

Response to Written Questions on Notice from Senator Hughes

1. I note that your submission states that the electricity sector is on course to achieve an emissions reduction on 2005 levels by 55%. Can you expand on how that's being achieved?

We assume question 1 and 8 refer to the [2021 Commonwealth Emissions projection](#) of a 55% reduction in *electricity* emissions by 2030. For the avoidance of doubt, this projection is unrelated to the AEC's policy recommendation of a 55% reduction in *economy-wide* emissions by 2035 which was also cited in the submission.

Other forecasts, such as [AEMO's Integrated System Plan](#) "Step Change" scenario, and the ALP's election policy [Reputex](#) forecast, suggest the reduction could be larger.

The drivers behind the dramatic achievement are many, but could be listed as:

- Relative falls in the build cost of wind and solar which have made it competitive with fossil fuels, even without subsidies.
- Increase in the cost of operating and building fossil fuel generation, caused mostly by higher domestic fuel prices and higher costs of finance for this technology.
- State-based policies subsidising local large-scale renewable energy, most significantly the NSW roadmap.
- Coal closures since 2005 plus commitments to close this decade Liddell, Eraring, Muja C, Collie and Yallourn power stations.
- State and federal subsidies to rooftop solar, and the structure of customer network tariffs which indirectly cross subsidise this technology.
- The voluntary environmental certificate market, which is holding up the price of Large-Scale Renewable Energy Certificates (LGC), despite the Renewable Energy Target having been met.

2. Are there policies which you are concerned may be expecting too much from the electricity sector given that they are already projected to reduce emissions at a greater level than what the Government is targeting?

The premise of this question is not clear to AEC.

We don't understand that the previous or current Governments have ever had an electricity sectoral emissions target per se. For its election policy, the current Government engaged Reputex which modelled that the result of its policies would be to increase the penetration of renewable energy from 68 percent (base case) to 82 percent in the National Electricity Market (NEM) and for emissions across the whole sector to reduce from 88Mt to 51Mt. These modelling outcomes have sometimes been mistakenly described as "targets".

Reputex' modelling change case is at the high end of renewable penetration forecasts and well above the former government's 2021 emissions projections. We are not sure which projections the question is referring to that are even stronger.

With respect to the current Government's policies, there will be a considerable challenge in their delivery, such as through Rewiring the Nation, and to ensure that it doesn't create unintended consequences, such as build subsequently regretted transmission. It is hoped, above all else, that the Federal Government will consolidate leadership over energy and carbon policy. Parochial and uncoordinated state policies are what places the national electricity grid under the most strain.

The AEC considers that federal and state-based subsidies for solar rooftops to have already served their purpose. Whilst the AEC is not opposed to rooftop solar, it notes that it is already highly economic without such support¹ and that additional small scale solar is no longer displacing coal² and has minimal environmental value.

3. Are gas and coal-fired power stations also making reductions in their emissions?

Many coal fired power stations have conducted plant upgrades that improve their thermal efficiencies. This is predominately by retrofitting modern turbine blading designs. For example:

- Alinta Energy's Loy Yang B power station in Victoria³;
- AGL's Bayswater power station in New South Wales⁴;
- AGL's Loy Yang A power station in Victoria⁵;
- Origin Energy's Eraring power station in New South Wales⁶; and
- Intergen/CS Energy's Callide C power station in Queensland⁷.

Meanwhile the owners of all Australia's coal-fired power stations have made considerable investments in alternative, less emitting technologies which places them well for long-term emissions reductions.

4. What sort of carbon capture and storage work are gas and coal companies undertaking?

The AEC is aware of one power station that is presently contemplating a trial carbon capture and storage project, Intergen's [Millmerran](#) power station in Queensland⁸.

5. How much does this work offset their emissions?

The AEC understands that carbon capture and storage (CCS) for coal fired power stations remains challenging. Based on its current technological capabilities versus the economics of renewable energy, we do not see CCS playing a significant role in the decarbonisation of Australia's electricity system. It is outside our expertise, but we expect it to play a significant

¹ See page x of

https://www.accc.gov.au/system/files/Retail%20Electricity%20Pricing%20Inquiry%E2%80%94Final%20Report%20June%202018_0.pdf

² See page 6 of <https://www.energycouncil.com.au/media/ixgbqiam/20211126-vic-legislative-council-enquiry-into-renewable-energy.pdf>

³ See page 14 of <https://www.loyyangb.com.au/cms/wp-content/uploads/2021/12/Final-version-Loy-Yang-B-Sustainability-Report-FY21.pdf>

⁴ <https://www.2018sustainabilityreport.agl.com.au/energy-landscape/power-station-transition-and-closure> and <https://www.agl.com.au/about-agl/media-centre/asx-and-media-releases/2021/march/largest-maintenance-works-underway-at-agl-bayswater> and page 26 of <https://www.agl.com.au/content/dam/digital/agl/documents/about-agl/investors/2022/220819-agl-energy-annual-report-2022.pdf> and Page 27 and 29 of https://www.agl.com.au/-/media/aglmedia/documents/about-agl/asx-and-media-releases/2021/210812_fy21tcfreport.pdf?la=en&hash=C6FD395B573008ED8201A5CBE2EE0AD1

⁵ <https://www.heraldsun.com.au/business/loy-yang-a-power-station-to-get-25m-upgrade/news-story/28446adadf99f5159e4b9eba3265ff6c>

⁶ See page 15 of

<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=MP060238%2120190807T041218.649%20GMT>

⁷ <https://www.intergen.com/our-assets/callide-c/> and <https://www.csenergy.com.au/news/callide-c-major-overhaul-now-underway>

⁸ See <https://www.glencore.com.au/operations-and-projects/coal/projects/carbon-transport-and-storage-project> and <https://davidlittleproud.com.au/5-million-investment-in-millmerran-carbon-capture-project/>

role in hydrocarbon extraction in the short term, and potentially in hydrogen and cement production in the longer-term.

We do note that the International Energy Agency has forecast globally a role for CCS with respect to peaking gas generation and hard-to-abate sectors⁹.

6. What would be the consequences of pushing the electricity sector to reduce emissions even further or, if you like, too far too quickly?

The electricity system is an extremely complex industry built up over 100 years around traditional fossil fuelled generators transmitting and distributing in one direction to consumers. Assets are long-lived and plans typically occur over decades.

All the power system's paradigms are changing at an incredibly fast rate, and myriad technical, economic, regulatory, social and community-acceptance challenges are arising. The AEC welcomes this rate of change as part of the necessary decarbonisation, but our submission emphasises the risks it unavoidably creates, which, if it goes badly, will put in jeopardy the present political acceptance of decarbonisation. The AEC does not advocate a slow-down in electricity action but is suggesting that if we wish to increase Australia's short-term emissions ambitions further, it would be more sensible, and safer, to look first to those sectors yet to begin their transition.

AEMO publishes material detailing the many technical challenges that arise as the generation stock transforms¹⁰, similar issues that are much discussed and analysed across the world.

There are many challenges associated with achieving a safe grid connection for the great rate of renewable build and in recruiting the specialist skills to undertake it.

Community resistance, particularly of the construction of wind turbines and associated transmission lines, is another consequence of the rapid build rate.

Workforce and community disruption occurs with the sudden loss of employment in coal-fired generation regions¹¹.

The AEC supports the industry's transformation and its members are prepared to engage with all the challenges listed above that the journey necessitates. However, it urges government to recognise the immensity of these challenges and to recognise it requires a reasonable timeframe for them to unfold.

7. How would the Government avoid pushing the electricity sector too far on emissions reduction to circumvent those consequences?

As alluded to earlier, the best way to minimise negative consequences is for the Federal Government to consolidate leadership over energy and carbon policy. This reflects our view that the dangers mostly lay at a state level, where state governments introduce insular policies that may have benefits to their state, but not nationally and achieve environmental benefits less efficiently.

⁹ <https://www.energycouncil.com.au/analysis/iea-net-zero-by-2050-narrow-but-still-achievable/>

¹⁰ <https://aemo.com.au/en/initiatives/major-programs/engineering-framework>

¹¹ <https://www.energycouncil.com.au/media/5f4m2xvh/aec045-regional-transitions.pdf>

By sharing the decarbonisation journey beyond the electricity sector, government becomes less reliant on requiring an unreasonable rate of change.

On the Safeguard Mechanism, the AEC considers the Federal Government's retention of the sectoral baseline for electricity to be pragmatic. There were some risks, explained in full [here](#), about the unintended consequences for the electricity sector if it was part of the Safeguard Mechanism reforms, namely:

- Generators with below-grid average emissions intensity reducing dispatch to beat their baseline, only for their output to be replaced by higher emitting generation.
- Disincentivising lagging industrial facilities to decarbonise because they can rely on electricity to meet the Government's aggregated target.

Finally, the AEC encourages governments to avoid setting specific technology targets. This increases costs for consumers and limits the growth of other new or emerging technologies. It is best for governments to ensure there are appropriate market signals that enable investment in the technologies required.

8. The Government is seeking to have 82% renewables by 2030 to meet its 43% target. In your estimation, how much would that reduce emissions in the electricity sector? Is it over 55% on 2005 levels?

The AEC's understanding is that 82 percent renewables in the NEM by 2030 is not a target but an outcome of the Federal Government's Rewiring the Nation policy being implemented in full. Reputex modelled emissions falling by 37Mt across the sector nationally compared to a base case of not introducing the policy.

The AEC was not involved in Reputex modelling and cannot vouch for it. We did uncover an uncertainty: the additional 14 percent of NEM renewables claimed to be brought about by Rewiring the Nation would appear to equate to about 25Mt of emissions reduction rather than 37Mt. 12Mt is too large a shift for non-NEM electricity and so we are unable to explain the discrepancy.

Nevertheless, the AEC considers 82% renewable penetration in the NEM implies a fall in Australian electricity sectoral emissions beyond 55% from 2005 levels by 2030. A precise estimate requires knowing also the modelled non-NEM renewable penetration.

Officers in the Department of Climate Change, Energy, the Environment, Heritage and Water may be better placed to provide these estimates.

9. In your submission you also note that are the sectors are doing very little. Does this create a level of frustration amongst those in your industry?

The electricity sector is proud of its efforts to date in driving Australia's emissions reductions. While we accept some sectors like aviation are hard-to-abate, there is frustration that the burden of decarbonisation is being almost exclusively carried by the electricity sector when other sectors have immediate decarbonisation opportunities available. Most notably this is through heat-pump technology (stationary energy) and the progressive electrification of light transport.

Even ignoring a principled frustration about fairness, the accelerated rate of electricity's decarbonisation poses immense technical and operational challenges that are not fully

appreciated. Electricity is an essential service that must maintain 24/7 supply – it is incredibly difficult to repair and replace generation assets without disrupting the reliability of supply.

10. Is there a feeling in the industry that the Government is expecting too much from the electricity sector in terms of Australia’s overall emissions, especially in comparison to other sectors?

Yes, but this expectation is not confined to governments. There is a broader misunderstanding across the polity that the electricity sector is the only sector that matters when it comes to decarbonisation. Even if the electricity sector reached net-zero tomorrow, about two thirds of Australia’s carbon emissions sources would still be emitting.

The challenge for governments is this reality will eventually become political. As the table below illustrates, emissions in each of transport and stationary energy will overtake electricity by 2030, and yet these sectors both have opportunities through electrification to significantly decarbonise before then.

Table 2: Sectoral breakdown of 2021 projections results to 2030, Mt CO₂-e

Emissions by sector (Mt CO ₂ -e)	National Greenhouse Gas Inventory		Projection
	2005	2019	2030
Electricity	197	179	88
Stationary energy	82	99	99
Transport	82	100	97
Fugitives	41	55	56
Agriculture	86	75	76
Industrial processes and product use	31	32	28
Waste	16	14	11
Land use, land-use change and forestry	89	-25	-16
Total	624	529	439

Note: totals do not sum due to rounding.