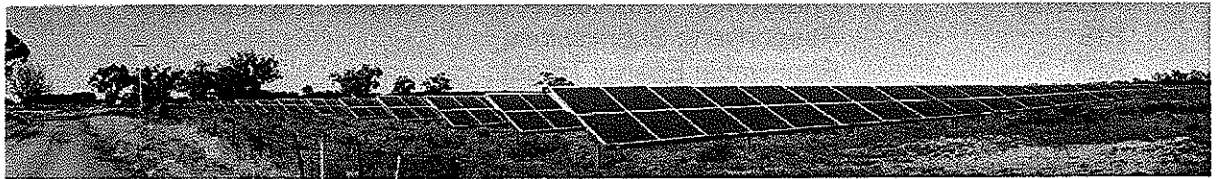




Planning

**MAJOR PROJECT ASSESSMENT:
Nyngan Solar Farm
East Nyngan Road, Nyngan
(10_0123)**



Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

December 2010

ABBREVIATIONS

CIV	Capital Investment Value
Department	Department of Planning
DGRs	Director-General's Requirements
Director-General	Director-General of the Department of Planning
EA	Environmental Assessment
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPI	Environmental Planning Instrument
GWh	gigawatt hour
kV	Kilovolt
MD SEPP	<i>State Environmental Planning Policy (Major Development) 2005</i>
Minister	Minister for Planning
MW	Megawatt
PAC	Planning Assessment Commission
Part 3A	Part 3A of the <i>Environmental Planning and Assessment Act 1979</i>
PEA	Preliminary Environmental Assessment
PFM	Planning Focus Meeting
PPR	Preferred Project Report
Proponent	Infigen Suntech Australia Pty Ltd
PV	Photovoltaic
PV array	Photovoltaic cells connected in a series and in parallel
RtS	Response to Submissions
RET	Renewable Energy Target
tCO ₂ -e per annum	Tonnes of Carbon Dioxide equivalent. The metric measurement unit for greenhouse emissions
TSC Act	<i>Threatened Species Conservation Act 1995</i>

Cover Photograph: Photomontage of proposed solar farm from East Nyngan Road
(NGH 28 October 2010)

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EXECUTIVE SUMMARY

Infigen Suntech Australia Pty Ltd has lodged a project application seeking the Minister for Planning's approval for the construction and operation of a 100 megawatt capacity solar farm over approximately 200 hectares within a 450 hectare site located off East Nyngan Road, Nyngan, within the Bogan Shire local government area.

The project consists of 70 photovoltaic array blocks arranged in rows two to five metres apart connected to a series of central inverters and kiosk transformers, substation augmentation, electrical connections, access tracks, an operations and maintenance building, fencing, landscaping and other ancillary infrastructure. The project has a capital investment value of \$300 million and is expected to generate 50 construction jobs and five operational positions.

The project was developed in response to the Federal Government's Solar Flagships Program, which is part of the Australian Government's \$4.5 billion Clean Energy Initiative (CEI), announced in the May 2009 Budget. The CEI complements the Carbon Pollution Reduction Scheme and the Renewable Energy Target (RET) of 20 per cent of electricity from renewable sources by 2020 by supporting the research, development and demonstration of low-emission energy technologies.

The Solar Flagships Program aims to accelerate the commercialisation of solar power in Australia, with the commitment of \$1.5 billion to support the construction and demonstration of up to four large-scale solar power plants in Australia, using solar thermal and photovoltaic (PV) technologies.

The project environmental assessment was placed on public exhibition between 4 November 2010 and 6 December 2010. Two submissions were received from public authorities. Submissions received from the NSW Office of Water and the Department of Environment, Climate Change and Water indicated no objection to the project subject to conditions and/or raised comments for the Department's consideration. No public submissions were received.

A Submissions Report, prepared by the Proponent, addressing the issues raised in the submissions on the Project, regarding the construction, operation and proposed alignment of the pipeline, was submitted to the Department. As part of this report the Proponent completed a supplementary flora investigation and further archaeological investigation.

The Department has undertaken a comprehensive assessment of the merits of the project and considers that the project would positively contribute towards achieving the RET, provide greenhouse benefits as Australia moves towards a more carbon constrained market, help meet the predicted growing demand for electricity and is therefore in the public interest. The Department also considers that all environmental issues have been adequately addressed and can be managed to acceptable levels. The Department therefore recommends that the project be approved, subject to the Proponents Statement of Commitments and the Department's recommended conditions.

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1. BACKGROUND

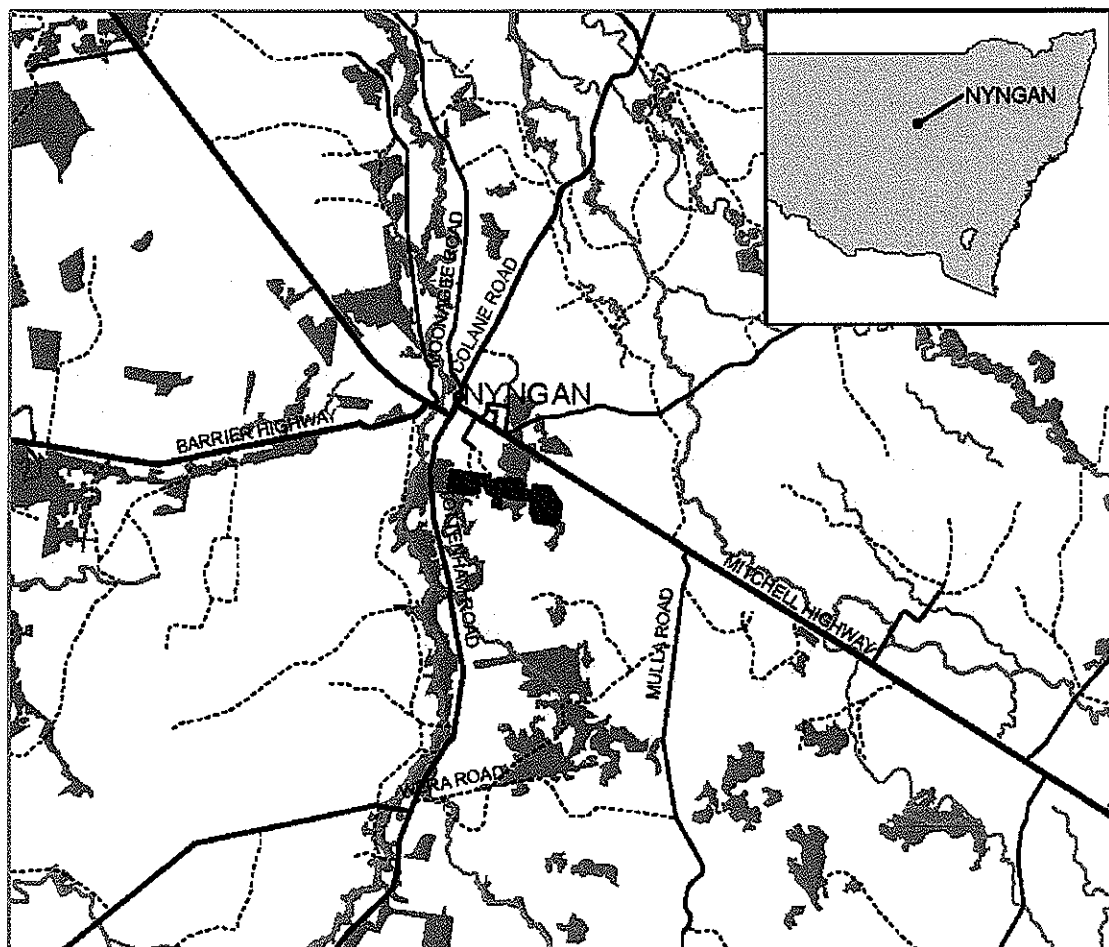
Infigen Suntech Australia Pty Ltd proposes to construct and operate a 100 megawatt (MW) capacity solar farm on farmland off East Nyngan Road at Nyngan. The solar farm would occupy an area of approximately 200 hectares and consist of 70 photovoltaic array blocks. The solar farm would connect to the New South Wales electricity network via underground cabling to the existing 132 kilovolt Nyngan substation adjacent to the proposed site.

1.1. Location

The site is located 2 kilometres from the township of Nyngan between the junction of Tottenham Road and the Mitchell Highway. The proposal would be located on rural land across two landholdings adjacent to Nyngan's southern semi-rural/residential precinct. The land is predominantly used for grazing with some areas utilised for cropping.

The project location is shown in Figure 1.

Figure 1: Project Location



Source Nyngan Environmental Assessment (NGH October 2010)

1.2. Surrounding Land Use

Land uses adjacent to the proposal include agricultural production such as cropping and grazing, electricity infrastructure and rural residential uses. Refer to Figure 2 for the site context.

Other land uses in close proximity to the proposed site include the Mitchell Highway and local roads, Nyngan Railway Station, Nyngan Racecourse, Nyngan Cemetery, urban residential, commercial, grain storage silos, schools, sports ovals, churches.

Figure 2: Site Context



Source Nyngan Environmental Assessment (NGH October 2010)

2. PROPOSED PROJECT

2.1. Project Description

The Proposal is for the construction and operation of a 100 MW fixed photovoltaic solar module array at Nyngan. The project layout is shown in Figure 3. The key components of the project are listed in Table 1.

Figure 3: Project layout



Source Nyngan Environmental Assessment (NGH October 2010)

Table 1: Key Project Components

Aspect	Description
Project Summary	The construction and operation of a 100 MW photovoltaic array with underground electrical connections to the existing 132kV Nyngan substation. Annual production output of 200 gigawatt hours (GWh). The proposal also includes substation augmentation, road upgrades and internal access tracks, fencing and landscaping, operations and maintenance building and temporary construction infrastructure.
Photovoltaic array	Consists of 70 Photovoltaic array blocks arranged in a series of panel rows two to five metres apart connected to a series of central inverters and kiosk transformers. The array would be installed on a module mounting structure attached to approximately 100,000 pylons.
Central inverters and kiosk transformers	140 inverters and 70 kiosk transformers would be installed, in groups of two inverters to one kiosk transformer. Each inverter would be installed on a concrete slab and be approximately 2.5 metres long, 2.3 metres high and one metre wide. Each transformer would be installed on a concrete slab within an oil containment bund and be approximately 4.3m long, 2.2 metres wide and 2.3 metres high.

Aspect	Description
Electrical connections	Underground or frame secured cabling connecting the PV array to the central inverters and kiosk transformers. An underground transmission line, including any switchyard and substation augmentation, to connect to the existing 132kV substation. Onsite control and communications cabling, control room and equipment.
Substation augmentation	A new 22kv or 33kv/132kv transformer (likely to be oil cooled) would be installed on a new concrete slab within the existing substation compound if possible. If this is not possible, the proponent proposes to acquire additional neighbouring land to accommodate the new transformer.
Access tracks	Gravel access tracks up to four metres in width would be required to access all inverter/kiosk locations, construction site office, laydown area, the operations and maintenance building and the perimeter of the solar farm.
Fencing and landscaping around the whole site.	A standard 2-2.6 metre high cyclone fence topped with barbed wire would be installed to prevent trespassers and stock ingress. Tree planting of areas surrounding the operations and maintenance building and associated parking area.
Construction facilities	Site office of several demountable buildings for up to 50 staff, car parking for 20-40 vehicles and a temporary laydown area.
Operations and maintenance building	A metal or masonry building with air conditioning and parking would be constructed on a 20x20 metre concrete slab.
Decommissioning	The solar farm is expected to be operational for 30-50 years after which all above ground infrastructure would be removed.

2.2. Project Need and Justification

The Proponent has argued that the justification of the project is based on the following:

- help secure reliable energy in a market where demand will soon exceed supply;
- assist in the reduction of increased Green House Gas (GHG) emissions contributing to climate change;
- help meet Federal and State policy objectives to enhance the contribution made by renewable energy sources to meeting demand;
- contribute to the development of the utility scale renewable energy industry in NSW;
- assist in the experience and learning required to further develop utility scale solar in Australia; and
- provide a local and regional economic stimulus through jobs and training.

The Proponent's Environmental Assessment (EA) states that, according to Transgrid's 2010 Annual Planning Report, growth in electricity demand will soon exceed supply during peak times. The Australian Energy Market Operator (AEMO) Electricity Statement of Opportunities 2010 report states that NSW's average annual growth rate of energy consumption and maximum demand (based on medium economic growth forecasts) over the next 10 years is 2.6 per cent, which in five years is predicted to surpass the NSW summer 2010/11 summer aggregate scheduled and semi-scheduled generation capacity of 15,950 megawatts. AEMO predicts that low reserve conditions (LRC) may occur in NSW as early as 2016/2017 (with a predicted shortfall of 27 megawatts) but more likely in 2017/2018 (with a predicted shortfall of 416 megawatts). This shortfall is predicted to further increase to 1,335 megawatts by 2019/2020. The LRC point is the time at which the network reliability standard may not be met, and at which point loadshedding may be required and brown-outs may occur in some areas. Continued demand growth beyond the LRC without provision of additional generating capacity increases the need for loadshedding and exacerbates issues with the quality and reliability of supply (ie. Increases in brown-out extent, severity and duration).

The Australian Government's Mandatory Renewable Energy Target (MRET) scheme was established in 2001 to expand the renewable energy market and increase the amount being utilised in Australia's electricity supply. The Renewable Energy Target (RET) scheme is an expansion of the MRET and has been established to encourage additional generation of electricity from renewable energy sources to meet the Government's commitment to achieving a 20 per cent share of renewables in Australia's electricity supply in 2020. The Proponent has identified that the project would help meet the RET targets for renewable energy as well as provide significant greenhouse gas benefits as Australia moves towards a more carbon constrained market.

The Proponent claims the Nyngan Solar Farm would be clean, renewable and sustainable and would emit zero greenhouse gases during operation and generate enough renewable energy to power up to 20,000 homes and would be the equivalent of removing approximately 30,000 cars from the roads. The Proponent states that the development would provide local job opportunities and would help develop local and regional capabilities in solar photovoltaic plant construction. In addition, based on life cycle analyses of the proposed generating components (i.e. greenhouse gas emitted during the production, transportation, construction and decommissioning of the components), the Proponent has estimated that the greenhouse gas payback period for the proposal would be in the order of 1.5 to four years, after which the proposal would provide a net neutral greenhouse gas outcome.

The Department acknowledges that additional electricity generators will need to be built to meet this demand to avoid potential power outages and blackouts in peak times. Renewable energy projects, such as this one, will assist in providing additional supply capacity which could contribute to addressing the supply/demand shortfalls predicted by AEMO. The Department also considers that the proposed solar farm would make a contribution towards offsetting the emissions of Carbon Dioxide (CO₂) and other gases, particulate emissions and other pollutants that would otherwise be produced if the equivalent power supply was provided by fossil-fuel combustion. The project would also result in the avoidance of consumption of water that would otherwise have been used in coal or other fossil fuel fired power stations.

The Department supports the development of solar farms as a form of renewable energy, subject to suitability of the location of these solar farms. This is consistent with Commonwealth and State policies promoting the production and uptake of renewable energies as a means of addressing climate change. The solar farm would contribute to Australia's Renewable Energy Target (RET) of sourcing 20 per cent of electricity from renewable sources by 2020. It is consistent with the NSW State Plan's target of achieving 20 per cent renewable energy consumption by 2020 and State and Federal Government targets for reducing greenhouse gas emissions of at least 5 per cent below 2000 levels.

The Department considers that in conjunction with relevant demand management and efficiency measures, a diverse mix of local embedded generating solutions would provide the most risk-averse method of achieving a secure and reliable electricity supply base for the State, which is resilient to changing market factors including a more constrained carbon market and water restrictions associated with drought. Local embedded generation in regional areas would promote greater transmission efficiencies (and associated greenhouse gas benefits from reduced transmission losses) by reducing the need for electricity to be delivered from further afield. The Department also accepts that the proposal would involve a number of direct local benefits including employment generation, potential tourist opportunities and opportunities for the local landowner to supplement rural income. Although it acknowledged that Solar farms could not solely meet the future energy demands on either the Federal or State level, it is likely to play an increasing role in energy production and the development of solar energy will encourage and assist future industry development, reduce barriers to the national electricity market, and provide greater community access to renewable energy.

In May 2010, Infigen Suntech Australia Pty Ltd was short-listed as one of four applicants in the solar photovoltaic category under round one of the Solar Flagships Program. The Solar Flagships program is part of the Australian Government's \$4.5 billion Clean Energy Initiative (CEI), announced in the May 2009 Budget. To accelerate the commercialisation of solar power in Australia, the Government has committed \$1.5 billion to support the construction and

demonstration of up to four large-scale solar power plants in Australia, using solar thermal and photovoltaic (PV) technologies. In addition the NSW Government has pledged \$120 million to help NSW solar projects bidding for funding under the Solar Flagships Program. The proposed solar farm would assist the State's goals of attracting solar energy projects to the State and help make NSW home to one of the largest solar thermal or solar photovoltaic power plants in the world.

On the above basis, the Department considers the proposed Nyngan Solar Farm would have a role in helping to meet the energy requirements of the State as well as in addressing local demand and would therefore have benefits for the local industry and community. It would also contribute to addressing the urgent challenges of climate change, reliance on fossil fuels and energy supply.

2.3. Critical Infrastructure

The project is classified as critical infrastructure in accordance with section 75C of the *Environmental Planning and Assessment Act 1979* by virtue of the Minister's declaration of 11 November 2009 relating to the generation of electricity derived from renewable fuel sources being development with a capacity to generate at least 30 megawatts, which is the subject of a project application lodged pursuant to section 75E or 75M of the EP&A Act.

3. STATUTORY CONTEXT

3.1. Major Project

The proposal is a major project under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) because it is development for the purpose of a facility for the generation of electricity or heat or their co-generation (using any energy source, including gas, coal, bio-fuel, distillate and waste hydro, wave, solar or wind power), being development that has a capital investment value of more than \$30 million under clause 24 of Schedule 1 of *State Environmental Planning Policy (Major Development) 2005*. Therefore, the Minister for Planning is the approval authority.

3.2. Permissibility

The proposal is located on land Zoned 1(a) General Rural under the *Bogan Local Environmental Plan 1991* (LEP). Generating works are permissible with development consent within land Zoned 1(a).

In addition, the *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP) applies to the project. Division 4 of the Infrastructure SEPP relates to electricity generating works with Clause 34(1) stating that development for the purpose of electricity generating works may be carried out by any person with consent on land in a prescribed zone. Therefore, as the proposal is for the purpose of generating electricity within a prescribed zone it is permissible within all zones.

3.3. Environmental Planning Instruments

There are no other environmental planning instruments that substantially govern the carrying out of the project.

3.4. Objects of the EP&A Act

Decisions made under the EP&A Act must have regard to the objects of the Act, as set out in Section 5 of the Act. The relevant objects are:

- (a) *to encourage:*
 - (i) *the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*
 - (ii) *the promotion and co-ordination of the orderly and economic use and development of land,*
 - (iii) *the protection, provision and co-ordination of communication and utility services,*
 - (iv) *the provision of land for public purposes,*
 - (v) *the provision and co-ordination of community services and facilities, and*
 - (vi) *the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
 - (vii) *ecologically sustainable development, and*
 - (viii) *the provision and maintenance of affordable housing, and*
- (b) *to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and*
- (c) *to provide increased opportunity for public involvement and participation in environmental planning and assessment.*

Of particular relevance to the environmental assessment and eventual determination of the subject project application by the Minister, are those objects stipulated under Section 5(a). Relevantly, the objects stipulated under (i), (ii), (iii), (vi) and (vii) are significant factors informing the determination of the application (noting that the proposal does not raise significant issues relating to land for public purposes, community services and facilities or affordable housing). With respect to ecologically sustainable development, the EP&A Act adopts the definition in the *Protection of the Environment Administration Act 1991*. This is discussed further in Section 3.5.

In addition to the above, the agency and community consultation undertaken as part of the assessment process (see Section 4 of this report), address objects 5(b) and (c) of the Act.

3.5. Ecologically Sustainable Development

The EP&A Act adopts the definition of Ecologically Sustainable Development (ESD) found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

- (a) *the precautionary principle,*
- (b) *inter-generational equity,*
- (c) *conservation of biological diversity and ecological integrity,*
- (d) *improved valuation, pricing and incentive mechanisms.*

The Department has considered the need to encourage the principles of ecologically sustainable development, in addition to the need for the proper management and conservation of natural resources; the orderly development of land considering land use; the need for the project as a whole (which comprises a utility provision); and the protection of the environment including threatened species in Section 5 of this report.

The Department's assessment of the ecological impacts of the project (section 5.1) is based on a conservative and rigorous assessment of the likely extent of ecological impacts and of likely offset requirements to ensure that appropriate and adequate measures are put in place to prevent the threats of serious or irreversible environmental damage consistent with the precautionary principle and the principle of conservation of biological diversity and ecological integrity. The majority of

potential impacts of the proposal are likely to be localised and would not diminish the options regarding land and resource uses and nature conservation available to future generations. The proposal would not require large scale earthworks and impacts to the site would be reversible. The development has significant social and environmental benefits on a local, state and federal level and can be argued to have global environmental benefits on the basis that the project would produce electricity without the production of greenhouse gases. With assessed benefits of the proposal and the assessed impacts on the environment and their ability to be managed (section 5.1), it is considered that the development would be ecologically sustainable within the context of the above principles.

3.6. Statement of Compliance

On the 27 October 2010, the Department notified the Proponent that, in accordance with section 75I of the EP&A Act, it was satisfied that the Director-General's environmental assessment requirements have been complied with.

4. CONSULTATION AND SUBMISSIONS

4.1. Exhibition

Under section 75H(3) of the EP&A Act, the Director-General is required to make the EA of an application publicly available for at least 30 days. After accepting the EA, the Department publicly exhibited it from 4 November 2010 until 6 December 2010 (33 days) on the Department's website, and at:

- the Department of Planning, Information Centre, Sydney;
- Nature Conservation Council of NSW; and
- Bogan Shire Council, Nyngan.

The Department also advertised the public exhibition in the Nyngan Observer on 3 November 2010 and notified relevant State and local government authorities in writing.

The Department received two submissions during the exhibition of the EA from public authorities. No submissions were received from the general public or special interest groups. Bogan Shire Council was invited to make a submission but did not make a submission.

A summary of the issues raised in submissions is provided below.

4.2. Public Authority Submissions

Two submissions were received from public authorities.

NSW Office of Water (NOW) does not object to the project. NOW noted that risk to water sources was low but a licence may be required if the project intercepted or used groundwater. NOW also noted the inclusion of a flood management plan within the Construction Environment Management Plan (CEMP) and the Operation Environment Management Plan (OEMP) and requested the review the CMEP and OEMP prior to project commencement.

Department of Environment, Climate Change and Water (DECCW) supports the project subject to revised Statement of Commitments regarding biodiversity impacts and the offset strategy. DECCW recommended that a supplementary flora and fauna survey be completed during spring to target threatened species, particularly the Red Darling-pea and the Slender Darling-pea. DECCW also recommended that the offset strategy, prepared by an ecologist in consultation with the landholder, be submitted for approval prior to the commencement of works.

The Department has considered the issues raised in submissions in its assessment of the project.

4.3. Proponent's Response to Submissions

The Proponent provided a response to the issues raised in submissions (see Appendix B). The Nyngan Solar Farm Submissions Report was placed on the Department's website on the 10 December 2010.

5. ASSESSMENT

The Department considers the key environmental issues for the project to be:

- Biodiversity
- Visual Impact
- Noise
- Traffic and transport
- Indigenous Heritage

5.1. Biodiversity

Five vegetation communities were identified within the proposed site, two of which meet the definition of Endangered Ecological Communities; Coolibah – Black Box Woodland and Myall Woodland both listed under the *Threatened Species Conservation Act 1995* (TSC Act). Two threatened flora species, Red Darling-pea (*swainsona plagiotropis*) and the Slender Darling-pea (*Swainsona murrayana*), listed as vulnerable under both the TSC Act and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were considered to have a moderate potential to be present at the site. No threatened species were identified during an additional survey undertaken on the 3 November 2010 to target the threatened species when they were likely to be visible and in flower. However, an area of good condition native pasture was identified in the northern section of the eastern paddock. The vegetation community the native pasture is derived from could not be determined.

The site is considered suitable habitat for 15 threatened fauna species with a low-moderate potential to be impacted by the proposal. Three threatened fauna species were identified on or adjacent to the site during field surveys; Superb Parrot (*Polytelis swainsonii*), Brown Treecreeper (*Climacteris picumnus*) and Grey-crowned Babblers (*Pomatostomus temporalis*).

The proposal would cover an area of 200 hectares within a 450 hectare site and require the clearing of 28.8 hectares of vegetation. This includes removing:

- 26.8 hectares of ground layer vegetation comprising native and exotic dominated pasture and cultivated paddocks for internal and perimeter access tracks;
- Two hectares of vegetation removed and reinstated to install the underground cabling; and
- 50 trees including 27 hollow bearing trees to reduce shading of the PV cells.

Both Endangered Ecological Communities have the potential to be impacted by the proposal with impacts to the Myall Woodland being limited to a small number of scattered and isolated Myall trees. The assessment concludes that impacts to the Endangered Ecological Communities as a result of the proposal were unlikely to be significant.

Impacts on biodiversity during operation from the installation of the PV array structure include altered micro climates of shading and changes to rainfall distribution, increased rain splash intensity and increased soil moisture from reduced evaporative demands. The assessment also considered indirect impacts on fauna, downstream impacts and impacts to the frequency and impact of fires on the site and surrounds. The assessment could not determine if impacts of shading from the solar PV array on the native pasture would result in long term impacts to the pasture.

Mitigation & Offset

Measures are included in the project design and layout to avoid impacts to native vegetation including impacts to stands of woodland, hollow bearing and isolated trees where possible. The Proponent commits to further reducing impacts to vegetation through design opportunities to 'microsite' the proposed infrastructure on the site to further reduce impacts to vegetation including areas containing EEC.

The Proponent also commits to trying to avoid impacts to the area containing good condition native pasture and if avoidance is not possible, implementing appropriate measures in

accordance with the ground cover management plan to maintain the biodiversity values of this area.

Further mitigation measures relating to construction activities include planning works to avoid sensitive times and areas of known threatened species, increasing the visibility of cyclone fencing, top soil management and rehabilitation, weed management, erosion management and monitoring of vegetation cover and composition to allow for adaptive management.

The Proponent has committed to preparing a Groundcover Management Plan which would include the need to obtain advice from an agronomist to identify preferred species or varieties of ground cover, establishment methods and best practice management to ensure appropriate cover and composition of vegetation beneath the solar PV array given the changes to the microclimate. The Proponent has indicated that it may also commence field trials where information about the best groundcover is lacking.

To offset the residual impacts to vegetation the Proponent proposes to develop an Offset Plan. The Offset Plan would consider offsets of impacts from the removal of wooded vegetation and native pasture in a moderate to good condition. The offset is proposed to be provided on site through enhancing local connectivity, particularly through the central remnant woodland area. It is considered that the habitat and connectivity values could be increased by fencing and expanding the area via planting within the Coolibah – Black Box Woodland located in the central area of the site. The offset once finalised would be secured by a formal agreement with the land owners and managed for the life of the project.

Consideration

The Department has considered the Proponent's biodiversity assessment and is satisfied that the level of assessment undertaken for the Nyngan Solar Farm is sufficient to enable the Department to form a view on the existing biodiversity values on site and likely extent and significance of impacts associated with these project elements. In assessing the acceptability of the biodiversity impacts, the Department has considered whether the Proponent has demonstrated that impacts on biodiversity have been avoided wherever possible and, where unavoidable, whether viable options exist to offset the impacts of the project consistent with "maintain or improve" principles.

The Proponent's assessment stated that the potential impact on threatened flora and fauna species, endangered ecological communities and their habitats will not be significant.

In this regard, the Department is supportive of development options including micro-siting infrastructure and restricting construction activities to designated access tracks to reduce impacts to endangered ecological communities and the areas of native pasture in good condition. Combined with a suitable offset the Department agrees with the Proponent's assessment that flora and fauna impacts are unlikely to be significant.

With respect to residual biodiversity impacts, the Department considers that a suitable offset is required. The Department is therefore supportive of the requirement to prepare an offset package to ensure that residual impacts on vegetation are adequately compensated for, consistent with the principles of "maintain or improve", given the nature of vegetation to be cleared which comprise listed endangered ecological communities, native pastures and suitable foraging and/ or roosting habitat for up to 15 listed threatened fauna species.

Whilst the Department accepts that the biodiversity impacts of the Nyngan Solar Farm on the existing biodiversity values could in principle be offset on site to ensure no net loss of biodiversity values in the long term, the suitability of the offset needs to be further investigated to ensure that it is consistent with the principles of "maintain or improve". The Department also considers that the security and management of the offset needs to be in perpetuity and not only for the life of the project which is nominally proposed to be 30-50 years. This position is consistent with DECCW's submission and has been recommended as a condition of approval.

The Department also recommends that the Proponent be required to:

- detail procedures for clearing vegetation and minimising clearing within vegetated corridors in a Flora and Fauna Management Plan; and
- where information is lacking on the types of groundcover that would be suitable to ensure adequate ground cover beneath the solar array, undertake field trials in consultation with an agronomist and, where it involves the native pastures, DECCW.

Overall, the Department is satisfied that there are no biodiversity constraints to recommending project approval for the Nyngan Solar Farm as all impacts would be acceptable with the implementation of appropriate management measures as outlined.

5.2. Visual Impact

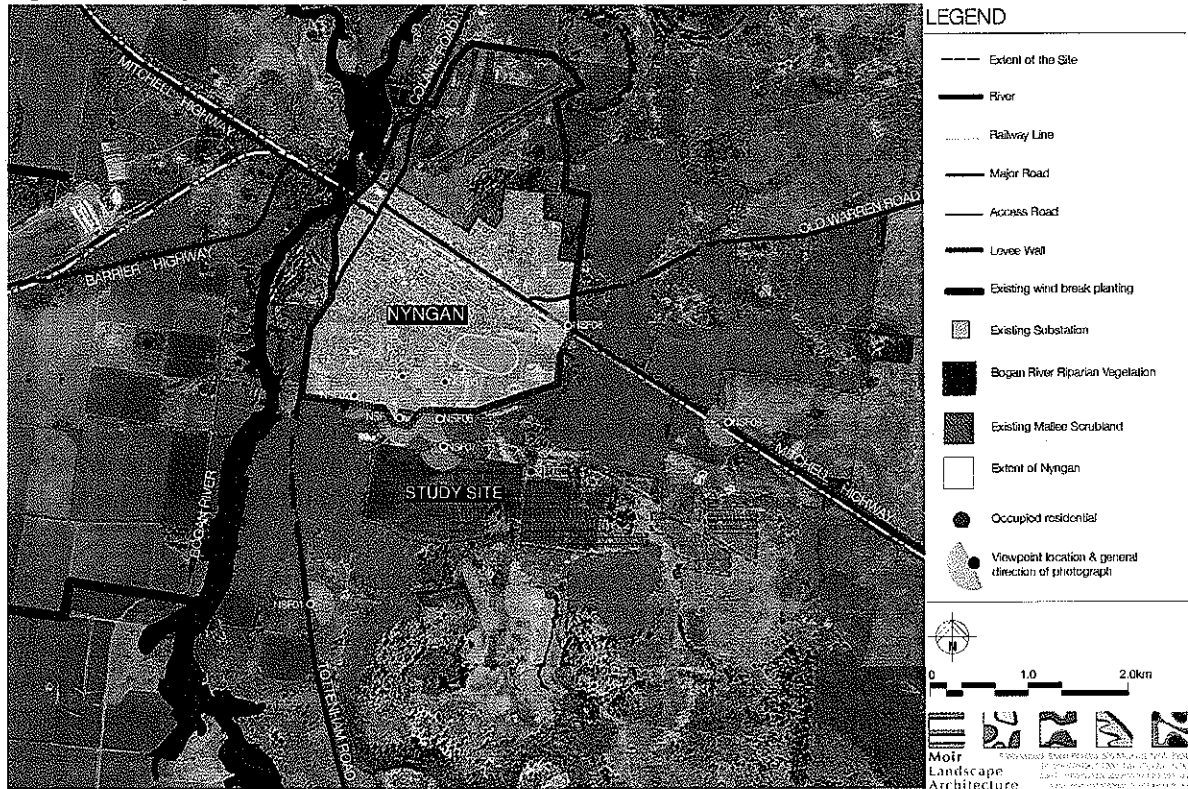
The Nyngan Solar Farm would comprise solar PV arrays installed in rows in an east-west direction with the panels facing north at a height of two to 3.5 metres above the existing ground level. The operations and maintenance building (20 metres by 20 metres) would be located south of the existing substation.

The proposed solar farm would be concealed from most surrounding view points as a result of a combination of flat topography, dense existing vegetation and the levee wall surrounding Nyngan township. Of the viewing locations assessed, the solar farm would be most visible from East Nyngan Road and the Mitchell Highway where existing vegetation, that could provide an effective screen of the site, is sparse, see Table 2. The viewing locations chosen for the assessment were from publically accessible locations and are shown in Figure 4.

Table 2 View point locations

Viewpoint	Location	Visual Sensitivity	Visual Effect	Visual Impact
NSFO1	Tottenham Road	-*	-	-
NSFO2	Southern end of Terangion St	-	-	-
NSFO3	Nyngan Substation	-	-	-
NSFO4	Dandaloo & Oatley St	-	-	-
NSFO5	East Nyngan Road	-	-	-
NSFO6	East Nyngan Road	Low	Low	Low
NSFO7	East Nyngan Road	Moderate	Moderate	Moderate
NSFO8	Mitchell Highway	-	-	-
NSFO9	Mitchell Highway	Moderate	Moderate	Moderate

* Not visible from this location

Figure 4 View point locations

Source Nyngan Environmental Assessment (NGH October 2010)

The visual impact associated with the solar farm is expected to be the greatest during construction with light vehicles, trucks, equipment containers, site offices and cranes being used on site. The construction of the solar farm is expected to take 10 months.

The nearest residence to the solar farm is located 160m south and the nearest business, a Horse Ranch, is located 85m north of the site. An isolated homestead is located at least 400 metres north of the site with other residences located at least 600m north. The views to the solar farm are expected to be the most visible from the north and south. However, views from the residences in Nyngan are obscured by the height of the levee wall which surrounds the town. The site would, however, be visible to the isolated homestead approximately 400m north of the site and an associated residence located 160m south of the site.

The EA also considers the impacts associated with reflection, glint and glare of the solar panels. The assessment illustrates that the solar glass proposed would reflect less than 10-18% of solar energy when compared to other surfaces. For example, the solar panels would reflect less solar energy than that associated with a typical rural environment, crops or grassland but more than that experienced from asphalt. The metal stripping surrounding each PV panel would reflect more solar energy than the PV panels, however, this was not considered to be a significant issue as the strips would be thin and would limit glare impacts.

The Proponent proposes to mitigate the visual impacts of the Nyngan Solar Farm by planting a visual screen around the boundary of the solar farm, foreground planting at affected viewing points and at affected residences in consultation with the owner. It is proposed that the plant species used would be those typical of the area.

The Proponent has also considered ways to maximise viewing of the solar farm with the potential to provide a dedicated viewing area where the public would be able to safely view the solar farm.

Consideration

The Department is satisfied that the level of assessment provided in the Environmental Assessment provides sufficient information to adequately assess the visual impacts of the proposal. Although the solar farm would be visible at particular viewpoints the low lying nature of

the development (between one and 3.5 m above ground level) enables these impacts to be greatly reduced through appropriate mitigation measures.

The photomontages produced for the EA illustrate that the solar farm would still be partially visible following the implementation of the mitigation measures proposed but is, unlikely to result in an unacceptable impact. The Department considers that the proposed planted visual screen around the boundary of the solar farm and at affected viewing locations would greatly reduce the visual impact of the solar farm and accepts that the Proponent has undertaken a robust assessment with due consideration to factors that can be reasonably considered to influence the level of visual impact.

The Department has recommended conditions of approval requiring the Proponent to submit a Landscaping Plan to the Department for approval and a Visual Impact Verification Report for the Director-General's approval within 6 months of commissioning of the project. The report shall confirm the visual impacts at each of the receptors and roadways identified in the Environmental Assessment, and shall identify all reasonable and feasible screening and landscape planting options available at each receptor and roadways at which potential impacts have been verified. The Department is satisfied that impacts are unlikely to be significant due to the transient nature of the views and the low lying nature of the development.

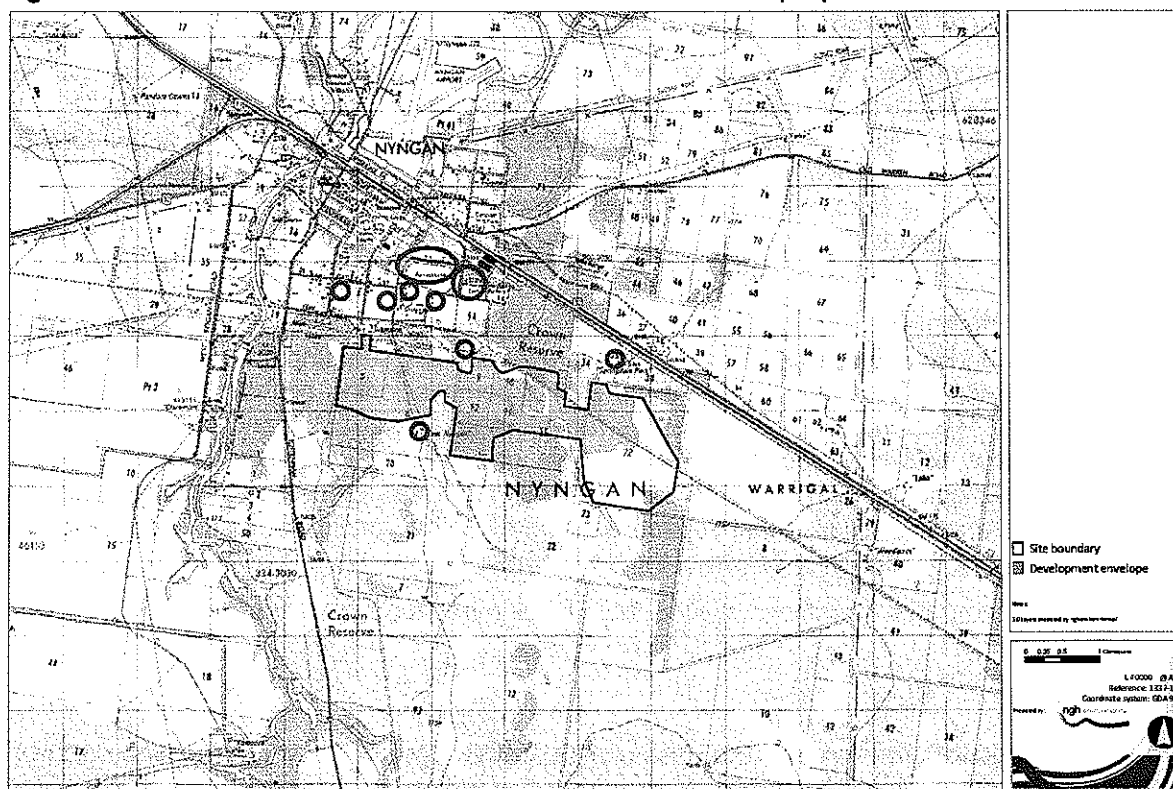
The Department is therefore satisfied that visual impacts do not pose a constraint to the project proceeding.

5.3. Noise

The Proponent prepared a noise assessment for the Nyngan Solar Farm based on the *DECCW Interim Construction Noise Guideline 2009*. The rating background level was determined in accordance with the *NSW Industrial Noise Policy 2009*. The assessment focuses on the construction period as noise emitted by the transformers and from the substation was considered unlikely to increase noise levels significantly. Operational noise impacts from maintenance activities and vehicle movements were expected to be short term and intermittent.

The area surrounding the proposed solar farm is primarily used for agricultural purposes with an ambient noise background dominated by natural sources which is reflected in the low Rating Background Level of 32 dB(A). The nearest residence to the solar farm is located 160m south and the nearest business, a Horse Ranch, is located 85m north of the site.

The construction noise assessment concludes that noise from construction activities is likely to exceed the management noise level of 42 dB(A) at residences within 1 kilometre south of the proposal, within 700m north east of the project and within 500m north of the project. The location of noise sensitive receivers within one kilometre of the site are shown in Figure 5.

Figure 5 Noise sensitive receivers within one kilometre of the proposed solar farm.

Source Nyngan Environmental Assessment (NGH October 2010)

Table 3 shows that the closest sensitive receiver, the Horse Ranch located at 85m from the proposal, is likely to be negatively affected by construction noise. The Proponent states that the impacts are likely to be intermittent as works would be undertaken at different parts of the site for varied periods. However, typically more than one source would operate at a time which would result in a higher noise level than for a single source. The Proponent commits to implementing a range of feasible and reasonable mitigation measures in line with the recommendations in *Interim Construction Noise Guideline*, including liaising with local landholders within one kilometre of the site.

Table 3 Typical Noise levels of construction equipment used for the works

Plant Description	Sound Power Level at source (dBA)	Noise level at closest residence to the site – 85m (dBA)	Exceed 42 dBA target?
Bulldozer	112	65	Yes
Excavator	110	63	Yes
Vibratory Roller	109	62	Yes
Concrete Truck	109	62	Yes
Dump Trucks	108	61	Yes
Water Cart	107	60	Yes
Concrete Pump	105	58	Yes
Generators	100	53	Yes
Mobile Crane	105	58	Yes
Powered Hand Tools	109	62	Yes
Air Compressor (power tools)	98	51	Yes
Compactor	113	66	Yes
50-tonne crane	102	55	Yes
Vibrated Piling	116	69	Yes
Traffic Control	101	54	Yes
Grader	109	62	Yes
Front End Loader	111	64	Yes
Backhoe	108	61	Yes

Source Nyngan Environmental Assessment (NGH October 2010)

Consideration

The Department is satisfied that an appropriate assessment of the construction noise impacts has been completed and with the implementation of the proposed statement of commitments and the temporary nature of construction works, the construction noise is unlikely to pose an unacceptable impact.

The noise management level of 42dB(A) was calculated in accordance with the *Interim Construction Noise Guideline*, which requires that construction noise goals be set at background + 10 dB(A). The Proponent has determined that construction activities are likely to exceed the noise management level of 42 dB(A) with the greatest impact on the closest sensitive receiver (the Horse Ranch) occurring during vibrated piling, which may reach 69dB(A) resulting in an exceedance of 27dB(A) above the target.

The Department notes that noise impacts from the construction works would be intermittent as works would be undertaken in different parts of the site. The estimated noise levels are calculated on a 'worst case scenario' with work only reaching the highest dB(A) when work is carried out on the site boundary closest to the receiver. This would limit the excessive noise impacts significantly throughout the entire construction period, although it is acknowledged that an impact is still likely and mitigation methods are required to reduce the impact.

To ensure that all reasonable and feasible noise mitigation measures are implemented during construction, the Department has recommended conditions of approval requiring the Proponents to develop comprehensive noise management measures as part of a construction environmental management plan, including measures for community notification, noise monitoring and complaints management.

For operational noise, however, it is unclear what the impact the solar farm and the upgrade to the substation would have on sensitive receivers, particularly the residence located 160m south and the Horse Ranch located 85m north of the proposal. Given that 140 inverters, 70 kiosks transformers and the substation upgrade are proposed, it is possible that there would be a change in noise on the site. While it is highly unlikely, given the distance to the nearest receivers, that the change in noise level would result in an unacceptable impact at nearest sensitive receivers, the Department's recommended conditions of approval require operational noise to be verified prior to construction and post operation noise monitoring at nearby sensitive receivers to compare the actual noise performance of the project against the *Industrial Noise Policy*.

5.4. Traffic and Transport

Construction equipment and materials are proposed to be shipped via rail to Dubbo and trucked 160 kilometres to Nyngan via the Mitchell Highway. Construction and delivery vehicles would access the site west of the existing substation by the use of local roads including Hastings Street and East Nyngan Road. An alternative access via the transmission easement is also proposed should access west of the existing substation be unavailable.

The proposal is not expected to unduly increase construction traffic on the Mitchell Highway and Hoskins Street with the roads considered capable of handling the expected volumes and types of traffic required for the construction of the solar farm.

It is considered that construction vehicles required for the solar farm would not significantly impact the safety of the local road system. During construction, it is expected that:

- approximately 20-40 cars would access the site daily;
- five utilities and three trucks would be used on site daily;
- one standard articulated truck to transport 500 shipping containers (12 metres long) from Dubbo would complete two to three deliveries to the site per day; and
- there would be one oversized vehicle for a one off delivery of a substation transformer.

The assessment notes that the additional traffic, particularly heavy vehicles, could result in impacts on the road quality causing dilapidation of the local sealed and unsealed roads.

The Proponent commits to a range of mitigation measures to reduce impacts from traffic associated with the construction and operation of the solar farm including the development of a Traffic Management Plan, community consultation with potentially affected residents, road dilapidation reports and a commitment to repair damage resulting from the construction traffic.

Consideration

The Department acknowledges that potential impacts from an increase in construction traffic, in particular from heavy vehicles, are likely if not managed appropriately and supports the Proponent's commitments to prepare a Traffic Management Plan, road dilapidation report and repair damage resulting from construction traffic.

A condition is recommended to require the investigation of the existing condition of all public roads proposed to be used for construction and the upgrade of these roads to a standard considered necessary to accommodate the traffic volumes associated with the project. In this regard, the Department has recommended conditions of approval requiring the Proponent to commission an independent expert to undertake pre and post construction road dilapidation surveys in consultation with Council and the RTA to determine upgrade requirements including for road surfaces (and associated culvert, bridge and drainage design), intersection treatments, vehicle turning requirements and property access taking into account finalised traffic volumes following detailed design.

The Department has also recommended that the Proponent be required to prepare a Traffic Management Plan in consultation with the relevant road authority prior to the commencement of construction.

The Department is therefore satisfied that traffic impacts do not pose a constraint to the project proceeding subject to the implementation of the proposed statement of commitments and recommended conditions of approval.

5.5. Indigenous Heritage

Based on the predictive model of site distribution for the area the artefact density in the study area is assessed in the EA to be very low. The results of the field surveys identified four Aboriginal objects. The objects were identified as single and isolated stone artefacts. The area was assessed to be of low archaeological potential and significance particularly due to the high levels of disturbance associated with past agricultural practices and the predicted low artefact densities.

The assessment therefore concludes that there are no identified Indigenous archaeological and heritage constraints relating to the proposal.

Consideration

The Department is satisfied that an appropriate level of assessment has been completed to provide sufficient information for the Department to form a view that the existing Indigenous heritage values and archaeological potential of the site are low. The Department supports the Proponent's commitment for ongoing consultation with the registered Aboriginal parties and is satisfied that Indigenous heritage does not pose a constraint to the project proceeding.

6. RECOMMENDATION

The Department considers that the Nyngan Solar Farm would entail significant benefits to the community by helping to meet the predicted electricity demand shortfall without the production of additional greenhouse gases.

The key environmental impacts associated with the proposal relate to the physical disturbance of biodiversity, visual impact, construction noise, construction traffic and Indigenous heritage from the construction of the solar farm and ancillary infrastructure.

The Department has assessed the Proponent's Environmental Assessment, Submissions Report and Statement of Commitments as well as the submissions received from agencies on the proposal. Based on its assessment, the Department is satisfied that sufficient justification exists for the project and that the Proponent has, for the most part, undertaken a robust and

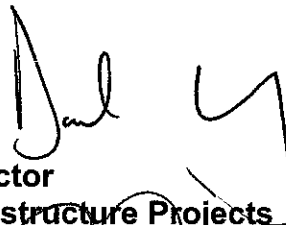
conservative assessment of the impacts of the proposal and that the impacts of the proposal can be managed and/or mitigated to an acceptable level.

In order to manage potential impacts resulting from the proposal, a range of conditions of approval are recommended. These conditions would ensure the key issues addressed in this report are appropriately addressed and managed to acceptable levels. The conditions will also ensure that commitments made in the Environmental Assessment and submissions report are implemented as well as strengthening the management and mitigation of identified impacts.

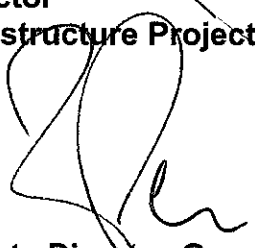
The Department notes that the project will assist in meeting the Renewable Energy Target proposed by the Federal Government in 2009, of achieving a 20% share of renewable electricity in Australia's electricity supply by 2020. It is also consistent with the NSW State Plan and Federal Government targets for reducing greenhouse gas emissions of at least 5 per cent below 2000 levels.

The Department considers that, on balance, the project is justified, given its benefits to the broader community in producing renewable energy with greenhouse gas benefits.

The Department therefore recommends that this project be approved subject to the recommended conditions of approval.


14/12/10
**Director
Infrastructure Projects**


14-12-10
**Executive Director
Major Projects Assessment**


15/12/10
**Deputy Director-General
Development Assessment & Systems Performance**

APPENDIX A ENVIRONMENTAL ASSESSMENT

See the Department's website at

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=4076

APPENDIX B SUBMISSIONS

See the Department's website at

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=4076

APPENDIX C PROPONENT'S RESPONSE TO SUBMISSIONS

See the Department's website at

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=4076

APPENDIX D RECOMMENDED CONDITIONS OF APPROVAL
