Edify

# Brewongle Solar Farm
# Frequently Asked Questions

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**How does solar generation work?**

When sunlight photons shine on a solar panel, they 'knock' electrons free on an electrical circuit (semi-conductor) and produce electricity. This electricity is initially generated as Direct Current (DC). Inverters then regulate the accumulation of electricity from a cluster or string of solar panels and convert this to Alternating Current (AC), delivering this AC power through the substation to the transmission network.

Regarding the solar module components, the angle-of-incidence for which the sunlight interacts with the panel is of high importance, as this determines the amount of energy that can be extracted or generated. This is why installing tracking systems helps increase the energy generation.

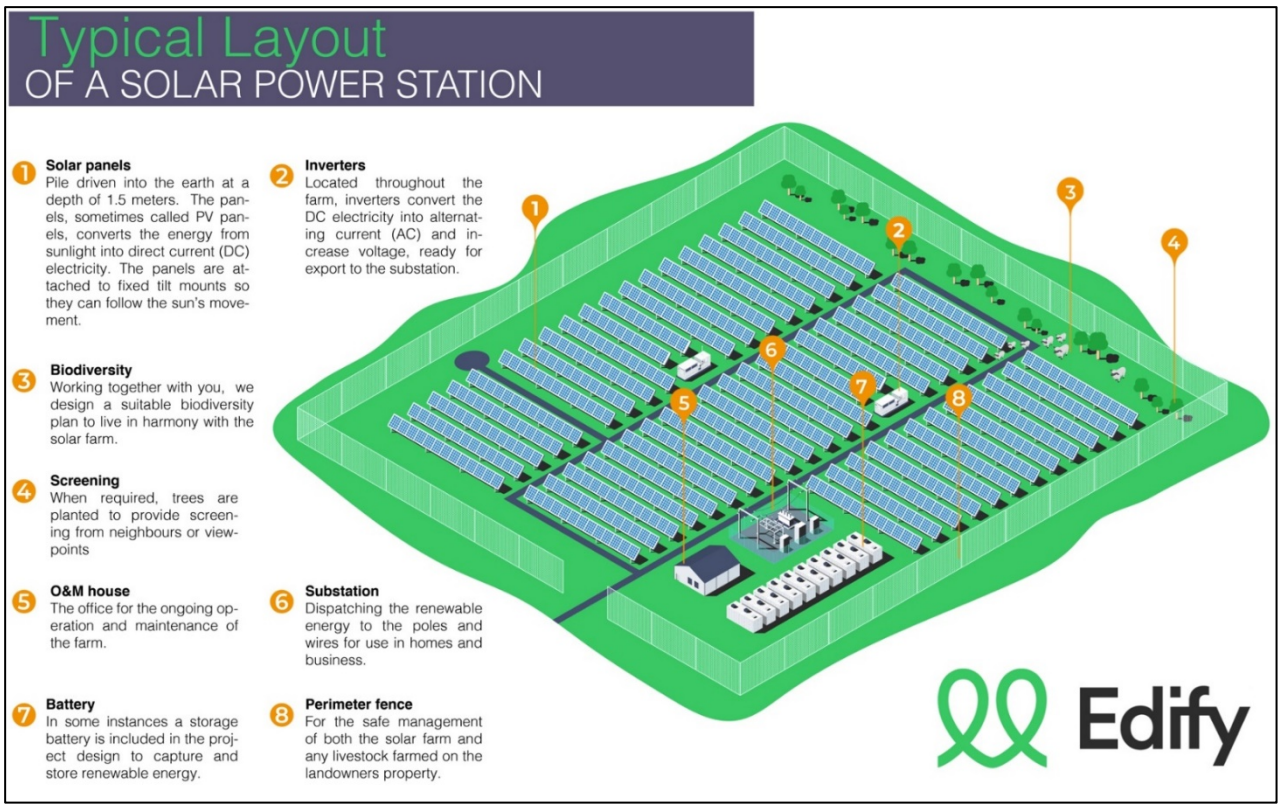


*Figure 1: Indicative Solar Farm layout.*

**What type of infrastructure makes up a co-location of agriculture and a solar farm?**

Edify's Brewongle Solar Farm intends to incorporate animal husbandry (sheep grazing) which will be co-located within the solar generating infrastructure, known as 'Agri-solar'. The Farm co-locates agricultural purposes with the addition of renewable electricity capabilities.

The solar modules utilised by the project are the same used in residential solar photovoltaic installations. The main difference however is that utility-scale solar modules are mounted on systems that track the sun's movement across the sky.

Edify has broad experience in financing, constructing and operating solar and energy storage projects. This proven track record is reflected in the suppliers and components that we procure for our projects, which totals around $1.7 billion of renewable energy investments in Australia.

All components are procured from premium, Tier-1 providers, supported by long term warranty periods and performance guarantees. This product and performance guarantee is important to us, since Edify also acts as the Asset Manager throughout the multi-decade life of the project. The Brewongle Solar Farm will utilise merino or dorper sheep, which have successfully proven to graze within the solar and energy storage infrastructure. Some benefits found with introducing Merino sheep to a solar farm for example include:

- Merino Sheep are one of the most common breeds of sheep involved in 'agri-solar' grazing, having a reputation for a docile temperament and are not prone to jumping on equipment or damaging electrical cables.
- Merino Sheep growth rate and fertility are potentially higher due to the shade provided by solar panels, as well as lower temperatures particularly during summer months.
- The micro-climate under the solar panels lead to better soil quality and water retention, ultimately providing a higher quality grass for sheep to graze on.

**What is 'Agri-Solar' and why does it matter?**

In addition to Edify's expertise in renewable energy, we are also leaders in the implementation of 'Agri-solar' principles. 'Agri-solar' is an important evolution in the way land is use around solar farm infrastructure which involves the continuation of modified agricultural activities such as sheep farming or cropping. This allows landholders to get the benefits of hosting a renewable energy project, without sacrificing the productivity of the associated land.

Edify has unrivalled experience in the integration of Agri-solar projects into the Australian electricity network, owning and operating Australia's first solar plus sheep grazing plus battery project. This project currently hosts around 500 merino sheep within the project area, with the Gannawarra Solar Farm located in regional Victoria, Kerang (see Figure 2).

Second to Gannawarra is Edify's Darlington Point Solar Farm located in southwest NSW, having up to 800 head of sheep introduced in Q4-2023.

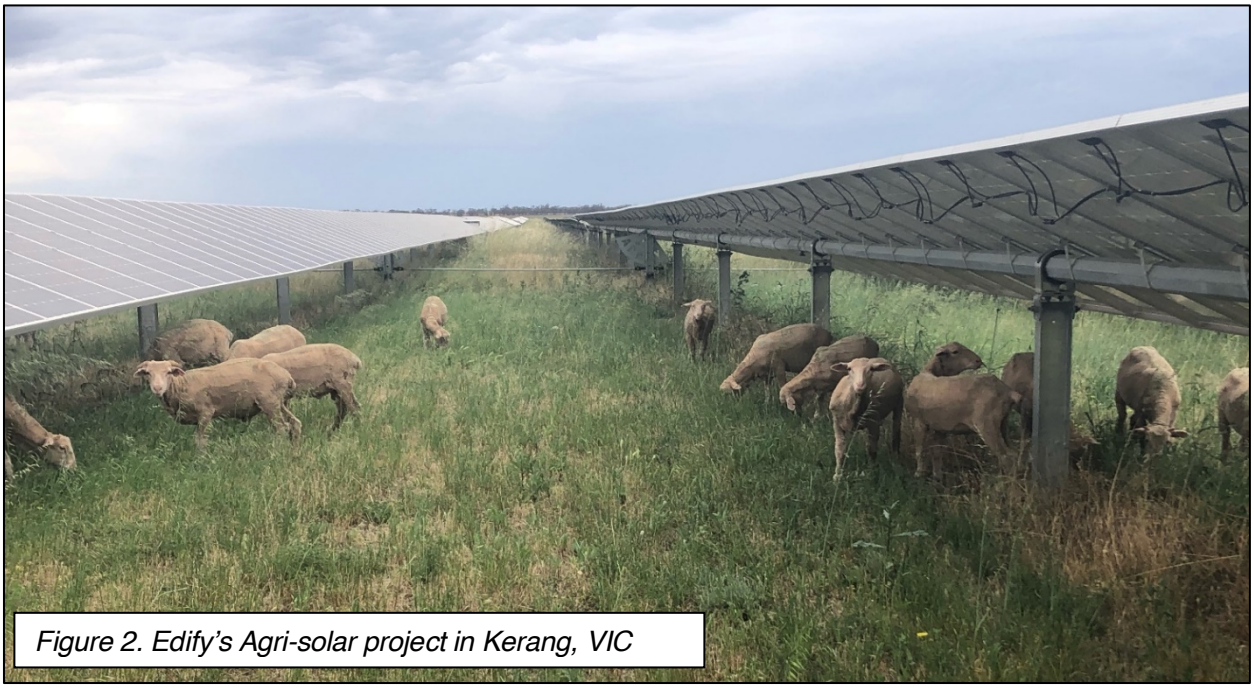

*Figure 2. Edify's Agri-solar project in Kerang, VIC*

**How does the addition of Battery Energy Storage benefit Solar Farms?**

Historically, solar farms have not been built with the inclusion of a battery energy storage system. Instead, solar farms only include the solar infrastructure needed to produce electricity, limiting their productivity to times when both supply and demand align. Whilst solar generation is an important contributor to Australia's energy mix, the technology is solely dependent on sunlight conditions and cannot generate electricity on-demand, nor after the sun goes down. Therefore, they often do not maximise the use of the weather-dependent energy that is generated.

By adding a large-scale battery system, this enables the generator to dispatch electricity on-demand, maximising the value derived. This includes supplying the grid during times of high demand, which could otherwise result in price surges, creating a more stable market with reduced costs for consumers. The battery component also supports the variability of solar generation by smoothing output.

The battery interfaces with the transmission network via a digital inverter, which enables the project to support the grid's frequency, in the event of a contingency or disruption to the network. The system's inverters have a response time within 200 - 300 milliseconds, which is incredibly fast and accurate when compared to traditional, thermal electricity generators.

By integrating both solar and battery facilities into one project, this combined system achieves a more balanced supply of power and voltage stability, allowing the operator to control when energy is stored or sent into the grid to ensure sufficient generation is available when it's most needed.

Finally, the battery can also provide an alternative solution to building more poles and wires. Transmission network augmentation can be deferred and sometimes avoided altogether, as this project has the ability to support periods of network congestion (which have been notable from 2017 - 2022). Batteries and other 'non-network solutions' can create savings for the network owners, government and most importantly – household consumers.

**How long does it take to build a solar with battery project?**

The construction timeframe depends on the project size and the number of workers deployed on site. As a rule of thumb, a typical 100 MW solar project can be built within a 12-18 month timeframe, with a peak construction period of 4 to 6 months. Following the construction of the solar and battery infrastructure, there will be an additional period of time required for rehabilitation of groundcover before any sheep grazing can commence.

**What is the life cycle of a solar farm with battery project?**

A project will typically operate for 30 years or more. Tier 1 solar panels that will be procured for the project generally come with a 25-year manufacturer's warranty. Depending on the local environment, they can generate electricity for 30 years or more with only about 0.5% efficiency loss each year. It is anticipated that the Brewongle Solar Farm would operate for 30 years or more.

**How long will the batteries last?**

The battery's lifespan is dictated by the usage and frequency of cycles (charge / discharge). Tier 1 suppliers are able to provide a performance guarantee that will warrant the performance of the battery cells for 20 years. Edify's battery procurement contracts include an agreed 'degradation rate', which provides certainty over the long-term performance of the battery cells and cycling frequency.

The ambient and operational temperature of the battery system is a key factor that has impacts upon the overall life of the battery cell. The battery systems used will have protection systems which will constantly measure the temperature of the cells and will disconnect the batteries in the case of abnormal operation.

**What is the maximum height of a solar panel when mounted on a tracking system?**

The maximum height of the solar panel occurs when the tracking system is tilted at sunrise and sunset. This height is approximately 4.2m tall. Generally speaking, solar panels have a dimension of 1m x 2m. Rows of solar panels are usually 30, 60 or 90 metres long. And rows of panels are separated by 5 to 7 metres. However, this varies from project to project.

**Will the solar panels generate glare?**

All tier 1 solar modules are coated with an Anti-Reflective (AR) material, which is why solar systems are commonplace across most major airports in Australia.

Improved manufacturing techniques on Tier 1 panels include Anti-Reflective coatings on solar panels to increase the amount of energy converted by the panels from sunlight. In addition, by minimising reflective losses from (or trapping more light within) solar panels, their performance can be increased while costs are lowered.

A useful way to represent this is by calculating Fresnel's equation, which predicts that roughly 4% of sunlight is reflected off the panel at normal incidence (i.e. when the sun's rays make an angle of 90°). Because every photon makes a difference in the efficiency of electricity generation, significant investment has been made in AR coatings. AR coating can reduce the normal incidence reflectance to less than 1%.

The AR coating performance directly translates to increased power and energy output, which is designed to achieve greater than 99% transmittance. This coating is applied as a spray process integrated into the panel manufacturing process. Because of these anti-reflective innovations, solar panel installations are now commonly found in airports around the world where any issue of glare would be highly scrutinised. For example, the Melbourne Airport represents the largest solar installation at any Australian airport, consisting of solar modules that span an area nine times the size of the Melbourne Cricket Ground. The Brisbane airport includes 22,000 solar panels, whilst the Adelaide airport also has 5,000 solar panels with a capacity of 1.28 MW on the roof of the terminal and carpark. From a regional NSW perspective, the Orange airport has 200 panels with a capacity of 100 kW on the roof of the terminal carpark. Finally, the upcoming Western Sydney Airport is also considering significant solar investments to help contribute towards electricity demands and lower greenhouse gas emissions. All of these installations have been undertaken by stakeholders that are highly cognisant of risks, such as glare and other safety related concerns.

**Where is the site and what route will large vehicles utilise?**

The Brewongle Solar Farm is proposed to have an anticipated combined capacity across both solar and battery of 90MW$^{ac}$ and 90MW / 360MWhr respectively. The project's site access point will be established via Tarana Road, via O'Connell Road.

Edify will engage with Bathurst Regional Council and Transport for NSW to determine which roads and/or intersections may require upgrades to accommodate the transport of materials to site. The project will seek to upgrade roads or intersections utilised for construction purposes, in consultation with Council and Transport for NSW.

**Do these projects benefit the Australian/local economy?**

Each project benefits the local community by creating employment, utilising local services and by increasing the long-term assets and investments that generate opportunities for decades to come. At Edify's Darlington

Point Solar and Battery project, approximately 350 people were employed locally during the construction phase and five (5) are employed locally in full-time positions during operations, as well as ongoing indirect employment (e.g. ground, fencing and building maintenance, engineering, Control Centre for 24hr monitoring, project management, vegetation control, calibration services, cleaning services, etc.).

Edify's Local Participation Plan is prepared on a project-by-project basis and provides opportunities for local contractors and community members to submit suggestions, tenders and local jobseeker application. For those who seek employment, as the construction process nears, a series of 'Contractor Information Sessions' will be held in the local area and online.

In addition, Edify establishes a community fund with the local council for each project, which is designed to support community group projects and local initiatives.

Media reports also indicate that some drought-stricken farmers are turning to renewable energy contracts as a way of earning additional income and future-proofing their enterprises against increasingly unpredictable climates.

**How much do renewables cost compared with other energy sources?**

Renewable energy projects are now the cheapest sources of new energy generation in Australia. Solar energy projects produce energy at less than $50 per megawatt hour. The costs of other sources of generation are:

» Existing coal: approximately $40 per megawatt hour

» New coal: approximately $130 per megawatt hour

» Combined gas-cycle generation: approximately $75 per megawatt hour

**Do these projects result in a decrease in electricity prices?**

Solar energy forms just one part of the Australian Energy Market Operator's (AEMO) move towards a sustainable energy system. Solar farms supported by battery energy storage systems add to the supply side of the electricity supply / demand equation, which puts downward pressure on all electricity bills.

The Australian Energy Market Operator provides excellent guidance for Australia's anticipated energy mix, particularly since AEMO is tasked with managing Australia's energy transition, balance the power system and orchestrate the cheapest mix of electricity generators across every minute of the day[1].

**Should I expect the value of my near-by property to decrease due to the project's development?**

Some neighbours have questioned what impacts a development of renewable (primarily wind) projects will have on the value of their neighbouring property. Edify it cognisant that for most households, their home is their primary asset, which in turn means that any factor which may affect its value, including emotional value, is significant and important to understand.

After delivering eight projects throughout Queensland and Australia, including the first combined solar plus battery project in Victoria, Edify is not aware of any reliable research or evidence which establishes a correlation between declining real estate values and proximity to renewable infrastructure.

[1] AEMO (2022) Integrated System Plan: https://aemo.com.au/en/energy-systems/major-publications/integrated-system-plan-isp/2022-integrated-system-plan-isp

The most recent and relevant study carried out in Australia that Edify is aware of was commissioned by the NSW Office of Environment and Heritage and published by planning consultancy Urbis in July 2016[2]. This report comprised an analysis of available sales data and a 'literature review' of Australian and international studies. An example of the literature review includes a 2009 report prepared for the NSW Valuer General's office. Its conclusions are most easily understood when divided into 'agricultural' and 'lifestyle' land. The report recognises that property values are influenced by a range of factors and it is therefore difficult to determine if solar farms (or other similar infrastructure) can cause land values on neighbouring agriculture properties to increase or decrease.

In summary, it is not expected that the Brewongle Solar Farm would affect the values of neighbouring agricultural properties.

**What are the insurance implications for my nearby property or the broader community?**

Edify will have its own insurance policies in place to provide coverage in the unlikely event that the solar project equipment is damaged (i.e. fire, flood, etc), or in the event that our operations cause loss / damage / injury to any third parties. These insurances will be placed with major, globally recognised insurance companies, and will provide a very high standard of cover in line with the expectations of our investors, financiers and various other counterparties to the Project.

As a requirement of these policies and as a part of our overarching approach to proactive risk management, a project-specific Bushfire Management Plan will consider both fire-risk mitigation, and detailed procedures to follow in the event of a fire on site (whether arising from within the site or from outside – e.g. an adjacent premises). We would also note that the project's design requires water to be kept on site for firefighting purposes. Further, the Environmental and Emergency Management Plans will include obligations that prevent the spread of fire across the site (such as a detailed vegetation management plan and a buffer / asset protection zone along all boundaries of the project).

Edify understands that some adjoining landowners often pose questions regarding the process that occurs if damages occurred to an adjacent project, however the important elements for consideration are:

» For an adjoining landowner to have any liability for fires that have spread from their property into the solar project, it has to be demonstrated that the landowner was negligent in causing damage. In this regard, Edify's facilities are no different from any other – e.g. rural buildings, an adjacent commercial facility e.g. substation, abattoir, etc.

» The occurrence of a fire from a weather event (e.g. a lightning strike) that migrates from the neighbouring landowner's property to Edify's project property would be deemed a natural event and would not likely create a legal liability for the neighbouring landowner. Likewise if there was a heavy rainfall event and water drained from an adjoining property into Edify's facility, this again would be considered a natural event. In such a case, Edify would not seek to pursue a claim directly against an adjacent landowner's insurances – this is precisely what Edify's own insurance program is for. Such a claim in respect of Edify's assets would be made against Edify's own insurers.

» In Edify's experience, an adjacent landowner would not be required to make any adjustment to their own insurances – only the landowner whose property is being leased would need to do so.

In summary, Edify has its own comprehensive insurance program which would respond to any claim in the event of loss or damage to the Solar Farm. Notwithstanding, Edify recommends that landholders on nearby

[2] https://epuron.com.au/documents/444/review_of_the_impact_of_wind_farms_on_property_values_urbis_2016_07_21.pdf

properties continue to take all necessary precautions to prevent the ignition and spreading of fires, in the same way that you already do for the present land users.

# Health & Culture

**Is cultural heritage taken into consideration?**

Edify Energy recognises the Wiradjuri People as the original custodians of the lands throughout Brewongle and, as such, have been invited to undertake an Aboriginal Cultural Heritage Assessment as part of this proposal's Environmental Impact Statement (Planning Application). A cultural heritage assessment forms part of the critical studies, as does consultation with Bathurst Local Aboriginal Land Council and other local indigenous groups and elders, to ensure cultural heritage is protected. This collaboration between Edify and the local indigenous groups will remain an ongoing commitment throughout the lifecycle of the project.

**How does Edify approach community engagement?**

Edify undertakes community engagement in line with NSW Department of Planning and Environment, Social Impact Assessment guidelines (SIA Guide). The guidelines provide a consultation guide that recommends actions and tools to undertake community engagement according to each phase of the development. The SIA guide provides a three phased approach to Social Impact Assessment

- First Phase (completed).

The first phase involves SIA scoping and initial assessment, refining and planning. It occurs early in project development and is used to identify likely social impacts before considering suitable refinements or other early responses. This phase will inform the required scale of the SIA report, undertaken in the second phase.

Edify have sent an introductory letter, with this FAQ document included, to the residents proximate to the Project. This represents an initial step in community engagement, which will be expanded upon based on community feedback. In the months of July and August 2023, Edify also engaged with Bathurst Regional Council and NSW Department of Planning and Environment, to introduce the Project and discuss considerations that require focus across the upcoming planning process.

- Second Phase (Current phase)

  The second phase assesses identified issues and develops then finalises responses and management measures. This results in an SIA report, which forms a component of the EIS.

  Edify have engaged Environmental Resources Management[3] (ERM) to draft the EIS and undertake the relevant assessments including the SIA.

- Third Phase (post approval)

The third phase occurs post-approval. It verifies and refines how social impacts are managed, depending on the conditions of consent or approval. Not all projects require post-approval monitoring and management of social impacts.

**Does the Project consider Local, State or Federal Government Planning Schemes?**

Local, State and Federal Government Acts and Policies that are consulted and factored into the planning assessment for the Project's development approval include but are not limited to:

- Local
  *Bathurst Regional Council's Local Environmental Plan 2014*

[3] ERM - Environmental Resources Management (www.erm.com)

*Bathurst Regional Council's Strategies and Plans:*
*Vision Bathurst 2040 - Bathurst Region Local Strategic Planning Statement*
*Bathurst Community Strategic Plan 2022*
*Bathurst Regional Development Control Plan 2014*
*Bathurst Region Rural Strategy 2008*
*Bathurst 2036 Housing Strategy Volume 2 - The Implementation Plan*
*Bathurst Region Vegetation Management Plan 2019*

- State
  *Environmental Planning and Assessment Act 1979*
  *Protection of the Environment Operations Act 1997*
  *Roads Act 1993*
  *Biodiversity Conservation Act 2016*
  *State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems EPP)*
  *State Environmental Planning Policy (Transport and Infrastructure) 2021*

- Federal
  *Environment Protection and Biodiversity Conservation Act 1999*
  *Native Title Act 1993*

**Which regulatory agency is responsible for assessing the project's Development Application?**

The main regulator for the Brewongle Solar Farm is Department of Planning Housing and Infrastructure (DPHI) (previously known as the Department of Planning and Environment (DPE)) and, as the project would be classified as a State Significant Development (SSD), the assessment will involve referral to the Bathurst Regional Council. All Edify projects meet strict Local, State and Federal Government regulations and are assessed under these regulations. We work closely with all levels of government to ensure we meet all legal requirements and exceed these requirements wherever possible.

**Is there an alternative site for the Brewongle Project?**

The Project site on the involved landholder property 'Euarra' was selected based on the proximity to the overhead transmission line, which is an integral component of any electricity generator, to ensure energy produced is exported into the NSW transmission network with the least amount of electrical losses.

We understand that alternative sites have been proposed within other sections of the landholder's property, by consultants, *Anthony Daintith Town Planning* (November 2017). It is noted that this alternative site was located approximately 2,900m south of Transgrid's 132kV network. This compares with Edify's proposed site, which is approximately 200m south of the overhead line (-93% distance), setback 200m to avoid Saltwater Creek and higher quality soils that run along the creek line.

After considering this site and other alternatives that offer viable capacity and available access to the transmission network (such as Wallerawang to the east of this subject land), it was concluded that the proposed site remains most suitable.

**Are there any health risks associated with solar projects?**

Solar panels are deployed on over 30% of Australian homes and have been deployed extensively for the past 15 years. The Brewongle Solar Farm would use the same type of technology, with the exception that the project utilises a single-axis tracking system and operates at a higher voltage and scale. High voltage infrastructure is an inherently risky undertaking, due to the complexity of operating national electricity networks. However, these risks are contained within the project boundary, where the project's staff are trained to perform and operate tasks in this work environment.

**Is there any risk of chemical leaks from the solar PV modules or batteries?**

Because PV panel materials are enclosed, and do not mix with water or vaporize into the air, there is little residual risk of chemical releases to the environment during normal use. The most common type of PV panel is made of tempered glass. These Tier-1 modules with tempered glass are also required to pass hail impact tests.

Studies on the potential for leaching of heavy metals and metalloids from crystalline silicon PV systems from the Journal of Natural Resources and Development was conducted to investigate whether potentially toxic elements could leach into the surrounding environment. Soils were analysed from beneath panels against a control site away from panels. This was done to determine if soils were being enriched by metals such as lead, cadmium, lithium, strontium etc. and metalloids such as selenium. The results of the findings concluded that there were no significant differences in lead or cadmium levels, with only minor concentration differences in other metals between soil samples under PV panels and the control sample (NSW Department of Planning Industry and Environment, 2020). No elements were present in concentrations that would pose a risk to nearby ecosystems. Such findings indicate that PV systems remain a cleaner alternative to traditional energy sources, such as coal, especially during the operation of these energy production systems (Robinson & Meindl, 2019).

The project will procure high quality Tier-1 battery cells and systems. This includes hermetically sealed battery cells, the temperature of which is controlled using a battery cooling system. A hermetically sealed battery cell is a type of seal that is airtight and impervious to external factors such as moisture, dust, or other contaminants. This assists in prolonging the service life of the battery and reduces the risk of failure or malfunction. Additionally, hermetically sealed batteries are less likely to leak, which can reduce the risk of exposure to potentially harmful chemicals used in the batteries.

**Can solar projects produce noise that affects local residents?**

The project team will undertake an acoustic noise assessment for the Development Application, prepared by a third-party acoustic engineering expert. This will assess the predicted noise level emitted from the potentially sensitive equipment (inverters, substation, transformers). The project's design will then situate this noise emitting equipment well away from neighbouring residences, to allow the noise levels to dissipate to low levels that are typical for this regional setting.

During Construction and Operation of the facility, a Noise Management Plan will be implemented to ensure procedures to minimise noise are utilised, and any complaints on noise levels are recorded and appropriately investigated.

**Will the project reduce air quality?**

Monitoring of dust levels during construction is a basic requirement of each project. Dust generating activities are assessed during windy conditions and are stopped and rescheduled where adequate control of dust generation cannot be achieved. Visual observation of machinery is undertaken during site inspections in addition to daily pre-start checks which ensure all machinery has appropriate emission control devices, is in good working order and is maintained correctly. Trucks that spray water to suppress dust will be utilised when required – mostly likely on a daily basis – which will reduce the impact of dust from the various truck deliveries throughout the construction phase.

# Environment

**Do solar projects impact on flora and fauna?**

Edify engages specialist consultants to undertake detailed flora and fauna surveys to determine the ecological attributes of the land. On all of our projects, we aim to minimise the impact on flora and fauna by designing projects to be constructed outside areas of high conservation significance and adopting control measures such as minimised clearing during the construction process.

Edify has selected the Brewongle Solar Farm site, in part due to the lack of vegetation that is present on the development area today. Mitigation measures include preparing management plans and conducting pre-clearance surveys to ensure flora and fauna are protected throughout construction and operation. Edify also consults with government departments of environment and biodiversity throughout the development, construction and operational stages of projects, as well as local non-government organisations.

**Does solar or energy storage infrastructure affect farm/domestic animals?**

Edify built and operates the Gannawarra solar and battery project in Kerang, VIC. This project is now host to around 500 merino sheep. This experience has proven that the sheep take a couple of days to get used to the site, and then are very comfortable with the solar and battery infrastructure. The sheep commonly use the shade from the solar arrays during summer to escape the harsh temperature and conditions.

Merino sheep, particularly wethers and merino-cross, are currently the most common breeds of sheep involved in solar grazing at Australian solar farms[4]. As a breed, the merino has a reputation for keeping its head down and not jumping on equipment. Dorpers have also been successfully grazed on Australian solar farms, despite a reputation for being livelier and are often chosen for solar grazing in the USA.

**How do you stop the solar facilities from impacting our landscape?**

Edify acknowledge that solar facilities do impact the visual amenity of the immediate surrounds, however we will work with adjacent neighbours and broader communities to ensure our solar projects have the least possible detrimental impact on visual amenity. Edify encourages individuals and groups that have questions about visual impact and remedies, or suggestions on how we may ameliorate impacts to view (such as a suggested local plant list to screen with) to engage with us early.

**How does Edify manage solar panels after they are decommissioned and no longer in use?**

Solar panels are manufactured using few components; predominantly aluminium, glass and silicon, and over 90-95% of a panel's weight can be recycled. These materials can be separated and captured for reuse in the manufacture of other products.

Edify is committed to Project Custodian responsibilities and intends to implement such recycling practices with a local company. Edify has been engaging with Solar Recovery Corporation for over twelve months, which has a facility located in western Sydney, to incorporate a circular practise into our Projects. Other companies such as Reclaim PV Recycling or Tindo Solar are based in Adelaide and offer a solar waste management / resource recovery solution. This includes logistics and recycling of PV modules, inverters and batteries. Such companies are expected to open additional facilities in New South Wales in the near future and Edify would seek to utilise as many local services as possible.

[4] Clean Energy Council, Agri-solar Report: https://assets.cleanenergycouncil.org.au/documents/resources/reports/AgriSolar-guide/Australian-guide-to-AgriSolar-for-large-scale-solar.pdf

*Figure 3. Edify's Agri-Solar Project, Kerang VIC*

*Figure 4. Edify's Agri-Solar Project, Kerang VIC*

**Will the batteries end up in landfill once their capacity is diminished?**

There is no intention for project's batteries to be discarded to landfill. Lithium-ion batteries form critical asset components and Edify recognises that a total cost of ownership strategy must encompass a robust end-of-life management process to ensure the project is a sustainable investment.

Edify works with key equipment supply partners and newly emerging E-waste recycling parties, who share our 'Project Custodian' commitments. These end-of-life responsibilities represent a commercially viable incentive that strengthens the company's sustainability, local industry and circular economy procurement strategies.

Innovations are emerging in the battery value stream that extend the useful life of the battery cells beyond the original Project's use case. At the end of the initial 20-25 year expected lifespan, these battery cells will still possess useful capacity that can be used in 'second-life applications' that require less-frequent battery cycling (charge/ discharge). An example of an alternative use case is in 'standby back-up' power systems that require less cycling and capacity than Edify's primary use case via the Project. This is exemplified by the battery recycling project at the Netherland's national soccer stadium[5]. This project utilises recycled Nissan Leaf car battery cells and repurposes the lithium-ion batteries from previous applications to match them with a second alternative use case – such as the stadium's back-up power system.

**How are any potential fire risks managed?**

The design of the Brewongle Solar Farm incorporates a cleared vegetation zone around the edges of the project to prevent fire propagation. This is complemented by a strict vegetation management plan. The specific width of this zone will be determined in consultation with Fire and Rescue NSW and Rural Fire Services.

In addition, the project plans will be greatly influenced by NSW Rural Fire Service and Fire and Rescue NSW design guidelines, which ensure emergency access gates and the installation of multiple large water tanks to be located throughout the project. All these plans and project designs are undertaken in collaboration with the relevant emergency response agencies.

The battery systems used will have protection systems which will constantly measure the temperature of the cells and will disconnect the batteries in the case of abnormal operation making the risk of thermal runaway and fire very low. In the event of the fire, the spacing of the battery units will prevent the fire spreading to adjacent units such that the fire can safely self-extinguish without further damage. All battery units will be surrounded by an area which is permanently clear of vegetation which eliminates any risk of spread of fire to the grass or other vegetation.

This key safety aspect will be designed by Edify and / or the Designated Construction Contractor and must be agreed by NSW Rural Fire Service and Fire and Rescue NSW prior to construction commencing.

The initial report that the project presents to the NSW Rural Fire Service and Fire and Rescue NSW will be undertaken by a fire and risk specialist engineer. This report (Bushfire and Preliminary Hazard Assessment) is the first of a multi-stage process that will assist Edify and the regulators to refine the project's design and fire mitigation features.

[5] Example of upcycled Nissan Leaf EV battery cells: https://insideevs.com/news/356320/nissan-leaf-batteries-power-soccer-stadiums/

**Will the hybrid solar and battery facility impact on hydrology of the site?**

Solar farms create minimal impervious footprint as the solar panels are erected onto post structures effectively allowing the existing ground surface (grass) to be retained for the majority of the site. The advantage of the design is that the panels can be installed to retain the existing contours of the site, respecting and maintaining existing drainage lines. This will ensure that existing drainage flows and existing points of discharge will be retained. Notwithstanding, drainage improvements may be implemented where existing erosion and scouring is evident and may be addressed through improved or more controlled movement of runoff, facilitated by DPE approved Erosion and Sediment, and Stormwater Management Plans.

Stormwater sheet flows evenly from the downslope of the panels and discharges directly to the existing in-situ ground conditions, and is mobilised for infiltration and surface flows, replicating existing catchment scenario and characteristics.

Internal gravel roads will be introduced between some rows of panels for servicing purposes as well as around the perimeter of the development footprint. These internal roads will be designed and constructed at-grade to avoid impacts to existing stormwater overland flows and no increase to runoff is expected.

Significant increases (90%) in biomass have resulted due to more persistent stores of soil water throughout the growing season, with areas under PV panels 328% more water efficient (Adeh, Good, & Calaf, 2019). Grasses grew about twice as tall and thick as those not underneath the panels, despite the fact that they did not receive any irrigation water (Oregon State University, 2018). Noting this, the site is likely to retain groundcover and therefore a natural erosion control measure throughout the year including the dry season.

# Further Information

| Information | QR Code |
|---|---|
| NSW Planning Portal Brewongle | |
| Brewongle Scoping Report | |
| Clean Energy Council Guide to Agri solar for Large Scale | |
| Queensland Case Study Hamilton Agri solar | |
| Edify Energy Brewongle Project Page | |