

Introduction

This submission identifies a major opportunity to transform and reinvigorate the Australian economy by making revenue-neutral changes to Australia’s system of taxes and transfers with the intention of eliminating Australian consumption of fossil carbon – not only is this the driver of the climate change that now afflicts this and other nations, and threatens to inundate Australia’s major metropolises under rising sea levels in coming centuries if prompt action is not taken by the middle decades of this century, but consumption of fossil carbon locks Australia into costly imports of petroleum products and into the degradation of productive land in order to produce coal, and the diversion and degradation of too much of Australia’s scarce water resources.

Although high latitude nations such as Russia and Khazakstan might benefit from climate warming almost as much as Australia is degraded and devastated, no reference to or discussion of changes to be made by any other nation is included; instead, this submission sets out how unilateral Australian actions benefits Australia even in the absence of any actions taken elsewhere in the world.

Australian capital markets are presently over-valued and under-performing as a result of too much money created and issued by central banks in the faint hope that this would return the world economy to pre-GFC levels of productive activity. This has lead to asset price inflation in speculative, non-productive assets have been inflated to a much greater extent than investment in beneficial activity and enterprise – and so economic productivity remains muted. For example, Australia’s fleet of coal-fired power stations is old and clapped-out, expensive to operate and maintain – but renewal seems stymied by existing regulation and taxation.

Preliminary, “back of the envelope” calculations to indicate the possible magnitude of revenue to be raised by a Fossil Carbon Consumption Tax are presented in the hope that that this leads to more considered, detailed investigations by competent authorities.

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Foreword: An imprudent civilisation

This submission to the 2020 Federal Budget begins with the Open Letter to all Australians from Professor Steven Sherwood of the ARC Centre of Excellence for Climate Extremes, UNSW Climate Change Research Centre and 80 fellow Australian Research Council laureates, published in and copied from the Sydney Morning Herald of 29 January 2020.

The gravity of the world's predicament demands that letter be read as a Foreword to the submission rather than as an appendix.

Professor Sherwood and fellows address all we Australians - and the leaders we choose from time to time - as follows.

The tragedy of this summer's bushfires commands our attention, and after aiding and supporting the victims it is important to learn from the event. The scale and ferocity of the recent fires are unprecedented since European settlement of this country. They arrived at the end of a year with the lowest average rainfall and the highest average temperatures ever recorded across Australia. Climate change has arrived, and without significant action greater impacts on Australia are inevitable.

While many factors have contributed to the bushfire crisis, the role of exceptional heat and dryness cannot be ignored. Temperatures nearly everywhere on Earth have been rising for decades, a clear result of the build-up of greenhouse gases in the atmosphere from fossil fuel use and other human activities. The increasing variability of rainfall across Australia, bringing more dry years, is a consequence.

These outcomes were predicted decades ago. We should listen to the voices of not only our scientists, but also those who are on the frontlines fighting fires. The message is clear: the situation is becoming ever less manageable as extreme-fire risk weather becomes more common, while conditions suitable for controlled burns to reduce fuel loads are becoming less frequent.

While much remains to be learned about the impacts of climate change, more than enough studies have been conducted to tell us we have a serious problem that requires urgent changes to be made.

We welcome government actions to help current victims and improve adaptation to future fires, as well as its acceptance of a role for climate change in the catastrophe. But this is not enough, because the greenhouse gas amounts driving warming are still rising: the world is only at the beginning of the climate change phenomenon.

The current impacts are happening with just 1 °C of global temperature increase, but we are set for the best part of another degree even if very strong international action is taken to reduce emissions. This means further increases in extreme fire risk, heatwaves and flooding rains, ecosystems degraded and wild species forced to migrate or vanish, agricultural activities moved or abandoned, challenging our food security.

If strong action is not taken, environmental degradation and social disruption will be much greater and in many cases adaptation will no longer be achievable. It would be naive to assume that such a world will still support human societies in their current form and maintain human wellbeing.

This dire outlook demands stronger mitigation of carbon emissions. Many argue that actions to achieve this would be economically destructive. This claim has no basis, nor is it consistent with Australia's traditional optimism and ingenuity, nor with historical experience.

Similar objections were raised in the past against government policies to limit air pollution, environmental toxins and ozone-destroying chemicals, but we collectively found ways to achieve mitigation at manageable cost, and with net benefits to society that are clear in hindsight.

A transition to lower, and eventually net zero emissions, is a huge task but is achievable and far less risky and irresponsible than allowing unmitigated warming. This transition requires determination on the part of leaders, as well as empathy, aid and forward planning for communities disadvantaged by the transition.

Large transformations in the face of comparable challenges have been successfully achieved in the past, such as the development of road and mass transportation systems, waste-water and sewage handling to minimise diseases, and many others. These transformations created new jobs and whole industries, and will do so again.

Australia cannot solve climate change on its own. Reducing emissions is a global challenge that requires collective action. But Australia's current visibility as ground zero for both climate impacts and climate policy uncertainty presents a unique opportunity for us to emerge as a leader on this challenge.

Doing so will aid our economy, strengthen our standing in international affairs and relations with neighbours, and help secure Australia and the world from the impacts of climate change. Much

research has already been done to identify the policies and technologies that can move us to where we need to go.

What is lacking is the courage to implement them on the required scale. We call on all governments to acknowledge the gravity of the threat posed by climate change driven by human activities, and to support and implement evidence-based policy responses to reduce greenhouse gas emissions in time to safeguard against catastrophe. We owe this to younger generations and those who come after them, who will bear the brunt of our decisions.

This open letter, from 81 Australian Research Council laureates led by Professor Steven Sherwood of the ARC Centre of Excellence for Climate Extremes, UNSW Climate Change Research Centre, was published in the Sydney Morning Herald of 29 January 2020.

Opportunity - virtuous opportunity - in necessity

The author of this submission has no issue with most of the arguments these eminent scientists make, other than the assumption that:

Reducing emissions is a global challenge that requires collective action.

The author agrees that it is necessary that fossil carbon combustion ceases worldwide (see the paragraphs under the heading "2. The need for complete cessation of all fossil carbon consumption ..."), but argues that "collective" action is not necessary; rather, such cessation should and will be the prudent rational choice of each person, each corporation and each nation. The major role of national governments is to guide and inform the making of prudent rational choices, the exercising of prudent rational actions.

National governments do this by wise regulation, and by the setting of appropriate rather than perverse price signals.

The author does not see reducing emissions as a global *challenge*; rather, eliminating fossil carbon combustion is an *opportunity* to end the tyranny of high-priced, centralised power provision, replacing the dark satanic mills that are power stations and the devastation of nearby rivers and lakes with poverty-ending distributed access to electricity in even the most remote locations where people live.

Renewable energy technologies already allow for lower cost energy and transport than possible with fossil fuels. This is a huge opportunity.

A liberal, low-taxing nation.

Australia prides itself as a liberal nation where people and businesses are free to prosper by choosing, deciding and acting in their own – and their communities’ – best interests. The regulatory hand of government is not a heavy burden, and the sequestration of the profits from hard work, taxation, is kept to a minimum. Australian governments rightly strive to maintain Australia as a low-taxing jurisdiction.

There are two ways of achieving a low-taxing economy, one of which is to keep cutting taxes – but there may be certain public goods which must be funded through taxation.

One consequence of excessive tax-cutting may be decreased funding of such productive public goods as education, health care, transport, utilities and emergency services. Inadequate funding of public goods may prove to be a false economy: the exacerbation of the recent bushfire crisis due to lack of sufficient water-bombing aircraft illustrates how inadequate funding of public goods compelled by excessively low rates of taxation may be self-defeating.

Beyond crisis situations, a nation requires its working population to be both healthy enough to work reliably, and sufficiently well-educated to do that work competently.

The alternative method of achieving the desirable outcome of having a low-taxing economy is to set taxes so as to encourage economic growth; that is, to increase the size of the taxable economy.

A liberal, self-reflecting nation can correct its mistakes.

For example, negative gearing of housing – a taxation expenditure - can and does encourage private sector investment in housing, which relieves the public sector of the need to invest in housing. However, to the extent that negatively-g geared housing investment goes to existing housing rather than new construction, it neither adds to aggregate housing stock nor contributes to construction activity. There is thus no net benefit for such taxation expenditure, and we can only conclude that negative gearing on investments in existing housing stock is an inefficient use of taxpayer funds that does nothing to increase the size of the economy.

Permitting negative gearing on investments in existing housing also results in asset price inflation, and also diverts investment funds away from equity funding in business enterprises. If anything, negative gearing on investment in established housing is an indulgence that stymies economic activity; not only does it limit the overall efficiency of Australia’s taxes, it

also bears the opportunity cost of limiting investment in productive economic activity. It is therefore sensible to restrict eligibility for negative gearing to newly-constructed housing stock.

It is suggested that at least some of the revenue recovered by this restriction of taxation expenditure could instead be allocated to ongoing funding of the Australian Renewable Energy Agency (ARENA) ¹; that is, a taxation expenditure that inflates property prices and engenders no productive economic activity could and should be replaced by the funding of necessary technological Research & Development (R&D).

However, [returning to consideration of negative gearing and asset price inflation] the cancellation of eligibility for negative gearing from new investment of existing housing may not suffice to alleviate recently experienced asset price inflation; according to a stock broker of the writer's acquaintance

“central banks across the world printed money like drunks and depressed interest rates, forcing investors out of safe haven fixed interest investments into riskier assets like shares and property”

... yet all this purported pump-priming has failed to boost economic productivity; all that has been achieved is inflated asset price valuations. The same stockbroker continues:

“In reality, companies in the US, Europe and Australia are not investing their cashflows into new projects or even ambitious longer term R&D programs which is necessary to deliver higher future profits. They are mostly taking the easier and perhaps safer strategy of pumping up earnings per share via share buy-backs.

“In the longer term this is going to affect growth and I suspect it is already showing up in the GDP data.

Historically, it is new projects and ambitious longer term R&D programs that deliver higher future profits and *are essential to* GDP growth; investing in new projects is the mission of the Clean Energy Finance Corporation, and investing in ambitious longer term R&D projects is the mission of the

¹ “Morrison urged to act as ARENA funding about to be exhausted” Renew Economy, 28 January 2020, <https://reneweconomy.com.au/morrison-urged-to-act-as-arena-funding-about-to-be-exhausted-22604/>, refers to the Australia Institute's 2020 Budget submission proposal that Clean Energy Finance Corporation (CEFC) operating profits be directed to funding of ARENA; it is reported that since its 2011 inception, ARENA's expenditure of \$1.4 billion in renewable energy R&D has enabled the investment of \$5.5 billion in the same projects. That is, every dollar of taxpayer investment in ARENA has enabled a further \$4 of investment from other sources.

Australian Renewable Energy Agency. These are *precisely* the investments – the lifters, in Joe Hockey’s “lifters and leaners” dichotomy - that in the long term increase the per capita productivity of the economy, and makes a lower-taxing economy more feasible.

The stockbroker goes on to describe the consequences of inflation in non-productive asset valuations:

“High valuations are problematic for local equity and property investors because the returns are almost guaranteed to be disappointing unless asset price inflation continues at an accelerating rate. The further that prices are pumped up, the more liquidity will be needed to keep the price rises going. Turning off the monetary spigots would be very detrimental to all asset prices and yet has to be a possibility.

“As a result of the risks to financial stability, it thus would seem reasonable to assume that Central Banks will just continue on their merry way, depressing interest rates and effectively monetising Government Budget as well as Trade Deficits. Markets have come to expect this sort of Central Bank guarantee that asset prices always go up. Investors more generally have been lulled into a false sense of security that this paradigm is sustainable. I personally do not buy that line of thinking and am therefore much more circumspect about the near term outlook.”

A liberal, honest nation accepts reality and embraces the opportunities this affords.

Arguably, it would be timely for Australia to establish a new avenue for investment in productive assets. Potential investors may be replete with cash, but growth-creating investments – that benefit the broader economy as well as the investor – seem unavailable.

Meanwhile security of electricity supply security is now being compromised by the decreasing reliability of Australia’s fleet of ageing power plants; recent IBISWorld research is reported as finding that one of Australia’s coal or gasfired power plants is breaking down every 3.2 days².

² See, for example, “Australia's coal and gas plants are breaking down every three days” Sophie Vorrath, RenewEconomy, 21 Jan 20, <https://reneweconomy.com.au/australias-coal-and-gas-plants-are-breaking-down-every-three-days-34744/>

“The major problem with Australia’s reliance on coal fired power plants is the age and efficiency of the infrastructure,” said IBISWorld senior industry analyst James Caldwell.

“Approximately half of Australia’s fleet of coal-fired power stations, generating over two-thirds of generating capacity, are over 30 years old. This trend presents a number of problems, primarily that these plants are no longer reliable.”

- <https://reneweconomy.com.au/australias-coal-and-gas-plants-are-breaking-down-every-three-days-34744/>

It is noted (Wikipedia table of Australia’s coal-fired power stations) that scheduled decommissioning of Australian coal-fired power plants is typically 50 years or so after commissioning; the *a priori* expectation might then be that fleet average age of Australia’s generators is around 25 years, in which case the greater reliability of the younger plants would ensure adequate system reliability despite the increased breakdown rate of the older plants – and yet in 2020 we are already in the situation that the capacity-weighted average age of Australia’s coal-fired power is around 34.6 years.

If Liddell and Vales Point B (commissioned in 1971 and 1978 respectively, the oldest operating coal-fired power stations still operating in Australia) plants shut down as scheduled in 2022/3 and 2028 respectively, and all other coal-fired power stations remain operational then by the 2030 deadline for Australia’s CO₂ emissions to have decreased by 30%, the capacity-weighted average age of Australia’s remaining coal-fired power stations will be 42.8 years.

The ongoing trend of decreasing reliability for these increasingly clapped-out old clunkers should be no surprise; not only does it put the lie to the pretence that Australia’s coal-fired stations are “reliable” providers of so-called baseload power, but increasing maintenance costs inevitably increase the price at which such stations can continue to generate power. The corporation that owns Liddell, AGL, has recently warned that Liddell’s maintenance requirements are now so extensive that it cannot reliably supply power to the National Energy Market (NEM) at a levelled cost of less than \$110/MWh – “double the cost of renewable alternatives” (<https://reneweconomy.com.au/agl-says-its-getting-harder-to-keep-liddell-coal-plant-online-26736/>, 29 January 2020).

AGL is already investing in renewable power generation and associated battery storage (<https://www.smh.com.au/business/companies/dawn-of-battery-age-agl-inks-huge-battery-deal-in-time-for-liddell-exit-20191030-p535mf.html>, <https://www.smh.com.au/business/companies/game->

[changer-agl-s-big-battery-deal-set-to-help-rise-of-renewables-20200129-p53vs7.html](https://reneweconomy.com.au/aemo-worries-about-ageing-coal-fleet-and-summer-extremes-wants-new-tools-20516/)); AGL is *not* investing in new coal-fired generation plant.

This submission shares the concern of the Australian Energy Market Operator (AEMO) regarding the

“deterioration of reliability of ageing thermal generators”, particularly in the extreme summer heat (ref <https://reneweconomy.com.au/aemo-worries-about-ageing-coal-fleet-and-summer-extremes-wants-new-tools-20516/>).

Clearly, Australia’s power generation capacity requires renewal; that is, the existing fleet of generators must substantially be replaced – which in turn offers opportunities for investment of the surplus investment capital that inflates asset values without facilitating growth in the productive economy. It is the view of this submission that this necessary renewal of Australia’s power generation capacity is a suitable investment target for this surplus liquidity, particularly given technological advances in the decades since the commissioning of the current ageing fleet.

As a demonstration of technological advances that might be surprising for those who assume that the intermittency of renewable power generation implies unreliability, AEMO’s 2019 advice that the recent decrease in risk of summertime power outages has in large part been due to a ‘surge’ in solar installations over the last year.

AEMO chief Audrey Zibelman said the market operator was “pleased to see” 3,700 megawatts (MW) of increased generation in the National Electricity Market, with rooftop and grid-scale solar generation representing approximately 90% of this increase.

“The introduction of these resources delivers a welcomed improvement to reliability and reduces the need to procure further out of market reserves,” Zibelman said.

<https://reneweconomy.com.au/huge-influx-of-solar-will-reduce-risk-of-power-outages-this-summer-says-aemo-39807/>)

Such real-world outcomes as reported by AEMO essentially rebut ill-informed claims about the reliability of renewables particularly as many of these renewable installations have been guided and informed by ever-declining costs of renewable generation.

“As renewable sources of energy continue to become more competitive and ramp up capacity, the wholesale price of electricity is expected to decline,” Caldwell said.

- <https://reneweconomy.com.au/australias-coal-and-gas-plants-are-breaking-down-every-three-days-34744/>

Despite all of above, “lack of reliability” remains one of the key criticisms levelled at renewable energy generation sources like solar and wind, particularly by pro-coal lobbyists in both industry and government who claim that so-called “baseload” generation from coal and gas – and failing those, nuclear – are the way forward for Australia’s grid.

A recent federal parliamentary inquiry has tried to re-open the case for introducing nuclear power to the NEM as a “clean” baseload replacement for coal.

But, in line with most of the evidence to the parliamentary inquiry, IBISWorld concludes that “significant obstacles” – including cheap and abundant renewables – make nuclear a non-starter in Australia.

“The development of nuclear power facilities in Australia would come at great cost, and likely drive an increase in electricity prices,” Caldwell said.

“Despite being more reliable, the high establishment costs of nuclear power would ensure this method of electricity generation would be uneconomical, especially against the falling cost of renewable energy”, Caldwell said.

- <https://reneweconomy.com.au/australias-coal-and-gas-plants-are-breaking-down-every-three-days-34744/>

Consumption taxation - a prudent approach to limiting self-destruction.

This submission proposes a new tax – a consumption tax on the carbon content of fossil fuels and carbon-containing minerals used for consumption of goods and services in Australia- will guide and inform small and large-scale investment in new lower cost higher efficiency power generation. The new revenue stream from this new tax will make feasible a range of growth-enhancing tax cuts and payment increases in Australia’s present system of taxes and transfers, which may augment the price signal that the tax itself provides.

Consumption taxes are designed to apply within the instituting jurisdiction (nation), a principle that determines the treatment for consumption taxation purposes for both goods exported from, and goods imported to, the jurisdiction. Exported goods are ‘zero-rated’ for consumption tax in the exporting jurisdiction so that they are not disadvantaged by the tax regime

of whichever nation imports (and ‘consumes’) them, and goods that are imported to the jurisdiction (nation) are subject to Border Adjustment Taxes to ensure that imports are treated on the same basis as domestic production.

This principle of same treatment ensures the WTO-compliance of these Border Adjustments, unlike the general case of tariffs, and because of compliance with WTO regulations, this Fossil Carbon Consumption Tax (‘FCCT’) can be unilaterally imposed.

The FCCT’s treatment of imports and exports implicitly avoids adverse impacts on Australia’s external trade. The FCCT shares this trade-neutrality with Australia’s GST, which since its introduction has not adversely affected Australia’s external trade, unlike the Kyoto-compliant emissions *production* methodologies which underlie the Rudd Government’s ill-fated Carbon Pollution Reduction Scheme (CPRS) and the short-lived Carbon Price introduced under the Gillard government.

The absence of adverse impact on external trade by consumption-based pricing policy is reflected in Geoff Carmody’s title for his chapter contribution to the Committee for the Economic Development of Australia’s August 2009 bulletin (“Growth 61: A taxing debate - Climate Policy Beyond Copenhagen”): Carmody’s article is entitled “Consumption-based emissions policy: A vaccine for the CPRS ‘trade flu?’”.

The Committee for the Economic Development of Australia (CEDA) has always preferred consumption-based policy over the emissions production methodology favoured by European nations and expressed in the Kyoto Protocol – as does the writer of this submission.

In turn, this would in large part obviate regulatory responses to the climate crisis that underlies the severity and extent of this season’s bushfires. Adjusting the rate (\$ per tonne fossil carbon, or equivalently \$ per tonne carbon dioxide) at which this FCCT is applied obviates much if not all further emission-reducing measures (thus minimising opportunities for grandstanding about “great moral challenges”).

The FCCT should be introduced at a low enough rate and with suitable adjustments to other taxes and excises to maintain revenue-neutrality as appropriate to avoid unduly perturbing economic activity, then steadily increased year by year (with further adjustments to other taxes and transfers) until the required decrease in fossil carbon consumption is achieved.

The proceeds of this new tax can be applied to economically beneficial and socially equitable changes to Australia’s system of taxes and transfers; to

tax cuts and redistributive income payments respectively. Approximate maintenance of revenue-neutrality benefits a liberal economy such as Australia's by preserving the balance between productive private sector activity and the public sector activity that serves broader national purposes than private gain. This submission includes the writer's suggestions for what might be economically beneficial and socially equitable changes .

In making the argument for a revenue-neutral FCCT, this submission draws on Geoff Carmody's chapter contribution under the title "Consumption-based emissions policy: A vaccine for the CPRS 'trade flu'?" to the Committee for the Economic Development of Australia's August 2009 publication, *Growth 61* ³, and on the Special Topic discussion of Australia's carbon footprint in Chapter 4 of the Department of the Environment and Energy's "Quarterly Update of Australia's National Greenhouse Gas Inventory: June 2019" ⁴.

Carmody (2009) describes how and why a *Consumption Tax* on "emissions" would be preferable to the *Emissions Production* pricing methodology underlying the Kyoto Protocol and hence also underlying the Rudd government's proposed Carbon Pollution Reduction Scheme and the carbon-pricing scheme introduced by the Gillard government and abolished by its successor.

Carmody (2009) argued that the debate about climate policy design was (as of 2009) not over, with three major unresolved issues:

1. whether an emissions trading scheme (ETS) is better than a carbon tax (it isn't; the superiority of taxation over emissions trading schemes is explained by University of Western Australia's David Hodgkinson and Rebecca Johnston ⁵).
2. whether national emissions *production* or national emissions *consumption* is the best national emissions base for policy (Carmody's article argues the case for the latter by comparing the

³ Carmody (2009): "Consumption-based emissions policy: A vaccine for the CPRS 'trade flu'?" by Geoff Carmody in "A Taxing Debate: Climate policy beyond Copenhagen" Committee for the Economic Development of Australia, August 2009.

⁴ 'Quarterly Update of Australia's National Greenhouse Gas Inventory: June 2019', Commonwealth of Australia 2019.

⁵ David Hodgkinson & Rebecca Johnston, "Politics aside, a simple carbon tax makes more sense than a convoluted emissions trading scheme", *The Conversation*, 31 July. 2015, <https://theconversation.com/politics-aside-a-simple-carbon-tax-makes-more-sense-than-a-convoluted-emissions-trading-scheme-45433>

- trade implications of the two methodologies, explaining *why* a national carbon-pricing scheme is optimally based on consumption).
3. the setting of global emissions abatement targets and their allocation among countries.

Carmody (2009) argues that a national emissions consumption-based carbon tax best avoids adverse outcomes. He labels the CPRS “the GST from hell” because it adversely affects exports and exempts imports, thus decreasing Australian industrial competitiveness.

(the carbon price under the CPRS) hits exports, exempts imports and cuts Australia’s competitiveness. It’s more likely to drive emissions (and jobs) overseas than reduce emissions globally. Naturally, it’s been poorly received across-the-board. Its national ‘trade flu’ effect explains why the Kyoto Protocol (which employs the same emissions production methodology as the CPRS) has failed.

Emissions *production* necessarily targets emissions that are produced in Australia for goods destined to be ‘consumed’ (bought and used) overseas in other jurisdictions, and yet is unable to target emissions produced in other nations for goods destined to be ‘consumed’ (bought and used) overseas in Australia.

The underlying argument of this submission differs from Carmody (2009) as follows

1. The consumption tax is applied to fossil carbon (defined below under the heading “Impose consumption taxation on fossil carbon instead of “emissions”) instead of to what Carmody describes as “emissions“.
2. There is no need to allocate emissions abatement targets among various nations because atmospheric CO₂ is already high enough to necessitate the complete cessation of *all* further fossil carbon emissions as rapidly as carbon-burning technologies can be replaced. This is further explained below under the heading “The need for complete cessation of all fossil carbon consumption ...”.
3. Thanks to technological advances in the decade since Carmody was writing, as well as the economies of scale that China in particular has achieved since the 2009 Copenhagen UNFCCC Conference, the costs of renewable power generation technologies have decreased to such extent that in Australia, renewable power-generating technologies (‘renewables’) can supply firmed power at lower Levelised Cost of

Electricity (LCOE) than newly-constructed coal-fired power stations⁶. This point is further explained below under the heading “Since 2009, renewables have become ...”.

1. Impose consumption taxation on fossil carbon instead of “emissions”.

“Fossil carbon” is carbon that, over the course of earth’s geological history, has been drawn down from the atmospheric CO₂ (for example, through photosynthesis, dissolution in seawater or by chemical reaction with silicate rocks) and naturally sequestered in carboniferous mineral deposits as carbonate rocks such as limestone or as potentially combustible fossil fuels such as coal, petroleum and “natural” gas.

The fossil carbon content of any fossil fuel much more easily measured than “emissions”; in fact the most straightforward way of estimating emission is to measure how much fossil carbon is burnt (‘consumed’).

Furthermore, the cause of the entire climate crisis is by now well-known and is ascribable to the emission to the atmosphere of carbon that has been dug up from underground and emitted to the atmosphere since the onset of the Industrial Revolution. About 5% of this emitted carbon has been carbon dioxide (CO₂) emitted in the cement manufacturing process when lime is produced by roasting limestone; the remaining 95% of the increase in atmospheric CO₂ is accounted for by the burning of carbonaceous (“fossil”) fuels such as coal, petroleum and “natural” gas ⁷.

Aside: did they really get it right in Kyoto?

The writer views land-clearing, land use and land use changes as having relatively small effects on total atmospheric CO₂ concentration for various reasons; cutting down a tree doesn’t add the tree’s carbon to atmospheric

⁶ Graham, P.W., Hayward, J, Foster, J., Story, O.1 and Havas, L. 2018, GenCost 2018. CSIRO, Australia. A draft update of this document to 2019 is available at https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/Inputs-Assumptions-Methodologies/2019/CSIRO-GenCost2019-20_DraftforReview.pdf

⁷ It can be readily shown that CO₂ emissions from fossil fuel use and cement production since 1800 (data available from Oak Ridge National (US) Laboratory Carbon Dioxide Information Analysis Center) is more than sufficient to account for the entire increase in atmospheric CO₂ since 1800. As at 2007 industrial CO₂ emissions would have sufficed to increase atmospheric CO₂ but for the uptake of some of this gas in oceans – which compromises marine ecological integrity through ocean acidification. Despite ongoing increases in anthropogenic CO₂ emissions, further CO₂ dissolution in oceans has limited atmospheric CO₂ to about 390 ppm in 2007, 400 ppm in 2013 and 410 ppm in 2018, while continuing to acidify oceans.

CO₂ unless it is burnt, for example, and the smoke that may be produced by the fire isn't gaseous CO₂ which stays in the atmosphere, it's fine particles of soot which rapidly fall out of the sky and fertilise new growth –which itself draws carbon from the atmosphere.

This view is supported by the fact that since humans began landscape-scale vegetation management, our forebears' endeavours have had relatively small impact on atmospheric CO₂ right up until the large-scale burning of coal that began with the Industrial Revolution; Neolithic (early Holocene) development and subsequent spread of agriculture may be discernible in elevated atmospheric methane (CH₄) concentrations, but Holocene atmospheric CO₂ reconstructions show limited effect (at most).

As a price on Fossil Carbon – the carbon contained in fossil fuels coal, petroleum and mineral gas, (as well as the carbon contained in limestone and emitted from cement manufacturing) – the Fossil Carbon Consumption Tax (FCCT) would directly improve economic efficiency by imposing a price on the direct cause of the entire increase in atmospheric carbon dioxide (CO₂) on all time intervals since the start of the Industrial Revolution while simultaneously raising the revenue that lets a government adjust other taxes and transfers as appropriate.

A Consumption Tax can be unilaterally established because it applies only within the jurisdiction. In Australia's case, an FCCT would be imposed on all fossil carbon that is burnt (CO₂ emitted) in Australia (except for fossil carbon burnt in the production of exported goods, as explained in the following paragraph); through Border Adjustments, FCCT would also apply to fossil carbon burnt overseas in order to produce goods and commodities that are then exported to Australia for consumption (purchase) in Australia. Such Border Adjustments would be applied to all imports to Australia to account for fossil carbon consumption embodied in the delivery of the imports to Australia, which by definition includes the fossil carbon emitted (burnt) by the vessel that transports the imports to Australia.

Border Adjustment Taxes are calculated by accounting for all the fossil carbon consumed in the processes leading to the arrival of imported goods in the Australian port; ideally the estimate would include all fuel burnt along the supply chain from obtaining raw materials through manufacturing processes to the fuel burnt by the vessel on which the goods are shipped to Australia. At first glance this may seem an impracticably complex calculation, but use of carbon accounting for Australian domestic

production, national carbon accounts and other data should simplify the calculations, particularly when such determinations become routine.

Of course, any importer of the view that Australian authorities are deeming an excessively high embodied fossil carbon on the importer's goods is would be encouraged to provide audited carbon accounts for their supply chain. Carbon accounts thus provided could then be used to improve future Border Adjustment Tax assessments.

FCCT imposed in Australia on exported goods and commodities is rebated ("zero-rated") at the point of export. Just as "Border Adjustment" ensures that products imported *to* Australia effectively receive the same FCCT treatment of products manufactured and consumed in Australia, for FCCT purposes this "zero-rating" of exports *from* Australia ensures that Australian exports can be subjected to the carbon taxing regime of the destination (importing) nation without unfair disadvantage. This WTO-compliant arrangement is already in place for Australia's other consumption tax, its GST; imports to Australia have border Adjustment Tax equivalent to the GST applied to their domestic competition, exports from Australia are 'zero-rated' for GST.

In Geoff Carmody's 2009 contribution to CEDA's Growth 61 (August 2009) publication ("Consumption-based emissions policy: A vaccine for the CPRS 'trade flu'"), Carmody writes that "Australia's Carbon Pollution Reduction Scheme (CPRS) is 'the GST from hell'."

The Carbon Pollution Reduction Scheme" was the carbon-pricing scheme proposed and then withdrawn during the administration of Julia Gillard's Prime Ministerial predecessor Kevin Rudd. Because the carbon price introduced under Ms Gillard's leadership was a price on emissions production, design of which was based on the CPRS, it shared the flaws which Carmody critiques.

2. The need for complete cessation of all fossil carbon consumption ...

... as rapidly as can be achieved renders moot any varied allocation of emission abatement "targets" among nations. That is, adherence to the terms of the 2015 Paris Climate Accord is inadequate, and ultimately self-defeating.

The concentration of CO₂ in earth's atmosphere is now over 410 parts per million (410 ppm, or 0.041%). This is higher even than it was during the Pliocene Epoch (5.5 to 2.8 million years ago), when global average temperatures were about 3°C higher than they were through the Holocene Epoch (the 11 millennia of fairly stable climate prior to the onset of the Industrial Revolution) when concentration of atmospheric CO₂ was fairly

stable at about 280 ppm. If atmospheric CO₂ concentration remains at or higher than Pliocene-like concentrations (that is, $\geq \sim 400$ ppm), the world's climate will remain warm enough for ongoing loss of polar icesheets, which will ultimately result in Pliocene-like sea levels and global average temperature.

With global average temperatures having risen by only 1.1°C (let alone the aspirational 1.5°C limit of the 2015 Paris Accord), accelerating mass loss is already observed from terrestrial polar icecaps⁸. Loss of Arctic Ocean surface ice every summer⁹ will accelerate warming of the Arctic Ocean and exacerbate disruption of northern hemisphere climate, and loss of ice from terrestrial icecaps on Greenland and Antarctica will result in sea level rise to Pliocene-like levels over several centuries.

The prospect of 20-30 metres of sea level rise has inevitable consequences for the long-term viability of most of the world's coastal cities, including Australia's State capital cities.

Strict adherence to the terms of the 2015 Paris Climate Accord is inadequate, and ultimately self-defeating. Instead, the first essential step to avoiding this self-defeat is the rapid phasing out of *all* fossil fuel burning technologies, which can readily be achieved by replacement with renewable energy technologies. That is, *the only credible "target" for emissions reduction is 100% (complete cessation of all fossil carbon consumption) as rapidly as can be practicably implemented.*

3. Since 2009, renewables have become ...

... the lowest-cost technologies available for electricity generation.

In Australia's case, for example, CSIRO's GenCost report of December 2018 (footnote 6) finds that Levelised Cost Of Electricity (LCOE) using renewable power generating technologies is already lower than LCOE for newly-constructed coal-fired power. Meanwhile, Australia's fleet of coal-fired power plants are ageing with more and more frequent breakdowns.

For Australia, the declining cost of renewable energy generation coupled with developing trend toward electrification of transport also raises the

⁸ Rignot *et al*, (2019) "Four decades of Antarctic Ice Sheet mass balance from 1979–2017", Proceedings of the National Academy of Sciences", <http://www.pnas.org/cgi/doi/10.1073/pnas.1812883116>, Cheng, L., *et al*, (2020), "Record-setting ocean warmth continued in 2019". Adv. Atmos. Sci., 37(2), 137–142, <https://doi.org/10.1007/s00376-020-9283-7>.

⁹ Ironically, refreezing at the surface of the Arctic Ocean during the darkness of northern winters will block evaporation from the surface of the Arctic Ocean, limiting the extent to which the Arctic Ocean re-cools during the winter dark.

intriguing possibility that Australia could do away with the need to spend money on transport fuel imports; ground transport in particular would instead be powered by low-cost “home-grown” renewable energy. If battery electric vehicles are kept connected to the power grid when not in use their batteries might even serve as power sources during times of low renewable power generation such as dark windless nights.

This was not the case in 2009 when Carmody was writing. At that time, coal-fired power was still the lowest-cost available technology, and with the fleet of coal-fired power stations about a decade younger than now, they were also somewhat more reliable. At that time these inconvenient facts further constrained enthusiasm for carbon pricing among authors who were in Denial about the facts of climate science itself.

The great decrease in cost of renewable power generation over the last decade has in part been due to technological advances, but also due to the massive scaling up of production of renewable generation equipment that investment (particularly in China) in manufacturing facilities has enabled.

That Chinese investment in particular stepped up immediately after China stymied agreement to further emissions reductions at the 2009 Copenhagen Conference of the Parties to the United Nations Framework Convention on Climate Change is no surprise to the writer of this submission.

Revenue neutral Fossil Carbon Consumption Taxation with annual rate escalation - a suggestion for eliminating fossil carbon consumption by growing, not destroying, the economy.

This submission proposes that FCCT should be introduced in the 2020 Federal Budget at a rate of about \$92 per tonne contained carbon, or \$25 per tonne emitted CO₂. Each year thereafter, the rate at which FCCT is applied increases by a further \$92 per tonne contained carbon, so that in 2021/22 the tax rate is \$50 per tonne emitted CO₂, in 2022/23 the tax rate is \$75 per tonne emitted CO₂, in 2023/24 the tax rate is \$100 per tonne emitted CO₂, and so on.

According to fossil carbon consumption data from the [US] Carbon Dioxide Information Analysis Center, in 2014 Australia consumed 98.517 million tonnes of fossil carbon; since each tonne of carbon is equivalent to 3.67 tonnes of CO₂, Australian consumption emitted 361 million tonnes of CO₂.¹⁰

¹⁰ 361 million tonnes of CO₂ is comparable to the sum of Department of Energy and Environment’s Greenhouse Account entries for Electricity, other Stationary Energy and

In the first decade or so of operation, revenue from the FCCT will increase with every increase in FCCT rate, allowing for further downward adjustments to other tax rates and upward adjustments to transfer rates. At some stage declining consumption of fossil carbon in the Australian economy will balance the annual FCCT rate increase; thereafter increasing FCCT rate will not suffice to maintain FCCT revenue. Eventually, fossil carbon consumption will cease as will FCCT revenues. Changing FCCT revenues over forthcoming decades will be reflected in ongoing further adjustments to Australia's system of taxes and transfers.

We can illustrate the revenue that might be raised by an FCCT that increases year by year as outlined above; for arguments' sake, let's say¹¹ Australian carbon consumption decreases linearly to 70% of 2014 consumption in 2030, then further decreases linearly to 0% by 2050. In that case Australian fossil carbon consumption would be 321 Mt of CO₂ in the year to June 2021; at \$25/tonne of CO₂ the FCCT would raise about \$7.8 billion in revenue. FCCT revenue would increase to \$63 billion in the year to June 2030, and peak at \$71 billion in about 2035 before declining to \$0 by 2050 in line with the cessation in fossil carbon consumption.

Taxpaying companies and individuals will respond to each increase in the FCCT rate by using their increased returns from other taxes (see below) to invest in equipment and technologies – solar panels and batteries, electric vehicles and so on – to avoid future FCCT liabilities. Manufacturers and technologists will respond to market demand for such equipment and technologies, striving to outcompete each other by developing and providing lower-cost, higher-performance equipment.

Like other advanced economies, the Australian economy continues to suffer from a lack of investment in new production – a situation that has persisted since the GFC of 2008. However, with the price signal provided

Transport. The difference between this value and reported greenhouse production emissions of the order of 550 million tonnes of CO₂-e goes to the extent to which emissions production accounting under the Kyoto protocol places undue burdens on trading nations such as Australia and China while favouring capital-exporting nations that have essentially outsourced their emissions consumption.

¹¹ Given the rate of climate deterioration that is now starting to be experienced plus the ongoing cost reductions for renewable technologies it is likely that cessation of fossil fuel consumption will come sooner than 2050. That said, Tony Abbott was correct when he suggested that some nations might benefit further climate warming might be beneficial; Burke, Hsiang and Miguel, *Nature*, 2015. "Global non-linear effect of temperature on economic production", doi:10.1038/nature15725 showed that high-latitude nations such as Russia, Kazakhstan and Mongolia may be long-term beneficiaries of a warmer climate.

by a gradually increasing Fossil Carbon price Australians and Australian enterprises quietly move away from reliance on climate-damaging carbon-emitting practices and technologies through adoption of climate-friendly lower-cost renewable practices and technologies.

Whatever emissions reduction “targets” governments might proclaim from time to time will be met and generally exceeded without the need for grandstanding about “great moral challenges”.

For the decades of its operation, the Fossil Carbon Consumption Tax proposed in this submission will create a new revenue stream to the Commonwealth that can be used to decrease rates of other taxes and excises, or for additional Commonwealth expenditure. In the case of fuels on which Fuel Excise is imposed, double-dip taxation would be avoided by decreasing the rate of Fuel Excise when FCCT is applied. For example, a Fuel Excise of 38.14 c/L would be approximately equivalent to a tax on the Fossil Carbon content of the fuel at an approximate rate of \$625/tonne of CO₂, so if Fossil Carbon Consumption Tax (FCCT) is applied at the rate of \$25/tonne of CO₂ (4% of \$625/tonne of CO₂) then the Fuel Excise rate should be decreased by 4% ie decreased from 38.14 c/L to 36.233 c/L.

While this Fuel Excise rate decrease serves to avoid “double-dipping” on taxation of fuels, it should be noted that because consumption taxation applies to the entire supply chain – in the case of petroleum products, all fossil carbon consumed in the transportation and processing of crude oil to refined product sold at service stations would also have FCCT imposed at \$25/tonne of CO₂ – overall taxation of petroleum products would increase despite decreased Fuel Excise rate *except for those petroleum products where carbon accounting demonstrates that the entire supply chain of petroleum products involves no fossil carbon consumption.*

The writer’s understanding is that there are no such petroleum products available in Australia – but the imposition of FCCT gives fuel refiners and suppliers an incentive to optimise their supply chains to decrease their FCCT liability.

In the year to June 2019, Australia’s electricity generation sector emitted 179.9 Mt CO₂-e (“Quarterly Update of Australia’s National Greenhouse Gas Inventory: June 2019”, Commonwealth of Australia 2019); at an FCCT rate of \$25/tonne CO₂, the electricity generating sector would be liable for FCCT payments of nearly \$4.5 billion for the year to June 2019. This \$4.5 billion could be made revenue-neutral by being used for a combination of

- decreases in Company Tax rate for electricity consumed by entities subject to Company Tax, and
- per capita distribution of FCCT revenue to Australian residents.

For example, if 70% of metered electricity is consumed by entities liable for Company Tax then 70% of this \$4.5 billion (ie \$3.15 billion) could be used to decrease Company Tax rate. If Company Tax at a rate of 30% presently raises \$94.5 billion per annum, then Company Tax at a rate of 29% would raise \$91.35 billion - \$3.15 billion less. The writer therefore anticipates that the imposition of FCCT would provide tax relief to Company Taxpayers which could be invested in solar panels and other technologies to decrease a Company's FCCT liability in future years.

It would also give electricity generators who are liable for FCCT in respect of coal that they burn to replace their ageing fossil carbon-consuming power plants with technologies that do not require fossil carbon consumption.

Discussion of how the \$1.35 billion of FCCT revenue from the power generating sector that is not applied to Company Tax rate decrease could allocated follows after discussion of the proceeds of Border Adjustment Tax on the fossil carbon consumption embodied in goods imports to Australia.

Border Adjustment Taxes are calculated by accounting for all the fossil carbon consumed in the processes leading to the arrival of imported goods in the Australian port; ideally the estimate would include all fuel burnt along the supply chain from obtaining raw materials through manufacturing processes to the fuel burnt by the vessel on which the goods are shipped to Australia. At first glance this may seem an impracticably complex calculation, but use of carbon accounting for Australian domestic production, national carbon accounts and other data should simplify the calculations, particularly when such determinations become routine.

Of course, any importer of the view that Australian authorities are deeming an excessively high embodied fossil carbon on the importer's goods is would be encouraged to provide audited carbon accounts for their supply chain. Carbon accounts thus provided could then be used to improve future Border Adjustment Tax assessments.

It is suggested that Fossil Carbon Border Adjustment Taxes could also be made approximately revenue-neutral by allocating a portion of the revenue raised by Fossil Carbon Border Adjustment to decreasing the Company Tax Rate, and the remainder of the revenue thus raised to per capita payments to Australian people.

The money used for these per capita payments could include the portion of money raised by Fossil Carbon Border Adjustment that is *not* allocated to Company Tax cuts, plus the portion of money raised by FCCT revenue from coal-fired power generation.

Operation of the Fossil Carbon Border Adjustment would affect various groups in Australia in different ways.

People ('consumers') receive their per capita payments, but may find that the imported goods they want to buy are more expensive.

Companies subject to Company Tax will benefit from lower Company Tax rate.

Retailers may find their domestic manufacturing suppliers better able to compete against imported goods; the competitiveness of Australian manufactures will gradually increase over the years with FCCT rate because operation of the FCCT will lead to declining fossil carbon consumption in Australia's power and transport sectors.

Importing companies will benefit from lower Company Tax rates, but may experience declining import volumes. This is particularly true of petroleum importers, who will eventually be superseded by Australian production of renewably-generated electric power charging Australia's battery electric vehicle fleet.

Import-competing manufacturers may benefit by paying Company Tax at lower rates, and find that they are better able to compete against imported goods that are subjected to an equivalent to the Fossil Carbon price that they are paying.

Companies that export goods from Australia would receive the Company Tax rate cut even *and* have their FCCT liability 'zero-rated' in respect of the goods they export. Of course, the goods they export are subject to the carbon-pricing regime of the nation to which they are being exported.

Conclusions and Summary

The world needs to cease all fossil fuel consumption as rapidly as can be economically effected.

Irrespective of what the rest of the world does, replacing fossil fuel consumption with renewables offers Australia a lower cost future – but the transition to renewables is likely take a decade or two. The less Australia burns coal, the more coal it has available to earn export revenue.

A revenue-neutral Fossil Carbon Consumption Tax does not adversely affect Australia's trade position, and is therefore an appropriate mechanism to achieve these goals. Inclusion of such a Tax in the Federal Budget should be further investigated.

Appendix 1: an ASX stockbroker's January 2020 appraisal of current economic conditions in full:

"Global equity markets had a stellar year in 2019 with major indices in the US and Australia racking up some of the best returns in years. However, this feat was not achieved by free market forces alone. Central banks across the world printed money like drunks and depressed interest rates, forcing investors out of safe haven fixed interest investments into riskier assets like shares and property.

"The US 10-year bond rate fell from around 2.75% to end the year at 1.92%. While up from a year low of 1.5%, the drop in the bond year was hugely positive for asset valuations and was the primary contributor to the equity buying frenzy.

"The impact of US corporate tax cuts also helped Wall St as did the tsunami of corporate cash (and cheap debt) used to undertake share buy-backs on a massive scale. The combination of falling bond yields and a huge amount of share buy-backs combined to deliver the stellar returns in 2019. It is moot whether whether such an alignment of the planets can possibly continue this sort of performance – and I don't expect it in 2020.

"In reality, companies in the US, Europe and Australia are not investing their cashflows into new projects or even ambitious longer term R&D programs which is necessary to deliver higher future profits. They are mostly taking the easier and perhaps safer strategy of pumping up earnings per share via share buy-backs.

"In the longer term this is going to affect growth and I suspect it is already showing up in the GDP data.

"Low interest rates have certainly helped a rebound in domestic property prices as well, despite the scandals and the overbuilding of units in various States and Cities. Property valuations are also being pumped up through questionable policy settings on foreign investment and are reaching levels that imply significant risk for those who are infact still able to get a mortgage.

"High valuations are problematic for local equity and property investors because the returns are almost guaranteed to be disappointing unless asset price inflation continues at an accelerating rate. The further that prices are pumped up, the more liquidity will be needed to keep the price rises going. Turning off the monetary spigots would be very detrimental to all asset prices and yet has to be a possibility.

“As a result of the risks to financial stability, it thus would seem reasonable to assume that Central Banks will just continue on their merry way, depressing interest rates and effectively monetising Government Budget as well as Trade Deficits. Markets have come to expect this sort of Central Bank guarantee that asset prices always go up. Investors more generally have been lulled into a false sense of security that this paradigm is sustainable. I personally do not buy that line of thinking and am therefore much more circumspect about the near term outlook.”

Appendix 2: New Daily article on IBISworld assessment of reliability of Australia's power stations.

Coal power stations struggling to meet Australia's energy needs

Killian Plastow, New Daily, 21 Jan 2020,

<https://thenewdaily.com.au/finance/finance-news/2020/01/21/coal-power-failing-renewable/>

Australia's ageing power plants are becoming less and less reliable, and growing demand for airconditioning in peak summer heat is only adding to the problem.

In the two years to December 2019, a gas or coalfired power plant was breaking down once every 3.2 days, IBISWorld research shows.

In coming years those breakdowns will become more frequent, IBISWorld senior industry analyst James Caldwell told The New Daily.

And one of the major risks facing fossil-fuel fired power plants is increasingly hot weather forcing more Australians to turn on their airconditioners.

"These coal-fired power stations are only getting older, so they're going to be less reliable and some of them will be taken offline in the future," Mr Caldwell said.

"So as long as Australia relies on coal, our electricity transmission will be quite unreliable."

Further investment in coal would also drive up energy costs, Mr Caldwell said, because the "massive investment" required to build new plants would end up stinging consumers.

"It would be billions of dollars, which the consumer would end up paying," he said. "We're not going to see the end of coal electricity generation any time soon, but I think it's on its way out."

Export market remains, but becoming risky

Coal's future as a power source may be limited in Australia, but demand remains strong elsewhere and Mr Caldwell said exports will continue.

"Australia exports most of its coal – I don't see how that is going to change," he said. "That's what the government is very keen on, because it's good for the economy."

Data from the Department of Industry, Innovation and Science showed coal exports brought \$54 billion into the economy in the 2016-17 financial year.

But Australia's large involvement in the global supply of coal could also leave us exposed to the next global financial crisis, according to the Bank for International Settlements (BIS).

During the 2008 GFC, the US central bank – the Federal Reserve – was forced to bail out retail banks that had given bad loans to optimistic home buyers.

A similar scenario could play out with coal and fossil fuel mining, the BIS cautioned, as a sudden shift away from these commodities could leave resource companies unable to pay their loans.

And if the world is to meet the Paris Agreement target of limiting global warming to 1.5 to 2 degrees, then 80% of current coal reserves (and 50% of natural gas) would need to be left in the ground – making them 'stranded assets'.

University of Canberra assistant professor Dr John Hawkins told The New Daily this places Australia in a difficult position.

Though governments around the world have been relatively slow to respond to climate change, Dr Hawkins said those attitudes can change rapidly and without warning.

Massive climate-related catastrophes – including the bushfires currently tearing across Australia's east coast – could even trigger a rapid change in policy.

"If governments start coming down heavily on greenhouse gases, that could be a real shock on the economy. The better thing to do would have been to start on this 20 years ago," Dr Hawkins said. "As a country, our banking sector does have a significant exposure to coal, and so if there is a sudden drop in value of coal deposits and an increase in stranded assets then that is a serious concern."

Appendix 3: RenewEconomy article on IBISworld assessment of reliability of Australia's power stations.

Australia's coal and gas plants are breaking down every three days

Sophie Vorrath, RenewEconomy, 21 Jan 20,

<https://reneweconomy.com.au/australias-coal-and-gas-plants-are-breaking-down-every-three-days-34744/>

Australia's ageing fleet of coal and gas-fired power plants are becoming increasingly unreliable and inefficient, suffering break downs at least twice a week on average, a new report has found.

The report, published by IBISWorld on Tuesday, says that Australia's gas and coal-fired power plants broke down an average of once every 3.2 days over the two years through December 2019.

This is a significant concern, the report notes, in light of the fact that Australia still gets more than 80% of its energy from fossil fuels – and around 60% from coal-fired plants – and considering these plants aren't getting any younger.

"The major problem with Australia's reliance on coal fired power plants is the age and efficiency of the infrastructure," said IBISWorld senior industry analyst James Caldwell.

"Approximately half of Australia's fleet of coal-fired power stations, generating over two-thirds of generating capacity, are over 30 years old. This trend presents a number of problems, primarily that these plants are no longer reliable."

The unreliable nature of Australia's ageing coal plants – particularly when they're needed the most, in summer heatwaves – has been well documented by RenewEconomy, including as a major point of concern for the Australian Energy Market Operator.

In its annual Electricity Statement of Opportunities last August, AEMO said its biggest fear was the "deterioration of reliability of ageing thermal generators", particularly in the extreme summer heat (ref <https://reneweconomy.com.au/aemo-worriesabout-ageing-coal-fleet-and-summer-extremes-wants-new-tools-20516/>).

And just last month, AEMO reassured consumers (<https://reneweconomy.com.au/huge-influx-of-solar-will-reduce-riskof-power-outages-this-summer-says-aemo-39807/>) that the risk of power outages over the summer had been reduced by the surge in solar installations in the past 12 months.

AEMO chief Audrey Zibelman said the market operator was “pleased to see” 3,700 megawatts (MW) of increased generation in the National Electricity Market, with rooftop and grid-scale solar generation representing approximately 90% of this increase.

“The introduction of these resources delivers a welcomed improvement to reliability and reduces the need to procure further out of market reserves,” Zibelman said.

Despite all of above, “lack of reliability” remains one of the key criticisms levelled at renewable energy generation sources like solar and wind, particularly by pro-coal lobbyists in both industry and government.

This small but noisy group, which includes numerous high-profile members of the federal Coalition government, claims that so-called “baseload” generation from coal and gas – and failing those, nuclear – are the way forward for Australia’s grid.

Nuclear power, in particular, has been enjoying another “moment” in Australian politics, with a recent federal parliamentary inquiry pushing to re-open the case for introducing it to the NEM as a “clean” baseload replacement for coal.

But, in line with most of the evidence to the parliamentary inquiry, IBISWorld concludes that “significant obstacles” – including cheap and abundant renewables – make nuclear a non-starter Australia.

“The development of nuclear power facilities in Australia would come at great cost, and likely drive an increase in electricity prices,” Caldwell said.

“Despite being more reliable, the high establishment costs of nuclear power would ensure this method of electricity generation would be uneconomical, especially against the falling cost of renewable energy.

“As renewable sources of energy continue to become more competitive and ramp up capacity, the wholesale price of electricity is expected to decline,” Caldwell said.

Sophie Vorrath (<https://reneweconomy.com.au/author/sophie-vorrath/>)

Sophie is editor of One Step Off The Grid (<https://onestepoffthegrid.com.au/>) and deputy editor of its sister site, Renew Economy (<https://reneweconomy.com.au/>). Sophie has been writing about clean energy for more than a decade. (<https://twitter.com/sophvorrath>, <https://www.linkedin.com/in/sophie-vorrath-55018099/>)

LOG IN WITH OR SIGN UP WITH DISQUS

Name

Join the discussion...

Kobus de Kock • 2 hours ago

Seems like conceivable that you are going to join us South Africans in load shedding.

Same problem: aging coal generators with politics keeping renewables out.

2 △ ▽

Peter Farley • 3 hours ago

Nuclear "moment" is very apt. It is a diversion to delay renewables, it cannot possibly compete on either cost or reliability in Australia. If we think a trip of a coal 500 MW coal generator can destabilise the grid, what will happen when a 1,100 MW nuclear plant goes pop.

Oh and as for those SMR's that have been 4 years away since 1987, there is no realistic plan to have even one operating in Australia before 2032 and we would need at least thirty to just replace NSW coal plants

3 △ ▽

Chris Drongers • 4 hours ago

If Doha can maybe install 800 MW of solar at 2c/kWh for its football match using masses of cheap imported labour Australia should be able to get close to that cost using robots and our supposedly world leading supply chain management. Nuclear wouldn't even be in the argument.

I would be interested to see a breakdown of the regulation/tariff/port/transport/labour etc costs for Australia and other countries.

△ ▽

Peter Farley • 3 hours ago

• Reply to Chris Drongers

The in-country costs of a solar plant are about 35-40% for an Australian plant.

Assuming that local costs in Doha are half ours the installed cost in Doha might be $60\% + .5 \times 40\% = 80\%$ Due to high levels of dust and high temperature output degradation the output of these Doha plants is probably lower than some locations in Australia. If Doha can halve the installation costs and reduce financing costs from say 6.5% to 3% then they

could get their lifetime LCOE about 40% lower than Australia, but their backup costs will be much higher as they don't have the wind and hydro resources. Net result is we could have a balanced renewable/storage system for probably US 3-4 c/kWh vs 2.5-3.5c in the Middle East

1 Δ ∇

Maddogeco > Chris Drongers • 3 hours ago

The pre fab rows of panels that are unfolded on site should make things a bit quicker and cut labor costs . Seems to be the plan to use them on the Sun Cable project.