

We provide reasons why this proposal should be rejected. **Note:** Redbank Power Station is referred to throughout our submission as **RPS**.

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Section A:

Summary: Grounds for Rejection of Proposal

Re-opening RPS for wood biomass combustion based power generation will have far-reaching negative impact.

1. Air Quality

Air quality in the vicinity of the proposal will and must decrease with acknowledged further emission of a range of pollutants into the atmosphere upon re-opening of RPS. Furthermore: the known propensity for the dispersal of particulate matter - acknowledged in the AQIA to increase if RPS re-opens burning biomass – means that dangerous particulates *WILL disperse well beyond the local area or the region.*

*The increase in emissions and concomitant decrease in air quality has the potential to impact the health of metropolitan populations well beyond the Hunter, i.e. including Sydney, and potentially along the entire east coast. A NSW Department of Health analysis of dispersal of particulate matter conveys this clearly, diagrammatically and in text, depicting the nature and scale of the health impact of specific pollutants from wood combustion, power stations and on-road diesel vehicle exhaust emissions, all of which combine in this proposal. We include relevant extracts in **Section B: Detail of shortfalls in the Air Quality Impact Assessment.***

Also see Appendix 1 A: Transference of impact from large scale emission point sources which explains an extract from a transcript of evidence provided to the *NSW Legislative Assembly Committee on Environment and Planning enquiry into the Sustainability of Energy Supply and Resources in NSW*. An expert witness describes how emissions from energy generation in the Hunter already transfer pollution across the state. Air born emissions travel. Dr Tait, Core Group, Ecology and Environment Special Interest Group, Public Health Association of Australia: (committee hearing transcript 26th August, 2020:

*“The EFA Report on the health burdens of fine particle pollution from electricity generation in NSW, that Ben Awald did at the end of 2018, actually shows that **a lot of the air pollution in Sydney comes from the Hunter Valley power stations**. We are not just talking about adverse health consequences for people in the Hunter Valley from Hunter Valley power stations; **we are actually talking about people down the whole east coast.**”*

Exacerbation of Covid 19 transmission and other air borne respiratory pathogens

PM_{2.5} emissions travelling from the Hunter to the Sydney metropolitan region and elsewhere, heighten risk of Covid 19 air-borne transmission. **Appendix 1 B: Propensity of biomass combustion to facilitate transmission of Covid 19 molecules on PM_{2.5}**

The RPS proposal is inconsistent with emerging policy and regulatory frameworks at state, national and international levels in regard to air quality as a result of wood combustion.

There is omission of reference to the changing opinion re GHG emissions from biomass energy now occurring at international, national and NSW state level, and to the reasons for changes to international and national guidelines for ambient atmospheric pollutant thresholds. These include (2021) WHO standards and the 2021 revision of Australia’s National Environment Protection Measure (NEPM) for specific relevant emissions.

Utilising biomass combustion RPS will emit large volumes of pollutants directly and indirectly toxic to environmental and human health. These include high levels of CO₂ and other GHGs as well as pollutants with a direct causal association with cardiovascular and respiratory disease (leading to stroke, lung cancer and chronic obstructive pulmonary disease (COPD) as well as other documented conditions. We have already referred to PM_{2.5} and the fact that RPS (by the admission of its own AQIA) will further burden PM_{2.5} ambient levels in the Hunter which now already exceed WHO and other standards.

2. Forest Bioenergy Carbon Emissions and Cycles

Findings of the (2021) report of the NSW Legislative Assembly Committee on Environment and Planning refute claims on the carbon neutrality of the biomass carbon cycle.

The committee enquired into Sustainability of Energy Supply and Resources in NSW. After consideration of *current* peer reviewed science, economic analysis and expert opinion in August

2020, the committee confirmed that to burn any wood (whether it be native forest biomass or not), as a fossil fuel substitute, is not carbon neutral, not renewable, damaging to climate and of immediate severe threat not only to the region in which it occurs, but at a state level.

Sustainability of Energy Supply and Resources in NSW: Summary of findings and recommendations, (p 15-17)

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Forest biomass is not a renewable, sustainable source of energy.

In a former submission we argued that proposed conversion of Redbank Power Station (RPS) from BDT to wood is predicated on not only inaccurate information regarding the carbon neutrality of wood combustion, but on out-dated policy settings. The findings of the aforementioned enquiry confirm that argument as do **international policy reversals regarding forest biomass as a renewable energy.**

The European Union

As of 2017 member states can no longer grant subsidies to electricity-only installations burning forest biomass unless there are very specific provisions. The European Commission's proposal for biomass 'reform' will take subsidies away from electricity-only biomass plants burning forest biomass starting 2026.

The European Academies Science Advisory Council now finds forest biomass for power *"not effective in mitigating climate change and may even increase the risk of dangerous climate change."*¹

A review based on Europe's Academies of Science states that classification of woody biomass as 'renewable energy' needs to be reversed because the net effect of its use is having the opposite effect that expected of renewable energy, by increasing atmospheric levels of carbon dioxide for substantial periods of time. It finds that *"current policies are failing to recognize that removing forest carbon stocks for bioenergy leads to an initial increase in emissions. Moreover, the periods during which atmospheric CO2 levels are raised before forest regrowth can reabsorb the excess emissions are incompatible with the urgency of reducing emissions to comply with the objectives enshrined in the Paris Agreement."*

"Woody biomass contains less energy than coal (biomass pellets 9.6–12.2 GJ/m³; coal 18.4–23.8 GJ/m³; IEABioenergy, 2017), so that CO2 emissions for the same energy output are higher (110 kg CO2/GJ for solid biomass, 94.6–96 kg CO2/GJ for coals in IPCC, 2006).

Combined with the energy needs to gather from diffuse sources and intermediate treatment (drying and pelleting), replacing fossil fuels in electricity generation results in significant increases in emissions of CO2 per kWh.

¹ <https://easac.eu/media-room/press-releases/details/easac-welcomes-that-the-jrc-report-strengthens-the-case-for-shorter-payback-periods-on-woody-biomass/>

The net effect of switching to FDB biomass is thus usually to increase emissions and thus increase atmospheric levels of CO₂'²

International calls for reform of the EU Renewable Energy Directive are loud and clear with 500 scientists signing an open letter to world leaders:

"As numerous studies have shown...burning of wood will increase warming for decades to centuries. That is true even when the wood replaces coal, oil or natural gas."

National Policy Change re forest bioenergy as carbon neutral:

The United Kingdom:

The UK announced revision of policy in 2018 that sets a new and substantially lower limit on life-cycle CO₂ emissions that will affect the ability of forest biomass based energy and fuel facilities to attract subsidy.³

Slovakia: On 6th December 2018, the Slovak Parliament adopted an amendment to the law regulating support for renewable energy sources (n. 309/2009) which means de facto end of subsidies for wood biomass used for energy production in Slovakia. The amendment changes the definition of renewable energy sources so from 1st January 2019 only biomass from dedicated energy crops and waste from wood processing industry can be subsidized.

Source documents: Appendix 4: Progress in Reform of Biomass Carbon Accounting

Advocates of forest biomass energy (or fuel) rely on the outdated policy settings because they currently provide for subsidisation of the enterprise under the guise that forest bioenergy is 'renewable'.

Clearly, not only in NSW but in other jurisdictions which have allowed the entrenchment of false biomass carbon accounting, the argument that wood biomass is a carbon neutral fossil fuel substitute is being challenged. Based on scientific advice and evidence of impact, countries are becoming hesitant regarding subsidising bioenergy, or B.E.C.C.S, (as the strategy is commonly referred to) as a legitimate pathway to emission reduction.

This includes the recent warning issued by co-author of the most recent IPCC report, that there is 'no carbon budget left' left for Paris target; in other words absolutely no more emissions of CO₂ (regardless of how they are 'theoretically' accounted for), should be released to atmosphere.

² ***Serious mismatches continue between science and policy in forest bioenergy***

Michael Norton Andras Baldi Vicas Buda Bruno Carli Pavel Cudlin Mike B. Jones Atte Korhola Rajmund Michalski Francisco Novo Július Oszlányi ... See all authors

First published: 22 August 2019 <https://doi.org/10.1111/gcbb.12643>Citations: 6

³ <https://www.pfpi.net/new-uk-biomass-policy-removes-subsidies-for-high-carbon-wood-pellets>

We need biosphere stewardship that protects carbon sinks and builds resilience

*“It is therefore concerning that the IPCC now concludes that Earth’s temperature is slightly more sensitive to rising CO₂ concentrations than previously thought —meaning our remaining carbon budget to achieve the Paris target may have effectively shrunk. If we were able to more accurately simulate feedbacks in the global carbon cycle, such as tipping points in forest ecosystems and abrupt permafrost thaw, **the estimated remaining budget could disappear altogether.** Hence, safeguarding the biosphere from further degradation or collapse is an existential challenge for humanity.”⁴*

In 2009 Australian scientists warned against any further damage to the biosphere from land-clearing or logging: *“Native vegetation is a major carbon sink. Forest and woodland destruction is the fastest-growing contributor to Australia’s carbon emissions, as it transfers the carbon that was stored in the vegetation to the atmosphere. Hence, Australia’s increasing forest and woodland destruction threatens its ability to meet its commitments under four major international treaties: the Convention on Biological Diversity, the World Heritage Convention, the Convention to Combat Desertification, and the Framework Convention on Climate Change.”⁵*

Verdant’s RPS proposal involves immediate emission of high volumes of CO₂ to atmosphere simultaneous with reliance on logging, this time of plantations, for in this iteration of the re-start of Redbank it is proposed not to use native forest biomass but plantation forests, though we will describe later how that is not really the case based on the description of their targeted feedstock including native vegetation from private landholder native forest clearing. See Section A: 4

Planning also to use plantation wood will invoke pressure on native forests to be even more aggressively logged or cleared as a shortfall in any plantation wood is likely to arise, as plantations are burnt to feed this power station. Its approval will ensure that any plantations – meant to address wood, not energy supply, are likely to be targeted for burning if less immediately valuable, at any given time, as wood than as feedstock.

3. Inability to Offset Emissions - in Reality

Either way – native or non native wood biomass, the emissions generated by RPS will mean the same volumes of C entering the atmosphere, in direct contravention of repeated warnings on how best to address climate emergency. The first most critical action is: avoid any avoidable emissions. The best way to do that would be to not re-start an already defunct power station that is not, right now, emitting. To alter that status quo could be to approve massive volumes of C entering the atmosphere when it is entirely unnecessary, i.e. avoidable.

The proponent admits there will be high volumes of C released to atmosphere which it admits it cannot take out of the atmosphere through any current technology. It argues it will deal with those emissions by buying ‘offset’. It argues this in the **Greenhouse Gas Mitigation Plan and Climate Change Adaptation Plan**. An extract is reproduced below.

⁴ Rockstrom et al, PNAS September 21, 2011 118 (38) e2115218118; <https://doi.org/10.1073/pnas.2115218118>, <https://www.pnas.org/content/118/38/e2115218118?etoc=>

⁵ <http://scboceania.org/landclearing/>

“Section:3.6

Measures to avoid and reduce GHG emissions

Around 97% of the Proposal’s Scope 1 emissions are due to the burning of biomass for electricity generation.

However, there are currently no viable technologies for reducing these emissions at source. The remaining 3% of Scope 1 emissions are due to material handling. These emissions – and similarly the Scope 3 emissions from biomass processing and transport – could potentially be reduced to zero through the use of, for example, electric equipment and vehicles. Verdant will periodically review technological developments, and will prioritise emission-reduction measures that are technically and commercially feasible.

Realistically, the main mechanism for addressing GHG emissions in the near future will be carbon offsetting.”

Section 3.6.2). *In other words, it is proposed that carbon offsetting will be used to achieve the targets in Table 3.11.”*

We refer you to **Appendix 2: Failure and Corruption of Emission Trading Markets** for exposition of the inability to offset emissions(in reality) by the purchase of carbon credits and of the rapidly shifting policies regarding the carbon offsetting concept in general. It’s an approach fraught with risk, risk of increasing actual emissions by creating conditions whereby there is no real incentive to reduce emissions, risk of a reversal of not only domestic, but international carbon accounting policy settings and the risk of market failure of offset arrangements.

4. The proposal STILL seeks approval combustion of native forest biomass

The Lifecycle Assessment admits the proposal will rely on burning native forest biomass although it attempts to minimise this fact by describing it in Section 2.2.1 as:

“native scrub vegetation that has reached unnatural densities and dominate an area on agricultural land. Verdant Earth have determined that the current practices for weed control is the removal of trees, which are then left to dry for a few weeks before being pushed into a pile and burnt in situ. They will be harvested in accordance with land management codes, then chipped on site and transported to Redbank Power Station.”

The so-called life cycle analysis that finds forest biomass combustion emissions are negated by regrowing trees has been comprehensively discredited by scientists nationally and internationally.

Appendix 3: A The Science of Why Forest Biomass Combustion Exacerbates Climate Crisis provides recent, and decades of previous science challenging this industry promoted falsity.

It’s dangerous and inappropriate to put up the Redbank proposal that can only lead to further pressures on native forests even if any native forest feedstock is to be restricted to a derivation of native forest derived biomass from private land. Regrowth forests are just that, whether regrowing on public or private land. Regrowing forests: to define them as a residue of invasive species harvesting as the Lifecycle Report seeks to do is disingenuous.

The 850,000 plus tonnes of wet biomass this proposal needs to find to operate will definitely put pressure on surrounding native vegetation - across any tenure – it will eventually be needed to keep up supply, especially if there is an economic incentive. Private landholders might gain a market for their ‘thinning’ of their re-growing forests (to the detriment of the ecosystem) and a price that might be put on the feedstock will simply create incentive for native vegetation clearing.

Vast swathes of native vegetation will be regarded as waste, residue and hence potential feedstock, making recovering forests and corridors vulnerable to exploitation. Many of the areas proposed in the Lifecycle Report are in fact valuable habitat for wildlife that in turn help to keep trees and ecosystems healthy. They contribute to climate stability. They are essential to rain cycles, and they provide many economic and social values for human beings and industries other than the forestry industry. Yet this is what the proposal depends on: logging trees including regrowing native stands on private land, for energy production.

The main message that needs to be conveyed in relation to the folly of a biomass combustion power station is: large CO₂ emissions result per each kWh generated. Such are the findings of the review of studies of the European Academy of Science into the net impact of using forest derived biomass (FDB): From “Serious mismatches continue between science and policy in forest bioenergy”

Woody biomass contains less energy than coal (biomass pellets 9.6–12.2 GJ/m³; coal 18.4–23.8 GJ/m³; IEABioenergy, 2017), so that CO₂ emissions for the same energy output are higher (110 kg CO₂/GJ for solid biomass, 94.6–96 kg CO₂/GJ for coals in IPCC, 2006).

Combined with the energy needs to gather from diffuse sources and intermediate treatment (drying and pelleting), replacing fossil fuels in electricity generation results in significant increases in emissions of CO₂ per kWh.

The net effect of switching to biomass is thus usually to increase emissions and thus increase atmospheric levels of CO₂’ ⁶

Section B: Detail of shortfalls in proponent’s Air Quality Impact Assessment

Air Quality Impact

In terms of increase to chronic illness and death from air pollution, an approval of this proposal would be to invite into the Hunter Region almost as severe a threat as possible.

A NSW government report warns about emissions from wood power stations. Arguing from the findings of a 2020 study funded by the NSW Environment Protection Authority and the NSW Ministry of Health, we explain below why a wood combustion power station represents possibly the most polluting scenario that could be devised for increasing the likelihood of death and illness

⁶ “Serious mismatches continue between science and policy in forest bioenergy”

Michael Norton Andras Baldi Vicas Buda Bruno Carli Pavel Cudlin Mike B. Jones Atte Korhola Rajmund Michalski Francisco Novo Július Oszlányi ... See all authors

First published: 22 August 2019 <https://doi.org/10.1111/gcbb.12643>Citations: 6

from air pollution in the pursuit of a so-called 'renewable energy from biomass' fossil fuel transition.

3 worst PM_{2.5} point sources: Wood combustion, power stations, on-road diesel exhaust

These findings were the culmination of a comprehensive project⁷ that examined air quality danger from 8 point sources dispersing particulate matter 2.5 (PM_{2.5}). The results were that in NSW PM_{2.5} is worse from 1) wood combustion 2) power stations, followed up by 3) on-road diesel vehicles exhaust. The ranked point sources in order of volume and dispersal propensity were overlaid with impact on population and are listed in the column below in order of greatest to least threat.

On-road diesel vehicle exhaust (the third worst source) forms the core form transport strategy of RPS's proposed new supply chain. This all represents dangerous *additional* emissions and dispersion of particulates throughout the region; currently the (non-operational) power station engenders no vehicular traffic.

- wood heaters
- power stations
- on-road diesel vehicle exhaust
- on-road petrol vehicle exhaust
- on-road non-exhaust
- ships
- industrial plant and machinery
- air craft both flight and on ground operations

To approve Redbank Power Station would be to combine three of the worst possible point sources for PM_{2.5} pollution and operate them together, concentrating emissions with cumulative impact. See the list above from the NSW Dept. Health Study already mentioned.

It is illustrated clearly in the figure overleaf, derived from Fig. 1 of the report of the project funded by NSW Department of Health and the NSW Department of Planning. One can see the area between Wollongong and Newcastle and encompassing Sydney with various overlays. Data regarding PM_{2.5} point sources and dispersal is overlaid with population. The spatial distribution of source-specific PM_{2.5} demonstrates the significance of wood combustion and power stations in generating PM_{2.5}.

⁷ The mortality effect of PM_{2.5} sources in the Greater Metropolitan Region of Sydney, Australia
Richard A. Broome^{a,c,*}, Jennifer Powell^b, Martin E. Cope^b, Geoffrey G. Morgan^d

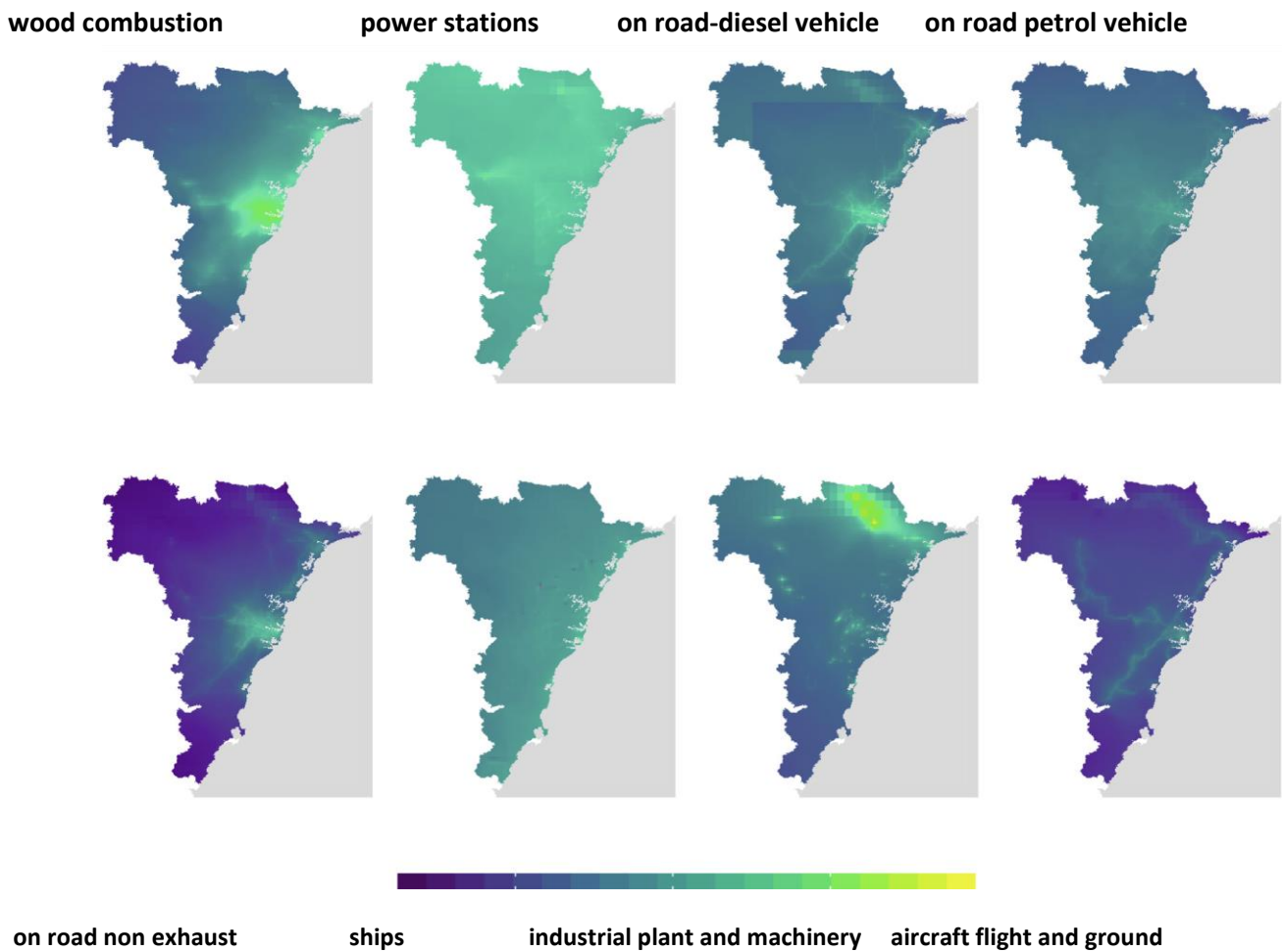
^a Health Protection NSW, NSW Ministry of Health, Australia

^b CSIRO Oceans and Atmosphere, Aspendale, Australia

^c School of Public Health, University of Sydney, Australia

^d University Centre for Rural Health - North Coast, School of Public Health, University of Sydney, Australia

Dark blue indicates lower (<0.01 concentration), pale green to yellow higher (1.0 >1.0)



Adaptation of Table 2 of the study is potential of PM 2.5 concentration, according to source, ranked for severity.

Primary PM2.5 emissions from individual sources in 2008 and the modelled population-weighted annual average PM2.5 (primary and secondary) in 2010/11, using the CCAM-B particle modeling framework.

Source	PM2.5emissiona		PM2.5concentration	
	Tonnes	%	µg/m3	%
Wood heaters	7,400	19.0	0.49	24.0
Power stations	3,400	8.8	0.22	10.5
On-road mobile sources	2,100	5.3	0.35	16.9
Exhaust from petrol vehicle	180	0.5	0.08	4.1
Exhaust from diesel vehicles	1,100	2.9	0.16	7.6

Non-exhaust emissions	770	2.0	0.11	5.3
Off-road mobile sources	2,900	7.5	0.22	10.4
Industrial vehicles and equipment	2,000	5.2	0.06	3.0
Ships	850	2.2	0.12	5.7
Aircraft (flight and ground)	64	0.2	0.03	1.7
Other anthropogenic sources	16,000	41.0	1.28	38.1

a Emissions of primary PM_{2.5} in 2008 (NSW EPA, 2012).

b Population-weighted annual average concentration

The danger of particulate matter from wood combustion

PM_{2.5} is one of the most dangerous outputs of wood combustion, because of its size. Too small to be filtered by nose hair and the throat but too large to be filtered by Brownian motion, it can move deep into the respiratory system and lungs and is small enough to penetrate the bloodstream. The particles transport noxious micro-molecules deep into the lungs and pulmonary system, many cancerous e.g. SO₂. Those not necessarily cancerous can promote severe respiratory illness and heart disease, amongst other conditions, resulting in severe and/or chronic illness and death. The 2020 NSW government funded project found:

PM_{2.5} from wood combustion and power stations the most prevalent, mobile and dangerous to human health.⁸

Regarding mortality, the study states unequivocally (at section 4) that: *Wood heaters and power stations were responsible for the greatest burden, causing 0.3% and 0.1% of all mortality (1,400 and 620 YLL) respectively.*

Also: This paper quantifies the burden of mortality attributable to PM_{2.5} from specific emission sources. It shows that wood heaters, on-road vehicles and power stations are collectively responsible for more than 50% of PM_{2.5}-related mortality.

For this reason alone, the proposed modification to Redbank Power Station should not be allowed to proceed.

“Our primary analysis shows that around 1.2% of all mortality in the Sydney GMR (equivalent to 5,900 YLL) is attributable to long-term exposure to anthropogenic PM_{2.5}. Wood heaters and power stations were responsible for the greatest burden, causing 0.3% and 0.1% of all mortality (1,400 and 620 YLL) respectively.”

Reliance on theoretical (predictive modelling) rather than real world experience (evidence) renders the AQIA inadequate. So also does omission of discussion of the significance of further burden of emissions (further concentration) and the cumulative impact that this has on air quality.

RPS emissions will result in:

- PM₁₀ and PM_{2.5} (from soot and fly ash)
- oxides of Nitrogen (NO_x)² including nitrogen dioxide, arising from nitrogen in the fuel and reactions of atmospheric nitrogen
- sulphur dioxide (SO₂) arising from the sulphur in the fuel (high for fuel but relatively minor for biomass)
- carbon monoxide (CO) formed as an intermediate of the combustion process
- volatile organic compounds (VOs) from incomplete combustion or unreacted fuel compounds; and
- trace elements, emitted as PM and arising from the metal content of the fuel

We refute the AQIA findings in relation to these pollutants, i.e. that they will not or only infrequently exceed acceptable ambient levels, on the basis that a plethora of national and international studies contradict the information provided in Verdant's AQIA.

For example, re:

- PM₁₀ and PM_{2.5} (from soot and fly ash), the AQIA relies on predictions derived from what is claimed to be acceptable standards. The AQIA doesn't refer to real world (known) PM₁₀ and PM_{2.5} concentrations arising from the burning of wood in a furnace to produce power.

Australia isn't measuring emissions from 100% wood combustion power stations because it doesn't have any. Elsewhere in the world such facilities do exist and where they operate the findings are that the emissions are dangerous and unacceptable:

The 2017 report from the Air Quality Expert Group to the Department for Environment, Food and Rural Affairs; Scottish Government; Welsh Government; and Department of the Environment in Northern Ireland, reporting results from a range of biomass combustion facilities, noted that industrial scale biomass facilities had the most comprehensive data collection and reporting methodology. However, the expert group found, in relation to the question: *Will the impact of future levels of biomass burning, with proposed policy measures in place, lead to a significant change in ambient concentrations of major pollutants and further in population weighted mean exposure?* that:

'Biomass burning activity data used in the NAEI suggests that there are increasing emissions of PM₁₀, PM_{2.5}, NO_x, BaP and dioxins from this source category at a range of scales of combustion.'

Evidence from the U.S. suggests that as coal is replaced by biomass to generate electricity, it is also replaced by biomass as a major source of air pollution that impacts public health. Peer reviewed science published in May 2021 states that, *"The increasing role of gas and biomass and wood emissions in the health burden of PM_{2.5} exposure indicates that swapping one air pollution-emitting fuel source for another is not a pathway to a healthy energy system."* Jonathan J

Diminishing, rather than improving air quality is inevitable if RPS is allowed to proceed based on prediction rather than known consequence. Prediction is just that; acting on lessons from facilities for which there are already results from monitoring data is a more prudent path. Countries that experiment with large scale of burning wood for power now regret it.

Covid 19 molecule aggregation on PM_{2.5} from biomass combustion (black soot) emissions

In our first submission regarding RPS we warned the project was fraught with risk and liable to invite litigation. Links between PM_{2.5} from the black soot component of biomass combustion had already been made by a World Bank report and these findings were submitted to the NSW parliamentary enquiry into NSW energy supply in August 2020.

Omission of life cycle analysis into effects on health from the bioenergy/fuel industries:

Another expert witness who presented to the NSW Environment and Planning enquiry into the sustainability of energy supply and resources was Dr Christine Cowie, representing the Centre for Air Pollution, Energy and Health Research (CAR), a National Health and Medical Research Council-funded centre for research excellence in air pollution and health. This organisation consists of 30 scientists working collaboratively in the fields of epidemiology, toxicologists and atmospheric scientists, in collaboration also with CSIRO.

Dr Cowie reported findings of CAR research into 7,000 scientific abstracts that showed lack of analysis of energy impact in terms of health. She expressed particular concerns about the lack of research and analysis taking place in energy transition technology explaining that there were few epidemiological observational studies being conducted. There was a lack of lifecycle analyses with very little consideration of little of public health impact in some emerging fields. She raised the issue of biofuels remarking that although there has been significant investment in the last 5 years, there is a widespread assumption they are less hazardous with very little research actually conducted.

Lack of objectivity of RPS proposal

We query the objectivity of consultants preparing briefs for this RPS proposal and will detail this upon further request.

The biomass combustion industry has a vested interest in white (or green) -washing emission impact. The AQIA omits reference to now known links between PM_{2.5} and Covid transmission published internationally in air quality research. Since the World Bank warning in 2020 more studies demonstrate propensity of biomass combustion emissions to hasten and extend Covid 19 transmission where 'black soot' is prevalent.

The AQIA does not address the latest World Health Organisation guidelines which now recommend lower levels (far lower than NSW's permitted levels) for NO₂ and small particulates to protect human health.

We think that to establish a facility, the operation of which can only promote Covid 19 and other airborne molecular virus or bacteria via particulate generation and transmission, would be an extremely risky undertaking, for everyone. **Appendix 1 b Propensity of biomass combustion to facilitate transmission of Covid 19 molecules**

Section C: Carbon Cycles and the Lifecycle Assessment

Critique of claims re carbon neutrality of biomass (wood) combustion

Around the world respected scientific authorities in association now warn there is absolutely no scope for the release of further GHG concentrates to atmosphere because the current level of 1.5 degrees above pre-industrial global concentrations of CO₂ is already too high. As explained in our general introduction, there is no carbon budget left. Biomass combustion is inherently emissive of CO₂ regardless of the feedstock. It occurs upon combustion, at the smoke stack.

Claims made in the AQIA and the Life Cycle chapters of the amended RPS proposal lack understanding of impact on global CO₂ levels. The proponent is either not *au fait* with or ignoring the highest levels of climate change policy making, which now agree there needs to be urgent review of policy settings re biomass combustion.

The carbon neutrality of forest biomass (and wood combustion generally) for power generation is disputed scientifically at international, regional, national and levels, and is now rejected by a NSW a parliamentary committee, recommending legislative change. This is the context within which RPS needs to be assessed.

We re-state the NSW *Sustainability of energy supply and resources in NSW report*, which recommends legislative change on the basis that forest bioenergy is highly emissive.

Sustainability of energy supply and resources in NSW, Findings and recommendations, (pp. 15-17)

Finding 5 _____ 16

Forest biomass is not a renewable, sustainable source of energy.

Below is further explanation of how bio mass energy raises rather than lowers concentration of atmospheric carbon:

- wood biomass combustion is, in itself, highly emissive of carbon at the smokestack
- life cycle arguments based on the simple assertion the re-growing trees will absorb carbon emitted are simplistic and ignore critical timeframes for atmospheric draw down of carbon there is an opportunity cost of not leaving the trees in the ground to mature where they can sequester and store exponentially more atmospheric carbon; logging releases huge stocks of carbon to atmosphere; potential carbon storage and sequestration is lost
- supply chains for bioenergy are in themselves highly emissive (from clearing or logging to secure biomass product to transport from (purpose grown or not) and private or public land (forests) to combustion destination

We critique (in red) claims made the Life Cycle Assessment produced for Verdant's RPS proposal.

Energy crops

The production of feedstock from energy crops will involve the cultivation of purpose-grown biomass within managed plantations. These energy crops will be planted in annual rotations, and will take approximately four years before they contain enough above ground biomass to be harvested. This will be done using coppicing to allow the harvest biomass to regrow during the following four years. Once harvested, the plant material will be air dried, chipped and screened before being transported to the power station for combustion. These plantations are planned to be located within a 50km radius of the power station. There is no detail of the arrangements that have been made to ensure this will occur. It is hypothetical.

Several species are under investigation, with the two most likely crops to consist of quick-rotation coppicing of eucalypts and mallees, as well as Bana grass. For the quick-rotation eucalypts and mallees, seedlings will be planted on an annual basis over four years, from which point harvest will begin, with four years of growth between each harvest. For Bana grass, seedlings will be planted and allowed to grow for 1 year, after which, the tops are harvested and replanted to thicken the crop or for energy. After 3 to 4 years, the plants are coppiced on a regular rotation. Agricultural crops for biomass are known to be highly polluting. China has undertaken multiple studies of the effects of its crop based biomass combustion because of its immense contribution to air pollution.

Appendix 1.

In terms of land use, Verdant Earth are seeking to use areas that currently have no alternative economic value to farmers/land owners. For example, they will target buffer zones of mines in the area, semi-arable land parcels without other economically viable economic agricultural uses. Again this is an hypothetical scenario, no detail; no certainty and the problem of combustion remains. It also ignores the recognised need for Australia to re-establish corridors of native vegetation and create connections over currently degrade and/or unused land for the promotion of the resilience of degraded landscapes. This requires permanent vegetation enhancement, not combustion of crops grown on such sites, i.e. needed for corridors. This ignores the likely value of such swathes of land for restoration, as expressed in Nature Based Solutions NBs, now being promoted internationally as a critical tool for climate change mitigation..

Residues from land clearing of invasive species on agricultural land

Verdant Earth have been working with the Civil Industries and Local Landcare Services LLS NSW as well as landowners who have trees and shrubs that are classified as noxious weeds and may be cleared from land for agricultural uses. This includes native scrub vegetation that has reached unnatural densities and dominate an area on agricultural land. Verdant Earth have determined that the current practices for weed control is the removal of trees, which are then left to dry for a few weeks before being pushed into a pile and burnt in situ. They will be harvested in accordance with land management codes, then chipped on site and transported to Redbank Power Station. We have criticised this under Section A. 4 (above)

Domestic biomass fuel

The domestic biomass fuel (DBF) Verdant Earth are targeting as potential fuel includes

Construction and Demolition (C&D) and Dry Sorted Commercial and Industrial (C&I) waste sourced primarily from industry skip and bulk bin collection, and demolition works, where this material is presently destined for landfill. This is inherently polluting given the predicted certainty of pollutants in the form of building adhesives, chemical treatment etc, and no exemption from the PEO Act should be sought to facilitate this.

Section D: Risk

Risks Involved in approving the Verdant RPS proposal include: Human Health, Immediate Risk to Environment, Economic, Legal, Reputational (for those involved)

Human Health

Omission of life cycle analysis into effects on health from the bioenergy/fuel industries:

Another expert witness who presented to the NSW Legislative Assembly Committee on Environment and Planning enquiry into the sustainability of energy supply and resources in 2020 was Dr Christine Cowie, representing the Centre for Air Pollution, Energy and Health Research (CAR), a National Health and Medical Research Council-funded centre for research excellence in air pollution and health. This organisation consists of 30 scientists working collaboratively in the fields of epidemiology, toxicologists and atmospheric scientists, in collaboration also with CSIRO.

Dr Cowie reported findings of CAR research into 7,000 scientific abstracts which demonstrated a clear lack of analysis of energy impact in terms of health. She expressed particular concerns about the lack of research and analysis taking place in energy transition technology explaining that there were few epidemiological observational studies being conducted.

There was a lack of lifecycle analyses with very little consideration of little of public health impact in some emerging fields. She raised the issue of biofuels remarking that although there has been significant investment in the last 5 years, there is a widespread assumption they are less hazardous with very little research actually conducted.

Lack of objectivity of RPS proposal

The biomass combustion industry, like the mining industry, has a vested interest in whitewashing emission impact. We query the objectivity of information provided in the AQIS. No mention has been made in the AQIA of the now known link between PM2.5 and Covid transmission now published internationally in air quality research. Since the World Bank warning in 2020 much research has demonstrated the propensity of emissions from biomass combustion to hasten and extend the transmission of Covid 19 across populations.

We leave the assessors to draw their own conclusions regarding the risk this proposal poses by introduction into the atmosphere of any more PM 2.5 particles. We think that to establish a facility, the ensuing emissions of which can only promote Covid 19 transmission, would be an extremely risky undertaking, for everyone.

Evidence of the **danger we face from centuries of combustion based power generation** is already vast. The exponential growth of human population has relied on combustion based power for centuries with devastating impact on the planet, so the voluminous body of knowledge relating to this impact is not surprising.

There is already a voluminous body of knowledge on the extreme danger posed by not only fossil fuels but by the pseudo renewable substitute of what is purported to be renewable but which isn't, i.e. wood biomass.

Recent litigation regarding exacerbation of climate change should convince state government assessing agencies. If that's not enough pending public action regarding exacerbation of health outcomes due to knowingly increasing allowance for dangerous concentrations of volatile, dispersible, known air pollutants should be enough.

We urge assessors to heed only peer reviewed science and relevant case studies provided in Appendices re the experience worldwide of biomass combustion. A controversial proposal with such far reaching impact requires peer reviewed science, not industry rhetoric re job projections or empty claims of proponents with vested interests, made possible only by outdated policy settings.

Economic Risk: This is highly likely given that there is no guaranteed feedstock provider beyond possibly the plantations of FCNSW, which has in the past already been sued by clients for 'lack of supply'.

AFCA appeals to assessors to gather all available resources for this assessment, but in particular: Independent technical expertise and mindfulness of the need to follow ecologically sustainable and development principles including, most importantly, the 'precautionary principle', i.e. the mandate to address uncertainty and to ensure that potential hazards are taken into account in decision making.⁹

This proposal attracts (but does not address amelioration of) unacceptable levels of risk.

There is potential for severe reputational damage and/or legal challenge arising from approval of a development that will lead to irreversible and horrendous environmental and health outcomes - from annual combustion of approaching a million tonnes of **(wet)** plantation and/or native forest biomass (whether referred to as invasive native regrowth or not), under the guise of 'green energy'.

⁹ <https://www.pc.gov.au/research/supporting/precaution/precaution.pdf>