

Department of Planning, Industry and Environment (DPIE)
Submission lodged via DPIE website
15th February 2021

Objections to SSD 10452 - Stubbo Solar Works

Save Our Surroundings (SOS)

SOS Central West NSW is an umbrella group for like-minded concerned citizens that oppose the proliferation of industrial scale weather-dependent "renewables" and their negative impacts on local and global environments and communities. The independently run SOS groups share and distribute information and are currently: SOS Central West NSW, SOS-Gulgong, SOS-Mudgee, SOS-Wellington, SOS-Orange, SOS-Greater Hume, SOS-Riverina and SOS-Qld.

Outline of objections

SOS Central West NSW object to the proposed Stubbo solar industrial electricity generating works (solar works or IEGW) because it fails to meet many of the requirements set out in the "Planning Secretary's Environment Assessment Requirements" document. An industrial development that requires the same area of agricultural land as the land area of two Sydney Airports, or the same area as the currently under construction Western Sydney Airport, must be subject to very detailed scrutiny. SOS has read all 966 pages of the Environmental Impact Statement (EIS) and has based its objections of what is contained and, just as importantly, what is not contained in the EIS.

SOS members attended the 28/10/20 drop-in session and held unsatisfactory discussions with several of the Applicant's representatives for about 40 minutes and subsequently submitted 31 questions by email on 30/11/20 (Appendix A). The response from the Applicant was that the EIS would address the questions that were raised. Of the emailed questions the majority have not been addressed.

Throughout our submission we may refer to relevant parts of the SOS Research Paper November 2020 (Attachment 1 and referenced in this submission as RP[page number]), which was recently part of our submission and evidence presented at the House of Representatives Standing Committee on the Environment and Energy hearing held on 29 January 2021 on the:

Climate Change (National Framework for Adaptation and Mitigation) Bill 2020 and Climate Change (National Framework for Adaptation and Mitigation) (Consequential and Transitional Provisions) Bill 2020

SOS will also present additional evidence in this submission in support of our objections to the proposed Stubbo solar works development.

General Requirements

1. On page 1 of the EIS the Project Director certified that *"this assessment contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure, and that information in the EIS is neither*

false or misleading." SOS will draw attention to, where we believe, information is inconsistent, inaccurate or potentially misleading or through omission could be so.

2. The EIS is inadequate in addressing: the justification for the development; the basis of the site selection; the environmental impacts; its failure to meet the objectives of the Environmental Planning and Assessment Act 1979 (including ecologically sustainable development, land use conflicts); how the project contributes to the security and reliability of the electricity system; a full evaluation of the merits of the project as a whole and; comparison with alternatives.

Each of these inadequacies will be addressed in more detail by SOS under the headings listed in the "Planning Secretary's Environmental Assessment Requirements" or under the heading "Other Issues" at the end of our submission.

3. However, the fundamental question that the Applicant must answer is, "Is there a net benefit to the local, Australian and global communities if the project was to proceed". The next section details why the project must not be approved because it totally fails on numerous measures, namely: reducing emissions so as to reduce the Earth's temperature; providing reliable and continuous supply of electricity; lowering retail electricity prices; likelihood of long term operation and industry viability; using natural resources economically and without harming the environment; reducing the incidence of global slavery; creating net Australian jobs.
4. As UPC/AC Australia, owned by joint venture overseas entities and only registered in Australia in April 2017, have both wind and solar works under development and therefore the whole of the SOS Research Paper (Attachment 1) is applicable as it addresses both these forms of weather-dependent renewables. In addition, table 1.1 will be referenced in support of the next section.

Table 1.1 Comparison of 400MW capacity Generation Types

Generator	Land Req't	Capacity	Output	Availability	Tonnes Material	Expected	Energy out/in	Materials Over
Type	Hectares *	Factor %	MWh/year		Requirement	Life yrs	Payback %	80 years MT
Stubbo Solar	1772	28.5	1,000,000	Daylight Hrs #	74,200##	30	60	218,666###
Industrial Solar	1280	25.5	893,520	Daylight Hrs	67,745	25	60	216,784
Rooftop Solar	0	24.5	858,480	Daylight Hrs	13,550	25	>60	43,360
HELE	30	82.3	2,915,328	24hrs/7days	< 108,550	60	3,000	<144,733
CCGT-CCS	146	90	3,153,600	24hrs/7days	< 108,550	25	3,000	NA
Nuclear	169	91.3	3,199,152	24hrs/7days	108,550	80	7,400	108,550

* Ratios used to bring to all types to 400W capacity level, except nuclear, used 50% for 1000MW plant

plus up to one hour from BESS

Stubbo estimated: 4,800T batteries, 16,000T (20kg x 800,000) solar panels, 53,400T steel (40kg/m x 5m lengths X 133,500 piles plus 133,500 cross members) but no allowance for concrete, inverters, wiring, etc.

Batteries replaced 7 times, rest of system 2.67 times (80yrs/30 yrs)

Net Benefits of Proposed Project Can Not Be Substantiated

Greenhouse Emissions

1. Australia's Chief Scientist of Australia, Dr Finkel, told the Senate in June 2017 that if Australia reduced its **total** carbon emissions to **zero**, that it would do **virtually nothing to reduce global temperatures**. Therefore, as the project cannot influence the climate, the Applicant cannot use emissions reductions as justification for the project. [RP5 and RP8]. But if GHG emissions are a concern then this project should not be approved for the following reasons.

2. Studies show, if the TOTAL life-cycle (e.g. mining, processing, manufacturing, transportation, land acquisition/lease, land clearing, construction, operation, decommissioning and disposal/recycling) of an industrial PV electricity generating system and the associated extra supporting infrastructure needed (e.g. backup power/storage, grid building/upgrades, substation building/upgrades, recycling facilities/storage, landfill facilities), creates substantially more CO2 emissions than say a nuclear power plant of the same nameplate capacity (megawatts). Only about **60%** more energy is generated over the claimed up to **30** years life of an industrial PV solar plant than it takes to build it. Nuclear generates about **7,400%** more energy than it takes to build it and operates for up to **80** years. **Hence, lower emissions will be achieved if the project is not approved.** [ref: 30/6/20 Michael Shellenberger "Apocalypse Never" p192; Oct 2020 Dr Lars Schernikau "The truth behind renewable energy"; RP8]

3. The Applicant ignored the SOS request to indicate the amount of green house gases (GHG) embedded in its project. One panel manufacturer stated that just the CO2 created in the manufacture of their "glass" solar panels, excluding the energy used in the aluminium frames, requires 1.5 to 2.5 years (double if Chinese made) of electricity generation from a panel. Therefore, 10 -12 years (40% of 30 year life) for the Stubbo project to offset the CO2 created up to commissioning of the Stubbo project is a reasonable assumption. Refer diagram of "PV solar supply chain" under the "Key Issues - Water" section. and the link below for how silicon "glass" panels are made and the amount of CO2 generated.

Hence, lower emissions will be achieved if the project is not approved.

[ref: [The environmental impact of solar panels \(dualsun.com\)](https://www.researchgate.net/publication/335083312_Why_do_we_burn_coal_and_trees_to_make_solar_panels);
[https://www.researchgate.net/publication/335083312 Why do we burn coal and trees to make solar panels](https://www.researchgate.net/publication/335083312_Why_do_we_burn_coal_and_trees_to_make_solar_panels)]

4. In addition, to match the 80 years life of a once-off built nuclear power station one also has to add the replacement solar works and their GHG emissions. Also, the GHG emissions involved in extending and upgrading transmission lines which are only required to service renewables would be avoided. Nuclear plants emit no GHG once operational, rapidly cancel out the embedded GHG, can be located near existing grid infrastructure, and so are a far superior alternative to the proposed project. **Hence, lower emissions will be achieved if the project is not approved.**

5. The Applicant should supply GHG estimates so that alternative forms of electricity generation can be compared. For instance, rooftop solar will always have much less embedded GHG and already supplies 9% of electricity into the NEM compared to Industrial solar at 4%. Currently, rooftop solar is only installed on 30% (3 million) households, is much cheaper per KW than industrial solar, is widely distributed and directly benefits the consumer, if consumed by the household and/or sold into the grid. **Hence, lower emissions will be achieved if the project is not approved.**

Reliable and Continuous Supply

1. The Applicant in the EIS equated Liddell Power station with its project and suggested that their project would help to replace the lost output when Liddell is closed down in 2023. They incorrectly stated that Liddell has 450MW capacity (EIS p59), so implying their 400MW project is comparable. In fact, 50 year old Liddell, was 2,000MW nameplate capacity, but is now 1680MW according the AGL website and currently produces 8,000 Gigawatt hours of electricity output of annually (46% capacity factor) Liddell is still capable of producing electricity 24 hours a day. A currently installed low emissions HELE power plant in Kogan Creek, Qld, has a capacity factor of 82%. Hundreds of newer HELE's being installed in China and Japan have about 90% capacity factors, especially if they are not hindered by restrictive operating regulations.

2. From table 1.1, contrast the Stubbo project proposal with other types of electricity generation. Comparing annual outputs over a year are misleading, as is equating a 400MW solar works with a 400MW continuous output generator (HELE, CCGT, Nuclear). For, example, in Gulgong during 2020 the days of least sunlight were July 10th and the day of most sunlight was December 8th. If Stubbo was operational on those days it would have produced variably throughout each day a total of only 315MWh (0.8 hours worth) on July 10th and 3,746MWh (10.9 hours) on December 8th. At best, the BESS could have supplied four MWh (EIS page 60, but they should check their figures) .

Meanwhile, the non-solar generators could have supplied the whole 24 hours each day at full capacity (9,600MWh). While the BESS may help smoothing the inconsistent solar output it cannot make up for the 23 or 13.1 hours of no solar output. The BESS capacity would have to be expanded to 46 times larger capacity to maintain peak capacity output of 400MW or a 400MW CCGT or nuclear module installed onsite to ensure continuous electricity supply to consumers 24/7. Costly pumped hydro is not part of the project. Obviously, these options are not feasible due to the massive cost increase or unnecessary duplication, which makes the Stubbo proposal unviable and unable to provide reliable and continuous power supply to consumers. The project cannot claim it is a standalone electricity generating system able to supply thousands of homes with reliable and available on demand elect city.

The proposal should be rejected.

3. The applicant's claim that the project generates enough electricity to supply 150,000 typical homes is a falsehood. As shown above, the project cannot supply electricity for even 11 hours on the best day of a year and therefore should not make such claims. These claims are designed to mislead people into thinking that renewables are the same as non-renewable generation types. Obviously they are not. **The proposal should be rejected.**

4. EIS page 59 refers to the project adding to the security and reliability of supply (covered above). As for security of supply there are lots of examples where weather-dependent renewables can't deliver. For example, Beryl solar works near Gulgong has had significant problems throughout 2020. Output in the December quarter was down 18.3% below its "weather adjusted" expectations. Perhaps the fact the Gulgong region had about 12% less sunlight compared to the 2019 December quarter also had something to do with the decline in output. The other reasons included inverter malfunctions, lightening strike damage and intermittent curtailment directed by the AMEO. Earlier in the year component failures and

heavy rain restricted output. Manildra also suffered inverter failures in the quarter and is still awaiting replacements. Output was reduced by 32%, from the same owners of Beryl and Manildra, after a grassfire damaged two of its plants in California in June 2020, which may not be fully operational until mid 2021. Oakey 2 solar works in Queensland was out of action for months following damage by two separate storms. Australia's weather is harsh at times and weather related damage to more massive open-air solar works near Gulgong as proposed for Stubbo are highly susceptible. The Applicant cannot claim that its project will add security and reliability to the network.

The proposal should be rejected.

[ref: New Energy Solar Quarterly Update December 2020; RP43]

Lowering Retail Electricity Prices

1. The Applicant refers to the project putting downward pressure on wholesale prices. However, what the consumers are interested in is what they have to actually pay for their electricity. Please refer to section 2 (RP12-RP16) for an analysis that shows no country or state with a high proportion of renewables has achieved lower electricity prices. This diagram from the NSW Energy website shows why:

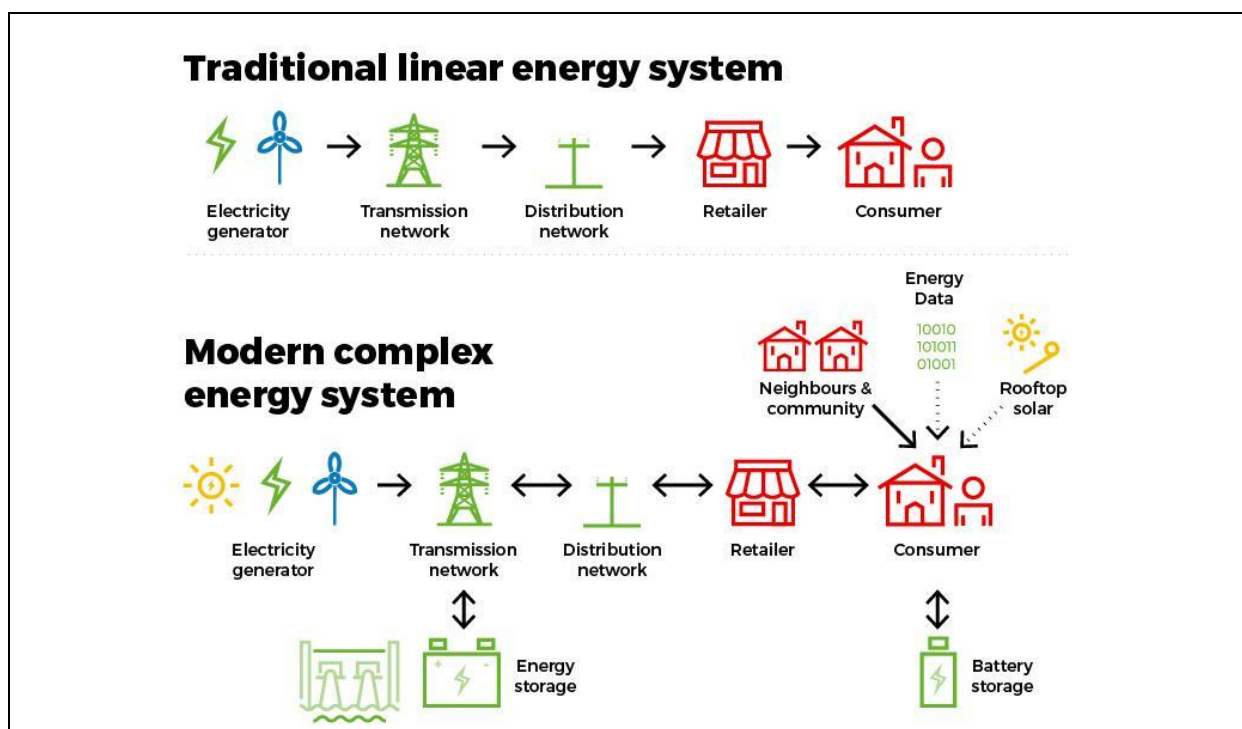


Diagram from NSW Energy 18/12/20 [Renewable Energy in NSW | Energy NSW](#)

Complexity adds cost and risk. Weather-dependent renewables cannot provide the electricity to run our society. They have to be augmented with: expensive pumped hydro, of which Australia has virtually none; prohibitively expensive batteries that have to be charged daily, so requiring even more wind and solar plants; upgraded or new transmission lines and infrastructure, specifically to accommodate wind and solar generation; very much more difficult management of an unstable and complex system, something that Australia has little experience. Since issuing the SOS Research Paper in November 2020 a lot more has occurred that shows electricity prices are or must continue to increase, not decrease.

2. In 18 months one Gulgong resident with rooftop solar has had his electricity usage and supply rates increased by 11.9% and his feed-in tariff reduced by 24%, a net cost increase of \$419 yearly if no more rate increases/FIT decreases occur in 2021, which is highly unlikely given the following.

3. AGL and Origin Energy, Australia's largest electricity retailers announced their half-yearly results in February 2021. Their write-downs and large profit falls, in addition to previous write-downs, are in the billions of dollars. Just AGL's first half year write-down of its unprofitable wind farm deals amounted to \$2.7 billion. In its half yearly report AGL wrote in regards to increased supply that *"... the long-term outlook for wholesale electricity and renewable energy certificates now indicates a sustained and material reduction in prices."* Cost-cutting (job losses?) were announced.

3. Wholesale prices may be reducing but the retail costs are rising because of increased infrastructure costs (e.g. Tas-Vic underwater cable > \$1b), massive subsidies, financial support and favourable regulations (\$13 billion yearly - RP14), massive losses and write-downs and massive cost blow outs (e.g. Snowy 2.0 \$2B to \$5.1B, NSW-SA interconnector \$1.53B to \$2.43B before its even started) have to be recovered from the consumer or taxpayers. Add to this the failure in 2018 of RC Tomlinson, with a loss of 3,400 jobs. In addition, shareholders in Origin Energy and AGL, both ASX listed companies, have seen nearly 50% falls in the value of their shareholdings in less than 12 months.

4. A Gulgong resident was advised by EnergyAustralia in January 2020 that the usage and supply rate increases were because *"...supply costs have increased significantly"* and in January 2021 the Feed-in Tariff rate was again being reduced because *"...there's more solar-generated energy going back into the grid. This has reduced the wholesale price of energy going back into the grid during the day when the sun is out."* The Applicant's proposal may well reduce wholesale prices during some parts of a day but it is the consumer who gets sluggish. This has been the case throughout the world.

The proposal should be rejected as more daytime electricity is not needed at high cost to the consumers.

5. On 11 February 2021 it was reported that "AEMO prepares for negative NEM demand with request for new rules." [<https://reneweconomy.com.au/aemo-prepares-for-negative-nem-demand-with-request-for-new-rules/amp/>]. The AEMO stated that it made a faulty assumption about the possibility of negative demand and was unexpected i.e. of more electricity going into the grid from rooftop solar than being consumed, which continue to occur with increasing frequency. Perhaps AEMO and others would not such an assumption if they had been paying attention to SOS, who have repeated said this has been happening in many other countries (e.g. Germany, Denmark,) and states, such as California, for years. As rooftop solar continues to grow from 30% of households the need for more expensive industrial solar plants is unnecessary.

The Stubbo proposal should be rejected as it will exacerbate the problem of too much electricity being generated at the wrong time of day, if at all.

Long Term Operation and Industry Viability

1. UPC/AC Australia Pty Ltd was registered on 1/4/2017. It has no track record of construction of weather-dependent renewables plants in Australia. RP18 and RP19 summarise some of the company failures, company withdrawals from renewables construction both domestic companies and by overseas companies and the significant losses

they incurred. USA experienced similar problems. In addition, several instances of companies not doing all the claims made in their submissions are evident. Since November 2020 more evidence of a market in turmoil has arisen. Yet, are we to believe that companies are in it for the long haul of 30 years or more. How many companies exist today that existed 30 years ago? Hence, one has to be very sceptical that the Applicant will be around to clean up the site or will that be left to the then landowner or our Council to deal with at huge cost to the landowners or ratepayers. After all, the Applicant does not have to put up a bond to cover such costs. **If APC/AC or their joint owners fail then who is responsible for operation and decommissioning? Who pays?**

2. In December 2020, 15 solar works and some wind works were put up for sale. Some projects, as occurred with Beryl are sold before commissioning and others once the project has been approved. **What guarantee is there that UPC/AC will not do the same once approved?**

3. A number of previously ASX listed renewables companies delisted because they regarded their share price as not reflecting the value of their assets. No, the share price reflected what the investors regarded as not a good investment. For instance, New Energy Solar was \$1.35 in January 2020 but \$0.85 ex 3 cents dividend on 12/2/21. New Energy was seeking a 50% sale of its portfolio in January 2020 but nothing eventuated so it is now wanting to sell its Australian solar assets and exit the Australian renewables market. **Why should the regional community of Central West put our faith in the Applicants proposal when so many others don't for similar developments?**

4. New Energy received a A\$50 million acquisition facility from the Clean Energy Finance Corporation (CEFC) for acquisition of Manildra solar works with an enterprise value of \$113 million. Manildra had a 10 year power purchase agreement (PPA) in place. Beryl also has 99% of its output subject to two PPAs for about 12 years. Yet, these assets do not command high value to investors. Could it be that investors are concerned that once the fixed price with escalation PPAs expire that the solar works will suffer a huge drop in revenue as NEM wholesale prices are already incurring negative demand. Will they become stranded assets as new technology evolves over the next decade. The Applicant has made no reference to PPAs or Government assistance. **Could this be a financial risk for the project?**

5. Many SOS members have raised issues when dealing with development companies during the approval process, construction and operation. These include failure to consult, failure to address community issues raised and failure to do things that they undertook during the approval process. Whether its post construction glare or noise, failure to repair damaged roads during construction, not creating the tree screens, not keeping vegetation under control, etc. For example, these photos dated 20/01/21 of the Beryl solar plant show; failure to manage the fire risk of long grass; failure to create viable tree screening even after 21 months of operation; failure to keep the verge slashed. **Will UPC/AC keep theirs?**



Beryl - long grass in summer 20/1/21



Beryl - 21 month old 'bonsai trees' 20/1/21

Using Natural Resources Economically and Without Harming the Environment

The Applicant claims its EIS meets the objectives of various environmental acts, statutory, policies, guidelines and its own objective on page 31 to "*avoid and/or minimise environmental impacts wherever practical,..*". In particular, the WARR Act orders "avoidance of unnecessary resource consumption; resource recovery (including reuse, reprocessing, recycling and energy recovery); disposal". Sections 5 [RP25-34], 6 [RP33-37] and 10 [RP44- 45] provide details of how the growth of wind and solar energy and battery backup over their end-to-end life-cycles is extremely detrimental to the world's environments and are not clean or sustainable. This can be easily seen in Table 1.1 on page 2 of this submission.

1. The land requirements of the Stubbo project and indeed any industrial solar works, is massive compared to viable and necessary alternatives. For instance, the proposed project would take 1772ha of grazing land out of production for decades, compared to no land for rooftop solar and under 170ha for HELE, CCGT-CCS or nuclear. Requiring 10 times more land or over 30 times if the actual electricity generation output, as opposed to capacity, is factored in. Actually, it is much more land again once the essential backup is added and the additional grid infrastructure is included.

2. The tonnes of materials, which are understated, required for the project far exceeds that needed for rooftop solar (74,200T vs 13,550T) by a factor of 5.5. However, the materials required to maintain the initial project's claimed output over 80 years (new solar works would have to replace the project plant before it could be dismantled) would far exceed all non-industrial solar alternatives by a large margin.

3. Because solar works and their battery storage units require a large variety of specific minerals the mining of these extends globally. A comprehensive study [RP28] identified that "*Most mining areas (82%) target materials needed for renewable energy production,..*" and so "*Mining threats to biodiversity will increase as more mines target materials for renewable energy production*". Apart from the huge increase in mining the actual processing and manufacture of solar panels and Lithium batteries involve enormous use of various chemicals and the creation of massive quantities of toxic waste. e.g. producing one tonne rare earth elements creates one tonne of radioactive waste [RP28].

4. To give some idea of just what the proposed 4,800 tonnes of the BESS will require for just for one ingredient, Lithium, refer to RP31. In summary, based on an assumed 200 Tesla utility power packs, 9000kg of Lithium is required. This equates to the Kathleen Valley WA

mine mining 695,000,000 tonnes of ore. The project would require 10 times more mining than what a 400MW natural gas power plant. That is, ten times more CO₂ and many times more in toxic waste, much of it created in other countries. This consumption will need to be repaeted several times over an 80 years period. The photos below give one some idea of the size of Lithium mines, which would have an impact on the local ecology as will the project if built on the Stubbo site. Either mine appears big enough to easily total consume the town of Gulgong.



Open cut Lithium mines

5. The decision by the Independent Planning Commission, and upheld by the Land and Environment Court in December 2020, in assessing the proposal for a the Bylong Valley coal mine application stated that not only does the Commission have to take into account GHG emissions but also environmental impacts external to the project. These principles should be applied in assessing the Applicant's EIS. SOS has demonstrated that the project brings with it a substantial CO₂/GHG emissions deficient that takes years of operation to offset. In addition, the extensive actual and potential damage to local and overseas environments is added to by the project if it was to proceed.

6. It is clear that the project adds excessively to the World's consumption of finite resources and which is detrimental to both Australia's and the environments of other countries. These massive amounts of resources consumed by the project are neither a good use economic use of resources or environmentally friendly. It does not meet its stated environmental objectives or that of WARR Act. **The project must not be approved.**

Reducing the Incidence of Global Slavery

70% of the world's cobalt, which is used in Lithium batteries, comes from the Democratic Republic of the Congo and 15 to 30 percent of that is produced by artisanal mining. Adults and over 40,000 children work in terrible conditions for little reward. [RP24]. The Australian Modern Slavery Act commenced operation on 1 January 2019. The definition of slavery would include the adults and children who in many cases are forced to work in the artisanal mines of the Congo. 21% of the world's cobalt could end up in the BESS of the Stubbo project. **How will UPC/AC trace the sources of cobalt in its batteries and so comply with the Act?**



Democratic Republic of Congo: E.g. of artisanal mining of cobalt, used in batteries, destroys many African lives

Creating Net Australian Jobs

1. Section 3 [RP17-19] of the SOS Research Paper shows that the jobs created by weather-dependent renewables result in job losses in the renewables industry as well as in other industries. On 8 February 2021 it was reported that another organisation building their first solar plant in Australia stood down 230 workers involved in installing solar panels at the 120MW Gangarri solar project. Their services were terminated by text messages and told to leave that morning, including making arrangements to vacate any supplied accommodation. Add these job losses to those thousands already lost by the company failures, companies exiting Australia and Australian companies cutting costs (jobs). The Stubbo project suggesting up to 10 ongoing jobs looks insignificant compared with the job losses so far just in the electricity industry. [<https://reneweconomy.com.au/work-stops-at-shell-solar-project-after-contractor-dispute-leads-to-stand-downs/amp/>]

2. Recent decisions that stop creation of coal and gas related jobs from as a result of decisions only supporting weather-related renewables lead one can to see why an in-depth study in Spain concluded that for every subsidised job in renewables that 2.2 jobs were lost elsewhere in the economy. Australia seems to be well on track for a similar result to that found in Spain's case. [RP18]

3. As stated elsewhere, Australia's already high retail electricity prices will only rise further with the drive towards more industrial scale renewables, so stifling the expansion or creation of manufacturing or other investments. Jobs that will not be created in Australia.

Reject the Stubbo proposal to save Australian jobs on a net basis.

Key Issues

Key Issues: Biodiversity

SOS has several concerns about the lack of consideration in the EIS of the district's wildlife. They are:

1. A 5.8ha property, 6km south-west from the Stubbo site, has no natural water or dams only a few trees and is fully fenced (1.2m high), yet over thirty different species of fauna live on or visited the property in 2020 alone. At least three different mobs of kangaroos up to 20 at a time, echidnas, three foxes in a den, Peron's tree frogs, flocks of up to 42 Ibis, micro-bats, Black Swan, Pelican, large flocks of cockatoos and galahs, many varieties of parrots and finches, wag-tails, lizards, tortoise, Wedge-tail Eagles, Nankeen Kestrels, hares, rabbits, Peewees, Currawongs, Magpies, and field mice, are visible at various times. Such wild-life coexists with grazing animals, such as sheep, horses, Alpacas and cattle. Welcome to country NSW and biodiversity, which is valued by residents and visitors to our area..
2. One can only imagine the number and diversity of wild-life that must utilise an area of 1772ha with 19 dams, a creek, rocky outcrops, and significant treed areas. We therefore do not agree with the Applicant's statement of page 4 of the EIS that *"...the proposed development site footprint is located on land with little or no biodiversity value"*.
3. The proposed earthworks will remove the grasses, rocks, logs and top-soil that provide homes and food sources for many species necessary for maintaining the health of the surface layer, as well as being a source of food for larger creatures. That is, 70% of the total site's habitats and ecosystems will be destroyed. This wholesale destruction of ecosystems, which against the concept of environment protection, is of very serious concern.
4. The 2.4m high security wire-mesh fence will prevent the movement larger animals from feeding and watering anywhere on the site and also prevent the natural movement of these animals for establishing new territories e.g. a new mob of kangaroos. The addition of 800,000 or more solar panels covering much of the site will affect the larger flocks of birds by reducing their landing and feeding areas and reducing fertilisation of the ground via their droppings. Please refer to Appendix C of Attachment 1, RP49 - RP50 .
5. By preventing access to animals such as kangaroos, wombats, echidnas, foxes and tortoises to such a large fully-fenced off area, these animals will have denser populations elsewhere and so be more likely to be involved in vehicle accidents because of the closeness of roads to the site.
6. Publications by several bodies, including the CSIRO, state that livestock and many native animals, such as kangaroos, have a hearing range much greater than humans, as do many pets. They further state that such animals can become very distressed by sudden loud or high pitched noises. This stress can cause aggressive and other negative behaviour as well as affecting weight gain and quality of the meat. Months of frequent loud and sudden noise from pile-driving and the operation of large machinery could cause prolonged stress in the animals.

The affect of frequent loud noise on the nearby human population and their pets should be obvious as well as those that have to cope with severely stressed animals. [Ref: [Human noise affects animal behaviour, studies show | Animal behaviour | The Guardian](#); [9781486301614 Chapter4 \(csiro.au\)](#)]

7. Barking Owls are present on the development site. Owls rely on their exceptional hearing to locate prey in the dark. Inverters and transformers produce noise when the batteries are supplying electricity after dark, albeit for short duration given the small storage capacity. This frequent noise will make hunting by the owl harder and may drive it out of the site altogether. [Ref: [BBC - Earth News - Noise pollution threatens animals](#)]

8. Removal of the top layer of grazing vegetation will encourage the spread of weeds, including invasive species, as weeds are the first to populate bare ground. Management and control of weeds over such a large site covered in solar panels will be extremely difficult. The weed density will rapidly increase and seeds will spread to neighbouring properties, so passing the effort and cost of controlling these weeds to the owners.

Key Issues: Heritage

SOS is concerned about the instances of Applicants not doing what they propose in their submissions and communications with the impacted communities. There appears to be little independent oversight or consequences if conditions are not met. In particular, a recent event involved the destruction of Wiradjuri artefacts during construction of a solar works at Wagga. Wiradjuri artefacts are on the proposed Stubbo development site. How can we be assured that similar destruction or removal of artefacts will not occur? [Ref: ['Minor fine' for UK-based firm after destroying Wiradjuri artefacts | NITV \(sbs.com.au\)](#)]

Key Issues: Land

1. Mid-western Regional Council LEP states that RU1 classification of land prohibits electricity generation. However, the EP&A Act states *"Development consent may be granted if the development is wholly prohibited by an environment planning instrument."* The operative phrase is *"may be granted"*. The proposed Stubbo solar works development is a huge industrial undertaking with far reaching consequences for the region because of its claimed operational life of 30 years and then the period (years) needed to remove the entire installation and fully rehabilitate the 1772ha site. Thus, the entirety of the SOS submission must be taken into account as to why the development consent should not be granted.

2. Our region is not a desert, but is a major agricultural, mining and tourist area. Many farmers are also tradespeople or people who also work in the mines or in retail and commercial activities. There are already shortages in many of the trades. All these "farmers" and others depend on real **ongoing** work availability, which this project does not provide. Just within 10km of Gulgong by adding the 1772ha Stubbo development to the existing 310ha Beryl solar works and once proposed 810ha Vena Energy projects would total 2,892ha or 29 km² of agricultural land. Other large scale solar works sites are already rumoured to be under investigation near Gulgong. For the Central West Region REZ **pilot** just the NSW government's desired 3,000MW increase over the existing wind and solar

projects will result in lost agricultural land of over 13,290ha or 133km² (using Stubbo proposed 1772ha/400MW capacity figures).

3. This miss-use of agricultural land, when compared to the land requirements of other electricity generation methods, is addressed in more detail in Attachment 1, RP25 -RP34

Key Issues: Visual

SOS notes that some nearby landholders did not respond to the Applicant's attempts to contact them. SOS is not aware at this time if such landholders would be impacted visually if the project was to proceed.

Key Issues: Noise

SOS notes that some nearby landholders did not respond to the Applicant's attempts to contact them. SOS is not aware at this time if such landholders would be impacted by noise if the project was to proceed. However, SOS has raised noise concerns under the Biodiversity section, points 6 and 7.

Key Issues: Transport

SOS is very concerned about the traffic implications of the proposed project. In particular, the proposed light vehicle numbers and proposed traffic routes through Gulgong pose unacceptable risks to residents and visitors to Gulgong. We therefore oppose the proposed Stubbo industrial solar works development, for the following reasons:

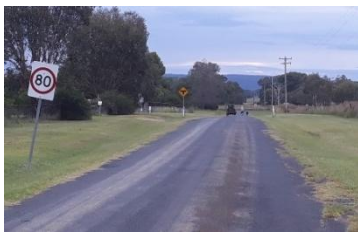
1. The Applicant has stated that the 460 light-vehicle trips each working day during 12 months of the 2 year construction phase would mainly occur between Mudgee (90%) and Gulgong (10%). The proposed morning routes from Mudgee would be Castlereagh Highway-Medley St-Barneys Reef Rd or Castlereagh Highway-Herbert St-Station St-Cope Rd-Blue Springs Rd. The afternoon routes would be in the reverse direction to the morning traffic flow. The traffic study undertaken surveyed seven intersections yet the two most dangerous intersections were ignored, namely Medley St and Mayne St, and, Herbert St and Mayne St, which also has two pedestrian crossings. Also, congestion at these intersections would have a detrimental impact on the functioning of the town.

2. Medley St and Mayne St, and, Herbert and Mayne St intersections have stop signs and so a huge increase between 230 to 260 extra vehicles in traffic trying to cross these intersections in the relatively short peak periods (say 6:30am to 6:50am and 5pm to 6pm) for workers to and from the Stubbo site will create grid-lock, much increased likelihood of pedestrian and vehicle accidents. The possibility of road rage incidents also will exist because of significant delays that will be experienced. Also, at both these intersections, turning left or right into Mayne St encounters a "one-way at a time courteous give way" as only one vehicle can pass at a time because of the narrowing of the road and parked vehicles. Likewise, once crossing Mayne St and entering Medley St from either direction the "one-way at a time courteous give way" protocol, well known to Gulgong locals, applies.

3. The Herbert and Mayne St intersection not only has stop signs for Herbert St traffic but also has two pedestrian crossings. These crossings are heavily used by all residents and

visitors as they are in the heart of the town where most of the shops are, especially to access the IGA Supermarket. Many of the pedestrians are elderly or school age children, especially in the afternoons. During Gulgong's various festivals and events, such as the Clay Festival, Henry Lawson Festival or Gulgong Show, etc. Gulgong's pedestrian traffic increases enormously. The proposed huge increase in vehicle traffic poses very serious threats to the safety of all the pedestrians of the town.

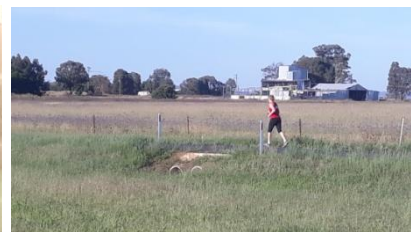
4. Another increased risk to residents of Gulgong from such a huge increase in vehicle traffic is to those walkers, joggers and cyclists that exercise their selves and, in several cases, their dogs during the morning peak (6am to 7am). There are teenage joggers and walkers in their 70s and others in-between. Typically, the people doing their early morning exercises, usually 5 kms or more, choose Medley St, Barneys Reef Rd, Black Lead Lane, and Tallawang St because there is little traffic during that time and it is the coolest part of the day. However, these roads do not have footpaths and the roadsides are uneven and can have high vegetation (snakes and wetness). Therefore, people and their dogs have to walk on the roads. Depending on their starting point, local town roads are also used. We have already had two cyclist killed (17/08/19 Spring Creek Rd, Yarrawonga, 12/5/14 Ulan Rd). These risks are very real and will only be increased if such large increases in traffic due to such projects as Stubbo solar works were to proceed. Examples of people exercising in the early morning in Black Lead Lane and Barneys Reef Rd are:



Elderly woman with her dog



Young woman jogger



Middle-aged woman jogger

5. The Gulgong Waste Depot, for the use of Council residents only, has its access off Cope Rd, between Black Lead Lane and Mineshaft Lane. The left-hand turn from Cope Rd is sharp and vehicles, often with trailers, slow right down to make the turn. Cope Rd has a 100kmph speed limit. With 60 heavy vehicles per day and increased light vehicle traffic from the Stubbo project there is increased risk of road accidents to local residents.

6. The Applicant states that, "*The decommissioning phase would see lower traffic generation in relation to expected mechanical decommissioning processes and reduced labour force compared to the construction phase.*" [EIS main, page 223]. How much lower traffic generation and over what time period? Given that decommissioning is basically the reverse of construction (remove 800,000 panels, hundreds of thousands of cross supports and pilings, kilometres of wiring, batteries and inverters, concrete slabs, fencing, etc., restore 1500ha of top soil and vegetation, etc.) it's hard to believe that this massive undertaking will not involve a substantial workforce and many light and heavy vehicles, especially if, say, a 6 months' timeframe was imposed. After all, the landowners will want their land back as soon as possible to restart agricultural activities to help feed the expected huge increase in

Australia's and the world's population in 30 years time. **The Applicant must provide a comprehensive decommissioning, land rehabilitation and waste disposal plan.**

7. SOS takes issue with the Applicant's claim, *"In addition, there is no evidence that the rail track to the west of Gulgong, which includes level crossings on Cope Road/Station Street, Barney's Reef Road and Black Lead Lane, is in use."* (13.2.6 Rail Services, page 220 Main EIS). There are several goods trains a week passing through, or in a recent example, stopped at these crossings. On the 21/01/21, starting at about 7:50 a.m. one such train was stopped for 20 minutes and simultaneously blocked two level crossings at Barney's Reef rd/Black Lead Lane and Barneys Reef Rd/Tallawang St. The photos below are evidence that trains do run through the level crossings and that they can block vehicular traffic for long durations of a few minutes to 20 minutes. This could cause significant traffic build up if 260 project vehicles were wanting to travel through the crossings at Black Lead Lane/ Barneys Reef Rd or Cope Rd/Tallawang Rd/Station St when a train is passing through or stopped.



12/01/21 6:25a.m. travelling north



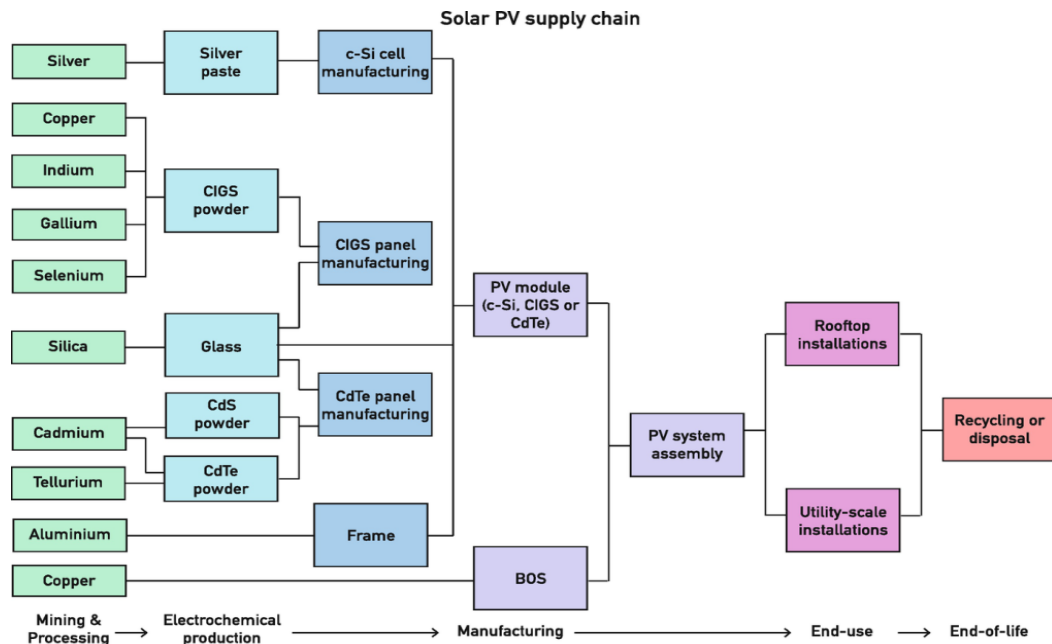
21/01/21 7:55a.m. stopped, going south

8. In *"Table 13.6: Management and mitigation measures - traffic and transport"* the timing of all of the listed mitigation actions is *"Prior to construction"*, which presumes approval of the project has already occurred. However, SOS has raised many issues in this section that demonstrate that **the Applicant should not get approval for the project because they have not properly addressed the many risks that the project will impose on the Gulgong community and beyond.**

Key Issues: Water

The Applicant has failed to answer the SOS questions 2 ,3, 5 and 6 in Appendix A concerning the proposed solar panels it intends to use and the contamination consequences of using those panels. The EIS says very little about the major component of its proposal, i.e. solar panels and only refers to them as "glass panels".

What it did say is they will use 500W panels (originally stated as 400W), and that they are made of glass. In fact, 500W solar panels may not currently exist or suitable for industrial applications due to very high prices. (Sunwaysolar is the only supplier of 500W panels that SOS could find). On 6/01/21 news.energysage.com stated that the Sunpower E-series 435W is the top panel for commercial use. An advertised price on 24/12/20 for the Sunpower Maxeon 3 400W solar panel was A\$679. Solar panels are not just made of glass, but can include a variety of minerals, some toxic, as this flowchart shows:



To see how "glass" silicon solar panels are made read the pdf found here

https://www.researchgate.net/publication/335083312_Why_do_we_burn_coal_and_trees_to_make_solar_panels

SOS has significant concerns about the potential for the proposed project to adversely impact the area's water sources and its use of huge amounts of water. Two SOS members attended the 28/10/20 drop-in session and raised the issue that all solar panels have been declared e-waste by EPA Victoria and that some panel types are worse than others, such as those used in the Beryl solar works (thin film or cadmium telluride). The representative's response that he was unaware that solar panels are classed as e-waste and then state that thin film solar cells are only used in outer space applications did not instil any confidence in their knowledge. When asked what type of panel technology will be used by the project his answer was "*tier 1 panels*". A more knowledgeable answer may have been at least silicon based monocrystalline or polycrystalline panels, but there are others. In the questions (Appendix A) submitted by SOS to the Applicant, questions 2, 3 and 29 specifically requested how the risks would be handled. **However, the Applicant has failed to address the concerns raised even though:**

1. The proposed site includes an area the size of two Sydney airports and will be covered by over 800,000 solar panels, which have been declared by EPA Victoria, the EU and various jurisdictions in other countries as e-waste, yet has creeks, dams and bores on the site that are vulnerable to contamination. The system of creeks ultimately feeds into Cudgegong River.

2. Victoria's government has stated that: *"It is estimated that more than 100,000 tonnes of solar panels will enter Australia's waste stream by 2035. This has the potential to create a hazardous waste management issue, as materials contained within solar panels can leach into soil and groundwater, causing environmental contamination and safety concerns if managed poorly. Keeping these materials out of landfill prevents environmental and human*

health problems, and rescues valuable resources for reuse. Compounding the issue is a lack of dedicated processing facilities in Australia that can recover valuable materials contained in PV products." [ref: www.sustainability.vic.gov.au "The growing issue of PV system waste"]

3. The creek systems on and near the site are noted in the Mid-Western Regional LEP as "Groundwater Vulnerability" and as such the development application is to consider the likelihood of groundwater contamination. The EIS has not considered the potential contamination from solar panels, especially as the two bores, one of which is only 1.9 metres deep and the that groundwater may occur at a depth of only 0.61 meters below ground level. Any chemicals leaching from the solar panels over the claimed 30 years' life into the soil could then be washed by surface water into the creeks, bores and groundwater.

4. A US National Institute of Health study found that 73% of a panel's cadmium concentration can leach within a municipal landfill in just 30 days. Being soluble means this deadly toxin can find its way into our bore water, creeks and rivers. Beryl solar works is on a 310ha site and has about 355,000 thin film solar panels (First Solar 28nov16 factsheet states 950,000 PV modules) and sits over two waterways, which feed into Cudegong River. The potential for leached chemicals from two large solar works in close proximity and with run-off from both feeding into Cudegong River and the area's groundwater is of great concern. In times of flood (recently 2010, 2016 and 2020) Gulgong Lagoon is created by the Stubbo creek system via Slapdash Creek. The Lagoon is 7km from the Stubbo site and becomes a wetland for several months and a habitat for Black, Swans, Pelicans, ducks and other wildlife. In February 2020, over 70mm of rain fell in a day, so re-creating the Lagoon below.



Gulgong Lagoon January 2010



Gulgong Lagoon September 2016

5. Studies have shown that rain can leach toxic materials from solar panels over time in-situ due to deterioration or within 30 days if disposal is in land-fill. Also, damage from fire, hail, wind and lightning strikes, which occurred in several solar plants in 2020, exacerbates the speed of toxic chemicals leaching into the ground. Refer pages 20, 35 and 36 of the SOS Research Paper at Attachment 1 for more contamination issues involving solar panels and the referenced sources.

6. Could this risk of PV solar panel toxins entering our soils and water sources become the equivalent of the damage done from smoking or exposure to asbestos? Independent soil and water testing for all the chemicals included in solar panels and in batteries must be done before construction (as a base-line), at commissioning, during operation (annually or after each major hazardous event), and post rehabilitation of the site. The results of such soil studies must be made public should the project be approved. **If unsafe levels of toxins are identified how will the issue be managed? Will the solar plant be made to close down, be dismantled and then the land be rehabilitated, as is the case of asbestos**

contamination?

7. Water Use

Having recently come out of three years of drought, where many residents of Gulgong and surrounding areas rely on tank water and/or dams, bores and trucked-in water, the issue of water use and availability is of critical importance. SOS has great concern about the water use statements made by the Applicant in the EIS, namely on EIS page 232 (**bolding added**):

*"Extraction of groundwater is not proposed for the project and therefore impacts to the groundwater resource or supported ecology from **extractions are unlikely**."*

"Water would be sourced from water trucks collecting water from commercial suppliers of treated wastewater, opportunistically from farm dams located within the study area or as a last resort, from town water."

The Applicant states at 14.2.4 page 222 that *"Groundwater extraction is not required within the study area."* Yet on page 232 they say "extractions are unlikely". Given that bores exist and the groundwater is at a depth 0.61m how can we be assured that the Applicant will not access the groundwater, especially as the 19 onsite dams only have a capacity of 105ML (half a day's need during construction). **How could groundwater use be policed?**

During the 2016 -2020 drought in the NSW, farmers and others were forced to sell many or all of their farm animals because of the acute scarcity of water for domestic and farm use. Crop planting was not possible for many famers. Most dams were dry and water tanks empty. The towns of the Central West NSW faced severe water shortages. Long queues were seen at the Mudgee water station as people filled 500 and 1000 litre cubes. **How many more times might this situation occur over the next 30 years or so, being the claimed life of the proposed Stubbo solar works?**

The Applicant on page 240 provides some indication of the volume of water required for the project, namely, **200 kL** (200,000 litres) **a day** during construction and five megalitres (5,000,000 litres) a year during operation. For just the first construction period of 12 months the project would require 200,000 L/day times 250 working days, an amount of 50,000,000 litres (50 ML). Over two years the water for construction could be 2 x 50ML or 100ML.

According to spectrum.ieee an industrial-scale PV solar project in the 230 to 550 megawatt range can require up to **1.5 billion litres of water** for dust control during construction and another **26 million litres annually** for panel washing during operation. [ref: [Solar Energy Isn't Always as Green as You Think - IEEE Spectrum](#); RP30]. Applying these estimates to the Stubbo project, using the 550MW figure yields a water requirement for dust control over the two years of construction of 1,091ML and for operations 18.9ML/year. These figures are considerably more than proposed by the Applicant. If one assumes that when cleaning the panels that 10L (one bucket) of water is used per panel and each panel is cleaned twice a year then the water required would be 2 x 10L x 800,000 panels equals 16ML/year, which is close to the 18.9ML/year Spectrum estimate, but much more than the 5ML/year quoted by the Applicant. **The Applicant needs justify their figures, given the importance of water usage to the area, especially during drought years.**

During the next severe drought, not only the Stubbo, but also the Beryl, solar works will compete with the regions residents and farmers for very scarce water resources. In addition, the solar works will need to clean their solar panels much more frequently as the many dust storms will cover the panels and reduce their efficiency (output of electricity) by 10% or more. When this situation arises the "unlikely" will become "likely", the 19 onsite dams will be empty, commercially treated water will become scarcer and town water will be either restricted or unavailable. Some residents in Black Lead Lane, just outside the Gulgong town boundary, do not even have town water available and so rely totally on tank water and the Council's potable water stations.

The MWRC *Asset Management Plan*, Table 3.4: *Current Levels of Service* on page 20 states that the total annual average consumption of water by Gulgong is 600ML/year. Mudgee is 2000ML/yr and Rylstone 600ML/yr. During peak construction, just the proposed Stubbo project would use over 8.3% (50ML/600ML) of the annual usage of the whole of Gulgong. Expressed another way, it would take the residents of Gulgong or Rylstone one month to use the same amount of water that the project requires for just one year of construction. However, the Applicant's estimates of water usage could be grossly understated by a factor of 10, as highlighted above. **This is a further unacceptable demand on our local environment and citizens of Gulgong, Mudgee and Rylstone. The proposal must be rejected.**



Construction site dust control



Cleaning PV solar panels

Key Issues: Hazards and Risks

Risks to biodiversity, heritage, land, noise, transport and water were raised previously under those headings. The following covers bushfire and grass fire risks.

Bushfire and grass fire risks:

Fire-fighters have to take special precautions when fighting a fire in a PV solar electricity generating works because of the dangerous voltages and the release of toxic fumes from burning panels and cables. Their approach is to just contain the perimeter of a solar IEGW. Refer RP21, 22 & RP36



PV solar IEGW left to burn out



PV solar panel fire result

Distributing solar and wind IEGW into rural areas, such as Central West NSW, even though the electricity is consumed hundreds of kilometres away in the cities, creates the need for hundreds of kilometres of new or upgraded transmission lines, which not only impact the environment but increase the incidence of bushfires. In the US, one power company caused [1,500 fires in California](#) over a period of six years including [the 2018 Camp Fire](#), which killed 85 people.

New Energy, owners of Beryl and Manildra solar works, in their December 2020 quarterly report stated that in June 2020 the Rosamond California solar plants "*were damaged by a grass fire, reducing generation by approximately 32%.*". Site remediation is expected to continue "*through the first half of 2021*". This example, which one of many, highlights a few risks that cannot be wished away.

Firstly, a grass fire, can cause a lot of damage to a solar plant. The Stubbo site is on and surrounded by grassland and woodland. The Council has yet to sign-off on the proposed bushfire prone zoning for Gulgong, but the Applicant knows it exists and should assume it will be approved.

Secondly, solar plant fires are extremely hard for fire-fighters to contain because of the dangers to them of large confined areas, toxic fumes and high voltages. Where are all the fire-fighting resources going to come from to deal with a fire in a 18km2 dangerous zone? One RFS captain said we have to water-bomb the plant, otherwise try to contain the perimeter. The 2017 Leadville grass fire could not be contained and 35 homes were lost, 55,000ha destroyed and 6,000 livestock died.



February 2017 Central West NSW Leadville-Dunedoo fire front



Why we hate grass fires

Onsite water tanks for fire-fighters are cosmetic. It only takes another Leadville situation to prove that! But at what cost to Gulgong township and its surrounds. **The UPC proposal should be denied.**

Thirdly, it takes a long time to fully remediate a damaged plant, in this example 12 months. RP21 highlights other events (e.g. storm or hail) that can take part or all of a solar plant out of action and so substantially reduce the intermittent and unreliable electricity generation. In New Energy's report both Beryl and Manildra plants suffered inverter problems in the December 2020 quarter. In addition, a lightning strike damaged Beryl and feed in problems

into the grid occurred. Just these examples so close to Gulgong demonstrate the fragility of solar plants. Concentrating more and much larger solar plants in close proximity to each other is just foolhardy. **The UPC proposal should be denied.**



Aftermath of storm hitting Qld solar plant



Canberra 2020, hail storm damage

2. On page 246 of the EIS The Applicant lists some/all hazardous events. Fire-fighters and sheep would be interested in exposure to voltage and infrastructure fire. Arc flash could result in release of the most potent greenhouse known, if used, Sulphur hexafluoride (Refer RP10). The Arc flash suppressant gas to be used has not been specified in the EIS. Release of hazardous materials, but The Applicant does not address the e-waste classification of solar panels, which are used on a massive scale (800,000 panels weighing about 8000 tonnes). Battery thermal runaway when using lithium batteries, while now rare, does happen. With 4,800 tonnes of batteries the risks must be higher but also the resultant grass fires is the big risk to the community. Also, local air temperatures can be in low 40 degrees Celsius, well above the preferred storage temperature of below 30 degrees. With so many batteries the likelihood of just one near out-of-tolerance battery must be increased and resulting in a fire. Also, the inverters, substation, PCU, electrical wiring can all cause a fire. Table 15.6 on page 252, while listing many risks as medium and the likelihood as "very unlikely", highlights to SOS that in combination the probability of some major hazardous event occurring is increased. **The UPC proposal should be denied as the combined risks are too great.**

3. Pages 253-255 address bushfire risk (15.3.3). There are many potential sources of ignition listed. The main risk of a fire starting in vegetation is human caused. A study of 280,000 fire incidents concluded that 35.2% accidental, 13.3% incendiary and 36.2% suspicious. Therefore, apart from the many panel, battery, inverter, etc. fire risks that may be mitigated it is the human caused fire either on the site or outside of it that poses the highest risk. The Leadville-Dunedoo fire of 2017 and similar fires in California demonstrate that such fires easily get out of control, regardless of the precautions taken. **The UPC proposal should be denied as the combined risks are too great.**

Bryant C 2008. Deliberately lit vegetation fires in Australia. *Trends & issues in crime and criminal justice* no. 350. Canberra: Australian Institute of Criminology.
<https://www.aic.gov.au/publications/tandi/tandi350>.

4. A significant fire event, if started negligently, on an adjoining property to the study site raises the question of public liability. Even after a Public Liability insurance payout of the maximum \$20 million, a landowner could face a damages cost that could bankrupt them. In

June 2019 a fire at the California Valley Solar Ranch burnt out 456 hectares of grassland causing net losses in damages of over A\$9 million.

Has the Applicant advised all the landowners within say 5km that they will carry a potential financial cost?

Key Issues: Socio-Economic

1. Page 260 of the EIS refers to the increase in visitors (1,900 Oct 2019, 5,900 Oct 2020) to the Mudgee Tourist Information Centre. With the uncertainty around Covid-19 restrictions and international travel for the next few years it has to be assumed the Central West will attract much larger numbers of visitors and of people moving from major cities to country areas to live. Local real estate agents confirm demand for established housing (purchase or rental) is already occurring. Home builders also confirm demand for their already overstretched resources has increased.

2. On page 262 the Applicant claims it has advice "*that there was both skilled and unskilled labour capacity within the social locality.*" The several comments made during the community drop-in session. One community comment was in relation to actual experiences of Gulgong residents that have recently built or are still building their homes. For example, several residents requiring installation of water tanks prior to the council permanently cutting their town water off had to seek several extensions to the cut-off date because they could not get the required trades (earthworks, gravel delivery, tank delivery, plumber, electrician). There are plenty of other examples in the last two years of tradespeople (e.g. gas fitters, electricians, plasterers, tilers, plumbers, painters, slashers) too busy to even quote let alone attend the property. Some tradespersons agree to do the job then either delay attendance for weeks or subsequently withdraw.

3. Another comment referenced tradespeople, such as in the electrical and plumbing trades, that get work at the mines. The durations are short. The tradespeople say the money is very good but it does mean they can't service the wider community during these short bursts of mine work. The point made to the Applicant was that their project would need tradespeople, especially electricians, that are already in short supply locally. Therefore they would either take resources away from the community or do what Beryl solar works did and bring in a huge team of electricians from one company that stayed in cabins at Big4 caravan park Mudgee. Either way, the local community suffers and tourists have fewer accommodation options and who may go elsewhere.

How will this potential problem for the community be addressed?

4. The fruit picking comment was in relation to backpackers being used for the majority of solar construction works (panel assembly) as was the case for the Beryl and Wellington projects. Employment of backpackers via labour hire firms take resources away from fruit growers. The Applicant said that they expect 50% of workers to be non-locals.

[Ref: Daily Telegraph 6/11/20 p15 "Clean energy farm a fatal risk; RP17-18].



Land cleared. cables laid. pile-driven uprights in place



Crew of two install cross-members and panels

5. From table 16-1 Gulgong's population is 2,521 and Mudgee 10,923. Table 16-3 lists the unemployment rate for Gulgong as 8.7% and Mudgee as 5.8%. Assuming 60% (53% Australia wide; RBA 2019) of the population is "working age" then the number of unemployed would be, Gulgong 132 people and Mudgee 380 people for a total of 512 unemployed people of various skills. The project's estimate of 200 local workers during 12 months peak construction is extremely optimistic from such a small pool, even if no other major employment activities occur during the project's construction. In all likelihood the vast majority of workers will be non-local, which raises the question of where will they be accommodated and what implications that has for the region.

6. The Applicant presents very optimistic assumptions on how hundreds of non-local workers would be temporarily accommodated for up to 12 months. If international and intermittent State border closures continue well into 2022 then domestic tourism will be well above historic numbers. If travel restrictions are eased Gulgong will be able to run its highly successful festivals and events, including The Clay Festival, for which attendees book accommodation up to 12 or more months in advance. No doubt worker camps would be needed, which would bring their own issues.

7. During the construction of Beryl solar works 2018/19 some residents claimed that crime increased in Gulgong. The NSW Bureau of Crime Statistics and Research website only allows statistics by local government area. However for the MWRC area, it did show an increase in "Assault - non-domestic violence related" of 28% from 2017/18 to 2018/19, which dropped by 15.7% in 2019/20. Stealing from motor vehicle, from retail store and from dwelling all fell in 2019/20 by a combined 13.8% from 2018/19. Malicious damage to property fell 24%. While only circumstantial evidence, as we don't know who was involved, it is something to be considered when very large numbers of people come from outside the area.

How will these potential problems for the community be addressed?

8. This loss of land, which were/can be used for agriculture and grazing stock, reduces the ongoing job opportunities for Gulgong area local workers and businesses, such as those involved in farm fencing, machinery supply, equipment maintenance, irrigation, sheep shearing, hay bailing, chemicals supply/dispersion, provisions, fertiliser, feedstock, hardware supplies, goods and animal transport, sales yards, hay bailing, etc, and the support services (accommodation, food, entertainment, health services, etc) or, for permanent residents that live on the land, all the associated services (building, plumbing, electrical, etc). Industrial solar works will take the agricultural/grazing/residential land out of alternative use for 30 years and will provide virtually no local employment benefits over that time, but jobs elsewhere will be diminished.

Will the Stubbo project's up to 10 jobs be offset by the job losses elsewhere?

9. The Applicant on page 267 refers to UPC/AC *"...is expected to be long term i.e. UPC/AC ...because it intends to be involved in the construction and operation phase of the asset over a 30 year plus timeframe"*. While many companies have made similar claims the facts are quite different. Please refer "Long Term Operation and Industry Viability" on page 6 for details.

10. Page 267 UPC/AC considers that the addition of 400 workers (16% increase to Gulgong's population) only 10km from Gulgong would be unlikely to exceed the capacity of the existing health services. The same services residents have been fighting for months to get a doctor for their hospital and that one has to book days in advance to see a doctor at the Medical Centre. What of the impact on the local community of additional ill people or even from additional services, such as flu injections?

Key Issues: Waste

1. The Applicant's response at the community drop-in session when asked about the lack of economic recycling of solar panels. It is not good enough for the Applicant to say that recycling of solar panels will be sorted out in 30 years time when it is not economic now, panel technology will be different, and 78 million tonnes of panel waste is expected globally by 2050 (RP35-36). As pointed out by SOS in this submission the problem exists now. Damaged solar panels from rooftop, commercial and industrial solar systems are either being stockpiled or sent to landfill sites. The project will have at least 8,000 tonnes of panels, 4,800 tonnes of batteries, which will be totally replaced at least two or three times over the solar plant's life, thousands of tonnes of steel, concrete, fencing, inverters, copper wiring, etc. With the claimed experience of its owners it seems incredible that UPC/AC cannot estimate the massive tonnage of the materials required. Waiting until after approval and detailed design is unacceptable. **A plan of how much materials that will have to be disposed of and how recycled over the entire project life should be provided.**

2. Victoria's government has stated that: *"It is estimated that more than 100,000 tonnes of solar panels will enter Australia's waste stream by 2035. This has the potential to create a hazardous waste management issue, as materials contained within solar panels can leach into soil and groundwater, causing environmental contamination and safety concerns if managed poorly. Keeping these materials out of landfill prevents environmental and human health problems, and rescues valuable resources for reuse. Compounding the issue is a lack of dedicated processing facilities in Australia that can recover valuable materials contained in PV products."* The Stubbo project's 8000 tonnes of solar panels will represent 8% of that waste. [ref: www.sustainability.vic.gov.au "The growing issue of PV system waste"; RP35]

3. According to the Council website the Gulgong Waste Facility is for residents only use. The Applicant needs to confirm the tonnes of non-recycling materials can be dumped at the facility.

Legislation, Policies & Guidelines

It is interesting that the Applicant mentions the boom in renewables. For every boom there is eventually a bust.

The Electricity Infrastructure Investment Act 2020

SOS has queried with Mr Kean, but have yet to receive an answer, a perceived flaw in the Act:

"The Bill's Division 1, 12(1) "energy security target" only refers to megawatts (MW), which is a capacity measure not an electricity production or consumption measure. The latter are measured in megawatt hours (MWh) of electricity. The bill is therefore fundamentally flawed in our opinion. The 3,000MW extra capacity proposed using only weather-dependent intermittent renewables produces only about a third of the total electricity output of equivalent total capacity reliable HELE, CCGT or nuclear power plants. See Appendix A of the SOS Research Paper for detailed definitions of MW, MWh and capacity factor. Thus, the security targets to prevent 1 in 10 years major power failures is not based on a technically correct basis. Please prove our assessment of this flaw is incorrect"

The Act provides very favourable conditions for NSW weather-dependent renewable developers and operators, such as those listed on EIS page 62. Rooftop solar, at a much lower cost per kilowatt hour, already produces 9% of NSW electricity compared to only 5% by industrial solar. However, the legislation gives no equivalent guarantees for rooftop solar producers. One Gulgong resident on the outskirts of town paid \$30,000 for a transformer and pole, which the distributor now owns, just to connect to the pole directly on the other side of the road. Several thousand dollars more was spent to get power on the other side of the fence. More still was spent to connect to the building. Meanwhile, the feed-in tariff has been reduced by 24% since March 2019. Yet for industrial solar operators they get a government guaranteed minimum wholesale price and other favourable payments. The higher production costs and the costly guarantees will add to electricity costs overall and disadvantage the cheaper alternatives, such as rooftop solar. The Applicant needs to include rooftop solar in its comparison of alternatives to their project.

Other

1. The NES calculated the average annual electricity may drop by \$40 in 2040 when all 12GW is installed in REZs. The AEMO predicted \$55 annually per household will result by 2040, if the NEM is substantially renewables. Both predictions are an insult when a Gulgong resident with rooftop solar has his annual electricity cost rise by \$419 in just 18 months. Obviously, the whole transition to renewables is not about seriously reducing electricity bills.

2. Australia's rooftop solar penetration at 30% of households is by far the highest in the world. In addition, the DISER submission to THE HOUSE OF REPRESENTATIVES STANDING COMMITTEE ON THE ENVIRONMENT AND ENERGY on the Climate Bills 2020 on 27 January 2021 included in their Attachment E, "Change in emissions and renewable energy comparators for selected countries". The various comparisons covering the period 2005-18/19 showed that Australia leads the world, except for the UK in some cases, in emissions reductions, capacity of renewables installed and investment per capita. Not what we are usually told.

Consultation

1. SOS rejects the Applicant's claim they have wide community support for their project. The communities of Gulgong and Mudgee have resoundingly rejected two solar electricity generating works proposed for Gulgong (445 submissions, 439 against) and Mudgee (over 1100 submissions, almost all against). Both proposals were unanimously rejected by the Western Regional Planning Panels 4 nil (Gulgong) and 5 nil (Burrundulla, Mudgee).

UPC/AC's conclusion that *"Overall, there has been a generally positive or neutral response"* (EIS Main page 4) may either be due to a very small sample size (only 40 people attended the 28/10/20 open session) or resident fatigue. After all, how many individuals have time to read and understand multiple proposals a year, let alone UPC/AC's 966 page EIS, and then make a submission to the DPIE or other relevant body. SOS Central West supports the communities negatively impacted by these massive industrial developments.

2. Just a few examples of the depth of feeling, stress and anxiety suffered by residents in various communities when an industrial solar works is approved near their town are:

"Hi [name of addressee], I'm gutted! We lost! So unfair. Are you aware of any appeal process we may have, or is that it? In anger, [Name of sender]", Solar works approved in Orange December 2020,

"gut-wrenching ...", says Another solar works approved near Jindera NSW, December 2020

The renewables energy project *"had a lot of resistance. They are worn out....don't even want to talk about it"*. Wagga Wagga resident.

"I'm so disgusted [name] with how this government, all governments are allowing this to happen to our pristine, countryside our environment and Australians in general", Mudgee resident, January 2021 following lodgement of Stubbo EIS.

"The only positive thing I have considered will come out of this significantly stressful situation is that I will have found some sensible, thoughtful and lovely people in the same situation that are prepared to support each other in need. Thanks for reaching out." Resident impacted by Culcairn Solar and loss of agricultural land. January 2021

3. SOS members attended the 28/10/20 drop-in session and held unsatisfactory discussions with several of the Applicant's representatives for about 40 minutes and subsequently submitted 31 questions by email on 30/11/20 (Appendix A). The five representative's lacked knowledge about most issues raised such as, solar panels types and their classification as e-waste by the Victorian EPA and by the EU, cobalt being used in batteries and that artisanal mining is used to supply cobalt to China. The response from the Applicant was that the EIS would address the questions that were raised. This did not give SOS the opportunity to raise follow-on questions from their responses. Of the emailed questions, only 7 questions were fully addressed and 4 partially addressed by the EIS. The Applicant only wants to *"focus on the benefits of renewable energy"* which makes "community consultation" and the EIS little more than a marketing exercise. The SOS Research Paper (Attachment 1) presents the factual side of weather-dependent renewables.

4. More examples of the lack of community support for weather-dependent renewables within and outside of Australia refer to Attachment 1, RP39 - RP41

Other Issues

1. **Vagueness of wording throughout the EIS main document:** just from a sample from pages 29 to 60 there is over 40 different of vague words and phrases used (refer Appendix B). How can the reader have confidence in or properly assess what the Applicant is proposing when so many of their statements in the EIS are qualified? For example, "**up to** 400 full-time equivalent employees during peak construction" could mean only 200 employees are actually used, so reducing any claimed employment benefit from the project. Another example, "**up to approximately** 10 full-time equivalent employees would be required". What does that even mean?
2. The majority of the questions in Appendix A still require responses from the Applicant.
3. The Beryl solar works is but one example where developers can say things in their submissions and then not do them adequately because there is little or no oversight. This is especially true where the ownership changes hands so rapidly and frequently. The Applicant, who is new to building renewable projects and them operating them in Australia, has made a lot of mitigation commitments, but who will ensure they satisfactorily carry them out for 30 years or more. Who is responsible for independently managing this risk?
4. The following information from an SOS member questions the Applicant's claim that the grazing sheep on a solar works site has been successfully done elsewhere. In addition, what happens to sheep when grass fires occur on site? How are the pastures maintained to ensure soil is not degraded and the health and quality of sheep maintained?

"We have been personally informed in 2020 by Parkes Mayor Ken Keith - connected with the Parkes Neoen Show Society Trial - that at least 2 sheep had already died a cruel death - caught up by their wool in the rotating universal joints of the solar tilting mechanism (also quoted by 'Intelligent Living' 10th Sept 2020.)

The DPI have advised me that they are not monitoring or recording how the sheep have died, any increased fly strike due to lack of care/accessibility, nor any damage to solar components."

Appendix A

From: [name] <saveoursurroundings@outlook.com>

Date: Monday, 30 November 2020 at 4:39 pm

To: Stubbo Solar <stubbo@upc-ac.com>

Subject: Q&A Stubbo Solar Works: Proposed 400MW energy generator 10km north of Gulgong NSW

Good Day

The SOS groups have a number of questions, based mainly on your Fact Sheet for the Stubbo Solar Farm. We shall be pleased to receive explanation and answers to the following:

1. As the site will be fully fenced how will sheep escape during a major fire?
2. As solar panels are declared as e-waste by the Victorian Environmental Protection Authority and by the European Union, what measures will you take to prevent contamination of the site?
3. Exactly what type of solar panels will be installed? What are all the metals and chemicals in these panels?
4. What will the solar panel starting efficiency and warranted time for 80% efficiency.
5. Will the site be soil and water tested for the chemicals/minerals/metals used in your panels before work commences to establish a baseline for each?
6. Will ongoing regular soil and water monitoring be done against the baselines and reported to the community?
7. Please explain how you propose to power one typical NSW home, which uses electricity 24/7, when your solar works produces no electricity at night.
8. How is your 600,000 tonnes reduction of CO2 calculated?
9. How is your 190,000 cars taken off our roads calculated?
10. How many tonnes of CO2 (including CO2 equivalents) are imbedded in your total solar works (I.e. from mining, processing, transport, manufacturing, etc)?
11. Council has requirements for residents that a septic sewerage system must be 200 metres from any waterway and a 60 metres setback for buildings on R1 rated land. Your setbacks appear to inside of these limits. Why?
12. What is the breakdown of the 400 construction jobs by trade/skill set?
13. What is the breakdown of the up to 10 operations jobs by trade/skill set?

14. How many of the up to 10 operations jobs will be full-time onsite?
15. What business and contracting opportunities are there specifically?
16. Who owns UPC/AC Renewables Australia?
17. How do your solar works actually contribute to reducing wholesale electricity prices when your output is low (e.g. a cloudy day) or zero at night?
18. What method and frequency will be used to clean your solar panels?
19. Assuming that the majority of the construction workers will be for assembly of the cross supports and panels for a few months, where will they be accommodated in Gulgong, especially during our festive events and peak tourist seasons?
20. Given the safety restrictions for fire-fighters in fighting solar works fires how do you intend to eliminate any risk of a catastrophic fire on your site escaping the perimeter?
21. What is your definition of “near neighbours”?
22. What is the expected economic and physical lives of the works ?
23. Why did you not choose a site such as a reclaimed mine site, such as in Ulan?
24. Why did you choose the Stubbo site?
25. What will be the impact of clearing all vegetation from the site for all the wild-life that live or visit the site?
26. What will the impact on larger wild-life that cannot pass through the fenced-off site?
27. What is the percentage breakdown of the cost of the works into Australian content and imported content?
28. Who is responsible for decommissioning and rehabilitation of the site when the works are no longer viable?
29. Who is responsible for recycling/disposal of all the works materials and the safe handling and disposal of the e-waste solar panels?
30. Does the company have to lodge a bond for the future decommissioning, disposal and site rehabilitation in case you are no longer the owner or a subsequent owner becomes bankrupt?
31. What are the tonnes of each material used for your 900,000 solar panels works (e.g. steel, concrete, copper, glass, aluminium, rare earths, etc)?

Save Our Surroundings (SOS) Central West NSW, Representing Groups of concerned citizens

Appendix B

Examples of Vague words/phrases used in Stubbo EIS Main Paper

Number	Word/phrase	Page		Number	Word/phrase	Page
1	Does not intend	29		26	Approximately	
2	Except that			27	Will attempt to	
3	Farm			28	Preferably	53
4	Parks			29	Likely that	
5	Where practicable			30	Indicatively	
6	Intended to			31	Opportunistically	
7	Indicative			32	If available	
8	No... with the exception	42		33	Where available	
9	Will be			34	Assuming	58
10	Subject to			35	In the longer term	60
11	Up to			36	Is considering	
12	Will be determined			37	If	
13	Depending on	45		38	Would	
14	Anticipated that			39	As much as practicable	
15	Solar Farm			40	Where required	
16	Most likely	47		41	Expected to be	
17	Could be			42	Provided that	
18	Could in theory	48		43	Not likely	
19	Where possible			44	Intention	
20	Would depend on	49		45		
21	Will be...as much as practicable	49		46		
22	Could include	50		47		
23	May			48		
24	Expected that	52		49		
25	Around	52		50		