



12 December 2024

TO: House Select Committee on Nuclear Energy

RE: Questions on Notice

Thank you for the opportunity for the Institute for Energy Economics and Financial Analysis (IEEFA) to provide input to the House Select Committee on Nuclear Energy as part of its inquiry into nuclear power generation in Australia.

IEEFA is an independent energy finance think tank that 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.

IEEFA is responding to several questions taken on notice from the public hearing in Melbourne on the 4th of December at which IEEFA provided evidence. Our answers to the questions on notice are provided below.

Kind regards,

Johanna Bowyer, Lead Analyst, Australian Electricity, IEEFA

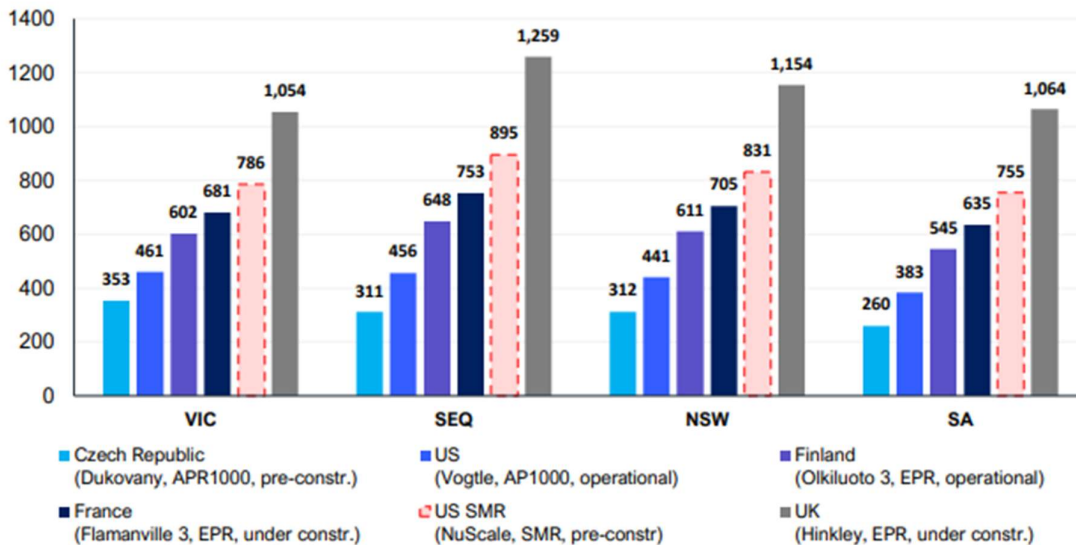
Nuclear bill impact for households

“Ms Bowyer: If it were at the higher end, it would have been a \$1,200 bill increase for a typical household. For a four-person household it would have been higher. I can provide that as well.”

The bill impact for households that we calculated in our report, [Nuclear in Australia would increase household power bills](#), are as follows.

For a typical household using a median amount of electricity, the bill impact ranges from: \$260 per annum bill rise in South Australia based on the Dukovany pre-construction project in the Czech Republic; to \$1,259 in South East Queensland (SEQ), based on the experience with Hinkley Point C in the UK, which has nearly finished construction. This is shown in Figure 1.

Figure 1: Increase in typical household electricity bill to recover costs of nuclear plants, based on different countries' experience (AUD/year)



Source: Various sources and IEEFA calculations. Note: Bill increases are for a household with median electricity consumption levels.

The average bill impact across the examined regions is shown in Table 1.

For a household using the typical amount of electricity, the average bill rise across regions and nuclear scenarios was \$665 per year.

For a four-person household the average bill rise across regions and nuclear scenarios was \$972 – ranging from \$451 based on Dukovany costs, to \$1,657 based on Hinkley Point C costs.

For a five-plus-person household the bill impact would be higher again. On average across nuclear scenarios and regions, the bill increase for a five-plus-person household was \$1182 per year.

Table 1: Average bill impacts across nuclear scenarios and across the examined regions, for different consumption levels (AUD/year)

Scenario	Median	Household size (number of people)				
		1	2	3	4	5+
Czech Republic (Dukovany, APR1000, pre-constr.)	309	206	334	384	451	550
US (Vogtle, AP1000, operational)	435	289	469	540	636	774
Finland (Olkiluoto 3, EPR, operational)	602	399	647	747	880	1070
France (Flamanville 3, EPR, under constr.)	693	460	745	860	1014	1233
US SMR (NuScale, SMR, pre-constr)	817	541	877	1013	1195	1452
UK (Hinkley, EPR, under constr.)	1133	750	1214	1405	1657	2013
Averages						
Average US complete (Vogtle)	435	289	469	540	636	774
Average EU complete or near complete (Olkiluoto, Flamanville)	648	429	696	803	947	1151
Average EU all	684	454	735	849	1001	1216
Average US all	626	415	673	777	915	1113
Average for nuclear scenarios	665	441	714	825	972	1182

SMRs are not a present-day solution for data centre and AI demand growth

“Ms Bowyer: We wrote a report on this, which I can send through. We looked at those recent commitments, with the data centres potentially signing up to the SMRs, but those details were very thin. There wasn’t a good amount of information about them, and they were all far in the future. They weren’t about now, whereas what we actually are seeing now is that SB Global Energy has begun commercial operation of an 875-megawatt solar project in Texas. The biggest customer is Google. Orsted launched commercial operation of the hybrid 11-mile solar and battery storage project.”

Mr KENNEDY: If you could table that, that would be great, and then we can have a look at.”

IEEFA recently released a briefing note [Nuclear hype ignores high cost, long timelines](#) about how nuclear is being touted as a solution to meet growing energy demand from the growth of data centres and artificial intelligence (AI). However it is not a realistic solution for the present day.

Some key findings of this report include:

- *“Nuclear power is being touted as a solution to meeting growing electricity demand spurred by demand from artificial intelligence and data centers.”*
- *“Plans to build small modular reactors (SMRs) may bear fruit after 2030 but will be of no use in meeting current demand growth.”*
- *“Announcements of new SMR plans have one thing in common: They’ve been very short on details.”*
- *“Solar and geothermal plants are being built for less money and in much less time than even the most optimistic SMR designs.”*

Technology companies have made a number of announcements regarding plans to use nuclear to power their operations, but the announcements are light on details and are focused on pledges far into the future rather than the present day. They also did not include information about how the companies would finance the reactors.

- **Kairos and Google** “said they had signed a master plant development agreement that would lead to the building of a “fleet” of reactors generating a total of 500 megawatts (MW) of capacity by 2035, with the first unit planned for a 2030 startup. Beyond that, details from Kairos and Google were slim—in fact, almost nonexistent. The Kairos website says its SMR will offer 75MW of capacity, and be sold as a two-unit, 150MW plant. For comparison, Microsoft’s deal at TMI is for 835 MW of capacity, with a planned startup date in 2028... **How the company will afford to finance and build its reactors, even with help from Google and the government, is an open question.”**
- **Amazon, Energy Northwest and X-energy:** “The details in the Amazon, Energy Northwest and X-energy announcement were equally sparse. The topline takeaway was Amazon’s pledge to bring five gigawatts (GW) of X-energy’s SMR technology online by 2039—15 years from now—with the focus initially on developing one 320MW plant in Energy Northwest’s Washington service territory... **How Energy Northwest will finance and build the planned reactor was not addressed in the parties’ press release.”**

Solutions like solar and storage are already being implemented to power technology companies in the present day.

- **SB Energy Global and Google:** “SB Energy Global said it had begun commercial operation at an 875MW solar project in Texas—less than two years after the project was announced. The biggest customer for the project is Google, which has agreed to purchase 75% of the output. Financing for the project was secured in November 2023, meaning getting the steel in the ground and the plant into commercial operation took just 11 months.”

- **Enbridge and AT&T:** “Enbridge announced a similar large-scale project on Nov. 1, saying it would build an 815MW solar farm west of Dallas that it expects will be fully online in 2026. The main customer for the project is AT&T.”
- **Orsted and Meta Platforms:** “In Arizona, another hot spot for both solar and data center demand growth, Ørsted launched commercial operation at the hybrid Eleven Mile Solar and battery storage project in November—just 21 months after beginning construction. The project includes 300MW of solar generation capacity plus a 300MW, four-hour battery unit. The project’s principal offtaker is Meta Platforms, the parent company of Facebook and Instagram.”

Impact of gas on wholesale prices

In the inquiry we referred to a Griffith University study that examined the impact of gas prices on wholesale electricity prices. We provide this study for reference: [The role of gas price in wholesale electricity price outcomes in the Australian National Electricity Market \(NEM\)](#).

This study shows that rising gas prices are a key driver of rising electricity prices over history and that the gas price is closely correlated with the wholesale spot price over 2012 to 2021. “Once extreme scarcity pricing is removed, we find a strong correlation of 0.90 between gas and electricity prices. We also find similar correlations existing in international markets.”

Figure 2: Monthly averaged NEM-wide volume weighted under-cap electricity price and average daily gas price STTM ex-ante



Source: [Griffith University](#).



The study states that “We find gas prices have set NEM electricity prices for between 50-90% of historical periods.” This is due to:

- Direct price setting whereby gas-powered generators directly set the wholesale price in the time periods in which they are the marginal generator.
- Indirect price setting whereby gas-powered generators influence the pricing strategies of other generators such as hydro and black coal.

In 2021 the correlation between gas price and electricity price was not as strong, according to Griffith University. The years 2020-2021 saw record levels of renewable energy generation and rooftop solar installed, and “competitive demand” (NEM operational demand after renewables are subtracted) was at record low levels in 2021. This means gas was needed less frequently and coal units were forced to compete among themselves to a greater extent.

Griffith University stated that “In the longer-term, reducing the impact on consumers of high gas prices relies on ensuring that competition remains at efficient levels. This requires better coordination of coal outages, rapid uptake of renewable generation, and a sharp focus on the level of horizontal integration of market participants.”