**Oxley Solar Farm – Energy Storage Facility**

It is way past due for the Department of Planning, Industry and Environment (the Department or DPIE) to enforce the terms of its SEARs as they relate to Lithium Ion Energy Storage Facilities.

On more than one occasion, wind and solar proponents have indicated that the inclusion of an Energy Storage Facility (ESF) in their Scoping Report/EIS is at the suggestion of the NSW Planning function, even if they have no firm plans to construct an ESF. The Department has been very successful and rightly so. Some attempt at providing a level of backup for intermittent solar and wind must be part of each solar and wind proposal.

Moreover, no wind and solar proposal should be approved, nor grid connection allowed, without such backup **as part of the initial development.**

The proponent for the Oxley Solar farm would appear to have no firm plan.
NGH Consulting (NGH), the authors of the EIS, write in confirmation on Page 31 of the EIS:

> "The proposed Oxley Solar Farm would include a **provision** for an energy storage facility with a capacity of up to 50MWh (i.e. 50MW power output for one hour) consisting of approximately 25 containers (40 foot each). **The energy storage infrastructure would be installed once the solar farm is in operation** and would consist of power packs comprising of lithium ion batteries with inverters (Figure 4-7)." (Emphasis added)

That implies that the ESF may be built at some stage, or maybe not. On this basis alone, the Oxley solar farm proposal should be rejected.
However, the Oxley proposal does include an ESF, so we and the Department must assess accordingly.

**Lithium Ion battery systems have unique environmental impacts that need to be addressed in far more detail than currently covered in the EIS. These impacts include:**

**Waste.**

Waste, in general, is a significant and growing environmental issue and it is agreed there will be a large quantity of waste associated with the Oxley ESF, especially during the 30 year operational period.
On Page 270 of the EIS, NGH advises:

> "Batteries may require replacement up to a maximum of two times during the life of the solar farm"

NGH and the proponent should be congratulated for highlighting the issue. Most other developers ignore it, with apparent departmental concurrence.
To this operational waste must be added the waste associated with decommissioning the ESF, an issue conveniently omitted by the planning function from the relevant SEARs requirement below. (We won't go into the possibility that the then owner of the proponent, Oxley Solar Development Pty Ltd, won't have the financial resources to decommission the ESF and the rest of the solar farm. We'll leave that as a financial surprise for the turbine and ESF hosts)

The Oxley solar farm SEARs, in recognition that waste is a significant issue in broader solar farm development, state:

> **"Waste** – the EIS must:
>
> identify, quantify and classify the likely waste streams to be generated during construction and operation, and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste."

This clause has been included in the SEARs for all recent renewables projects. It is time for the Department to insist that the Oxley proponent adequately addresses the issue before Determination particularly in relation to the ESF.
The Oxley EIS does say:

> "A Waste Management Plan would be developed to minimise waste and maximise the opportunity for reuse and recycling"

Sometime in the future is too late. It should have been part of the EIS as it is not difficult.
The mandatory SEARs requirement for Waste, above, succinctly describes the components of a Waste Management Plan.

NGH has identified the major waste stream from the ESF during Operations (defective or worn out batteries). However, NGH has neither "quantified nor classified" the likely ESF waste stream and has failed to adequately "describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste".

As proponents and their consultants are unlikely, in my experience, to overestimate negative impacts, let us assume that batteries will be replaced twice during the solar farm lifetime. Could NGH please quantify the tonnage of waste batteries this equates to? A thousand? Certainly many hundreds.
How does the proponent plan to manage this waste stream?
Defective or worn out grid scale batteries cannot be reused. (There is some literature suggesting that Electric Vehicle [EV] batteries at the end of their useful life in an EV application can be repurposed as domestic batteries for rooftop solar storage. Won't happen. New ones will be safer, more effective and probably as cheap.)

Can ESF Lithium ion batteries be recycled in Australia? It would appear not. The CSIRO and others have raised the lack of a solution for recycling.

On the issue of recycling, the suggestion offered by NGH in the Oxley EIS is to get one of four unnamed companies to drop by and pick them up and – who knows. Are they then sent overseas for "recycling"? Will they be sent to landfill? Are they a suitable waste stream for one of the existing or proposed incinerators?

This is not just an issue with the Oxley solar farm. Most recent solar and wind proposals rightly include provision for an ESF. Additionally, there are massive standalone ESF proposals in the planning process. For example, in the last 6 months alone, SEARs have been issued, or are in preparation, for 19 NSW Solar and Wind farm and standalone ESFs. All except Eglington solar farm and Burrendong wind farm have ESFs as part of the proposal.
The storage capacity of the remaining 17 proposals is 6350 MWh, compared to the 50 MWh proposed for the Oxley solar farm ESF. If you include projects previously issued SEARs or in other later stages of the approval process or approved and/or constructed, you must massively multiply the impacts of the issues highlighted here for Oxley.

A quick review of a few standalone ESF proposals:
Hume BESS. (40 MWh)

> "The operation of the Project is not anticipated to generate waste. Battery cores would be taken back by the technology provider for re-purposing while steel components would be recycled."

The Department accepted this nonsense before approving the proposal.

Lismore BESS (another NGH Scoping Report – 200 MWh). Waste is not mentioned!

Great Western Battery (from the Aecom Scoping Report – 1000 MWh)

> "Small quantities of waste may be produced intermittently during operational maintenance activities; however, operation of the project would have little or no impact on waste disposal resources in the region. Operational waste is likely to be mainly limited to waste associated with human use such as general solid waste and sewerage."

How can two experts, NGH and Aecom be so far apart? NGH is probably the most active expert consultant in NSW renewables applications, and if they were consistent between their waste evaluation for the Oxley ESF and their hypothetical assessment for the Great Western Battery, they would estimate the potential for operational waste at something in the vicinity of 5000 tonnes of battery waste over the life of the project (decommissioning battery waste excluded). Hardly "general solid waste and sewerage".

Wallerarang BESS (from the Arcadis Scoping Report – 1000 MWh).

> "Wastes generated during operation of the Project are expected to be minimal, and associated with ongoing maintenance of the Project, and the generation from staff present at the Project Site during operation. Waste streams are expected to include residual waste, recyclable waste, used spill kit consumables and sewerage and waste generated by site staff (i.e. food waste, paper and cardboard). The quantity of waste generated during operation is expected to be minor and would not result in any significant adverse environmental impacts. Resource use during operation would primarily be associated with electricity generation."

Another expert ignoring up to 5000 tonnes of used or defective battery waste over the operational life of the project.

Eraring BESS (from the Jacobs Scoping Report – 2800 MWh)

> "The operation of the Project would not produce any waste and would not significantly impact the local environment in that regard. Most battery components are expected to be readily recyclable at end of life."

Let us move on rather than be repetitious, except to say that the Department has a challenge.

**Hazards and Risks**.

Lithium batteries are undeniably hazardous and therefore pose huge risks.
We know that some models of Samsung phones spontaneously combust.
We know that Tesla EVs suffer from the same design flaw, or feature, as do household storage batteries.
Only last month, Hyundai recalled 82,000 EVs globally, including over 1000 in Australia to replace the battery packs in response to instances of fire overseas.
Only last month, the ACCC confirmed a recall notice for some domestic Battery Energy Storage Systems from LG Energy Solution due to potential defects which can cause overheating and fire.

The Department clearly recognizes that battery storage is a hazard and a risk by nominating in its Large Scale Solar Energy Guideline as an Assessment issue:

> "Hazards and risks: Any hazards or risks associated with the construction, operation and decommissioning of the solar energy project, including those associated with hazardous materials (for instance, from solar thermal energy and **battery storage**), and…" (emphasis added)

The Oxley solar farm SEARs state that the "**EIS must address the following specific issues**":

> **Hazards and Risks –** including:

- a preliminary risk screening in accordance with State Environmental Planning Policy No. 33 (DoP, 2011), and if the preliminary risk screening indicates the development is "potentially hazardous", a Preliminary Hazard Analysis (PHA) must be prepared in accordance with Hazard Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (DoP, 2011) and *Multi-Level Risk Assessment* (DoP, 2011);

To reinforce this, the Department, in its Large Scale Solar Energy Guideline writes with specific reference to batteries:

> "• ***Batteries:*** If the project includes battery energy storage, the applicant should undertake a preliminary risk screening in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development*. If the preliminary risk screening indicates the development is "potentially hazardous", a Preliminary Hazard Analysis (PHA) must be prepared in accordance with *Hazard Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis* (DoP, 2011) and *Multi-Level Risk Assessment* (DoP, 2011)."

Note that the SEPP and the supporting papers are basically 2011 documents, penned when grid scale Lithium batteries in NSW were in their infancy and the risks and hazards associated with them were not as appreciated and as a result, downplayed.

It is time that these 2011 documents were updated to reflect the issues associated with grid scale ESFs.

In summary Battery Storage is hazardous, not just "potentially hazardous", so a Preliminary Hazard Analysis must be prepared.

We'd like to comment on the Preliminary Hazard Analysis (PHA) for the Oxley solar farm but there isn't one.

NGH declared it wasn't required. By writing statements in the EIS such as (Page 271):

> "Lithium-ion batteries are classified as a Class 9 miscellaneous dangerous goods and Class 9 hazardous goods (both new and waste batteries). They pose little threat to people or property, although they may pose an environmental hazard (DOP, 2011). Class 9 goods are excluded from the SEPP 33 risk screening process."

NGH is categorically stating that no risk screening and therefore no PHA is required for any solar or wind proposal containing an ESF. What brought about this conflict between the EIS and SEPP 33? What involvement did DPIE have?

The EIS for the Culcairn solar farm (approved by the IPC on March 25, 2021) includes a PHA. The PHA was commissioned from an independent expert, Systra, by the Culcairn EIS author, **once again, NGH**.

The expert, Systra, advises (Page 1):

> "the Department has adopted the approach to consider developments (or modifications) incorporating a BESS which can deliver or supply more than 30 MW of electrical power to be potentially hazardous under the State environmental Planning Policy No. 33 ( SEPP 33). Further details can be found in Appendix 3 of the Department's *Applying SEPP 33.*

allowing the expert to declare on Page 13 of the Culcairn PHA that:

> In this case a PHA is required automatically as the proposed battery storage units exceed 30 MW.

What changed?

From the transcript of the meeting between IPC Assessors for the Culcairn solar farm and DPIE as part of the recent Determination, Department Director of Assessments, Nicole Brewer, when asked by IPC Chair, Andrew Hutton, about hazards specific to Battery Storage Systems:

> “Does the Department have a view or comments around the hazards and under the hazard assessment type regime around these battery storages? I understand obviously fire and those sort of things are a key hazard, but is there any other hazards that the Department is looking into around these battery facilities?”

said:

> MS BREWER: Yes, certainly. Specifically on this project, a preliminary hazard analysis was done to consider those hazards and concluded that those hazards could be managed.”

So what was, rightly, a requirement for the Culcairn EIS, was not required for the Oxley solar farm.

What changed?

Ms Brewer’s answer implies that the Department believes that there are no significant hazards associated with battery storage systems and for the Oxley solar farm ESF, not worth considering in detail. We humbly disagree.
An Assessment, on the merits, cannot be concluded without a PHA and the application should be rejected until a PHA is provided.
Chair Hutton’s question also implies that at least some IPC Commissioners have concerns about the hazards associated with ESFs. Perhaps we can progress it at the next opportunity.

It is not obvious that a solar farm submission is the right place to raise this looming issue. But we’ll start here and see how the proponent and the Department responds.

Anthony Gardner