

WE NEED NUCLEAR POWER IN AUSTRALIA

• Demands for net zero emissions to save the planet are far
• too often coupled with neglect or opposition to the only
• baseload form of zero-carbon power: nuclear energy.

Get the facts on Nuclear Energy

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AUSTRALIA HAS BEEN LEFT BEHIND

Australia is the only high electricity consuming country without nuclear – or plans to include nuclear – in its energy mix.

THE OUTLIER

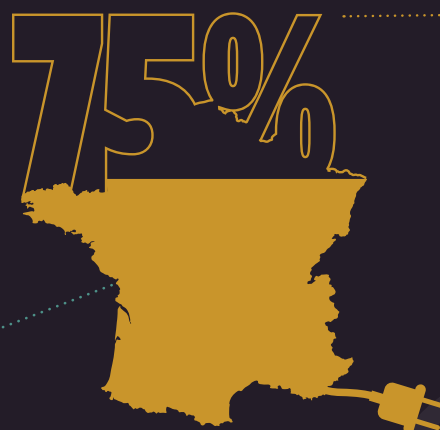
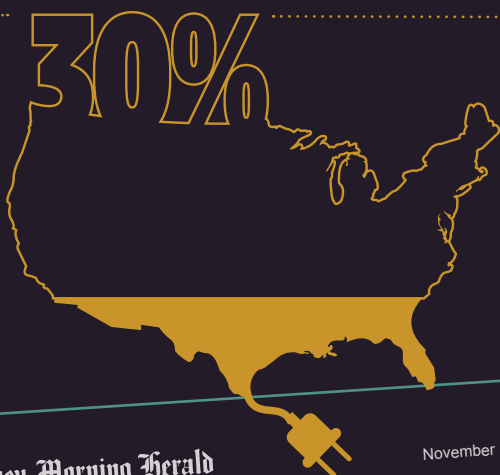
Top 20 electricity consuming countries 2019

✓ Nuclear consumer	● Nuclear under development	✗ Nuclear power prohibited
1 ✓ China	6 ✓ Brazil	11 ● Saudi Arabia
2 ✓ US	7 ✓ Canada	12 ✓ United Kingdom
3 ✓ India	8 ✓ South Korea	13 ✓ Italy*
4 ✓ Russia	9 ✓ Germany	14 ✓ Mexico
5 ✓ Japan	10 ✓ France	15 ✓ Taiwan
		16 ✓ Spain
		17 ✗ Australia
		18 ● Indonesia
		19 ✓ Iran
		20 ● Vietnam

* More than 80 per cent of electricity imported by Italy comes from nuclear powered countries

Source: Energy Information Administration

**30% of America's energy needs and
75% of France's is generated by nuclear power plants,
and there's never been an incident.**



The Sydney Morning Herald

November 10, 2021

Macron boosts nuclear power plans to meet France's net-zero ambitions

London: France will construct a series of large nuclear power plants for the first time in decades, as the nuclear powerhouse seeks to neutralise carbon emissions by 2050 and reduce its reliance on unreliable gas imports

Perhaps this is why France has **INCREASED** its manufacturing output at a stable rate since WW2, while Australia's manufacturing output **DECLINED** in the last decade.

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URANIUM... WE'VE GOT A LOT OF IT

Australia has 30% of the world's uranium deposits yet we barely scratch the surface of what's possible for our uranium industry.

UNTAPPED POTENTIAL

Australia has the world's largest share of uranium resources but is only the 3rd biggest producer

30%

Australia

1,818,300 t

14%

Kazakhstan

842,200 t

8%

Canada

514,400 t

8%

Russia

485,600 t

7%

Namibia

442,100 t

Source: World Nuclear Association



2019-20

**AUSTRALIA MADE
\$688 MILLION
IN URANIUM EXPORTS**

That's 290TWh of **Zero-emissions electricity** generated by Australian Uranium – enough to generate 109% of Australia's domestic electricity.*

Yet our politicians refuse to consider its use even though a nuclear reactor continues to operate safely on the fringes of Sydney.



**ENOUGH TO
GENERATE 109%
OF AUSTRALIA'S
DOMESTIC
ELECTRICITY**

*According to the Minerals Council

Canada demonstrates what's possible if we took full advantage of our nuclear potential.

AUSTRALIA VS CANADA

A side by side comparison of uranium industries

	Australia	Canada
Jobs	3000	60,000
Value	A\$600 million	A\$6.7 billion
CO ₂ from electricity	800kg per MWh	160kg per MWh

Source: Australian Bureau of Statistics; Australian Safeguards Non-Proliferation Office; compareyourcountry.org; Canadian Nuclear Association; MCA calculations

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NUCLEAR FUEL IS DENSE... REALLY DENSE

1 uranium
fuel pellet
1 INCH TALL
HAS AS MUCH
ENERGY AS



UNBELIEVABLY DENSE

A lifetime supply of energy in a golf ball

Just a golf ball-sized amount of uranium can provide all the energy needs in a person's lifetime.



17,000 ft³
OF NATURAL GAS



1 ton
OF COAL

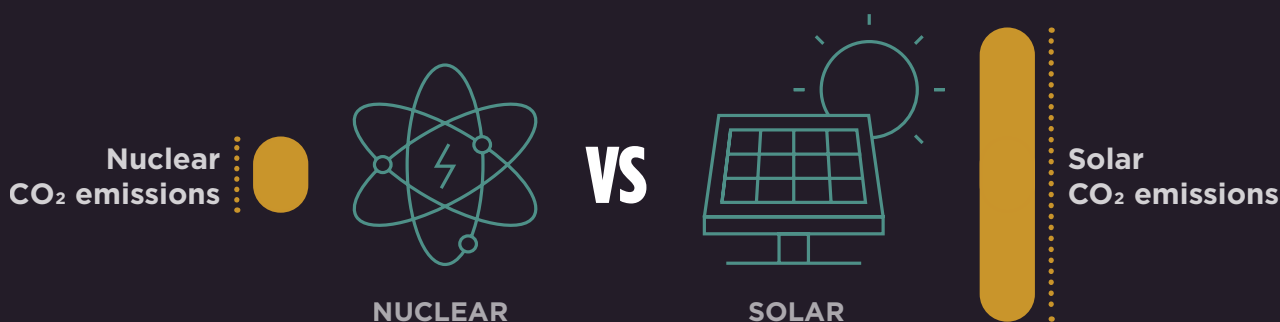


120 gallons
OF OIL

4



NUCLEAR IS GREAT FOR THE ENVIRONMENT



Nuclear emits 4X LESS CO₂ emissions than solar

The World Nuclear Association reviewed the life cycle CO₂ emissions (construction, operation and decommissioning) of fuel sources, averaging the findings of 20-plus studies.[^]

ENERGY FOOTPRINTS COMPARED

Nuclear produces more power with a far smaller footprint

Land required to produce Australia's annual electricity generation (260 TWh)^{^^}

NUCLEAR

150km²

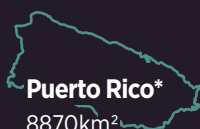


Liechtenstein*

160km²

SOLAR

8,000km²



Puerto Rico*

8870km²

HYDRO

14,000km²



Montenegro*

13,450km²

WIND

33,000km²



Taiwan*

32,260km²

Environmentally conscious Australians are keenly aware of how nuclear power is more sustainable than solar and wind because reactors last 80 years and require less materials. Meanwhile China-built solar panels and wind turbines require more materials, need to be replaced every 10 to 15 years, and cannot be recycled.

^{*}Approximation

[^]Source: WNA, Comparison of lifecycle greenhouse gas emissions of various electricity generation sources, 2011

^{^^}Source: Canadian Nuclear Association, Nuclear Energy Institute and MCA calculations; World Nuclear Association



NUCLEAR PRODUCES CHEAPER ELECTRICITY

Over the past few decades, the demonisation of cheap fossil fuels, the uptick of intermittent renewables, and poor energy policy has hurt our industry and households greatly.

POWER BILLS BY STATE

Cost change over 10yrs

SYDNEY	106%▲
ADELAIDE	106%▲
PERTH	105%▲
MELBOURNE	101%▲
BRISBANE	85%▲

Source: Australian Bureau of Statistics

90%▲

COST TO MANUFACTURING

Electricity cost increase to manufacturing since 2009.

Source: Australian Bureau of Statistics

98%▲

HOUSEHOLD BILLS

Electricity bill increases over the past decade.

Australia's electricity costs have doubled in the last decade, driving up the cost of living and killing our manufacturing...

EUROPE: AN EXAMPLE

France

0.19
per kWh



Slovakia

0.16
per kWh



Germany

0.32
per kWh



Denmark

0.29
per kWh



Spain

0.23
per kWh



MOSTLY NUCLEAR

(France 75%, Slovakia 55%)

MOSTLY INTERMITTENT RENEWABLES

Source: Eurostat (2021)



NEW NUCLEAR TECHNOLOGY IS SMALLER, CHEAPER & LASTS LONGER

Nuclear tech has come a long way since the 1950s. Companies like Rolls Royce have been developing a new generation of small modular reactors (SMRs).



Rolls-Royce small modular reactor

SMRs are small enough to be delivered by truck and can power a decentralised grid. Each mini plant can power around 1 million homes, perfect for Australia's many towns and regions.

REUTERS

November 10, 2021

Britain backs Rolls-Royce mini nuclear plants in net zero drive

Small Modular Reactors (SMRs) can be made in factories, with parts small enough to be transported on trucks and barges and assembled more quickly and cheaply than large-scale ones.



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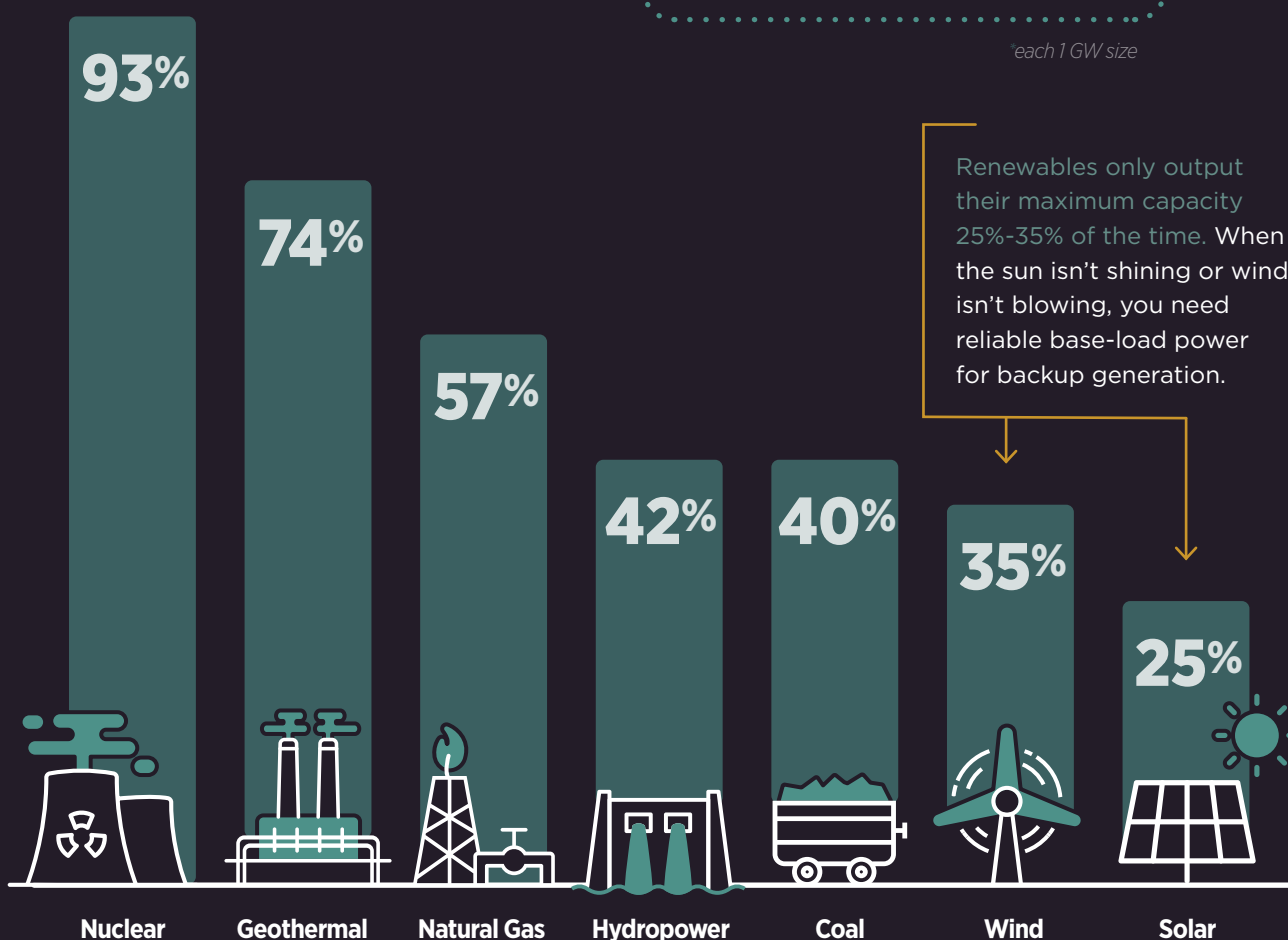


NUCLEAR POWER IS BY FAR THE MOST RELIABLE ENERGY SOURCE

This means nuclear power plants can produce maximum power more than 93% of the time during the year. They also require less maintenance and refuelling than other base-load sources.

You would need 3 to 4 renewable plants* to send the same amount of electricity onto the grid as one nuclear plant.

*each 1 GW size



Renewables only output their maximum capacity 25%-35% of the time. When the sun isn't shining or wind isn't blowing, you need reliable base-load power for backup generation.

CAPACITY FACTOR BY ENERGY SOURCE IN 2020

Figures are rounded to nearest percent

Source: U.S. Energy Information Administration



NUCLEAR IS ONE OF THE SAFEST ENERGY SOURCES AROUND

AS SAFE AS RENEWABLES

Death rates from energy production per TWh



Source: Markandya & Wilkinson (2007); Sovacool et al. (2016)



BUT WHAT ABOUT CHERNOBYL?

When considering the safety of nuclear power, it's important to look at the three nuclear incidents in perspective.

Source: World Nuclear Association; Prof. Geraldine Thomas; World Health Organisation; Nuclear Energy Agency, Organisation for Economic Co-operation and Development

1979

Three Mile Island

United States

0 INJURIES OR DEATHS

The amount of radiation released was about the same as one would receive from a chest X-Ray.

1986

Chernobyl

Ukraine

Approx. **200** DEATHS IN 30 YRS inc.
30 FIREFIGHTER DEATHS
<50 RADIATION-RELATED DEATHS

Abysmal safety procedures unique to the Soviet Union caused the infamous 1986 incident in Chernobyl. Despite the fear narrative, The World Health Organization wrote in 2005 that "fewer than 50 deaths had been directly attributed to radiation from the disaster". ^

2011

Fukushima

Japan

16,000 TSUNAMI DEATHS
30 EVACUATION DEATHS
0 RADIATION-RELATED DEATHS

Deaths from the 2011 earthquake and resulting tsunami have often been mistakenly reported as being attributed to nuclear radiation as well. In reality, not one death was directly caused by radiation.

^ Source: World Health Organization (2005)



WHAT ABOUT THE WASTE?

Nuclear produces very little waste. Of this small amount, just 3% is considered 'high-level waste' which is easily and safely stored in steel containers encased in concrete.

On average, the waste from a reactor supplying a person's electricity needs for a year would be about the size of a brick. Only 5 grams of this is high-level waste - about the same weight as a sheet of paper.



NUCLEAR WASTE IN PERSPECTIVE

Total volume of nuclear waste



90%

Low-level Waste

Lightly contaminated items like tools and work clothing containing only 1% of radioactivity in the nuclear waste.

7%

Intermediate-level Waste

Used filters, steel components from within the reactor and some effluents from reprocessing containing 4% of radioactivity in the nuclear waste.

3%

High-level Waste

Spent fuel containing 95% of radioactivity in the nuclear waste. High level waste is safely and easily stored in steel containers encased in concrete.

Source: World Nuclear Association

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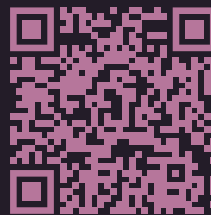


SO HOW WOULD WE END THE BAN ON NUCLEAR?

The government can follow the lead of the Minerals Council, which found that the “*nuclear ban can be reversed with a single amendment* to the Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth). The removal of four words – ‘a nuclear power plant’ – in Section 140A(1)(b) would allow nuclear industries to be considered for development in Australia.”

To POWER UP, we need to get both sides of politics to agree on nuclear energy — it's time for the Coalition and Labor to get on board.

SIGN THE
PETITION TO PUT
NUCLEAR FRONT
AND CENTRE!



SCAN ME! 