Institute for Energy Economics and Financial Analysis

Fact Sheet:

As gas bills rise in South Australia, all-electric homes are the most cost-effective solution.

FOSSIL GAS

The average cost for household gas in South Australia is:

$51.53 per GJ gas

20%	60%	19%
Wholesale	Networks	Retail costs and margin

Wholesale gas costs in SA increased nearly **300%** since 2015. These are impacted by volatility in global LNG markets.

Network charges make up 60% of SA gas bills.

AGN (SA) maintains $1.7 billion in network assets, or $3,600 per customer - higher than any other network.

The regulator has approved AGN (SA) to accelerate the recovery of $250 million from consumer bills from 2021-26.

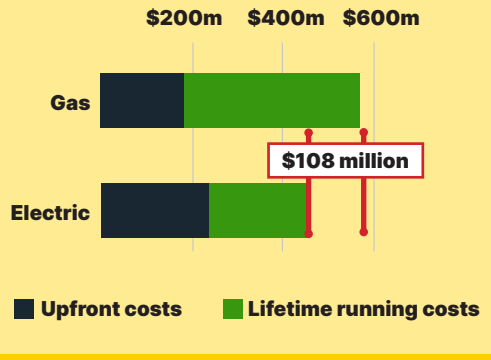
ELECTRICITY

On average, running electric appliances costs:

$24.84
per GJ gas replaced

~58,000
gas appliances are installed in SA homes each year. Switching these to electric would **save** households

$108 million
in upfront & lifetime running costs.



HYDROGEN

Current costs for hydrogen are around:

$141 per GJ hydrogen

Hydrogen may be an important future fuel for some hard-to-abate sectors – but is **not cost-effective for the home.**

Transmission networks and some parts of the distribution networks are incompatible with 100% hydrogen.

If a new hydrogen transmission network were required in SA and Victoria, this could cost $10 billion

AVAILABILITY

Reverse-cycle air conditioners are **3-6 times** more efficient than gas heaters.

Heat pump water heaters are **5 times** more efficient than gas systems, and **4-5 times** more efficient than older electric systems.

Induction cooktops are **2 times** more efficient than gas cooktops, and **do not emit pollutants**.

One trial project in South Australia serves 4,000 homes with a blend of **5% hydrogen by volume**, or

1.7% by energy

The current system is limited to blends of **3% by energy**, after which specific hydrogen appliances are required. These are not yet available on the market.

EMISSIONS

SA has the highest share of renewable generation in mainland Australia.

An all-electric household in SA produces **64%-74% less emissions** than a gas household today.

The maximum blend of hydrogen possible today would **reduce emissions by 3%.**
If leaked, hydrogen has a global warming effect 11.6 times that of CO_2

Sources and further information

FOSSIL GAS	
Cost for household gas	• Average SA bill data from St Vincent de Paul Society (2023), excluding fixed gas connection charges.
Breakdown of household gas bill	• From AER – State of the Energy Market 2023 (p.223).
Wholesale gas prices	• From AER – State of the Energy Market 2023 data (Figure 5.2); Adelaide prices between Q1 2015 and Q2 2023. • Excludes significant price surge in 2022 following the Russia-Ukraine war.
Network charges	• AGN (SA)'s nominal regulated asset base in 2022 was $1,701,994,599, with an average customer base of 469,029. Assets per customer are $3,629; 48% higher than the average of $2,447 for all networks. (AER – Gas Network Performance Report 2023) • $250 million in accelerated depreciation was approved in AGN (SA)'s 2021-26 Access Arrangement (p.36).
ELECTRICITY	
Cost per GJ gas replaced	• Average SA bill data from St Vincent de Paul Society – South Australian Energy Prices 2023, excluding fixed electricity connection charges. • Assumes 1GJ electricity displaces 4.65GJ gas on average, based on IEEFA analysis of EnergyConsult (2021) and representative sample of market appliance efficiencies.
Lifetime cost savings	IEEFA analysis based on: • Estimated gas appliance sales from EnergyConsult (2021). • Current average electricity and gas prices. • Current appliance costs from a representative market sample.
Energy bill savings	A household that completely replaces its gas cooking, space heating and hot water appliances could see gross savings of: • $800/year if they currently use a room gas heater • $1,900/year if they currently use a gas ducted heater, which consumes much more energy • This is based on an average annual energy consumption per appliance from EnergyConsult (2021)), and current average gas and electricity prices • It assumes gas fixed charges are avoided after electrification
Appliance efficiencies	• Based on appliance efficiencies and coefficients of performance from a representative market sample of appliances.
Emissions	• Based on current electricity and gas emissions factors for SA from DCCEEW (2023). • Assumes energy savings in line with analysis of energy bill savings. • 64% reduction for a household replacing a room gas heater. 74% reduction for a household replacing a gas ducted heater.
HYDROGEN	
Cost per GJ hydrogen	• Average of current costs from DCCEEW - State of Hydrogen 2022 (p.18)
Transmission costs for 100% hydrogen	• Australian Hydrogen Centre – 100% Hydrogen Distribution Networks South Australia Feasibility Study (p.46).
Hydrogen blending	• AGIG – Hydrogen Park South Australia. • Assumes a volumetric energy density of 12.7MJ/m_3 for Hydrogen (Bossel & Eliasson; p.5) versus 39.3MJ/m_3 for fossil gas (DCCEEW; p.16). • The system is limited to low blends by the household gas appliance stock, which is only compatible with hydrogen blends up to 10% by volume (3% by energy) (GPA Engineering for SA Government 2019; p.i).
Emissions	• Emissions savings correlate directly with the energy content of fossil gas that is displaced, which is currently limited to 3%. • The small molecular size of hydrogen makes it more prone to leakage. Hydrogen may have global warming impacts 11.6 times higher than carbon dioxide (Sand et al. 2013).

About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) examines issues related to energy markets, trends and policies. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy.

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