Submission to the Productivity Commission:
Comment on
The Commission's Interim Report on
"*Investing in Cheaper, Cleaner Energy and the Net-Zero Transformation*"

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"They were careless people, Tom and Daisy – they smashed up things and creatures
and then retreated back into their money or their vast carelessness,
or whatever it was that kept them together,
and let other people clean up the mess they had made …"
- F. Scott Fitzgerald *The Great Gatsby.*

"*Move fast and break things*"
- Facebook staff directive

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I welcome the opportunity to comment on the Productivity Commission's Interim Report "*Investing in Cheaper, Cleaner Energy and the NetZero Transformation*".

1 Executive Summary

The Productivity Commission has been asked by the Executive Government to find the most expedient means to enable a roll-out comprising, in the Commission's own words: "*thousands of wind turbines, millions of panels for solar farms, new transmission lines and substantial storage capacity*", *(Interim Report, paragraph 3, pp.7)*, as a means, supposedly, to meet something called Net Zero Greenhouse Emissions Targets as a means to address Climate Change.

What the government is asking of the Commission, is, in effect, that it give its approval to the roll-out of a totally unproven, completely uncosted, strategy, and to find the most expedient way to achieve this roll-out. To this author's knowledge, the Minister for Climate Change and Energy and his Departments have given no clear statement as to how many wind turbines, how many solar panels, how many kilometres of new high-voltage transmission lines will be required. And, importantly, the Minister has given no indication that he is aware of the sheer scale of the storage requirement.

Let us be clear on a second point. The Productivity Commission is required to address a set of Statutory Requirements in every Inquiry upon which it is asked to deliberate. These requirements are, quoting from Clause 8 of the Productivity Commission Act 1998:

"8 General policy guidelines for Commission

(1) In the performance of its functions, the Commission must have regard to the need:
(a) to improve the overall economic performance of the economy through higher productivity in the public and private sectors in order to achieve higher living standards for all members of the Australian community; and
(b) to reduce regulation of industry (including regulation by the States, Territories and local government) where this is consistent with the social and economic goals of the Commonwealth Government; and
(c) to encourage the development and growth of Australian industries that are efficient in their use of resources, enterprising, innovative and internationally competitive; and
(d) to facilitate adjustment to structural changes in the economy and the avoidance of social and economic hardships arising from those changes; and
(e) to recognise the interests of industries, employees, consumers and the community, likely to be affected by measures proposed by the Commission; and
(f) to increase employment, including in regional areas; and
(g) to promote regional development; and
(h) to recognise the progress made by Australia's trading partners in reducing both tariff and non-tariff barriers; and
(i) to ensure that industry develops in a way that is ecologically sustainable; and
(j) for Australia to meet its international obligations and commitments."

(2) In the performance of its functions, the Commission must also have regard to any other matters notified to it in writing by the Minister.

(3) The Commission, in all reports on matters referred to it, must provide a variety of viewpoints and options representing alternative means of addressing the issues in the report. If the report relies on formal mathematical economic modelling, the Commission must either:

(a) if practicable—utilise at least 2 different economic models, with the assumptions and results of those models made explicit in the report; or
(b) if it is not practicable to utilise at least 2 different economic models, appoint, and report on the views of, an independent reference panel on the modelling.

The relevant clauses here, in my view, are Clause 8 Sections (1)(a) and 3.
The Commission is required to conduct a thoroughgoing analysis of the strategy that is being proposed, that is, in this instance, the proposed completely uncosted, open-ended, roll-out of vast quantities of wind turbines, solar panels, transmission lines, batteries, etc. The Commission then, to my understanding, is required by the Act to properly cost this strategy, and to make recommendations as to how the strategy might be conducted, how it ought to be changed, where necessary, so as to achieve the aims, in particular and in this instance, of Clauses 1(a) and 1(d).

That is, in the first instance, the Commission is required to place a cost on this "Renewables Roll-out" as I prefer to call it. It is required to show, in monetary terms, the overall cost, and the impact on Australia's productivity, whether positive or negative, that the roll-out will have, and it is required to explore a range of options (Clause 8, Section 3) as potential alternative means to achieving the aims of the proposed policy.

The Interim Report gives no indication whatsoever that this preparatory work has even been considered, let alone commenced.

What is clear, after an examination of this Enabling Legislation which created "The Productivity Commission", (the Commission), is that the Interim Report prepared by the Commission in this matter fails to meet the Statutory Requirements as laid down in the Productivity Commission Act 1998, as stated in the current version of the Act, (Compilation 11, of 8 January 2024). In particular, it seems to this author, that the Commission has failed:
"*to undertake, on its own initiative, research about matters relating to industry, industry development and productivity*" (Clause 6 (1(e)); and failed to address the requirement that:
"*The Commission, in all reports on matters referred to it, must provide a variety of viewpoints and options representing alternative means of addressing the issues in the report. (Clause 8, item 3 Preamble).*

As such, that the Interim Report would seem to fail to meet these Statutory Requirements may mean that the Interim Report is open to legal challenge.

This submission highlights some of the Statutory Requirements which, in this writer's view, the Interim Report fails to meet, why it fails to meet them, and suggests ways that the Report might be modified so as to begin to meet these requirements.

A second, and equally serious, deficiency, in the author's view, is that, because the Commission seems to accept as a *fait accompli* that, for want of a better term, a Renewables Roll-out comprising, "*thousands of wind turbines, millions of panels for solar farms, new transmission lines and substantial storage capacity", (Interim Report, paragraph 3, pp.7),* it fails to address the extremely serious impacts on Australia's Productivity that will result should this Roll-out proceed.

In presuming that the Renewables Roll-out is the only way to proceed, and thereby failing to subject the Roll-out methodology to any sort of scrutiny, the Commission has failed to grasp the fact that, as a strategy, the proposed Roll-out represents a totally futile attempt to attain any meaningful emissions reductions whatsoever. This submission indicates some of the reasons as to why the government's Roll-out strategy fails as a means of achieving any meaningful emission reductions.

Also shown by the analysis described here, the Renewables Roll-out will leave the Eastern Australian Grid in a highly unstable, permanently fragile state, and therefore subject to a regime of frequent, unpredictabe, widespread blackouts. The potential for massive impacts on Australia's Productivity from such an outcome may not be underestimated, may not be ignored.

As this submission aims to show, the consequences of this absurd, failed policy proposal, (that of filling rural Australia with vast quantities of wind turbines, solar panels, battery storage, all connected by a mesh of new transmission lines, and in the process destroying much of Australia's valuable productive farmland), for Australia's future prosperity, are profound.

2 Recommendations

2.1 In the preparation of a revised Interim Report

Recommendation 1
As the proposed Renewables Roll-out would, effectively, destroy the Eastern Australian Grid,

- the so-called Clean Energy Transition has to be seen as a nonsense;
- any suggestion therefore that the EPBC Act be watered down so as to speed approvals and thereby hasten the Roll-out then, is premature.

Recommendation 2
For its part, this submission strongly recommends that the Productivity Commission address its Statutory Requirements by:

- conducting its own, fully independent, research into the merits and the detail of the government's proposed Clean Energy Transition;
- giving proper consideration to a range of alternatives to the proposed Renewables Roll-out.

2.2 Recommendations for the content of the Interim Report

The following are recommendations, in no particular order, that follow from the conclusions of this submission.

Recommendation 1
That, there be no changes to the EPBC Act that would be designed to speed approvals for such as solar and wind farms. It is most definitely not the case, as claimed in the Interim Report, that: "*a carpark and solar farm are treated in much the same way*". In New South Wales, for example, it is the case at present, that such as The NSW Independent Planning Commission cannot fall over backwards fast enough to accommodate the wishes of solar, wind and battery storage developers. There is no proper oversight given by Planning NSW to ensure that any Conditions of Consent that might be applied to solar, wind and battery storage projects are strictly enforced.

Recommendation 2
That the Renewable Energy Act 2000 be repealed, and that all subsidy arrangements such as the MRET and the LRET that arise from that legislation be abolished. We constantly hear from the Climate Change and Energy Minister that "Renewables are the cheapest source of electricity". If this is the reality, then they no longer require subsidies, so this Act is no longer necessary for their support.

Recommendation 3
That the relevant clauses of the Australian Radiation Protection and Nuclear Safety Act 1998 and the Environment Protection and Biodiversity Conservation Act 1999, (the same EPBC Act), be amended so as to remove the ban on nuclear power in Australia.

In regard to this last recommendation, as this submission shows, the Renewables Roll-out can never work. It is a totally futile attempt to reduce CO2 Emissions. The one technology that can provide a path to really low emissions, is an excellent fit to existing grids, and causes no security or reliability issues for the grid, is nuclear power. Yet here in Australia nuclear power remains under ban as a result of the outdated beliefs of a bunch of idealogically-driven political interests that are patently out of step with the rest of the world as regards nuclear power's proven low-emissions advantages.

3 Preamble

I found it useful to examine the Productivity Commission's remit in some detail. I have found, in another life, when drafting such as Ministerials, that it was often useful to look at such items as the Enabling Legislation, the Mission Statement, of the relevant organisation, etc.

3.1 Requirements of The Productivity Commission's Enabling Legislation

I found a copy of the Enabling Legislation that brought the entity, "The Productivity Commission", into being, at: "https://www.legislation.gov.au/C2004A05326/latest/text".
This legislation is described as the Productivity Commission Act 1998. The specific reference is: "The Productivity Commission Act 1998, Compilation 11 of 8 January 2024".

There are two important clauses in the legislation that describe the requirements on "The Productivity Commission", (hereinafter called: the Commission).
The first, which describes those functions expected by government of the Commission, is Clause 6, "*Functions of the Commission*":

6 Functions of Commission

1) *The functions of the Commission are:*
   a) *to hold inquiries and report to the Minister about matters relating to industry, industry development and productivity that are referred to it by the Minister; and*
   b) *to provide secretariat services and research services to government bodies as directed by the Minister; and*
   c) *on and after 1 July 1997, to receive and investigate complaints about the implementation of competitive neutrality arrangements in relation to Commonwealth government businesses and business activities and to report to the Minister on its investigations; and*
   d) *to provide advice to the Minister about matters relating to industry, industry development and productivity, as requested by the Minister; and*
   e) *to undertake, on its own initiative, research about matters relating to industry, industry development and productivity; and*

f) to promote public understanding of matters relating to industry, industry development and productivity; and
g) to perform any other function conferred on it by this Act; and
h) to do anything incidental to any of the preceding functions.

2) In this section:
- *matters relating to industry, industry development and productivity includes legislative or administrative action taken, or to be taken, by the Commonwealth, a State or a Territory that affects or might affect the productivity performance of industry, industry development, or the productivity performance of the economy as a whole.*

The second, very important, clause, relevant to the form and content of advice provided to the Minister and to the Parliament by the Commission is Clause 8, "*General policy guidelines for Commission*":

8 General policy guidelines for Commission

1) In the performance of its functions, the Commission must have regard to the need:
a) to improve the overall economic performance of the economy through higher productivity in the public and private sectors in order to achieve higher living standards for all members of the Australian community; and
b) to reduce regulation of industry (including regulation by the States, Territories and local government) where this is consistent with the social and economic goals of the Commonwealth Government; and
c) to encourage the development and growth of Australian industries that are efficient in their use of resources, enterprising, innovative and internationally competitive; and
d) to facilitate adjustment to structural changes in the economy and the avoidance of social and economic hardships arising from those changes; and
e) to recognise the interests of industries, employees, consumers and the community, likely to be affected by measures proposed by the Commission; and
f) to increase employment, including in regional areas; and
g) to promote regional development; and
h) to recognise the progress made by Australia's trading partners in reducing both tariff and non-tariff barriers; and
i) to ensure that industry develops in a way that is ecologically sustainable; and
j) for Australia to meet its international obligations and commitments.

2) In the performance of its functions, the Commission must also have regard to any other matters notified to it in writing by the Minister.

3) The Commission, in all reports on matters referred to it, must provide a variety of viewpoints and options representing alternative means of addressing the issues in the report. If the report relies on formal mathematical economic modelling, the Commission must either:

a) *if practicable—utilise at least 2 different economic models, with the assumptions and results of those models made explicit in the report; or*
b) *if it is not practicable to utilise at least 2 different economic models, appoint, and report on the views of, an independent reference panel on the modelling.*

I have chosen to reproduce the quotes above in *italics* both to indicate clearly that this text is a quote, and for emphasis that they are important items.

Finally, as to who is the Responsible Minister, according to the Wikipedia entry:
"https://en.wikipedia.org/wiki/Productivity_Commission",
the Productivity Commission "*operates within the Treasury portfolio and its core function involves responding to references from the Treasurer*", that is the Federal Treasurer, the Minister of state of the Commonwealth of Australia, "*charged with overseeing government revenue collection, federal expenditure and economic policy as the head of the Department of the Treasury*".

3.2 The Commission's Mission Statement

In addition to the statements in the Enabling Legislation, the opening lines of the Commission's own home page: https://www.pc.gov.au/ , are:
"*Providing independent research and advice to Government on economic, social and environmental issues affecting the welfare of Australians.*"

Clicking on the box to the right of this text, the box that encloses the question: "What is Productivity?", takes the reader to the page: "https://www.pc.gov.au/what-is-productivity".
This page goes into great detail as to the meaning of "productivity", thus providing a ready definition of what the Commission itself sees as its core role in its provision of advice to Government.

Then, as if to emphasise further the requirement for independence, and that the Commission shall conduct its own research, we see, at: "https://www.pc.gov.au/about":
"*The Productivity Commission (PC) is the Australian Government's independent research and advisory body on economic, social and environmental issues affecting the welfare of Australians."*

Let us be clear then as to what is the stated remit of the Productivity Commission.

The Productivity Commission:

- is tasked with doing independent research;
- is tasked with providing independent advice;
- it is required to conduct Inquiries into important matters, and in any such Inquiry, it is required to address the issues as they affect the welfare of ALL Australians;
- in the matter of enhancing Productivity in Australia.

On the "Research" page, at: https://www.pc.gov.au/research
and also on the "Completed Research" page, at:
"https://www.pc.gov.au/research/completed?result_183784_result_page=1", we read:

"***About our research***

The Commission has a statutory mandate to conduct a program of research to support its inquiries, annual reporting and other responsibilities, including promoting community awareness and understanding of various productivity and regulatory issues."

I note the use of the term above: "*statutory mandate*".
If I am not mistaken, this means that the "*mandate*" is written into law. Presumably the "*law*" to which the term refers is the same Act of Parliament which brought the Productivity Commission into being.

3.3 Quotes from a selection of the Commission's recent Reports

To underscore the critical requirements discussed above, I quote from one of the Productivity Commission's recent reports, at:
https://oia.pmc.gov.au/sites/default/files/posts/2023/09/5%20Productivity%20Commission%20-5%20Year%20Productivity%20Inquiry%20report%20Volume%207%20A%20more%20productive%20labour%20market%20%28PDF%29.pdf

This is Report No. 100, entitled: "*5-year Productivity Inquiry: A more productive labour market*".
The following quote is taken from one of the title pages of this report:

"The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long term interest of the Australian community.

"The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole."
End of quote.
I have reproduced the quote in *italics* both to highlight the importance attached by the writers to the Commission's remit, and to distinguish the quote from the body of the text of this submission.

As if to reinforce the requirement that the Commission provide a measure of the Productivity of the proposed Renewables Roll-out, in his statement of the Terms of Reference, under the heading "Process", the Treasurer requests, in this particular matter:
"*The Commission's advice should clearly convey the importance of the reform opportunities identified, including <u>quantitative</u> analysis of the measurable benefits of the priority reforms where possible.*"
I have chosen, in this quotation, both *italics* and *<u>underlining</u>* for emphasis.

3.4 Preamble Summary

Clearly, in underpinning its establishment and creation by an Act of Parliament, the Commonwealth Government has placed great stake on the Commission's independence, and its role in providing advice that addresses the overall wellbeing of the WHOLE of the Australian community. These are responsibilities that are not to be taken lightly.

The Productivity Commission, by an Act of Parliament, in any matter that is brought before it by the Treasurer, among a number of other requirements, but specific to the shortcomings in the Interim Report which is the subject of this submission:

1. Is required, by statute, that it: '*must provide a variety of viewpoints and options representing alternative means of addressing the issues in the report."*
2. Must conduct a programme of independent, detailed research to support its Inquiries.

Now, with these responsibilities of the Commission very clearly in mind, let us consider the content of the Interim Report against these statutory requirements.

Simply put, a perusal of the Interim Report leads the reader to ask the question: where is there any indication that the Commission has conducted any independent research into the proposed Renewables Roll-out? Where has the Commission provided a variety of viewpoints and options? How then, in this extremely important matter has the Commission provided what might be even remotely considered to be truly independent, robust, advice to government?

Given that, quite clearly, these two important requirements have not been met in the Interim Report, it therefore seems to me that the Commission has chosen to abrogate its responsibilities as regards both:
1. the conducting of independent research;
2. the provision of truly independent, robust advice to government;
into the matter of Energy Policy, a policy matter that clearly is a matter of extreme importance both to government and to the welfare of ALL Australians.

4 Introduction

With the considerations listed in the Preamble above in mind, let us have a look at how, in this Interim Report on Clean Energy and NetZero, the Commission has gone about its remit in the matter of providing the Treasurer with independent advice as to a range of options; how it might have gone about its research remit should the writers of the Interim Report had been mindful of the Commission's Statutory Obligations; and, in the light of the outcomes of that research, how that research might have qualified the Commission's recommendations in both the Interim Report, and, in its forthcoming Final Report to the Treasurer.

4.1 The Interim Report provides neither a variety of viewpoints nor options

The first point that I would like to make is that in the Interim Report there does not seem to be any attempt whatsoever to address Clause 8, sub-clause 3: "*to provide a variety of viewpoints and options representing alternative means of addressing the issues in the report*".

To state the relevant section of the Act in full, I refer again to the Productivity Commission Act 1998, Compilation 11 of 8 January 2024, Clause 8 – General Policy Guidelines for the Commission, sub-clause 3:

(3) The Commission, in all reports on matters referred to it, must provide a variety of viewpoints and options representing alternative means of addressing the issues in the report. If the report relies on formal mathematical economic modelling, the Commission must either:
(a) if practicable—utilise at least 2 different economic models, with the assumptions and results of those models made explicit in the report; or
(b) if it is not practicable to utilise at least 2 different economic models, appoint, and report on the views of, an independent reference panel on the modelling.

I would have thought that as this appears in the Act, it is a Statutory Requirement, as it is set down in an Act of Parliament.

4.2 No evidence of the conduct of any independent, quantitative research

The Interim Report accepts as a *fait accompli* that Australia has to be covered with a rash of wind farms and sheets of solar panels, that in its view, that this is the only way to achieve lower CO_2 emissions; then, that all that has to be done is to find the most efficient way to achieve this roll-out.

Surely however, that in the Interim Report's very first discussion section titled "*About this inquiry*", the occurrence of the following sentence early in that section's opening paragraphs:
"*Australia will need to install thousands of wind turbines, millions of panels for solar farms, new transmission lines and substantial storage capacity.*", written in a completely open-ended way, should ring alarm bells for an organisation, that is, The Productivity Commission, that is charged with obtaining the "biggest bang for the buck", that is, obtaining the most efficient use of capital, labour and resources, in the production of any given economic good?

Surely it should enter the collective mind of the Commission that, in contemplating such huge numbers, affecting as they must, vast amounts of otherwise productive farmland in Australia, there should be considerable thought given to attempting to achieve the most efficient use of this equipment, if only to seek to reduce the absolute numbers of wind turbines, solar arrays, storage and transmission lines to an absolute minimum, so as to minimise the opportunity cost resulting from the loss of valuable, productive farmland that will be sterilised by the presence of this equipment?

A very obvious first step, then, that is both well within the Commission's remit, and, indeed, a statutory requirement, is that the Commission ought to attempt to quantify this renewables'

requirement. That is, the Commission ought to attempt to determine an accurate estimate of the number of wind turbines, the number of solar panels, the amounts of the storage capacity, the actual length and type of transmission lines, the types and amounts of all the required associated equipment. After all, it is only by attempting to quantify the actual equipment requirements that the Commission might be able to indicate to the government what improvements in productivity, if any, would accrue in the pursuit of this course of action.

A second step would be to attempt to quantify the likely emissions reductions that might result from this Renewable Roll-out. Any such accounting must include the emissions resulting from the roll-out itself, and these must include the entirety of the emissions resulting from all production, manufacture, transport and construction involved in the roll-out. As will be shown in this submission, the sheer scale of the equipment requirement means that these embedded emissions may not be ignored. It is only after these emissions are accounted for, on one side of the ledger, versus any emissions offsets on the other side of the ledger, that will enable any accurate calculation of potential emissions reduction.

As far as I can tell, there is nothing in the Interim Report that even begins to address these questions. It is a statutory requirement that this quantification be done.

Again, let me restate here the "mandate" given on the Commission's "research" page:
"*The Commission has a statutory mandate to conduct a program of research to support its inquiries, annual reporting and other responsibilities, including promoting community awareness and understanding of various productivity and regulatory issues.*"

Electricity grids are very complex systems. Understanding the complexities of their operation is by no means a simple task, let alone gaining an understanding the management of their operations. With that in mind, I see nothing in the Interim Report that suggests that any aspect of grid operation has been researched. Any such discussion would require expert comment from persons well versed in the complexities of Electric Power Engineering. I see nothing in the report that would indicate that such in-depth research has been undertaken by, or on behalf of, the Productivity Commission. I see a lot of material which has been quoted from other government agencies, but I see no original investigative work that might be presumed to have been done by the Productivity Commission, or commissioned by it to be done by "*an independent reference panel*".

Of those heading up this Inquiry, I note:
Commissioner Barry Sterland is leading the Inquiry into Investing in Cheaper, Cleaner Energy. His qualifications are not listed at: https://www.pc.gov.au/about/people-structure/commissioners/barry-sterland.
Commissioner Martin Stokie is also involved in this Inquiry. His qualifications seem to be in Economics. See: https://www.pc.gov.au/about/people-structure/commissioners/martin-stokie.
I note that Commissioner Joanne Chong holds a degree in Engineering, specialising in Environment and Water matters.

It would seem to me that no Member of the Productivity Commission possesses qualifications in Electrical Engineering, qualifications which I would have thought to be a minimum requirement for presuming to provide informed comment to government on the operation of such complex systems as electricity grids, generation mix, the properties of generators, and the like.

Furthermore, I see no evidence whatsoever in the text of the Interim Report that would indicate that during the preparation of the report, that there has been any analysis conducted by any person with any qualifications in electrical engineering. In terms of the topic under consideration, I regard this lack of the appropriate expertise to be a very serious flaw.

So, why hasn't this work been done? That, after all, is the Productivity Commission's remit. I note the use of the term "*statutory mandate*" in the reference to the Commission's need "*to conduct a programme of research to support its inquiries*". As I understand it: "*A statutory mandate refers to a requirement or duty imposed by a law or regulation that must be followed by individuals, organizations, or government entities. It establishes the legal authority to act in specific ways or to fulfil certain obligations as defined by the statute.*"
Therefore, a "*statutory mandate*" is the outcome of a "*statutory requirement*". The latter is binding: it means that what has been described in the enabling legislation is a legal requirement: that is, the Authority designated by the enabling legislation is required by law to carry out the activity described as part of its duties.
It is difficult to not conclude that failure to carry out the designated activity may leave the designated authority, in this case the Productivity Commission, open to legal challenge in regard to its findings from this Inquiry, and thence to a judicial review.

4.3 Suggested Viewpoints and Scenarios for the Commission's consideration

Given then that "*a variety of viewpoints and options representing alternative means of addressing the issues in the report*" has not been provided in the Interim Report, nor has any indication been foreshadowed there that such are to be provided in the final report, I would like to take the opportunity here to make some suggestions as to what viewpoints and options might be provided for the Minister's consideration.

I possess the relevant qualifications and experience in Electric Power Engineering, so am qualified to both conduct the relevant "research" and to provide expert comment on such matters as electricity generator types, their respective performance characteristics, etc., battery storage matters, grid control systems, and other relevant matters relating to electricity grid operation. In the absence of any mention of these matters in the Interim Report, matters the consideration of which I would have thought, had I been charged with the preparation of this report, would be critically important to the provision of any advice and/or recommendations to be made to the Treasurer in this matter, any suggestions of mine here as to what viewpoints and options could be considered by the Commission might be of some assistance.

First, let us be clear as to the definition of "productivity".

I note that, helpfully, on the Commission's home page, there is a box at the top right hand corner containing the text: "What is Productivity", and that clicking on this box takes the reader to the link: https://www.pc.gov.au/what-is-productivity, where the term is given a clear and detailed definition with helpful examples. The Commission's definition then, is:
"*Put simply, productivity measures how efficiently inputs (say, labour, capital or raw materials) are used to produce outputs (goods or services).*"

In this matter, then, has the Commission any idea of how efficiently any or all of these renewables are operating, how well the inputs of labour, capital and raw materials that go into the manufacture of these generators, storage facilities and transmission lines, are being used?

In the context of this Renewables Roll-out matter, given that it is proposed that "*thousands of wind turbines*", "*millions of panels for solar farms*", "*new transmission lines*" and "*substantial storage capacity*", need to be installed, surely the Commission should be considering that some measure of the efficiency of the use of what is potentially a vast quantity of inputs of both raw materials and capital to produce the required outputs, that is, its productivity, ought to be determined?

And, should the resulting measure indicate that there is room for improvement, then surely serious consideration ought to be given to the consideration of a range of potential options to bring about such improvement?

Further, as already mentioned, the proposed Renewables Roll-out comes with a significant opportunity cost: as this form of generation requires vast amounts of land, this roll-out will have, and indeed is already having, a significant impact on Australia's agricultural production. The Roll-out has the potential to destroy vast acreages of Australia's most productive agricultural lands.

A logical first step, in my view, would be to examine the efficiencies of the various energy conversion processes that are in operation in these renewable generators. In the case of the wind turbines, what is the mechanism for the conversion of wind energy to electricity? Similarly, in the case of the solar panels, what mechanism is in operation there? Is there any means of increasing the efficiencies of these energy conversion technologies?

A logical second step would be to compare the likely performance of any Renewables Roll-out with a range and mix of other types of generation. Here are some other possible scenarios:

- a mix of HELE (high-efficiency low-emissions) coal-fired power stations and both combined-cycle and fast-acting gas turbine generators;

- a mix of nuclear generators (whether or both Gen IV large generators and SMR designs) plus gas turbine generators;

- a mix of all three generator types (coal, gas and nuclear).

The generator combinations would be in addition to the existing mix on the Eastern Australian Grid. Clearly, the consideration of nuclear power would require the repeal of the relevant legislation banning nuclear power in Australia.

4.4 Fundamental Properties of the Electricity Grid

The Commission also needs to be aware of certain fundamental properties of the electricity grid.

4.4.1 Supply and Demand must be in Balance second-by-second

One critical property is that, unlike a lending institution, or a national economy, supply of, and demand for, its currency – electricity - must be in strict balance at all times. Note the underlining: this is to indicate that this property of balance is not so much a desirable property, but is the result of a fixed, immutable, physical law.

Unlike, for example, a bank account, the "currency", that is, the electricity, may not be drawn down at one time on the expectation that it might be paid back at another. Indeed, should electricity supply and demand on a grid go out of balance for more than a few tens of seconds, widespread blackouts swiftly follow. The occurrence of a widespread blackout, or as electric power engineers call the phenomenon, "grid collapse", is an extremely undesirable event because, depending on the size of the grid, it may take days or, in some instances, weeks, to restore supply, (*Petermann et al*, 2011). Needless to say, the impact on the nation's productivity of such events is profound, with long-lasting consequences (*Peterman et al, ibid*.). In summary, a cast-iron rule is that electricity supply and demand on a grid must be in balance at all times. This important fact places significant constraints on the characteristics of generators supplying the grid. In particular, the requirement that supply be able to follow and satisfy the vagaries in the demand, at all times, requires that the generators be dispatchable, or, at the very least, that the mix of generators supplying the grid be fully dispatchable, that is, that their outputs are able to be varied sufficiently rapidly to match all expected changes in demand.

4.4.2 Wind Farms – Generation Limitations

Regarding the ability of wind farms to produce a useful supply of electricity, might I suggest that the Commission peruse a scholarly paper, (*Miskelly*, 2012), which I was fortunate to have had published what is now many years ago. I believe that with my colleague Dr Tom Quirk, we were the first to show, (using actual publicly-available operational data supplied by the grid operator, the AEMO), the profound variability and intermittency of the output of wind farms, both individually and collectively. As the paper shows, these two properties have profound consequences affecting the usefulness of this form of generation when it is proposed to connect it to an electricity grid.

In particular, I was able to show that, contrary to the view at the time, that: "the wind was always blowing somewhere", that in fact, there were many periods throughout the calendar year where there was very little output from the entire fleet of wind farms connected to the Eastern Australian grid. The significance of this finding is that these "wind droughts" as they came later to be known are occurring on what is claimed - by the AEMO – to be geographically the largest interconnected grid in the world. This implies that if these wind droughts were occurring on such a large,

widespread grid, then they were likely to be occurring even more frequently on smaller grids around the world.

The immediate effect of this finding is that the entire fleet of wind farms on the Eastern Australian Grid requires, at all times, the presence of 100-percent backup by either a fleet of conventional, dispatchable generation, and/or, a significant amount of storage. This finding is an engineering reality. It is not something that results merely from the whim of some policymaker. That the finding is both correct and immutable has profound consequences.

4.4.3 Solar Farms - Generation Limitations

It is pertinent to remember, amidst all the hype about renewables being able to supply so many thousand homes, that these claims are based on some estimate of average output. It is easy to neglect the fact that solar generation supplies the grid for just a few hours of the day. At night, all night, every night, 365 nights of the year, both solar farms and rooftop solar produce absolutely no electricity whatsoever. On cloudy days, solar may produce next to nothing. It does not require scholarly analysis to realise that solar generation requires the instant availability of 100 percent backup all day, every day.

4.4.4 Storage - the Sheer Scale of the Storage Requirement

What should be clear from the discussion above as to the limitations of wind and solar generation is that a very significant amount of backup – whether as backup generation or energy storage – will be required. It needs to be clearly understood that no form of backup, apart from a relatively small amount of pumped-hydro storage, was ever required for the conventional, dispatchable, fleet of generation connected to the Eastern Australian Grid. The backup requirement for wind and solar will be a completely new install.

In its pursuit of so-called NetZero, as it is Governments' intention to eliminate the fleet of conventional, dispatchable generation, the question arises: as the necessary backup for intermittent, variable, solar and wind generation could then be provided only by means of storage, how much storage is required? The Interim Report merely states: "*substantial storage capacity"*. Surely, given that this storage is absolutely required, and that the Commission is required by the Minister to *quantify* its findings, the Commission should be seeking to determine both the size of the storage requirement and what this means in terms of the actual equipment requirement. Given that the wind fleet is expected to be "*thousands of turbines*" and that the solar requirement is "*millions of solar panels*", we can be reasonably certain that the equipment requirement would translate to rather more than a couple of AAA batteries on the nearest power pole, but how much more?

I have, in fact, done such a calculation, using actual AEMO operational data. I used operational data for the respective fleets of hydro, solar, wind, solar PV (rooftop) and demand data from the entire period of calendar years 2023-4 for the analysis. It may be of interest that the requirement comes to the storage equivalent of 33 days of average daily demand. This translates, presuming that the necessary energy storage is to be provided principally by battery energy storage systems (BESS),

into a fleet of some 37,000 Geelong Big Battery-sized BESS units over and above the existing hydro pumped-storage capacity. (The calculation is based on the stated storage capacity for the Geelong/Moorabool Big Battery being 450 MWh – see: https://infrastructurepipeline.org/project/victorian-big-battery.) The analysis does not take account of all losses in the round-trip energy conversion process, (that is, electricity converted to battery chemical energy storage and back again, etc.), so the figure for the number of such batteries is then very much the minimum requirement.

Some 37,000 Geelong Big Battery equivalents is, by any standard, a huge requirement. It is sobering to keep in mind that each such Geelong Big Battery installation requires a land take of some 4 hectares. According to: https://moorabool.com.au/faqs/ , the battery occupies some 4 hectares. The scale of this total land-take requirement raises serious issues as to how it is to be obtained. I address some of these issues further in the section on Environmental Implications below.

A final point to be made here is that electricity grids whose demand requirements are fully supplied by conventional generators do not need battery storage, unless there is no form of short-term, fast-acting generation, such as hydro, available. In the latter case such grids most certainly do not need it in the humongous amounts required by the large-penetration presence of intermittent renewables.

4.4.5 Batteries are NOT generators

In the rush to support and promote renewables, many fail to remember, or even to understand, that batteries are not generators. Their purpose, in supporting variable, intermittent, non-dispatchable generation, is to store energy when it is generated by such forms of generation – wind and solar – and to subsequently make it available as and when required. If a battery is fully discharged, it has to be recharged before it can supply electricity again. It cannot be considered to be any form of generator. In a very real sense, the batteries are a “band-aid” required to make up for the deficiencies of intermittent, variable, non-dispatchable generation. This has implications when it comes to determining the embedded emissions of these generators: all emissions resulting from the production, transport, installation, and those occurring during battery operation, must be subtracted from any supposed emissions offsets gained by the supported intermittent, variable, renewable generator. (As examples of emissions that might occur during battery operation, big batteries require support services such as air-conditioning round-the-clock, even when the wind is becalmed and the sun is not shining.)

4.5 The absolute requirement for Synchronous Inertia or its equivalent

Synchronous Inertia, another fundamental requirement, is an absolutely essential component for the control of, and therefore the reliability of, any electricity grid. It is not the easiest concept to understand. A useful reference providing a copiously illustrated, easy-to-understand discussion of this often difficult concept is provided by *Denholm et al.* (2020), although it should be emphasised that the authors’ suggestions there as to the availability of substitutes for synchronous inertia, so called “grid-firming” or “synthetic” inertia, are still very much in the realm of the speculative and the subject of intensive research, so that section can be safely ignored.

Synchronous inertia, the locked-together, mechanical rotational inertia provided fully automatically by conventional generators spinning at system frequency, is always “there”, for free, when conventional generators are in use. Its presence is a direct consequence of the application of Maxwell’s equations in an AC machine. So long as these generators are properly operational, properly connected to a grid, synchronous inertia is fail-safe, and always available, on that grid. It’s presence requires no software monitoring, that is, it does not require fancy computer algorithms, which themselves can be subject to error, and hijacking, to ensure that it is available. In exactly the same way that the long balancing bar carried by a tightrope walker assists balance, or exactly similarly, as long as the wheels of a bicycle are turning they assist the rider’s balance, then so long as these generators are spinning at synchronous speed, the balancing mechanism that is synchronous inertia is present. However, to be effective, there must be sufficient of this conventional generation operating at all times.

The presence of synchronous inertia is very real: any electrical system disturbance that may occur has to cause a change in the rotational speed of not just the nearest conventional generator to any such disturbance, but must cause a change in spin speed to ALL generators at the same instant. All generators are spinning at the same equivalent electrical frequency in lockstep. On a large grid, this mechanical rotational inertia may well be tens of thousands of tonnes of spinning turbine/generator sets, the combined mass being that of the total number of operational generators.
Clearly, this inertia provides a huge buffer against the likely impact of any system disturbance.

By contrast, no form of substitute for synchronous inertia can be provided by such as solar panels, wind turbines or batteries without the provision of highly complex, and therefore prone to failure, sophisticated circuitry and constantly-monitoring software, of some kind. However this might be provided, it can never be considered to be “fail-safe”. At present, any attempts at “synthetic inertia” are highly experimental, and any that is in place on the Eastern Australian grid at the present time is most certainly no replacement for the required amount of synchronous inertia. Furthermore, how to have all providers of so-called “synthetic inertia”, or “grid-firming” act in concert, simultaneously, as does synchronous inertia do automatically, with no required software monitoring or interference, remains a formidable challenge. It should also be clearly understood that the provision of any such “synthetic inertia”, should the problems of its implementation be solved, will require a very substantial increase in the numbers of BESS batteries or whatever it is that is to provide it.

With sufficient synchronous inertia in place, as used to be the case before the advent of “renewables”, then the impact of large-scale system disturbances, such as a generator outage or the collapse of a transmission line, is absorbed, to the extent that the grid operator is given valuable time to deal with such events.

Take away the all-important synchronous inertia, by, for example, allowing over 60% of the power to come from non-synchronous generators, such as solar or wind generators, then that grid has no means to delay the impact of any form of large-scale disturbance.

The recent widespread blackouts in Spain, Portugal and neighbouring parts of Europe, (which occurred on 28 April 2025), given that immediately prior to the failure, input from solar generation was 60-percent or more, are directly attributable to a lack of synchronous inertia.

In that circumstance, the grid operator has, as illustrated during that recent widespread blackout experienced on the Iberian Peninsula, no more than tens of milliseconds at most to deal with system disturbances. From pronouncements made at the time, this level of renewables penetration – over 60% - was the case at the time of this recent blackout – widespread system collapse - in Spain.

The importance of the presence of synchronous inertia to grid operational stability has long been known to electrical engineers and its use is a routine part of grid control.

For a detailed analysis of the causes of this widespread blackout, the reader is referred to two excellent, detailed papers by *Porter,* (2025). As to costs, according to Porter, (*ibid*.), the loss of ten (10) lives is directly attributable to the blackout, and the widespread disruption has been variously estimated to have resulted in a social cost of anywhere from 1.6 billion to 4.5 billion Euros. Comments from some quarters, about some presumed lack of transmission infrastructure to solar generation as being the likely cause of the blackouts in Spain can be seen to be entirely spurious. On a grid lacking sufficient synchronous inertia, as Porter (*ibid.*) shows, ANY system disturbance is going to be a candidate to cause rapid system collapse.

This “incident” has profound lessons for Eastern Australia. Unlike the Iberian grid, the Eastern Australian grid has no connections to any neighbouring grids. The Spanish authorities were able to restore grid operation relatively quickly after the blackout occurred, because the Iberian grid has high-megawatt-capacity interconnectors to both France and Morocco, allowing power at levels of hundreds of megawatts to be available. Here in Eastern Australia, in the event of a widespread system collapse, which has no interconnectors to neighbouring large, secure, grids, the bootstrapping process to bring the grid back to full operation could be expected to take considerably longer, with consequently increased costs, and, regretfully, the potential for greater loss of life.

It is well to keep in mind that after the State-wide blackout in South Australia on 28 September 2016, parts of northern and western South Australia – Port Lincoln comes to mind – did not see the power restored for some two weeks after the initial blackout event.

The recent blackout event affecting Far Western New South Wales, where, on the night of 16 October 2024, several transmission towers along the single transmission line supplying Broken Hill from the main grid collapsed during a storm, provides an even more pertinent harbinger of what might happen on a 100-percent renewables Eastern Australian grid.

Here, the Network Service Provider for the region, as I understand it, had failed to keep up the maintenance programme on the two 25 MW backup generators specifically located at Broken Hill for just such an emergency. The result was that one of these generators was unable to operate at all, the other only intermittently, during the emergency. It took some two weeks for the transmission line to be repaired. During that time many customers were without power for the entire period. Vast quantities of food suffered spoilage. Quantities of essential pharmaceuticals suffered the same fate. The local mines, a very significant part of the local economy were unable to operate, resulting a substantial loss of income for the mine operators, and also resulting in the loss of employment during that 2-week period and beyond, for a significant number of employees and contracting companies.

The matter that is particularly pertinent is that, in the Broken Hill region, there is a large solar farm, a large wind Farm (at Silverton), a large grid-scale battery, all on the Broken Hill side of the transmission line failure, so available to the local, stranded, grid. The solar farm and wind farm, when able to operate, (when the sun is shining and the wind blowing, respectively), should, in theory, have more than sufficient capacity to power the region. However, the solar farm and the wind farm were unable to operate during the emergency, because they are unable to supply the absolutely vital synchronous inertia services. The grid-scale battery was eventually permitted to

operate towards the end of the emergency, but only, as I understand it, as a support to the one available backup generator when it was operational.

That it is a harbinger for a 100-percent renewables grid in Eastern Australia is that this isolated grid scenario in the Broken Hill region translates into something very like a 100-percent renewables grid, with a small amount of conventional backup. As with the Iberian blackout, the renewables were unable to operate. Unlike the Iberian blackout, there were no connections to a larger, more robust grid which might have helped with the restart.

Fortunately, no lives were lost, but this latter outcome can be put down to the resilience and caring for others that is typical in rural communities in Australia.

The NSW IPART is inquiring into the matter at present for the specific purpose of establishing the scale of compensation to be paid to the Far Western NSW commuity. That the matter is being pursued in this way is a clear indication that such events cause a very significant loss of Productivity to the affected communities.

5 Embedded Emissions of Renewables

Government Policymakers and Planners in Australia would have us believe that wind turbines, solar arrays and grid-scale batteries somehow magically "pop out of thin air" and appear completely assembled and fully operational at the developer's chosen site. That is, they choose to ignore the CO2 emissions resulting from the burning of fossil fuels in the mining, refining, manufacture, transport and installation of the various components that go to make up the "*thousands of wind turbines*", "*the millions of solar panels*" and the tens of thousands of grid-scale batteries that will be required by the proposed transition to NetZero in Australia.

5.1 Wind turbines

Each wind turbine generator requires a minimum of some 1100 tonnes of reinforced concrete for the base, the tower foundation, some 300 tonnes of steel for the tower, some 30 tonnes of fibreglass resin for the blades (including the toxic chenical Bisphenyl-A), significant quantities of copper, nickel, and so-called 'rare-earth' metals such as Neodymium in its generator magnets.

The manufacture of all of these materials requires the burning of very considerable quantities of fossil fuels to provide the energy for the manufacturing processes. The manufacturing processes of both concrete and steel in particular are highly emissions-intensive. Given that the turbine requirement, by the Commission's own admission is "*thousands of wind turbines*", this embedded emissions term may not be ignored.

5.2 Silicon Photovoltaic Solar Cells

Similarly, the manufacture of the ultra-pure silicon used in the photovoltaic panels of solar cells requires enormous quantities of electricity. That term "enormous" applies to each and every solar panel. As the manufacturing process is a continuous process, it requires an uninterruptible supply of electricity. N those countries where silicon solar cells are manufactured, dedicated coal-fired power stations supply the electricity for these processes. Shernikau (2024) provides a detailed account of the manufacturing process. Again, as "*millions of solar panels"* will be required, this embedded emissions term also may not be ignored.

5.3 Grid-Scale Big Batteries

Again, similarly, the same embedded emissions considerations apply in the manufacture of the required many thousands of Grid-Scale Big Batteries.

5.4 Proposed additional Transmission Line Infrastructure

The several thousand kilometres of high-voltage transmission lines quoted as required for the Renewables Roll-out would of necessity comprise millions of tonnes of steel, aluminium and copper. To suggest that the embedded CO2 emissions resulting from the manufacture of these quantities of materials might be ignored is laughable.

The significance of this source of embedded emissions is that, for any of the other proposed scenarios, there is no requirement, or minimal requirement at most, for any additional transmission line infrastructure.

6 Environmental Implications of the proposed Renewables Roll-out

I note that in the Interim Report the Commission concentrates on the objective of streamlining the approvals process for new wind, solar and storage so as to improve Australia's productivity by getting this equipment up and running as soon as possible. As a first step to achieving this streamlining, the Commission wants to, in effect, side-line the seemingly stringent requirements of the EPBC Act, to, in effect, blatantly ignore certain of its requirements.

Setting aside the merits or otherwise of this proposed strategy, has the Commission considered how it might address any long term environmental impacts that might be caused by the roll-out of these technologies? After all, unlike the alternative of the building of a few large conventional power plants to meet the demand, by its own admission in the Interim Report, the Commission is expecting that "*thousands of wind turbines, millions of panels for solar farms, new transmission lines and substantial storage capacity*" are to be built. Surely the Commission has given consideration to the fact that such a vast undertaking may have at least some long-term environmental impacts?

I would like to consider the likely impacts of each of these categories of equipment in some detail.

6.1 Thousands of Wind Turbines

A number of disturbing impacts have emerged from what is now long experience in the operation of these machines. Some of these are:

- ongoing bird and bat strike;
- leaking of lubricating oil leading to ground contamination;
- blade throw;
- collapse of towers;
- wind turbine fires;
- blade leading-edge erosion, leading to widespread contamination of surrounding lands by an extremely toxic, non-biodegradable material Bisphenyl-A;

to name but a few.

6.2 Millions of solar panels

Solar panels at solar farms have their own set of serious, ongoing, environmental impacts. Some of these are:

- properties with end-to-end solar panels can no longer be used for broad-acre farming;
- solar farms consume very large quantities of water, required to keep the panels clean so that the incoming sunlight energy is not attenuated;
- the runoff water, if properly designed drainage has not been installed can constitute a significant erosion hazard to neighbouring properties;
- at end-of-operational-life, solar panels cannot be recycled without the expenditure of vast quantities of energy;
- if consigned to surface waste heaps, or to landfill, waste solar panels can constitute a source of heavy metal contamination; being mindful that, although these heavy metals may be in trace quantities in the panels, the quantities of waste panels is of the order of millions of tonnes;

These by no means constitute the entirety of the impacts and hazards.

6.3 Environmental Impacts of the required substantial Storage

As already shown above, the sheer scale of the grid-scale battery requirement means that any environmental impacts may not be ignored. However, there is a further overlay: these batteries have a lifetime of, at most, 10 years. They cannot be recycled without the expenditure of vast quantities of energy, so it is highly likely that, as with wind turbine blades, they will be consigned to landfill.

The result is a waste problem of the order of millions of tonnes, repeated every 10 years. What is to be done with the toxic, permanent waste generated by the replacement, every 10 years, of a minimum of 25,000 Geelong Big Batteries?

Big Batteries, like their smaller counterparts, have a real probability of fire risk. The complication is that during a fire:

a lithium-technology big battery releases a plume containing considerable quantities of highly toxic materials, including significant quantities of hydrogen fluoride. This forms hydrofluoric acid which can have a devastating impact on the airways and lungs of any person or mammal that might inhale it.

Other toxic pollutants are also released in the plume. These can cause permanent contamination of such as neighbouring lands, causing, in the case that the lands are rural farmlands, permanent loss of income to the neighbouring landowner.

Fordham et al. (2021) provide a comprehensive coverage of the fire issues. *Shernikau* (2025) provides a a very complete coverage of the advantages and disadvantages of Big Batteries.

For comparison, the amounts of radioactive waste generated by the use of nuclear reactors pales into insignificance.

6.4 Required Additional Transmission Infrastructure

When the Eastern Australian Grid's electricity supply came from generators situated in three regions with substantial coal reserves, the Latrobe Valley in Victoria, the Hunter Valley in New South Wales, the Bowen Basin in Queensland, Transmission, coming from what are relatively compact areas, to serve the major cities and other regions, with the connection to the Snowy Scheme along the corridor, comprised a mere 10 percent of system costs[1]. With the requirement to collect electricity from generators many generators of much lower energy density per generator, a much more diffuse, more widespread, larger transmission network is required.

6.5 Environmental Impacts – Summary

Not acknowledged by their proponents are the very significant and ongoing environmental impacts that result from the deployment of so-called "renewables".

The most obvious impact is the sheer scale of the required renewables deployment required for any useful electricity generation. This is a direct result of the very low energy density of the energy source, whether it be solar irradiance or wind velocity. The materials requirement, even on the Eastern Australian, may amount to millions of tonnes of equipment. In the case of wind turbines, even where the per-turbine output increases with gains in the technology there is little improvement in the output per tonne of equipment complement. Moore's law of miniaturisation in semiconductor electronics does NOT apply. The wind turbines and the solar panels do NOT get magically smaller and still produce the same amount, or more, of output.

The impacts are ongoing because, due to the massive energy requirements for any recycling, these items cannot be expected to be recycled at end-of-service-life.

This lack-of-ability-to-recycle issue is not to be dismissed by the constant repetition of the now-fashionable phrase "circular economy": without addressing the detail, the nitty-gritty of how such a "circular economy" is to be put onto operation, the battery waste, the wind turbine blade waste, the solar panel waste, all sources of vast quantities of highly-toxic, persistent chemicals, these issues remain as insurmountable problems.

1 Moran A 2025 *The energy grid needs markets, not mandates!* Spectator Australia 26 August 2025.

7 Conclusion

In the author's opinion, in the Interim Report "*Investing in Cheaper, Cleaner Energy and the Net-Zero Transformation*", the Productivity Commission has failed to address its statutory responsibilities stated in its enabling legislation, the Productivity Commission Act of 1998.

In the Interim Report, the Commission has:

- failed to conduct any analysis of the Government's proposed Renewables Roll-out;
- failed to propose or examine any alternative scenarios.

Both are requirements of the Commission's enabling legislation.

If the Commission had conducted an analysis of the proposed Renewables Roll-out, it would have found that what is proposed is a totally futile strategy to address the requirement to reach so-called Net-Zero emissions.

In addition, as shown in this submission, the proposed Renewables Roll-out:

- Will cause vast, non-reversible environmental impacts across Australia;
- Will result in a massive hit to the Agricultural sector as a result of the massive land alienation as a Result of the land grab required for the thousands of wind turbines, millions of solar panels, the massive storage requirements and the many thousands of kilometres of additional transmission line corridors;
- Will result in an ongoing regime of frequent, widespread and unpredictable blackouts across the Eastern Australian Grid.

Any one of these impacts will massively negatively affect Australia's Productivity, hence will massively impact Australians' standard of Living, and hence the well-being of all Australians. That all three would be the outcome can best be described as catastrophic.

The Commission, on a proper examination of the alternative scenarios, should find that, as a matter of urgency, that the ageing conventional generation and transmission and distribution assets be upgraded. In the case of the generation assets, these should be replaced with current-technology, low-emissions generation.

If the Executive Government is serious about achieving the Net-Zero transformation, then the Commission will recommend to government that the lowest emissions technology of all, nuclear energy, be part of the generation mix. Any such consideration will of course require the removal of the ban on nuclear energy in Australia from the relevant legislation.

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12 September 2025

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