ENA

THE EVOLUTION OF THE NETWORK

A YEAR IN REVIEW AND KEY ISSUES LOOKING AHEAD TO 2017

AUSTRALIAN DOMESTIC GAS OUTLOOK

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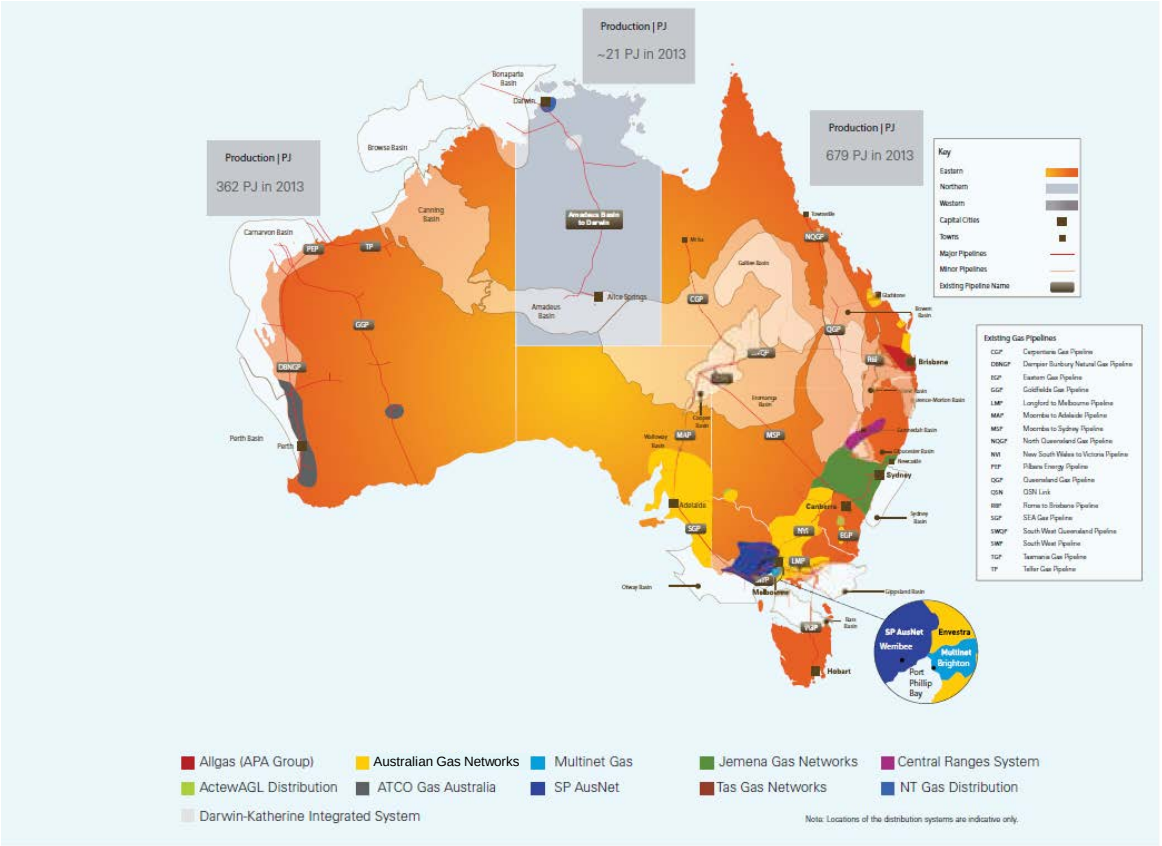
10 MARCH 2016

ENA & Gas Distribution

- 74,000 km Distribution pipelines
- 4.1 million gas customers

- Gas Penetration:
  - 90% in Victoria
  - 80% in ACT
  - 60% in South Australia
  - 45% in NSW
  - 10% in Queensland
  - 5% in Tasmania



Source: AER State of the Energy Market 2015

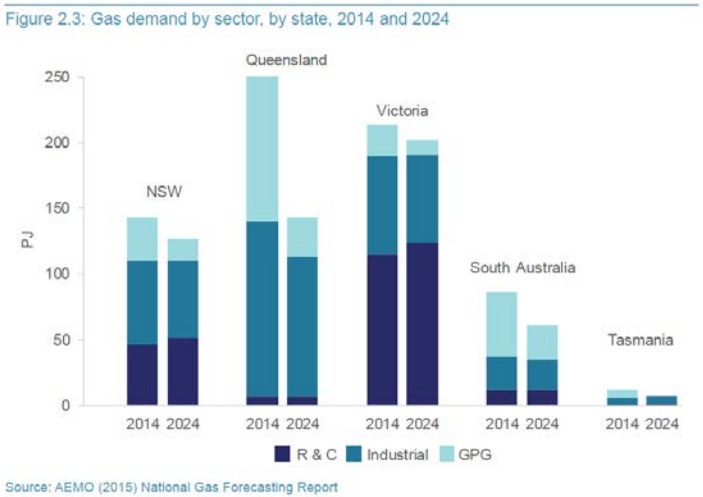
Source: Core Energy

Outline

- Domestic gas challenges
- *Australia's Bright Gas Future*
- The role of gas in climate policy options

Domestic Gas Challenges

> Impact of export LNG markets on domestic prices and availability

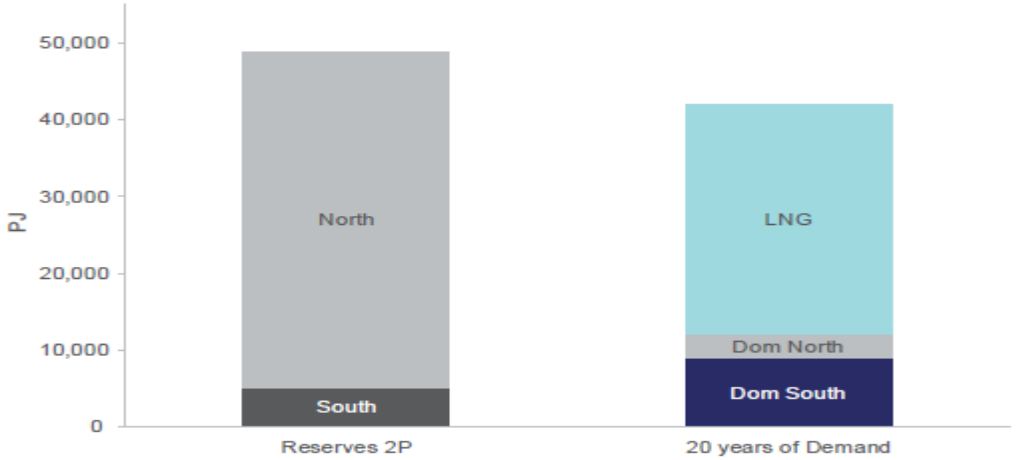


Source: Australian Government, Office of the Chief Economist (2016), *Gas Market Report 2015*, Figure 3.2

Source: Woodside Energy Ltd.

Domestic Gas Challenges

> *Regional Mismatch of Supply & Demand*

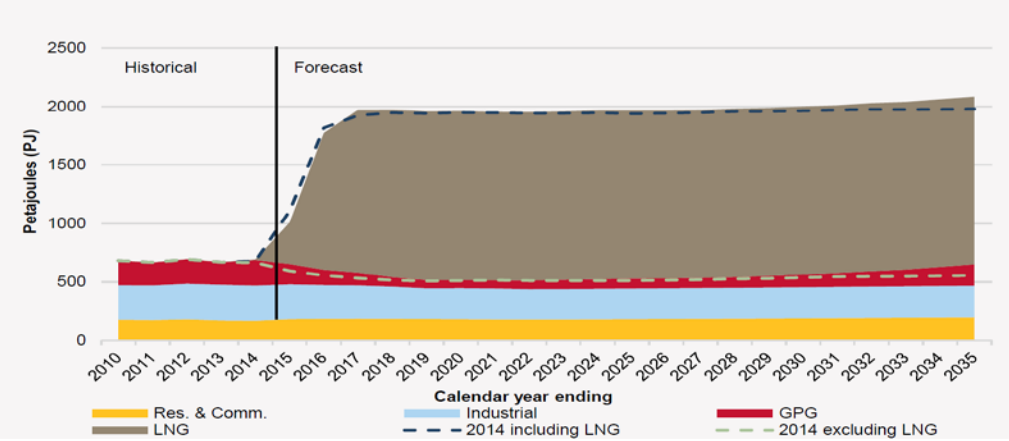


Source: Australian Government, Office of the Chief Economist (2016), *Gas Market Report 2015*, Figure 3.2

Domestic Gas Challenges

> *Technology-specific policies leading impacting least cost abatement*

Total annual gas consumption



"In an oversupplied market, new renewable generation displaces GPG from the electricity dispatch merit order …"(AEMO, 2015)

"Electricity generation from renewables and black and brown coal increased over 2014-15, while generation from gas and hydro fell…"(DoE, 2015)

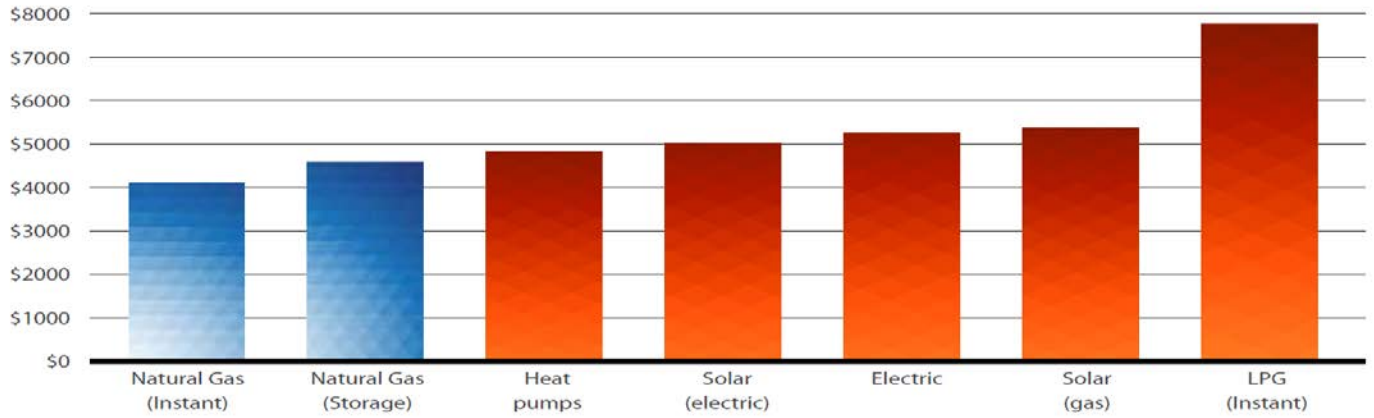
Source: AEMO (2015), Nation*al Gas Forecasting Report*, Figure 1

Department of the Environment (2015), *Tracking to 2020*, pp 9

Domestic Gas Challenges

> *Technology-specific policies leading impacting least cost abatement*

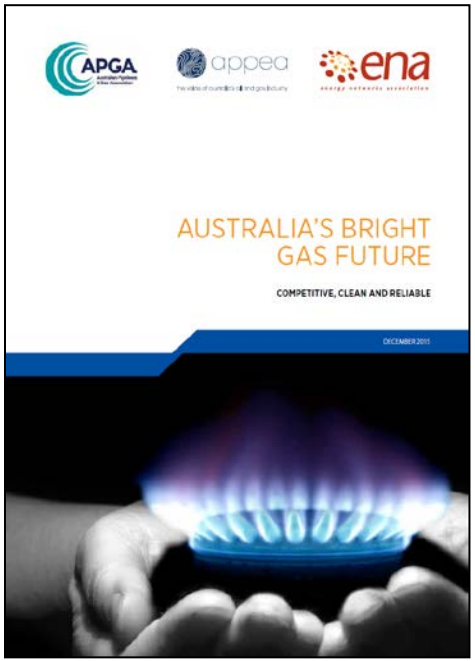
Comparison of Water Heating Lifecycle Cost



Source: Core Energy Group (2014), *Gas Network Sector Study*, Figure 6.8

A strong value proposition for households….

- Gas is a **low cost**, **low carbon** and **convenient** fuel of choice for Australian consumers when it comes to cooking, hot water and winter heating.
- Natural gas from a distribution network delivers energy which is **1/4 to 1/6 of the carbon intensity of mains electricity.**
- Can deliver **a hot water system that never goes cold** and **up to 83% less emissions** than a electric resistance HWS.
- **Control for home chef, amenity and warmth**



…and innovative applications

WHAT'S NEXT ?

Australians are enjoying innovative new uses for household gas appliances

GAS REVERSE CYCLE AIR CONDITIONING

For the larger homes, ducted gas reverse cycle air conditioning is now an option. This is even lower emissions and running cost than electric air conditioning and performs better at low temperatures. If you need to manage your peak electricity demand, gas fired air conditioning is a great option.

GAS DRYERS[4]

Comparisons show that that the 54% of Victorians who have clothes dryers will add $123 a year to their electricity bill to run a large electric dryer 1.5 times a week. For the same load, gas dryers are more efficient and will save a customer $87 annually whilst reducing drying times and greenhouse gas emissions.

GAS BARBEQUES AND PATIO HEATERS[5]

Natural gas barbeques and patio heaters allow warm outdoor entertaining all year round. A networked natural gas patio heater provides substantial warmth, requires no lifting of heavy cylinders and can save you money. Networked natural gas costs about one quarter to one-third of the cost of LPG cylinders, without the inconvenience or transport emissions of refueling.

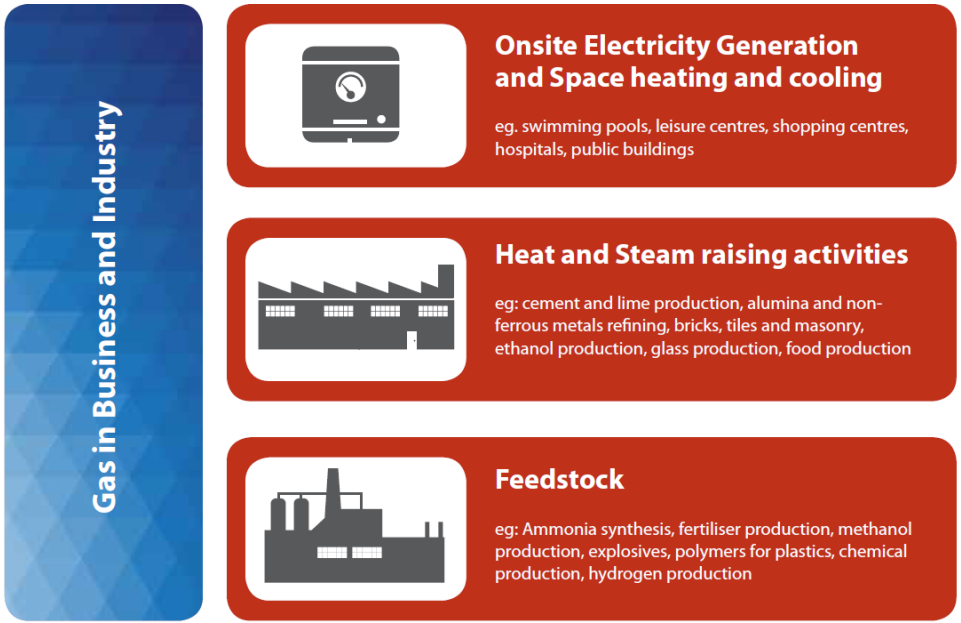
GAS MICRO GENERATION

Gas microgenerators are being developed in Europe, North America and Asia to assist balancing residential electricity demand. These can provide hot water and cooling as useful by-products, and being onsite, gas-fired micro generation can help to avoid electricity losses and lower carbon emissions.

4 Washer and Dryers, Sustainability Victoria, April 2014
5 natural-gas.com.au - Natural Gas your questions answered, p.2

AUSTRALIA'S BRIGHT GAS FUTURE COMPETITIVE, CLEAN AND RELIABLE

A vital input to Business and Industry



… new commercial opportunities

GPAC

CASE STUDY: GPAC

The ATCO Gas site in Jandakot, WA utilises clean, reliable and safe natural gas for cooling through Gas Powered Air Conditioning. The building uses four, 85kW gas powered air conditioning units to cool a total of 3,127 m². Using GPAC has saved the business 40% on the running cost of an equivalent electricity system. It has improved environmental performance also, adding an extra star under the Green Star building rating scheme.

Co-gen & Tri-gen

CASE STUDY: Co-Generation[9]

A year after the installation of a 229kW Cogeneration System at the Oasis Regional Aquatic Centre in Wagga Wagga NSW, the Centre has reduced its electricity bill by over $20, 000 a month and its greenhouse gas emissions by 945 tonnes.

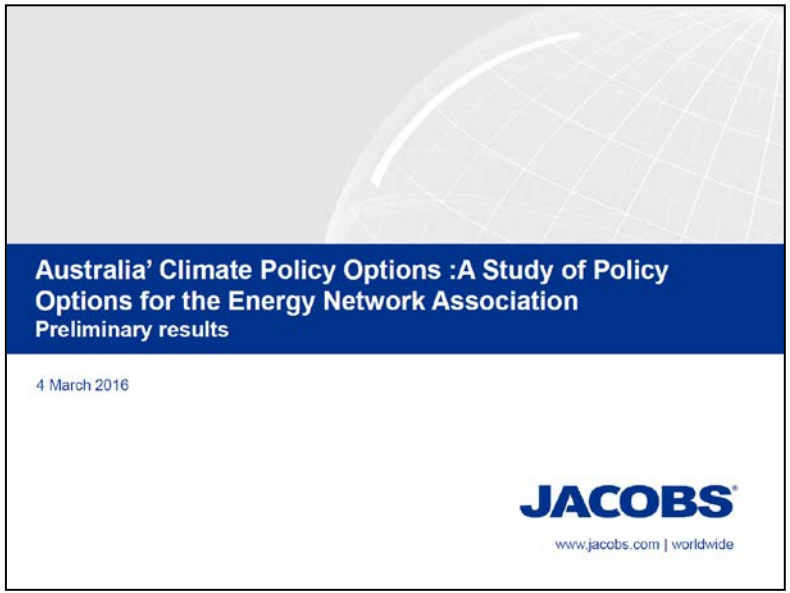
The Cogeneration System is fuelled by Natural Gas but supplements the existing gas fired hot water boilers. With the total investment of the system including installation of $373,636 and factoring in maintenance costs, an estimated payback of just over 2 years has been achieved.

Natural Gas Vehicles

TABLE1. Payback periods based on 40c/litre/equivalent price spread between CNG, NGV and petrol/diesel. Figures include fuel excise.[10]

	Km/yr	Fuel use l/yr	CNG premium	Annual saving	Payback period years
Car 2.5l	30000	3000	$4,500	$1,200	3.75
	60000	6000	$4,500	$2,400	2.5
Taxi	150000	20000	$4,500	$6,000	0.75
Light duty van	30000	3600	$7,000	$1,440	4.86
	75000	9000	$7,000	$3,600	1.94
Light duty truck	30000	7500	$13,000	$3,000	4.33
	75000	18750	$13,000	$7,500	1.73
Medium duty truck	30000	9000	$18,000	$3,600	5
	75000	22,500	$18,000	$9,000	2

Climate Policy & the Role of Gas



Two targets – Three Policy Scenarios…

- ***Objective:*** Quantify the impacts of alternative policy approaches to achieve the stated national emission reduction target in 2030.

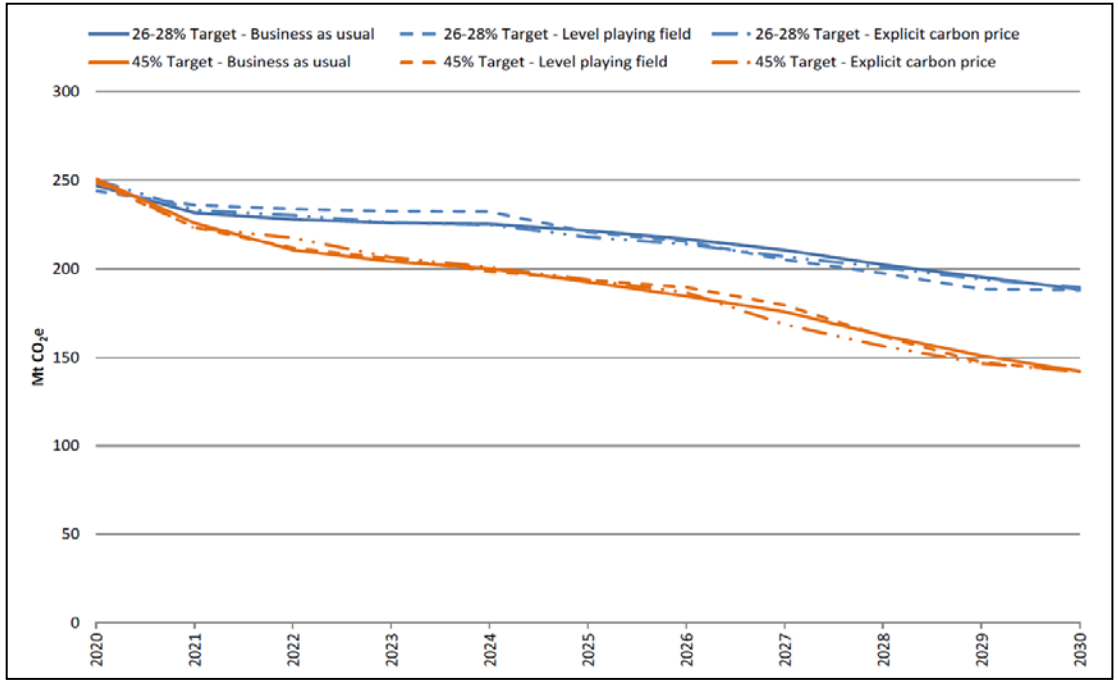
	26-28% Target	45% Target
Business as usual	☑	☑
Level playing field	☑	☑
Explicit carbon price	☑	☑

Scenarios:

1. **Business as usual:**
   - Continue diverse State and Federal abatement initiatives which prescribe **specific technologies** (e.g. renewables) or **scale** (e.g. SRES, FiT).
   - Extend use of a binding **Safeguards Mechanism** that limits sectoral emissions without trading.
   - *PLUS in the 45% target scenario a carbon price and 50% RET is assumed).*
2. **Level playing field scenario:**
   - Abatement initiatives maintained but made **technology neutral** (eg. via a low emissions target scheme) and indifferent to scale.
   - In the 26-28% target scenario, the Safeguards Mechanism evolves to a **baseline & credit mechanism** permitting trading among participants.
   - *PLUS in the 45% target scenario, a carbon price and 50% LET is assumed.*
3. **Explicit carbon price scenario:**
   - This scenario assumes that an explicit carbon price is established through a mechanism equivalent to a whole of economy carbon tax or emissions trading scheme.
   - All other abatement policies (eg RET, SRES) are removed.

Key Findings

1. **Carbon reduction targets for 2030 for the stationary energy sector can be met using all of the different policy approaches.**



Key Findings

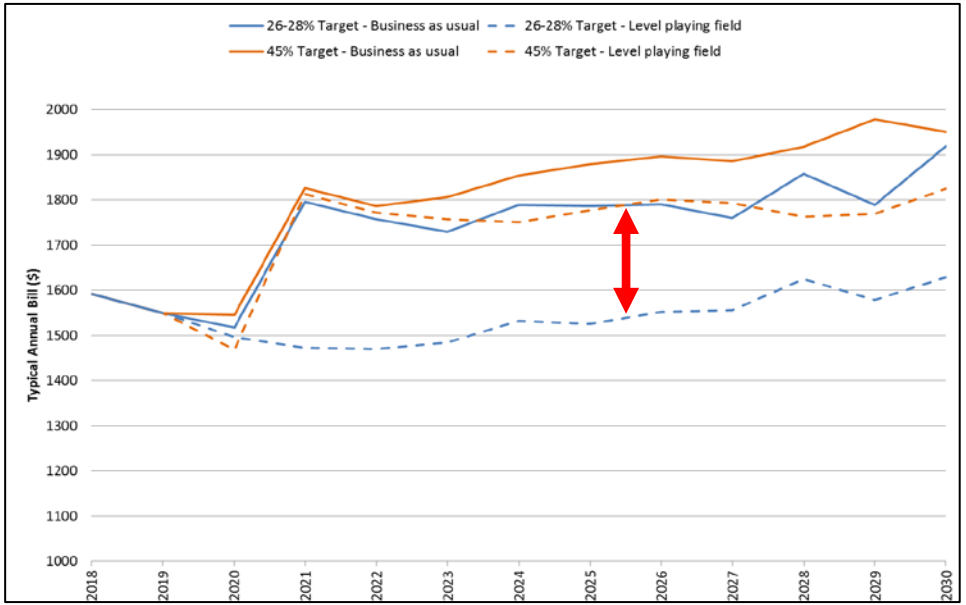
2. Technology neutral policies would achieve Australia's carbon abatement targets at lower costs in the stationary energy sector.

	Abatement Target			
	26 to 28%		45%	
Policy Settings	***Total Cost***	***Savings***	***Total Cost***	***Savings***
Business as usual	$129.2 bn	-	$152.5 bn	-
Level playing field	$128.6 bn	$600 m	$150.9 bn	$1.5 bn
Explicit carbon price	$128.5 bn	$700 m	$144.3 bn	$8.2 bn

Key Findings

3. The technology neutral framework provides the lowest residential electricity bills from 2020-30.

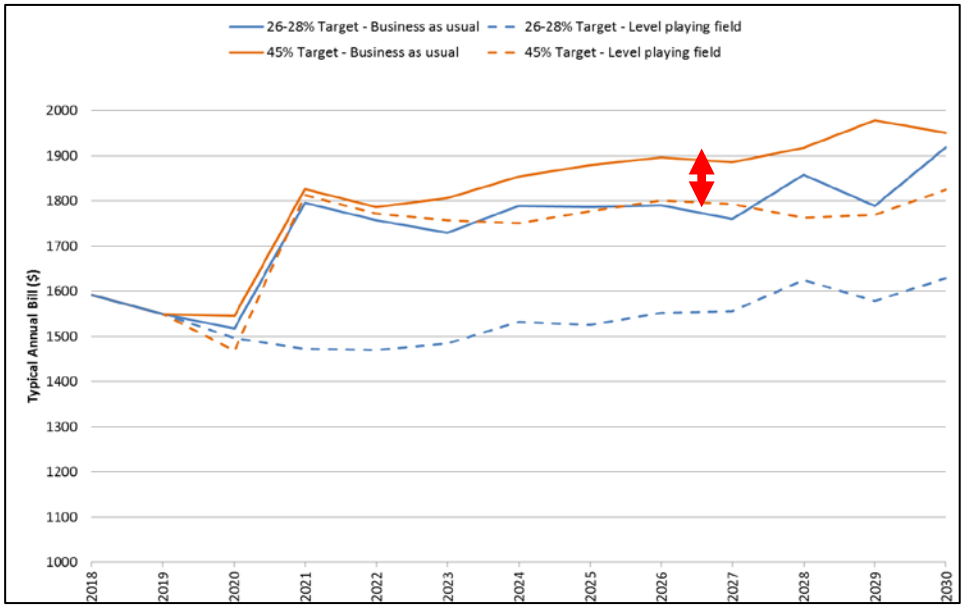
- Savings from a 'level playing field' compared to "BAU" in 26-28% target:
  - Typical residential bills average $234 pa lower in period 2020-30.
  - Cumulative savings up to $2,570.



Key Findings

3. The technology neutral framework provides the lowest residential electricity bills from 2020-30.

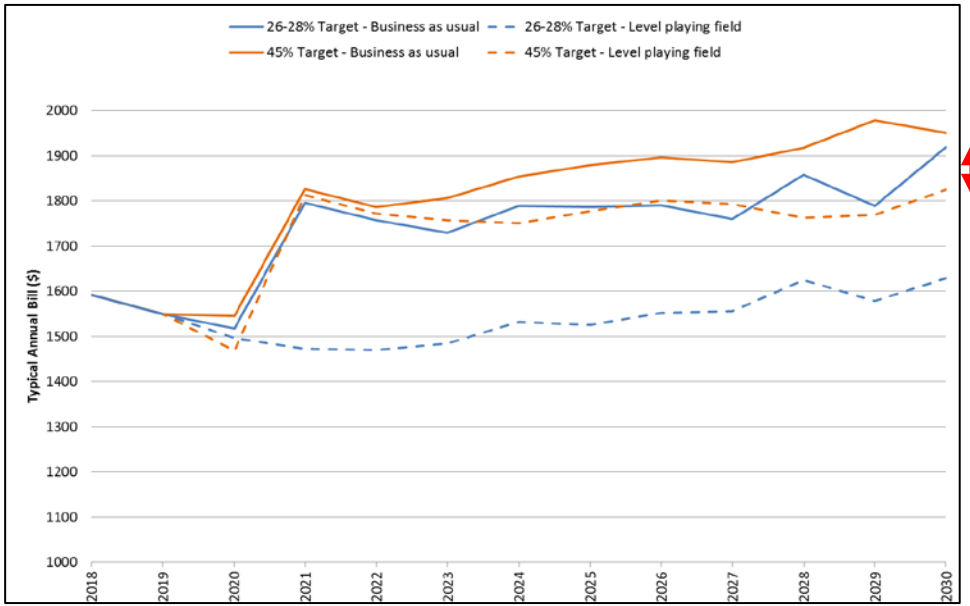
- Savings from a 'level playing field' compared to "BAU" in 45% target:
  - Typical residential bills average $94 pa lower in period 2020-30.
  - Cumulative savings up to $1,033



Key Findings

3. The technology neutral framework provides the lowest residential electricity bills from 2020-30.

- Efficiency benefits of technology neutral policy settings are enough to offset impacts of a higher target (45% vs 26-28%).



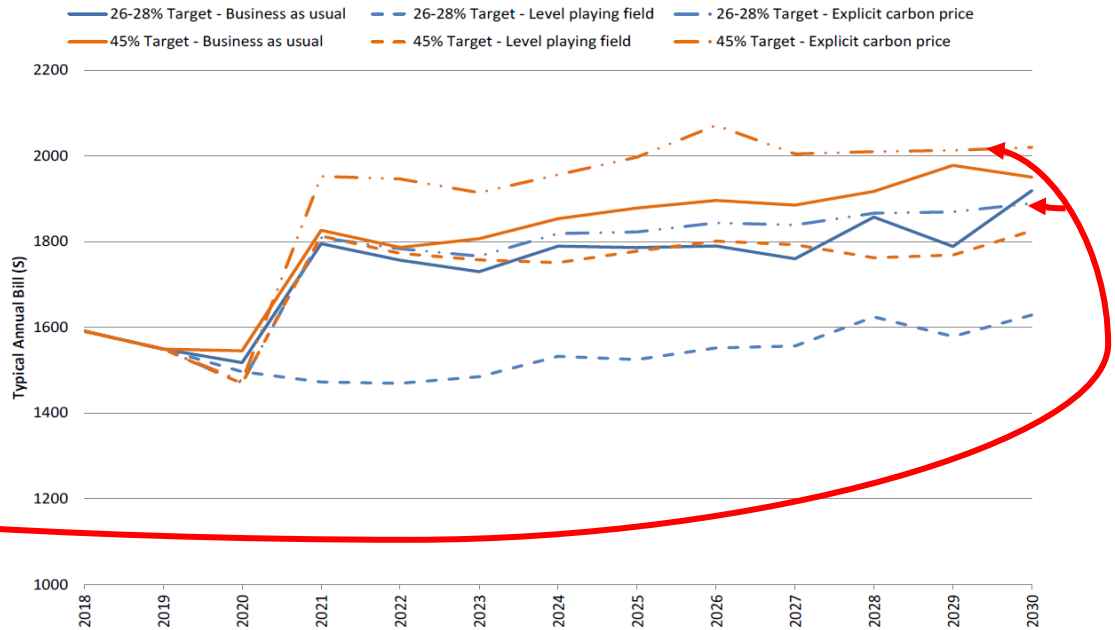
Key Findings

4. Residential outcomes of Carbon Price Scenario depend on approach to household transfers.

NOTE:

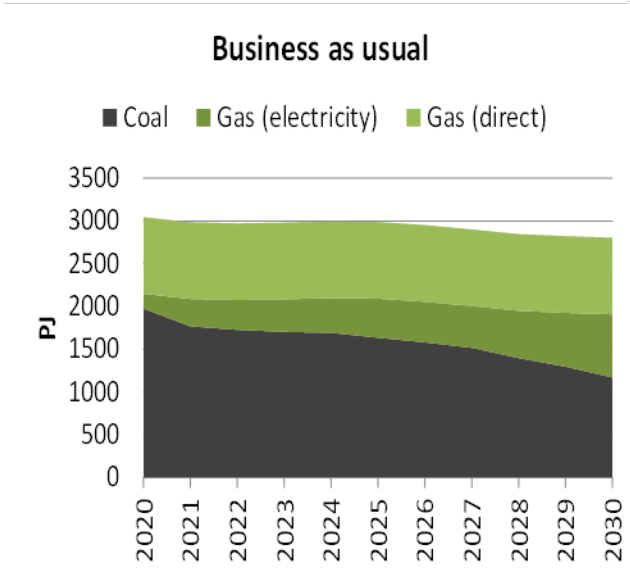
Explicit Carbon Price scenario bill outcomes do not reflect the final household financial outcome.

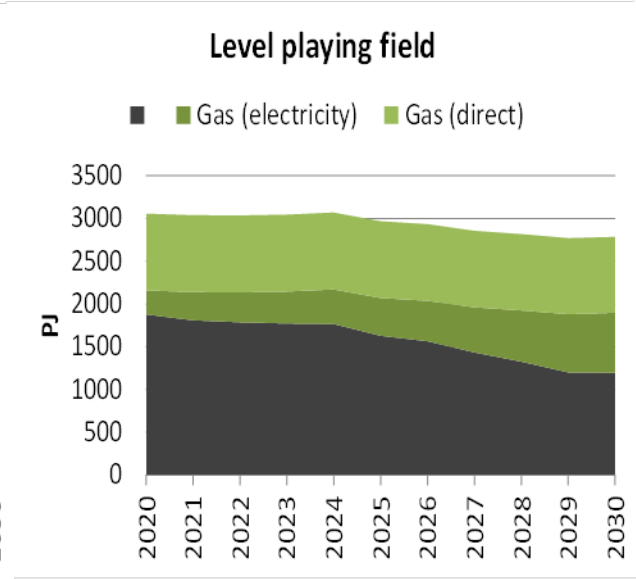
No adjustment has been made for any offsetting household payment/relief which would be possible from scheme revenue.

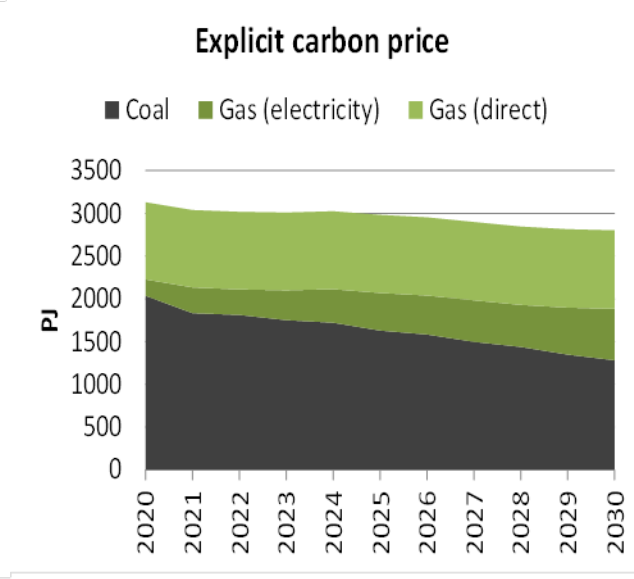


The Role of Gas in Climate Policy Options

> Key Results – gas usage in the 26-28% scenario

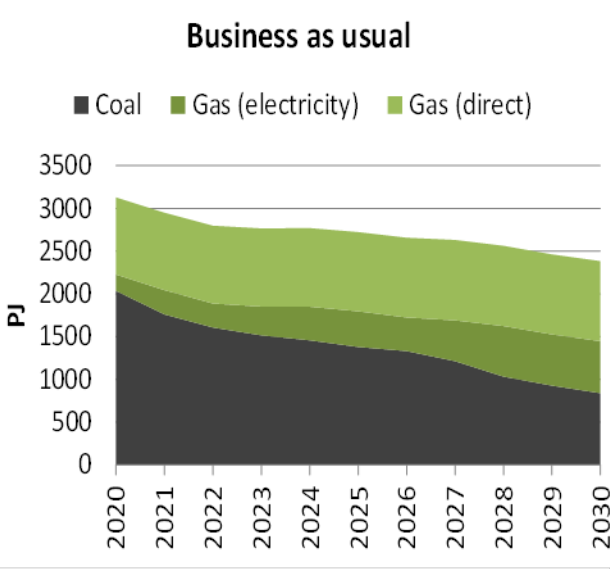


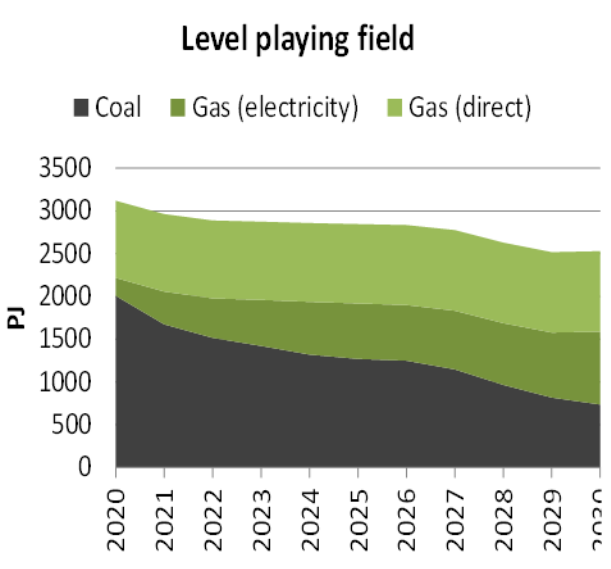


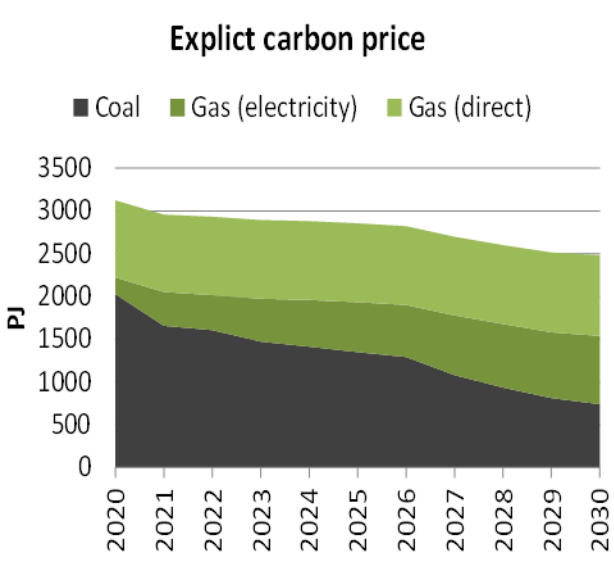


The Role of Gas in Climate Policy Options

> Key Results – gas usage in the 45% scenario







Key Findings

- The achievement of Australia's abatement targets does not require technology-specific abatement programs.

- The lowest economic cost is associated with:
  - Market based mechanisms applied broadly across the energy sector that allow for the lowest cost options to be adopted
  - Technology neutral policies

- The lowest residential electricity bills occur with:
  - Level playing field for technologies to participate in mitigation
  - Where trading around liabilities is allowed

- In the period under study, Australia's domestic gas usage needs to increase in all scenarios from 2020 to 2030 due to the need to deploy low emission technologies

More information….

www.ena.asn.au