



Smoky Creek Solar Power Station



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1 Description of the Activity

The subject sites were identified and chosen for the project due to the traversing High Voltage Transmission line and relatively flat landscape.

The built form on the site will consist of the following:

- Solar Farm consisting 'array blocks' typically of 3MVA and 6MVA;
- Site office and car park;
- Access and perimeter tracks;
- Buildings including Operations, Maintenance and Storage
- High Voltage Switch Room
- High Voltage Substation;

The solar panel technology utilises semiconductor material designed to absorb and convert sunlight into electricity. The panels will be mounted on tilt trackers (tilt from -52 to +52 degrees) to collect and convert solar energy into electricity. The panels provide energy in the form of direct current, which must be converted to alternative current via a solar inverter. Groups of solar panels are connected to each inverter and the inverters are linked together to collect the energy generated by the solar field. Underground or overhead lines are run from each inverter station to the facility substation where voltage is increased to match the voltage of the transmission network.



The proposal features an option to incorporate batteries into the facility to allow storage of power on site, which will likely store sufficient power to enable power to be distributed to the network outside of sunlight hrs, likely during the evening and morning peak times. Exact detail on the size and volume of the battery houses are unknown at this time as battery technology is an evolving technology with the size and capacity of the batteries changing at rapid rate. The batteries will be located within the development footprint.





The project consists of the following built form elements that will make up the Solar Power Station.

1.1 General description of the action

The proposed action will consist of solar panels mounted on a frame which tracks the sun to generate energy. The panels will be connected to inverter stations which convert the DC power to AC power, and using integrated transformers step the voltage up to 33kV. A medium voltage AC network will be installed in underground trenches to connect each inverter to a central switchgear. The switchboard is adjacent to the step-up substation, which is owned and operated by the network operator, Powerlink. This substation will step up the voltage to 275kV for injecting the green energy into the transmission network operated by Powerlink.

The development will contain the following infrastructure:

- Photovoltaic solar panels;
- Tracking system;
- Piled foundations;
- DC/AC Inverter stations;
- Battery enclosures/modules;
- High Voltage Switchroom;
- Internal access tracks;
- Underground medium voltage network;
- Administration and amenities building;
- Vehicle car park;
- Security fencing; and
- Substation.

1.1.1 Solar Array Areas

The development will consist of a number of solar array areas or blocks comprised of photovoltaic modules arranged in a series of long rows. The modules are mounted on frames which follow the sun to optimize energy generation. The frames are fixed to piles driven into the soil. The rows interconnect to form a single array block of either approximately 3.0MW (AC) or 6 MW (AC). In each block there will be a prefabricated, containerized/skid mounted inverter and integrated transformer to convert and step up the voltage level. Electrical connections will also be constructed between the PV arrays, as well as associated monitoring and protection equipment and central inverters via underground or frame secured cabling. Row Spacings are generally between 6 & 7 meters apart.





The solar module frames and inverter stations will be installed on piles and sit above ground level. This ensures retention of existing grassland vegetation and habitats in situ with a minimal level of ground disturbance. Regrowth of vegetation will be enabled following temporary disturbance during installation.

1.1.2 Medium Voltage Reticulation

Each inverter will be connected to the central 33kV switchroom by underground medium voltage cable reticulation. The cables will be installed in trenches not below 1m in depth and typically less than 1m in width. The excavation will comply with the Soil and Erosion Sediment Control Report and Regulations for construction within Queensland. The medium voltage switchboard will be connected through a step-up transformer and a substation via an overhead line constructed by Powerlink.

Temporary disturbances to vegetation from the underground installation of the cables will rehabilitate naturally.

1.1.3 Solar Substation

A high voltage substation will connect the solar farm to the national transmission network. The substation footprint will be approximately 100m x 100m. The substation will provide switching and protection of the electrical network and will be fenced separately from the solar farm for safety reasons. The T connection into the existing transmission line will be owned and operated by the Network Operator, Powerlink. This will form part of the National Transmission Network.



Project phase description

Detailed components of the proposed action are discussed below in relation to the following project phases:

- Pre-mobilisation.
- Construction.
- Commissioning and operation.
- De-commissioning.

1.2 Mitigation Measures

It is important to note that activities within the Project Area throughout the various phases will be guided by and comply with the mitigation, management and monitoring measures defined in the Solar Power Station Environmental Management Plan (EMP) (Construction and Operation). The environmental aspects and management actions generally included the Project EMP are covered in the following sections.

1.2.1 Exclusion Zones

- All areas to be avoided and protected from construction impacts are to be clearly marked and flagged to prevent access.
- Signage will be located at each exclusion area.
- Flagging and signage is to be checked regularly to ensure it remains intact and areas are not accessed for any impact activities (including stockpiling or storage of materials).

1.2.2 Soil and Water Management

- Ground and vegetation disturbed only in immediate work areas, minimise exposed areas as far as practical
- An Erosion and Sediment Control Plan will be developed with site specific controls designed to minimise erosion risks and the transportation of sediments to the environment
- Erosion and sediment control devices to be installed correctly, regularly checked for integrity and replaced as necessary
- Topsoil and subsoils to be stored separately, away from any watercourses and drainage lines, and protected by appropriate controls
- Completed work areas to be stabilised as soon as practical
- Hazardous substances, and liquid and solid wastes to be managed to minimise risk of soil or water contamination
- Plant and equipment to be maintained regularly, and onsite maintenance carried out in authorised areas only to minimise contamination of soil or water
- Preference will be given to use non-potable water for dust suppression and construction activities, where possible



1.2.3 Flora and Fauna Management

The following measures to avoid or reduce impacts will be employed:

- Where feasible habitat features such as tree hollows, large logs, leaf litter, and rock and boulder piles will be avoided or relocated to provide habitat value for native fauna (e.g. within or near remnant vegetation).
- The development will avoid all mapped areas of remnant and regrowth vegetation identified during the desktop assessment and subsequent field survey.
- During vegetation clearing the project will:
 - Restrict the area of disturbed habitat to the proposed footprint and where possible retain significant habitat features such as hollow logs
 - Limit onsite speed limits to 20 km/hr reduce the risk of traffic related injury and mortality
 - Vegetation clearing undertaken in a manner that reduces potential injuries and mortalities to fauna
 - Engage a Department of Environment and Science (DES) approved spotter/catcher or ecologist to identify habitat trees that may be occupied by fauna and implement a staged approach to clearing where habitat trees are gently disturbed to warn resident fauna of the impending clearing.
 - Construction activities to be undertaken in daylight hours to avoid impacts on any nocturnal fauna that might be present.
 - Maximise the retention of vegetation along adjacent streams and watercourse/s
 - Control measures should include but not limited to staff trained in the use of spill kits, diesel storage is in self-bunded units and all major services are undertaken off site.

1.2.4 Weed and Pest Management

- A weed control program targeting species listed within the *Biosecurity Act 2014* will be initiated during the construction and operational phase in accordance with Queensland's General Biosecurity Obligation (GBO).
- The dispersal of weeds from both internal and external sources will be avoided by implementing control measures during the construction and operational phases including but not limited to the following:
 - Ensure that all vehicles are cleaned (i.e. free of contaminants) prior to entering and on exiting the project site
 - Weeds and weed-affected material will be disposed of offsite in an approved refuse site
 - Weed management of disturbed areas will follow clearing until a suitable ground cover can be established; and
 - Cleared vegetation will be mulched and placed in a layer over cleared surfaces, where practical, to minimise erosion.

1.2.5 Dust, Noise & Vibration Management

- Working hours to be restricted to relevant working hours as determined and approved by local Council, no working on Sundays or Public Holidays unless approved by Council
- Vehicles, plant and equipment to be maintained regularly to reduce potential for noise emissions
- Implement appropriate site speed limit/s
- Appropriate site exit controls (e.g. rumble pads, vibration grids) installed to minimise tracking of soils onto public roads
- Remove material spilled or tracked onto public roads as soon as practical
- Cover loads of loose soil, gravel, sand, mulch travelling on public roads to and from the site
- Soil stockpiles to be exposed for more than 28 days to be stabilised or appropriately covered
- Suppress dust emission from road surfaces using water, chemical stabilisers or gravel



1.2.6 Liquid & Solid Waste Management

- Wastes to be separated and disposed or otherwise recycled, repurposed or reused in accordance with local regulations and opportunities
- Appropriate and adequate waste collection bins/skips/receptacles to be provided and distributed around the site
- Bins/skips to be covered to prevent windblown litter or access by birds/vermin
- No onsite disposal or burning of wastes
- Vegetation waste (other than weeds) to be mulched and reused onsite wherever possible
- All wastes transported by appropriately licensed waste transporters to licensed waste facilities
- All waste tracking documents and receipts retained

1.2.7 Cultural Heritage Management

- Exclusion areas appropriately marked/fenced/flagged to prevent access
- Workforce to complete appropriate cultural heritage awareness training
- Stop, Find, Notify, Manage procedure to be implemented upon any unexpected cultural heritage finds
- *Human Remains Guideline* to be adhered to upon discovery of suspected human remains

1.2.8 Hazardous Substance Use and Management

- Hazardous substances labelled, stored, handled, used and disposed of appropriately
- Register and SDS of all hazardous substances to be available onsite
- Spill kits available and maintained
- Relevant workforce to be trained in appropriate use of spill kits
- Spills/leaks to be contained and cleaned up as soon as practical

1.3 Pre-mobilisation

Pre-mobilisation activities for each area of development will typically occur over a 1-2 month period and include the following as required:

- Temporary fencing of site offices and facilities for construction.
- Fencing of areas for development. The fence will be compliant with the Development Consent.
- Removal of any non-remnant woody vegetation within the areas to be developed in accordance with the vegetation removal procedure.
- Laydown of temporary offices and facilities. These will be temporary prefabricated buildings used for construction projects.

The current site works requirements include:

- Office facilities.
- Changing rooms.
- Toilets.
- Showers.
- First aid.
- Lunchrooms.
- Parking
- Lay down areas.
- Temporary Security building at the front gate for construction



1.4 Construction

Construction activities will include the installation of the PV arrays and supporting infrastructure.

The PV arrays and site office components will largely be built off-site and transported to the site in modulated sections. Construction on-site will be limited to the unloading and joining together of the modulated sections and trenching electrical and control cabling to the electricity grid and control room. Construction activities are planned to occur during daylight hours only.

The proposed action will consist of installing the following components:

- Arrays of solar PV modules arranged in a series of long rows (generally up to 90m) typically no higher than 2.5 m above the ground and supported by a steel and/or aluminium mounting structure including framing and piles which are either screwed or driven into the ground.
- A series of prefabricated, containerised/skid based inverters distributed throughout the PV arrays.
- Electrical connections between PV arrays, associated monitoring and protection equipment, and central inverters via underground or frame secured cabling.
- A tracker actuation system.
- Network interconnection facilities to connect the project to high voltage transmission network

Construction activities for the PV arrays and their indicative timeframes (there may be overlap in timing) will include:

- Pile driving or screwing mounting pylons (~4 months).
- Trenching or underground cabling connecting PV (~2 months).
- Mounting pre constructed PV modules (~4 months)
- Network interconnection (~6 weeks).
- Establishing revegetation as screening (~1-2 years).

To facilitate the future operational and maintenance activities on site the following infrastructure will be constructed:

- Site office and operations and maintenance facilities.
- Site entry road, internal access tracks and car park.
- Site fencing and associated security equipment.

Further details relating to construction of this infrastructure are as follows:

1.4.1 Operations and Maintenance Building

The building will be a prefabricated design approx. 10m by 10m and single story. The facility will provide a working area for staff, ablutions and amenities including:

- Office.
- Toilet.
- Kitchen.
- First Aid area.
- Meeting room.
- Storeroom.

1.4.2 Site fencing and security

The whole site will be secured with appropriate fencing and lockable gates will be placed at the main entrance, providing restricted access.



1.4.3 Parking

Parking for staff and visitors will be provided.

1.4.4 Access roads

The main access to the site will be via Tomlin's and Dodson's Roads.

1.4.5 Internal roads

A number of internal access roads will connect with the site entry to the various work fronts for construction and materials. These roads are expected to be unsealed, single to dual vehicle width and include areas for maneuvering. They will be located entirely within the mapped Development Footprint.

1.4.6 Commissioning and operation

The commissioning phase of the project will involve testing of PV system prior to connection to network. It is anticipated that this will take approximately 4 months for each area to be developed.

Operational elements of the proposed action include:

1.4.7 Operating hours

Once in operation, the normal operating hours of the solar farm will be during daylight hours between the hours of sunrise (say) 6:00 am to sunset 6:00 pm. There is no (very low levels of) noise in operations.

1.4.8 Water supply

As there is no reticulated water to site, any water use will need to be brought on to the site or captured on site. It is expected that existing stock watering dams will be retained.

1.4.9 Water demand

Water may also be required for routine cleaning of panels and potentially for dust suppression on site. This activity will likely take place once per annum based upon current Australian best practice. This may require a small mobile water tanker, although dry techniques are being investigated. Water consumption for this activity is expected to be lower than current agricultural activity on the site.

During construction, water will be trucked in and wastewater will be pumped out by engaging the services of a local service provider.

1.4.10 Sewerage

Solid waste and putrescible waste disposal will be by the regular service of a licensed waste management contractor. Site storage of waste will be in approved waste containers provided by the contractor.

1.4.11 Stormwater management

There are no major earthworks anticipated for the proposed action and as a result there will be no significant changes to the drainage regime of the site. The stormwater management provisions for the solar farm are designed in accordance with the Australian Rainfall and Runoff Guidelines.

1.4.12 Vegetation management

Regular vegetation maintenance will occur within the potential Development Footprint throughout the operational phase to control re-emerging woody vegetation and weeds and to maintain low fuel loads to reduce risks associated with wildfire.

The current level of vegetation without maintenance is low and below the lower level of the solar panels. Any vegetation maintenance will involve the slashing of grasses in the areas to be covered by and surrounding



the solar panels and the application of selective herbicides to control emerging woody vegetation and weeds to maintain a grassland environment.

The grass will remain in place under solar panels and there will be not likely be a requirement to spray grasses with herbicides.

1.4.13 Fire management

Bushfire management will be undertaken in accordance with the Solar Farm – Bushfire Management Plan. Asset Protection Zones will be maintained within the Development Footprint and bushfire management will not result in impacts to nearby vegetation.

1.4.14 Decommissioning

Upon decommissioning of the solar power station, the site will be subject to certain rehabilitation regimes to restore the land to a standard appropriate for rural use. Restoration of the disturbed areas within the Development Footprint will include removal of all above ground structures and footings and capping of services.