



**Australian
Gas Networks**

Attachment 13.1A

Demand Forecasting Report

Final Plan 2023/24 – 2027/28

September 2022



Revised Gas Demand Forecast

AGN Victoria & Albury Gas Access Arrangement

Financial Years ending 30 June 2024-2028



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Glossary

ABS	Australian Bureau of Statistics
AER	Australian Energy Regulator
CORE	Core Energy & Resources Pty Ltd
D/C	Demand per Connection
Existing connections	Connections recorded on 30 June 2021, as reduced by disconnections and zero consuming meter removals in subsequent years
GAAR, AA	Gas Access Arrangement
GJ	Gigajoule
GSR	Gas Substitution Roadmap
July Forecast	The CORE forecast of demand included in a 1 July 2022 submission to the AER - Access Arrangement Period: 1 st July 2023 to 30 June 2028
MHQ	Maximum Hourly Quantity
New Connections	Connections recorded from 1 July 2021 onward
NGR	National Gas Rules
PJ	Petajoule
Revised Forecast	A revised AGN Vic gas demand forecast prepared by CORE and dated 1 August 2022.
Tariff C	Commercial customers
Tariff D	Industrial customers
Tariff R	Residential customers
Tariff V	Sum of Tariff R (residential) and Tariff C (commercial) customers
Vic	Victoria

1. Introduction

1.1. Report Scope

This report has been prepared by Core Energy & Resources Pty Ltd (“CORE”) for the purpose of providing AGN with a Revised independent forecast of gas customers and gas demand for the AGN Vic gas distribution network, for the five-year (Financial Year) Review Period from 1 July 2023 to 30 June 2028 (“Review Period”).

This Revision has been undertaken due to a material change in circumstances since the submission of the July forecast. This includes, but is not limited to, the release the Gas Substitution Roadmap, announced changes to National Construction Code, global changes in circumstances impacting national and Victorian energy markets, and increasing focus of new Federal Government on ensuring Australia maintains a pathway to Net Zero Emissions by 2050, or earlier.

This report addresses the Revision to the AGN Vic forecast alone as no revisions have been made to the forecast relating to Albury. Other than the revisions set out within this report, content of the July Forecast report and models remain effective.

We acknowledge that this Revised Forecast report and the related model, will form part of AGN Vic and Albury’s Access Arrangement (“AA”) Proposal submission to the Australian Energy Regulator (“AER”). This report should be read in conjunction with the Revised Gas Demand Model (Confidential and Not for Public Disclosure).

CORE has taken all reasonable steps to ensure this report, and the approach to deriving the forecasts referred to within this report, comply with Part 9, Division 2 of the National Gas Rules (“NGRs”). This division outlines “*access arrangement information relevant to price and revenue regulation*”, and particularly ss 74 and 75:

74. Forecasts and estimates

- (1) Information in the nature of a forecast or estimate must be supported by a statement of the basis of the forecast or estimate.
- (2) A forecast or estimate:
 - (a) must be arrived at on a reasonable basis; and
 - (b) must represent the best forecast or estimate possible in the circumstances.

75. Inferred or derivative information

Information in the nature of an extrapolation or inference must be supported by the primary information on which the extrapolation or inference is based.

2. Executive Summary

2.1. Methodology Overview

CORE has adopted a methodology which is consistent with the approach used to develop the July Forecast. The only change relates to use of broader data, information and analysis relating to the specific change in circumstances.

2.2. Impact of Change in Circumstances

There is scope for the programs and initiatives listed within this report to materially reduce gas consumption across over 1,000,000 homes and over 25,000 small businesses during the period to 30 June 2028. However, the Revised Forecast incorporates reduction relating to a significantly lower share of this potential impact within the AGN Vic network (assuming approximately 30% share of total Victorian dwellings and 35% of total Victorian gas connected dwellings).

2.3. Revised Forecast Summary AGN Vic – Tariff classes R & C

CORE has developed a Revised Demand Forecast for the AGN Vic network for the FY 2023-24 to 2027-28 access arrangement, having regard to drivers of demand for Tariff R and Tariff C, as summarised in the following tables.

No revision is proposed for Tariff D, Industrial.

Table 2.1 1 July AGN Vic Demand Forecast | FY 2023-4 to 2027-8

Tariff	2023-4	2024-5	2025-6	2026-7	2027-8	5-year Growth
Tariff R Demand TJ	29,476,681	28,925,653	28,456,080	27,852,056	27,337,875	-1.87%
Tariff C Demand TJ	8,026,028	7,939,144	8,035,383	8,110,064	8,186,970	0.50%
Total Tariff V	37,502,709	36,864,797	36,491,463	35,962,120	35,524,845	-1.35%

Table 2.2 Revised AGN Vic Demand Forecast | FY 2023-4 to 2027-8

Tariff	2023-4	2024-5	2025-6	2026-7	2027-8	5-year Growth
Tariff R Demand TJ	28,947,339	27,836,087	26,519,621	24,931,633	23,297,407	-5.28%
Tariff C Demand TJ	7,945,768	7,730,251	7,694,228	7,658,374	7,622,687	-1.03%
Total Tariff V	36,893,107	35,566,338	34,213,849	32,590,007	30,920,094	-4.32%

The following paragraphs of this report present a concise overview of the Revised demand forecast for each tariff class and later sections provide further detail.

2.4. Revised Forecast - Residential Summary

2.4.1. Connections

Figure 2.1 Residential Closing Connections (No.)

Closing Connections	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
July Forecast	695,963	707,081	715,795	727,169	737,945	748,762	759,559	1.49%
Revised Forecast	695,963	704,179	705,234	703,654	694,587	680,251	660,021	-1.64%
Movement	0	-2,902	-10,561	-23,515	-43,358	-68,511	-99,538	

The factors contributing to the Revised Closing Connections forecast (and Average Connections therefore) are set out in the Scenario Manager tab of the accompanying model and following sections of this report.

2.4.2. Demand per Connection

Figure 2.2 Residential Demand per Connection (GJ)

D/C	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
July Forecast	43.69	42.93	41.43	40.09	38.84	37.47	36.25	-3.29%
Revised Forecast	43.69	42.81	41.08	39.51	37.93	36.27	34.77	-4.08%
Movement	0	-0.12	-0.35	-0.58	-0.91	-1.2	-1.48	

The factors contributing to the Revised Demand/Connection forecast are set out in the Scenario Manager tab of the accompanying model and following sections of this report.

2.5. Revised Forecast - Commercial Summary

The Revised Forecast for the Commercial customer segment relates to an adjustment to Demand/Connection only. No change is proposed for Commercial connections.

2.5.1. Demand per Connection

Table 2.3 AGN Vic Commercial Connections, D/C and Demand

D/C	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
July Forecast	290.70	334.32	351.91	354.23	356.60	357.98	359.44	0.53%
Revised Forecast	290.70	334.32	348.39	344.91	341.46	338.05	334.67	-1.00%

This reduction is attributable to forecast growth in solar PV and a degree of switching from gas appliances to electricity, including R/C air conditioning for space heating. Both are supported by clearly defined Government programs and changing consumer preferences as evidenced by survey and stakeholder consultation.

2.6. Revised Allocation by AGN Vic Zones

Core has allocated forecast connections, demand per connection and demand between the four AGN Vic network zones – Central, North, Murray Valley, and Bairnsdale, for the Residential and Commercial segments and Connections, MHQ and ACQ for the Industrial segment.

The allocation has taken the following factors into consideration:

- Historical trend (pre COVID) in connections and demand per connection
- Likely change in future trends having regard to publicly available research and references
- Changes in circumstances since the July Forecast

The allocation commences with an allocation to regions other than the Central region and the Central region is then allocated the balance.

The result is summarised in the following figures.

2.6.1. Residential Demand Allocation

Zone	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
Central	26,812,193	26,625,281	25,552,391	24,415,911	23,067,190	21,518,493	19,907,635	
North	2,860,912	2,896,023	2,938,155	2,950,625	2,970,198	2,917,001	2,935,473	
Murray Valley	214,437	217,269	221,158	226,029	233,373	234,357	237,634	
Bairnsdale	223,812	229,535	235,635	243,521	248,861	261,782	216,666	
Total Network	30,111,354	29,968,107	28,947,339	27,836,087	26,519,621	24,931,633	23,297,407	-5.28%

2.6.2. Commercial Demand Allocation

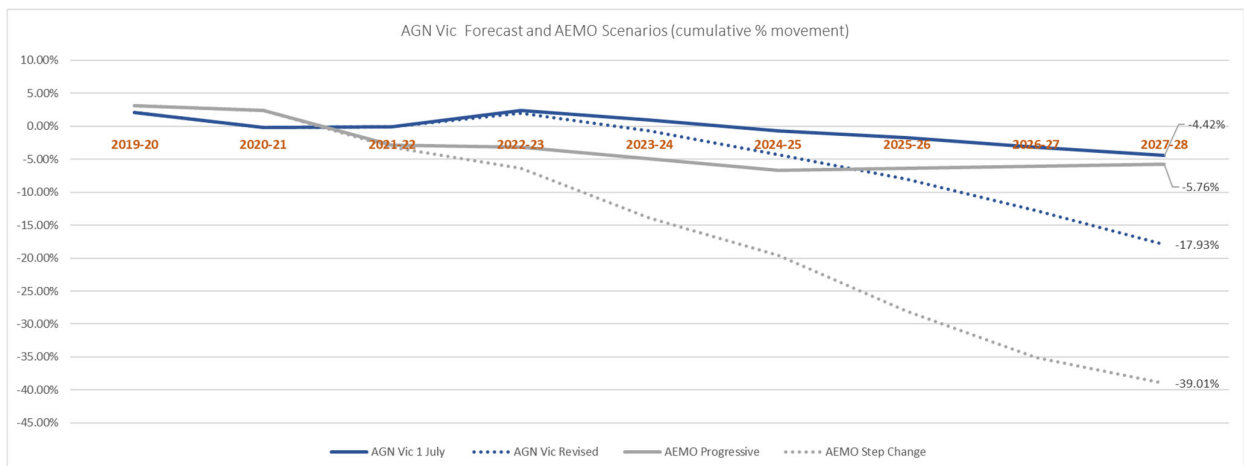
Zone	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
Central	6,130,693	7,046,767	7,078,090	6,893,064	6,869,407	6,843,140	6,812,868	
North	756,754	748,725	738,956	711,183	700,175	693,083	689,091	
Murray Valley	62,694	61,834	59,593	58,750	58,476	57,821	57,460	
Bairnsdale	72,717	70,988	69,128	67,253	66,170	64,330	63,268	
Total Network	7,022,858	7,928,314	7,945,768	7,730,251	7,694,228	7,658,374	7,622,687	-103%

2.7. Validation

CORE has compared the Revised AGN Vic R&C demand forecast set out above, against the R&C forecast presented by AEMO in the 2022 Gas Statement of Opportunities (GSOO).

While the GSOO forecast is for Victoria as a whole, CORE has compared forecast average growth rates under AEMO defined scenarios, against the combined CORE AGN Vic forecasts for Tariff R and C together (collectively Tariff V). The result is summarised in the following figure.

Figure 2.3 Comparison of AEMO GSOO Scenario annual movements and CORE July and Revised AGN Vic forecast annual movements for R&C segment.



CORE notes that the reduction in demand resulting from CORE Revised forecast, is materially below the potential reduction relating to AEMO's Step Change scenario. CORE 's Revised forecast takes into consideration only specific policies, programs and initiatives which have been legislated, approved, or budgeted at the date of this report. CORE recognises that there is scope for further changes during the AA period to June 2028, but these influences have been excluded based on conservatism.

3. Methodology

3.1. Principles of CORE's Approach to Deriving the Revised Forecast

The Methodology used to derive the July Demand Forecast submitted to the AER on 1 July, and for this Revised Forecast, are consistent in all material respects, including weather normalisation of demand.

This report uses the 1 July forecast as a base and extends analysis, using consistent approaches, but new information, to arrive at the Revised forecast.

CORE acknowledges that the Revised forecast is based on a series of inputs which cannot be specifically analysed against an actual historical data series. This is due to the fact that the Revision is attributable to a rapidly changing energy industry, influenced by new policy settings and defined programs to achieve legislated national and State GHG emission and other targets and National Construction Code Standards. Therefore CORE has used techniques which are based on best practice, to develop forecasts which result in the “best forecast or estimate possible in the circumstances” in accordance with the NGR.

What is best estimate under the changing circumstances?

Core is not aware of any single reference which defines best estimate under the specific circumstances which are faced by the AGN Vic network. Therefore, CORE has considered ISO Standards and approaches adopted by leading global organisations to guide best practices used to develop estimates of future energy and gas demand. This analysis concludes that a best estimate results from an approach which includes the following elements:

- A balance of top down and bottom-up, qualitative and quantitative analysis by professionals with relevant experience
- Broad based stakeholder consultation/collaboration
- Comprehensive, high quality data/evidence which informs feasible scenarios
- Systematic thinking and analysis - The change in circumstance and its potential impact should be considered in terms of the energy system, economy as a whole and National and State legislated targets
- Specific analysis of each major driver of demand, and use of best available evidence to support assumptions made

The Revised Forecast embraces these elements, as presented in Section 4.

The revised Forecast is based on the following specific drivers/expected trends:

- Tariff R Residential – Connections – a higher level of existing customer disconnections and lower level of new connections, due to incentives, consumer preference, perceived future price differential between gas and electricity, and National Construction Code (NCC) changes; Demand per Connection - an acceleration of gas appliance substitution in favour of solar and grid electricity – most significantly in the area of space/room heating but also water heating, due to incentives, outlook for lower cost of electricity relative to gas, NCC changes and consumer preferences
- Tariff C Commercial – Demand per connection - a reduction in gas use for Government and semi Government commercial segment activities and expected increase in R/C airconditioning for heating in the future vs gas

3.1.1. Validation

Results have also been compared in detail against reputable third party analysis, including the gas and electricity market operator, AEMO, to ensure that the Revised Forecast is further validated.

4. Analysis of the Impact of Change in Circumstances

CORE has developed a structured approach to satisfy the NGR requirement of “best estimate in the circumstances”. The approach has been designed following analysis of approaches applied by leading national and international energy research and analytical organisations, as noted above in Section 3 above.

4.1. Third Party Approaches

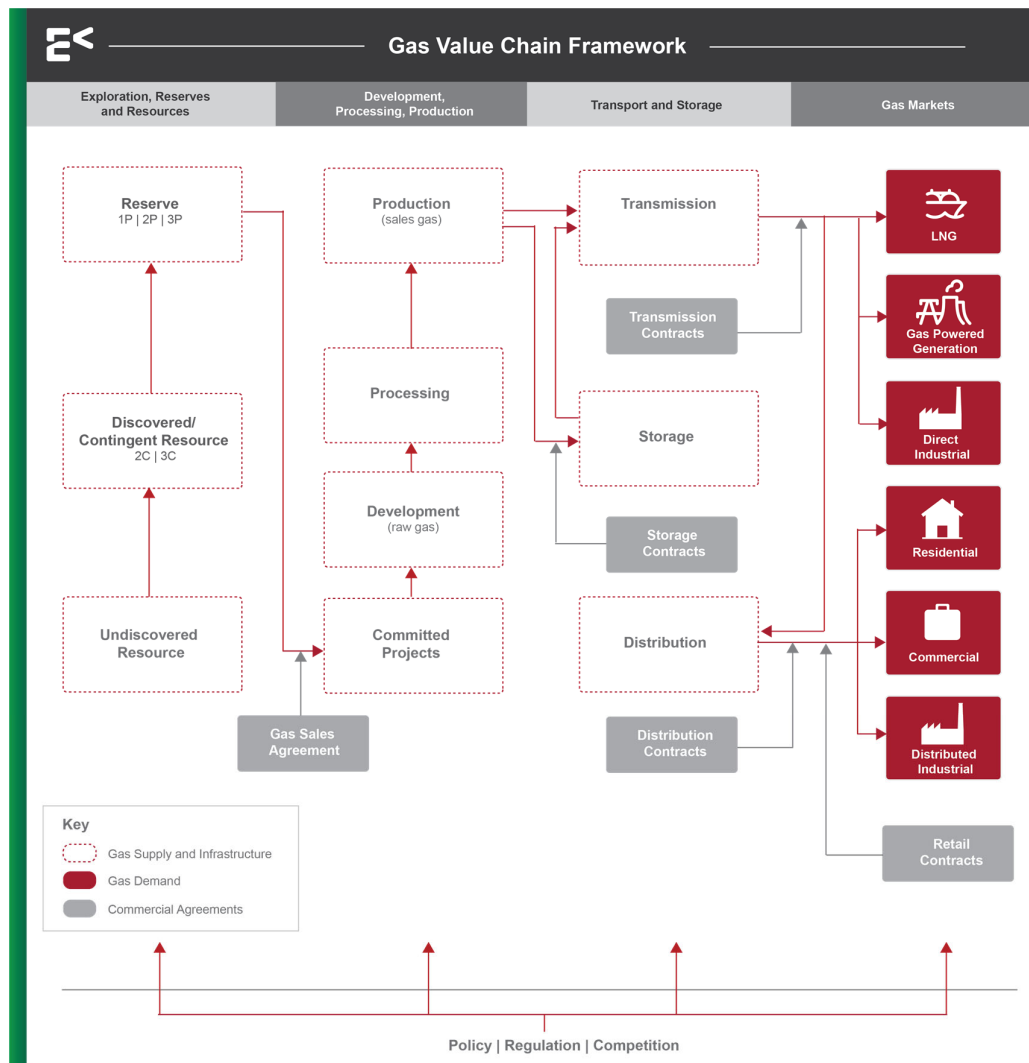
The following table summarises third party organisations who have completed relevant comparable analysis of the outlook for the energy industry, under a uncertain future setting. These international organisations are rated as leaders in energy analysis. CORE has considered approaches adopted by these organisations to ensure that the approach used by CORE approach to deriving the Revised Forecast meets the NGR requirements as to best estimate under the circumstances.

Jurisdiction	Organisation
Australia	Monash University
Australia	AEMO
International	International Energy Agency
USA	Energy Information Administration
Japan	The Institute of Energy Economics
UK	Oxford Energy Institute
Canada	Canadian Energy Research Institute
Korea	Korean Institute of Energy Research

4.1.1. System Thinking - Value Chain Analysis

Given the uncertainty regarding future demand for gas by network customers, CORE has undertaken analysis of the broader gas and energy value chain to ensure that forecast demand for the AGN Vic network is consistent with the most likely outlook for the gas and energy value chain more broadly, and consistent with legislated targets relating to GHG emissions in Victoria and nationally.

The following figure presents a summary of the Value Chain logic and interrelationships which have been considered – based on CORE’s proprietary Energyview™ system.



This analysis demonstrates that the AGN Vic Revised Forecast is consistent with a whole value chain logic, on the basis that:

- domestic gas supply in eastern Australia is short relative to AEMO GSOO Progressive Scenario gas demand outlook.
- there is a logical foundation for reallocating gas (in a supply short context) from residential and commercial users to higher value-added industrial consumers and Gas Generation facilities, which must increasingly stabilise the electricity system as Variable Renewable Energy increases.
- Victoria via Otway and Gippsland Basin supply sources has been a major supplier of gas to Victoria and eastern Australia more broadly. As noted by the ACCC Gas Inquiry and AEMO, these sources are unable to sustain historical production levels, which has the potential to result in demand/supply shortfalls if demand is not constrained.
- Victoria accounts for a major proportion of national GHG emissions and must address options available to ensure 2030 targets are met. Given that there is limited scope to lower coal generation capacity before 2028 and substantially reduce petroleum product combustion by road transport sectors, gas is called upon to make a material contribution.

- There are growing claims and customer perceptions that other forms of energy, including solar and renewable electricity are likely to be materially more cost effective than gas.

4.2. Best Available Data/Evidence

CORE has compiled and analysed a broad range of best available data, analysis, and broader evidence to develop the Revised Forecast. This includes but is not limited to the following:

Commonwealth Government policies and programs	<ul style="list-style-type: none"> • Emission targets and trajectory • Defined programs, initiatives
National Construction Code	<ul style="list-style-type: none"> • Final code changes including seven-star requirement for dwellings which has material adverse consequences for gas connections for new dwellings
Victorian Government legislated emission targets	<ul style="list-style-type: none"> • Targets and timing • Stated programs and initiatives
Gas Substitution Roadmap	<ul style="list-style-type: none"> • relative cost of gas and electricity for Residential and Commercial customers • consumer preference survey • Government and social housing program
Victorian Energy Upgrades program	Analysis of initiatives focused on energy efficiency and appliance substitution
Victorian State Budget	Budgeted programs
AEMO	Gas consumption forecast for Victoria and R&C segment specifically
Energy Consumers Australia Survey	<p>ECA enhanced their sentiments survey in 2021, creating two discrete surveys:</p> <ul style="list-style-type: none"> • Energy Consumers Sentiment Survey – conducted 2 x per year – Dec and June • Energy Consumers Behaviour Survey – conducted annually – June
CORE	<p>Analysis of in-house data and analysis which has been developed through collaboration with leading national and international organisations</p> <p>Consideration of the options available to Victoria to achieve emission targets and the role of distributed Residential, Commercial, and Industrial gas supply/consumption reductions in meeting the 2030 emission reduction target.</p>

4.3. Balanced, Qualitative and Quantitative, Top Down and Bottom-up Analysis

The approach adopted by CORE involves sequential analysis to address a series of decision gates as summarised below.

Qualitative analysis

1. Is it reasonable to assume that the Victorian Government will achieve reduction targets set for 2025 and 2030?



2. Is it reasonable to assume that Gas will be a near term focus area to achieve near term reduction targets?



3. Are there clearly defined consumer segments targeted by Victoria's gas substitution/reduction program?



4. Are specific policies and programs in place or being put in place as a priority to address these consumers?



5. Is there adequate evidence to support a robust forecast of the impact on these consumer segments?



6. How can scenarios be defined to ensure they are feasible and within an acceptable range of probability?



Quantitative analysis

7. How has CORE satisfied itself that the forecast is the best estimate or forecast in the circumstances?



The analysis undertaken by CORE at each stage of the Qualitative phase is outlined in Annexure 2, however the following table summarises the number of Victorian consumers likely to be impacted. Analysis undertaken by CORE to complete the Quantitative phase is set out in Section 5 below.

The following tables summarise the potential impact of firm programs which are expected to reduce gas demand during the period to 30 June 2028, and the adjustments made to Connection numbers and average Demand/Connection, to derive the Revised Forecast. CORE notes that there is some potential overlap across elements presented, however the Revised forecast has taken this into consideration.

Residential

Program, Initiative, Indicator	Customers likely to be impacted (Victoria total and AGN Vic Share - 30% of VIC houses and 35% of VIC gas connected houses)	
	Victoria	AGN Vic
<p>Government and social housing – existing and new</p> <p>Programs include: Victorian Energy Upgrades Solar program The \$5.3 billion Big Housing Build</p>	<p>Approximately 3% of Victorian State vs 4.2% Australia</p> <p>100,000+ existing and 12,000 new</p>	<p>35,000+ existing and 3,000 new</p>
<p>Existing customers considering electrification</p> <p>Survey based – GSR survey and AGN’s ECA survey</p>	<p>10% of existing gas customer seriously considering</p> <p>~200,000 existing</p>	<p>10% of existing gas customer seriously considering</p> <p>~70,000 existing</p>
<p>National Construction Code - New Connection</p> <p>NCC standards generally and 7-star requirement specifically</p>	<p>~15,000 dwellings per annum</p> <p>~75,000 new over AA period</p>	<p>~5,000 new connections per annum</p> <p>~25,000 new over AA period</p>
Revised Forecast		AGN Vic (reduction below July Forecast)
Reduction in connections		~100,000 connections by 30 June 2028
Reduction in D/C		~4% reduction by 30 June 2028

Commercial

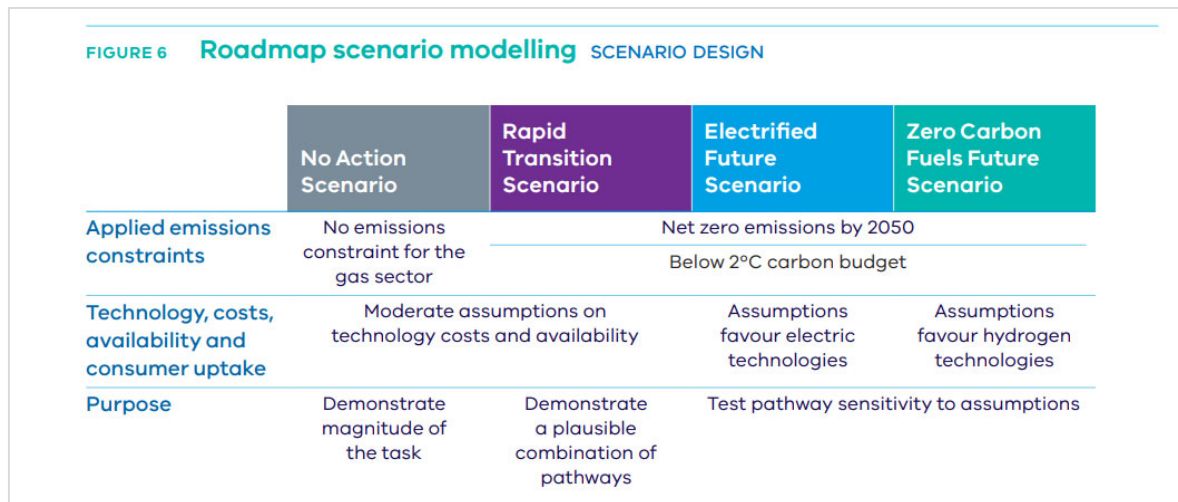
Program, Initiative, Indicator	AGN VIC customers potentially impacted
<ul style="list-style-type: none"> Refer below Solar incentives -15,000 small business rebates Energy efficiency support under VEU and other programs Consumer preference as evidenced by surveys, public consultation Electrification incentives generally and impact on economics/cost competitiveness of appliance switching 	<p>~10-12% of existing connected customers</p> <p>~15-20% of new connections</p> <p>Potential for >10% reduction in D/C by June 2028</p>

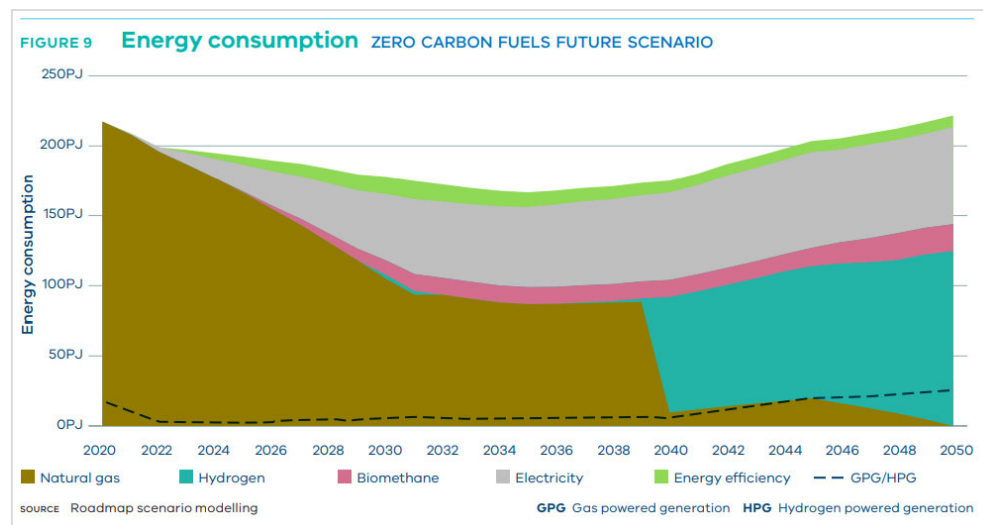
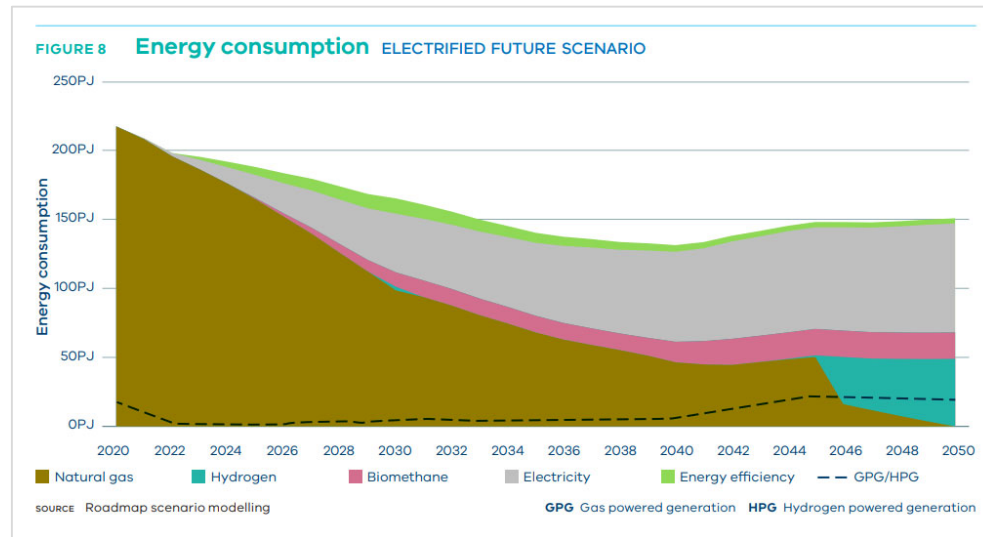
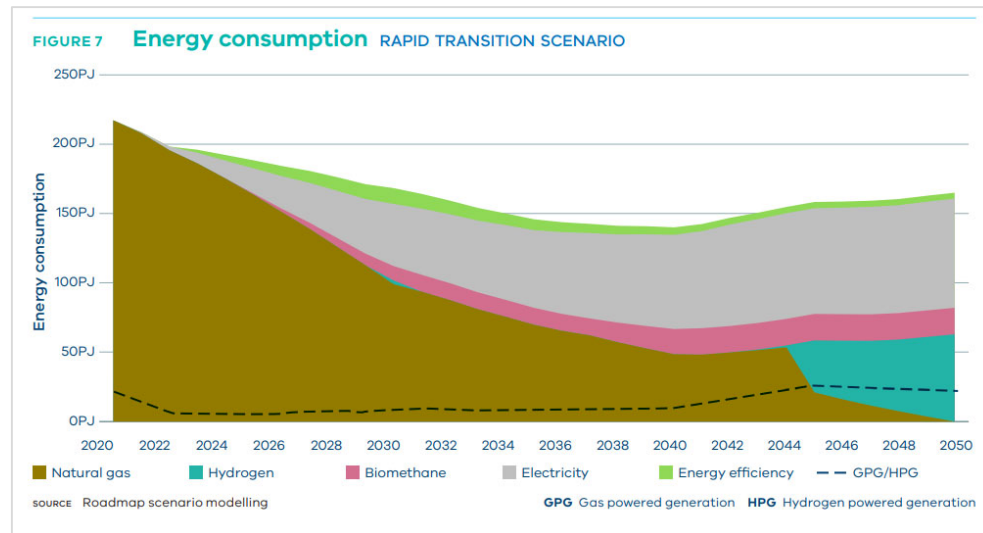
Revised Forecast	AGN Vic
Reduction in existing connections	No revision
Reduction in New Connections	No revision
Reduction in D/C	1% reduction in D/C over 4 out of 5 years of the AA period, which is equivalent to a loss of less than 0.5% of existing Commercial customers

Specific disclosures relating to programs and initiatives which impact commercial customers include:

Modelling

Overarching modelling that demonstrates that R,C and I gas consumption reductions are targeted in a highly focused manner by the Vic Government – a 50% reduction inside 10 years to 2030.








Solar Incentives

Victoria's Climate Commitments


Victoria's *Climate Change Act 2017* sets a target of **net zero emissions by 2050**

Victoria's Sector Pledges

Energy Sector	Transport Sector	Whole of Victorian Government
		
<ul style="list-style-type: none"> 50% of electricity from renewable sources by 2030 778,500 household rebates for solar panels, solar hot water systems and batteries 15,000 small business rebates for solar panels 	<ul style="list-style-type: none"> 50% zero emissions vehicle target for all new light vehicle sales by 2030 	<ul style="list-style-type: none"> Schools, hospitals, metropolitan trains and trams powered by renewable electricity by 2025 400 zero emissions vehicles by 2023 Improved energy efficiency of buildings

NET ZERO EMISSIONS 2050

YEAR	REDUCTION
2030	45–50%
2025	28–33%



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VEU Program

Victorian Government actions

New and continuing Victorian Government programs that help businesses reduce their energy bills and emissions include:



The Solar for Business Program, launched in May 2021, will support up to 15,000 Victorian businesses to install solar PV systems at their work premises, empowering businesses to generate their own electricity and minimise their bills.



The VEU program provides businesses with upfront incentives to reduce their gas use by installing new equipment such as efficient water heaters, space heaters and commercial and industrial gas boilers; a new commercial and industrial heat pump hot water activity was introduced in February 2022. Businesses can also earn credits for bespoke 'project based' energy efficiency, electrification and fuel switching activities that cut emissions. These projects have the potential to achieve significant reductions in gas consumption for businesses; work is underway to streamline activity requirements and to further encourage renewable energy investment through these projects.



Stronger energy efficiency standards for new and refurbished commercial buildings will be developed for the 2025 edition of the National Construction Code. The Victorian Government will engage with industry on this and prepare them to meet new standards.



Sustainability Victoria's Small Business Energy Saver Program (run until June 2022) provided \$5 million in discounts to small businesses upgrading to more energy-efficient equipment, including hot water systems and efficient reverse cycle air conditioners.



\$60 million over 5 years will support Victorian farmers to improve on-farm energy efficiency and incorporate renewable energy into farming systems to make Victoria's agriculture industries resilient and internationally competitive.



In addition, the \$31 million Business Recovery Energy Efficiency Fund, allocated 110 grants across more than 25 industries in 2021, with these projects now helping businesses improve their energy efficiency and reduce energy costs through investment in capital works and energy demand management technologies.

Government own use gas: pledge to move to 100% renewable electricity by 2025

AGN Vic Commercial customers include many Government buildings, and it is considered highly likely that the Government will meet its pledge to reduce gas consumption, as evidenced below

Transitioning Government's own gas use

The Victorian Government has committed to reduce its greenhouse gas emissions by around 70 per cent from 2018-19 levels in the 2021-25 Whole of Government emissions reduction pledge, including by using 100 per cent renewable electricity by 2025. Reducing emissions from fossil gas will become an increasingly important feature of the Victorian Government's transition to net zero emissions.

The Victorian Government is responsible for approximately three per cent of Victoria's total gas consumption with major users including schools, hospitals and correctional facilities, alongside widespread use in office-buildings and other settings.

The Government is demonstrating leadership as an early adopter of electrification and alternatives to fossil gas, including by requiring all State Government infrastructure business cases, for buildings and facilities, to include options for all-electric developments. This will ensure that alternatives to gas are always considered in our new builds and major upgrades.

Victorian Government actions

In addition to a new requirement for businesses cases, for buildings and facilities, to consider all-electric options, policies are already in place to reduce reliance on fossil gas in Victorian Government buildings and infrastructure, including:




Public hospitals and health services

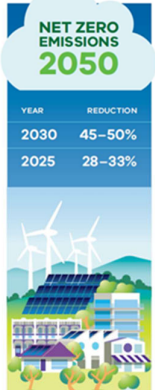
- The Victorian Health Building Authority Guidelines for sustainability in health care capital works support the transition to all-electric public healthcare buildings when building new hospitals. This supports the decarbonisation of the public healthcare system when government operations move to 100 per cent renewable electricity from 2025.
- In May, the Government announced funding for the new Melton Hospital, designed to be Victoria's first all-electric hospital powered by 100 per cent renewable electricity. The hospital's design will focus on sustainability initiatives such as maximising on-site solar generation, high-performing façades, efficient plant and equipment, and integration of green spaces within the hospital precinct.

Victoria's Climate Commitments

Victoria's *Climate Change Act 2017* sets a target of net zero emissions by 2050

Victoria's Sector Pledges

Energy Sector	Transport Sector	Whole of Victorian Government
 <ul style="list-style-type: none"> 50% of electricity from renewable sources by 2030 778,500 household rebates for solar panels, solar hot water systems and batteries 15,000 small business rebates for solar panels 	 <ul style="list-style-type: none"> 50% zero emissions vehicle target for all new light vehicle sales by 2030 	 <ul style="list-style-type: none"> Schools, hospitals, metropolitan trains and trams powered by renewable electricity by 2025 400 zero emissions vehicles by 2023 Improved energy efficiency of buildings



YEAR	REDUCTION
2030	45–50%
2025	28–33%

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Incentives to move away from gas, public messaging:

Victoria's Gas Substitution Roadmap

Helping businesses electrify and cut energy bills

The Victorian Government's Gas Substitution Roadmap is helping our State navigate the path to net zero emissions while cutting energy bills.

The Roadmap outlines how we will use energy efficiency, electrification, hydrogen and biogas to drive down bills and cut carbon emissions.

It will also ensure that Victorians have access to an affordable, secure, reliable, and safe supply of energy.

Businesses can move to electric appliances and reduce their energy bills today, by accessing incentives from the Victorian Energy Upgrades program.

Recently Commercial and Industrial Heat Pump Water Heaters (C&I HPWH) were introduced into the Victorian Energy Upgrades program. This means that if businesses have an existing gas or electric resistance boiler or water heater, they can install a HPWH at a reduced price thanks to the VEU program.

The technology behind HPWHs allow them to be three to seven times more efficient than gas and electric resistance technologies.

Businesses can receive an incentive from the VEU program of between \$2,000 and \$16,000 for replacing an existing commercial-scale gas boiler with an efficient electric HPWH. When you install a HPWH you can save up to 60 per cent on your energy consumption compared to gas or electric resistance boiler or water heaters. A typical commercial business might save anywhere from \$1,500 to \$9,000 a year on energy bills. Manufacturing businesses with even larger HPWHs could save even more.

HPWH can achieve temperatures of up to 90°C, making them suitable for:

- space heating
- potable hot water
- sanitation.

The VEU program will also be introducing new incentives to support upgrades to reverse cycle heating and cooling systems and smaller-scale HPWHs, which can benefit businesses.

And for those businesses where C&I HPWH are not suitable for their needs, the VEU program can help by providing incentives for an efficient gas boiler or water heater.

For more information about the VEU program, please visit:

www.victorianenergyupgrades.vic.gov.au

The average business currently saves \$3,700 per year by participating in the VEU program.

5. Revised Residential, Tariff R Forecast

5.1. Residential Demand

The Revised Forecast of residential demand is the product of Revised Average Connections and Revised Demand per connection. These elements, together with Closing connections, which is the basis for calculating Average connections, are summarised in the following table, together with a comparison against the Forecast included in the July submission.

Further detail regarding the derivation of Revised Connections and revised Average Demand per Connection is set out in the following paragraphs.

5.1.1. Residential Connections

July Forecast

Connections								
	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Existing Closing		678,530	673,045	667,562	666,562	665,561	664,560	663,559
New - Annual		17,433	16,603	14,196	12,375	11,777	11,818	11,797
New - cumulative		17,433	34,036	48,232	60,607	72,384	84,202	95,999
Total Closing	682,374	695,963	707,081	715,795	728,170	737,945	748,762	759,559

Revised Forecast

Connections								
	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Existing		678,530	673,045	667,562	666,562	665,561	664,560	663,559
Disconnection number annual (1/15)			569	4,549	9,098	13,647	15,922	18,197
Disconnection number cumulative (1/15)			569	5,118	14,216	27,864	43,786	61,982
Disconnections - annual renovation, economic, social			673	1,335	2,000	2,662	3,323	3,981
Disconnections - cumulative renovation, economic, social			673	2,008	4,008	6,670	9,993	13,974
Existing Closing - Revision		678,530	671,804	660,437	648,338	631,027	610,782	587,603
New - annual		17,433	16,603	14,196	12,375	11,777	11,818	11,797
New - cumulative		17,433	34,036	48,232	60,607	72,384	84,202	95,999
Policy - GSR - annual			1,660	1,775	1,856	3,533	5,909	8,848
Policy - GSR - Cum			1,660	3,435	5,291	8,824	14,733	23,581
New - cumulative		17,433	32,376	44,797	55,316	63,560	69,469	72,418
Total	682,374	695,963	704,179	705,234	703,654	694,587	680,251	660,021
Average	675,731	689,169	700,071	704,707	704,444	699,121	687,419	670,136

5.1.2. Residential Demand per Connection

July Forecast

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Existing D/C	43.93	42.95	41.98	40.74	39.53	38.34	37.16
New D/C	36.02	35.22	34.42	33.41	32.42	31.44	30.47
Weighted new and existing	43.69	42.93	41.43	40.09	38.84	37.47	36.25

Revised Forecast

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Existing							
Opening existing		42.95	41.98	40.74	39.53	38.34	37.16
Loss - space heating load		41,938	115,861	209,688	312,044	425,773	545,188
Loss - water heating load		58,002	130,504	217,507	304,509	391,512	478,515
Loss - space heating GJ/connect		0.06	0.18	0.32	0.49	0.70	0.93
Loss - water heating GJ/Connect		0.09	0.20	0.34	0.48	0.64	0.81
Closing		42.80	41.61	40.09	38.55	37.00	35.42
New							
Opening		35.22	34.42	33.41	32.42	31.44	30.47
Reduction - space heating		0.00	0.55	0.76	0.78	0.68	0.41
Closing		35.22	33.87	32.65	31.64	30.75	30.06
Weighted							
Existing	0.00	40.84	38.96	36.93	35.03	33.22	31.53
New	0.00	1.62	2.15	2.57	2.90	3.14	3.30
Elasticity adjustment - July		0.35	-0.04	0.01	0.01	-0.09	-0.07
	43.69	42.81	41.08	39.51	37.93	36.27	34.77

6. Commercial, Tariff C Forecast

The Revised Forecast of Commercial Demand is 7.623 PJ p.a. by 2028 vs 8.19 PJ in 2029 in the July Forecast a reduction of ~6%. This change is attributable to a revision of estimated D/C from 359.44 GJ to 334.67 GJ, by the June 2028 year.

Factors contributing to this include increased energy efficiency, appliance switching in favour of electricity generally and in Government owned connections specifically.

6.1.1. Commercial Closing Connections

No change

Closing Connections	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
Opening	24,149	24,168	23,262	22,352	22,473	22,594	22,716	22,838	0.54%
Reduction									
Closing Revised	24,149	24,168	23,262	22,352	22,473	22,594	22,716	22,838	0.54%

6.1.2. Commercial Demand/Connection

July Forecast

Consumption/Connection	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
Total VIC	285.13	290.70	334.32	351.91	354.23	356.60	357.98	359.44	0.53%

Revised Forecast

Demand per connection	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
Opening	285.13	290.70	334.32	351.91	348.39	344.91	341.46	338.05	-1.00%
Reduction (%)				1.00%	1.00%	1.00%	1.00%	1.00%	
Reduction (D/C)				3.52	3.48	3.45	3.41	3.38	
Closing Revised	285.13	290.70	334.32	348.39	344.91	341.46	338.05	334.67	-1.00%

6.1.3. Commercial Demand

July Forecast

Consumption	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
Total VIC	6,835,995	7,022,858	7,928,314	8,026,028	7,939,144	8,035,383	8,110,064	8,186,970	0.50%

Revised Forecast

Consumption	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
Revised	6,858,047	7,022,858	7,928,314	7,945,768	7,730,251	7,694,228	7,658,374	7,622,687	-1.03%

7. AGN Vic Allocation of Connections and Demand by Zone

Core has allocated forecast connections, demand per connection and demand between the four AGN Vic network zones – Central, North, Murray Valley, and Bairnsdale, for the Residential and Commercial segments and Connections, MHQ and ACQ for the Industrial segment.

The allocation has taken the following factors into consideration:

- Historical trend (pre COVID) in connections and demand per connection
- Likely change in future trends having regard to publicly available research and references

Consistent with the approach adopted for allocation within the July Forecast, the Revised Forecast allocation commences with an allocation to regions other than the Central region and the Central region is then allocated the balance. The result is summarised in the following figures.

7.1. Residential Allocation

Residential Demand								
Zone	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
Central	26,812,193	26,625,281	25,552,391	24,415,911	23,067,190	21,518,493	19,907,635	
North	2,860,912	2,896,023	2,938,155	2,950,625	2,970,198	2,917,001	2,935,473	
Murray Valley	214,437	217,269	221,158	226,029	233,373	234,357	237,634	
Bairnsdale	223,812	229,535	235,635	243,521	248,861	261,782	216,666	
Total Network	30,111,354	29,968,107	28,947,339	27,836,087	26,519,621	24,931,633	23,297,407	-5.28%

Closing Connections								
Zone	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
Central	597,206	604,303	603,924	602,471	591,221	575,809	553,621	
North	84,786	85,589	86,744	86,194	88,213	89,113	91,083	
Murray Valley	8,792	8,887	8,925	9,009	9,007	8,935	8,784	
Bairnsdale	5,179	5,401	5,642	5,981	6,147	6,394	6,534	
Total Network	695,963	704,179	705,234	703,654	694,587	680,251	660,021	-164%

Demand/ Connection								
Zone	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
Central	44.9	44.1	42.3	40.5	39.0	37.4	36.0	
North	33.7	33.8	33.9	34.2	33.7	32.7	32.2	
Murray Valley	24.4	24.4	24.8	25.1	25.9	26.2	27.1	
Bairnsdale	43.2	42.5	41.8	40.7	40.5	40.9	33.2	
Total Network	43.7	42.8	41.1	39.5	37.9	36.3	34.8	-4.08%

7.2. Commercial Allocation

Commercial Demand

Zone	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
Central	6,130,693	7,046,767	7,078,090	6,893,064	6,869,407	6,843,140	6,812,868	
North	756,754	748,725	738,956	711,183	700,175	693,083	689,091	
Murray Valley	62,694	61,834	59,593	58,750	58,476	57,821	57,460	
Bairnsdale	72,717	70,988	69,128	67,253	66,170	64,330	63,268	
Total Network	7,022,858	7,928,314	7,945,768	7,730,251	7,694,228	7,658,374	7,622,687	-1.03%

Closing Connections

Zone	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
Central	20,347	19,559	18,768	18,858	18,948	19,039	19,129	
North	3,314	3,196	3,077	3,095	3,113	3,131	3,150	
Murray Valley	373	369	364	369	375	380	386	
Bairnsdale	133	138	143	150	158	166	174	
Total Network	24,168	23,262	22,352	22,473	22,594	22,716	22,838	0.54%

Demand/ Connection

Zone	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	Growth 2023-4-2027-8
Central	3013	360.3	377.1	365.5	362.5	359.4	356.2	
North	228.3	234.3	240.2	229.8	224.9	2213	218.8	
Murray Valley	167.9	167.7	163.7	159.0	156.0	152.1	148.9	
Bairnsdale	545.9	515.4	481.8	446.9	419.2	388.6	364.3	
Total Network	290.7	334.3	348.4	344.9	341.5	338.0	334.7	-1.00%

8. Validation

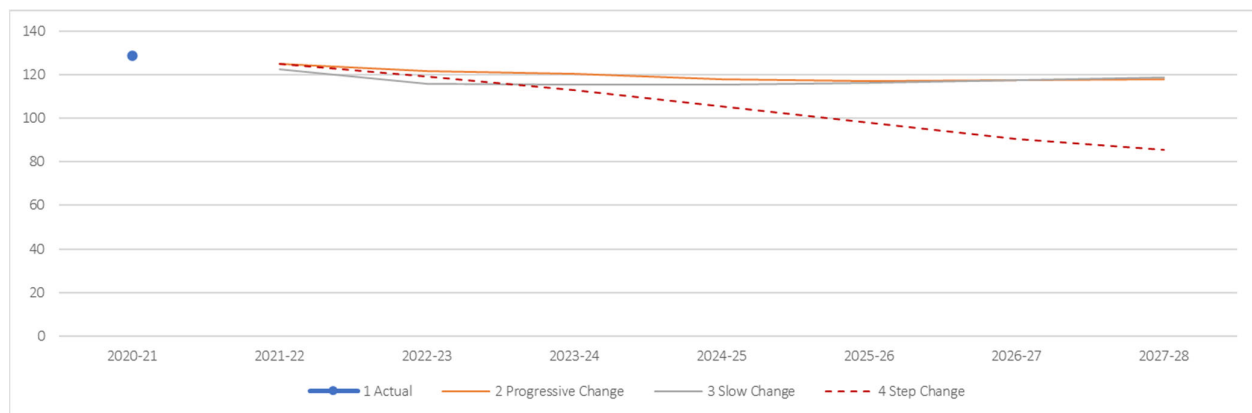
A key step undertaken by CORE, to ensure forecasts meet the ‘Best estimate in the circumstances’ requirement of the NGR, as summarised in earlier sections of this report, is to validate inputs and results by reference to appropriate third-party disclosures, ensuring:

- All inputs are from quality sources
- Results are cross-checked/compared against analysis undertaken by highly qualified organisations

In this regard, CORE’s Revised Forecast of demand is compared with demand scenarios presented by AEMO in its 2022 Gas Statement of Opportunities (GSOO), as it relates to the Victorian R&C segment collectively. The GSOO does not provide the level of granularity required to separate Residential and Commercial elements. Further industrial demand combines Tariff D demand and industrial demand associated with customers outside distribution networks and thus does not provide a suitable basis for validation purposes.

CORE considers the Progressive and Slow change scenarios to be the most appropriate for cross-check/validation purposes, with Step change setting the lower boundary of potential demand for Victoria as a whole.

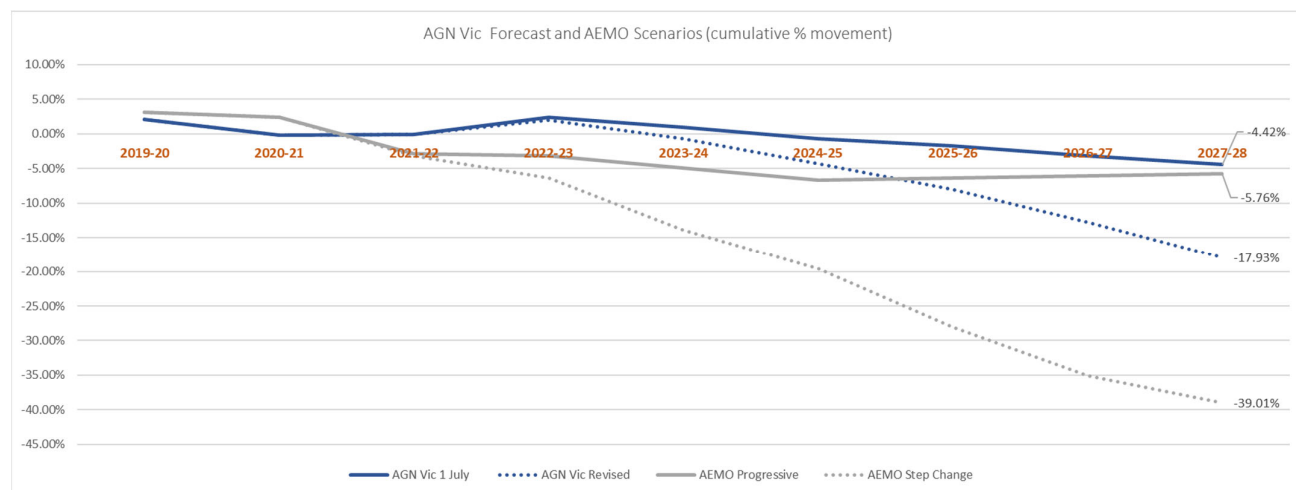
Figure 8.1 AEMO GSOO Scenarios – VIC R&C



The above time series is for Victoria R&C, as AEMO does not present forecasts by network. However, the annual demand movements in % terms can be compared against % movements forecast by CORE for the AGN Vic network.

The annual movements for the above AEMO scenarios and CORE’s forecast annual movements for the Revised AGN Vic network R&C demand, is summarised in the following figure.

Figure 8.2 AEMO GSOO Scenario R&C annual movements and CORE AGN Vic Revised Forecast annual movements



CORE considers the variance between the AEMO scenarios to be reasonable on the following basis:

- **General:**

- Gas Substitution Roadmap (GSR) – at the date of release of the AEMO scenarios, the GSR had not been issued in final form. CORE’s forecast has taken a detailed analysis of the final GSR and supporting material.
- AEMO Victoria total vs AGN Vic specifically - AEMO does not differentiate between the trend between Victoria as a whole and the three major individual networks. The total Victorian trend will not necessarily reflect the trend relating to individual networks. CORE’s forecast does consider the AGN Vic network specifically.
- CORE Forecast vs AEMO Scenario Analysis – CORE’s forecast is based on detailed actual data and information relating to the AGN Vic network. AEMO scenarios are based on more broadly defined potential future forces.
- Data Currency - AEMO’s scenarios are based on data which is less current than data considered by CORE (to August 2022). The GSOO report was released in March 2022 and was based on data which is likely to have been considered over numerous months prior to the release date. Further several inputs and assumption were based on 2021 data. For example, the gas price data used was dated December 2021 and released in 2022. Since the release of the report there have been significant increases in oil price linked LNG prices with consequences for retail gas prices relative to electricity.
- GSOO specific issues - quotes from GSOO:
 - “Public policy and private investment in energy efficiency and electrification, which would reduce gas consumption. The extent to, and speed at, which business and household consumers switch from gas to electricity is uncertain.”
 - “The forecast level of annual domestic gas consumption varies widely across the range of plausible scenarios modelled in this GSOO, which assume different pathways for use of gas by industry, businesses, and households. The variation in future gas use between scenarios is apparent as early as next year and widens over the 20-year outlook period”.
 - “The number of households and commercial businesses connected to gas is forecast to fall under all scenarios and sensitivities except Low Gas Price, and to be lower than the 2021 GSOO forecasts in all scenarios and sensitivities”.

- **Forecasts/Scenarios**

- **2021-22:** CORE's forecast for 2021-22 is based on observation of actual data (draft year to date) and therefore is the best estimate in the circumstances
- **2022-3 to 2024-5:** There is a defensible variance between the CORE forecast and AEMO Progressive Scenario for the period, based on granular analysis of major drivers, including use of independent residential data from HIA
- **2025-6 to 2027-8:** The CORE forecast is more closely aligned with Commonwealth and Vic State targeted reductions in GHG emissions, and the recent release of the final Gas Substitution Roadmap and NCC.

A1. Victorian Government Energy Policy Impact – 1 July Submission

Recap of CORE’s Assessment relating to 1 July Submission

At the date of the 1 July submission to the AER, CORE’s forecast included an adjustment for only one Victorian program, on the basis that it had been committed to, with approved budget support. This program is the Victorian Energy Upgrades program (VEU) - a \$335 million heating upgrades program which targets 250,000 low-income households (including an estimated 150,000 households with old gas space heaters) to replace inefficient heaters with efficient reverse cycle air conditioners.

CORE estimates that the 250,000 homes will be impacted. Based on AGN Vic data relating to customers who use gas for room heating only (negligible use outside winter months), CORE estimates that 4.5% of these customers will become disconnected. The remainder are expected to substitute in favour of electricity room heating appliance replacement and a lower percentage of water heating appliance replacement – together averaging 26 GJ p.a. per household. This estimate is based on an analysis of the average room heating and water heating usage for AGN Vic customers. The allocation of this impact on each of the three main Victorian networks, has been based on residential connection share on 30 June 2021 as shown in the following tables.

Table 8.2 Network share of Vic gas connections

	Connections 30 June 2021	% Total Network Connections
AGN VIC	682,374	32.4%
Multinet	701,267	33.3%
Ausnet	738,801	34.3%
Total Networks	1,383,641	100%

The impact for AGN Vic includes two elements, involving $32.4\% \times 250,000$ customers = 81,000 customers:

- a reduction in 6,005 connections, spread evenly over a six-year period (1,001 per year), and
- 74,995 customers who are forecast to reduce usage by an average of 26 GJ = 1.95 PJ, spread evenly over six years (12,499 customers per year x 26 GJ = annual demand reduction of 324,974GJ).

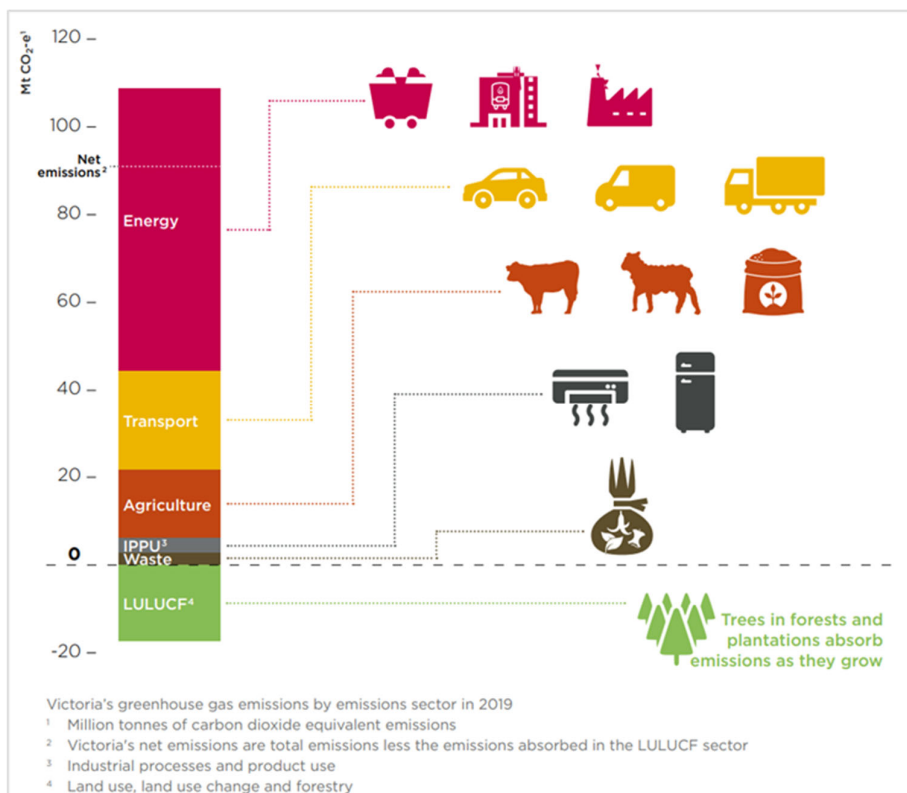
A2. Victorian Government Energy Policy Impact – Revised Forecast

CORE has undertaken extensive research and analysis to support the development of a Revised Forecast, considering changed circumstances, since the 1 July submission, including the impact of Commonwealth and Victorian Government policy, the final Vic GSR and changes to the NCC.

This Annexures summarises significant issues, analysis, observations, and conclusions reached by CORE in deriving the Revised Forecast for AGN Vic.

1. Is it reasonable to assume that the Victorian Government will achieve reduction targets set for 2025 and 2030?

In 2019 Victoria's net emission were approximately 90 Mtpa CO₂-e - almost 25% below the 2005 base reference level. This demonstrated that the targeted reduction of 15-20 % reduction by 2020 was clearly met.



<https://www.climatechange.vic.gov.au/victorias-greenhouse-gas-emissions-and-targets>

The Government has legislated to achieve Net Zero emissions by 2050 and has presented interim targets of 28-33% by 2025 and 45-50% by 2030.

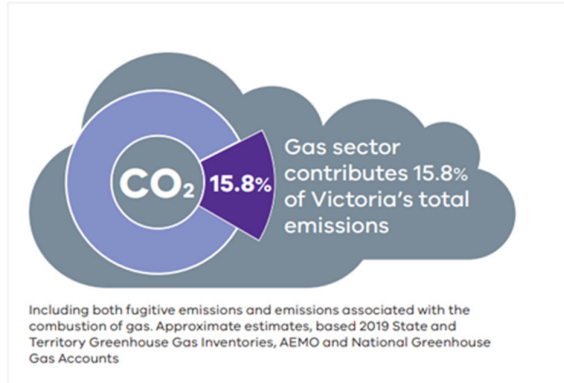
As at end July 2022 there is compelling evidence that the 2025 target range will be met, with a best estimate of a minimum achievement of 30%.

Conclusion:

CORE considers it reasonable to conclude that the Victorian Government is meeting its targets to date and is committed to ensuring it can realise the 2030 target.

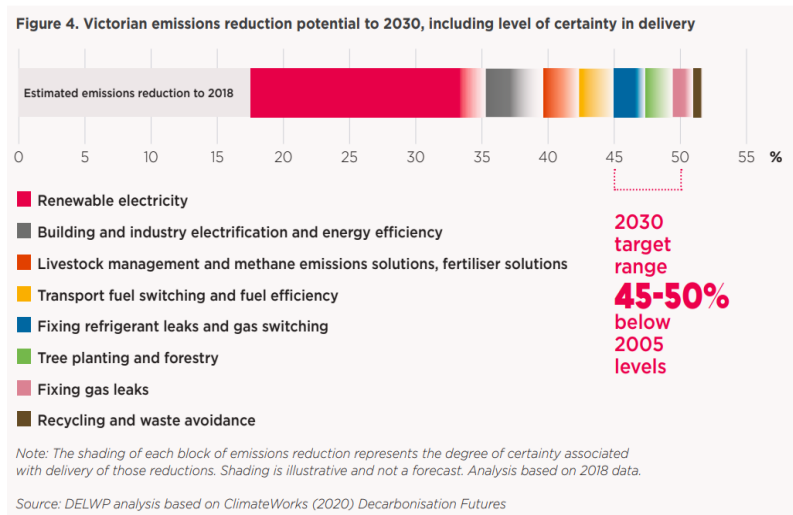
2. Is it reasonable to assume that Gas will be a near term focus area to achieve 2025 and 2028 GHG reduction targets?

CORE has undertaken research and analysis to determine the significance of the gas sector as a source of GHG emissions, and whether it is likely to be a sector of focus for reduction during the Review Period – to June 2028, (in the context of next emission review timeframes of 2025 and 2030).



The fact that gas accounts for ~16% of State GHG emissions and the fact that the Victorian Government has formally released a range of programs which directly or indirectly target reductions in gas consumption and related GHG emission, provides unambiguous evidence that gas is an area of near-term focus to achieve the 2030 reduction target.

Further DELWP analysis highlights that gas is specifically targeted to contributed to achievement of 2030 targets.



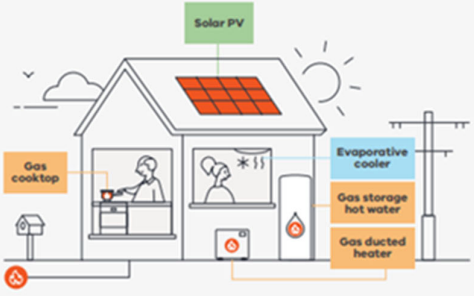
Conclusion:

CORE considers that Gas, as a ~16% source of State GHG emissions is both significant and is clearly a focus area for emission reduction during the period to June 2028, (in the context of next emission review timeframes of 2025 and 2030).

3. Are there clearly defined focus areas for a gas reduction program?

CORE analysis identifies four major focus areas for reductions across Residential, Commercial and Industrial Customer segments: **Existing houses generally** – space heating and water heating appliances e.g., DELWP focused promotion of the benefits of and incentives available to encourage appliance switching or total electrification.

Dual-fuel:

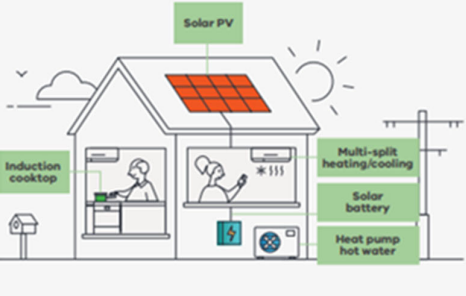


Appliance and install costs*	
Cooling	\$12.4k
Heating	\$2.4k
Hot water	\$12k
Cooktop (inc. fixed charge)	Existing
Solar	\$16k
Total	\$16k

Bill costs	
Electricity bill (Note: Existing solar saving \$950)	\$580
Gas bill	\$1,780
Annual energy bill	\$2,360

*Does not include site-specific upgrade costs (eg. switchboard upgrade)

All-electric:



Appliance and install costs*		Costs after Solar Homes rebate
Cooling & Heating	\$9.5k <small>(incl. new \$2.6k VEU incentive)</small>	
Hot water	\$4.2k <small>(incl. new \$300 VEU incentive)</small>	\$3.2k <small>(incl. \$1k solar hot water rebate)</small>
Cooktop (inc. fixed charge)	\$1.8k	
Solar	Existing	
Total (appliances)	\$15.5k	\$14.5k
Battery	\$13.8k	\$10.3k <small>(incl. \$3.5k solar battery rebate)</small>

Bill savings**	
Heating/Cooling	\$570 saving
Hot water	\$180 saving
Additional solar savings	\$230 saving
Cooktop (inc. fixed charge)	\$270 saving
Total savings	\$1,250 saving
Annual energy bill	\$1,110
Battery	\$520 saving
Annual energy bill (with battery)	\$590

*Does not include site-specific upgrade costs (eg. switchboard upgrade)
**Average annual savings, 2022 dollars

delwp.vic.gov.au

1. New Houses:

The National Construction Code is Australia's primary set of technical design and construction provisions for buildings.

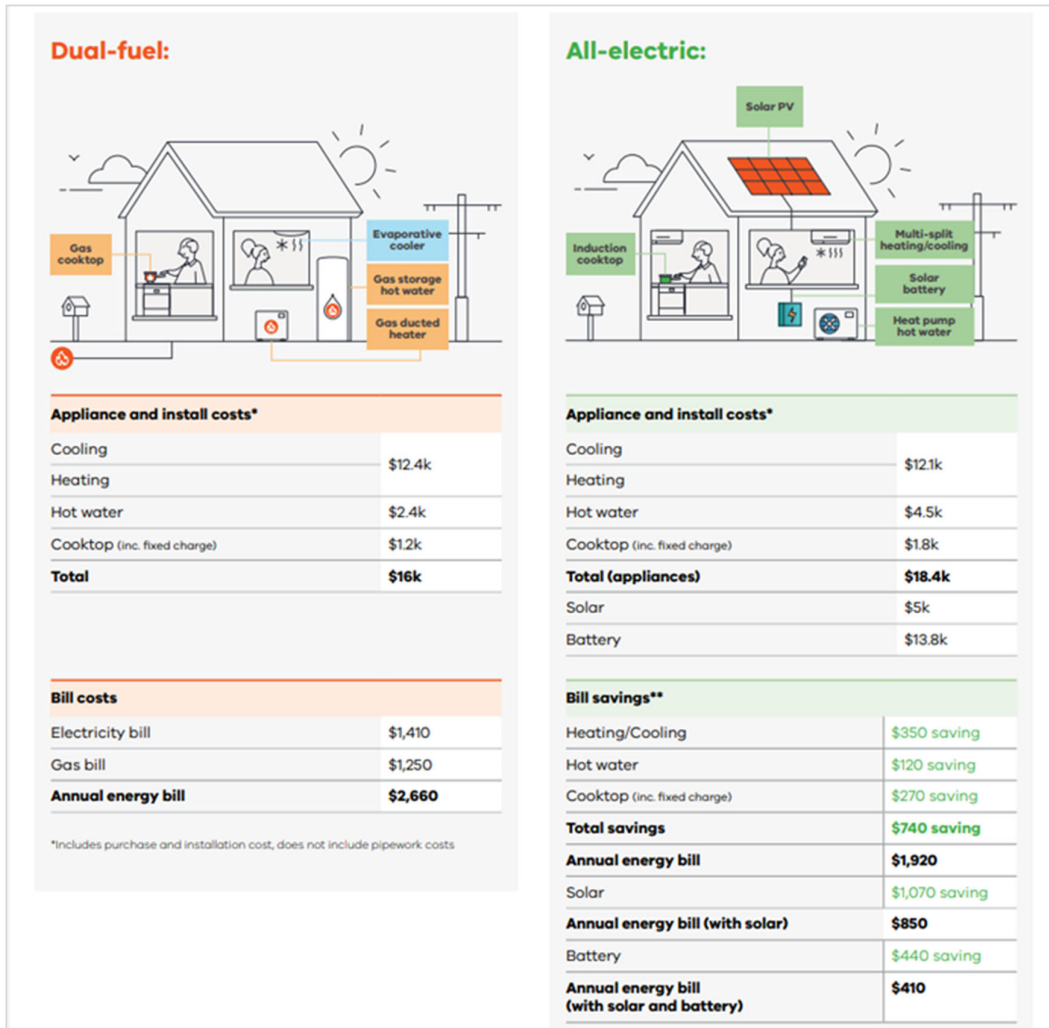
The NCC was released in August 2022 and is effective from May 2023

Changes to National Construction Code encourage gas connection and usage reductions, as gas appliances for new dwellings do not yet have a 7-star rating. To meet such a standard will require combined solar and gas installations at significantly higher capital cost.

<p>Minimum energy standards for rental homes</p> <p>The Government will introduce minimum energy efficiency standards for rental homes covering insulation, draught sealing and hot water, subject to a Regulatory Impact Statement. These new energy efficiency standards will complement the minimum standard for heaters that commenced on 29 March 2021.</p>	<p>/ As part of changes to the National Construction Code, Victoria will remove barriers to installation of efficient electric hot water systems, helping households to capture further benefits from investing in solar panels, and supporting those who choose all-electric new homes.</p>
<p>Smart, efficient new homes</p> <p>Victoria has led the way nationally with energy efficiency standards for new buildings. Since 2011, more than 500,000 new homes (roughly 20 per cent of all homes) have been built to 6-Star standard and above.</p>	<p>Many new homes built as part of the Government's \$5.3 billion Big Housing Build package will exceed current minimum standards for energy efficiency, including 7-Star thermal performance, solar PV and all-electric appliances where possible. More than 12,000 new social and affordable homes will be built over four years.</p>
<p>7-Star building standards</p> <p>The next step for new homes will be '7-Star' building standards, with changes to the National Construction Code planned to take effect from September 2022. To achieve this target, the Victorian Government will support:</p> <ul style="list-style-type: none"> / Improved thermal performance (from 6-Star to 7-Star) to make homes more comfortable and resilient / Strengthened energy performance standards for fixed appliances such as heating and cooling, hot water systems and lighting to make homes cheaper to run and increase demand response capability / Design and construction for easy retrofit of solar panels, batteries and electric vehicle charging in apartments and commercial buildings 	<p>Environmentally sustainable development</p> <p>The Government's roadmap for the environmentally sustainable development of buildings and subdivisions outlines a program through which the planning system can support reduced energy consumption in buildings.</p> <p>7-STAR building standards from 2022... improved thermal performance... strengthened energy performance standards...</p>

https://www.energy.vic.gov.au/_data/assets/pdf_file/0022/521347/Energy-Sector-Pledge.pdf

Further, DELWP is heavily promoting rebates to incentivise new home developers and owners to favour other energy appliances over gas – see next page



2. **Public, social and lower-income housing specifically** – full electrification e.g., statements by Victorian Government within the Energy Sector Pledge.

Targeted upgrades of homes for improved affordability and comfort

Energy efficiency is one of the most effective ways for households to reduce energy costs and reduce emissions, while improving comfort and health.

Major investments in energy efficiency from 2020-21 will ensure that low-income and vulnerable households benefit from the energy transition through appliance upgrades and home retrofitting.

https://www.energy.vic.gov.au/_data/assets/pdf_file/0022/521347/Energy-Sector-Pledge.pdf

3. Existing commercial and industrial enterprises generally - fuel switching and energy efficiency:

Solar Program – support to 15,000 businesses to install small-scale renewable energy, savings in energy bills.

4. Government commercial and industrial consumer activities specifically – electrification, energy efficiency

The Government consumes ~3% of Victoria's gas, with a concentration in Commercial and Industrial customer segments of distribution networks.

Transitioning Government's own gas use

The Victorian Government has committed to reduce its greenhouse gas emissions by around 70 per cent from 2018-19 levels in the 2021-25 Whole of Government emissions reduction pledge, including by using 100 per cent renewable electricity by 2025. Reducing emissions from fossil gas will become an increasingly important feature of the Victorian Government's transition to net zero emissions.

The Victorian Government is responsible for approximately three per cent of Victoria's total gas consumption with major users including schools, hospitals and correctional facilities, alongside widespread use in office-buildings and other settings.

The Government is demonstrating leadership as an early adopter of electrification and alternatives to fossil gas, including by requiring all State Government infrastructure business cases, for buildings and facilities, to include options for all-electric developments. This will ensure that alternatives to gas are always considered in our new builds and major upgrades.

Victorian Government actions

In addition to a new requirement for businesses cases, for buildings and facilities, to consider all-electric options, policies are already in place to reduce reliance on fossil gas in Victorian Government buildings and infrastructure, including:

Public hospitals and health services

- The Victorian Health Building Authority Guidelines for sustainability in health care capital works support the transition to all-electric public healthcare buildings when building new hospitals. This supports the decarbonisation of the public healthcare system when government operations move to 100 per cent renewable electricity from 2025.
- In May, the Government announced funding for the new Melton Hospital, designed to be Victoria's first all-electric hospital powered by 100 per cent renewable electricity. The hospital's design will focus on sustainability initiatives such as maximising on-site solar generation, high-performing façades, efficient plant and equipment, and integration of green spaces within the hospital precinct.

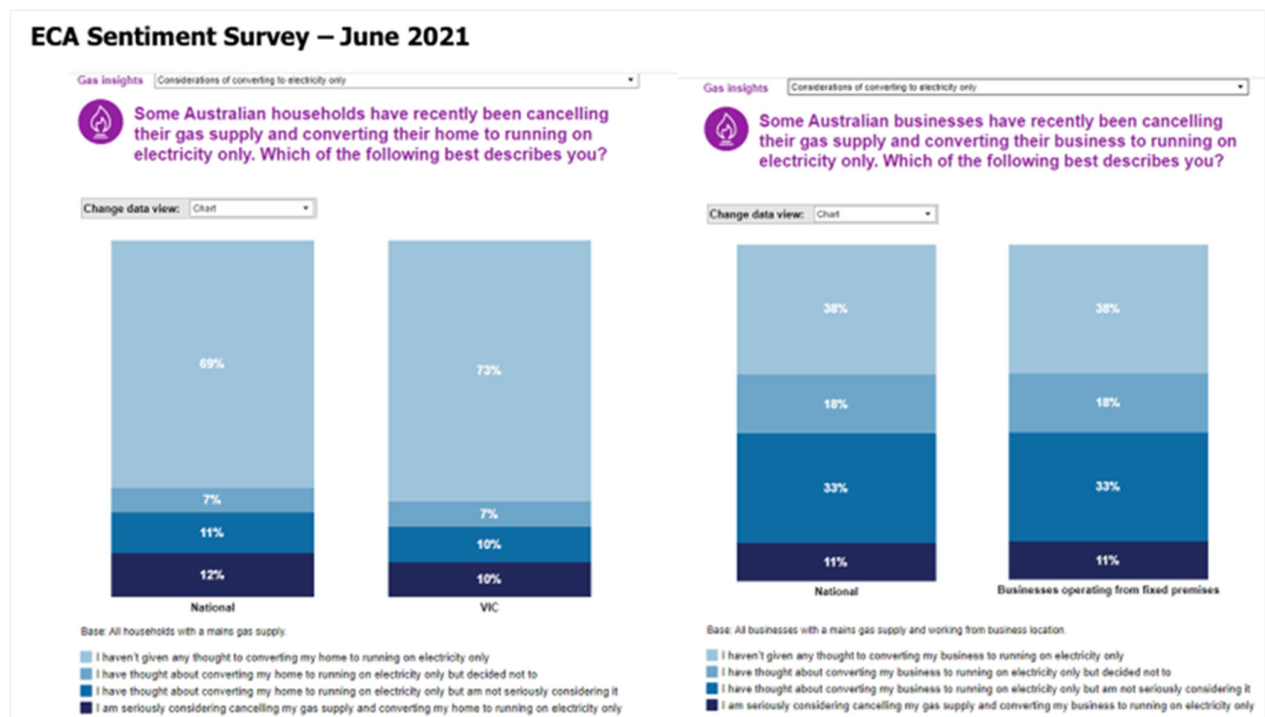
Conclusion:

CORE considers that the Government has identified specific areas to ensure a focus on practical action to achieve legislated targets.

4. Are specific policies and programs in place or planned as a priority?

1. **Gas Substitution Roadmap:** targets significant reduction in gas in favour of electricity and lower emission sources
2. **The Victorian Energy Upgrades program:** targets reduction of Victoria’s energy demand by 7 per cent by 2025, delivering energy bill savings
3. **Rebates to 250,000 low-income and vulnerable households:** \$335 million to install high efficiency air conditioners in place of old heaters – expected to save households between \$300 and \$900 per year
4. **‘7-Star’ building standards:** planned to take effect from September 2022, savings in energy bills and energy for owners of those new homes and buildings. Note gas appliances are 5-star, so to meet 7-star standard will require a combined solar PV and gas installation to meet the standard
5. **Expanded Solar Homes program:** rebates to 778,500 households and 15,000 businesses to install small-scale renewable energy, savings in energy bills. Note: increased solar penetration encourages incremental increase in electrical vs gas energy
6. **Energy efficiency upgrades:** 35,000 social housing properties to help reduce energy use and improve thermal comfort
7. \$5.3 billion to construct more than 12,000 low-cost homes, all of which will meet 7-Star energy efficiency standards

There is also significant evidence through GSR and AGN surveys that 10% of Victorian households/Residential customers are seriously considering switching away from gas.



Heating and cooling



Gas ducted heating and reverse cycle air conditioners are the dominant systems in Victorian homes



Half of home owners mostly use gas ducted heating to heat their homes (50%) – either as a heating only system (40%) or with add-on cooling (10%).



For cooling, half of home owners (51%) use reverse cycle air conditioners (that can both heat and cool).

- There is a higher penetration of using single unit reverse cycle air conditioners (that can both heat and cool) for cooling in regional areas (53%) (compared to 43% in Melbourne).

Thinking toward the future, reverse cycle air conditioners (that can both heat and cool) are preferred by 38% likely home owners to heat their future homes, followed by ducted reverse cycle air conditioners (22%). Only 15% prefer gas ducted heating (heating only or with add-on cooling).

For cooling, most likely home owners (52%) prefer reverse cycle air conditioners that can both heat and cool.

Victorians are more likely to add single split system reverse cycle air conditioners to their homes

Just over one in five home owners (21%) intend to change their heating or cooling systems in the next two years. There is a higher likelihood that this change will involve adding a reverse cycle air conditioner (32%), as opposed to having them replaced (20%) or removed (9%).

Arguments in favour of reverse cycle air conditioners to heat homes are more convincing than those against

The most persuasive reasons to consider reverse cycle air conditioners for heating are:

- A reverse cycle air conditioner can provide both heating and cooling for your home (74% consider this a 'very good' or 'good' reason to consider reverse cycle air conditioners to heat their home).
- A reverse cycle air conditioner is generally cheaper to run than gas heating (73%).

People aged 18 to 34 years and likely home owners (i.e. renters who hope to own their own home), find these arguments more persuasive.

Heating and cooling (cont'd)



Strength of agreement is less pronounced across all arguments *against* using reverse cycle air conditioners to heat homes, including:

- Larger houses need several split systems to heat the whole house, unlike a ducted system (59% consider this a 'very good' or a 'good' reason not to consider reverse cycle air conditioners for heating).
- The internal units on split systems can only push air so far, meaning they struggle to maintain the same level of heating comfort for large rooms or spaces with interior walls (56%).

Information increases consideration of reverse cycle air conditioners for heating

Exposure to balanced arguments *significantly* increases the likelihood to consider installing both types of reverse cycle air conditioners as the main heater:

- **Split system reverse cycle air conditioners** – from 62% to 66% likely (with a *significant* decrease from 32% to 27% in those who are 'unlikely').
- **Ducted reverse cycle air conditioners** – from 51% to 57% likely (with a *significant* decrease from 41% to 35% in those who are 'unlikely').

Again, consideration is not strong, with the increase coming from those who are 'very' or 'somewhat likely'.

There is a higher incidence of being 'always likely' to consider both types of air conditioners (pre and post messaging) among:

- People aged 18 to 34 years, and likely home owners, people from CALD backgrounds, and those with high household incomes.


In considering **split system reverse cycle air conditioners as the main heater**:

- People aged 55 years and over are significantly more likely to be 'positive converters' (post information, move up the rating scale to a higher likelihood to consider reverse cycle air conditioners for heating).

In considering **ducted reverse cycle air conditioners as the main heater**:

- People in regional areas are significantly more likely to be 'positive converters'.

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Hot water systems

Gas is the most prevalent hot water system


Over three in five home owners (63%) have gas (storage or instantaneous) hot water systems. This is significantly higher among those aged 55 years and over (70%).

There is growing intention to move away from gas hot water systems

While the majority of home owners (35%) intend to replace their old hot water system with a gas system, there is a leaning toward other options.

Over a quarter (28%) of home owners intending to replace their system in the next two years are planning to install a solar hot water system.

- People of CALD background are significantly more likely to install solar hot water systems (44%).
- People aged 18 to 34 years (37%) have a significantly higher preference for solar hot water.



More than one in eight home owners are planning to install heat pump water heaters (13%) in the next two years.

Arguments for heat pump water heaters have more traction than those against

✓ The most persuasive arguments in favour of heat pump water heaters include:

- Heat pump water heaters can have lower running costs than gas water heaters and are always lower than running costs for traditional electric water heaters (72% consider this a 'very good' or 'good' reason to consider heat pump water heaters).
- Heat pump water heaters absorb warmth from the air and transfer it to heat water. This makes them more energy efficient than other hot water systems (70%).

✗ Arguments *against* heat pump water heaters are not as compelling, including:

- Heat pump water heaters are more expensive to buy than gas or electric water heaters (59% consider this a 'very good' or a 'good' reason not to consider an heat pump water heater).
- A heat pump water heater uses a tank to store hot water, and so it could run out on days when my household uses a lot of hot water (58%).

Conclusion:

CORE considers that there are specific policies and programs in place, with financial support to drive reduction in gas use during the period to June 2028.

There is scope for the programs listed above to materially reduce gas consumption by over 1,000,000 homes and over 50,000 small businesses during the period to 2028, whereas the Revised Forecast incorporates reduction relating to under 40% of the potential reduction within the AGN Vic network (assuming approximately 30% of Victorian dwellings and 35% of total Victorian distributed gas connected dwellings).