

From: [REDACTED]
To: [Nina Harrison: IPCN Enquiries Mailbox](#)
Cc: [REDACTED]
Subject: Walla Walla Solar Farm (SSD 9874.) Submission
Date: Thursday, 12 November 2020 8:23:37 AM
Attachments: [Solar Photos.pdf](#)
[Shattered Panels - 1.PNG](#)
[Shattered Panels - 2.PNG](#)

Dear Independent Planning Commission NSW Panel,

Re: Walla Walla Solar Farm (SSD 9874.)

I express the following grave concerns for FRV's Walla Walla Solar Farm proposal (SSD 9874,) from the basis of a personal, 60 year long family involvement with Australian agriculture/healthy food production & as a detrimentally impacted neighbour to Bomen Solar.

The Total Environment Centre (Saul Deane) has approved this submission & shares the following concerns.

1. The heavy metal land/water contamination risk from inferior, aged, degraded, fractured, smashed PV Solar panels is a terrifying prospect!

Please find attached photos of smashed solar panels nearby my son's property, with damage caused by tennis ball sized hail. This also destroyed my son's car - 31st October 2020.

What impact would the consequential heavy metal leachate have on the land/water of the Walla Walla solar site & also the neighbouring land & the Murray River Catchment - with Back Creek & Middle Creek, ephemeral tributaries of Billabong Creek, traversing the site?

There is nothing to prevent hail/severe storm damage to the Walla Walla Solar Farm & nothing at all to contain shattered solar panel components.

How would the inherent capability of this proven uncontaminated, food producing land be guaranteed, if these 700,000 PV Solar panels (or some of) were compromised over time or from sudden destruction eg.hail?

How would this not "alienate the resource lands"?

How would the neighbouring land to the Walla Walla site also be guaranteed to not be alienated through such contamination?

Personally, our family's livelihood relies on the healthy, uncontaminated production of cereals - wheat & barley, canola oil - supplying quality oil to Riverina Oils for human consumption, grazing sheep, a family orchard & vegetable garden providing our food supplies & also a crustacean (yabby) supply from our uncontaminated dams - within close proximity to Bomen Solar.

Given the DPIE takes a "risk based approach" & both DPIE Planner Rob Beckett & the EPA advise me that only once contamination actually occurs is there a complaints process to follow, this is extremely alarming!

Why isn't the 'Environmental Precautionary Principle' triggered by the land/water contamination risk presented to this vital food producing area by FRV's Walla Walla Solar proposal?

There is a lack of evidentiary basis to guarantee no contamination, with proven hail damage to PV Solar being a definite 'Foreseeable Risk.'

Please supply reputable, independent, peer reviewed studies into the water run-off toxicity levels from degraded/fractured/shattered PV Solar panels, to prove the effects on the land & water supplies.

Please supply reputable, independent, peer reviewed studies of heavy metal toxicity levels of sheep grazing within solar 'farms,' ensuring the edible & saleable quality of these sheep. Also, please provide full, independent, peer reviewed reports/studies from all current Australian solar 'farms' with grazing sheep - regarding the number of sheep deaths & injuries (including unmonitored/untreated fly strike) that have occurred within these operating solar 'farms.'

2. It is unsatisfactory to simply state that the Walla Walla Solar 'Farm' would be rehabilitated within 18 months of being decommissioned or suddenly ceasing, without an absolute guarantee.

What guarantee do we have that these PV Solar panels & all introduced solar components, no matter the depth, will be completely removed & no residue will remain?

From our family's personal experience, development conditions set are ignored & never enforced.

Eg.1. Bomen Solar have completely failed to provide adequate tree screening surrounding Bomen Solar.

Eg.2. French company owners of Bomen's abandoned Wool-Combing enterprise skipped the country, leaving their contaminated ponds unremediated to date, since 2005.

Nobody has ever taken responsibility for this clean up/remediation despite conditions having been applied to the development.

3. What are the recycling & waste destinations for these 700,000 PV Solar panels?

What is the recycling & waste destination for the millions of PV Solar panels if the four Greater Hume Shire proposals were all approved?

Please provide full details of the actual facilities available where this massive waste burden of toxic classed PV Solar panels will be safely & sustainably dealt with.

If FRV abandons Australia, leaving the proposed Walla Walla Solar 'Farm' (& potentially other nearby solar 'farms' owned by other foreign developers) to degrade, who is responsible for the clean up?

If landholders hosting this large-scale solar were left with an abandoned solar 'farm,' how would they deal with this costly, extensive, toxic waste burden?

If a host landholder subsequently declared bankruptcy, who then is responsible for the costs & the clean-up?

Will the local Greater Hume Shire Council be responsible?

Please provide these answers & a response from Greater Hume Council regarding their ability & capacity to deal with this enormous waste possibility.

Please provide a guarantee that the Walla Walla Solar 'Farm' site & surrounding landholders

would not be subject to toxic contamination risk from the dumping of 'future electronic garbage' scenarios. Especially if the solar 'farm' remained abandoned/unattended/unmaintained & not monitored by the DPIE's risk based procedure.

Yours Sincerely,

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[please do not publicise my name and contact details]

Our family encounter with smashed PV Solar panels from tennis ball sized hail - 31 Oct 2020





NEWS



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NEWS

Bomen Solar's absent tree screen buffer.





Felled century old tree with hollow - "retained in the landscape."
Placed on the ground in the outer perimeter of Bomen Solar.

Our easterly view of Bomen Solar.
Where's the conditional tree screening?



There is one tiny tree next to the white tree guard - planted mid 2019





The same hollow log as photographed prior to construction - placed in the absent tree screen buffer area. Originating from one of many felled century old trees - habitat for vulnerable superb parrots & squirrel gliders - now "retained in the landscape."
One tiny tree is in the foreground next to the white tree guard - planted mid 2019.

There is also an unimpeded view of ROBE which has never been adequately screened or limited its night lighting for a decade, despite conditions being imposed!



Our Obnoxious, Unscreened, Southerly Bomen Solar View. It's a glaring nightmare!







The tree screen buffer consists predominantly of substantial weed growth, rather than any trees.



Patterson's Curse dominates the absent tree screen area.
The previously vegetated Western tree line is that of Byrnes Rd.



The tree buffer zone consists predominantly of pattersons curse/salvation jane & other weeds.



The same hollow log as photographed prior to construction - placed in the absent tree screen area. Originating from one of many felled century old trees - habitat for vulnerable superb parrots & squirrel gliders - now "retained in the landscape."







NEWS





From: [REDACTED]
To: [Nina Harrison: IPCN Enquiries Mailbox](#)
Subject: Walla Walla Solar Farm - - SSD 9874
Date: Thursday, 12 November 2020 4:44:27 PM

Dear Independent Planning Commission Panel,

Introduction

The NSW DPIE are **causing a genuine & unnecessary social & mental health crisis** in rural NSW through their persistent promotion of a most corrupt & fraudulent 'renewable' scam & their dogged determination to force detrimental large-scale PV Solar 'dumps' - such as FRV's Walla Walla Solar proposal, on to our irreplaceable, uncontaminated, good quality soil & reliable food producing areas & our most sustainable, beautiful & ecologically precious rural communities.

The **harassment, bullying, bribery, lack of consideration for rural human beings, inaccuracies, misrepresentation, lying & fraudulence** used to force these developments on to vital food producing land is shocking, dishonest, deserves severe rebuke & must be brought to account.

I note a current social impacts submission opportunity from DPIE regarding the impacts of state significant developments & believe this will have been generated because of their cruel treatment of rural communities & that of opportunistic solar developers such as FRV.

No responsible, intelligent Government would prioritise this **anti-Australian, foolish energy policy** - resulting in the mass dumping of '**future electronic garbage**' on a beautiful, pristine & reliably productive rural area such as this Walla Walla Solar site.

I am a great believer & participant in genuine sustainability of the land, environmental care, organic production, reducing waste & recycling.

The **hysterical, exaggerated claims of FRV's** spokesperson at the IPCN hearing 5th Nov 2020, that we are in a "climate crisis" & large-scale **PV Solar would "save our lives,"** is appalling, fanciful & untrue!

Where is her proof that operation of this proposal or the 4 Greater Hume Shire proposals would change the world's temperature at all?

How could it be that a mass of PV Solar panels would be more important to "save our lives" than actual food for human & animal sustenance?

Please provide reputable, independent, peer reviewed evidence/studies of how FRV's PV Solar proposal (including the whole PV Solar lifecycle) will lead to zero emissions, actually alter the world's temperature, practically "save our lives" & benefit this beautiful Walla Walla environment.

It is apparent that **large-scale financial gain is misleading & diminishing the ability & awareness of promoters & participants**, to even see that FRV's Walla Walla proposal has nothing to do with environmental care at all!

It is in fact **environmental vandalism**, as proven by Bomen Solar & Metka Solar at Wagga Wagga.

Desecration of Productive, Uncontaminated Land & Environmental Vandalism.

The proposed desecration of Australia's irreplaceable food producing land, biodiversity & precious ecology is wanton environmental vandalism!

Large-scale PV Solar, **brings nothing positive whatsoever to the district**, it **conflicts with agriculture**, burdens many with **broad-scale land/water contamination risk**, **productivity impacts** for surrounding producers, a **glaring visual amenity nightmare** for beautiful rural communities & creates a **massive, toxic waste burden** (300 times more

toxic waste created from PV Solar per unit of energy than from nuclear power plants) with **no planned destination.**

Inferior, Unreliable Renewable Con Driven By Socialist Ideology.

The renewable energy con is driven by foolish Federal Government support for the socialist, **Beijing influenced U.N Paris emission targets.**

The Energy Security Board's plans for Australia are nightmare for rural Australia, conflicting with food production, providing costly energy to consumers, & severely curbing Australian industry & manufacturing with energy poverty.

Even climate alarmist zealot **Audrey Zibelman** - Australian Energy Market Operator (AEMO) CEO has acknowledged that her **insidious Green New Deal/The Great Reset**, globally interconnected electricity grid ambitions for Australia, **accepts it will lead to a decade of blackouts!**

With the **World Economic Forum's** founder & The Great Reset advocate **Klaus Schwab** proclaiming **China as the natural global leader of this disastrous global energy nightmare for Australia.**

This is an ideologically driven, left-wing scam with **no proven benefits to Australia or to the world's environment at all.**

Dr Alan Finkel - Australia's Chief Scientist, stated that "**we need to look with a bit of sophistication at what is inadvertently emitted..**" (ABC RN 23rd Sept 2020.)

Whilst Finkel has failed in his Energy Blueprint to adhere to this one piece of sage advice, it is completely dishonest not to do so regarding large-scale PV Solar developments such as Walla Walla - in assessing their genuine, truthful environmental credentials.

Dishonest Misrepresentation of Environmental Benefitting Terminology

Fake terminology has been used to label large-scale PV Solar as sustainable, clean, green & zero emissions, when none of this is true.

It is essential to consider the **whole PV Solar life-cycle**, as it is not just sweet little ray's of sunshine alone & nothing but gentle breezes from wind energy.

Environmental terminology must take into account the **intensive energy required for the manufacturing** of PV Solar (300 tonnes of coal per 1 square metre of solar module,) the **extensive toxic pollution created** (phosphine gas & sulphuric acid, etc.,) the **leaking of Sulphur Hexafluoride from solar manufacturing, 'renewable' switch gear, circuit breakers (due to the boom in 'renewables') & wind turbines. SF6 is the most potent greenhouse gas known to man - 23,500 times more warming than CO2 - remaining in the atmosphere for at least 1,000 years.**

Importing Mass Toxic Waste

There is a massive, imported, unplanned for, non-recycled, toxic classed PV waste burden created from the Department's **fake sustainable energy.**

It is apparently too difficult & costly to recycle toxic PV.

There is one Solar panel recycling business in Adelaide S.A who does not recycle the toxic modules, with none at all in NSW.

The DPIE have advised me that they have only just begun to investigate whether the recycling of these tens of millions of toxic classed panels is actually possible.

This is terrible planning, when the lifespan of inferior Chinese PV panels averages 5-15 years.

It is incredibly foolish to be **purposelessly investing in waste creating proposals** when Australia should be reducing waste, not importing mass quantities of it in **support of Chinese manufacturing for inferior energy provision.**

Please provide the waste facilities available now to deal with this mass of toxic classed PV Solar. Hail storms & bushfires would lead to the immediate requirement for such facilities.

The destination details & the full costings for this disaster scenario must be fully planned for, guaranteed & revealed for consideration prior to any further approval.

Land/Water Contamination Risk Experiment

Harmful effects & negative health impacts for local landholders, the environment, land & water are excluded by the Department's Assessment, when this development is an **experiment** with no substantiated proof for the exclusion of **heavy metal contamination risk** of this presently **uncontaminated land** & the **ability to ever restore it & any surrounding area** negatively impacted, to its original, "inherent" healthy food producing capability & present pristine water ways condition.

Associate Professor Dr Geoff Currie AO - Nuclear Medicine Specialist - CSU Wagga Wagga states that he would live next to a nuclear power station because of all the historic testing, monitoring & safeguards implemented, but never next to a PV Solar 'farm,' because of the serious soil/water contamination risks & the increased fire risk. According to Dr Currie, satisfactory, long term testing has not been done in relation to the effects of mass toxic PV.

I have written in more detail on this large-scale contamination risk in a separate submission supported by the **Total Environment Centre** (Saul Deane) also informed by **Professor Ravi Naidu - CR-CARE : The Cooperative Research Centre For Contamination Assessment & Remediation of the Environment**. Professor Ravi Naidu believes that the contamination risk has not been determined as yet because work has not been done to do so.

Please provide this essential, peer reviewed, independent testing & study reports prior to any further approval.

The installation of future **battery storage creates further toxic contamination risk**.

Considering Chinese PV Solar panels have an approximate life span of 5-15 years (Kelly Pickerel Solar Panel World/Mary Hutzler senior fellow at the Institute for Energy Research The Verge 25th Oct 2020) & batteries have a very limited life span, where is their present waste destination?

Please advise full details of these facilities available today & the plans to deal with this extensive, toxic battery waste.

Bushfire risk has not adequately been dealt with by FRV or the DPIE. Far improved local facilities & extensive numbers of specialised personnel would need to be readily available to protect the facility & the surrounding landscape & residences.

Insurance & liability for surrounding landowners is astronomical given the value placed on these solar 'factories.' Given the complete conflict of interest FRV presents to this rural area & the abnormal expectations for the rural fire service, It therefore, must be a requirement that FRV would have to supply far more of their own fire fighting equipment & manpower to manage any fire threatening their site or that they have caused.

Large-scale PV Solar developments are a large-scale fire risk, made virtually unmanageable by the danger of the power plant & the lack of access.

Hayden Kingston - South East Local Land Services has advised me on the 12th Nov 2020 that **heifer cattle were killed in the Cobargo district from consuming toxic heavy metals from melted batteries caused from bushfires recently - 2020**.

Climate Alarmism Apology & 'Future Electronic Garbage' Solar & Wind Energy Exposed

Many reputable climate **experts & scientists dispute** the Department & FRV's '**climate crisis**' supposition.

Former climate activist & advisor on 'renewable' energy to Barack Obama - **Michael Shellenberger** has now apologised for his 'climate alarmism,' declaring solar & wind energy are '**future electronic garbage**,' worse for the environment than fossil fuels. His Californian led 'renewable' energy experiment is now a proven blackout disaster, whose

foolishness should surely advise the Department to not repeat a similar nightmare for NSW & Australia.

Even the hard-core environmentalists have **clearly exposed the 'renewable' energy con** in the film '**Planet of the Humans**' - **Michael Moore & Jeff Gibbs**.

***Additional Email** - Please find further supporting documents supplied provided by **Professor Ravi Naidu CR-CARE**.

Essential DPIE Disclaimer Due to Spurious Claims

It is no wonder that the **disclaimer** is included at the beginning of this Walla Walla Solar Assessment - stating that it may not be accurate, current, complete, reliable or correct. Numerous false claims pervade this document, including land quality class, erroneous, unsubstantiated benefits & the grossly understated impacts of this solar proposal. Fanciful positive assumptions are made with no evidentiary basis at all, completely neglecting or largely downplaying the obvious negative reality experienced by already suffering rural communities plagued by large-scale solar.

False Mapping & Purposeful Withholding of Current State Significant Mapping

Whilst the Department consistently makes **false/erroneous claims** for their own ideological benefit in this Walla Walla Solar Assessment, it is not surprising at all, considering the disgraceful behaviour of **Executive Director David Kitto** - Wagga Wagga Solar Forum 3rd July 2019 with his displays of **completely inaccurate, far outdated agricultural mapping (apparently 1982) & his absolute failure/refusal to answer numerous valid questions** from very concerned, potentially impacted rural landholders. Bomen landholders were told by David Kitto that our reliably productive Bomen/Eunony Valley area was "a wasteland," & therefore, he had no quarms/hesitation approving Bomen Solar.

This is outrageous, as this area, like the Walla Walla, Culcairn, Jindera & Glenellen area, has consistently proven to be a reliable food producing area, being in the 1% of NSW that was not drought declared.

During Bomen Solar's construction, Cheung Kong's Beon construction company supervisor Damien - expressed his deep regret that large-scale PV Solar would be dumped on such obviously rich & productive soil. I was grief stricken & traumatised viewing the massive piles of disturbed beautiful soil with the burial of numerous solar components. Yet, David Kitto had planned out his solar/wind energy route & Interconnector scheme & it appears nothing would deter him. Despite Greater Hume Council & the majority of residents (other than opportunistic landholders with other professions who don't care about their land or bribed solar hosts) validly objecting to these burdensome PV Solar invasions, objecting landholders & the community have been tortured relentlessly & persistently badgered.

It is a corrupt & scandalous state of affairs that the promised updated mapping to be finalised Dec 2019 is still not complete. It is apparent that this is being purposely withheld & the DPI's commentary also silenced in order to shove through these horrible developments under false pretences.

Under these circumstances, given there is no valid reason to have withheld this mapping, please provide current, accurate agricultural mapping prior to this & any further large-scale PV Solar approval. The significance of the agricultural land must also rely on the proven past capabilities of this land & also factoid in any mismanagement issues which may disguise the inherent capability of the soil.

Only 5 to 6 % of Australia is Arable Land

Two thirds of Australia is arid or semi-arid & only 5 to 6 % is arable.

If the Department believes the global warming theory, FRV's "climate crisis" claims & the increasing temperature mantra, this would further reduce productive growing areas in NSW.

It therefore makes all arable land even more indispensable for vital food & fibre production.

In spite of the **Department's incorrect, misguided land quality figures** presented, it is clear from **historical production records** that this Walla Walla, Culcairn, Jindera & Glenellen area is **superior & absolutely essential to retain as uncontaminated land for Australia's food & fibre security. This is by no means an insignificant area of land to Australia!**

**Australia's fertile soil is Australia's heritage & cannot be replaced.
Solar energy will never be more important to human or animal life than food!**

Monetary Bribes

The excessive **monetary baiting** of landholders to host solar **has led to the fracturing of a long term cohesive community** in the whole area. This has extremely **serious social consequences** that have divided families & caused **extensive, unnecessary heartache**. The Department is causing this cruel agony throughout NSW wherever they are pushing these damaging energy proposals.

Whilst solar hosts may delight in their supposed windfall, this will pale into insignificance when they are left with an abandoned solar waste land, with responsibility for the astronomical cost of the clean up.

Conditions Are Often Ignored For Decades

Development conditions are often useless, with Bomen Solar completely failing to meet their conditions with the provision of adequate tree screening.

***Photos** included.

Likewise, adequate tree screening & lighting conditions at Bomen's Robe Canola factory remaining unfulfilled for 10 years.

***Photos** included.

French company owners skipped the country abandoning Bomen's Woolcombing Factory, with no remediation of the contaminated ponds for 15 years - since 2005! No one has ever taken responsibility for this.

What of This Toxic PV Waste?

How will abandonment or bankruptcy pan out for large-scale PV Solar developments.

Who will then be responsible for the **decommissioning & clean up & rehabilitation in the 18 month time frame or ever?**

Whose specially lined dumps would these 700,000 toxic PV Solar panels for Walla Walla, adding up to millions proposed in this area, be destined for?

Please provide full details of these plans & the waste facilities available to manage this extensive waste in case of hail or bushfire etc. disaster today.

Recent bushfires & my family's **tennis ball sized hail storm experience 31/10/2020 highlight this dilemma.**

***Photos** of our family experience with **tennis ball sized hail fracturing toxic PV Solar** are included. This hail storm also destroyed vehicles & roofing, etc.

This very possible hail damage would be catastrophic for Walla Walla's large-scale PV Solar proposal area!

Rainwater simply washes the hazardous metal leachate from aged, inferior, hail/storm damaged PV Solar panels, presenting a disastrous, toxic contamination risk for surrounding land/water which would make it **unviable for human beings, animals, food production & water supplies.**

Where is the Department's plan to adequately deal with this terrible scenario without any land/water contamination impacts?

Please provide comprehensive independent, peer reviewed testing/studies to determine this risk & full waste management facility details, costings & availability.

Lies, False Assessments & Imaginary Claims

We have experienced these obvious lies, false assessments & imaginary claims of minor impacts when it is clearly obvious even prior to construction that many **Department statements are baloney & completely unrealistic.**

Tiny tree plantings are not going to limit any visual impact for a decade or two.

Bomen Solar has proven this at Wagga Wagga where the view for many local landholders will never be screened at all because of the undulating land.

Whilst Metka Solar Council Planner - Amanda Gray claimed that mass PV Solar would "soften" into the natural environment & "blend" into the landscape, this is absolute rubbish & completely contrary to reality.

Bomen Solar has been ordered to fix their **proven, unacceptable, hazardous, glaring visual amenity nightmare.** This is even **impacting local road users**, including the school bus, with the extreme glare causing a serious hazard for drivers.

Useless Tiny Tree Plantings to Hide Solar Horror Will Never Restore Natural Beauty & Charm

No amount of promised screening (which requires decades of growth to be of any use,) or painting of buildings will adequately alleviate the obnoxious views of FRV's PV Solar Proposal nor ever replace the **original, precious ecology habitats** destroyed. Such **tree growth is far more beneficial to actual cooling/temperature reduction & the reduction of CO2 emissions than this Walla Walla PV Solar proposal.**

It is essential for mental health & peace of mind to be able to continue to enjoy one's own long-term, country lifestyle from all aspects on your property, not solely from the residence.

It is the character of the area with its beautiful, natural surroundings that sets this Walla Walla area apart from many - with a real sense of serenity, combined with interesting & thriving primary production.

Two of my children love the idea of celebrating their weddings at the beautiful **Orange Grove Gardens** venue, but just a glimpse of FRV's obnoxious PV Solar in the vicinity would immediately squash their dreams & obviously badly impact this great, local business which genuinely employs 19 locals.

The sickening sight & experience of Bomen Solar & Metka Solar has traumatised us all for a lifetime!

***Photos** are included of our family's unimpeded obnoxious Bomen Solar views with non-existent tree screening.

Glaring Amenity Precedent Set, With Forseeable Contamination Risks To Come

Bomen Solar has now set an obvious precedent with any future solar developments causing road accidents due to the obvious glare issues, a clear case for future liability.

Liability will also apply to the **obvious heavy metal land/water contamination & increased fire risk** which are also '**Forseeable Risks**' which should trigger the **Environmental Precautionary Principle** & thus reject these developments midst food production & rural communities.

Whilst some landholders are driven by monetary baiting at the expense of their neighbour's & community's welfare & woke Councils such as Wagga Wagga & Parkes are sucked in by the monetary development expenditure 'bribe,' their wealthy future fantasy may well become a glaring nightmare when they are burdened with a failed or superseded solar waste land which they will be responsible for at astronomical cost. Claims by NGH Environmental's Brooke Marshall - that the recycled copper wiring would cover this massive cost are clearly ridiculous & untrue.

Heat Island Impacts Are Downplayed

The Department's projected '**Heat Island Effect**' impacts are not based on a broad range of

peer reviewed studies. They have plucked out one limited, self benefitting opinion piece from Ken Guthrie - who is not an independent or suitable expert. He is a 'renewable' energy promoter who is neither a scientist or climatologist.

Varied studies included here show a 3-4 deg C increase in heat for surrounding land with negative impacts extending up to a distance of at least 300 metres. Or perhaps 100 metres from the outer, dense tree screen.

Even 100 metres into neighbouring land is extremely impactful for producers, with life sustaining dams located within this distance.

Given present operating large-scale PV Solar developments have failed to provide conditional tree screening, tree screening cannot be used as a proven heat reduction measure.

Please provide reputable, independent, peer reviewed studies of the heat island impacts of fully operational, similar sized, large-scale PV Solar power plants, under similar climactic conditions in Australia.

In order to claim any heat reduction capability from the conditional, dense tree screening suggested or any additional screening, this tree screening must be planted at least a decade prior to construction, actually growing, be fully maintained & of a substantial thickness & height as to completely eliminate any adverse heat effect on any neighbours & any visual view of the solar plant for any neighbours from any part of their property.

It is plainly obvious that the development footprint of 421 hec of mass PV will create extreme heat with its 700,000 PV Solar panels, as there is **nothing to limit this heat impacting a far more extensive neighbouring land area than has been conveniently & typically reported** by NGH & the Department.

Given the Department's intention to majorly magnify the scale of PV Solar with millions of heat creating panels close by, this area will become a hotspot which has serious consequences for life & production.

Industrial Physics expert & orchardist Peter Hall, impacted by the **Shepparton Solar** proposals, visited the infamous **Jinko Solar factory in China**. (All Jinko panels at Cheung Kong's Bomen Solar.) He visited a solar 'farm' there & said it was SO HOT it could not operate effectively.

NGH Environmental have form with producing developer skewed Environmental Impact Statements containing erroneous comments.

Including NGR's Brooke Marshall with her false claims that local employment, the local economy & that of Australia receives far greater benefit from solar/wind energy compared to agriculture.

Ms Marshall also ridiculously stated that host landowners who end up burdened by failed solar would easily cover the massive decommissioning & clean up costs by recycling the 'junk,' copper wiring etc. This is absolute garbage!

Dust & Noise Are Excessive in Spite of Conditions.

Extensive, uncharacteristic dust storms are caused from solar's denuding of the landscape resulting in gritty eyes & teeth, coating everything including our home grown fruit & veges in spite of Bomen Solar's watering.

The most irritating jack-hammering noise continued relentlessly during construction, reverberating through our whole farm so annoyingly until 6pm.

Sheep Grazing in Large-Scale Solar is a Death Trap

FRV's plans for weed control thorough sheep grazing & equal productivity claims are flawed.

It is also completely false to pretend that the grazier has easy access to his sheep. **There is no way that a host landowner would be allowed in the solar panel area at all during operation!**

Parkes Neoen Solar - 2020 sheep grazing trial resulted in some sheep dying a very

cruel death - caught up by their wool in the rotating universal joints! Just how **fly strike** would also be monitored is **another deadly issue**.

Whilst Mayor Ken Keith believed the sheep had adequate feed - from patches of growth where the water drips from the panels, these **sheep would definitely need testing for heavy metal contamination (lead, carcinogenic cadmium & chromium) before sale or consumption**.

Bomen Solar advised that sheep would ruin solar components.

Please provide independent, peer reviewed studies of all Australian solar 'farms' with grazing sheep, regarding the death rates & causes of death, including lack of management due to inaccessibility to the site. Also, independent, peer reviewed studies/testing of all sheep regarding toxicity levels & their suitability for sale or home meat consumption.

Ignorant, Inept NSW MP's & Public Servants Lie Regarding 'Renewables'

Whilst NSW Government MP Wagga Wagga's Marxist ideology, 'Extinction Rebellion' supporting **MP Dr Joe McGirr** is delighted with the fruition of his **damaging ideological solar energy 'dumps'** at Wagga Wagga, he never even bothered to observe or engage with locals to experience the obvious disaster they have promoted. It is little wonder that he wrote such falsehoods regarding 'renewable' energy along with MP Greg Piper & Alex Greenwich -

"In a post carbon economy, there are great opportunities for regional communities including agriculture & wine, tourism & **renewable energy**. These diverse industries **boost job creation while better preserving local soil, air quality, water & biodiversity.**" (March 2019)

This is an outright lie!

Please provide reputable, independent, peer reviewed studies to prove Dr Joe McGirr's claims quoted above - that the NSW Government's energy policy is based on.

Please substantiate the claims of FRV's Walla Walla Solar & multiple NSW large-scale solar developments on food producing land using DPIE's statements of zero emissions, clean, green, sustainable energy. This must include the whole PV Solar life cycle.

Wagga Wagga climate activist Mayor Greg Conkey also continually sprukes these lies, as he shamelessly advertises through local media for the off-shore Cheung Kong Conglomerate & Greek Metka - at the expense of local food producers & all Australians. Both Mayor Conkey & Dr Joe McGirr ignore the facts in their own home town of Wagga Wagga, that prove PV Solar energy is desecration of the soil, a land/water contamination risk, environmental vandalism - destroying precious biodiversity, vulnerable species & their habitat. With numerous century old trees felled & their hollow sections disingenuously & uselessly cut out & placed horizontally on the ground - in the open perimeter. Developers & Council Planner Amanda Gray claim they are "retained in the landscape" for the benefit of the now displaced vulnerable squirrel gliders & superb parrots!

***Photo** - hollow log section "retained in the landscape" - dumped in the open perimeter.

A few months ago, **Riverina Federal MP/ Deputy Prime Minister Michael McCormack's office staff** were **oblivious to the fact that Australia would run out of Australian grown rice this year**.

In spite of this shortage of a vital Australian grown staple, the **Department** have **shamefully** pressured Leeton Council relentlessly to **'dump' large-scale PV Solar on irrigation land at Yanco - SunRice Headquarters**. This is an absolute disgrace for the Yanco/Leeton economy, with related **agricultural jobs lost already** - directly because of this burdening foreign development, which does not support the local or Australian economy.

This is especially gauling when **less than 1 % of NSW is irrigated land** - established & upgraded at great cost to taxpayers!

In response to my extensive information & questioning in relation to NSW Government dumping of large-scale, toxic PV developments, predominantly foreign owned, in the midst of productive rural communities to **NSW Energy & Environment Minister Matt Kean, NSW Agricultural Minister Adam Marshall & Deputy Premier John Barilaro**, all they could eventually manage was a combined erroneous reply from **public servant Cameron O'Reilly** - claiming the cost benefits of a 'renewable,' zero emissions future, whilst clearly, dishonestly excluding the 1 or 2 trillion dollars of expenditure essential for incorporation - with grid upgrades, battery/hydro storage, interconnectors & the extensive costs of dealing with such a massive waste burden. This is not consistent with the Department's own claims of sustainability, a circular economy & healthy environment.

***Email addition** - Cameron O'Reilly's erroneous reply.

Claims that new coal & nuclear fired power would cost 2-4 times more than this unsubstantiated solar/wind/battery/hydro/Interconnector debacle & would lead to more expensive electricity prices is ludicrous! Coal energy is far more efficient, reliable, economical & beneficial to Australia's self sufficiency.

Nuclear fusion would also use our own plentiful resources & is a clean, efficient source of energy security which must be a part of our future energy provision.

All sensible countries around the world are now building numerous new low emission, high efficiency coal-fired power stations & using nuclear energy.

China is building hundreds of coal-fired power stations in China & throughout their Belt & Road controlled countries.

Considering China emits more than 1/3 of the world's CO2 emissions & has inferior pollution & emission controls, depriving Australia of sensible energy supply with minuscule emission impacts for the world is ludicrous!

Please provide reputable, independent, peer reviewed studies & cost benefit analysis for solar & wind energy - including essential grid upgrades, battery/hydro storage & interconnectors for their successful integration into the electricity grid compared to coal & nuclear energy generation.

NSW Minister for Planning - Rob Stokes doesn't even bother to answer.

He has further proven his department's **extreme mapping incompetency** - with his non-sensical koala mapping farce. He & his public servants display **extreme carelessness with the truth combined with a complete lack of common sense & practical reality**. Or worse still, **do not care about or cannot empathise with rural constituents**.

How can anyone have faith in any decisions made by these public servants & Ministers responsible for these debacles - which have such large-scale, detrimental consequences for rural NSW & to Australia?

All of these **Ministers & public servants** responsible, appear to have **no comprehension or care** at all of their own policies (except to ensure that they benefit them financially or position wise) & their impacts on rural communities. They **see rural NSW as expendable** - selfishly **useful** for production of their own food, fibre & fake green energy but **not worthy of consideration or appreciation** at all.

Conflicted Energy Consultants & Advisors

Whilst **Lazard's Energy Consultants** provide **fudged energy costing comparisons** between wind/solar & coal fired power, omitting massive, essential incorporation figures for wind/solar, it is not surprising that they continually present skewed, incomplete energy cost comparison data favouring solar & wind energy, as they are a **substantial shareholder in Spark Infrastructure** (majority owned by HSBC) - part of the **Cheung Kong Conglomerate** - owner/constructor of Wagga Wagga's obnoxious **Bomen Solar** (proven opportunistic, environmental vandal with no consideration for or benefit

whatsoever to the Bomen/Eunony Valley district or Wagga Wagga in general.)

Regrettably, **Lazard's is also an advisor to the scandalous Snowy 2.0!**

The Snowy 2.0 project has become an extremely wasteful, foolish, technologically inefficient burden. Its original 2 billion dollar, 4 year prediction has blown out to 10 to 11 billion dollars with a completion date more than a decade away.

Lazard's also fail to note that wind turbines function at 59% efficiency, cost Australian taxpayers 660,000 per year & are predominantly foreign owned.

***Photo - Lazard's Extraordinary Costing Omissions**

Foreign Solar' Dumps' Are Not a Genuine Primary Industry.

Large-scale PV Solar is not a "primary industry." It is a corrupt & fraudulent industry - enabled by the Federal Government's useless, socialist, Beijing influenced United Nations emission targets & the foolish subsidies given to opportunistic, predominantly foreign developers, to force these inefficient, inferior energy sources on our best land.

Neither is mass solar a positive, beneficial alternative "producer" for The Greater Hume Shire.

The economic multiplier effect from this area's farm production is reliable & substantial, compared to nothing but burden from FRV's PV Solar invasion - **which benefits FRV, foreign manufacturers - probably China & potentially a few gullible landholder hosts - although this is quite likely to end in future ruination.**

Cities can accommodate this rural burdening 'industry.' Buildings & vacant, contaminated city land space is a superior & far less harmful option for solar on a large-scale, as these land areas have already been contaminated.

Australia Needs Energy Independence

Given the extreme global connectivity difficulties associated with COVID-19 & the frightening hostilities & trade punishment tactics employed by China's Communist Regime, it is even more obvious & urgent that Australia must focus on energy independence.

Considering our present economic constraints & massive debt burden, Australia must use the **most efficient, cost effective, reliable, safest & most beneficial energy sources possible which support Australia economically & give Australian workers substantial employment.**

This does not apply to inferior, unreliable, predominantly foreign owned, rural burdening PV Solar 'dumps' that do nothing whatsoever to help the environment. Solar & wind energy only increase our reliance on China.

Dominating Chinese Companies

It is essential that dominating energy companies such as the **Cheung Kong Conglomerate** & the **State Grid Corporation of China** who control South Australian & Victorian electricity supply & distribution are constrained.

The Chinese Government 'owned' **ElectraNet** is the main proponent of the **Project Energy Connect proposal.**

Cheung Kong Conglomerate are dominating Australian gas networks & hydrogen trials/pilots through **AGN** (Australian Gas Networks)/**AGIG** (Australian Gas Infrastructure Group.)

Rick Francis- the influential **Vice Chairman of Transgrid**, is also a **Director of Cheung Kong's Victorian Power Networks**, a **Director of Cheung Kong's S.A Power Networks & Managing Director of Cheung Kong's Spark Infrastructure.**

Considering that 'sustainability' means -

" the avoidance of the depletion of natural resources in order to maintain an ecological balance," **Rick Francis has proven large-scale PV Solar's absolutely false sustainability claims with the ghastly Bomen Solar & its environmental vandalism.**

From his initial 'Golden Panel' opening celebration at Bomen, Wagga Wagga, Francis

continually panders to China, promotes Chinese manufactured 'junk' with great fervour & uses spurious claims to drive the 'renewable' scam solely for the benefit of China. This is definitely not in Australia's best interests.

NSW DPIE Favours Chinese Government Control

Why on earth is this Government Department so unaware of the national security issues the electricity grid presents & the fraudulent claims of 'renewable' promoters & developers?

Are the Ministers & public servants all driven by socialist ideology or are they too benefitting financially from this scam?

Why would they be keen to interconnect NSW to the Chinese Government owned State Grid Corporation of China via Project Energy Connect - Wagga Wagga to Robertstown Substation SA, all in the name of a "renewable energy freeway to the Eastern Seaboard" (Dan van Holst Pellekaan) & the Chinese yuan?

There is not one NSW State National or Liberal party MP/MLC who gives any priority whatsoever to Australian Agriculture. All have prioritised anti-Australian energy policy which greatly increases Australia's foolish reliance on China.

Conclusion

The NSW Government's large-scale 'renewable' energy plans are based on harmful, anti-Australian, socialist ideology, monetary greed & opportunism.

Foolish, inept decision makers are producing & implementing destructive & nationally damaging energy policy to the detriment of the general Australian population, especially rural Australians.

Australia should be focussing on energy independence, producing energy from our own rich resource base that has no reliance on Chinese components.

There is a complete **disregard for the horror FRV's PV Solar proposal** would bring to the Walla Walla District, the Department has failed to address the **social breakdown** of this & other rural communities that they are persistently harassing.

They are responsible for extreme **mental health** & consequential **physical stress induced illnesses/conditions** borne by hundreds of rural families, whose livelihoods are being severely impacted - including families with many generations deeply attached to their rural outlooks, their healthy surroundings, who are dependent upon the ongoing non-contamination of this vital & precious area.

The **Department has completely failed to address** the obvious **heavy metal land/water contamination risk** from toxic, large-scale PV Solar & cannot proceed under these circumstances without negligence.

Heat Island Effect impacts & **proven non-existent tree screening** have not been dealt with to date. These need addressing prior to any further consideration for Walla Walla & any other solar proposal.

Neither can they continue to persist with their inferior, harmful renewable scam which **threatens** Australia's **national security** & reliable, economical energy provision.

The renewable scam is **based on fudged figures**, with promoters, developers & media **colluding to hide the truth**.

This requires serious investigation, accountability & a reckoning!

Yours Sincerely,



Energy and resource security are therefore paramount to achieving economic security which in turn allows a society to afford to fund the research and development of innovative new power generation technologies that can lead to lower emissions.

At present, wind and solar remain uncommercial in most parts of the world, unable to provide reliable electricity on their own. The cost of back up and storage measures to fill the gap in electricity generation when the wind doesn't blow and the sun doesn't shine makes wind and solar unaffordable.

How can this be, given recent electricity generation cost analysis by energy consultants Lazards shows the cost of new wind generation at USD28-54 per MWh, compared to new coal at USD66-152 per MWh?



Simply, the 'levelised cost of electricity' only includes capital costs, operating and maintenance costs and fuel cost, but excludes the significant costs associated with increased penetration of variable renewables, including backup, storage, network upgrades, integration, and transmission.

From: [REDACTED]
To: [Nina Harrison: IPCN Enquiries Mailbox](#)
Subject: Professor Ravi Naidu - Solar panel contamination risks.
Date: Thursday, 12 November 2020 4:54:44 PM
Attachments: [ATT00001.htm](#)
[ATT00002.htm](#)
[ATT00003.htm](#)
[ATT00004.htm](#)
[If Solar Panels Are So Clean, Why Do They Produce So Much Toxic Waste .html](#)
[ATT00005.htm](#)

Dear [REDACTED]

Much apologise for the last email relating to your request. As promised, please find attached a couple of articles that may help your case,

I hope these help your case,

Best wishes,

Ravi

Professor Ravi Naidu
CEO & Managing Director
[Chair, Global CleanUp Congress](#)
[Chair, CleanUp Conference Series](#)
Co-Editor-in-Chief, *Environmental Technology & Innovation*

May 23, 2018, 12:28pm EDT

If Solar Panels Are So Clean, Why Do They Produce So Much Toxic Waste?

Michael
Shellenb
erger

Michael Shellenberger Contributor 

[Energy](#)

I write about energy and the environment.

 **This article is more than 2 years old.**

Bell Labs, 1954. Solar Panel Waste, 2014

Bell Labs, 1954. Solar Panel Waste, 2014 [BELL LABS & PV CYCLE](#)

Para la traducción al español, haga [clic aquí](#)

Klik [hier](#) voor de Nederlandse versie

The last few years have seen growing concern over what happens to solar panels at the end of their life. Consider the following statements:

- The problem of solar panel disposal will explode with full force in two or three decades and wreck the environment because it is a huge amount of waste and they are not easy to recycle.
- The reality is that there is a problem now, and it's only going to get larger, expanding as rapidly as the PV industry expanded 10 years ago.

- Contrary to previous assumptions, pollutants such as lead or carcinogenic cadmium can be almost completely washed out of the fragments of solar modules over a period of several months, for example by rainwater.

Were these statements made by the right-wing Heritage Foundation? Koch-funded global warming deniers? The editorial board of the *Wall Street Journal*?

None of the above. Rather, the quotes come from a senior Chinese solar official, a 40-year veteran of the U.S. solar industry, and research scientists with the German Stuttgart Institute for Photovoltaics.

With few environmental journalists willing to report on much of anything other than the good news about renewables, it's been left to environmental scientists and solar industry leaders to raise the alarm.

I've been working in solar since 1976 and that's part of my guilt, the veteran solar developer told *Solar Power World* last year. I've been involved with millions of solar panels going into the field, and now they're getting old.

The Trouble With Solar Waste

The International Renewable Energy Agency (IRENA) in 2016 estimated there was about 250,000 metric tonnes of solar panel waste in the world at the end of that year. IRENA projected that this amount could reach 78 million metric tonnes by 2050.

Solar panels often contain lead, cadmium, and other toxic chemicals that cannot be removed without breaking apart the entire panel. Approximately 90% of most PV modules are made up of glass, notes San Jose State environmental studies professor

Dustin Mulvaney. ❖ However, this glass often cannot be recycled as float glass due to impurities. Common problematic impurities in glass include plastics, lead, cadmium and antimony. ❖

Researchers with the Electric Power Research Institute (EPRI) [undertook a study](#) for U.S. solar-owning utilities to plan for end-of-life and concluded that solar panel ❖ disposal in ❖ regular landfills [is] not recommended in case modules break and toxic materials leach into the soil ❖ and so ❖ disposal is potentially a major issue. ❖

California is in the process of [determining how to divert solar panels](#) from landfills, which is where they currently go, at the end of their life.

California's Department of Toxic Substances Control (DTSC), which is implementing the new regulations, [held a meeting last August](#) with solar and waste industry representatives to discuss how to deal with the issue of solar waste. At the meeting, the representatives from industry and DTSC all acknowledged how difficult it would be to test to determine whether a solar panel being removed would be classified as hazardous waste or not.

The DTSC described building a database where solar panels and their toxicity could be tracked by their model numbers, but it's not clear DTSC will do this.

"The theory behind the regulations is to make [disposal] less burdensome," explained Rick Brausch of DTSC. "Putting it as universal waste eliminates the testing requirement."

The fact that cadmium can be washed out of solar modules by rainwater is increasingly a concern for local environmentalists like the Concerned Citizens of Fawn Lake in Virginia, where a [6,350](#)

acre solar farm to partly power Microsoft data centers is being proposed.

◆ We estimate there are 100,000 pounds of cadmium contained in the 1.8 million panels,◆ Sean Fogarty of the group told me.

◆ Leaching from broken panels damaged during natural events ◆ hail storms, tornadoes, hurricanes, earthquakes, etc. ◆ and at decommissioning is a big concern.◆

There is real-world precedent for this concern. A tornado in 2015 broke 200,000 solar modules at southern California solar farm Desert Sunlight.

"Any modules that were broken into small bits of glass had to be swept from the ground," Mulvaney explained, "so lots of rocks and dirt got mixed in that would not work in recycling plants that are designed to take modules. These were the cadmium-based modules that failed [hazardous] waste tests, so were treated at a [hazardous] waste facility. But about 70 percent of the modules were actually sent to recycling, and the recycled metals are in new panels today."

And when Hurricane Maria hit Puerto Rico last September, the nation◆s second largest solar farm, responsible for 40 percent of the island◆s solar energy, [lost a majority of its panels](#).

Destroys Solar Farm in Puerto Rico

Destroys Solar Farm in Puerto Rico BOB MEINETS

Many experts urge mandatory recycling. The main finding promoted by IRENA's in its [2016 report](#) was that, ◆ If fully injected back into the economy, the value of the recovered material [from used solar panels] could exceed USD 15 billion by 2050.◆

But IRENA's study did not compare the value of recovered material to the cost of new materials and admitted that Recent studies agree that PV material availability is not a major concern in the near term, but critical materials might impose limitations in the long term.

They might, but today recycling costs more than the economic value of the materials recovered, which is why most solar panels end up in landfills. The absence of valuable metals/materials produces economic losses, wrote a team of scientists in the *International Journal of Photoenergy* in their study of solar panel recycling last year, and Results are coherent with the literature.

Chinese and Japanese experts agree. If a recycling plant carries out every step by the book, a Chinese expert told *The South China Morning Post*, their products can end up being more expensive than new raw materials.

Toshiba Environmental Solutions told *Nikkei Asian Review* last year that,

Low demand for scrap and the high cost of employing workers to disassemble the aluminum frames and other components will make it difficult to create a profitable business unless recycling companies can charge several times more than the target set by [Japan's environment ministry].

Can Solar Producers Take Responsibility?

In 2012, First Solar stopped putting a share of its revenues into a fund for long-term waste management. "Customers have the option to use our services when the panels get to the end of life

stage," a spokesperson told *Solar Power World*. "We'll do the recycling, and they'll pay the price at that time."

Or they won't. "Either it becomes economical or it gets mandated," said EPRI's Cara Libby. "But I've heard that it will have to be mandated because it won't ever be economical."

Last July, Washington became the first U.S. state to require manufacturers selling solar panels to have a plan to recycle. But the legislature did not require manufacturers to pay a fee for disposal. "Washington-based solar panel manufacturer Itek Energy assisted with the bill's writing," noted *Solar Power World*.

The problem with putting the responsibility for recycling or long-term storage of solar panels on manufacturers, says [the insurance actuary Milliman](#), is that it increases the risk of more financial failures like the kinds that afflicted the solar industry over the last decade.

[A]ny mechanism that finances the cost of recycling PV modules with current revenues is not sustainable. This method raises the possibility of bankruptcy down the road by shifting today's greater burden of "caused" costs into the future. When growth levels off then PV producers would face rapidly increasing recycling costs as a percentage of revenues.

Since 2016, Sungevity, Beamreach, Verengo Solar, SunEdison, Yingli Green Energy, [Solar World](#), and [Suniva](#) have gone bankrupt.

The result of such bankruptcies is that the cost of managing or recycling PV waste will be born by the public. "In the event of company bankruptcies, PV module producers would no longer contribute to the recycling cost of their products," [notes](#)

Milliman, leaving governments to decide how to deal with cleanup.

Governments of poor and developing nations are often not equipped to deal with an influx of toxic solar waste, experts say. German researchers at the Stuttgart Institute for Photovoltaics **warned** that poor and developing nations are at higher risk of suffering the consequences.

Maharashtra, India, 2014

Maharashtra, India, 2014 DIPAK SHEELARE

Dangers and hazards of toxins in photovoltaic modules appear particularly large in countries where there are no orderly waste management systems. Especially in less developed countries in the so-called global south, which are particularly predestined for the use of photovoltaics because of the high solar radiation, it seems highly problematic to use modules that contain pollutants.

The attitude of some solar recyclers in China appears to feed this concern. A sales manager of a solar power recycling company, the *South China Morning News* reported, believes there could be a way to dispose of China's solar junk, nonetheless.

We can sell them to Middle East. Our customers there make it very clear that they don't want perfect or brand new panels. They just want them cheap. There, there is lots of land to install a large amount of panels to make up for their low performance. Everyone is happy with the result.

In other words, there are firms that may advertise themselves as "solar panel recyclers" but instead sell panels to a secondary markets in nations with less developed waste disposal systems. In

the past, communities living near electronic waste dumps in Ghana, Nigeria, Vietnam, Bangladesh, Pakistan, and India have been [primary e-waste destinations](#).

According to a [2015 United Nations Environment Program \(UNEP\) report](#), somewhere between 60 and 90 percent of electronic waste is illegally traded and dumped in poor nations. Writes UNEP:

[T]housands of tonnes of e-waste are falsely declared as second-hand goods and exported from developed to developing countries, including waste batteries falsely described as plastic or mixed metal scrap, and cathode ray tubes and computer monitors declared as metal scrap.

Unlike other forms of imported e-waste, used solar panels can enter nations legally before eventually entering e-waste streams. [As the United Nation Environment Program notes](#), [◆](#)loopholes in the current Waste Electrical and Electronic Equipment (WEEE) Directives allow the export of e-waste from developed to developing countries (70% of the collected WEEE ends up in unreported and largely unknown destinations). [◆](#)

A Path Forward on Solar Panel Waste

Perhaps the biggest problem with solar panel waste is that there is so much of it, and that's not going to change any time soon, for a basic physical reason: [sunlight is dilute and diffuse](#) and thus require large collectors to capture and convert the sun's rays into electricity. Those large surface areas, in turn, require an order of magnitude more in materials [◆](#) whether today's toxic combination of glass, heavy metals, and rare earth elements, or some new material in the future [◆](#) than other energy sources.

Solar requires 15x more materials than nuclear

Solar requires 15x more materials than nuclear EP

All of that waste creates a large quantity of material to track, which in turn requires coordinated, overlapping, and different responses at the international, national, state, and local levels.

The local level is where action to dispose of electronic and toxic waste takes place, often under state mandates. In the past, differing state laws have motivated the U.S. Congress to put in place national regulations. Industry often prefers to comply with a single national standard rather than multiple different state standards. And as the problem of the secondary market for solar shows, ultimately there needs to be some kind of international regulation.

The first step is a fee on solar panel purchases to make sure that the cost of safely removing, recycling or storing solar panel waste is internalized into the price of solar panels and not externalized onto future taxpayers. An obvious solution would be to impose a new fee on solar panels that would go into a federal disposal and decommissioning fund. The funds would then, in the future, be dispensed to state and local governments to pay for the removal and recycling or long-term storage of solar panel waste. The advantage of this fund over extended producer responsibility is that it would insure that solar panels are safely decommissioned, recycled, or stored over the long-term, even after solar manufacturers go bankrupt.

Second, the federal government should encourage citizen enforcement of laws to decommission, store, or recycle solar panels so that they do not end up in landfills. Currently, citizens have the right to file lawsuits against government agencies and corporations to force them to abide by various environmental laws,

including ones that protect the public from toxic waste. Solar should be no different. Given the decentralized nature of solar energy production, and lack of technical expertise at the local level, it is especially important that the whole society be involved in protecting itself from exposure to dangerous toxins.

◆ We have a County and State approval process over the next couple months, ◆ Fogarty of Concerned Citizens of Fawn Lake told me, ◆ but it has become clear that local authorities have very little technical breadth to analyze the impacts of such a massive solar power plant. ◆

Lack of technical expertise can be a problem when solar developers like Sustainable Power Group, or sPower, [incorrectly claim](#) that the cadmium in its panels is not water soluble. That claim has been contradicted by the previously-mentioned Stuttgart [research scientists](#) who found cadmium from solar panels ◆ can be almost completely washed out...over a period of several months...by rainwater. ◆

Third, the United Nations Environment Programme ◆s [Global Partnership for Waste Management](#), as part of its [International Environmental Partnership Center](#), should more strictly monitor e-waste shipments and encourage nations importing used solar panels into secondary markets to impose a fee to cover the cost of recycling or long-term management. Such a recycling and waste management fund could help nations address their other e-waste problems while supporting the development of a new, high-tech industry in recycling solar panels.

None of this will come quickly, or easily, and some solar industry executives will resist internalizing the cost of safely storing, or recycling, solar panel waste, perhaps for understandable reasons. They will rightly note that there are other kinds of electronic waste

in the world. But it is notable that some new forms of electronic waste, namely smartphones like the iPhone, have in many cases replaced things like stereo systems, GPS devices, and alarm clocks and thus reduced their contribution to the e-waste stream. And no other electronics industry makes being [clean](#) its main selling point.

Wise solar industry leaders can learn from the past and be proactive in seeking stricter regulation in accordance with growing scientific evidence that solar panels pose a risk of toxic chemical contamination. [If waste issues are not preemptively addressed](#), [warns Mulvaney](#), [the industry risks repeating the disastrous environmental mistakes of the electronics industry](#).

If the industry responds with foresight, Mulvaney notes, it could end up sparking clean innovation including [developing PV modules without hazardous inputs and recycled rare metals](#)." And that's something everyone can get powered up about.

Follow me on [Twitter](#). Check out my [website](#) or some of my other work [here](#).

Mic
hael

Michael Shellenberger



Michael Shellenberger is a Time Magazine [Hero of the Environment](#), [Green Book Award Winner](#), and author of *Apocalypse Never: Why Environmental Alarmism Hurts Us All* ([Har](#) [Read More](#))

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ADVERTISEMENT

From: [REDACTED]
To: [Nina Harrison: IPCN Enquiries Mailbox](#)
Subject: Heat Island Effect - Peter Hall - Submission for Shepparton Solar Proposals on Irrigation Land from an Orchardist's view point.
Date: Thursday, 12 November 2020 5:04:04 PM
Attachments: [Impact of heat flux from solar farms \(1\).docx](#)
[ATT00001.htm](#)
[panel presentation final.docx](#)
[ATT00002.htm](#)
[Peter Hall - Solar Panel Farms 25-05-2018.pdf](#)
[ATT00003.htm](#)



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25th May 2018

M J Hall and Sons

Attention: Peter Hall



Re: Solar Panel Plants

Dear Peter,

In response to your questions regarding the effect of Solar power plants being placed in “close proximity” to commercial orchards, I suggest that work needs to be done to evaluate the potential for any adverse impact including: heating effect, both Pest and disease issues, chilling hours and diurnal temperature changes needed for bi-coloured apples (i.e. Pink Lady varieties).

As you are probably aware, insect populations are sensitive to temperature and weather events. Whilst the use of scientific Insect prediction models provides us with a guide to a population emergence, they are notoriously difficult and cannot be relied on solely. Small differences in microclimates within or surrounding orchards will impact on insect population emergence and number of populations over a given season. Given what seems a lack of data in this space, I suggest some further testing and trials be performed to get a better understanding of how local microclimate changes may impact degree day models for both pests and diseases.

It is worth noting that even small differences even between what appear to be similar climatic areas, say Cobram and Shepparton can lead to radically different outcomes in some pest populations. Cobram for example has had great challenges with QFF well before Shepparton and still experiences greater population levels than Shepparton. Urban areas also experience greater challenges. Some of this is due to untreated trees but it is accepted the “heat Island effect” in urban areas provides favourable conditions for QFF to overwinter.

As you know, the colouring of apples is a challenging area particularly when warmer conditions occur and can have a very large impact on the commercial value of the crop. The cooler the temperatures in Autumn the better your chances are of getting colour, particularly if there is a sharp diurnal temperature change.

I K Caldwell has the capability to assist in verification trials and has extensive experience and access to meteorology equipment and models. I hope these comments help as you try to understand the potential impact of solar energy power plants on horticultural operations.

Kind Regards

David Morey | Business Manager Horticulture

I.K. Caldwell

Mobile: 





Agriculture Victoria

Department of Economic Development,
Jobs, Transport and Resources

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Telephone: +61 3 9651 9999
economicdevelopment.vic.gov.au
DX 210074

Peter Hall
[REDACTED]

Dear Peter

Impact of heat flux generated by solar farms

Thank you for your enquiry regarding potential impacts of heat flux, generated by solar farms, on surrounding orchards.

Heat flux is the amount of heat transferred per unit area per unit time to or from a surface. Photovoltaic installations such as solar farms generate heat but little is known about the lateral and vertical distribution of that heat. There are conflicting reports in the literature on this subject but all authors agree that more research is required to determine the factors impacting the scale of the heat effect.

Barron-Gafford et al. (2016), reporting in Nature Scientific Reports, provide evidence that the photovoltaic heat island effect causes large solar power plants to increase local temperatures and the effect may be felt 300m away. They call for research to investigate the relationship between panel density or spatial footprint of the power plant, the size of the heat island effect, and its effect on surrounding areas such as wild lands or farms. This is an important consideration for horticultural producers because their crops and the pests and diseases that attack the crops are largely driven by heat. Deciduous tree fruit crops require a period of chilling below critical temperature thresholds to set fruit buds and then warm weather to break dormancy and grow. The growth rate of insects also depends on accumulation of heat units above minimum developmental thresholds. For example, raising the minimum daily temperature from 6°C to 9°C and maximum daily temperature from 15°C to 18°C would double the number of growing degree days experienced by lightbrown apple moth and theoretically halve its development time. This may not be an issue if the heat island effect is localised to the power plant but if the effect dissipates through wind effects for longer distances it may impact fruit production.

There appears to be a need for better understanding of the heat island effect and how to mitigate it. The research to generate such understanding would require a multi-disciplinary approach involving plant protection experts, agronomists, meteorologists, engineers, and plume or flux modellers. Victoria has a considerable skill base in these disciplines.

I have attached a copy of the paper by Barron-Gafford et al. for your information. I hope this is of some use.

Yours sincerely

David Williams
Principal Research Scientist- Invertebrate Sciences
DEDJTR Tatura Centre
25 May 2018

Presentation to the COGS planning panel hearing for permits 2017-162, 2017-274, 2017-344, 2017-301 28/05/18

Introduction

My name is Peter Hall. I own and operate an orchard business M. J. Hall and Sons P/L with my 2 brothers in the Tatura/Mooroopna region as well as jointly own and manage a fruit packaging business Integrity Fruit P/L. My Dad and Grandfather grew fruit here and my sons and nephew now work in my business.

We employ up to 200 people and provide opportunities and economic activity for an even wider range of associated, packaging, logistics, transport and service businesses.

I sit as a member of the Goulburn Regional partnership, the GMW strategic advisory committee and the Community Advisory committee for the connections project which is overseeing the completion of the modernisation of the GMW irrigation system. I am a member of the National Fruit Fly Council and the Goulburn Murray fruit fly task force, the HIA apple and pear strategic advisory panel and the Stonefruit export development alliance for Stone fruit Australia. I have a degree in Applied Physics from RMIT and lectured in Agricultural engineering for VCAH at Dookie and subsequently Melbourne University.

I probably have the most complicated perspective on these projects!

I come to you today not to speak on behalf of these groups, but they illustrate my credentials as an active and well recognised community member. With broad experience and community passion, I come to speak on behalf of what I believe is best for my community.

Outline of the issue

I am challenging all of these projects up for consideration and I must say this is an unusual position for me. I would normally champion the right of a farmer to take any opportunity he sees fit in respect of his land additionally the Goulburn Regional Partnership body has as one objective the promotion of renewables.

The “Goulburn” in this name is a deliberate choice. We see the future of 5 councils being tied to what the river brings to our region. I share this view and it is for this reason I am primarily concerned, the protection of the rich irrigated land asset we are custodians of as a result of being sited along the Goulburn river.

I would like to be on the record as being in support of renewable power plants in our region, as Mr Guthrie pointed out we do have capacity for such projects, our climate

is favourable and there are community benefits. They just need to be sited in appropriate locations and these four projects are not. I am disappointed that some people have characterised this as a “beauty” contest. It is not, but the seeming conflict of 2 public policy objectives.

If I can summarise the dilemma as gleaned from doc 28, Agriculture is to be fortified and promoted and renewable energy is to be promoted. The problem we have is all four of these projects supported indirectly by public money have landed on prime irrigated agricultural land and a lack of clear guidelines has in my opinion, needlessly created conflict between proponents and local communities

If we need to judge between priorities, Irrigated agriculture must come first.

Irrigation as our most valuable asset

Irrigated agriculture is rightly the key economic driver for our region. Countless government documents and countless committees and community associations have re-emphasised this. The key to this is the GMW irrigation system. The location of these properties in prime GMW connected positions seems to completely contradict the already \$2 billion spent modernising and rationalising our system. We are on the tail end of a process whereby this system has been carefully and in an extensively planned and coordinated way has been modified to both conserve water, improve efficiencies and reduce the irrigated footprint to accommodate reduced flows into the future. All of these properties have been the beneficiaries of this process. This was all done in accordance with the objective to preserve and promote agriculture.

The rationalisation process needs to be understood. There has been a number of phases of this process, each with particular emphasis. All works done at public expense share the desire to contribute more water to the environment, make our system more efficient and sustainable, fortify the asset base for future generations. There has been a rationalisation of the system and is in the final stages of completion. The footprint has been reduced but in a planned manner and has been achieved through an extensive might I say exhausting level of community consultation and negotiation.

DELWP’s comments that this process is ongoing needs to be put in this context. It is certainly not desirable or I think in anyone’s interest that this process be jeopardised by willy nilly unmanaged and un-thought through random rationalisation. I sit on the connections project community consultation group Richard Anderson chairs. We have never discussed further rationalisation of already rationalised and modernised systems. This is completely illogical. Prime irrigation backbone components have been identified, these four properties lie on those and they have already been assessed as being part of our irrigation future. DEWLP’s comments regarding them

not being part of the connections project are flat out weird, they are not because in the first phase they were already modernised!

Impact on GMW investment

May I illustrate this by briefly explaining what the outcome may be if large tracts of land are removed in an adhoc way from the backbone. A channel link or unit is dependent and costed on all of the participants on that line contributing both monetarily and in a usage sense to that line. If enough volume is taken from the line the cost of maintaining it will be borne by those left in part but also GMW may be faced with the prospect of maintaining a large piece of infrastructure to deliver water to a single customer at the end. This would be inefficient in economic terms and in wasted water.

Given these projects can be located in areas that are not irrigated and would by default not attract opposition and not diminish irrigated agricultural outputs I see a sensible solution to redirect these sites by denying them planning permits.

The impacts on current agriculture

The impacts on Irrigated Agriculture need to be explored.

1. You have the direct removal of 2000 acres of prime productive land
2. You have the ripple effect to surrounding landholders and those into the future who when considering suitable sites will avoid selecting land adjoining solar power plants. 2000 acres quickly becomes 4000 or 8000 acres. The fact that it is primarily neighbouring farmers who are objecting should substantiate this observation. Apart from technical concerns, farmers are farmers because they enjoy and are drawn to Rural based business and working in rural landscapes. These projects do not present a rural landscape!
3. Irrigated agriculture is much more intensive than dryland farming. By definition it will have greater population density. The high number of objections particularly to the East Tatura illustrate that density. Irrigated agricultural landscapes attract lifestyle properties, irrigated landscapes are more aesthetically appealing and provide access to water for lifestyle farmlets. In Tatura East a great little community of residents has developed that has coexisted with irrigated farming operations. COGS by nature of being one of Australia's most successful irrigated agricultural destinations has a higher % of irrigated farms than most. I don't envy their task in managing this issue but the logical solution is to direct such projects to unirrigated lands which are over 30% of the COGS land area. You will minimise the unsettling of many local residents
4. Farming confidence in communities like ours is built on signals as much as market prices. The potential signal to people is that farming will play second

fiddle to passive solar arrays. Prime farm land is of little use but to locate steel, glass and concrete structures for energy production. It is of no more value than the desert.

5. Horticulture is in a growth phase. This needs to be understood. We have almost completed the rationalisation of the processing industry which probably is the image people think of (spc) Fresh fruit production has been on a continual growth curve. My own business has gone from 160 acres to over 800 acres in the last 10 years. Many of the new refugee immigrants who have worked for our industry are now purchasing bare land and developing orchards. Suitable land attached to the irrigation system of large enough size is increasingly in demand. I suggest with the opening of China to our stonefruit this will accelerate even further. It is not in our communities interest that high value irrigated land will be parked for a non-agricultural use when it is a finite resource that will be in increasing demand.
6. The comments on soil suitability are out dated. We use soil categorised as group 4 across our industry The Tatura site is of high value but all could accommodate horticulture. Modern practices applied to low grade soils make them suitable and at times desirable. All of these properties would be capable of maintaining orchard production.
7. The discussion around the reduction of available water needs to be also taken in context. We are in the fight for our communities life at the moment with MDBA negotiations. This comes at a time when dairy as an industry is having challenges. This should never be the reason to make decisions or have decisions influenced by short term issues. We believe we will win the water debate and even if further water is taken the natural advantages of our soils, climate and the GMW system will logically prevail. The world will continue to grow, available land for food production will continue to shrink, we have a finite asset that will continue to grow in value as areas of food production are seen to be increasingly important. It is the reason that all Agri-banks have now identified the growth of Australian agribusiness as an increasing trend. We have an enviable reputation of being one of the worlds best suppliers of clean and green food. Prime irrigated land is essential for this. Public policy should protect this above all other priorities. All four of these proposals are in prime locations. Three of them illustrate this by their location beside orchards, a preeminent indicator of land value.

Micro-climate impacts

I came into this issue with probably vague concerns about climatic issues. What I have heard these last few weeks and from my own evaluation of the scant data

available, I am convinced that this consideration needs much more research and study.

Can I bring some context to the discussion? Growing fruit is incredibly complex. There is science and there is experience and there is luck. I felt some sympathy for those in the cross examining process, when it comes to the environment and certainties about fruit growing outcomes there will always be hesitancy that needs nuancing beyond yes and no answers.

Fruit examples

Here is some examples of fruit I have just picked.

Insect damage, colour shades and blemishes all depend on the environment. See the very small variations that make fruit unsaleable. You can probably understand my concerns, you may even wonder why I persist in growing fruit?

As an example we cannot grow some varieties of fruit in Shepparton that Cobram can only 40 mins up the road but with slightly higher average temperatures and they cant grow some of ours. This temperature issue is not just an ambit claim, its probably the most common discussion amongst farmers, the environment we grow in is the one dominating factor in fruitgrowing.

Other respected views

I want to be persuaded but in just two very brief queries, one to Victoria's senior entomologist or "bug man" and one to the business manager agronomist and someone well versed in local pest and disease issues they have come back with the recommendation that further work be done. David suggests that an increase of 3 degrees would halve the hatching time of LBAM. Temp changes are not just incremental in pest development but more exponential or step change in effect. This is a significant issue.

I must point out what may be a typo or certainly it needs challenging. I was not here for Dr Blaesings evidence and was not able to ask questions but courtesy of Miss Tiffanys submission para 64. To suggest that a 1.5 degree rise in temperature would have no effect in the orchard. David Williams would have great difficulty agreeing with that as with pretty much every fruitgrower and fruit scientist I know. There is less of a difference in temperature between here and Cobram as I pointed out and fruitgrowing is markedly modified by that difference. I know Dr Blaesing she is a respected agronomist. I can only assume she has been incorrectly quoted or this is a typo. If not then I am very concerned that this is being put up and relied upon as expert evidence.

What we do know is the following and this again was confirmed by the expert witness testimony last week.

1. There is very little research to date on the heating effect of solar power plants
2. The evidence we do have indicates that there may be some heating effect up to 450m from the power plants (Fthenakis and Yu)
3. Pest, disease and colouring process of bi-colour fruit is highly sensitive to temperature variations.
4. Local landforms, topography and specific weather patterns will have impacts on any heat island effect
5. Calculations and modelling predictions are very difficult and complicated to construct.
6. Tree lined buffers are rarely used and there is little example in agricultural settings to gain information from
7. Larger sites will have some increased effect on heat island up to an as yet undefined size. (Dr Barron Gaffords one paper is based on a 13Ha site)
8. Vegetation will not be available in our proposals to mitigate heat effect
9. Night-time reflected light pollution will exist but has not been quantified

I can't see how any responsible approach to protecting the highest value agricultural product, that is horticultural produce, would consider these temperature risks as ticked off on. We are in completely uncharted waters.

"But we have our expert witnesses" I hear the barristers shout, Really? Two preliminary reports showing heating up to 450m away, scant meteorological analysis, no modelling, and caution from senior local insect specialists. We must do better than this.

You may take the risk if there was a pressing life or death issue or an overwhelming public interest, but given over 30% of COGS is unirrigated I just don't get this.

I put to you the three projects beside orchards should be denied on this basis alone.

Any discussion about value of research or error margins or feelings or opinions that it should be ok is completely unacceptable from a scientific perspective and good scientific investigation.

It is also completely disrespectful to local landholders who have in good faith raised concerns about these issues. May I add as an aside that when one landholder tried to reach out to Dr Barron Gafford he was told his services had been secured by the projects legal team and he could not discuss the issue? This hardly builds up community confidence when perhaps full and open discussion may have dispelled any genuine concerns.

Can I summarise the data so far, We have some limited evidence of a heating effect, localised conditions will be a factor, fruit is affected by changes in temperature regimes. But we haven't looked at localised climate characteristics, we haven't done enough studies, the key climate scientist hasn't been to the sites and yet we are supposed to be comforted by this evidence?

Precautionary principle

I must admit I am surprised by the formality and process at work here. Obviously it wasn't going to be a fireside chat and I get it, people's lives and businesses are at stake as well as potential investment. Some provision for locals who are not legal professionals would I think benefit the process. On the opening day Dr Joseph outlined the precautionary principle that needs to be applied when unquantified but real risks exist. Miss Tiffany has helped me again in her document outlining the two key pre-conditions. Para 52 this is taken from section 4 Part B p.38

1. There must be scientific uncertainty
2. There must be a threat of serious or reversible damage.

I think we can satisfy both of these. We only have two of what I would call preliminary reports. The scientists agree that more work would be needed and with very little effort two highly respected industry stakeholders suggest there needs to be a lot more work done in this space. With respect to serious damage. The difference between 1st grade fruit or 2nd grade fruit is the difference between having a viable business or not. If you look at this apple, this one red dot caused by an insect that is activated by heat knocks it out of a sale.

The precautionary principle I think is entirely appropriate in this case given you can literally put these things anywhere. I don't buy the argument fully that the system dictates the location, it's a factor but it will always come down to a matter of economic judgment and the appetite for a government to minimise the local impact on landholders if there is opposition.

As I understand it, sound planning policy must take into account potential risks. Additionally these risks cannot be overinflated to knock a proposal on the head irrationally. Given what I have just outlined I find the councils conditions on a 50m setback a good start but a bare minimum and are far from conservative. I do welcome their approach to acknowledge there is an issue and provide a condition.

The suggestion by X-ELIO that these be completely ignored or the suggestions of other proponents of 10m or 25m are cavalier in the extreme given the almost complete lack of data. Good science and good planning and good common sense would suggest before any concrete is poured or land formed or glass panels erected that testing and research be performed. Can I also give some advice as a grower of

trees you will need more than 10m width to grow six rows of trees successfully to get the desired effect!

Conclusion

I agree with but have not duplicated the reports and evidence given by other landholders and community members that may I say will be most effected by these projects. This issue has some level of complexity, perhaps planning issues always do. I understand that community benefit needs to be considered in a wide context, wider than those directly affected. But these people right next door are the most effected. It is my genuine conviction that both the challenge to our vital irrigation infrastructure and the yet almost untested and un-researched questions raised regarding heat effects should cause you to pause and consider the unique issues surrounding siting such projects in intensively irrigated regions.

I would ask the planning panel to affirm the clear and long held priority of our local area in protecting irrigated agricultural land and to also take a conservative view on the limited data of the heat island effect and deny each of the projects.

I am also mindful that as has already been evidenced by different presentations, that these proceedings will form a precedent and so will influence future proposals. I also understand from DELWP correspondence that the Minister will be relying on these outcomes to contribute to guidelines. May I commend the UK document that in my view rightly prioritises the high value, scarce resource of irrigated land. I get the point that we are here to decide these four but I can't ignore the clear direction from the planning department that outcomes today will be important for future projects. It is why I stress again to clearly find in favour of irrigated agriculture we do not want a carte blanche approach to our precious resource because future project proponents point to these as precedents if approved.

Yours sincerely

Peter Hall

[Redacted]

Email. [Redacted]

Mob. [Redacted]

Addendum

May I suggest an alternative approach? The DWELP guidelines tabled 2 weeks ago outline a process whereby community engagement is started well before signing up

landholders and spending resources on putting together planning applications. I suggest you take those guidelines and follow them. Meet with our community understand what the issues are and then with community help we can find much better solutions that avoid any confrontation, pitting landholder vs landholder and arrive at projects that are fully endorsed and welcomed by our community. Isn't this a better way to go?

<https://www.energy.vic.gov.au/renewable-energy/victorian-renewable-energy-auction-scheme>

From DEWLP doc. https://www.energy.vic.gov.au/__data/assets/pdf_file/0027/91377/Community-Engagement-and-Benefit-Sharing-in-Renewable-Energy-Development.pdf

Case study in solar: Uriarra solar farm, Australian Capital Territory

Community surveys in Australia show widespread support of large scale solar*. There is also a perception that solar projects may not face the same community opposition that has been associated with wind developments, such as noise and visual amenity (given turbines can be seen at further distances).

In the case of Uriarra Solar Farm, the local community felt that the proposed development was too close to residences, would result in glare and significantly change the rural landscape. As a consequence of community opposition, the solar farm was successfully relocated to an area that had fewer residents in close proximity to the proposed facility.

The experience of Uriarra Solar Farm demonstrates that large scale solar developments are not immune to social concerns, and carefully considered community engagement and benefit sharing approach is required regardless of the technology.

[REDACTED]

By email: [REDACTED]

Dear Ms [REDACTED]

I refer to your correspondence to the Deputy Premier, the Hon John Barilaro MP, and the Minister for Agriculture and Western New South Wales about impacts of large-scale solar farms. Your correspondence was referred to the Minister for Energy and Environment, the Hon Matt Kean MP, and the Minister has asked me to respond on his behalf. Please accept this as a response to all correspondence.

NSW has a strong pipeline of private sector generation and storage projects in the planning system that are expected to contribute to the ongoing reliability of supply in the State. This includes a range of renewable generation projects, additional gas-fired generation and energy storage options such as pumped hydro and batteries.

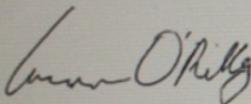
As at May 2020, 1410 megawatts of large-scale non-renewable energy projects are either approved or progressing through the NSW planning system, worth around \$1.5 billion. This includes 1250 megawatts of gas projects, worth \$1.25 billion, and 160 megawatts of coal upgrades, worth \$209 million.

You may be interested to know that reports by the Commonwealth Scientific and Industry Research Organisation (CSIRO) and other independent bodies have found that the cheapest, most reliable form of new-build generation is large scale renewables supported by firming technologies such as batteries, pumped hydro and gas fired generation. Building new coal or nuclear power stations would be two to four times more expensive than these technologies and would see power prices increase rather than decrease.

In relation to your comments about foreign investment, the Australian Government reviews foreign investment proposals against the national interest on a case-by-case basis. The Australian Government works with applicants to ensure the national interest is protected. However, if it is ultimately determined that a proposal is contrary to the national interest, it will not be approved, or conditions will be applied to safeguard the national interest. You can find more information on the Foreign Investment Review Board online at <https://firb.gov.au/about-firb>.

Should you have any further questions in relation to this matter, please contact Mr Jack Hunter, A/Manager Case Management, Energy Infrastructure and Zones, at the Department on 02 8229 2819.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Cameron O'Reilly', written in a cursive style.

Cameron O'Reilly
Executive Director
Energy Reform and Investment
Energy, Climate Change and Sustainability

27 July 2020