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This Environmental Assessment has addressed the impacts of the Marulan Gas Turbine Facilities with regard to the principles of ecologically sustainable development, and has addressed the impact of the Project on the biophysical and physical environment.

20.1 Ecologically Sustainable Development

The *Environmental Planning and Assessment Regulation 2000* requires that an Environmental Assessment include:

"The reasons justifying the carrying out of the development or activity in the manner proposed having regard to biophysical, economic and social considerations and the principles of ecologically sustainable development."

The principles of Ecologically Sustainable Development, as listed in the Regulation, are as follows:

a) *"The precautionary principle - namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*

b) *Inter-generational equity - namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.*

c) *Conservation of biological diversity and ecological integrity.*

d) *Improved valuation and pricing of environmental resources."*

20.1.1 Precautionary Principle

The Proponent's precautionary approach is demonstrated by the design and management controls to be implemented as part of the proposed development. The controls proposed specifically address the threat of serious or irreversible damage from:

- greenhouse gas emissions;
- air emissions;
- noise emissions;
- surface water discharges;
- soil and groundwater contamination;
- impacts on biodiversity;
- visual impacts;
- damage to cultural artefacts;
- wastewater disposal;
- potential hazards; and
- land use change.

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Monitoring of these aspects would be carried out in accordance with regulatory and licence requirements. Where deviations from expected conditions are recorded, the matter would be investigated immediately and appropriate action taken as necessary, to prevent any adverse environmental impact as required by the Environmental Management Plans (Construction and Operation) for the proposed Project.

20.1.2 Inter-Generational Equity

The Marulan Gas Turbine Facilities are needed to ensure the adequate, reliable and consistent supply of electricity during times of peak demand in NSW.

A range of alternatives to the proposal have been considered by Delta Electricity and EnergyAustralia. Operation of gas turbines was found to be suitable in open cycle mode for meeting peak electricity demand and in combined cycle mode for meeting base load demand.

20.1.3 Conservation of Biological Diversity and Maintenance of Ecological Integrity

Development of the Facilities, common infrastructure and transmission line would require the clearing of approximately 22 ha of Tableland Hills Grassy Woodland. Seven-part tests were performed for relevant threatened species, which concluded that the proposed works are not likely to have significant impacts on any threatened species due to the high mobility of the species, limited area of vegetation to be impacted, degradation of the site by weed species and grazing, and availability of suitable habitat in the surrounding area.

Measures to avoid impacts on biodiversity have been developed, mainly through locating the proposed Facilities as far as possible within cleared grazing lands, whilst allowing for a suitable setback from the Wollondilly River. Mitigation measures (to reduce or minimise biodiversity impacts) are to be included in a Construction Environmental Management Plan, including pre-clearance surveys, salvage and rescue of fauna and fauna habitats, weed control protocols and management of groundcover vegetation. A biodiversity offsets package has also been proposed, in consultation with DECC, to compensate for direct permanent loss of biodiversity values. A management plan would be prepared and implemented for the agreed offset areas and would include measures to improve biodiversity values, such as removal of grazing (through fencing), weed control, feral animal control and retention and salvage of habitat.

20.1.4 Improved Valuation and Pricing of Environmental Resources

It is difficult to assign a monetary value to the environment of the locality, given the lack of precedence and guidelines in the valuation of environmental resources not considered for commercial use. The approach taken would be to manage any environmental impacts by identifying appropriate mitigation measures and to include the cost of these safeguards in the total Project cost.

20.2 Consistency with objects of EP&A Act

An evaluation of the consistency of the Project with the objects of the EP&A Act is presented in **Table 20-1**.

Table 20-1 Consistency of the Project with objects of the EP&A Act

Object	Consistency of proposed Project with object
To encourage 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.	The use of natural gas for both the Delta Electricity and EnergyAustralia Facilities results in efficient use of resources for electricity generation as electricity production with gas is at a lower greenhouse intensity than the NSW average. Delta Electricity Facility combined cycle operation (i.e., Stage 2) further improves greenhouse efficiency to approximately half that of conventional coal-fired generation. For this reason, natural gas fired, combined cycle generation is widely considered to be an important transitional mode of generation for the achievement of long-term greenhouse reduction targets. As part of this Project, Delta Electricity and EnergyAustralia have committed to conserving a 32.3 ha portion of land that contains Tableland Hills Grassy Woodland and a riparian rehabilitation area of 9 ha to improve its condition and ecological value. The Marulan Site contains a mosaic of cleared pasture, native woodlands and riparian and aquatic ecosystems that are associated with the Wollondilly River. The Site has previously been used for agriculture (grazing cattle), however the exclusion of grazing cattle will improve the condition and ecological value of the woodland proposed to be conserved on the Site. This Environmental Assessment includes measures to protect local water resources such as the Wollondilly River through a design philosophy of zero discharge from the Site except for natural flows. The Facilities would have infrastructure for recycling water and would also make use of treated effluent as an alternative water source to fresh water. The existing socio-economic conditions of the area along with the possible impacts of the proposed development have been examined qualitatively. The proposed Facilities in the Marulan region are expected to have positive economic and social impacts during both construction and operation phases with potential for a positive effect on the regional economy through contribution to GDP, income and employment.
To encourage the promotion and co-ordination of the orderly and economic use and development of land.	Under the *Mulwaree Local Environment Plan 1995* the Site is zoned 1(a) General Rural and the proposed development is permissible subject to the granting of consent by the Minster.

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Object	Consistency of proposed Project with object
To encourage the protection, provision and co-ordination of communication and utility services.	The Facilities would contribute to the supply of electricity across NSW, which meets the object of providing utility services. Delta Electricity and EnergyAustralia propose to construct two electricity generating facilities on one site, consisting of open cycle gas turbines. This type of generating system can supply electricity to the grid at short notice and is therefore well suited to providing electricity in peak demand periods. Gas turbines are known to be one of the most effective options to provide electricity for short term demand. Delta Electricity also proposes to convert its open cycle gas turbines to combined cycle turbines to generate intermediate / base load electricity.
To encourage the provision of land for public purposes.	The Site would be used for the supply of electricity to the National Electricity Market.
To encourage the provision and co-ordination of community services and facilities.	The Project benefits broader community services through the supply of electricity to the state of NSW and the National Electricity Market. As a way of further enhancing public infrastructure, upgrade works, if deemed viable, would be undertaken to local sewage treatment facilities to meet the Facilities' operational water requirements.
To encourage 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.	As part of this Project, Delta Electricity and EnergyAustralia have committed to conserving a 32.3 ha portion of land that contains Tableland Hills Grassy Woodland and a riparian rehabilitation area of 9 ha to improve its condition and ecological value (refer also to the response to object one above). This Environmental Assessment includes mitigation measures for reducing impact on native animals and plants as described in **Chapter 11**.
To encourage ecologically sustainable development.	Having regard to the Environmental Assessment findings and the principles of ESD, the justification for carrying out the development in the manner proposed is as follows: - environmental issues associated with the proposed development of the Project have been fully considered; - potential impacts identified are capable of being mitigated and the proposed development does not represent a threat of serious or irreversible environmental damage; and - biological diversity and ecological integrity of the area would not be affected by the proposed development.
To encourage the provision and maintenance of affordable housing.	Not applicable.
To promote the sharing of the responsibility for environmental planning between the different levels of government in the State.	Approval is being sought for this Project under Part 3A of the EP&A Act. Involvement of different levels of government in the State is being coordinated by the Department of Planning.

Object	Consistency of proposed Project with object
To provide increased opportunity for public involvement and participation in environmental planning and assessment.	A consultation strategy was developed to initiate and maintain open communication with key stakeholders and to provide a forum to proactively respond and work with key community and key statutory and public authority stakeholders. A project newsletter was distributed to local residents and a free call number and email address were provided to facilitate open communication. The consultation strategy was undertaken by representatives of Delta Electricity, EnergyAustralia and members of the URS team. Delta Electricity and EnergyAustralia have committed to provide all relevant information to the community for their consideration and response. During public exhibition of the Environmental Assessment, Delta Electricity and EnergyAustralia will forward an electronic copy to landholders and tenants in immediate proximity to the Project Site along with an offer to meet and discuss the content of the Environmental Assessment. A consultation plan would be developed as part of the CEMP / OEMP to outline a coordinated, jointly managed consultation process for the Facilities. A single complaints line would be established for the two Facilities, with a jointly managed response process to be developed.

20.3 Summary of Environmental Assessment Findings

A brief summary of the main findings of the Environmental Assessment is presented below. Detailed descriptions of each aspect are presented in the separate sections of the Environmental Assessment. Details of environmental management and monitoring techniques and the commitments made by the Proponents which would be implemented for the proposed Project are presented in **Chapter 19.**

Consultation would be addressed in the CEMP and OEMP to provide strategies for community liaison including regular information updates and complaints handling.

Air Quality

The air dispersion modelling assessment for the combined Facilities concluded that all emissions were below NSW EPA regulatory criteria. No additional mitigation measures are considered necessary.

A range of dust suppression measures and soil and erosion controls would be implemented during the construction phase of the proposed Common Shared Works. These controls would be incorporated in a construction Soil and Water Management Plan to be developed as part of a Construction Environmental Management Plan (CEMP).

Noise and Vibration

An assessment of the noise likely to be generated by the Facilities during the operational stages shows that there are likely to be exceedances of the noise criteria at a number of residential receivers. Notwithstanding the feasible and reasonable noise control measures considered for both Facilities and included in the proposed development, the assessment of operational noise concluded that two

neighbouring residential dwellings are predicted to have noise levels that exceed the relevant noise criteria. One neighbouring residential dwelling is predicted to have a marginal exceedance. EnergyAustralia and Delta Electricity have entered into negotiations with these residences to address the noise impacts.

Biodiversity

Development of the Facilities, common infrastructure and transmission line would require the clearing of approximately 22 ha of Tableland Hills Grassy Woodland. A Weed and Pest Management Plan developed as part of the CEMP for the site would minimise the impacts of the development during construction. Implementation of these mitigation measures would ensure that the Project would not have any impact on surrounding land use from a flora and fauna perspective. Mitigation measures would be implemented to minimise the impact of the Facilities on biodiversity. These measures include developing a package of Biodiversity Offsets in consultation with DECC.

Cultural Heritage

An archaeological assessment of the Marulan Site was conducted, which identified 10 Aboriginal archaeological sites. All of these sites are stone artefact scatter sites or isolated stone artefact occurrences. A number of landforms within the proposed development area were also identified as having potential to contain further Aboriginal archaeological sites. No historical sites are situated within the area proposed to be occupied by the shared infrastructure. All attempts would be made to avoid significant Aboriginal archaeological sites within the study area through changes to the proposed design and construction methods. A Cultural Heritage Management Plan (CHMP) would also be prepared which would outline strategies for dealing with recorded and un-recorded Aboriginal archaeological sites encountered within the proposed development area.

Visual Amenity

The visual impact assessment concluded that both Facilities would have an overall medium visual impact on people living in, or travelling through, the local area, although the potential visual impact would be generally low for the majority of people, including residential view locations, in areas surrounding the Facilities.

Traffic and Transport

As a result of the proposed traffic impacts and existing road constraints the following mitigation measures would be required to mitigate these impacts:

- Further assessments to:
  - review what works may be required to bridges, causeways, traffic islands, intersections and drainage culverts along Canyonleigh and Brayton Roads to facilitate the construction and operation of the Facilities;
  - identify and cater for any necessary remedial treatments to facilitate passage to the Site along Canyonleigh and Brayton Roads once the actual weight and dimensions of the proposed plant are known; and
  - be undertaken in consultation with Goulburn Mulwaree and Upper Lachlan Shire Councils.

- A pre construction evaluation of the pavement condition of Brayton Road (between George Street intersection and Canyonleigh Road intersection) and Canyonleigh Road (from intersection of Brayton Road to the Site).
- A post construction evaluation of the pavement condition of Brayton Road (between George Street intersection and Canyonleigh Road intersection) and Canyonleigh Road (from intersection of Brayton Road to the Site) to determine remedial action required following passage of oversized vehicles.

Hazard

Despite the fact that many of the assumptions in the PHA are highly conservative, the results show that the risk associated with this development is very low. The most stringent risk criteria, as required by the Department of Planning, are adhered to.

20.4 Conclusion

Concept Approval under Part 3A of the EP&A Act is being sought by the Proponent for the construction and operation of the Marulan Gas Turbine Facilities and associated infrastructure.

Mitigation measures to ensure impacts to both the bio-physical and socio-cultural environment remain at an acceptable level throughout the planned lifespan of the development have been factored in to the proposal in the following ways:

- incorporation of appropriate measures into the proposed design of the development; and
- adherence to Environmental Management Plans (EMP) including a Construction EMP and Operational EMP, which would dictate the specific environmental policies and management plans that the facility would operate in accordance with.

The Environmental Assessment has been produced to ensure that the following regulatory and community requirements have been addressed:

- *Environmental Planning and Assessment Act 1979;*
- consistency of the Project with the objects of the Environmental Planning and Assessment Act 1979;
- consideration where applicable of State Environmental Planning Policies and Regional Environmental Plans;
- specific requirements identified by the Director General of the Department of Planning; and
- local residents and businesses.

Having regard to the Environmental Assessment findings and the principles of ESD, the reasons justifying the carrying out of the development in the manner proposed are as follows:

- environmental issues associated with the proposed development of the Project have been fully considered;
- potential impacts identified are capable of being mitigated and the proposed development does not represent a threat of serious or irreversible environmental damage; and

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- biological diversity and ecological integrity of the area would not be affected by the proposed development.

Environmental impacts associated with the proposed development have been identified and addressed in this Environmental Assessment according to the Environmental Assessment Requirements issued by Department of Planning. Where appropriate, environmental safeguards in the form of mitigation measures have been recommended to minimise the environmental effects of the Project.

No significant adverse environmental impacts have been identified through the course of studies. Environmental impacts that have been identified comply with relevant standards and are capable of being mitigated through the use of appropriate environmental controls.