks are and the key issues associated with them
- What IPART has been asked to do and how we have approached the review
- What we have heard from stakeholders to date.

1.1 What are embedded networks?

Embedded networks are private systems that supply services like electricity, gas, and hot and chilled water. They are often used in caravan parks and retirement villages, newer medium and high-density developments, and shopping centres. It is estimated that around 95,400 households in NSW currently live in electricity embedded networks, an increase from around 15,500 households in 2017.[2] Meanwhile it is estimated that around 64,325 households in NSW live in hot water embedded networks.

95,400 ↑

Estimated households within electricity embedded networks.
Up from 15,500 in 2017

64,325

Estimated households within hot water embedded networks

Embedded networks for electricity and gas services are defined under the Australian Energy Regulator's (AER) *Retail Exempt Selling Guidelines*, as a privately owned energy network, connected to the distribution network by one or more meters. Energy is delivered to customers via the private network. The exemptions under those guidelines generally apply to persons who on-sell electricity or gas. On-selling (or reselling) is when a person or business purchases energy from another person or business — usually an authorised energy retailer — and then sells it to a customer through an embedded network, such as a shopping centre, apartment building, retirement village or caravan park.[3]

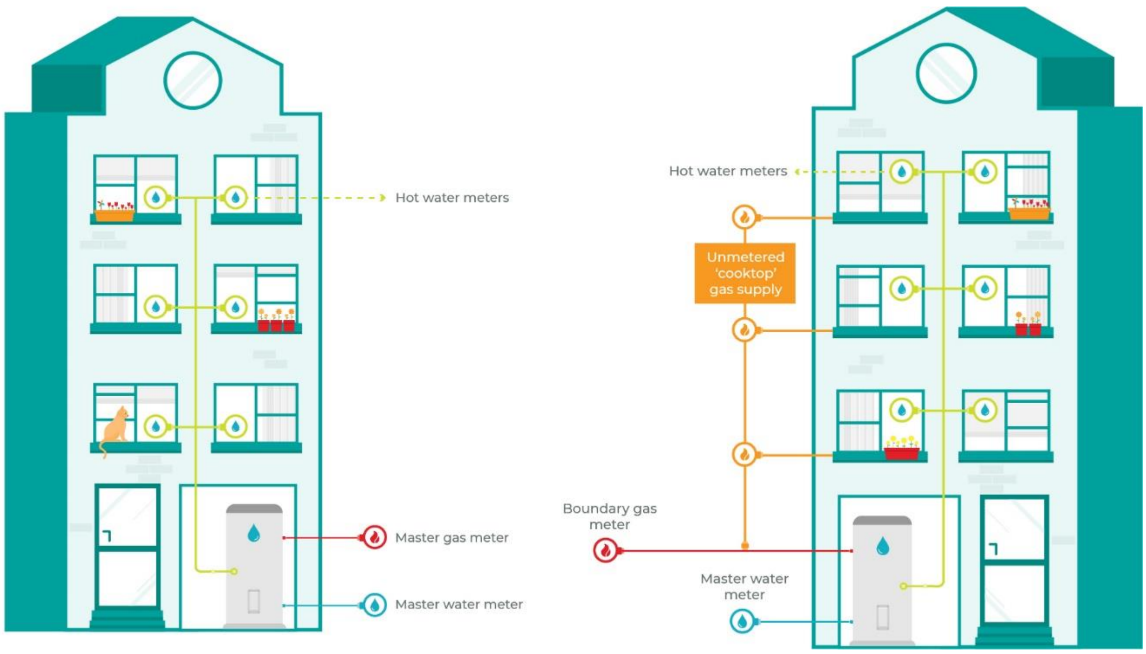
There is no definition for hot and chilled water embedded networks in the Exempt Selling Guidelines because the guidelines only apply to embedded networks for electricity and gas.

According to the major gas distribution network service provider in NSW, Jemena, hot water embedded networks occur where a third party (such as the owners corporation corporation) owns, installs and maintains utility network infrastructure beyond a meter placed at the boundary of a high-rise residential or commercial complex.[4] This means that the distribution service provider does not provide services beyond the boundary meter. Any internal metering is owned by the third-party. This is how most common hot water systems are delivered in Australia outside of the Jemena gas distribution area. Since 2015, many hot water systems within the Jemena region are also being configured in this way.

Prior to 2015, in most buildings with a gas common hot water system, Jemena owned the hot water meters for individual premises. Where Jemena owns the meters, it measures the hot water usage at the individual premise to calculate that customer's share of the gas used for the common hot water system. Customers are charged for this share of gas by their gas retailer alongside their other gas usage through their gas bill.[a]

Figure 1.1 shows the difference between a non-embedded network for hot water (left) and an embedded network (right). In the non-embedded network, the hot water meters are owned by Jemena and in the embedded network, the hot water meters are owned by the embedded network operator.

Figure 1.1 Non-embedded network vs hot water embedded network



a. Source: EWON

We expect that hot and chilled water embedded networks are mainly established in residential and mixed used buildings. In other types of development where electricity and gas embedded networks exists:

[a] Gas and Hot water meters are maintained and read by the gas distributor. EWON Presentation on Embedded Networks.

- Customers have individual stand-alone systems, where the hot or chilled water is not separately metered. The energy used is metered as part of the overall electricity or gas use at the premise and is charged through the customers' energy bill.
- A centralised system is in place, but end-users are not billed directly for the service. For example, commercial buildings are likely to incur the system costs of air-conditioning without billing customers separately for this service based on their consumption. Instead, these costs could be factored into the rent paid.

We understand that chilled water is not commonly charged by embedded network operators.[5] Chilled water networks are provided for the purposes of air-conditioning and not for direct consumption. We have also considered other vectors[b] in which energy is transferred through a centralised air-conditioning system. These include condensing gases, cooling towers and evaporative cooling units. The efficiency of these systems can vary considerably and may suit the specific requirements of different users.

Unlike hot water centralised systems, consumers often have the ability to opt-out using of centralised air-conditioning services and replace it with alternatives. Apartments are generally individually zoned, because an air-conditioning system must be capable of being deactivated when part of a building served by that system is not occupied.[6] We are aware of examples where customers have been able to easily opt-out of using the centralised air-conditioning system.

1.2 What are the issues with embedded networks?

In 2022, the NSW Legislative Assembly Committee on Law and Safety self-referred an inquiry into embedded networks in NSW. It focused on the current legal framework on embedded networks, the effect of embedded networks on business and consumers, and identifying policy and legal solutions to address the effect of and concerns about embedded networks.

The inquiry highlighted significant consumer issues in embedded networks.[7] It found residential customers in embedded networks have reduced consumer protections and some face unjustifiably high energy costs. For example, the Committee heard reports of residents receiving very high hot water charges for $2,000 over a 9-month period and $9,700 for a 14-month period.[8]

Unlike for on-market customers who can benefit from retail competition for energy services by shopping around for lower prices, it is difficult for individual customers in embedded networks to switch retailers if they are unhappy with their supplier. There are currently different price protections for customers in embedded networks, depending on the site and the type of seller. Exempt sellers can charge no higher than the applicable standing offer price of the local area retailer. There is no cap that applies to authorised retailers.

Electricity and gas embedded network customers are protected by the National Energy Customer Framework or the AER's Retail Exempt Selling Guidelines, which include hardship and life-support connection provisions. However, these don't apply to hot and chilled water embedded networks.

[b] Vectors is a term that describes the way that energy is transmitted.

The inquiry recommended banning sellers being able to charge for hot and chilled water separately to their energy bills and introducing price protections for all embedded network customers.[9] Additionally, the inquiry recommended that the NSW Government ensure hot and chilled water consumers in embedded networks have equal protections as are provided under the National Energy Customer Framework, including by requiring that these services are billed in accordance with the underlying source of energy.[10]

1.3 What have we been asked to do

To protect embedded network consumers from unreasonable prices, our Terms of Reference requested IPART investigate and recommend:

- appropriate maximum price methodologies for electricity (assessing if the DMO[c] is the appropriate maximum price), gas, hot and chilled water in embedded networks
- a framework for ensuring compliance and enforcement of new price protections
- if the NSW Government should prohibit new hot and chilled water embedded networks.

In formulating our recommendations, we have considered the factors identified in the Terms of Reference. These considerations include (but are not limited to) the efficient costs of providing the relevant services, short- and long-term outcomes for consumers, the financial effects on both consumers and current embedded network operators, and other consumer protections available. The full list of considerations is set out in the Terms of Reference.

IPART's review is one of the actions committed to by the NSW Government to bring outcomes for embedded network customers in-line with those in traditional energy supply arrangements. Other actions include:

- pursuing regulatory and legislative changes to provide enforceable consumer protections to customers of hot and chilled water embedded networks
- expanding the Energy Accounts Payment Assistance scheme to ensure customers in embedded networks have equal access to emergency financial support at times of crisis
- improving disclosure and consumer awareness by ensuring prospective purchasers and tenants of an owners corporation property are aware of the existence of embedded network arrangements prior to purchase or leasing
- implementing recommendation 120 of the 'Report on the statutory Review of the *Owners corporation Schemes Development Act 2015* and *Owners corporation Schemes Management Act 2015'*, protect electricity embedded network customers in owners corporation schemes from long contract terms.[11]

[c] The Default Market Offer (DMO) is a maximum price that retailers can charge electricity customers on default contracts known as standing offer contracts.

1.4 Our approach to this review

In undertaking this review, we consulted widely and often with stakeholders. This included releasing 2 consultation papers, one for consumers and another for industry participants. We also invited customers to respond to a survey which provided the opportunity to describe their experiences within embedded networks and submit their energy bills for analysis.

We received:

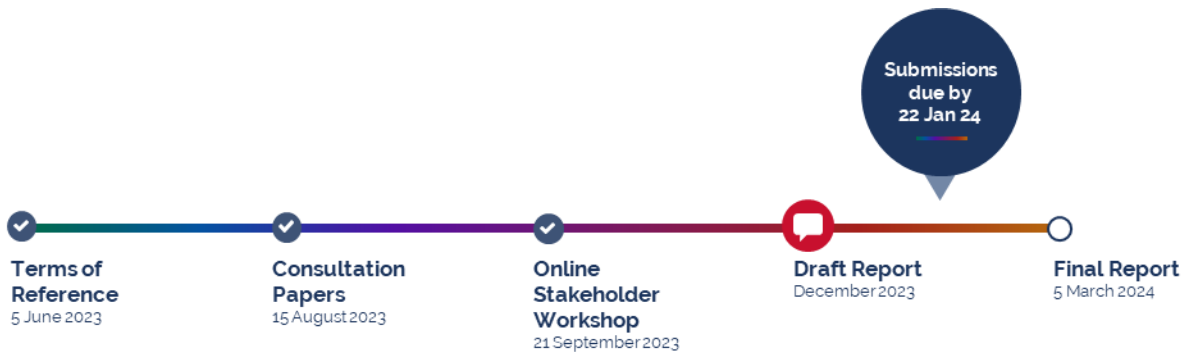
- 26 submissions from industry stakeholders (embedded network providers, advocacy groups, retailers and consultants)
- 8 submissions from individuals
- 85 responses to our consumer survey
- A sample of 64 customer bills.

We held an online workshop (public hearing) to engage directly with our stakeholders and to facilitate discussion between stakeholders. It provided an opportunity for individuals to voice their opinions and enabled us to engage with detailed issues. The workshop was attended by 57 stakeholders, 2 Tribunal members, and members of the IPART secretariat.

In forming our draft recommendations on how to set maximum prices for embedded network customers, we developed a set of pricing objectives in consultation with stakeholders. We then assessed several pricing approaches against these objectives. Once we had established an overall approach, we then developed detailed pricing methodologies for each embedded network service to further address the pricing objectives.

We encourage stakeholders to review our draft report and provide feedback. Your insights are invaluable to us, and we welcome submissions that will inform and enhance our final recommendations.

Review timetable



1.5 What we have heard from stakeholders

Through our customer survey, submissions to our consultation papers and at our stakeholder workshop, embedded network customers told us the key issues they are facing are:

- high bills
- changing providers is cost prohibitive
- issues accessing solar energy and solar feed in tariffs and gas rebates
- having to pay a daily charge for gas, regardless of whether it is actually used
- concerns about inefficient hot water provision, and a lack of transparency around charges
- metering issues
- not being made aware of the embedded network before moving in.

The majority of respondents to our survey commented on the high bills they receive and considered the prices they pay are high compared to consumers not in embedded networks. Customers also told us they have difficulty validating the accuracy of the charges on their bills and they do not have access to off-peak rates or are charged a continuous rate.

In relation to setting prices, most industry stakeholders strongly supported the use of the Default Market Offer to set maximum electricity prices to provide consistency with the broader regulatory framework and ease of application. Other stakeholders suggested maximum prices should be at or below competitive market offers, reflecting factors like exclusive supply and lack of competition.

For hot and chilled water embedded networks, stakeholders generally considered there were many potential benefits, but called for improved price protections and service quality. Some considered that these networks should be subject to an approval process, which would require them to demonstrate benefits to consumers. There were mixed views on whether hot and chilled water prices should be set to recover the internal infrastructure costs at the site.

We discuss these issues in detail throughout the report.

1.6 How this report is structured

The rest of this report is structured as followed:

- Chapter 2 discusses the pricing objectives that we used to assess different pricing approaches
- Chapter 3 assesses different pricing approaches against our pricing objectives
- Chapter 4 provides our proposed electricity and gas pricing methodologies
- Chapter 5 provides our proposed hot water pricing methodology
- Chapter 6 provides our proposed chilled water and centralised air-conditioning pricing methodology
- Chapter 7 discusses our proposed compliance and enforcement framework

- Chapter 8 discusses our recommendation on whether new hot and chilled water embedded networks should be prohibited.

Chapter 2

Pricing objectives

02

We have consulted with stakeholders on what a methodology for determining maximum prices for embedded networks should achieve.

This chapter explains how we have considered stakeholder feedback to develop a list of draft price setting objectives for assessing different price setting approaches. It also considers how we would apply the objective of ensuring that an embedded network seller is able to recover its efficient costs of supply.

2.1 Overview of our draft decision on pricing objectives

Our draft decision is that our overarching objective in recommending methodologies for setting maximum prices is to ensure that embedded network customers are not paying more than non-embedded network or 'on-market' customers. We have also developed a list of 9 other pricing objectives outlined below.

These draft pricing objectives are generally focused on either outcomes for customers, outcomes for sellers, or outcomes for the regulator. Therefore, some objectives will work in opposition to each other (for example, responsiveness to cost changes, and price stability). We will consider these objectives and the views from our stakeholders in developing our final recommendations.

With regards to the objective of ensuring that an embedded network seller is able to recover its efficient costs of supply, we consider it is sufficient for our pricing methodology to ensure that providers can recover the efficient costs of energy alone (including the cost of transporting the energy to the embedded network site). This does not include the costs of installing and maintaining the internal embedded network infrastructure. This ensures that embedded network customers are not worse off than on-market customers, who do not pay for internal infrastructure costs through their energy prices.

Like for on-market customers, these infrastructure costs would still be able to be recovered, but through mechanisms other than energy prices. For example, for apartment buildings, these costs can be recovered through owners corporation fees from the parties best placed to manage these costs – that is, the owners, who are able to change suppliers if they are faced with inefficient or additional costs, rather than tenants who have very limited opportunities to manage these costs. Ensuring that the parties who can manage the risks face the costs provides a strong incentive to ensure that services are provided efficiently. This could help drive greater engagement in the market, increasing competition and reducing the costs of embedded network services.

Draft decision

1. That the pricing methodologies be assessed according to the following objectives. That the pricing methodology:
   a. Ensures that embedded network customers are not paying more than non-embedded network customers
   b. Provides price stability for customers
   c. Is transparent, simple for customers to understand and easy to apply

d. Ensures that an embedded network seller is able to recover its efficient costs of supply
e. Is responsive to changes in the efficient costs of supplying customers
f. Incentivises embedded network sellers to supply energy efficiently and enable the efficient use of energy
g. Allows for cost-reflective pricing
h. Encourages sustainable energy solutions and accommodates innovation and investment in the energy sector
i. Involves regulatory costs that are proportionate to the problem
j. Results in prices that are enforceable and capable of being monitored

2.2 We revised the proposed pricing objectives in response to stakeholder feedback

We received significant feedback from stakeholders on the proposed pricing objectives for assessing different pricing methodologies that we included in our industry consultation paper. As a result of the stakeholder feedback, we have included 3 new draft objectives, and have removed one. We have also made some minor wording changes based on stakeholder feedback. The marked up draft objectives are included below, with the new additions included in red text.

2.2.1 Draft price setting objectives

We consider that a methodology for setting maximum prices for embedded network customers, where practical, should:

1. Ensure embedded network customers are not paying more than non-embedded network customers.
2. ~~Ensure there is no interruption to supply~~
3. Ensure an ~~efficient~~ embedded network seller is able to recover its efficient costs of supply
4. Ensure the regulatory costs are proportionate to the problem
5. Respond to changes in the efficient costs of supplying customers
6. Incentivise ~~customers and~~ embedded network sellers to supply ~~and use~~ energy efficiently and enable the efficient use of energy
7. Be transparent, simple for customers to understand and easy to apply
8. Provide price stability for customers.
9. Allow for cost-reflective pricing
10. Be enforceable and capable of being monitored
11. Encourage sustainable energy solutions and accommodate innovation and investment in the energy sector

The new draft objectives include:

- **Ensuring the regulatory costs associated with a pricing methodology are proportionate to the problem that we are solving.** Not placing unnecessary regulatory burdens on taxpayers or stakeholders is a key factor when weighing up approaches that may result in similar outcomes.
- **Ensuring a pricing methodology encourages sustainability, innovation, and investment.** Various stakeholders provided feedback that our objectives should consider investment in the energy sector, and additional objectives were suggested to encourage sustainability and allow for innovation.[12] We agree that it is worth having an explicit criterion on sustainability in addition to the objective to incentivise embedded network operators to supply energy efficiently.
- **Providing price stability for customers.** Some stakeholders provided feedback that customers value consistency in their energy bills and that our objectives should reflect this.[13] We agree that consumers value price stability and that it will be important to consider this alongside our existing criterion, that a methodology should be responsive to changes in supply costs.

We have removed the criterion to 'ensure continued energy supply', which caused confusion amongst stakeholders.[14] This objective was targeted at allowing suppliers to recover their efficient costs (which is already a separate objective).

In addition, we have:

- Removed 'efficient' from criterion 3. We agree with stakeholders that the inclusion of 'efficient' twice in the criterion is unnecessary.[15] One stakeholder submitted that is not appropriate to consider the costs of supply in determining a price for customers.[16] We disagree.
- Add 'efficient' to criterion 5 to ensure that the pricing methodology is capable of responding to changes in *efficient costs* of supply that may arise with new technologies.
- Remove 'customers' from criterion 6. Some stakeholders suggested this change because the criterion may impose an unfair burden on customers, who have little control over the efficiency of the systems in their buildings.[17] We agree that there can be significant constraints on tenants in controlling their energy usage. As suggested by some stakeholders, we have included 'enable the efficient use of energy' to allow for a methodology that would incentivise operators to enable the efficient use of energy by customers.[18]
- Add 'transparent' to criterion 7. This is in response to stakeholder feedback that protection for customers in the form of transparent prices and bills should be considered in the objectives.[19]
- Include 'capable of being monitored' in criterion 8. We agree with stakeholders that for a pricing methodology to be enforced it needs to be capable of being monitored.[20]

2.3 Ensuring sellers can recover the efficient costs of supply

One of our key objectives it to ensure that embedded network sellers can recover their efficient costs of supply.

For both non-embedded networks, and embedded networks, there are 2 types of costs associated with a customer's energy and hot and chilled water use:

- The energy (including the costs of transporting the energy to the site)
- The costs of the infrastructure onsite beyond the network meter (wiring, metering, and other plant such as solar, and hot water systems). These may include capital, operating and maintenance costs.

For non-embedded network customers, only the cost of energy is recovered through retail energy prices. The other costs are incurred upfront, initially by the builder and recovered through the sale of the property, or by the owner of the property.

Several stakeholders indicated that for embedded networks, customers should pay a share of the cost of the embedded network operator's investment in the infrastructure required.[21] Energy Locals submitted that if investments made are not considered in the cost of supply, operators could be deterred from providing the current level of investment.[22]

We consider that it is sufficient for our draft pricing methodology to ensure that providers can recover only the costs of the energy (and just the efficient costs). This helps ensure that embedded network customers are not required to pay more for their energy through their energy bills than on-market customers. This approach is consistent with the Electricity Network Service Provider Registration Exemption Guideline Version 6 for embedded networks, which does not allow for the recovery of internal network development and other capital costs. The Guideline outlines:

> **4.6.3 Internal network charges**
>
> We do not encourage separate network charges for exempt networks. Few, if any, situations currently exist where such charges are warranted. The formal determination of network charges by the AER is a complex and involved process, the costs of which will usually be disproportionate to the scale of an exempt network.
>
> Where an exempt network exists within a commercial building, shopping centre, airport, residential apartment building, retirement village or the like, the AER considers the network development costs to have been met in the initial establishment of the facility. Such costs are capital in nature and are normally recoverable through lease payments, fit–out charges or the like. A charge for network services is not appropriate as it may result in the customer being charged twice for the same facility.
>
> Accordingly, no charge is permitted for internal network services except where the parties have entered into an agreement on mutually agreed terms and both parties are:
>
> - large customers; or
> - large corporate entities
>
> **Small customers (excluding large corporate entities)**

> Exempt Network Operators are prohibited from billing for exempt network service charges. Network installation charges are only permissible where specified in a residential or commercial lease, tenancy agreement or similar instrument but only where such charges are permitted under relevant jurisdictional legislation.[23]

We consider that energy prices are not the only mechanism available to sellers for recovering costs. They can also charge the owners corporation for their services. This means that a regulated price would not cap a providers' ability to recover its costs (including a profit margin).

Where the total costs of providing an embedded network (energy plus internal infrastructure) exceed the costs that can be recovered through regulated prices, it is appropriate for owners corporations to incur the internal infrastructure costs, because they are better able to manage these costs. In contrast, tenants have no ability to manage these costs. Ensuring that the parties who can manage the risks face the costs provides a much greater incentive for them to ensure that services are provided efficiently. To the extent that this drives greater engagement in the market, this should help increase competition and reduce the costs of embedded network services.

Chapter 3

Pricing approach

03

Our Terms of Reference requires us to consider whether the Commonwealth Government's Default Market Offer (DMO) is the appropriate maximum price for electricity embedded network. This is the price cap set by the Australian Energy Regulator that applies to "standing offers" for on-market customers.

In response to our consultation papers, stakeholders suggested other options for setting maximum prices for embedded network customers:

- adjusted DMO (electricity only)
- embedded network specific cost-build-up
- benchmarking to the prices paid by on-market customers.

This chapter considers which of these approaches best meet the price setting objectives set out in Chapter 2.

3.1 Overview of our draft findings and decisions

Our draft finding is that the Default Market Offer (DMO) is not an appropriate maximum price for electricity embedded networks. The DMO is set higher than the efficient costs of supplying electricity to maintain incentives for competition, innovation and investment by retailers, and incentives for consumers to engage in the market. A price cap that is set to achieve competition outcomes is not suitable for embedded networks where most customers cannot easily shop around.

We consider that the DMO does not meet our overarching objective to ensure that embedded network customers are not paying more than non-embedded network customers because it is typically higher than most offers available in the market. Setting a maximum price at the DMO would penalise many embedded network customers who cannot influence the price that they pay in the same way that on-market customers are able to.

Our draft decision is that setting maximum prices by benchmarking them to what on-market customers are paying best meets our draft pricing objectives. In particular, it directly solves for the main objective of ensuring that customers are not worse off than on-market customers.

In a reasonably efficient market, market prices are also a better indicator of the efficient costs of supplying electricity than regulator estimates and forecasts. As market prices are readily available for analysis, benchmarking also comes at a significantly lower regulatory cost compared to producing an embedded-network cost build-up. Unlike DMO-based options, which are only available for electricity, market benchmarks are also available for gas.

A benchmarking approach ensures that the costs of energy can be recovered through prices, while allowing flexibility for other costs to also be recovered through prices (such as the upfront costs of sustainable technologies, or ongoing operating and maintenance costs of the other infrastructure).

As discussed in Chapter 2, where total costs exceed IPART's maximum market-based prices, they can be recovered through mechanisms other than energy prices.

Table 3.1 summarises our assessment of the options considered against our pricing objectives.

Table 3.1 Assessment of pricing approaches against the objectives

Objectives	Price-setting options			
	Benchmark to market prices	**DMO**	**Adjusted DMO**	**Embedded-network cost build up**
Ensure embedded network customers are not paying more than non-embedded network customers.	High	Low	Medium	Medium to High (depending on costs included)
Provide price stability for customers.	Medium, depending on frequency of benchmark updates	Medium	Medium	Medium, depending on frequency of updates
Is transparent, simple for customers to understand and easy to apply	High	High	High	Low
Ensure an embedded network provider is able to recover its efficient costs of supply	High	High	Medium	Medium
Is responsive to changes in the efficient costs of supplying customers	High	Medium	Medium	Medium
Incentivise embedded network operators to supply energy efficiently and enable the efficient use of energy.	High	Medium	High	High, depending on detailed methodology
Allows for cost-reflective pricing	Depends on detailed methodology rather than overall approach	Depends on detailed methodology rather than overall approach	Depends on detailed methodology rather than overall approach	Depends on detail ed methodology rather than overall approach
Encourages sustainable energy solutions and accommodates innovation and investment in the energy sector	High	Medium	High	High, depending on detailed methodology
Involves regulatory costs that are proportionate to the problem	High	High	High	Low
Results in prices that are enforceable and capable of being monitored.	High	High	High	Medium

3.2 The DMO is not an appropriate maximum price for electricity embedded networks

The DMO is the Australian Energy Regulator's maximum price for electricity standing offers. The AER sets the DMO based on its forecasts of the efficient costs of supplying electricity including headroom to facilitate competition.

In response to our consultation papers, many industry stakeholders supported using the DMO as the maximum price.[24] Most of these stakeholders considered this would maintain consistency with the broader energy framework. In addition, Origin also argued at the public hearing that the additional headroom (and higher prices) allowed by the DMO is necessary to support sustainability initiatives in embedded networks (e.g. solar and EV charging).

We do not consider that setting maximum prices using the DMO meets our overarching objective to ensure embedded network customers are not paying more than non-embedded network customers. This is because the DMO is typically higher than most offers available in the market.

One of the key objectives of the DMO is to maintain incentives for competition, innovation and investment by retailers, and incentives for consumers to engage in the market.[25] To facilitate this objective, the DMO includes additional 'headroom' which allows retailers to compete to offer lower retail prices.

The AER's 2023-24 DMO Determination noted that based on available offers in late April 2023, residential customers switching from a standing offer (capped at the DMO) to the lowest market offer could save 8%-17% on their bills. Similarly, small business customers could save 18%-34%, depending on their region.[26]

Our view is setting a maximum price at the DMO would penalise many embedded network customers who cannot influence the price they pay in the same way that on-market customers are able to choose better options by shopping around. A price cap that is set to achieve competition outcomes is not suitable for embedded networks where most customers cannot easily shop around. In addition, in the absence of strong competition, a higher price cap may be less likely to result in innovation, because there is less pressure on sellers to ensure the services are delivered efficiently.

We have also considered how well the DMO is able to reflect the efficient costs of supplying customers, and respond to changes in these costs. The AER sets the DMO based on its best forecasts of the efficient costs of supplying electricity (including headroom), however in an increasingly volatile market, it is difficult to accurately forecast costs. For example, in 2021-22, the DMO was set prior to a very high price event and several retailers left the market largely because they could not recover their energy costs.

We have also considered whether the additional headroom (and higher prices) allowed by the DMO is needed to recover the capital costs incurred by sustainability initiatives. Our view is that sustainable technologies such as solar and heat pumps should reduce the lifecycle energy costs. Customers should not be paying more over the asset life of the added infrastructure compared to if it was not installed.

Draft finding

1. The Default Market Offer is not an appropriate maximum price for electricity embedded networks.

3.3 We are not recommending using an adjusted Default Market Offer

Another option put forward by stakeholders in response to our consultation papers and at the public hearing is an adjusted DMO. 2 variations of this option were suggested:

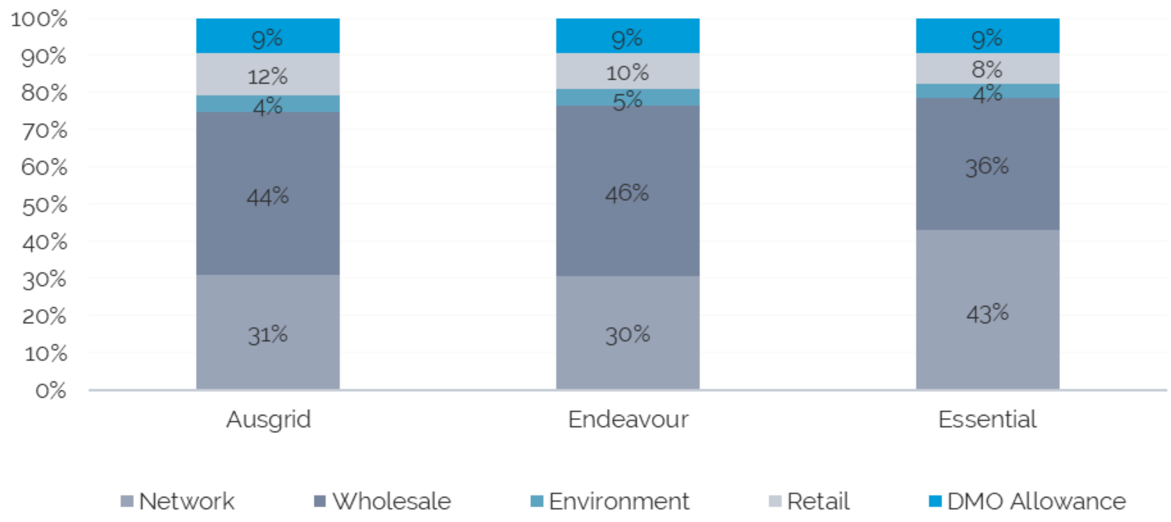
1. A small percentage discount reflecting discounts on-market customers are typically receiving relative to the DMO
2. Adjusting the DMO to remove the cost components that are not relevant to embedded network customers (i.e. costs of competition and customer acquisition and retention costs). This option was suggested by the network distributors, Ausgrid, Endeavour and Essential Energy.

Figure 3.1 shows that currently the 'DMO allowance', which represents the costs of competition and customer acquisition, and retention costs, makes up around 9% of the DMO. A 9% discount to the DMO is currently equivalent to the median market offer. Therefore, an adjusted DMO which removes these costs or applies a 10% discount for example, would achieve outcomes in-line with the median market offer in the current market.

While this approach is simple to apply and easy to understand, we consider it has the same shortfalls as the DMO. These include:

- To be cost-reflective, it relies on accurate forecasts of costs which will not always be available. In highly volatile periods such as 2021-22, the adjusted DMO would have been lower than efficient costs of supply.
- It is only adjusted annually, so there are limitations in its responsiveness to price changes.
- It is only available for electricity, therefore a different approach would be required for gas and gas-related services.

Figure 3.1 Default Market Offer cost components



Source: IPART analysis, based on AER, Default market offer prices 2023-24 -Final determination, p 67.

3.4 We are not recommending using an embedded network cost-build-up

None of the stakeholders advocated for an embedded network specific cost-build up for electricity and gas embedded networks. However, some industry stakeholders supported a methodology for hot and chilled water that considers energy costs, ongoing costs, capital cost and profit.[27]

To be effective, a cost-build up approach would require us to accurately estimate the various costs involved. In our view, it is very costly to accurately predict costs. For example, for gas prices, there is very limited transparency over the energy costs, particularly the wholesale and distribution costs. As noted by EnergyAustralia in its submission to our consultation papers:

> Unlike electricity, there is negligible precedent for a regulated gas retail tariff which means extra regulatory cost for IPART to develop. Setting a retail price cap for gas would be complex and costly – due to a lack of transparency over wholesale gas supply contracts (unlike electricity where wholesale costs can be pegged to public ASX contract data) and non-transparent network/pipeline costs. This cost/complexity should be weighed against any benefit which seems to be small given the scale of embedded networks in terms of low customer numbers (potentially even lower numbers with metered supply), and the actual amount of gas the regulated price would apply to e.g. only used for stove top gas not heating.[28]

A cost-build up approach would require us to specify which costs could be recovered through prices. If we were to allow only the efficient energy costs of an embedded network, it would have very large impacts on many of the existing embedded network sellers. Their business models are based on the savings arising from the difference in network costs for large sites versus residential customers, and so many would no longer be viable. However, as discussed in Chapter 2, we do not consider that it would be appropriate to allow for a specific allowance for the recovery of capital costs.

Setting prices to recover capital costs would make embedded network customers worse off than on-market customers who do not contribute to internal capital costs (such as wiring and other infrastructure) through their electricity prices. In addition, the Electricity Network Service Provider - Registration Exemption Guideline does not allow for the recovery of the internal network infrastructure costs.

There is also a very large variation in the types of embedded networks and network configurations, which make determining the representative efficient costs of any internal generation infrastructure (such as solar and batteries) very difficult. The opportunities for generation are very site specific which makes it difficult to set a single efficient cost and price level. If generation infrastructure is installed on site, then the efficient energy costs will also vary significantly between sites.

3.5 Benchmarking to market prices

In their submissions to our consultation papers, many consumer groups and individuals supported setting prices by benchmarking prices to market offers. For example:

- PIAC considered it appropriate for the maximum price to be set at the level of the lowest available market offer and updated 6-monthly.[29]
- Energy Metrics Consulting said that embedded networks should provide savings to users relative to the competitive tariffs offered by major on-market retailers.[30]
- Austin Tourist Park suggested the maximum price could be set according to the median tariff from the 5 largest retailers offering services in NSW (it also supported using the DMO).[31]

We consider benchmarking to market offers directly addresses our overarching objective that embedded network customers should not be worse-off compared to on-market customers. It also performs strongly against many of the other price setting objectives:

The efficient costs of supplying embedded network customers are significantly lower than the efficient costs of supplying an equivalent on-market customer. Therefore, setting prices using a market-based benchmark would allow providers to recover the efficient energy costs, and also offset additional costs (such as the upfront costs of sustainable technologies, or ongoing operating and maintenance costs of the other infrastructure). This provides an incentive for sellers to install on-site sustainable generation as they can share in the lower costs of supply over the life of the assets, while also recovering their upfront capital costs through prices. It also allows for the continuation of existing business models. This is discussed further in the sections below.

In addition, a benchmarking approach has the capacity to be very responsive to changes in efficient costs. Unlike the default market offer, market offers can adjust immediately in response to changes in costs. A benchmark could be adjusted to reflect these changes. We discuss our draft recommendations on the frequency of the price adjustments in the next chapter. It is also a low-cost regulatory approach because market prices are readily available.

Benchmarking also allows for a consistent price setting approach across electricity, gas, and hot and chilled water. This is unlike the DMO, which is only available for electricity.

3.5.1 The costs of supplying embedded network customers are lower than on-market customers

The efficient costs of supplying embedded network customers are significantly lower than the efficient costs of supplying an equivalent on-market customer. This is mainly due to lower network costs because the parent or boundary meter connection to the grid is treated as a large energy customer. Depending on the size of the site, the network cost for large customers can be significantly lower than the combined costs of all the individual small customers.

In addition, an embedded network seller is unlikely to incur any customer acquisition and retention costs. Sellers can also further reduce their costs of supplying electricity by installing generation assets at the site.

Electricity network costs

Electricity embedded network sites are charged commercial network tariffs for the parent connection point. These tariffs are normally cheaper than the sum of the residential network tariff at each premise for the equivalent electricity. Further, the fixed supply charge at the parent connection point can be spread across all child connection points in the embedded network. This means that the higher number of consumers within an embedded network, the lower their share of the fixed supply charge.

Table 3.2 is an excerpt from Ausgrid's Tariff structure statement for its 2024-2029 network revenue reset. It calculates the potential savings of supplying customers in a 315-unit residential apartment complex, based on applying the same commercial network tariff at the parent connection point to the child connection point, less fixed supply charges at the parent connection point which are spread across all child connection points. A standard residential network tariff is applied to the same customer to calculate the difference and determine the potential savings.

It shows that Ausgrid estimates in this scenario, that providers currently pay around 40% of the equivalent residential tariff per dwelling.[32] This represents a saving of around $315 per customer per year. For a site with a smaller number of sub meters, Ausgrid estimates a saving of around 32%.[33]

Ausgrid and Endeavour have sought to reduce the cost differential in their 2024-2029 pricing proposals by introducing specific tariffs for embedded networks. Under the proposal, after a 4-year transition period, network costs would remain lower for embedded network sites. As shown in Table 3.2, at large sites (315 customers), the tariff would still be almost 50% lower than the equivalent residential tariff for an average site.[a] Ausgrid's proposal for new embedded network tariffs would not result in earning more revenue because it is subject to a revenue cap but will result in lower chargers for other network customers.[34]

[a] The AER has not approved the new tariffs in its draft determination. It is not satisfied "that it complies with or contributes to the pricing principles and other applicable requirements of the NER based on the information available." While it supports Ausgrid's embedded network tariff in principle because it will improve cost recovery for a large number of customers, it is concerned that increasing network costs for embedded network operators may undermine the embedded network business model (to the extent that embedded networks benefit from the existing cross subsidy) with implications for customers.

The AER considers that Ausgrid should include more information to give certainty that the embedded network tariff is justified. The AER has stated that it will continue to work with distributors and stakeholders to further develop the tariffs so that they balance fair residual cost recovery with the needs of embedded networks and their customers.

Table 3.2 Ausgrid's comparative analysis of network charges for a residential embedded network with 315 sub-metered customers

	Normal customer billing (315 units on EA116)	Embedded network on EA310	With proposed embedded network tariff
Consumption per NMI, (kWh)	3,143	-	-
Total consumption, (kWh)	989,913	-	-
Fixed – network access charges	$45,480	$12,054	$12,054
Energy consumption charge	$22,176	$13,745	$13,745
Capacity charge	$100,268	$43,153	$64,730
Total network bill (per annum)	$167,924	$68,952	$90,529
Difference ($)		-$98,972	-$77,396
Difference (%)	-	-59%	-46%

Source: Ausgrid, Our TSS Explanatory Statement for 2024-29 p 23.

Gas network costs

Jemena introduced its boundary network tariffs in 2015 which led to a significant increase in the number of embedded networks.[35] A contributing factor to the increase is that volume boundary network tariffs are cheaper than the sum of the volume individual network tariffs for non-embedded customers for the same amount of gas used.

Both volume boundary and volume individual network tariffs are made up of:

- a fixed supply charge ($/annum),
- banded usage (or 'blocks') charges ($/GJ)
- ancillary activity charges (a charge per service).

Similar to the fixed charge for the network tariffs in electricity embedded networks, the fixed charge for the volume boundary tariff can be spread over the number of customers in an embedded network.

However, for gas networks volume boundary customers are subject to different block sizes for the banded usage charges compared to volume individual customers. For embedded networks, Jemena sets these at a level that recognises that beyond the boundary meter, they incur lower costs of infrastructure compared to non-embedded networks which are on the volume individual tariffs.

Table 3.3 shows a comparison of the annual network tariffs paid by embedded network customers through volume boundary tariffs to that paid by non-embedded network customers through volume individual tariffs. For an average consumption (per dwelling) of 24,400 MJ per year, our analysis shows a difference ranging from 13% to 25% depending on the size of apartment blocks being compared.

Table 3.3 Network costs differences between gas embedded and non-embedded network customers

		Embedded network customer		
	Non-embedded network customer	**40-unit apartment complex**	**100-unit apartment complex**	**315-unit apartment complex**
Fixed charge (per annum)	$51.68	$38.76	$15.50	$4.92
Banded usage charge (per annum)	$233.75	$210.38	$210.13	$210.13
Total network tariff (per annum)	$285.43	$249.13	$225.64	$215.05
Difference		**-13%**	**-21%**	**-25%**

Source: IPART Analysis.

3.5.2 Benchmarking would allow different business models to continue

Although the AER's Electricity Network Service Provider – Registration Exemption Guideline does not allow for the recovery of capital costs (discussed in Chapter 2), different business models have emerged for embedded networks as a result of the energy cost savings available to them. Many have used the difference in the energy costs to compete by providing capital contributions to developers.

Contributions are provided in exchange for the establishment of a contract with the owners corporation that is then executed at the inaugural annual general meeting. These contributions are then recovered from the embedded network customers over the life of the contract. Capital contributions may be relatively large to secure the contract with the developer and often lead to situations where the owners corporation does not own the embedded network infrastructure.

At our public hearing, we heard that under an embedded network 'service' model, the embedded network provider is responsible for any ongoing capital costs, which are also recovered from customers on a smoothed basis through prices. Stakeholders expressed the following views about this business model:

- Origin stated that owners corporations typically want to recover capital costs through the energy prices.
- One stakeholder noted that recovering the costs of the embedded networks through bills can reduce costs for owners corporation corporations.
- An individual said that it is a positive that a service model reduces the responsibility that a owners corporation has to take to maintain part of the asset.[36]

Unlike cost-based approaches which are prescriptive about which costs are recovered and the level of cost recovery, an approach based on benchmarking to market prices would allow these existing business models to continue. Where energy costs are lower than the market prices, sellers could continue to use the savings to offset other costs. This makes it well suited to the existing market, as described by Energy Locals which stated that there is not a universal approach to capital investment and there may not be a “one-size fits all” methodology to factor investment into the cost of supply to a customer.[37]

We understand that most embedded network sellers already benchmark their embedded network prices to market offers. For these sellers, using the benchmarking approach to set maximum prices should not result in significant changes in their expected revenues available to manage their costs.

3.5.3 Benchmarking to market prices provides an incentive to install sustainable technologies

Many sustainable technologies such as solar and heat pumps can reduce the lifecycle energy costs of supplying energy. However, a 'split incentive' problem arises where an occupier accrues the benefits through lower bills (for example, because less energy needs to be purchased from the grid), but developers/owner investors bear the upfront costs of installation.

As discussed above, the efficient costs of supplying embedded network customers are significantly lower than the efficient costs of supplying an equivalent on-market customer. Therefore, setting prices based on a market based benchmark provides an opportunity for embedded network sellers to use the savings to offset the capital costs of sustainable technologies. A price-based benchmark also benefits occupiers by providing assurance that they are not worse off than on-market customers.

Box 3.1 illustrates how this helps solve the problem of split incentives, using an example of 2 integrated heat pumps and storage units that were installed in a 15-apartment North Sydney building.

Box 3.1 The problem of split incentive in a 15-unit apartment complex

In this case study, heat pumps were installed to replace gas metered systems that were previously used in the apartments. Since the payback period is about 5 years, with a lifecycle of 15 years, it is economically beneficial for tenants and owner-occupiers to retrofit the building with the heat-pumps.

However, if the owner-investors do not share in the benefits of savings on the energy bill of $5,900 per year, there is no clear incentive for them to invest the required $30,000 capital outlay. Therefore, the building may not be retrofitted with the heat pumps, despite the project's positive net present value and sustainability benefits.

In this example, if prices were benchmarked to the market offer prices, the embedded network seller would recover its capital costs over 5 years. They would then incur significantly lower costs thereafter, providing an incentive to install the heat pumps. These cost savings could be shared with end-use customers.

Upfront costs	$30,000
Savings on the building's annual energy bill	$5,900
Payback period for residents (years)	5.1
Heat pump life-cycle	15

Draft decision

2. Setting maximum prices by benchmarking them to what on-market customers are paying best protects embedded network customers and meets our draft pricing objectives.

Chapter 4

Maximum price methodology for electricity and gas

04

Chapter 2 explained our draft recommendation to use a benchmarking approach for setting maximum prices for electricity, gas, and hot and chilled water.

This chapter details our draft benchmarking methodology for setting the maximum prices for electricity and gas sold in embedded networks. It discusses several dimensions we have considered in setting a market benchmark, including:

- the form of the maximum price
- the benchmark price level
- whether we need to set different prices for different customer types
- whether we need to set different prices for different locations
- the frequency that the benchmark is applied

4.1 Overview of our draft recommendations

Our draft methodology proposes retail market price benchmarks to set maximum prices for electricity and gas. A maximum price would comprise:

- a consumption charge equal to the median consumption charge of the lowest consumption charges from the offers of active retailers in the market
- a daily supply charge equal to the median supply charge of the lowest supply charges from the offers of active retailers in the market.

A different benchmark would apply for residential and business customers. A different benchmark would also apply in each of the 3 electricity distribution districts in NSW: Ausgrid, Endeavour Energy and Essential Energy. This is in line with how the AER sets the Default Market Offer (DMO) and largely reflects the difference in network prices especially between the rural and regional Essential Energy network and Ausgrid and Endeavour Energy, which supply to mostly urban areas. Similarly, we would set different benchmarks for each gas distribution network to reflect underlying differences in network prices.

The median tariffs would be calculated using single rate tariff offers, using available offer data on the Australian Energy Regulator's Energy Made Easy website.

Under our draft pricing methodology, embedded network sellers would also be able to charge different consumption tariffs from different times of the day (a 'time-of-use tariff') as long as the average consumption tariff does not exceed the determined consumption charge when weighted using the AER's DMO model annual usage profiles.

Historical data shows that the median of active retailers' lowest offers is around the 20th percentile of all market offers. We consider that this level provides the right balance of customers not being worse off than on-market customers, and sellers being able to recover their energy costs.

4.2 We propose setting maximum tariffs

In setting the methodology for electricity and gas, we considered two main forms that the maximum price could take:

- A bill cap for a given level of usage, for example, $2,000 for 4,000 kWh of annual usage.
- Maximum tariffs, for example, a maximum daily supply charge of $1/day and a maximum consumption charge of $0.40/kWh. This is what was recommended for land lease communities in the Department of Customer Service's (DCS*) Residential (Land Lease) Communities Act 2013* Statutory Review.[38]

In our view, the bill cap has several drawbacks which means that it is less transparent, and less simple for customers to understand. We consider it is more difficult for customers to relate a bill cap to their own bill, which in most cases will be for a consumption level that differs from the typical customer profile. To understand how their offer relates to the bill cap (and check if the offer is compliant), they will need to multiply out their tariffs to calculate a total bill at the representative consumption level and comparing it to the bill cap.

A bill cap could also be misinterpreted as an absolute cap on bills for all levels of consumption. Some customers may think their bills cannot exceed the bill cap figure regardless of their consumption.

A bill cap would require setting a model consumption profile. To set the DMO, the AER determines a different model annual usage and reference price for each distribution region[a] and each type of small customer (residential/small business customers). The model annual usage is determined based on how much electricity a broadly representative small customer of a particular type in a particular distribution region would consume in a year and the pattern of that consumption.

For 2023-24, the AER used a consumption level of 3,911 kWh to 4,913 kWh in NSW, (depending on the distribution region), reflecting the average[b] consumption of all customers. The average consumption of embedded network customers is likely to be lower than for all customers because most embedded network customers live in apartments. A significant mismatch between the model consumption and the actual average consumption for a particular group can lead to higher bill outcomes for consumers as illustrated in Box 4.1.

[a] The distributions regions are the same as distribution districts in NSW.
[b] The AER's methodology for determining the residential model annual usage has been largely unchanged since DMO 2019-20 Determination. At that time, average consumption per customer was calculated based on the distribution business' 2018-19 annual pricing model.

Box 4.1 Mismatch between model and actual consumption leading to high bill outcomes

			Customer bill at different levels of consumption			
Offer	Supply charge ($/day)	Consumption charge ($/kWh)	1,000 kWh/year	2,000 kWh/year	3,000 kWh/year	4,000 kWh/year
A	1.00	0.40875	$773.75	$1,182.50	$2,000	$2,817.50
B	2.00	0.3175	$1,047.50	$1,365.00	$2,000	$2,635.00

As illustrated above, there are various combinations of supply and consumption charges that would be compliant with a maximum price cap.

For example, if an embedded network operator has a majority of customers whose electricity consumption is around 2,000 kWh/year, the operator can choose to charge the supply and consumption charges represented by offer B to maximise their revenue.

While still being a compliant offer which would not exceed the maximum price of $2000 for 4,000 kWh/year, this would disadvantage these customers whose actual annual consumption levels vary significantly from the model consumption.

Source: IPART analysis

To overcome this issue, we could set different benchmarks for different premise types based on the typical consumption for each (for example, caravans, apartments, and townhouses separately).

Our draft recommendation is to set maximum tariffs. We consider that it is simple for customers to understand and is less complex because the same maximum benchmark can be applied for all residential customers without disadvantaging any particular group.

4.3 We propose benchmarking to the median of the lowest tariffs

For any given area and customer type, there is a range of market offers. Table 1.1 illustrates the range of residential flat-rate tariffs in Ausgrid's distribution district in September 2023 (including any discounts and GST). It calculates the annual bill for these tariffs at the Ausgrid DMO consumption level of 3,911 kWh, and compares it to the DMO bill of $1,827.

Table 4.1 Distribution of residential flat-rate market offers (Ausgrid, September 2023)

Level	Daily Supply charge (c/day)	Consumption charge (c/kWh)	Total annual bill[a]	Discount to the DMO[b]
Minimum tariffs (all retailers)	57.00	27.06	$1,266.37	-31%
5th lowest tariffs (all retailers)	75.76	31.94	$1,525.59	-16%
10th percentile tariffs (all retailers)	78.96	32.26	$1,549.90	-15%
20th lowest tariffs (all retailers)	83.85	32.95	$1,594.54	-13%
20th percentile tariffs (all retailers)	83.85	33.05	$1,598.57	-13%
50th percentile tariffs (median) (all retailers)	89.79	34.19	$1,664.84	-9%
Median offer[c] (all retailers)	91.81	33.91	$1,661.48	-9%
Median of lowest offer (retailers with >1000 customers)	89.79	33.17	$1,624.97	-11%
Median of lowest tariffs (retailers with >1000 customers)	86.22	33.23	$1616.79	-12%
Median of lowest tariffs (top 10 retailers by market share)	87.08	33.17	$1615.05	-12%
Median of lowest tariffs (top 5 retailers by market share)	85.58	34.19	$1649.46	-10%

a. Using the DMO consumption of 3,911 kWh per year

b. Compared to the DMO price in Ausgrid's distribution district of $1,827 (no controlled load)

c. The median offer represents an actual offer in the market while the median tariffs are the median consumption and median usage charge from all the offers in the market

Source: Energy Made Easy Data and IPART Analysis

In benchmarking the maximum tariffs to market offers, we considered where in the range of offers we should set the benchmark.

In the *Residential (Land Lease) Communities Act 2013* Statutory Review in 2021, DCS considered that the maximum price for customers in land lease communities should be capped at the median on-market offer.[39]

In response to our consultation papers, many industry stakeholders supported setting prices at the DMO level which is at the higher end of what on-market customers are paying.[40] Other stakeholders suggested benchmarking to market offers:

- PIAC considered that the maximum price should be benchmarked to the lowest available offer.[41]
- Austin Tourist Park supported the DMO, but as an alternative, suggested the maximum price could be set according to the median tariff from the 5 largest retailers in NSW.[42]

Origin did not support benchmarking to the lowest available offer. At the stakeholder workshop it noted that some of the lowest prices in the market represent short term discounts that are below cost. Therefore, benchmarking to the lowest offer could result in maximum prices that are below the efficient costs of supply.[43]

We agree that using the lowest offer is problematic for the reasons suggested by Origin, but also because there are sometimes data input errors that cause an offer to be much lower than intended, or there may be eligibility requirements associated with that offer that are not captured in in the input data. To address these risks, we consider that a broader range of offers should be used to determine the maximum price.

We consider there is a significant drawback associated with setting prices at a given percentile such as using the median tariffs as suggested by Austin Tourist Park. It creates an opportunity for retailers to influence the price level by placing a lot of offers at the top price range regardless of whether customers are taking them up. The data does not provide visibility over how many customers are on the various market offers, and so we are not able to calculate a weighted average market-offer price. To overcome these issues, we recommend setting prices by using the median lowest tariffs from each active retailer in the market (including any discounts and GST).

In calculating the median lowest offer, our draft recommendation is to only include retailers with more than 1000 customers ('active retailers') that have an active offer available on the benchmark day. This:

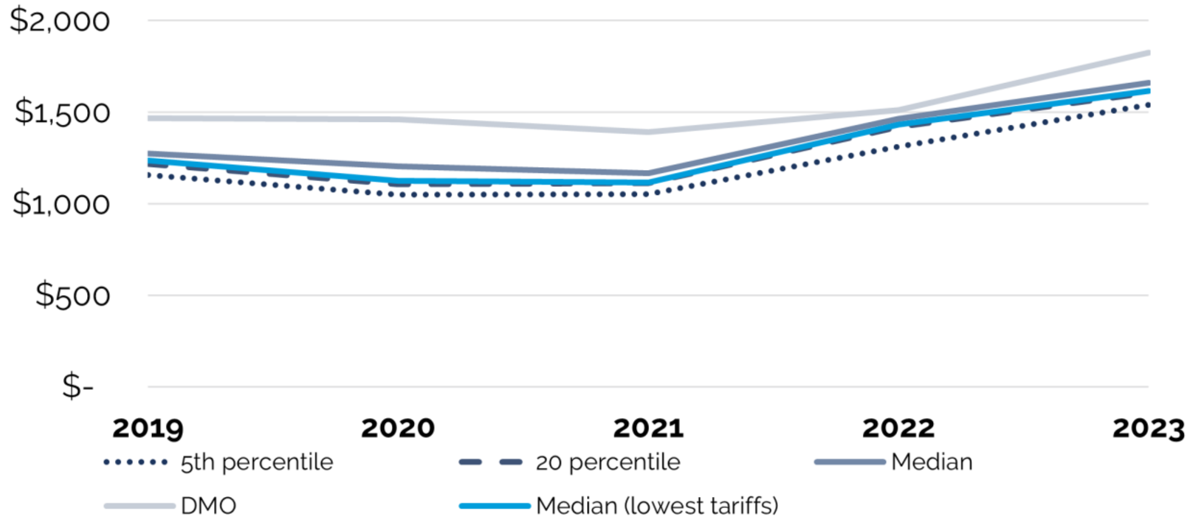
- ensures that all relevant market offers that may be taken up by on-market customers are used to calculate the median, including those from smaller retailers
- provides a safeguard against retailers setting up subsidiary retail operations intended to influence the price cap (but may not supply many customers).

Figure 4.1 shows that over the last 4 years, the median of the lowest tariffs for electricity has been around the 20th percentile in the Ausgrid network. Because the spread of offers in the range has been relatively small over this time, it is also fairly close to the median offer. To illustrate, compared to the DMO (at the DMO consumption level):

- the median offer has been 12% lower on average
- the 20th percentile offer has been 16% lower on average
- the median of the lowest tariffs has been 15% lower on average

Last year when market offers were very close to the DMO, the median offer was 3% lower than the DMO, while the lowest median tariffs were 5% lower.

Figure 4.1 Comparing market offers to the Default Market Offer for a typical customer since 2019 (Ausgrid network)



Note: Bills are calculated for the DMO level of consumption.

4.3.1 Using a single consumption charge for gas

Currently, the network tariffs of most gas distributors, including Jemena, AGN and Evoenergy, use declining block structures.[44] This means that for the consumption charge, the price per unit of consumption falls the more gas the customer uses. As customers consume progressively more gas within a billing period, they meet the thresholds between blocks and pay progressively lower per unit prices. Jemena considers that this reflects:

- that the costs of providing additional capacity decreases with volume increases. This ensures that customers receive price signals that reflect the costs of providing gas.
- the objective to promote utilisation of the network and incentivise customers to use gas.[45]

We have considered whether to set different benchmark consumption rates for different tariff blocks to reflect the widely used declining block tariff structure. This would also avoid the potential to set a lower maximum consumption rate than is appropriate for embedded network customers, given that they likely use less gas than the average on-market customer. Our view is that setting various consumption rates for different blocks would be problematic because:

- The blocks used differ between retailers. For example, not all retailers in Jemena's distribution district offer all the blocks offered by Jemena, preferring to adopt simpler tiered structures to reduce transaction costs and enhance customers understanding of bills.[46]
- There is potential for distributors to adopt flat tariffs or inclining block tariffs in the future. The AER has recently reviewed the use of declining block tariffs and decided to consider whether flat, declining or inclining block tariffs should be used on a case-by-case basis in the context of individual access arrangement reviews.[47]
- The AER observed that retail gas tariffs typically have a 'V' shape which does not reflect the declining block structure of network tariffs (i.e. the first consumption block is priced relatively high, the second block relatively low and the third and final block is priced relatively high).[48]

Our draft recommendation is therefore to set a single maximum consumption charge for gas in each distribution area based on a representative annual consumption of 10,000 MJ for a gas embedded network customer in NSW. This would allow the benchmark consumption tariff to be applicable regardless of which tariff structure retailers are charging.

4.3.2 We propose setting different benchmarks for business and residential customers

In recommending the appropriate methodologies for setting maximum prices, the Terms of Reference require us to take account of differences between different customer groups in different types of embedded networks (for example, apartment blocks, caravan parks, shopping centre tenants).

This section details how we have considered different customer types in embedded networks, particularly small business customers and customers in residential land lease communities.

We propose setting a different benchmark for small business customers

Currently, prices for small business customers in electricity embedded networks (e.g. in shopping centres) are capped at the AER's small business DMO if supplied by an exempt seller. The small business DMO price cap differs from the residential customer DMO and is set using a higher model annual usage (10,027 kWh in 2023).

Given that small business customers are charged different prices to residential customers (reflecting different underlying network tariffs), we recommend setting a different benchmark for small business customers.

In its submission to our consultation papers, the Shopping Centre Council of Australia stated that in its experience, embedded network issues are almost exclusively in relation to residential embedded networks. It also said its tenants, including 'small' energy customers can be large organisations which are not vulnerable.[49]

While we consider this is true for medium and large business customers, our view is that small business customers in embedded networks would benefit from price regulation. The ACCC, in its 2018 Retail Electricity Pricing Inquiry found an overlap of issues between households and small businesses. These included:

- Small business customers' engagement with retailers (e.g. searching for offers or dealing with day-to-day issues like billing) being just as difficult as their household counterparts
- Small business customers being on higher rates of undiscounted offers compared to residential customers as most were typically time-poor sole traders who have no staff to dedicate to energy procurement.[50]

The ACCC considered these issues warranted implementing similar measures between the two groups to help them find better deals, including implementing a DMO specific to small business customers. Similarly, we consider that small business customers, like residential customers would benefit from a maximum price that benchmarks to on-market offers.

The current supply charge discounts for residential land lease customers

There are currently different pricing restrictions for different types of embedded network customers.

Residents in land lease communities supplied through an embedded network cannot be charged more for a utility than the operator of the community has been charged for the supply or use of the utility.[51]

Under the calculation method that was used by the NSW Civil and Administrative Tribunal (NCAT) in the case *Reckless v Silva Portfolios Pty Ltd t/as Ballina Waterfront Village and Tourist Park (No. 2)*[52] ("Reckless method"), all charges in an operator's bill are combined, and then divided by the total number of kilowatt hours the operator has been charged for the whole community. This results in a single per kilowatt hour (kWh) rate. To calculate the correct charge for the home owner, the rate per kWh is multiplied by the total kilowatt hours used by the home owner.

In the *Residential (Land Lease) Communities Act 2013* Statutory Review, the report considered that operators should be able to charge up to the median market tariffs, similar to our draft recommendation. We consider that our recommended methodology would be suitable for land lease communities, as it would ensure that they are not charged more than on-market customers.

Under the *Residential (Land Lease) Communities Regulation 2015*, residents who receive less than 60 amps[c] of electricity are entitled to the following discounts on their service availability charge:

- 30% discount to the daily supply charge for residents with 30 amps or more but less than 60 amps
- 50% discount to the daily supply charge for residents with 20 amps or more but less than 30 amps
- 80% discount to the daily supply charge for residents with less than 20 amps.[53]

DCS' Statutory Review considered that it was appropriate that customers experiencing poor amperage should not be required to pay the full price for a utility which is not delivered in full.[54] Operators argued that discounts should be removed because the costs of supplying electricity to a community are the same regardless of the amperage received. However, the review considered that the quality of life of residents on low amperage is compromised. Many residents face difficulties using basic appliances such as toasters and kettles at the same time.[d]

In response to our consultation papers, the Tenants Union NSW submitted that the discounts would provide an incentive for a network operator to upgrade its infrastructure to ensure all customers receive at least 60 amps.[55] We agree that discounts for low amperage are appropriate. They would also reduce any bill impacts of moving from the Reckless method to our methodology.

c Low amperage is estimated to be experienced by at least 93% of residents.

d After modelling the impact of a number of different discount options, the Statutory review recommended the existing discounts to be changed to 30% discount to the daily supply charge for residents with 31-60 amps, and a 60% discount to the daily supply charge for residents with below 30 amps. However, DCS recommended that further work be done to understand the cost implications because its modelling was based on a very small sample of bills (11) provided..

Draft recommendation

1. Maximum gas and electricity pricing methodology for embedded networks comprise:
   - A consumption charge set equal to the median consumption charge of each active retailers' lowest consumption charge (inclusive of discounts and GST) for their generally available offers
   - A fixed rate set equal to the median supply charge of each active retailers' lowest fixed charges (inclusive of discounts and GST) for their generally available offers.

   A separate price should be set for each distribution district, and for small business and residential customers separately.

   An active retailer is defined as any retailer with at least 1000 customers in NSW that has an active offer available at the time the benchmark is calculated.

4.4 Our draft methodology allows for cost-reflective pricing

One of our pricing objectives is to allow for cost reflective pricing. Cost-reflective prices allow consumers to compare the value they place on using electricity networks with the costs of using them. This can help ensure the overall use of the network is sustainable over time and can avoid large future bill impacts.

In addressing this objective, we have considered how the benchmark maximum price could allow for time of use tariffs. Time of use tariffs have different consumption rates at different times of the day. Specifically, time is divided into peak, shoulder and off-peak periods which reflect the level of demand on the electricity network.

The cost of providing electricity networks is driven by the capacity needed to meet generally short peaks in usage, rather than just the amount of electricity customers use over time. Higher peak period tariffs allow the recovery of the higher costs involved in building and maintaining networks with the capacity to support customers' consumption during times of peak demand.[56] Time of use tariffs are therefore generally considered to be more cost-reflective than flat rate tariffs as customers are charged for how and when they use the network.

We considered the option of setting maximum tariffs for each tariff period based on the time-of-use offers on Energy Made Easy. However, retailers have flexibility over the times that they apply these different charges. This means the prices for 'peak periods' may not allow for a like for like comparison if they relate to different hours of the day. It can be difficult from the data to determine the comparable pricing periods and prices.

We consider it is more practical to allow for cost-reflective pricing by setting our maximum consumption charge in each distribution district as the maximum average consumption tariff in cases where customers are being charged time-of-use tariffs. The consumption tariffs would be weighted according to the flexible tariffs daily usage profiles determined by the AER for each distribution district.[57] This is the same usage profile used to determine:

- whether time-of-use standing offers are compliant with the DMO
- the discount for time-of-use offers relative to the DMO.

Seeking comment

1. Are embedded network sellers currently using time-of-use tariffs, demand tariffs, or any other innovative tariff designs?
2. How are embedded network sellers charging for electric vehicle charging at the site? What are the prices?

Draft recommendation

2. For electricity embedded networks, an embedded network seller be permitted to apply different consumption tariffs for different time periods (i.e. time-of-use tariffs), as long as the average price does not exceed the determined consumption charge when it is weighted by the AER's Default Market Offer model annual usage profiles.

4.5 Frequency of price adjustments

For our draft methodology to be effective, the frequency of price adjustments must strike a balance between responsiveness to cost changes and providing price stability to customers.

We have considered whether it would be appropriate to adjust the maximum price annually or more frequently (e.g. every 6 months or every quarter). Our main concern with annual adjustments is the lack of responsiveness to cost changes in times of high volatility.

In response to our consultation papers, Energy Locals submitted that a mechanism to adjust prices outside of the annual price review process should be introduced to enable better management of changes in costs of supply.[58] We consider examples of such mechanisms could be:

- including an overs/unders adjustment with each annual adjustment to account for high volatility which may have occurred in certain periods
- combining annual adjustments with more frequent adjustments in cases where market movements beyond a certain volatility threshold occur (e.g. occur (e.g. +/- 20%). This would allow embedded network operators to maintain the ability to cover their electricity costs during high volatility periods.

However, our view is these mechanisms would introduce added complexity to the methodology. Our draft recommendation is to adjust prices every 6 months. While this would impose a greater regulatory and administrative burden, we consider it is the most effective way of ensuring the pricing methodology is responsive to volatile cost changes while maintaining a reasonable level of price stability for customers.

We note that bi-annual price adjustments received support from PIAC in its submission to our consultation papers.[59]

Retailers can change their market offer prices at any time. However, they typically change in July every year when updated DMO prices come into effect. Going forward, we propose the following time schedules for the release of new maximum prices:

- maximum price from 1 August to 31 January: using market offers taken in July
- maximum price from 1 February to 31 July: using market offers taken in January.

4.6 Indicative prices and bills using our draft methodologies

To calculate the indicative bills for electricity residential customers, we have used different average consumption profiles as we would expect customers in apartments, townhouses, caravan parks/retirement villages to have different electricity consumption profiles. In particular, we expect the electricity consumption profiles of customers in apartments, retirement villages and caravan parks to be considerably lower than the representative one used by the AER for the entire market. This is because:

- apartments are generally smaller in size and typically accommodate smaller households compared to houses
- retirement village dwellings typically have smaller households (limited to one or 2 people)
- caravan parks are limited by one power line.

Although it is a small sample size, for illustrative purposes, we have considered the average consumption profiles indicated by the bill data we received from customers in:

1. Caravan parks/retirement villages – 2,400 kWh/year
2. Apartments – 3,800 kWh/year
3. Townhouses – 4,500 kWh/year.

Applying our draft methodology, Table 4.2 to Table 4.4 show the maximum daily supply and consumption charges and indicative bills for electricity residential customers, electricity small businesses and gas embedded network customers.

Table 4.2 Maximum electricity daily supply and consumption charges and indicative annual bills for residential customers (September 2023)

			Indicative annual bills		
Distribution district	**Consumption charge (c/kWh)**	**Daily Supply charge (c/day)**	**Caravan Parks/Retirement Villages (2,400 kWh)**	**Apartments (3,800 kWh)**	**Townhouses (4,500 kWh)**
Ausgrid	33.23	86.22	$1,112.17	$1,577.35	$1,809.94
Endeavour	32.96	91.71	$1,125.75	$1,587.16	$1,817.87
Essential	36.50	158.12	$1,453.08	$1,964.06	$2,219.54

Table 4.3 Maximum electricity tariffs and indicative bills for small business customers

Distribution district	Consumption charge (c/kWh)	Daily supply charge (c/day)	Indicative Annual Bill (at 10,027 kWh)	Discount to the DMO
Ausgrid	36.58	200.73	$4,400.57	-12%
Endeavour	36.54	115.50	$4,085.80	-11%
Essential	43.50	182.60	$5,027.96	-13%

Table 4.4 Maximum gas daily supply and consumption charges for residential and small business customers (November 2023)

Supply area	Residential usage charge (c/MJ)	Residential supply charge ($/day)	Business usage charge (c/MJ)	Business supply charge ($/day)
AGN Adelong, Gundagai and Tumut	3.39	0.97	2.97	1.04
AGN Albury	2.69	0.70	2.55	0.82
AGN Bombala and Cooma	3.47	0.78	3.07	1.01
AGN Murray Valley (NSW)	3.98	0.80	3.01	0.98
AGN Temora, Culcairn, Holbrook, Henty and Walla Walla	3.42	0.87	3.16	0.91
AGN Wagga Wagga	3.04	1.06	2.43	1.45
Allgas Energy NSW	3.69	1.23	3.20	1.30
Central Ranges Pipeline Tamworth	4.55	0.73	4.18	0.94
Evoenergy Queanbeyan	3.66	0.77	3.48	1.02
Evoenergy Shoalhaven	3.77	0.95		
Jemena - Capital Region	3.97	0.63	2.90	0.79
Jemena Coastal Network	3.75	0.66	3.42	0.80
Jemena Country Network	4.42	0.71	3.23	0.80

Chapter 5

Maximum pricing methodology for hot water

Body text for the explanatory text

05

Our Terms of Reference asks us to investigate and make recommendations on an appropriate methodology for IPART to use in setting maximum prices for hot water supplied through embedded networks.

This chapter sets out our draft pricing methodology for hot water, and discusses whether:

- prices should be set in water units or energy units or both
- there should be different prices for different types of hot water systems, including gas and electric hot water systems
- the efficiency of hot water systems should be addressed through prices.

5.1 Overview of our draft recommendations

Our draft pricing methodology recommendation is to set a maximum hot water price based on the costs of supplying hot water with a centralised gas hot water system, expressed as:

$$\text{Maximum hot water price (cents/L)} = \text{gas common factor (MJ/L)} \times \text{benchmarked gas price (cents/MJ)}$$

Where:

- the benchmarked gas price is based on the maximum gas consumption charge for embedded network customers.[a]
- the maximum common factor is equal to 0.4 MJ/L.
- No additional supply charge would be allowed for hot water services.

Under our draft recommendations, embedded network sellers could bill customers in water units or the underlying energy unit. We propose that where customers are billed in the energy unit, the energy unit multiplied by the common factor must not exceed the maximum hot water price. This provides flexibility to embedded network sellers and also ensures that customers are not paying more because of the units in which they are billed.

We consider that this draft methodology is representative of what an on-market customer with a centralised hot water system would pay.

Our draft methodology uses the benchmarked gas consumption charge to set maximum prices for hot water because gas is the underlying fuel source for most existing embedded networks. A maximum hot water price based on gas could also provide an incentive for sites to utilise more efficient systems, such as electric heat pumps because they have lower operational costs, and they could use the difference in their operating costs and the maximum price to recover the capital costs on site.

We propose to prescribe a common factor as part of our draft methodology to ensure that customers do not bear the costs of system inefficiencies, which are outside of their control. We understand that inefficient systems have been the main driver of very high hot water bills for some customers.

[a] As discussed in Chapter 4.

There is an established methodology and good data for calculating a benchmark MJ/L conversion factor (or 'common factor') for gas hot water systems. 0.4MJ/L is the maximum common factor required by Jemena for the design and certification of new centralised hot water systems to ensure that the system's efficiencies are comparable to that of other-gas hot water systems.

5.2 Evidence of high hot water bills

In 2022, the NSW Parliament Legislative Assembly Committee on Law and Safety released the Final Report on its inquiry into embedded networks in NSW. The inquiry found evidence of embedded network customers receiving very high hot water bills. Several examples were cited including a customer who received a bill of $2,000 for a period of 9 months, and their neighbour, who received a bill of $9,700 for a period of 14 months[60] and customers paying between $200 and $300 per month for hot water.[61]

These costs are significantly higher than we would expect most on-market customers pay for hot water. We expect that most on-market customers in a 2-bedroom apartment would pay less than $650 per year for hot water. Table 5.1 shows there is significant variation in how much customers pay for their hot water, depending on the type of hot water system, and whether it is shared or an individual system, the fuel type (including whether solar is used), and whether a customer has access to a controlled load tariff.[b]

[b] A controlled load is a tariff available for large appliances such as electric hot water systems that are metered separately. Controlled load tariffs are generally lower because the appliances operate during off-peak hours.

Table 5.1 Hot water costs for a typical 2-bedroom household (104L/day)

Type of hot water system	Electricity Tariff	Annual energy consumption	Annual price of hot water [a]	Fuel price	Price (cents/Litre) [b]	Common factor
On-market customers						
Electric storage	Continuous	2,075 kWh	$623	30 c/kWh	1.64 cents	54.7 kWh/KL
	Off-peak 1	2,141 kWh	$321	15 c/kWh	0.85 cents	56.4 kWh/KL
Electric instantaneous	Continuous	1,539 kWh	$462	30 c/kWh	1.22 cents	40.5 kWh/KL
	Off-peak 1	1,539 kWh	$231	15 c/kWh	0.61 cents	40.5 kWh/KL
Solar with electric booster	Continuous	726 kWh	$218	30 c/kWh	0.57 cents	19.1 kWh/KL
	Off-peak 1	749 kWh	$112	15 c/kWh	0.30 cents	19.7 kWh/KL
Heat pump	Continuous	692 kWh	$208	30 c/kWh	0.55 cents	18.2 kWh/KL
	Off-peak 1	714 kWh	$107	15 c/kWh	0.28 cents	18.8 kWh/KL
Gas storage		9,340 MJ	$299	3.2 c/MJ	0.79 cents	0.25 MJ/L
Gas (common hot water system)		9,340 MJ	$450	3.2 c/MJ	1.12 cents	0.35 MJ/L
Gas instantaneous		8,523 MJ	$273	3.2 c/MJ	0.72 cents	0.22 MJ/L
Solar with gas booster		3,269 MJ	$105	3.2 c/MJ	0.28 cents	0.09 MJ/L
Embedded network customers (based on the prices from a sample of customer bills)						
Gas		3,444 MJ	$372	4.17 c/MJ	0.98 cents	0.23 MJ/L
[c]		-	$607	-	1.60 cents	-
Not disclosed		-	$755	-	1.99 cents	-

a. Calculated using an Ausgrid calculator which uses energy prices indicative of competitive 2022–23 pay-on-time offers advertised by the major energy retailers for residential customers in the Ausgrid network area and the Jemena mains gas network area.
b. Calculated using a daily usage of 104L.
c. These bills were charged in the water unit. The underlying fuel type was not disclosed on the bill.

Source: Ausgrid Hot water calculator, IPART Analysis.

5.2.1 Inefficient systems are likely the leading cause of high bills

The Parliamentary Inquiry's Final Report did not explain the reasons for the very high embedded network bills it referred to. However, it found that external factors (e.g. temperature settings and efficiency) are likely to be why some customers are paying very high hot water bills.[62] Similarly, in 2019 the Australian Energy Market Commission reported it is likely that embedded network customers are paying estimated prices for hot water due to external factors.[63]

The efficiency of a common hot water system can be determined by calculating the common factor for the building. For gas hot water systems, the common factor is calculated by dividing the amount of gas used to heat the water for the common hot water system, divided by the total amount of hot water consumed by the building. The calculation can take into account energy losses.

The common factor is expressed as:

$$\frac{Energy\ Consumed\ (MJ/day)\ +\ Boiler\ Maintenance\ Meter\ Valve\ Losses\ (MJ/day)\ +\ System\ Losses\ (MJ/day)\ -\ Heat\ Gains\ (MJ/Day)}{Total\ water\ usage\ at\ the\ building\ (L/day)}$$

The common factor for a building can be influenced by a number of variables such as the daily usage per residence, occupancy of the building and the efficiency and maintenance of the system.[64] Customers have little control over these variables that effect efficiency.[65]

The common factor can be used in billing, by calculating the share of energy to be apportioned to an individual premise, based on their share of the building's overall hot water usage[66], as shown in Box 5.1. It is the standard way of determining the gas consumption for non-embedded network customers with centralised gas hot water systems.[67] This approach passes any system inefficiencies directly onto customers.

The Energy and Water Ombudsman (EWON) cannot investigate complaints related to external factors, such as the efficiency or condition of a system or the occupancy of a building.[68] EWON recommends referring complaints about high common factors to the body corporate or building owner.[69]

For embedded networks, most suppliers charge in units of hot water ($/L)[70], and so the underlying inputs are not disclosed (i.e. fuel price and common factor). The application and calculation of a common factor may vary depending on the provider.[71]

Box 5.1 Application of the common factor in billing and its relationship with other factors

(1) $$Total\ gas\ consumption\ (MJ) = heat\ loss + heat\ required + maintenance - energy\ augmentations\ (solar)$$

(2) $$Common\ factor\ (MJ/L) = \frac{energy\ consumed\ (MJ)}{hot\ water\ consumed\ (L)}$$

(3) $$Energy\ consumption\ (MJ) = hot\ water\ consumed\ (L)\ \times\ commmon\ factor\ (MJ/L)$$

(4) $$Price(cents/L) = common\ factor\ (MJ/L) \times benchmarked\ gas\ price\ (\$/MJ)$$

(5) $$Customer\ charge\ = hot\ water\ consumed\ (L)\ \times\ gas\ hot\ water\ price\ (cents/L)$$

Source: Jemena NSW Gas Networks Design Guide, p 13, IPART calculations.

5.3 Draft hot water pricing methodology

Our draft pricing methodology recommendation is to set a maximum hot water price based on the costs of supplying hot water with a centralised gas hot water system, expressed as:

$$\text{Maximum hot water price (cents/Litre)} = \text{gas common factor (MJ/L)} \times \text{benchmarked gas price (cents/MJ)}$$

- Where:
- The benchmarked price of gas is equal to the maximum gas consumption charge for embedded network customers.[c]
- The maximum common factor is equal to 0.4 MJ/L.

No additional supply charge would be allowed for hot water services.

provides a worked example of the maximum pricing methodology.

Box 5.2 Worked example

$$Price\ (cents/L)\ =\ common\ factor\ (MJ/L)\ x\ benchmarked\ gas\ price\ (\$/L)$$

$$= 0.4 MJ/L^{a} \times \$0.0375/MJ^{b}$$

$$=\ 1.5\ cents\ /L$$

a. Proposed maximum common factor.
b. In line with Jemena's current median gas price.
Source: Energy Made Easy gas prices, IPART calculations.

Energy Metrics Consulting, suggested a maximum annual cost (similar to the "DMO") for a given consumption level.[72]

Unlike the DMO, our draft approach does not require a model consumption level. We consider that a maximum price set in cents/Litre would be easier for customers to understand compared to a bill cap for a given consumption level, as discussed previously in Chapter 4.

5.3.1 Using gas as the underlying fuel source

Most submissions stated that a maximum price for hot water should be linked to the price of the fuel source used to heat the water.[73] Other submissions considered that the hot water price should be based on a particular fuel type.[74] EnergyAustralia, suggested that the DMO should be applied to hot water to maintain regulatory consistency, or where the underlying fuel is gas, the price should be linked to the DMO.[75]

[c] As discussed in Chapter 4.

Our draft pricing methodology uses the maximum gas consumption charge for embedded network customers to set the price of hot water for all sites, regardless of the underlying fuel type. This is because almost all existing sites are supplied using gas, and there is good data for calculating a common factor. In contrast, because there are few electric centralised hot water systems, there is little data on the common factors currently being applied. This makes it difficult to calculate a benchmark common factor for electric centralised systems.

Energy Metrics Consulting submitted that:

- A maximum price for hot water equal to standing offers from major retailers would encourage operators to ensure that their systems are as efficient as possible.
- If a maximum price was set below an equivalent gas standing offer, then embedded network sellers would need to ensure that systems are as efficient as possible to recover the cost of the capital they outlay to supply the plant.
- Setting a maximum price lower than the discounted gas tariffs offered in the market may cause embedded network operators to withdraw hot water services from their offerings or compel them to introduce capital recover charges.[76]

Under our draft methodology, customers would not pay more than on-market customers with centralised hot water systems. This is because our draft methodology uses the on-market median of retailer's lowest gas prices.[d] Using the median of the lowest retail gas prices would also provide an incentive for operators to ensure that their systems are efficient.

Applying a hot water price based on gas as the underlying fuel may provide an incentive for sites to install efficient electric systems such as, heat pumps. This is because the operational costs are significantly lower, and so operators could use the difference between the costs of supplying hot water with the heat pump to offset the upfront capital costs of installing or retrofitting the infrastructure. After an estimated pay-back period of around 5 years, the lower operational costs are ongoing, and could be passed through to end users through lower prices.

We note that Victoria prescribes common factors for both gas and electric hot water. The prescribed electricity common factor is 89 kWh/KL, which must be combined with an off-peak tariff for electricity systems.[77] shows that using Victoria's common factors, the resulting hot water prices in cents per litre is very similar to the hot water price to our draft methodology.

[d] i.e. our recommended maximum gas price for embedded network customers discussed in detail in Chapter 4.

Table 5.2 Hot water prices using electricity and gas inputs

Fuel	Fuel price	Common factor	Hot water price (cents/Litre)	Annual bill [a]
Gas	3.75 cents/MJ[b]	0.4 MJ/L	1.500	$602.25
Electricity	18 cents/kWh (off-peak tariff)	89 kWh/KL (Victorian common factor)	1.602	$643.20
Electricity	33 cents (electricity benchmark)	89 kWh/KL (Victorian common factor)	2.937	$1,179.20
Electricity	18 cents/kWh (off-peak tariff)	54.7 kWh/KL (based on an individual storage system)	0.985	$395.31
Electricity	33 cents (electricity benchmark)	54.7 kWh/KL (based on an individual storage system)	1.805	$724.75

a. Based on an annual consumption of 40,150L.
b. Gas price for the Jemena Coastal network.
Source: Ausgrid Hot water calculator, IPART Analysis.

5.3.2 Using maximum gas prices

Our draft methodology uses the maximum gas consumption charge for embedded network customers. Where customers are billed in cents/Litre, the maximum gas consumption charge is multiplied by the gas common factor to calculate the maximum hot water price.

At our stakeholder workshop, Energy Metrics noted where customers are billed in water units, currently very large hot water users can be worse off compared to if they had been billed for the gas used. This is due to the declining block tariffs in gas that are currently not applied to hot water charges.[78]

We have considered how our draft methodology could address this issue. Our view is setting different prices for different volumes of hot water would introduce disproportionate system complexity for embedded network sellers. This would require us to set different consumption charges for the various gas consumption blocks in each distribution network. In addition, we consider that setting the maximum hot water price based on a single maximum gas consumption tariff does not result in very large hot water users being worse off than on-market customers because:

- As noted in section 4.5, while gas distributors use declining block tariffs, the AER has found that retail gas tariffs typically have a 'V shape' (i.e. the first consumption block is priced relatively high, the second block relatively low and the third and final block is priced relatively high). This means very large water users would not be disadvantaged since the single maximum consumption charge is based on the model consumption of a typical embedded network customer.
- Our draft methodology is based on the median of the lowest gas consumption charge rather than the median consumption charge which achieves a lower maximum price for all hot water users regardless of how much water they use.

We consider our draft methodology provides the right balance between simplicity, ensuring embedded network customers are not paying more than on-market customers and ensuring embedded network sellers are able to recover their costs.

5.3.3 Prescribing a maximum common factor

Some stakeholders said that system inefficiencies should not be passed onto customers.[79] We heard that:

- The common factor methodology is not supported due to a variety of factors such as variability in bills[80], lack of regulation for common factors[81] and that it penalises customers where systems are not efficient.[82]
- Pricing needs to reflect that the calculation of the common factor is in the control of the embedded network operator and not the customer. This means there is no incentive for operators to ensure that the common factor is low.[83]
- Many embedded network sites do not have energy meters installed on centralised hot water systems and so they are unable to calculate actual common factors.[84] These embedded network sellers bill their customers in water units. By prescribing a maximum common factor, our draft methodology does not require embedded network sellers to install energy meters to calculate site specific common factors.
- Some stakeholders support the use of a common factor[e] as a safeguard to encourage upgrades to the efficiency of buildings.[85]

Box 5.3 Regulation of hot water in Victoria

In Victoria, the sale of bulk hot water is regulated through the Energy Retail Code of Practice.

The Energy Retail Code prescribes maximum common factors for the sale of all bulk hot water (i.e. for embedded *and* non-embedded networks). The prescribed maximum common factor is 0.497 MJ/L where gas is the underlying fuel source and 89 kWh/KL where electricity is the underlying fuel source. The common factor for electricity must be combined with an off-peak tariff for electric systems.

The Energy Retail Code also outlines specific information that must be included in hot water bills including the water consumed and the conversion factor used to calculate the hot water charge.

Source: *Energy Retail Code of Practice*, Schedule 4.

Our draft recommendation is to prescribe a maximum common factor to ensure customers do not bear the cost of inefficiencies. This would provide an incentive for embedded network operators to maintain their systems (i.e. to avoid operating at a loss).

[e] A factor used to convert litres of hot water used into energy units.

Our draft recommendation is to prescribe a maximum common factor for gas of 0.4 MJ/L based on the Jemena Gas Networks Design Guide. Jemena's NSW Gas Networks Design Guide provides that all gas centralised hot water systems should be designed, installed, and maintained to achieve a common factor of no more than 0.40MJ/L. Jemena states that this "ensures that the system delivers comparable energy efficiencies to that of other gas fired hot water systems".[86] The guide also states that where the calculated common factor for a system is greater than 0.40MJ/L, the design must be modified to increase efficiency.[87] The more efficient a system is, the lower the common factor.

A common factor of 0.4 MJ/L is lower than the prescribed common factor in Victoria for gas hot water of 0.497 MJ/L.[88] This common factor was introduced in around 2005.[89] It is likely that there have been improvements in the efficiency of gas water heat technology over the last 18 years. We understand that the Victorian Essential Services commission will be reviewing its prescribed common factors in the coming years.[90]

5.3.4 No additional supply charge for hot water

To ensure that embedded network customers do not pay more than on-market customers, our proposed methodology does not allow embedded network operators to charge customers a supply charge for the energy used to heat hot water. This is because on-market customers, who do not have controlled loads, do not incur separate supply charges for the energy used to heat hot water, through their electricity bills.[f]

Chapter 4 outlines the maximum supply charges for gas and electricity. Operators must not charge a hot water supply charge in addition to these charges.

Draft recommendation

3. Where customers are billed in cents/Litre, the maximum price for hot water be determined by multiplying the maximum gas consumption charge (as applicable to the customer's distribution district and whether the customer is a small business or residential customer) by the maximum common factor of 0.4MJ/L.

[f] Customers may be charged an additional supply charge for controlled load tariffs, in addition to the standard electricity supply charge.

5.4 Embedded network sellers could charge in energy or water units

There were mixed views amongst stakeholders on whether energy or water units are more suitable for billing customers:

Some stakeholders preferred billing in the water unit:

- Energy Metrics considered that billing in water units benefits consumers because the embedded network operator bears the risk of system inefficiencies and low occupancy.[91]
- Some stakeholders told us that most of their existing embedded networks do not have the infrastructure (i.e. gas meters on their common hot water systems) that would enable customers to be billed in the energy units.[92]
- Energy Locals submitted that it disagrees with mandating hot water services to be charged in energy units because centralised hot water services are "fundamentally different to the provision of electricity, gas or mains water."[93]

Other stakeholders submitted that we should set prices in energy units.[94]

- One customer at our workshop, who is billed in $/L, told us that they cannot compare the price they are receiving to the gas prices and in addition, residents do not have access to water meters to verify their consumption.[95]

Our draft recommendation provides for embedded network sellers to bill in water units or the underlying energy unit. Where customers are billed in the energy unit, the energy price multiplied by the common factor must not exceed the maximum hot water price.

- $Energy\ tariff\ x\ maximum\ common\ factor\ \leq\ maximum\ hot\ water\ price\ (cents/L)$

Where the maximum common factor is equal to 0.4 MJ/L.

This provides flexibility to embedded network sellers by allowing them to bill in either unit and ensures that customers do not pay more if they are billed in one unit compared to the other.

Where there is existing infrastructure to measure the energy consumed by each residence, our proposed methodology allows embedded network sellers to disclose the underlying energy rates and common factors used. However, it will not require embedded network operators to install additional metering if they lack the infrastructure to bill in the energy unit (a cost that could be passed onto owners corporations).

Draft recommendations

4. The pricing methodology for hot water permit embedded network sellers to charge for the consumption of hot water in either units of water (cents/Litre) or units of energy (cents/kWh or cents/MJ).

5. Where customers are billed in cents/MJ or cents/kWh, that the energy price charged, multiplied by the common factor, cannot exceed the maximum price of hot water as determined by the pricing methodology specified in draft recommendation 3.

Chapter 6

Maximum pricing methodology for chilled water

Body text for the explanatory text

06

Our Terms of Reference ask us to investigate and make recommendations on an appropriate methodology for setting maximum prices for chilled water supplied through embedded networks.

This chapter sets out our draft pricing methodology for chilled water. It considers how to set prices given the different metering arrangements in place for chilled water systems (including sites where consumption is not metered). It also considers whether customers are being charged too much due to system inefficiencies and whether this should be addressed through maximum prices.

6.1 Overview of our draft recommendations for chilled water

Chilled water is just one technology used in centralised air-conditioning systems. We do not consider there are material differences in the potential issues faced by chilled water and other centralised air-conditioning customers or in the measurement and billing of these services. For example, we have not seen embedded network sellers billing in water units for chilled water that is specific to the technology.

Therefore, while we have been asked to recommend a maximum price methodology for chilled water embedded networks, we are making a draft recommendation that a maximum price cap should be set for centralised air-conditioning more broadly.

For the purposes of this draft report, we have intended the term 'chilled water embedded networks' to be inclusive of all centralised air-conditioning systems. This reflects the concerns raised by the 2022 NSW Parliamentary Inquiry[96] in Embedded Networks and the scope our Terms of Reference.

Our draft recommendation is to use the maximum electricity price for embedded network customers to set maximum prices for chilled water embedded networks. This is because electricity is the underlying fuel source at existing sites.

Our draft methodology allows embedded network sellers of chilled water embedded networks to charge either:

- a consumption charge equal to or less than our electricity market price benchmark (cents/kilowatt hour (kWh)) or
- a fixed daily fee equal to or less than the retail market price benchmark multiplied by a daily consumption benchmark of electricity used for air-conditioning.

We benchmarked the daily consumption of electricity used for air-conditioning to that of 2 small air-conditioners. To derive the benchmark we used the Australian Government's energy ratings website[97] to determine the average annual electricity consumption of small air-conditioners.

These draft methodologies would achieve our overarching objective of ensuring that embedded network customers are not worse off than on-market customers.

Draft recommendation

6. Regulated maximum prices for chilled water be extended to all centralised air conditioning services sold by an embedded network seller.

6.2 Setting 2 separate methodologies for chilled water

Customers are charged for centralised air-conditioning and chilled water either through:

- an electricity tariff (cents/kWh) for the consumption of energy
- a fixed daily rate, or
- an electricity tariff (cents/kWh) for the consumption of energy and a fixed daily or monthly supply charge.

Intellihub submitted that they have worked with a number of embedded network operators to install energy meters to measure energy consumption of the common chilled water system as well as individual water meters for customers.[98] They told us that the customers are then billed for the energy used in proportion to the measured chilled water used.[99]

Given the existing billing practices and the potential for metering issues, our draft recommendation is to provide 2 separate pricing methodologies for chilled water; a consumption-based methodology, and a methodology for determining a maximum fixed daily rate.[a] Embedded network sellers would be able to charge **either** a price per unit of consumption **or** a fixed daily rate – but not both.

Under our draft methodology, embedded network sellers must use the same method for charging all customers at a given site, to prevent sellers from choosing to charge customers at the same site in different ways. This is to protect customers who have low consumption rates (i.e. lower than benchmarked consumption for the fixed daily fee) from being charged the fixed daily fee to maximise the seller's profit.

Where embedded network sellers choose to charge above the maximum fixed daily fee, they must have metering infrastructure to measure the consumption of individual residences. This approach provides price protections for customers and flexibility for sellers to continue the current billing practices. It avoids requiring sellers to upgrade infrastructure to allow for individual metering, a cost that would likely be passed on to customers.

Draft recommendation

7. Embedded network sellers of chilled water embedded networks be permitted to bill customers using either a consumption charge or a fixed daily rate. Sellers must use the same charging approach for all customers at a given site.

[a] We note that under the Residential Tenancies Act, tenants cannot be charged for water, electricity or gas that is not separately metered. In these cases the owner is responsible for these costs. These provisions may not apply to chilled water or air-conditioning. *Residential Tenancies Act 2010* (NSW), s 39(1), 40(1)(c)

6.3 Draft consumption-based methodology

Where embedded network sellers choose to impose a consumption charge, our draft recommendation is that the maximum consumption charge (in kWh) is equal to the maximum benchmarked electricity consumption tariff for embedded networks.[b] This is the same way that on-market customers are charged for air conditioning.

Our draft recommendation is that where embedded network sellers impose a consumption charge, the seller must not impose an additional fixed daily rate (or daily supply charge). This is because on-market customers do not incur separate fixed supply charges through their electricity bills for air conditioning. Furthermore, as for on-market customers, we proposes no additional allowance for the infrastructure costs of air-conditioning should be made in energy bills. This will ensure that chilled water embedded network customers are not worse off compared to on-market customers.

6.3.1 The efficiency of chilled water and centralised air-conditioning systems

We considered whether the consumption-based methodology needs to account for system inefficiencies, similar to our draft methodology for hot water.

The Tenants Union submitted that a common factor is appropriate but that it would need to reflect that it is outside of the customer's control.

As for hot water, the embedded network operator is in control of the variables that affect a calculated common factor.[100] We consider it would be possible for the pricing methodology to specify a common factor for air conditioning systems based on the reported efficiencies of the systems.

While efficiency can be compromised when only a small proportion of residences use centralised air-conditioning,[101] we consider that it would be unlikely for well-designed centralised air conditioning systems to be significantly less efficient than stand-alone units. We note that the efficiency of centralised heating and cooling systems is assessed as part of the Building Sustainability Index (BASIX) standards during the development application process.[102]

As a result, we do not recommend prescribing a maximum common factor for chilled water to set a standard for efficiency as part of our pricing setting methodology at this time.

However, we are proposing new requirements that would provide greater transparency over the efficiency of centralised air-conditioning systems. Our draft recommendation is that where embedded network sellers charge customers for their metered air conditioning consumption, they would need to disclose efficiency information to customers and owners corporations.

The relevant information for the system includes the following:

- Energy Efficiency Ratio (EER)
- Coefficient of Performance (COP)
- energy input for the last financial year

[b] The methodology for the benchmarked electricity price for embedded networks is discussed in Chapter.4.

- energy output for the last financial year
- system's brand name and model number, where available (to cross check reported efficiencies against the Greenhouse and Energy Minimum Standards (GEMS) registry).

We propose that this information would be required to be disclosed on the embedded network seller's website. This would protect customers by providing them with the information to make an informed decision about whether to opt into or out of a centralised air conditioning or chilled water network. Publishing efficiency information will also allow owners corporations to be informed of efficiency when entering into contracts or re-negotiating contracts.

We also propose that the system efficiency of centralised heating and cooling systems should also be monitored over time by the pricing and compliance regulator/s. If there is evidence of customers being charged for a high level of consumption due to inefficient centralised systems, then a common factor could be introduced into future pricing methodologies.

As discussed further in Chapter 7, we are proposing that the compliance regulator would have investigation and information gathering powers to determine whether embedded network sellers are complying with the pricing determinations.

Draft recommendation

8. Where an embedded network seller imposes a consumption charge for chilled water embedded networks:
   a. the maximum consumption charge in kWh is equal to the maximum electricity tariff for embedded networks, and
   b. no additional fixed rate charge is permitted.

9. Where an embedded network seller imposes a consumption charge for chilled water embedded networks, the seller must provide information on the efficiency of the centralised air-conditioning system on the seller's website. The information must include:
   - The Energy Efficiency Ratio (EER)
   - The Coefficient of Performance (COP)
   - The energy input for the last financial year
   - The energy output for the last financial year
   - The system's brand name or model number, where available.

6.4 Draft methodology for a maximum fixed daily fee

Our draft methodology for a setting maximum flat daily fee for chilled water is to benchmark against the price that a typical on-market customer would pay.

To estimate the costs that an on-market customer would pay, our draft recommendation is to use the maximum benchmarked electricity price for embedded networks and a daily consumption benchmark of electricity used for air-conditioning.

This would be calculated by:

$$\text{Maximum fixed daily rate (cents)} = \text{benchmarked electricity tariff (cents/kWh)} \times \text{benchmarked daily consumption (kWh)}$$

Where:

- The benchmarked price of electricity is equal to the on-market median of retailers' lowest electricity prices (i.e. our recommended maximum electricity price for embedded network customers).
- The benchmarked daily consumption of electricity is equal to 2 kWh.
- Box 6.1 shows a worked example of this calculation.

Box 6.1 Worked example - maximum flat daily fee

Maximum flat daily fee =

$$32.22 \text{ cents/kW}h^a \times 2 \text{ kW}h^b$$

$$= 64.40 \text{ cents/day}$$

a. Assumed electricity benchmark.
b. Benchmarked daily electricity consumption.

Source: IPART calculations.

6.4.1 Benchmarked annual energy consumption

Our draft recommendation is to benchmark the daily consumption of electricity to that of 2 small air conditioners on the Australian Government's energy ratings website.[103]

Using the data, we derived benchmarked daily consumption by calculating the average annual energy consumption of 2 small air-conditioners (Box 6.2)[c].

[c] Where a small air conditioner is 2.5-5kW, in an average climate with a 3-3.5-star heating rating and 5-star cooling rating.

Box 6.2 Calculation of benchmarked daily consumption of electricity

Benchmarked daily consumption of electricity =

$$\frac{2 \times average\ annual\ consumption\ of\ small\ air\ conditioners\ (kWh)^{a}}{365\ days}$$

$$= \frac{2\ x\ 743\ kWh}{365\ days}$$

$$= 2\ kWh$$

a. Based on small air conditioners with 3-3.5-star heating ratings and 5-star heating ratings with a size of 2.5-5kWh in an average climate.

Source: Energy Rating Calculator, IPART analysis.

We consider that 2 small air conditioners could be typical of the air-conditioner size needed to service an apartment, which have bedrooms with a minimum area of 9m^2.[104] Small air-conditioners are generally capable of cooling room sizes of up to 25m^2.[105]

Table 6.1 shows the large variability in the cost of air conditioning, depending on the energy rating of the air conditioner.

We benchmarked daily electricity consumption to a system that is rated 5-stars for cooling (out of a maximum of 7) to ensure that customers are not paying more than on-market customers who can choose the efficiency of their cooling system.

This draft methodology should incentivise embedded network operators to maintain a level of efficiency at least as efficient as an air-conditioner with a 5-star rating, to avoid operating at a loss.

Table 6.1 Running cost of a small sized air conditioner in Sydney

Heating energy rating	Cooling energy rating	1 year energy usage	Total price/year	Daily price	Heating cost/year	Cooling cost/year
N/A	0-stars	840 kWh	$269.64	$0.74	N/A	$269.64
3-stars	3-stars	596 kWh	$191.31	$0.52	$122.30	$69.02
3.stars	4-stars	528 kWh	$169.49	$0.46	$112.99	$56.50
3-stars	5-stars	506kWh	$162.43	$0.45	$112.67	$49.76
3-stars	6-stars	429 kWh	$137.71	$0.38	$94.37	$43.34
AVERAGE		**580kWh**	**$186.12**	**$0.51**	**$110.58**	**$97.65**

Source: Energy Ratings Calculator, IPART analysis.

Draft recommendation

10. Where an embedded network seller imposes a fixed daily rate for centralised air-conditioning, the maximum fixed daily rate be determined by:
    - taking the annual consumption benchmark for a comparable individual air-conditioning unit (i.e. for a given system size and star rating as per the products listed on the Commonwealth Government's Energy Rating website)
    - dividing it by 365
    - multiplying it by the benchmark electricity consumption charge.

6.5 Indicative hot water bills under our draft methodology

Table 6.2 applies our draft pricing methodology to show what a customer would pay using 743 kWh per year (based on our estimate of annual consumption) compared to Evergy's published air conditioning prices[d] and the bills we received.

Both of our draft methodologies, with an assumed electricity benchmark price, provide a price that is lower than what embedded network customers are currently paying, on an annualised basis.

Table 6.2 Comparison of draft methodologies with centralised air conditioning rates

Price (cents/kWh)	Fixed daily rate	Annualised bill for 743 kWh	Cost per day	Source
Draft consumption-based methodology				
32.21 cents	N/A	$239.39	$0.66	Assumed benchmark
Draft fixed daily rate methodology				
N/A	$0.6440/day	$235.06	$0.64	Assumed benchmark
Sample of bills				
26.4 cents	$0.27/day	$294.70	$0.81	Evergy
37.51 cents	$0.27/day	$377.25	$1.03	Evergy
25.97 cents	$5/month	$252.96	$0.69	Customer bill

Source: Evergy air-conditioning offers, customer bills submitted to IPART, IPART analysis.

[d] Evergy is an authorised retailer and embedded network operator that provides air-conditioning to embedded network customers as well as electricity, gas, hot water and internet.

Chapter 7

Compliance and enforcement framework

Body text for the explanatory text

07

For the proposed new price protections to be effective, embedded network sellers of electricity, gas and hot and chilled water need to comply with the maximum prices set by the regulator. To protect consumers, enforcement mechanisms are also required to ensure responsible parties meet their obligations.

The Terms of Reference require us to make recommendations on the compliance and enforcement framework for any new price protections.

In line with the Terms of Reference, this chapter considers:

- issues with capturing which entity should be required to comply with the maximum price for each embedded network
- how the regulator should monitor compliance with the maximum price requirements
- whether embedded network sellers should be required to publish prices
- which regulator is best placed to enforce the maximum prices for energy sold in embedded networks in NSW.

7.1 Overview of our draft recommendations

We propose that any entity that sells electricity, gas, hot or chilled water to embedded network customers (embedded network sellers) be prevented from charging prices that exceed the maximum price determined by the price regulator.

In addition, we are making draft recommendations that the statutory framework include the following:

- A requirement for all embedded network sellers to publish their prices on their website for each determination period.
- Authority for the regulator to:
  - require information from embedded network sellers to determine whether they comply with the pricing determination
  - direct embedded network sellers to remedy non-compliance and/or impose monetary penalties.

Under our draft recommendations, the Energy and Water Ombudsman NSW (EWON) would be authorised to report any breaches of maximum prices to the regulator for further investigation. As the pricing regulator in NSW, we consider IPART would be an appropriate pricing and compliance regulator of embedded network sellers. IPART also has certain compliance functions within the energy and water sectors.

7.2 Monitoring compliance with the maximum price requirements

The 2022 NSW Parliamentary Inquiry into embedded networks (the NSW Inquiry) found that under the current framework, it is difficult for the AER to monitor and enforce compliance of electricity and gas embedded network operators with customer protections. This is because the embedded network operators are not required to undertake compliance reporting or self-report breaches of their obligations.[106]

We consider that to enforce compliance with maximum prices that would apply in NSW, there needs to be mechanisms for identifying any discrepancies between the maximum prices and actual charges.

Options suggested by stakeholders in response to our consultation papers include:

- a proactive approach such as a licencing framework or a requirement for all embedded network sellers to register and report prices
- a complaints-reliant approach which relies on customers to raise complaints about non-compliance with the maximum price charged by the embedded network seller
- a system of regular audits being undertaken by the regulator.

In response to our consultation papers, Energy Consumers Australia submitted that enforcement of the maximum price should be proactive, rather than waiting for complaints to alert regulators where there is an issue.[107]

Our view is a requirement to report prices to the regulator is disproportionately burdensome. To proactively monitor compliance with and enforce the maximum price, the regulator must have a way of identifying all entities and their sites which are selling electricity, gas or hot or chilled water to customers in each embedded network. We consider that this would require a new registration framework, because the current systems do not capture all of the relevant information. However for the parties already registered with the AER, and are members of EWON, this imposes significant duplication.

We consider it is preferable to monitor compliance through customer complaints. Breaches of the maximum prices can be investigated by a regulator that has the authority to obtain information from embedded network sellers and take action for non-compliance.

7.2.1 The existing systems do not identify all relevant sellers

Currently the available information is not sufficient to identify all embedded network sellers in NSW. The NSW Inquiry noted the complexity of embedded network arrangements (involving owners corporations, operators, billing agents, exempt sellers, and authorised retailers) makes it difficult to determine which party is responsible for the sale of energy, and the obligations that apply to them.[108]

For electricity and gas embedded networks, embedded network sellers can either be exempt sellers or authorised retailers.[109] The AER's registration of these types is as follows:

- Exempt sellers: There are three types of exemptions: deemed, registrable and individual. Registrable and individual exemptions require application and registration with the AER and, through this process, the AER collects information on which embedded network site each exemption applies to. However, deemed exemptions apply automatically to certain types of energy sellers (e.g. caravan parks) which means there is no record of the exempt sellers or sites they sell to.
- Authorised retailers: Some embedded network operators contract authorised retailers to on-sell electricity or gas to customers. However, the AER's public register of authorised retailers does not record which sites they are responsible for.[110]

There is no currently available register of embedded network sellers for hot or chilled water embedded networks. The AER does not regulate the sale of hot water nor the chilling of water for air conditioning services.[111]

Exempt sellers and retailers are also required to be members of EWON.[112] However the membership has the same limitations as the AER's registrations, including that hot and chilled water embedded network sellers are not required to be members. In addition, exempt sellers have only been required to be EWON members since 2018 and the membership process is continuing.[113]

7.2.2 We consider a new licencing framework or registration of all embedded network sellers is not practical

Given that not all embedded network sellers can currently be identified, we considered whether the regulator could put its own systems in place through a licencing framework or registration.

In response to our consultation papers, Energy Locals submitted that all embedded network suppliers of electricity or gas should be required to hold a retail licence which would allow enforcement to occur via the retail licence.[114]

Our view is that a licencing framework is not appropriate because our Terms of Reference specifically ask us to recommend a compliance and enforcement framework for any price protections. A licencing framework might be more appropriate if our review was addressing embedded network issues more holistically and considering issues beyond just price protections.

Embedded network sellers that sell electricity or gas in NSW are already subject to the national regulatory framework that applies to authorised retailers and exempt sellers. Introducing a NSW licensing regime may introduce duplication or inconsistency with the national regime. In contrast, while the Victorian embedded networks review recommended introducing a licencing framework for embedded networks, the National Energy Retail Law does not apply there.[115]

We consider that a registration framework also poses some issues that make it impractical. These include:

- A registration framework would impose a heavy regulatory and administrative burden which would involve contacting embedded network sellers to inform them about the requirement to register. This would likely be a lengthy process as evidenced by how long it has taken for many exempt sellers to comply with the requirement to be members of EWON.
- It's possible that any new registration framework with requirements to report prices would be incomplete, with many exempt sellers not registering. The requirement for exempt sellers to become members of EWON has faced similar issues. The NSW Inquiry noted that many exempt entities are not complying with the requirement to become EWON members. Some have delayed their application indefinitely or have simply refused to join.

Our draft recommendation is therefore to not adopt a compliance and enforcement framework that requires embedded network sellers to obtain a licence or register with the regulator. As discussed in section 7.3, we propose a complaints-based system.

7.2.3 The regulator would investigate potential non-compliance

Authorised retailers in NSW are required to be members of EWON and must inform customers of their right to refer unresolved complaints to EWON.[116] Since 2018, exempt sellers have also been required to be members of EWON.[117] EWON receives complaints from and provides free and independent dispute resolution services for its members' customers.[118] However, as discussed in Box 7.1 we found that some embedded network customers do not have access to EWON.

Box 7.1 Some embedded network customers do not have access to EWON

The NSW Inquiry found that some consumers in embedded networks have limited access to EWON due to regulatory gaps related to the National Energy Customer Framework (NECF).

Currently, there is no requirement for hot or chilled water embedded networks to be members of EWON and some exempt sellers of electricity and gas have not complied with the requirement to become EWON members.[119] EWON has no authority to enforce its decisions relating to non-members.[120] Additionally, EWON told the NSW Inquiry it cannot make binding decisions regarding small businesses as these are not included in the dispute resolution requirements in the AER's Retail Exempt Selling Guidelines.[121]

The Inquiry recommended that the NSW Government:

- Ensure consumers in hot water embedded networks have the same access to EWON (which would require sellers of hot and chilled water to become members of EWON)[122]

Box 7.1 Some embedded network customers do not have access to EWON

- Increase the enforcement of the requirement for authorised retailers and exempt sellers of electricity and gas to become EWON members.[123]

Our draft recommendation is that:

- EWON should be authorised to refer potential embedded network pricing breaches and supporting information to the regulator.
- The regulator would have the powers to investigate compliance with pricing determinations by any embedded network seller, and would have the powers to obtain information (including documents and other evidence) from embedded network sellers for the purposes of such an investigation.

For a proposed complaints-based system to be effective, embedded network customers will need to be aware that EWON is the dispute resolution body. We note that under the National Energy Retail Law, authorised retailers and exempt sellers have the following obligations:

- authorised retailers are required to provide EWON contact details on their website[124]
- exempt sellers are required to advise customers of their right to access EWON at the commencement of their tenancy or residency.[125]

We propose that these obligations be extended to all embedded network sellers, including sellers of hot and chilled water.

These draft recommendations would allow the regulator to review the compliance of embedded network sellers in respect of any customer complaints received. For example, where EWON reports a potential breach of an embedded network pricing determination to the regulator, the regulator could require the embedded network seller to provide more information about the complaint that has been referred by EWON, and any other customer bills for the pricing determination period in question. Non-compliance with a notice to produce information issued by the regulator should be an offence.[a]

The regulator would also be able to publish on its website a register of embedded network sellers that have been found to be in breach of maximum prices and the enforcement action (if any) taken.

The regulator would also be able to exercise its powers if it became aware of a potential breach through another source of information. It should be an offence for an entity to refuse or fail to comply with a requirement to provide information, subject to penalties for non-compliance.

[a] For example, under the Independent Pricing and Regulatory Tribunal Act 1992 (IPART Act), in connection with its pricing determination monitoring and compliance functions, IPART may issue notices to an officer of a government agency requiring that person to produce information or documents or give evidence. Failure to comply with such a notice without reasonable excuse is an offence subject to a maximum penalty of $11,000 or 6 months imprisonment or both (IPART Act, ss 24AB and 24AC).

EWON regularly undertakes compliance reporting to the AER, where it identifies potential breaches of the National Energy Retail Law for further investigation.[126] Similarly, we consider that complaints about embedded networks would be a key surveillance mechanism for identifying non-compliances with any maximum prices.

As most embedded network sellers are now members of EWON, we consider the proposed complaints-based system would address the majority of cases of non-compliance with the maximum prices. However, we are seeking stakeholder feedback on whether this provides a sufficient level of consumer protection to embedded network customers.

Seeking comment

3. Would a complaints-based compliance system deliver the right level of consumer protection?

Draft recommendations

11. That the NSW Government enact legislation to authorise IPART to determine maximum prices for the sale of electricity, gas, hot and chilled water to customers in embedded networks in NSW.

12. That the NSW Government authorises the Energy and Water Ombudsman NSW (EWON) to:
    a. refer to the regulator any complaints that EWON reasonably suspects indicate an embedded network seller may have breached an embedded network pricing determination, and
    b. provide to the regulator any supporting information or documentation regarding customer complaints it receives related to embedded network sellers not complying with the maximum price.

13. That the statutory framework:
    a. authorise the regulator to investigate whether an embedded network seller has complied with an embedded network pricing determination
    b. authorise the regulator, by notice in writing, to require an embedded network seller to provide information, documents or evidence for the purposes of an investigation
    c. provide that it is an offence, subject to a monetary penalty for non-compliance, to refuse or fail to comply with a notice requiring the provision of information, documents or evidence.

7.3 Requirement for embedded networks to publish prices

Pricing transparency is another key issue for consideration under the compliance and enforcement framework. We have considered two main options:

- only requiring prices to be reported to the regulator and on customer bills
- requiring prices to be published on embedded network seller's website.

We considered whether market participants should be required to declare the prices they are charging on a confidential basis to the regulator. On the other hand, the Victoria embedded networks review recommended that energy providers in embedded networks should not only provide the same sort of rates/tariff information on their bills as on-market retailers, but also publish this information on their websites. The review considered this would enable customers to readily compare the price they pay with offers of on-market retailers.[127]

Although in practice it is difficult for embedded network customers to choose a different provider, we consider there are benefits to requiring embedded network sellers to publish their prices on their websites. These include:

- enabling prospective customers to check prices before they become part of an embedded network and compare prices with what they currently pay and with available market offers.
- visibility into what comparable embedded networks are being charged may facilitate competition at the building/owners corporation level when they renegotiate contracts or seek to change providers.

Our draft recommendation is that embedded network sellers should be required to publish their prices on their websites for each pricing determination period.

Draft recommendation

14. Embedded network sellers be required to publish their current prices on their websites.

7.4 Enforcement mechanisms

Effective enforcement mechanisms would enable the regulator to compel compliance and deter non-compliance. Our draft recommendation is that the following enforcement options are made available to the regulator if embedded network sellers are found to contravene an embedded network pricing determination:

- directing an embedded network seller to take specified action within a specified timeframe to remedy non-compliance (such as, reducing prices and/or providing information to customers)
- imposing monetary penalties (proportionate to the level of non-compliance) on:
  - the embedded network seller and/or
  - a person who is the director of or involved in the management of an embedded network seller.

The regulator should have discretion to use either or both options, depending on the level of non-compliance. For example, failure to comply with a direction to remedy a contravention could result in monetary penalties being imposed. Imposing monetary penalties should be considered for more serious instances of non-compliance.

Before issuing a direction or imposing a monetary penalty for non-compliance, the regulator should:

- consider the action the embedded network seller has taken or is likely to take in respect of the non-compliance, and be satisfied it is nevertheless appropriate to issue a direction/impose a penalty
- consider whether the contravention has been or is likely to be the subject of any other penalty or action or any claim for compensation, and it is nevertheless appropriate to issue a direction/impose a penalty.

Failure to comply with a direction issued by the regulator should be an offence, subject to monetary penalties. In addition, the regulator would also publicise fines imposed for failure to comply with a direction on its website and through a media release.

In addition to applying these proposed enforcement mechanisms, the regulator would also report publicly on non-compliance and the enforcement actions taken.

Draft recommendations

15. The regulator be empowered to take one or more of the following enforcement actions where it is satisfied an embedded network seller has not complied with an embedded network pricing determination:
    a. directing an embedded network seller to take specified action within a specified timeframe to remedy the non-compliance
    b. impose a monetary penalty on the embedded network seller and/or a person who is the director of or involved in the management of an embedded network seller.
16. The statutory framework require the regulator, before issuing a direction or imposing a monetary penalty to:
    a. consider the action the embedded network seller has taken or is likely to take in respect of the non-compliance, and be satisfied it is nevertheless appropriate to issue the direction/impose the penalty
    b. consider whether the non-compliance has been or is likely to be the subject of any other penalty or action or any claim for compensation, and be satisfied it is nevertheless appropriate to issue the direction/impose the penalty.
17. The statutory framework provide that failure by an embedded network seller to comply with a compliance direction of the regulator is an offence and is subject to a monetary penalty.

7.5 IPART as the regulator

In response to our consultation papers, stakeholders suggested that the compliance and enforcement framework should be carried out by the AER, EWON or IPART.

Many stakeholders who supported setting maximum prices equal to the AER's Default Market Offer considered that the AER should be responsible for its enforcement.[128] However the AER does not regulate the sale of hot and chilled water services. Therefore, a different regulator would be required for these services.

Other stakeholders submitted that EWON should be responsible for enforcing the maximum prices since both exempt sellers and authorised retailers are required to be members of EWON.[129] We do not consider that a general compliance role is appropriate for EWON because it is not well aligned with its current function. EWON only has the power to make binding decisions to resolve specific customer complaints. It cannot apply enforcement measures more broadly. As noted in the sections above, it currently reports to the AER, who can take compliance and enforcement activity.

Our draft recommendation is that IPART should be the regulator responsible for compliance and enforcement of the maximum price because:

- our recommended maximum prices are NSW specific
- IPART has the relevant expertise and experience in monitoring compliance for energy networks and determining prices in other sectors. IPART also currently performs the energy market monitoring function which will have synergies with establishing the price cap for electricity.

Draft recommendation

18. That IPART be the regulator that determines and enforces compliance with the maximum prices for the sale of electricity, gas, hot and chilled water to customers in embedded networks in NSW.

Chapter 8

Future of hot and chilled water embedded networks

Should new hot and chilled water embedded networks be prohibited in NSW?

08

Our Terms of Reference asks us to investigate and make recommendations on whether new hot and chilled water embedded network should be prohibited in NSW.

This chapter sets out our recommendations, which take into account:

- the benefits of hot and chilled water embedded networks to consumers and owners, and
- their shortcomings, and how they can be addressed.

8.1 Overview of our draft recommendations

Hot and chilled water embedded networks can deliver lower costs for consumers, have non-monetary advantages, and can help deliver on climate change objectives. They can provide cost savings and increased reliability over individual stand-alone systems by utilising more efficient technologies and central maintenance. They can also provide non-monetary advantages such as better use of space, improved aesthetics and noise control, and reduced carbon emissions through fewer, more efficient units.

Our draft pricing methodologies should protect customers from unreasonable prices and ensure they are no worse off than on-market customers. Given this, our draft recommendation is that new hot and chilled water embedded networks should not be prohibited.

We also considered whether we should recommend banning new inefficient hot and chilled water embedded network technologies. We are not recommending that these should be banned because it may entrench gas hot water systems under the current non-embedded network model in the Jemena distribution region. This would lead to more carbon emission in the long run, and also higher costs to customers because under this model there is a lower incentive to ensure hot water is provided efficiently. However, we are interested in your views on whether gas embedded networks should be banned.

We also seek your views on the role of gas in new developments to ensure consumers are not locked into more costly and inefficient technologies. For NSW to meet its climate change objectives such as achieving its net-zero by 2050 commitment. Victoria[130] and the ACT[131] have recently banned, or are in the process of banning, gas for new developments.

8.2 What stakeholders raised in their submissions

Stakeholders raised the following issues for us to consider when assessing whether new hot and chilled water networks should be prohibited:

- Stakeholders recognised the potential benefits of hot and chilled water embedded networks, such as cost-effectiveness due to economies of scale, the ability to buy water and energy in bulk, and reduced development costs.[132]
- The Tenants' Union and PIAC, among others, advocated for the allowance of new hot and chilled water embedded networks only if they offer tangible customer benefits, like lower prices, backed by robust regulation to ensure these networks provide equivalent rights and protections.[133]
- The Combined Pensioners & Superannuants Association[134] and others emphasised that embedded networks should have focused on technological innovation and cost savings, not just profit.
- EnergyAustralia[135] argued against banning embedded networks, proposing regulated prices as a solution to pricing concerns.
- Meriton[136] estimated that a ban on these networks could have increased costs by up to 30%, affecting housing supply in Sydney.
- Embedded networks could interact with the grid, supporting distribution networks as distributed energy resources.[137]

8.2.1 Why have we been asked to consider whether new hot and chilled water embedded networks should be banned?

The 2022 NSW Parliamentary Inquiry recommended that separate charging for hot and chilled water in embedded networks be banned[b]. So that customers would be charged based on the underlying fuel source and subsequently be protected by the National Energy Consumer Framework. It found that customers in hot water embedded networks are inadequately protected and often face high or incorrect charges due to these regulatory shortcomings. It found that some residents in apartments with such networks have reported exorbitantly high hot water bills, often billed on water usage, not the energy to heat it.[c]

The Inquiry heard that embedded networks can deliver benefits to their consumers, such as lower costs an enable technological innovation. However, this depended on who is managing it, who is running it, and for what purpose they have set it up.[138]

It also found that consumers within hot and chilled water embedded networks have less protections than other consumers because the National Energy Customer Framework (NECF) does not apply to these services.[d] The NECF ensures that energy consumers are guaranteed connection and limits the circumstances under which their energy supply can be disconnected, especially in cases of financial hardship where payment plans must be provided. It also provides specific protections for customers who rely on life support equipment.[139]

Some stakeholders have raised the issue of embedded network operator contracts having large exit charges. This may result in the appearance of lock-in for the owners corporation. However, in some cases, there may be valid reasons why the exit fee exists, which may be the residual of capital investment or other services provided.

The need for price protection is required for consumers within existing hot and chilled water embedded networks, whether or not these networks are prohibited in NSW in the future.

8.2.2 Benefits of embedded networks

Almost all hot and chilled water embedded network use centralised systems, which can provide cost and space savings (see Box 1). For hot water, centralised systems can also be provided through a non-embedded network in the Jemena network, and the costs of hot water can be passed onto consumers.[140] However, for centralised air-conditioning, without an embedded network, there is not a way of billing the end-use customers directly for this service. For apartments, all costs would instead need to be recovered through strata levies in the first instance. As a result, without an embedded network, sites can still realise space saving and other non-financial benefits, but there is a weaker incentive to install efficient centralised air-conditioning systems.

Box 8.1 Benefits of centralised heating and cooling systems

The financial benefits of a centralised system over individual stand-alone systems may include:

- Lower capital and ongoing costs through using more efficient systems.[e]
- Increased service time through greater system redundancy, centralised maintenance and repair.

Non-monetary benefits of centralised systems may include:

- More efficient use of floor space within the overall development.
- Better ability to meet planning controls in terms of:
  - Aesthetics, where there is less individual infrastructure visible (individual water heaters and air-conditioning units).

[b] Recommendation 5 - That the NSW Government immediately ban the separate charging of hot and chilled water in embedded networks and implement fulsome price protection measures to prevent the unreasonable and unfair pricing of these essential services.

[c] The parliamentary inquiry was also concerned that prices for hot water in embedded networks can be estimated using conversion factors that are affected by various elements like plant maintenance and efficiency, potentially leading to inflated or incorrect billing. It reported that the NSW Civil and Administrative Tribunal (NCAT) has questioned whether this metering meets the Residential Tenancies Act 2010, as it doesn't provide for direct gas supply charges, and found that the costs calculated include factors beyond mere gas consumption, indicating the systems aren't separately metered. We consider this issue applies equally to centralised hot water systems that supply a non-embedded network.

[d] Paragraph 2.13

[e] Meriton's submission estimated that prohibiting hot water embedded networks would increase costs by 30%. However, it is not clear if the baseline comparison is a distributed or a centralised non-embedded network hot water system.

Box 8.1 Benefits of centralised heating and cooling systems

  - Noise attenuation, infrastructure can be located away from habitable areas.
  - Safety, where heat and gaseous by-products of instantaneous gas boilers are removed from balconies.
- Lower overall carbon emissions where numerous individual systems can be reduced to a smaller number of more efficient production units.

Source: Submissions from Meriton, ENM Solutions, Energy Metrics Consulting.

The additional benefits of having this service provided through an embedded network may include:

- Cost savings through implementation of technological innovation over time if it is actively managed by operators with the incentive and technical know how to implement.[141]
- Increased investment in capital intensive solutions where the cost burden can be shared as it addresses the issue of split incentives (where the owners and consumer's economic objectives do not align).[142] This may include installing or upgrading to more efficient systems such as heat pumps for hot water.
- Increased flexibility in pricing structures:
  - Not limited to consumption only charges
  - Air conditioning can be charged as a flat daily fee.
- The efficiency of centralised hot water and air-conditioning systems are assessed as part of the BASIX system. This ensures that a minimum efficient system is being installed.[143]

These benefits can be shared between consumers, the owners corporation/owners, and the embedded network provider. The allocation of benefits will be dependent on a range of factors, including the terms of the contract between the owners corporation and the embedded network seller.

8.2.3 The shortcomings of embedded networks can be overcome

Table 3 provides a summary of consumer outcomes where hot water is provided through non-embedded and embedded networks.

Table 3 Comparing centralised hot water network options

Current Jemena centralised hot water system (non-embedded network)	Current embedded network common hot water systems	IPART draft recommendation: Hot water embedded networks not prohibited but maximum prices introduced
Customers can access gas retail price competition to manage costs. However, they cannot easily invest in more efficient systems to reduce ongoing costs over time.	No limits on prices. It is difficult and there may be little incentive for owners corporation to shop around to ensure residents have low prices.	Maximum price applies and greater transparency on how consumer bills are determined.
NECF protections apply	No NECF or exempt seller protections, until NSW Government enacts legislation to impose equivalent NECF protections[f]	No NECF or exempt seller protections, until NSW Government enacts legislation to impose equivalent NECF protections
Jemena guidelines provide guidance on system efficiency. However, there may not be a strong financial incentive to comply with these guidelines where a site is not predominantly owner occupied, as all costs of any upgrades are borne by the owners corporation, while the benefits are realised by the residents.	There is some incentive to manage the system efficiently: • Sellers benefit from making cost savings • If sellers do not manage the system efficiency, they can pass these costs onto the residents.	Strongest incentive to manage system efficiencies as: • Sellers benefit from making cost savings but any maintenance or upgrades will reduce the profit of the embedded network operator in the short term. • Inefficiencies cannot be passed onto customers.
There is a weak incentive to install heat pumps as an efficient and low emissions option, because without an embedded network, costs could only be recovered from owners, who are not necessarily the end user.	Weak to medium incentive to install more efficient systems as the embedded network operator has little incentive to invest in capital costs which may reduce their profit margin in the medium term.	Higher incentive for both embedded network operators and sellers to install more efficient systems to maximise profit within the price cap. Capital costs of installing more efficient systems can be recovered through separate contractual arrangements with the owners corporation.

There are currently a number of shortcomings of hot and chilled water embedded networks, but we consider that most can be overcome as discussed in Table 4.

[f] This is an action of the NSW Government's Embedded Network Action Plan.

Table 4 Addressing shortcomings of embedded networks

Shortcoming	How it can be addressed
Higher prices as customers do not have access to retail price competition to access lower retail prices. Ambiguity in how the prices/costs for the services provided are determined	Maximum regulated prices with requirement to provide transparency on prices charged.
Customers (typically tenants) may not have control over the infrastructure to produce hot or chilled water, i.e. they cannot change systems to meet their requirements	Draft maximum price methodology will ensure that customers only pay for a reasonably efficient system.
Some retailers charge a daily access fee for chilled water rather than charge customers based on their consumption. For some users, their annual bill might be significantly higher than what they would have otherwise been charged for their metered use.	As is the case now, chilled water customers can opt out of using the network, and install their own infrastructure, or equipment such as fans.
There are many factors that affect the energy-efficiency of centralised air-conditioning and there is little transparency over the overall efficiency at a particular site. This means it is possible that customers are being charged more for inefficient systems. It also means it is difficult to determine an "efficient" system, and therefore a benchmark for air conditioning services.	The efficiency of centralised hot water and air-conditioning systems is assessed as part of the BASIX system. This ensures that a minimum efficient system is being installed. Our draft recommendation 9 proposes that embedded networks sellers be required to report the efficiency of their system on their website. If the regulator finds that the efficiency of chilled water embedded networks is a systemic problem, it could adjust the pricing methodology to include an efficiency factor similar to the draft recommendation for the hot water pricing methodology.
The customer protections under NECF do not apply	The NSW Government is considering how these protections could apply under the Embedded Network Action Plan
Owners may be locked into long term contracts with onerous conditions	This issue is being considered under the Embedded Network Action Plan.
It is difficult for owners corporations to understand if they have an unfavourable contracts	Owners corporations should be provided with information about commercial arrangements and the infrastructure within the embedded network. This is discussed in later in this chapter. Maximum regulated prices will help ensure end-use customers are not locked into high prices.

8.2.4 Our draft recommendation is that new hot and chilled water embedded networks should not be prohibited

We consider the majority of the shortcomings of embedded networks can be addressed through introducing a price cap to protect consumers or are being addressed by other means. The benefits of embedded networks, such as cost savings can improve consumer outcomes over the long run.

Our draft pricing methodology for hot water will ensure that customers do not pay more for inefficient hot water systems. Under our draft pricing methodology, a maximum conversion factor applies. Where more gas is needed to produce a litre of supplied hot water due to system inefficiencies, the additional costs cannot be passed onto customers through prices.

The NSW Government's Embedded Network Action Plan[144] has committed to, among other things:

- Releasing a Ministerial Statement of Expectations that outlines the NSW Government's expectations that hot and chilled water embedded networks customer should have access to equivalent consumer protections to on-market customers under the National Energy Customer Framework,
- Pursuing regulatory and legislative changes to provide enforceable consumer protections to customers of hot and chilled water embedded networks, giving effect to the Ministerial Statement of Expectations, and
- National advocacy with the view to amend the AER Retail Exempt Selling Guideline to improve consumer protections for embedded network customers.

The current review of the Embedded Network Action Plan is also proposing changes to contracting arrangements for embedded networks. This includes applying the 3-year limit to utility contracts between an owners corporation and electricity embedded network provider.[g]

Draft Recommendation

19. New hot and chilled water embedded networks are not prohibited in NSW.

[g] Recommendation 120 of the Statutory Review of the Strata Schemes Development Act 2015. Under the *Strata Schemes Management Act 2015* contracts entered prior to 1 October 2019 are limited to 10 years, with renewals or new contracts entered after that period subject to the 3 year limit. Currently agreements to supply electricity to residents in a strata scheme through an embedded network are excluded from these limits.

8.2.5 We are seeking more information on non-centralised hot water embedded networks

We are considering whether new non-centralised hot water embedded networks should be prohibited.[h] A non-centralised embedded network is where hot water for consumers is provided by their own individual hot water unit. We consider that these embedded networks are unlikely to provide space and cost savings. For these networks, our draft hot water pricing methodology is likely to lead to a higher bill than just being billed for the underlying gas used. We are interested in your views on whether these embedded networks can benefit customers or whether they should be banned.

Seeking comment

4. Should new non-centralised hot water embedded networks be banned?

8.3 We are not proposing to recommend banning inefficient hot water embedded networks

We are not proposing to recommend that inefficient hot water embedded networks be banned because it may entrench gas common hot water systems as the default system for centralised hot water. This may lead to poorer consumer outcomes due to higher prices and more carbon emission in the long run and provides less incentives to upgrade inefficient systems.

We found that centralised heat pump hot water systems are currently the most efficient stand-alone system.[145] They produce hot water at a lower cost per litre when compared to gas boilers. However, the current industry approach is to use centralised gas boilers because they have lower capital costs and take up less floor space (as heat pumps store hot water for consumption where this is not required for gas systems).[146]

The greenhouse gases per litre of hot water is higher if it is generated by gas when compared to electricity, and for the latter will continue to decline as NSW reaches the goal of carbon free electricity grid.[147] Heat pumps can use heat or renewable energy (solar, wind, biomass) that is generated on site.

Heat pump systems, which absorb heat from the air or ground to heat water, need a well-ventilated area for efficient operation, generally with external access to ensure the effective exchange of air. To obtain their highest efficiency, the water is often stored in tanks. This is to take advantage of the electricity timed charges or onsite generation.

[h] We are aware of one case where an embedded network provides hot water to a townhouse complex through individual gas hot water units EWON Insights Jan-Mar 2023 - Energy & Water Ombudsman NSW

Retrofitting a heat pump system in a building where a gas boiler system is already installed may not always be feasible. The physical space originally designed for a gas boiler might not be suitable for a heat pump, which often requires a different configuration for optimal air circulation. The need to store water may mean that the area design for gas boilers may not be suitable, i.e. they may be located on the roof or in an enclosed space in the basement. It may be possible to locate heat pump plants to the exterior of the building, however this may have a negative impact on aesthetics.

We are seeking comment as to whether we should recommend to the NSW Government to ban inefficient hot water embedded networks within new developments. Efficient hot water systems, such as heat pumps, will mean that consumers would pay less for hot water per litre assisting with cost of living pressures. Heat pumps are also likely to have less environmental impact, due to lower carbon emissions, and assist in NSW achieving its net-zero by 2050 commitment.

We note that a introducing a ban on gas hot water embedded networks may be ineffective as developers could continue to use centralised gas boiler hot water systems provided by Jemena.[i] This would mean that customers, would continue to be locked into a system which is more expensive and continue to produce green house gases in the long run.

Seeking comment

5. Should embedded networks using gas hot water systems be prohibited in new developments to assist in addressing cost of living pressures and assist in the NSW Government meeting its net-zero policy?

8.4 Increase transparency for hot and chilled water embedded networks

We propose to not recommend prohibiting new hot and chilled water embedded networks, we also consider that these embedded networks operators should make it easier for customers and owners corporation committees to understand what they are signing up for by using clear, plain English explanations. They should provide a document that explains how they plan to build and operate the embedded network to benefit future homeowners and residents. We propose to recommend that the NSW Government investigate this as part of its review of disclosure and consumer awareness objective under the Embedded Network Action Plan.

We also propose that information on who owns the embedded network infrastructure, including the meters, the main water heating and air conditioning systems system, and solar power units be easily accessible to potential owners

Clear disclosure ensures that owners corporations have all the necessary information clearly laid out when they first enter into an embedded network agreement.

[i] Jemena's 2020 Gas Network Plan proposal to exist the hot water provision was declined by the AER. No other gas distribution network service provider in Australia offers a similar service. P.g. 64

This disclosure should also include what would happen if the embedded network contract was not entered into at the first owners corporation Annual General Meeting and subsequent contract renewals. This may include the depreciation of the assets that are owned by the embedded network operator.

Draft recommendation

20. The NSW Government consider imposing additional disclosure requirements as part of its action to improve disclosure and consumer awareness for prospective purchasers and tenants under the Embedded Network Action Plan.

1 NSW Embedded Network Action Plan, accessed 22 November 2023.
2 EWON, Presentation on Embedded Networks in NSW, August 2022.
3 AER, Retail Exempt Selling Guideline (version 6), July 2022, p 7.
4 JGN-2020-Plan.aspx (jemena.com.au) p 40.
5 Energy Locals, Industry Consultation Paper – energy prices in embedded networks, Submission to IPART, September 2023, p 7.
6 Part J6 Air-conditioning and ventilation | NCC (abcb.gov.au).
7 NSW Parliamentary Inquiry, Embedded networks in New South Wales, 2022.
8 Finding 3, NSW Parliamentary Inquiry, Embedded Networks in New South Wales, 2022.
9 Recommendation 5, NSW Parliamentary Inquiry, Embedded networks in New South Wales, 2022.
10 Recommendation 6, NSW Parliamentary Inquiry, Embedded networks in New South Wales, 2022.
11 NSW Embedded Network Action Plan, accessed 22 November 2023.
12 The Meriton Group, Submission to IPART Energy prices in embedded networks; Energy Locals, Industry Consultation Paper – energy prices in embedded networks Submission to IPART, September 2023.
13 Public Interest Advocacy Centre, Submission to IPART Energy prices in embedded networks, September 2023.
14 EnergyAustralia, Consultation Paper: Energy Prices in embedded networks Submission to IPART, September 2023.
15 EnergyAustralia, Consultation Paper: Energy Prices in embedded networks Submission to IPART, September 2023, p 2.
16 Public Interest Advocacy Centre, Submission to IPART Energy prices in embedded networks, September 2023, p 4.
17 Tenants' Union NSW submission to IPART Consultation Paper, September 2023 p 7; Energy Consumers Australia, submission to IPART Consultation Paper, September 2023 p 2.
18 Public Interest Advocacy Centre, Submission to IPART Energy prices in embedded networks, September 2023, pp 9-10.
19 Public Interest Advocacy Centre, Submission to IPART Energy prices in embedded networks, September 2023, p 10.
20 Public Interest Advocacy Centre, Submission to IPART Energy prices in embedded networks, September 2023, p 9, Tenants Union NSW, p 8-9.

[21] For example, see the Caravan, Camping & Touring Industry & Manufactured Housing Industry Association of NSW, Submission to IPART Energy prices in embedded networks, September 2023.
[22] Energy Locals, Industry Consultation Paper – energy prices in embedded networks Submission to IPART, September 2023, p 4.
[23] AER. Electricity Network Service Provider - Registration Exemption Guideline Version 6 March 2018.
[24] For example see EnergyAustralia, Consultation Paper: Energy Prices in embedded networks Submission to IPART, September 2023; Energy Locals, Industry Consultation Paper – energy prices in embedded networks Submission to IPART, September 2023.
[25] Australian Energy Regulator, Default market offer prices 2023-24, Final Determination, May 2023, p 2.
[26] Australian Energy Regulator, Default market offer prices 2023-24, Final Determination, May 2023, p 5.
[27] For example see, Energy Locals, Industry Consultation Paper – energy prices in embedded networks, Submission to IPART, September 2023, p 10 and Meriton Group, Industry Consultation Paper -energy prices in embedded networks, Submission to IPART, September 2023, p 5.
[28] EnergyAustralia, submission to IPART Consultation Paper, September 2023 p 3.
[29] Public Interest Advocacy Centre, Submission to IPART Energy prices in embedded networks, September 2023, p 9.
[30] Energy Metrics Consulting submission to IPART Consultation Paper, p 4.
[31] Austin Tourist Park, Submission to the IPART Review on Energy Prices In Embedded Networks, September 2023, p 3.
[32] Ausgrid, Our TSS Explanatory Statement for 2024-29, January 2023, p 23.
[33] Ausgrid, Our TSS Explanatory Statement for 2024-29, January 2023, p 24.
[34] Ausgrid, Pricing Directions Paper 2024-2029, p 29.
[35] NSW Government Committee on Law and Safety, Embedded Networks in New South Wales, November 2022, p 19.
[36] IPART, Embedded networks stakeholder workshop – summary of proceedings, September 2023, p 7.
[37] Energy Locals, Industry Consultation Paper – energy prices in embedded networks Submission to IPART, September 2023, p 4.
[38] NSW Department of Customer Service, Residential (Land Lease) Communities Act 2013 Statutory Review, November 2021, p 35-36.
[39] NSW Department of Customer Service, Residential (Land Lease) Communities Act 2013 Statutory Review, November 2021, p 36.
[40] For example, see EnergyAustralia, Consultation Paper: Energy Prices in embedded networks Submission to IPART, September 2023, p 2 and Energy Locals, Industry Consultation Paper – energy prices in embedded networks Submission to IPART, September 2023, p 3.
[41] Public Interest Advocacy Centre, Submission to IPART Energy prices in embedded networks, September 2023, p 10.
[42] Austin Tourist Park, Submission to the IPART Review on Energy Prices In Embedded Networks, September 2023, p 3.
[43] IPART, Embedded networks stakeholder workshop: summary of proceedings, September 2023, p 5.
[44] Australian Energy Regulator, Review of gas distribution network reference tariff variation mechanism and declining block tariffs, May 2023, p 20.
[45] Jemena Gas Networks (NSW) Ltd, 2020-25 Access Arrangement Proposal, June 2019, p 39.
[46] Jemena Gas Networks (NSW) Ltd, 2020-25 Access Arrangement Proposal, June 2019 p 9.
[47] Australian Energy Regulator, Review of gas distribution network reference tariff variation mechanism and declining block tariffs, October 2023, p 1.
[48] Australian Energy Regulator, Review of gas distribution network reference tariff variation mechanism and declining block tariffs, October 2023, p 12.
[49] Shopping Centre Council of Australia, The Future of Embedded Networks in NSW Submission to IPART, p 1.
[50] ACCC, Restoring electricity affordability and Australia's competitive advantage, Retail Electricity Pricing Inquiry – Final Report, June 2018, p 340.
[51] Residential (Land Lease) Communities Act 2013, s 77(3). Clarified by Supreme Court in Silva Portfolios Pty Ltd trading as Ballina Waterfront Village & Tourist Park v Reckless [2018] NSWSC 1343.
[52] [2018] NSWCATCD 59.
[53] NSW Government, Residential (Land Lease) Communities Regulation 2015, August 2015, p 7.
[54] NSW Department of Customer Service, Residential (Land Lease) Communities Act 2013 Statutory Review, p 35-36.
[55] Tenants' Union of New South Wales, Submission to IPART's review of energy pricing in embedded networks, September 2023, p 11.
[56] Essential Energy, Moving customers to Time of Use tariffs, July 2017, p 2.
[57] Australian Energy Regulator, Default market offer prices 2023-24 Final Determination, May 2023, p 58-64.
[58] Energy Locals, Industry Consultation Paper – energy prices in embedded networks, Submission to IPART, September 2023, p 3.
[59] Public Interest Advocacy Centre, Submission to IPART Energy prices in embedded networks, September 2023, p 9.
[60] NSW Legislative Assembly Committee on Law and Safety, *Embedded Networks in New South Wales*, November 2022, p iv and p 18.
[61] Report on proceedings before the NSW Legislative Assembly Committee on Law and Safety, 12 August 2022, p 34.
[62] NSW Legislative Assembly Committee on Law and Safety, *Embedded Networks in New South Wales*, November 2022, p 19.
[63] Australian Energy Market Commission, *2019 Retail Energy Competition Review Final Report*, pp 204-205.
[64] Jemena, *Jemena NSW Gas Networks DESIGN GUIDE*, August 2007, p 3.
[65] Tenants' Union NSW submission to IPART Consultation Paper, September 2023, p 11.
[66] Energy & Water Ombudsman NSW, *Common hot water systems*, June 2021, p 1.
[67] Energy & Water Ombudsman NSW, *Common hot water systems*, June 2021, p 1.
[68] Energy and Water Ombudsman of NSW, *Common hot water*.

[69] Energy & Water Ombudsman NSW, *Common hot water systems*, June 2021, p 2.
[70] For example, EnergyAustralia submission to IPART Consultation Paper. September 2023, p 4.
[71] ENM Solutions submission to IPART Consultation Paper, September 2023, p 3, citing the Australian Energy Market Commission, *2019 Retail Energy Competition Review Final Report*, p 204.
[72] Energy Metrics Consulting submission to IPART Consultation Paper, p 5.
[73] For example, [73] Energy Metrics Consulting submission to IPART Consultation Paper, p 5.
[74] Energy Metrics Consulting submission to IPART Consultation Paper, p 7.
[75] EnergyAustralia submission to IPART Consultation Paper. September 2023, p 2.
[76] Energy Metrics Consulting submission to IPART Consultation Paper, p 7-8.
[77] *Energy Retail Code of Practice 2022* (Vic), Schedule 4.
[78] IPART, Embedded networks stakeholder workshop: summary of proceedings, September 2023, p 9.
[79] For example, Tenants' Union NSW submission to IPART Consultation Paper, September 2023, p 11.
[80] Energy Metrics Consulting submission to IPART Consultation Paper, p 7.
[81] ENM Solutions submission to IPART Consultation Paper, September 2023, p 3,
[82] Tenants' Union NSW submission to IPART Consultation Paper, September 2023, p 11 and Energy Metrics Consulting, *Embedded networks stakeholder workshop summary of proceedings,* September 2023, p 8.
[83] Tenants' Union NSW submission to IPART Consultation Paper, September 2023, p 11.
[84] Energy Locals submission to IPART Consultation Paper, p 8.
[85] Public Interest Advocacy Centre submission to IPART Consultation Paper, September 2023, p 12.
[86] Jemena, *Jemena NSW Gas Networks DESIGN GUIDE,* August 2007, p 3.
[87] Jemena, *Jemena NSW Gas Networks DESIGN GUIDE,* August 2007, p 13.
[88] Energy Retail Code of Practice 2022 (Vic), Schedule 4.
[89] Information provided by the Victorian Essential Services Commission, October 2023.
[90] Information provided by the Victorian Essential Services Commission, October 2023.
[91] Energy Metrics Consulting, *Embedded networks stakeholder workshop summary of proceedings,* September 2023, p 8.
[92] For example, Energy Locals submission to IPART Consultation Paper, p 8.
[93] Energy Locals submission to IPART Consultation Paper, p 10.
[94] For example, the Public Interest Advocacy Centre, *Embedded networks stakeholder workshop summary of proceedings,* September 2023, p 8.
[95] Customer stakeholder, *Embedded networks stakeholder workshop summary of proceedings*, September 2023, p 3.
[96] NSW Parliamentary Inquiry, Embedded networks in New South Wales, 2022, p 4.
[97] Australian Government, Energy Rating Calculator.
[98] Intellihub submission to IPART Consultation Paper, September 2023, p 2.
[99] Intellihub submission to IPART Consultation Paper, September 2023, p 2.
[100] Tenants' Union NSW submission to IPART Consultation Paper, September 2023, p 11.
[101] NSW Government, BASIX Design principles Central cooling.
[102] NSW Government, BASIX Heating and Cooling.
[103] Australian Government, Energy Rating Calculator.
[104] NSW Department of Planning and Environment, Apartment Design Guide, July 2015, p 91.
[105] Canstar Blue, What size air conditioner do I need?, August 2023.
[106] NSW Government, Committee on Law and Safety, Embedded Networks in New South Wales, November 2022, p 14.
[107] Energy Consumers Australia, submission to IPART Consultation Paper, September 2023 p 3.
[108] NSW Government, Committee on Law and Safety, Embedded Networks in New South Wales, November 2022, p 14.
[109] *National Energy Retail Law (NSW),* s 88(1).
[110] *National Energy Retail Rules*, rule 164.
[111] AER, Retail Exempt Selling Guideline (version 6), July 2022, p 5.
[112] AER, Retail Exempt Selling Guideline (version 6), July 2022, condition 17; National Energy Retail Law (NSW), s 86.
[113] NSW Government, Committee on Law and Safety, Embedded Networks in New South Wales, November 2022, p 51.
[114] Energy Locals, Industry Consultation Paper – energy prices in embedded networks, September 2023, p 11.
[115] Victoria State Government, Embedded Networks Review Expert Panel, Embedded Networks Review Final Recommendations, January 2022, p 29.
[116] *National Energy Retail Law (NSW),* s 86; *National Energy Retail Rules*, rules 50(d), 56(1)(b) and 64(1)(e).
[117] AER, Retail Exempt Selling Guideline (version 6), July 2022, condition 17.
[118] NSW Government, Committee on Law and Safety, Embedded Networks in New South Wales, November 2022, p 51.
[119] NSW Government, Committee on Law and Safety, Embedded Networks in New South Wales, November 2022, p 51.
[120] *Electricity Supply Act 1995*, s 96D; Energy & Water Ombudsman, EWON Charter, November 2016, cl 11.
[121] NSW Government, Committee on Law and Safety, Embedded Networks in New South Wales, November 2022, p 51-53.
[122] NSW Government, Committee on Law and Safety, Embedded Networks in New South Wales, November 2022, p 53.
[123] NSW Government, Committee on Law and Safety, Embedded Networks in New South Wales, November 2022, p 49-50.
[124] *National Energy Retail Rules*, rule 56(1)(b).
[125] AER. *Retail Exempt Selling Guidelines*, version 6, July 2022, condition 2(1)(b)(i).
[126] Energy & Water Ombudsman NSW, Annual Report 2021/2022, July 2022, p 17.
[127] Victoria State Government, Embedded Networks Review Expert Panel, Embedded Networks Review Final Recommendations, January 2022, p 45.
[128] For example, see EnergyAustralia, Consultation Paper: energy prices in embedded networks: Submission to IPART, September 2023, p 5.

[129] For example, see Energy Metrics Consulting, IPART NSW – Industry Consultation Paper, Public Submission, September 2023, p 8 and Austin Tourist Park, Submission to the IPART review on energy prices in embedded networks, September 2023, p 5.
[130] Victoria's Gas Substitution Roadmap (planning.vic.gov.au).
[131] ACT reaches milestone preventing new fossil fuel gas connections - Chief Minister, Treasury and Economic Development Directorate.
[132] Intellihub submission to IPART Consultation Paper, September 2023, p 1; Combined pensioners & superannuants Association, submission to IPART Consultation Paper, September 2023 pp 7-8; Energy Metrics Consulting submission to IPART Consultation Paper, p 8; EnergyAustralia, Consultation Paper: Energy Prices in embedded networks Submission to IPART, September 2023 p 5.
[133] Tenants' Union NSW submission to IPART Consultation Paper, September 2023, p 6.
[134] Combined pensioners & superannuants Association, submission to IPART Consultation Paper, September 2023 pp 7-8
[135] EnergyAustralia, Consultation Paper: Energy Prices in embedded networks Submission to IPART, September 2023, p 5.
[136] The Meriton Group, Submission to IPART Energy prices in embedded networks, p 7-8.
[137] Energy Metrics Consulting submission to IPART Consultation Paper, p 9.
[138] NSW Parliamentary Inquiry, Embedded networks in New South Wales, 2022, pp 44-45.
[139] Additional protections under the NECF | AEMC.
[140] What is a common hot water system? - Energy & Water Ombudsman NSW (ewon.com.au).
[141] Energy Metrics Consulting submission to IPART Consultation Paper.
[142] HVAC factsheet - Overcoming split incentives | energy.gov.au.
[143] Hot water systems - BASIX (Building Sustainability Index) (nsw.gov.au).
[144] Embedded Network Action Plan – Improving outcomes for customers of embedded networks (nsw.gov.au).
[145] Central hot water - BASIX (Building Sustainability Index) (nsw.gov.au).
[146] heat-pump-hot-water-for-strata-north-sydney-council-fact-sheet (nsw.gov.au).
[147] heat-pump-hot-water-for-strata-north-sydney-council-fact-sheet (nsw.gov.au).

ISBN 978-1-76049-704-0