I object to this project.

I live and work on a farming property through which the heavy duty external vehicle route will pass. My wife and I and our family have lived on the farm since 1987. It is over 900 hectares and we have at all times worked it as a sheep (or cattle) grazing property.

As a whole, the EIS document is characterized by generalizations, assertions which are unsubstantiated, a lack of specific or definite detail, and a brushing aside of any matter which is problematic for the proponent on the basis that it will be dealt with in the future. This project **should not be approved.**

I set out below some immediate specific objections. I seek that the proponent answer each and every one of them in its Response to submissions.

<u>The External Heavy Duty Transport Route – General Matters</u>

1. The EIS is premised on existing traffic volume figures which are wrong. The maximum traffic on the relevant portion of the Yarrabin Road is hard pressed to reach half a dozen vehicles a day and most of that traffic consists of landowners moving within their own properties or going to and from the school bus. It is clear that the proponent has used a figure obtained from the sealed portion of the Yarrabin Road and not from the heavy vehicle route. **This project cannot be approved until the existing traffic volumes are corrected and all of the impacts which flow from the correction are considered.**
2. The **projected** traffic volumes are underestimated as they do not include heavy vehicle traffic movements which must occur but the present volume of which hasn't been precisely quantified at this time.

3. The existing road, which is a Council road (MWRC) is often not on the "paper" crown road i.e. it has been formed in the most convenient spots and not where the crown road should be. As the Department requires that transport routes occur on legal roads, this means **landowners are potentially looking at the relocation of the roads which run through their properties**. In addition, much of the work to upgrade the road (the work of transforming a narrow dirt road into a safe, sealed road with bends removed, crossings upgraded etc.) will **require access to private land and the acquisition of either title or easement rights.**
4. The proponent has **not obtained the consent of local landowners** to access or to be on, their private lands for the road upgrade. **The EIS should not have been filed, and certainly should not be approved, until these consents are obtained.** If it is approved, local landowners will remain in limbo in relation to their futures. This is the situation they have been in for the last three years and it should not be allowed to continue.
5. The Wind Farm Guidelines which the Department is currently exhibiting require that prior to the filing of an EIS, the consent of landowners must be obtained where private land is required for a project. The proponent has not complied with the Guideline.
6. The proponent should advise how it was able to obtain an exemption for the project from the requirement of landholders' consent. What information was provided to the Department to obtain this exemption? Did the proponent disclose to the Department of Planning the issue which it faced with the external transport route, the limited number of impacted landowners and the extent of the issues and impacts likely for these landholders as a result of the project?

External Heavy Duty Transport Route – Personal Impacts

For all the years I have lived here, my wife and I have worked the farm as an agricultural enterprise in partnership. The Yarrabin Road runs through our farm for about 3 kilometres. The road is narrow, largely unfenced and dirt. There is very little traffic other than neighbours. The topography is that hills on the boundaries of the property run down to the valley and the road passes through the valley. It runs through our prime ewe grazing paddocks. It has always been our major access to wider areas of the property and our primary stock movement route.

From the point of view of working the wider farm, the areas adjacent to the road are the prime area frequented on a day to day basis for weed and pasture control and for checking on stock. Stock, pasture and dams will all be impacted by noise and dust. Our working yards with small holding paddocks, associated watering dams, stock yards and shed abut the Yarrabin Road. To the best of our knowledge since the construction of the Burrendong Dam in 1957 (and always by us since 1987), the road has been used by the owners of the property for mustering livestock from the paddocks through which the road runs, into the sheep yard holding paddocks, with gates directly from the road into these holding/working areas. Construction of the road upgrades will necessitate significant change in the management of the farm and making mustering and stock movement much more difficult.

In the event that the road has to be sealed, it will need to be fenced. **The proponent consistently, formally refuses to accept this responsibility** We could not afford this expense but without fencing to keep stock off the roads, we will be unable to use the bulk of our property. The traffic movements proposed are huge – 400 per day plus during construction. Once construction of the Wind Farm is concluded, the road is likely to carry the construction traffic for the Burrendong pumped hydro project. Further, when the road is sealed, it is likely to become an alternative route for all traffic between Mudgee and Wellington, and Mudgee and Dubbo. This will irrevocably change traffic numbers and farm practices. If the paddocks are fenced off the road, it will totally alter our farm layout and

practices. Stock will not be able to access existing dams. Stock will not be able to travel on the road for regular, routine mustering. We will need to muster through difficult and less accessible areas and it will be impossible **without stock travelling lanes.**

The proponent has known for nearly three years that the development of the heavy duty traffic route will have the impacts outlined above. But it has consistently failed to deal transparently, honestly and genuinely with the landholders along the road to formalize arrangements which would allay their fears in relation to the impacts of the development.

For this reason, the EIS should not be approved until the necessary consents have been obtained from landowners. If the project is approved conditionally, it will mean that landowners will continue to have this issue hanging over their heads for the indefinite future. Ark Energy will go about its business, probably trying to onsell the wind farm and having no reason at all to deal with the impacts and negotiations with the landowners on the traffic route. Their behaviour to date has been unconscionable and it would be unconscionable of the Department to approve the EIS prior to the consent of the landowners being obtained.

Justification

1. The justification for this project is essentially said to be government policy in relation to the reduction of green house gas emissions and the development of renewable energy projects which are in turn alleged to be a cheap and reliable method of electricity generation. I object to the project on the same grounds that I object to the policy – it amounts to **destruction of the village to save the village.**

2. To sustain the assertion that wind energy is cheap and affordable, the proponent must include costings associated with all aspects of transmission as well as generation. In relation to cost and affordability, the proponent has not provided costing details **of its own project** nor has it provided details of the government subsidies upon which it will be drawing or the assistance being received from EnergyCo for the CWO REZ buildout. The proponent cannot sustain the truth of any assertions as to cost and affordability without a comprehensive disclosure of the financial inputs across the board.

3. As to sustainability - **Protection of the environment** is an integral part of sustainability. The following matters are raised:
   - The biodiversity report attached to the EIS is deficient in many respects. But even on its face, it sets out that **over half** of the threatened ecological communities of the area are within the Wind Farm site. The project has **a huge development footprint with associated vegetation removal**. Whilst the EIS does not list the trees or shrubs to be removed, over 600 hectares of bushland are impacted. Taking accepted average ecological figures, this would mean 133,000 trees are going. If this project were in a metropolitan area, replacement of 4 trees for every one would be required.
   - Threatened species credits have not been assessed with precision. The material in relation to **Koalas, Powerful Owls and the Wedge Tailed Eagles is so deficient that the Project should not approved until further studies are carried out.** The koala population inhabiting part of the project area is common knowledge among local farmers who have frequently captured photographs on the night cameras left in place to monitor stock. It is presently estimated that some 250,000 koalas will be extinguished due to Wind Farm developments. The proponent should explain how this is consistent with sustainability. The purchase of biodiversity credits, which may

not even be available given the number of wind farms proposed in central NSW, is no answer to the physical destruction of these species.

4. As to **green house gas emissions** - there has been no realistic and comprehensive assessment to substantiate that this project would meaningfully reduce green house gas emissions compared with the generation which it replaces. The glib calculation provided by the ghg tool does not comprise such an assessment. For obvious reasons, neither does the proponent calculate the proposed impact which this project will have on global ghg emission reduction.

5. **As to reliability and efficiency-** Clearly, wind is neither reliable nor efficient. It is an ancient and discarded technology. It is trite that it is intermittent and unreliable, and that firming back up is required in substantial amounts. The requisite firming back up does not exist in requisite amounts and there is no real likelihood at this point that it will in the foreseeable future. On no realistic basis is this energy transformation a "reliable" one.

6. Equally importantly, and in relation to the CWO REZ build out of which the Burrendong Wind Farm is a part:
    - the generation is too far inland from the areas which require the electricity;
    - The suitability of the wind resource has never been properly evaluated other than by proponents who are paid by averages and receive the benefits of significant subsidies.
    - The suitability for a grid which requires 5 minute dispatch intervals has never been demonstrated;
    - The known technical problems for such an array of renewables projects to be able to deliver rational electricity supply to the east coast from the central west are being ignored. Pretending these can be fixed is

irresponsible. I attach my more detailed consideration of these problems to this Objection.

I object to the approval of this Project. It should not be approved without a proper assessment of the impacts of the heavy vehicle route and necessary landowner consents have been obtained. It should not be approved without further biodiversity studies particularly in relation to the koalas and powerful owls. It should not be approved at all because it is yet another contribution to the hugely expensive and destructive build out of the Central West Orana region with renewables projects.

Terrence Conn

What follows is a summary of why a wind and solar grid will never work. The sources used are AEMO, Chris Morris and Russ Schussler (*4 part examination of the Australian NEM*), and Phil Kreveld.

Reliability, stability and no interruption to service are considered **must haves** for a grid. The world is watching Australia as a "unique" experiment – no grid has ever been run by wind and solar farms because of technical issues.

There are numerous technical problems in attempting to power the NEM with wind and solar as primary generating sources of electricity. The major issues relate to the fundamental character of these non-synchronous generators as working only intermittently in a random and chaotic manner producing, maybe, 30% and 20% of nameplate capacity on an average basis unrelated to demand.

By way of background, at a simplistic level, electricity received by consumers has two main components – current and voltage. The Australian current is AC - an alternating current system. The voltage is a measure of the pressure of the current. It needs to be strong and stable. Current and voltage move in a wave form which should be smooth and regular, not too big or too small. When the voltage wave form is strong and stable, we have high system strength. If we don't have high system strength, we have blackouts. As the AEMC states, ***"Historically, system strength was supplied as a free by-product of synchronous generators which are typically coal and gas fired generators, as well as hydro generators. As the power system transitions to an increasingly non-synchronous generation mix - which are typically wind and solar generators - we need new ways to provide system strength."***

Synchronous generators like coal and gas stabilized the voltage wave form. Not only was output of energy able to be controlled, the turbine (aka *condenser* or *generator*) which actually produced electricity was located as part of the power station with the coal or gas driving synchronous condensers which are/were physically coupled to the grid. Intermittent wind and solar generators have no such capacity and require Inverter Based Resources (IBR) which are nonsynchronous to couple with the grid.

As stated above, there are numerous technical problems in attempting to power the NEM with wind and solar as primary generating sources of electricity. They include the following:

1. It is a given that at this time, the grid requires some synchronous capacity. There must be voltage forming generators in the system to support asynchronous generation. As the Australian Energy Security Board has advised, a "capacity market" must exist.

   It has been argued that with sufficient numbers of asynchronous generators spread over sufficient areas of the continent, synchronous capacity becomes redundant because somewhere, the wind will be blowing or the sun will be shining. Even a cursory examination of wind output across the continent establishes that this is not an argument that can be sustained. There is ample evidence now, regularly collated, which demonstrates that system strength cannot and will not be maintained at all times by asynchronous generators. The battery technology usually trotted out in support of this argument does not exist and in any event, does not provide synchronous generation.

   As it is, the existing and proposed penetration of wind and solar generators into the NEM means synchronous generators must not only be available but will have to vary their output constantly in support of the grid. This means that effectively gas generators are the only alternative available. As a result of the policies of the states and the federal government, there is no reasonable likelihood of modern gas fired generators providing the necessary synchronised generation to support the wind and solar generators which will comprise the grid. There is little reasonable likelihood of Snowy 2 fulfilling any meaningful role in the foreseeable future.

2. The large scale renewable energy generators have been located in areas remote from highest demand. In addition, the NEM is a huge grid with over 40,000 kilometres of transmission lines. This does not include the additional 10 – 28,000 kilometres of new build out currently stated as required. The net effect of long transmission lines distant from consumers is a weak network giving limited short circuit capacity. The technical term is "impedance." Impedance is "the opposition to alternating current presented by the combined effect of resistance and reactance in a circuit." The more transmission lines added to the grid, the more impedance increases and the more current capacity is required

3. Wind and solar do not have synchronous generators stabilizing the electricity wave form. To assist in overcoming the resulting instability, wind and solar engineers have decided to use synchronous condensers (called "syncrons"). Synchronous condensers basically do the same job as synchronous generators but they consume power rather than generate it and therefore only work in conjunction with synchronous generators. Synchronous condensers and synchronous generators do both provide inertia, voltage control and provide and absorb vars. (Vars occur when AC electric

currents and voltage are not in phase.) But only synchronous generators generate power.

Synchronous condensers are merely a "trick" used to allow for less synchronous generators and pretend a grid is powered by wind and solar only.

South Australia is claimed to be a wholly renewable stand alone grid but it is simply a small part of the NEM grid and gets its support power from the existing Heywood interconnector which often relies entirely on coal fired generators. SA has replaced 4 synchronous generators with synchronous condensers powered by being online with other sources. These include now their own gas fired generator and diesel engine generators as well as the Heywood interconnector.

4. Voltage oscillation is a major problem. There is no current large scale solution and attempted fixes have failed. Voltage oscillation literally damages turbines of any sort.

5. Wind and solar generation connect to the grid via "inverter-based resources" (IBR). An IBR has been defined as "a source of electricity that is asynchronously connected to the grid via an electric power converter." They require the presence of stable AC voltage wave form to operate properly and to synchronise their AC output. In so doing, they can actually "use up" system strength.

   IBRs are "grid following" in Australia. Grid following inverters depend on the grid to provide a stable voltage and frequency reference, and cannot operate in islanded or off-grid mode. If there are no stable voltage forming generators in the electrical system, that system cannot work. Wind and solar are not stable voltage forming generators. Wind and solar are non synchronous inverter based technologies. There are no major grids in existence that only have IBR providing power.

   Batteries and synchronous condensers are mooted to solve the above problem. Batteries do not replace synchronous generators. There are currently no IBR in the world that can take the place of 100 MW and larger synchronous generators.

   On a wing and a prayer, the AEMC states *"this may change in the future as new technologies, particularly "grid forming" inverters, become more widespread…. Australia is leading the world in operating a system with high levels of inverter-based resources and new technologies are being tested by AEMO, ARENA and industry trials and other demonstration projects."*

6. System strength is essential for it to be functional. System strength is the availability of constant voltage regardless of how much current is being drawn. When there are increases in power demand, synchronous generators can keep their voltage up whereas inverters are not able to do so to any useful extent. Synchronous generators are able to supply up to 600% of their rated current. Inverters typically supply only between 120% to 150% at best. Voltage collapse cannot be prevented by inverters when power demand goes up quickly which it frequently does.
7.
8. AEMO acknowledges other significant technical issues relating to the following:-

    a) Reactive Power

    This becomes an even greater problem for proposed generation in "remote" places acknowledged to include "Central West of NSW."

    b) Frequency Control and Inertia.

    AEMO recognises synchronous units rather than renewables and batteries are needed to supply adequate frequency response. AEMO also recognises extremely expensive Frequency Control Ancillary Services (FCAS) are needed to deal with "short period dispatches" these now being 5 minutes, 60 seconds and 6 seconds and a proposed 1 second required in an attempt to make wind and solar work.

    c) Reserves

    Frequency control and inertia concerns do not resolve the imbalance between load (actual demand) and generation. In South Australia batteries are supposed to overcome this but in reality, they rely on thermal plant that renewables and batteries are supposed to replace.

    d) Load Shedding

    Grid capabilities must be able to cover its fundamental operating parameters such as frequency, voltage and reactive power, when things go wrong. This is when inertia is critical. AEMO has rules about this but nothing is currently in place to deal with it that does not include synchronous generation from fossil fuelled generators.

    e) System function during frequency excursions.

    On the 25.5.21 a number of Queensland coal stations "tripped" in a cascade. "Under frequency" load shedding occurred. Queensland was ultimately "islanded" for 15 seconds until things were stable and balanced enough to reconnect automatically. Queensland was saved by the high grid inertia. If renewables were

powering the grid it would have been a collapse into complete blackness. AEMO is aware of this.

The build out of the CWOREZ as proposed will only make a bad situation worse.

The solutions for the wind and solar grid are theoretical. The "just around the corner" industry changing innovations and breakthroughs have not worked out. Germany is now firing up old brown coal synchronous generators and still relies on neighbours for electricity. Australia is the only country in the world which insists on believing it has the solutions which basically translates to a manic build out of more wind and solar farms, more transmission lines, more batteries, more synchronous condensers, more pumped hydro stations and more expensive switchyards to attempt to deal with vars (i.e. issues with reactive power). Increasing the grid penetration with the above **"will only compound the problems and the cost and are not bold innovations but rather costly, makeshift, stop gap band aids"** (Chris Morris).