Purpose:

1. To analyse the information on nuclear costings released by the Coalition in late December 2024 in the form of the Frontier Economics report 2[A] ("**FER2**") supplied to the Coalition at no cost[B];
2. To show the public how poorly thought out the Coalition proposal; and
3. To identify critical questions that Darren Chester should answer,

Executive Summary:

1. The Coalition has no modelling for the wholesale cost per kilowatt-hour of nuclear electricity but claims it must be cheaper than under Labour's plan, despite multiple independent reports showing nuclear electricity is 2-3 times more expensive than that from renewable sources.
2. The Coalition's costings exclude major elements of the cost of their nuclear policy that could add hundreds of billions of dollars to the total cost.
3. The Coalition has chosen the much lower growth Progressive scenario from the ISP[C] (published by AEMO[D]), without any explanation or justification as to why they think that is the best direction for Australia, compared to the Step Change scenario favoured by AEMO. These scenarios have very different outcomes for electricity growth, emissions reductions progress, economic activity, take-up of EVs and volume of renewable energy.
4. Heroic and unjustifiable assumptions are made about key elements of the proposal which, if unable to be achieved will play havoc with the delivery dates, project costs, electricity prices, grid reliability and emissions growth, let alone emissions reductions.
5. The plan extends the use of coal-fired generation for at least another decade which will add billions of tonnes of greenhouse gas emissions and relies on nuclear to, somehow, let us meet the goal of net zero emissions by 2050.
6. The Coalition appears to intend to make massive interventions in the energy market by funding at public expense at least $140 billion of nuclear reactors, banning offshore wind, capping solar energy growth after 3-5 years and forcing uptake of nuclear electricity.
7. The Coalition's plan appears to be mainly funded by the taxpayers whereas Labour's plan appears to be mainly funded by private investors.

[A] Frontier Economics: Report 2 - Economic analysis of including nuclear power in the NEM (Dec 2024).
[B] Does this make the report a political donation? The commercial cost of that report might be $100-250,000.
[C] Integrated System Plan: a roadmap for the transition of the National Electricity Market (NEM) power system, with a clear plan for essential infrastructure that will meet future energy needs.
[D] Australian Energy Market Operator: manages electricity and gas systems and markets across Australia, helping to ensure Australians have access to affordable, secure and reliable energy.

New Information now available following the latest Coalition announcements:

1. Five power stations are to deliver 13.2 GW of output by 2050. This implies each site has two 1400 GW reactors[A].
2. The first of these will be in NSW but which site is not identified.
3. Detailed construction costs have been modelled in Frontier Economics Report 1[B] ("**FER1**"), but it does NOT model the price of nuclear electricity.
4. The costs for SMR deployment in WA and the NT are NOT included.
5. Costs are modelled using AEMO's Progressive Scenario rather than the Step Change scenario chosen by Labour.
6. The Coalition claim their plan will cost $331 billion, compared to $595 billion for Labour's plan.
7. The first reactor comes online in 2036 (in 11 years from now) and the last reactor comes online in 2050.
8. By 2050, 38% of our electricity will come from nuclear (with it being 13% of total electricity generation capacity), 50% from on-shore wind and solar with the remaining 12% coming mainly from gas.
9. The costs of the nuclear component will be funded by the taxpayers, but no details are given on how the rest will be funded.

Missing Information not included but necessary for a better understanding of their plan:

1. Breakdown of cost elements that comprise their plan's total costs.
2. Assumptions that inform their cost and project timetable outcomes.

[A] Inferred from Figure 1 (page 7) of the FE report. Equivalent to 14Gw capacity running at 94% utilisation.
[B] Frontier Economics: Report 1 – Developing a base case to assess the relative costs of nuclear power in the NEM (Nov 2024).

Cost of Nuclear Electricity: the report does not model what the cost of nuclear electricity will be, yet the Coalition claims it will be cheaper, since the total capital cost of their plan is cheaper.

1. The Coalition claims electricity costs will be cheaper than under Labour's plan since their claimed capital costs ($331 billion) are lower than what they claim Labour's capital costs are ($594 billion) but offer no price modelling to support this claim.
2. The accepted comparative measure for the cost of electricity generated by different technologies is the Levelized Cost Of Electricity (LCOE)[A].
3. Multiple sources[BCD] show that current and projected LCOE values for nuclear are at least $50-100 per megawatt hour more expensive than wind and solar supported by storage.
4. Others[E] show that the cost of electricity generated from nuclear plants would likely be 1.5 to 3.8 times the current cost of electricity generation in Eastern Australia and that that nuclear will increase annual costs to Australian households by $260 to $1,259.
5. The report is silent on the need for nuclear operating subsidies, but the above figures (and overseas experience) shows that a subsidy of at least $50-100 per Mwh will be needed. This could be **$3.9-7.8 billion per year**, paid for by the taxpayer[1].
6. Critical Questions:
   a. What modelling have you done to support your contention that nuclear electricity will be cheaper than renewables?
   b. What modelling have you done regarding the need for nuclear operating subsidies?

[A] LCOE compares the cost of generating electricity from renewable energy technologies (e.g., wind and solar) to conventional technologies (e.g., gas, coal and nuclear), including across various scenarios and sensitivities. The LCOE allows for an apples-to-apples comparison of different technologies by accounting for factors like generation/output, upfront capital costs, fuel costs, operating and maintenance expenses, and asset lifetimes. Essentially, it is the wholesale price for a megawatt hour of electricity an operator must receive, on average, to meet their required return on investment in the generation technology they have chosen.
[B] CSIRO "GenCost: cost of building Australia's future electricity needs", 2023-24 version.
[C] Lazard "LCOE Levelized Cost of Energy", June 2024.
[D] Institute for Energy Economics and Financial Analysis report "Nuclear in Australia would increase household power bills" (September 2024).
[E] Ibid

Missing Costs: The report excludes major costs totalling hundreds of billions that will arise when executing their plan, thus distorting the true cost of nuclear power and the potential cost to the taxpayers as well as destroying their "cheaper" claim.

1. **Most of the capital cost** of the nuclear buildout is deemed to occur after the period ending in 2050, on the basis that they should be amortized over at least 50 years of the plant's lifetime. This is an accounting approach relevant to pricing nuclear electricity but irrelevant to the total capital cost of the project. At least **$84 billion**[A] should be added back.
2. **No refurbishment costs at 40 and 60 years.** Nuclear plants are typically licensed for an initial 40 years with major refurbishment required every 20 years to enable any license extension. CSIRO[B] estimates these costs at $2.765 billion per Gigawatt of capacity. Thus, this will cost 10x1.4x2.765 billion or nearly $39 billion after 40 years and again after 60 years. The report (p.16) assumes an hourly variable cost of $30 per Mwh which includes maintenance but does not any refurbishment costs.
3. **No costings included for the SMR reactors** for WA and NT that are part of the Coalition's plan. Add back **$11-12 billion**[C].
4. **Coal capital expenditure** to extend the life of coal-fired generation and operating subsidies to make such electricity competitive in the open National Electricity Market (NEM). Add back **$24-30 billion**. (see Cost of Coal section).
5. **Operating subsidies** to ensure nuclear power is cost competitive against renewable energy generation in the NEM. Add back $4-8 billion per year for 50 years **(**see Cost of Nuclear Electricity section) or around **$60 billion** to 2050[D]. This alone closes the gap on the $5.5 billion per annum saved costs the Coalition claims for their plan[E] versus Labour's plan.
6. **Petrol/Diesel costs**: with the Coalition's plan calling for 9 million fewer EVs in 2050, Australians without EVs will be paying an extra $2-3,000[F] per vehicle per year in fuel and maintenance costs. Add-back **$18-27 billion per year** forever.
7. **Transmission lines** costs are excluded on the basis that the existing lines will be sufficient. This ignores, for example, the 9 Gw of offshore wind farm generation that the Victorian Government plans for Gippsland by 2040 (link). Add back **$3-10 billion**[G] to the project.

[A] Assume construction starts in 2030 and finishes in 2050. FER2's capital cost is $10,000 per kilowatt capacity times 14 Gw of capacity yields a construction cost of $140 billion. This is amortized over 50 years (FER2 p.16). The amortised amount before 2050 is thus 2/5 of the capital cost, thus 3/5 or $84 billion is amortised after 2050.

[B] CSIRO GenCost 2024-25 Consultation draft (December 2024). Page 18.

[C] Ibid: Report shows SMR LCOE as being 1.75-2.0 times that of large-scale nuclear. Using that ratio as a proxy for SMR construction costs compared to large-scale nuclear results requires times 1.75 x $10,000/kw x 2 SMRs of 0.3 Gw each, or $10.5 billion; $12 billion if a ratio of 2.0 is used.

[D] Assumes subsidies start at $4 billion in 2040 and ramp up to $8 billion by 2050.

[E] FER2 page 9.

[F] Evse.com.au How Much Would You Save if You Own an Electric Car? Higher savings from home solar charging.

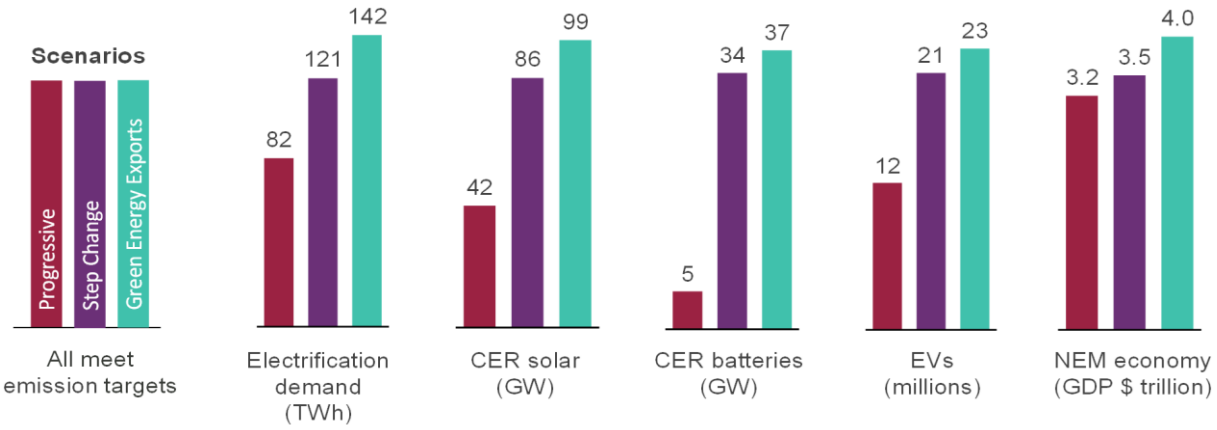
[G] The NSW Humelink project will cost $4.8 billion for 365 kilometres of transmission lines or $13m per kilometre. Assume each plant needs, on average, 50-150 km of new line, times 5 plants.

8. **Waste storage costs** for permanent ultra-long remote storage are excluded. Add back **$20 billion** at least[A].
9. **Decommissioning costs**: The report (p.16) assumes an hourly variable cost of $30 per Mwh which includes decommissioning costs at the end of the plant's life. It does not identify what the actual decommissioning costs will be. Others[B] have indicated that it is reasonable to assume such costs can end up with costs equal to the construction costs.
10. **Public liability for disasters**: what contingency is allowed for incidents over the claimed 80-year lifetime?
11. **Carbon Pricing**: The Coalition assumes there will be no carbon pricing in Australia but the ISP includes this at average global rates. If Australia is forced to price carbon, this will add **$57-72 billion** (see Emissions Reduction section).
12. **ADD IN Climate Council Australia Economic Meltdown: Counting the real cost of Peter Dutton's Nuclear Fantasy: COSTINGS**
13. **ADD IN INQUIRY REPORTED $45-60/hour maintenance cost.**
14. **The total missing project costs** (as above) exceeds their claimed total project cost.
15. Critical Questions:
    a. What is your estimate of the full lifetime costs that will be borne by the taxpayers?
    b. What proportion of this is included in your total plan costs of $331 billion?
    c. What modelling have you done on the level of operating subsidy required to ensure nuclear electricity is competitive in the NEM?
    d. What analysis have you done on the availability of transmission line capacity for nuclear output in 2040?

[A] Norway is spending $20 billion for the world's first multi-century nuclear waste storage facility.
[B] The Age (03-01-2025) The $80 billion question buried in Dutton's nuclear power plan.

Which Future Does Australia Want?

1. The Coalition has chosen the **Progressive** scenario from the ISP without any explanation or justification as to why they think it will be better for Australia than the **Step Change** scenario favoured by AEMO[A].
2. The ISP defines these scenarios thus:
   a. **Step Change**: "fulfils Australia's emission reduction commitments in a growing economy".
   b. **Progressive Change**: "reflects slower economic growth and energy investment with economic and international factors placing industrial demands at greater risk and slower decarbonisation action beyond current commitments".
   c. Both achieve our emissions targets.
3. The major differences between the two scenarios at 2050 are (from ISP Figure 13):



   a. Electricity demand grows at only 1.9% CAGR under the Coalition versus 2.8% under Labour.
   b. Home solar generation and battery installations (CER) under the Coalition are 49% and 15% respectively of that occurring under Labour's plan.
   c. 9 million fewer EVs on the road under the Coalition means greater emissions and continuing massive fossil fuel costs for motorists. It also represents lost EV storage capacity of 440 Gw[B].
4. The Coalition further modifies the Progressive scenario so that their 2050 outcomes include[C]:
   a. 53% reduction in onshore wind generation to 87,468 Gwh (itself reduced from Progressive's 135,002 Gwh) compared to Step Change's 185,735 Gwh.
   b. No offshore wind generation! Does this mean all existing projects will be banned or penalised out of existence?

[A] Note that the ISP (page 9) rates the likelihood of the Step Change and Progressive scenarios occurring at 43% and 42% respectively. Although not stated as such, these figures must reflect the policies that various Governments implement from time to time. Thus, political philosophy can change these likelihoods.
[B] Nine million EVs with an average 70Kw battery allowing 70% to be used by grid or household if required.
[C] FER2 Table 8.

c. Solar power (home and utility) to be almost halved under the Coalition[A]. This would probably mean no more solar projects need be installed beyond about 2030.

d. A much slower emissions reduction path (see Emissions Reduction section).

5. **Analysis**:

   a. This is not an apples-to-apples comparison. To do that requires comparing the equivalent costings for AEMO's Progressive scenario.

   b. It is hard to escape the conclusion that they choose the lower energy target to lower the total of their cost estimates.

6. Critical Questions:

   a. Futures are not pre-ordained, they are shaped by policies and decisions. Why have you chosen the lower-growth Progressive scenario as the best future for Australia?

   b. It appears you are intending that there be no offshore wind projects. How will you achieve that in an open market?

   c. State Governments drive most of the energy action. What if you are wrong about which scenario occurs? What happens to your costs then?

[A] Step Change 2050 solar: 91,435 GWh (FER2 Table 5), AEMO Progressive solar: 60,309 GWh (FER2 Table 7), Coalition plan solar: 48,351 GWH (FER2 Table 8).

Heroic Assumptions

1. The Proposal's costs rely heavily on several critical assumptions that fly in the face of expert opinion and overseas experiences. Justifications for such assumptions on costs, timeframes and implementation are not given. Any failure to reach the assumed conditions will have dramatic effect on the total viability of nuclear power and the cost keeping coal going.

Heroic Assumptions - Timetable

2. The Proposal assumes operational commissioning of our first reactor by 2036 with full rollout of the other nine reactors by 2050 (an average rate of one per year from 2040).
3. This requires Australia to deliver a world-beating first nuclear rollout period of 11 years[A] and deliver the remaining reactors at a rate that has never been attempted or delivered anywhere in the world.
4. It flies in the face of multiple analyses that indicate 15 years is more likely for countries with no large-scale nuclear power station construction experience nor existing skills base to support such projects.
5. It ignores the time taken for the legal and regulatory framework required to be established before tenders could be issued for construction[2].
6. It implies that all power stations will be built almost in parallel across five widely dispersed sites which negates the potential for "Nth of a kind" cost and productivity benefits the Report claims for its costings.
7. Failure to achieve this timetable will have major impacts on:
    a. Nuclear build costs and coal life extension/operating subsidy costs, for which the taxpayer will bear the risk.
    b. Grid reliability due increasingly unreliable coal baseload.
    c. Achieving net zero 2050 emissions.
8. Critical Questions:
    a. What project planning has been carried out that supports your claim of first reactor online in 2036 and all reactors online by 2050?
    b. What construction times per reactor have you assumed?
    c. How do you counter the multiple claims that it will take 15 years at least for the first reactor, compared to the 11 years you claim?
    d. How long will it take to let the first contracts for nuclear construction?
    e. The IAEA says nations should plan for the implementation of its recommended framework to take10-15 years. How long have you allowed for this process to occur?

[A] The history of the often-quoted UAE fast rollout is as follows. In 2006, the United Arab Emirates and other Persian Gulf states commissioned a study on the peaceful use of nuclear power. It was released in 2008 and the following year, Korean firm KHNP was selected to build four reactors. Final approval was not granted until 2012. The reactors began commercial operation between 2020 and 2024. The UAE has made no further nuclear orders and is, instead, rapidly expanding solar power. (The Conversation 16/12/24).

Heroic Assumptions - Costs

1. The Report assumes Australia can build nuclear power stations at a capital cost of $10,000 per kilowatt of capacity (CSIRO). This figure is way below other cost ranges reported elsewhere.
2. The implied capital cost of their nuclear build is not stated but we can assume $140 billion for ten 1400 Mw reactors at $10,000/KW. Less than half of this appears in the Report's headline costings as the total cost is amortized over 50 years. However, those costs will have been fully expended by 2050.
3. Lazard's June 2024 report[A] gives a cost range for new-build USA nuclear power stations of US$8,765 to US$14,400 per kW for a 2,200 MW power station. At US$0.62 to the AUD, this is equal to A$14,137 to A$23,225 per kW. Thus, Lazard's estimates are 1.4 to 2.3 times more expensive than the figure used by the Coalition.
4. The potential construction cost might thus be $196 billion to $322 billion, all of which is to be funded by the taxpayers.
5. It assumes nuclear build costs get cheaper with experience but that flies in face of nuclear cost trends globally[B] and ignores the widely geographically-dispersed nature of the planned installations and the compressed timetable proposed.
6. Critical Questions:
   a. What is the total nuclear build cost included in your modelling?
   b. Explain how Australia can deliver "first of a kind" build costs at 26-55% below current Western-world experience, especially when your timetable implies parallel projects in widely separated locations?
   c. How you model decreasing nuclear build costs in the face of global trends for these costs to keep rising?

[A] Lazard "LCOE Levelized Cost of Energy", June 2024. Page 38.
[B] Ibid page 16.

Heroic Assumptions - Implementation

1. The Coalition has not explained how several implementation assumptions they make can be delivered. These assumptions are critical to their ability to deliver to the dates and costs they claim and potentially fatal to the plan if proven unachievable.
2. **Simultaneously operating** a massive and complex construction project for a new nuclear power station on the site of the existing coal-fired ones whilst they are still operating at capacity.
   a. First, under their plan (see "Cost of Coal" section), there will be no retired coal plants that can be demolished and remediated in time to be used as a "brown field" site for nuclear. Sites are still required by law to be remediated before any other use can apply.
   b. Thus, nuclear builds are more likely to be a "green field" build, with an associated increase in construction costs (roads, drainage, switchyards, security, etc).
   c. Nuclear plants can take 1-2 years to commission once completed. During this time, they will be competing for water and transmission line space with the pre-existing coal-fired plants.
3. **Water sources**: The Coalition assumes they can take over the existing cooling water supplies currently used by the coal-fired plants.
   a. The existing operators are pursuing extensions of their existing water entitlements for a further 15-20 years post-retirement to use to render safe the attached coal mines, as required by law here in Victoria. Thus, that water will not be available for use by nuclear reactors.
   b. Local stream flows are in long-term decline which may be further affected by ongoing climate change. This may also increase water temperatures to the point where it is too hot to be used as cooling water (as experienced in Europe[A]).
   c. Other local water sources are in strong demand from growing populations (Thomson dam) and expanding agriculture (Glenmaggie weir and underground aquifers) and thus unable to be either physically or politically tapped.
   d. It would be prohibitively expensive to source cool sea-water from the coast and return hot exit water to the sea, not to mention issues of environmental damage and easements across agricultural land and National Parks.
   e. Nuclear power stations can use 20% to 80% more water than their coal-fired equivalents, thus adding more pressure to existing water sources.
   f. Maybe they should think of Victoria's site being at Wonthaggi so it can also use the desalination plant's infrastructure and transmission lines. Or Portland next to Alcoa?

[A] Renew Economy (14-Jan-25) Peter Dutton's "always on" nuclear power is about as reliable as wind and solar – during a renewables drought.

4. **Transmission Lines**: The Coalition does not include the cost of extra transmission lines since they claim they can use the existing ones currently served by the coal-fired plants. This ignores the uptake of their capacity by the expanding renewable energy sources projected over the next 10-20 years. For example, the Victorian Government's goal of having 9 Gw of offshore wind capacity by 2040.
5. **Work force**: The Coalition has made no statements on where the volume and skills of the construction workforce will come from to build ten reactors on five widely dispersed sites over 20 years.
   a. Each plant may require up to 9,000 workers at peak construction[A] and the total workforce required at any one time may be 20,000 overall[B].
   b. Assuming only 50% project overlap over 5 projects, up to 25,000-50,000 heavy construction workers may be required.
   c. This at a time when all forms of construction – civil and domestic – are struggling with severe skill shortages.
6. Critical Questions:
   a. What man-power modelling has been done to support the availability of this workforce to meet the projected timetable?

[A] Nuclear Energy Institute: Quick Facts on Nuclear Industry Jobs
[B] Nuclear For Climate Australia: Jobs and Community Growth

Cost of Coal: The Coalition plans to extend the life of our current generating capacity from most coal-fired power stations until that load can be assumed by nuclear. This has numerous implications and assumptions that have been poorly addressed so far.

1. The report assumes 65%[A] of our current generating capacity from coal-fired power stations[B] will be extended for an undefined period. No details are provided on which stations will be extended and which won't nor on how long they might need to be extended. Coal plant operators say that this extension is not feasible[C].
2. This will require financial incentives from the taxpayers to convince the operators:
    a. To abandon their current plans for the sites.
    b. To invest the capital required to keep the plants operating beyond their current retirement dates.
    c. That they can make their desired return on investment; and
    d. They can compete in an open market against renewables.
3. Victoria recently paid an unknown amount to extend the closing dates for the Yallourn W and Loy Yang A power plants[D]. NSW has agreed to underwrite losses of up to $225m per year for 2 years to extend the life of the Eraring plant[E].
    a. Assume an average annual cost of $300m per plant; this figure would rise as plants get less reliable, thus needing capital equipment replacement.
    b. Assume 8 plants need this subsidy for an average 10 years each.
    c. This could cost $24 billion for a 10-year extension with the risk of each additional year costing $2-3 billion.
4. The effect on our emissions reduction efforts is addressed in the following section.
5. Some critical risks need examination:
    a. The risk that the operators can't be budged from their existing plans for the site.
    b. The risk of financial extortion of the Government by the coal-plant operators ("if you want us to keep going, it will cost you $500m per year").
    c. The risk that the aging plants cannot be extended or that operating failures become significant, thus degrading generation supply from them.
    d. The risk of further carbon-pricing being forced upon Australia via import tariffs, etc.

[A] FER2 page 8, although which ones are to be extended is not identified.
[B] List of coal-fired power stations in Australia (Wikipedia) including chart & tables by state
[C] Dutton's 'brave' nuclear bet relies on coal plants. Their owners are concerned (The Age, 27/12/24)
[D] Renew Economy (06-Jan-2025) Closure deal on Australia's dirtiest power station kills hopes of early 100pct renewables.
[E] News.com.au (23-May-2024) NSW cements deal keep Eraring coal power plant open until 2027.

6. Critical Questions:
    a. Which coal-fired power stations are you expecting to keep open longer than their planned retirement dates?
    b. What current retirement dates are you assuming for each one?
    c. What operating life extension are you assuming for each one?
    d. What modelling have you done on the costs needed to ensure the required life-extensions for coal-fired power stations until nuclear arrives?
    e. What modelling have you done on the increased emissions resulting from this plan?
    f. What steps have you modelled to abate or offset these increased emissions?

Emissions Reduction

1. The report provides little useful content on the impact of Coalition policies on Australia's emissions reduction effort over the next 25 years.
2. It claims emissions intensity[A] will be lower under Coalition scenarios than under Labour ones[B] but the difference in intensity is miniscule; they admit that all four scenarios[C] fall within the definition of net zero by 2050.
3. It does not estimate the volume of additional emissions generated by their plan to extend the life of coal-fired power stations. However, CCA[D] has estimated this policy would produce nearly 2.0 billion tonnes of additional carbon emissions between now and 2050 compared to the AEMO's Step Change scenario.
4. Coalition statements appear to imply that nuclear is key to reaching net zero by 2050 but do not explain how it will achieve this, especially outside of the electricity sector (which generates only 35% of our emissions[E]).
5. The report does not allow for a price on carbon emissions whereas the ISP does, using global forecasts of what this might be over time. One estimate[F] shows that the total cost of this (on an NPV basis) would be $57-72 billion. Using the same basis as FER2 would produce figures 2-3 times this amount.
6. Add in Climate Change Authority's 2 billion tonnes estimate.
7. Critical Questions:
    a. Which plants are included in your life-extension policy and what responses have you had from those operators?
    b. What modelling has been done on how your plan will comply with Australia's Safeguard Mechanism[G] and what the additional costs will be?
    c. What modelling have you done on the costs of the life-extension element of your plan?
    d. Your plan assumes no price on carbon in Australia. How do you plan to achieve this when the rest of the world is pricing carbon and increasingly adding carbon border tariffs which would impact Australian exports?

[A] Tonnes of emissions per Megawatt-hour of electricity generated.
[B] FER2 section 4.4.
[C] Step Change and Progressive scenarios for both the AEMO-preferred energy mix and the Coalition-preferred nuclear-inclusive energy.
[D] Climate Change Authority (Feb 2025): Assessing the impact of a nuclear pathway on Australia's emissions.
[E] Department of Climate Change, Energy, the Environment and Water: Australia's emissions projections 2024 (figure 2).
[F] Renew Economy (30-Dec-24) This talk of nuclear is a waste of time: Wind, solar and firming can clearly do the job.
[G] The Safeguard Mechanism requires Australia's highest greenhouse gas emitting facilities to reduce their emissions in line with Australia's emission reduction targets of 43% below 2005 levels by 2030 and net zero by 2050.

Market Interventions

1. In our current regulated but still "free" electricity market, players make choices based upon the best return on investment. Buyers will need a compelling reason to pay 2-3 times as much for nuclear electricity.
2. To make nuclear work in open electricity market, the Coalition appears to intend to make massive interventions in the following areas:
    a. energy market by funding at public expense at least $140 billion of nuclear reactors,
    b. Limiting growth of renewable energy (banning offshore wind, capping solar energy growth after 2 years), and
    c. forcing uptake of nuclear electricity.
3. Critical Questions:
    a. What mechanisms do you propose will be required to ensure sufficient market take up of nuclear output if nuclear power is not price-competitive in an open market?

How To Proceed: how we should position the comparison for a more realistic view of things.

1. Always make the cost comparisons between the Step Change costings of both sides, since we do not have any AEMO estimate of the costs for the Progressive scenario. That way, we can use their costings (so they can't attack us on that).
2. Push hard on the missing costs and accounting fudges using the critical questions to expose their lack of planning.
3. Make their choice of the Progressive scenario as a choice between a bright future and a low economic growth one.
4. Push hard on the timetable problem as the "emperor really does not have any clothes" here. Demand they explain how they can deliver a first reactor within 15 years (ie 2040) and the rest within 30 years (ie 2055).
5. Push hard to move all comparison from "most optimistic" to the "more likely" and "worst case" scenarios.
6. Push hard on the "no water" side and suggest instead that the Wonthaggi desalination plant site would be much better; assured cooling water from the sea, existing transmission lines, cheap power for desal, etc. This is not about an "us and them" approach but forcing the cost comparisons to be done on a green-field site.

-end-

Footnotes

[1] **Nuclear Operating Subsidies**:
- Assumed subsidy to ensure nuclear is cost competitive with renewables-based forms of energy generation is $50 to $100 per megawatt hour (Mwh).
- Assumed volume of nuclear generation that must be purchased by the market is the report's (table 8) quoted 2050 figure of 104,138 Gigawatt hours (Gwh) delivering 38% of requirements under their scenario with only 13% share of generating capacity.
- Assumed proportion of this figure that does not need subsidy (because the market will, from time to tiume, be desperate for baseload at any price) is 25% (ie the other 75% needs to be subsidised).
- A subsidy of $50 per megawatt hour equals $50,000 per gigawatt hour.
- The annual cost of a $50/Mwh subsidy is thus 104,138 x 0.75 x 50,000 = $3.9 billion.
- The annual cost of a $100/Mwh subsidy is thus $7.8 billion.
- For comparison, Ontario subsidies their nuclear program by C$7.3 billion (A$8.2 billion).

[2] **Nuclear Regulatory Framework timetable**: The International Atomic Energy Agency publishes a framework called Milestones in the development of a national infrastructure for nuclear power. This describes what nations proposing to implement nuclear power generation should consider and how to go about making an informed decision about this. It identifies 19 infrastructure issues requiring attention before a decision to proceed is made:
- National position
- Nuclear safety
- Management
- Funding and financing
- Legal framework
- Safeguards
- Regulatory framework
- Radiation protection
- Electrical grid
- Human resource development
- Stakeholder involvement

- Site and supporting facilities
- Environmental protection
- Emergency planning
- Nuclear security
- Nuclear fuel cycle
- Radioactive waste management
- Industrial involvement
- Procurement

The IAEA says "Launching a nuclear power programme is a major undertaking that requires careful planning, preparation and investment in time, institutions, finances and human resources. It involves **10-15 years of preparatory work** and a commitment for around 100 years. Developing the infrastructure for a successful introduction or expansion of nuclear power requires many activities, such as building national institutions, establishing a legal and regulatory framework, developing human resources and financial strategies, addressing radioactive waste management and involving stakeholders."