



Knowledge Sharing Report-Milestone 4



RATCH-Australia

Collinsville Solar Thermal Power Station

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Introduction

RATCH-Australia Corporation Limited (RAC), in partnership Transfield Infrastructure Pty Limited, and The University of Queensland (UQ), is undertaking all the preparatory development work to assess the viability of converting an existing 180MW coal fired power station to a 30MW hybrid solar thermal / gas power station at the Collinsville Power Station (CPS) in Queensland (the Project).

As part of the Project, RAC will also examine the feasibility of using Novatec’s Supernova Linear Fresnel Solar Thermal technology to generate superheated steam to be supplied directly to a steam turbine to provide grid connected electricity. The dual-fuel boiler will also be designed to use natural gas to enhance grid reliability from the Project.

The Australian Government, through an Australian Renewable Energy Agency’s (ARENA) Emerging Renewables Program Funding Agreement, is partly funding the feasibility study.

This **Knowledge Sharing Report for Public Release** contains a summary of the learnings and knowledge gained during this phase of the Project, including information from the public release versions of the:

- Environmental and Regulatory Assessment Studies;
- Network Transmission Line Relocation Study; and
- Planning Study Report from Ergon Energy.

Environmental and Regulatory Assessment Studies

Draft DA submission documents

RAC engaged their environmental advisors to prepare the required Environmental and Regulatory Assessment Studies and Development Application (DA) submission documentation.

The draft DA submission documents and supporting reports have been prepared. A summary of the key considerations and findings from the preparation of the draft DA are outlined below. These considerations and findings will be updated once the final reports are received and final DA submission is prepared.

Learnings and Knowledge gained

Environmental Impacts

Clearing Vegetation

The nature of the proposed development is such that a very large area of open land is required, in order to harness the sun's energy for conversion to electricity. As a result, some clearing of vegetation is proposed, to create fenced operational areas.

A substantial body of work has gone into understanding environmental values and constraints at the subject site and developing the proposed activity in response to these values and constraints. Detailed assessments and field work have been undertaken to confirm the species of flora and fauna present on the site, to correct the status of regional ecosystem mapping via the Property Map of Assessable Vegetation (PMAV) process, some of which was previously mapped incorrectly, and to conclude with confidence that clearing required for the proposed solar thermal facility will not have a significant impact on important ecological values.

The proposed layout has been located and orientated to minimise the area of remnant vegetation requiring to be cleared.

The area proposed to be cleared for the development footprint involves approximately 20ha of 'least concern' remnant vegetation. The vegetation to be cleared will therefore not have a significant impact to connectivity throughout this regional ecosystem.

Furthermore, the clearing associated with the development has been determined to be exempt from assessment against the Vegetation Management Act 1999 due to the project being for community infrastructure. This was confirmed with the State Assessment and Referral Agency (SARA) during formal pre-lodgement meeting. This

exemption reflects a high-level policy decision by the State government to support important infrastructure developments despite where clearing of vegetation is required.

Waterways

The site contains a number of mapped waterways; therefore consideration has been given to assessment triggers pertaining to the Water Act 2000 as well as the potential to trigger assessment in relation to the Fisheries Act 1994.

The proposal layout has been carefully located and orientated so as to avoid nominated watercourses to the extent possible. Only a very small section of the mapped watercourse in the south-west corner of Lot 77 is affected. This section of mapped watercourse has been previously assessed by the Department of Natural and Mines (DNRM). DNRM has confirmed it is not a watercourse as defined by the Water Act 2000.

The same section of mapped watercourse has also undergone assessment by the Department of Agriculture, Fisheries and Forestry (DAFF) in relation its classification under the Fisheries Act 1994. A site inspection was undertaken by a Fisheries Biologist (DAFF) who confirmed that this section of waterway is not assessable for Fisheries Act purposes.

Bushfire Management

A Bushfire Management Plan will need to be implemented at site as part of the proposed 30MW hybrid solar thermal / gas power station development, due to the medium hazard rating under the Bowen Shire Planning scheme 2006.

A draft Fire Management Plan has been prepared and will be included in the development application. The draft Fire Management Plan takes into consideration the current fire management activities undertaken by the existing power station as well as the proposed fire management plan for the Solar PV development.

Emissions to air and water

Although a hallmark of the proposed development is the exciting prospect it presents for the development of commercially viable, utility-scale renewable energies in Australia, the potential for releases which are harmful to the environment is still a relevant consideration. The hybrid design incorporates a gas boiler to enhance efficiency and reliability of the plant as a power generation asset. This gas boiler constitutes an Environmentally Relevant Activity due to the burning of gas or fuel to generate the steam for the turbine during start-up, periods of cloud or after dark.

The relevant Environmentally Relevant Activities under consideration for the development are ERA 14 Electricity Generation, Threshold 1 and 2a. The site currently holds ERA 14 Electricity Generation, Threshold 2b for the coal fired power station.

It is recognised that a key consideration for the assessment of this development is the identification of potential risks associated with operation of the gas boiler and management of those risks.

Accompanying the development application will be specialist reports on air quality and noise. Both of these reports have assessed the potential impacts from the construction and operation of the proposed 30MW hybrid solar thermal / gas power station.

An Air Quality Impact Assessment is currently under preparation which addresses both construction and operation phases of the project.

Dust emissions are considered to be the primary source of pollutant generated during onsite construction activities, and are considered to be manageable within air quality objective, given the implementation of recommended safeguards through an appropriate construction Environmental Management Plan.

A Noise Impact Assessment study is currently under preparation. The report addresses both phases of the project, with consideration to the Queensland Environmental Protection Act 1994, Environmental Protection (Noise) Policy 2008 and the Planning for Noise Control Guidelines 2004.

Viable Renewable and Clean Energy

Potential adverse environmental impacts of the proposal must be balanced against the significant positive impact that the development will have on the key environmental issues of reliance on non-renewable resources to provide energy, and using carbon-emitting technologies to generate it. The project seeks to achieve a commercially viable dispatchable renewable energy facility, and to share this knowledge with the wider industry, to support the growth of the renewable energy industry in Australia. This supports numerous high-level environmental principles, including the precautionary principle and intergenerational equity.

Visual Impacts

Again, due to the large development area inherent in a solar power generation development, it is important to consider the potential impacts of the development on visual amenity and landscape character in the surrounding area.

A Visual Impact Assessment has been undertaken to ensure the project is informed by a thorough understanding of the potential visual impacts, including when combined with

the approved Solar PV power station that is planned in the same area. The draft Visual Impact Assessment concludes that the development poses very low potential for adverse visual impacts, due in particular to the low levels of exposure associated with the subject site due to its position within the surrounding topography and road network. The possibility of the development being perceived as a positive contribution to the landscape is also identified.

The Visual Impact Assessment will include a Glare and Glint Study, currently in draft form. Key findings of this draft study were that the incidence of glint or glare will be limited to short periods in the early morning or late afternoon, and that the negative impacts of these incidences will be limited by the direction of the reflected light due to the angle of the mirrors, the existence of natural vegetation along surrounding road reserves and neighbouring properties as well as the relatively remote location of the site. The Visual Impact Assessment did not make any special recommendations regarding physical design or landscaping at the site to mitigate impacts. However it recommended that the existing vegetation adjacent to Powerhouse road and within the site to the north of the proposed solar field areas be retained.

Construction Phase Impacts

Construction of a major solar power generation facility involving around 60 hectares of land is clearly a significant logistical undertaking. RAC has recognised the need for the project to be developed based on a thorough understanding of construction phase requirements as well as operational requirements. A number of assessments and management plans have been or will be developed which will assist in identifying and managing risks and impacts during construction:

- Road Impact Assessment
- Traffic Management Plan
- Construction Environmental Management Plan

A construction and site Environmental Management Plan (EMP) will be prepared, outlining operational procedures and ensuring risks to environment and health are identified, mitigated and managed, during both construction and operation.

It is intended the Construction EMP will address such items as:

- Dust & Erosion Control;
- Loss of Flora and Fauna;
- Weed Management;
- Groundwater Contamination;
- Waste Disposal;
- Bushfire.

- Cultural Heritage;
- Induction / Training;
- Risk Assessment (Hazard Identification, Existing and Proposed Controls, Risk Assessment, Risk Mitigation, Communication);
- Document & Records Management;
- Incident & Complaint Management;
- Environmental Inspection & Audit (including monitoring);
- Emergency Response; and
- Reporting.

Preparation of the EMP will be a requirement of the lead contractor prior to commencing construction.

Economic benefits

The proposed development encompasses significant economic benefits which are relevant to the consideration of the DA application. The proposed development is part of a multi-faceted approach being undertaken by RAC to redevelop Collinsville Power Station to ensure it becomes a sustainable power generation asset for Collinsville and Queensland.

The solar thermal power station represents part of a major capital investment in regional Queensland and will increase the diversity of the region's economy. The construction phase will generate significant employment opportunities for skilled and unskilled workers, whilst the operating power station will secure a number of long-term jobs for Collinsville.

In a wider context, it is expected to 'break the ice' on the development of renewable energy projects in central and northern Queensland, and Australia generally.

Community Engagement Plan

A Stakeholder and Community Engagement Strategy has been prepared for the Collinsville Solar Thermal Power Station (CSTPS).

The purpose of the Plan is to:

- support the Project's approvals (the development application (DA) to the Whitsunday Regional Council and the relevant environmental approvals);
- ensure minimal objections are received through submissions;
- ensure issues are identified early and proactively managed; and
- ensure the Project stays on time and budget.

The objectives of the Plan are to:

- ensure adequate, transparent, and relevant information is provided to all stakeholders and interested parties;
- articulate key messages clearly and consistently;
- establish, maintain, and where possible, enhance relationships with the local community throughout the life of the Project;
- ensure stakeholders affected by the Project are identified and provided with appropriate information, timeframes and avenues for feedback;
- maintain and enhance RATCH-Australia Corporation's reputation;
- provide integral data to the technical studies forming part of the environmental assessment process; and
- ensure minimal community disturbance and maximum community acceptance and ownership of the Project.

The Plan is intended to guide the Project team in implementing engagement strategies and activities to reach a broad range of stakeholders. The Plan takes a proactive approach to stakeholder and issues management and enables two-way communication flows and collaborative problem solving.

Learnings and Knowledge gained

A Stakeholder and Community Engagement Strategy has been developed for the duration of the Project development. Like all plans, the Stakeholder and Community Engagement Strategy is a working document and will need to be revised and updated regularly throughout the Project development.

The lessons learned to date and the knowledge gained is summarized in the following section.

Alignment with regional strategies, plans and projects

The redevelopment of an existing coal fired power station as a new hybrid solar thermal - gas power station increases the probability that the project will meet and align with the objectives of local and regional plans.

This Project meets and aligns with the objectives of the Whitsunday Hinterland and Mackay Regional Plan (WHAM), plans developed by the Regional Economic Development Corporation for the Mackay-Isaac-Whitsunday Region, and the Whitsunday Regional Council's Community Plan 2011—2021.

Whitsunday, Hinterlands and Mackay Regional Plan

The WHAM Regional Plan incorporates an integrated set of goals and strategies to address key regional issues (DLGPSR 2006). Specific goals of relevance to the Project include:

- to secure investment and resourcing avenues to support major growth, productivity and prosperity (1.4)
- to enhance the cooperative and pro-active partnership between stakeholders to facilitate development of sustainable business and industry initiatives in the region (3.2)
- to maximise sustainability of business and industry (3.3):
 - to encourage and facilitate the establishment of new 'green' industries throughout the region
 - identify and develop strategies to attract investment by organisations that develop products, processes and services, which specifically target the reduction of environmental impact
 - identify and develop regional opportunities to be involved in the development of renewable energy.
- to develop regional research capability and to maximise the transfer of technology and knowledge to commercial applications (3.7):
 - foster collaboration between organisations involved in education, training, research, design, innovation and entrepreneurship to facilitate exchange of ideas, information and knowledge.
- to develop, coordinate and promote the knowledge, skills and talent within the region that are capable of export (3.9)
- to establish, attract and retain a skilled labour force to strengthen economic opportunities and social infrastructure in the region and improve regional business performance (3.12)
- to meet the current and future needs of regional communities through coordinated and timely planning and provision of social infrastructure services and facilities (4.3).

The social and economic goals of the Project directly align with the WHAM Regional Plan, and no likely conflicts were identified.

Regional Economic Development Strategy for the Whitsunday Region

The 2017 vision for the Mackay Whitsunday Region is that it will be a desirable location in which to invest and visit, underpinned by a strong economy, growing skilled population, diverse employment opportunities and good quality of life. In order to achieve this vision for the Mackay Whitsunday Region, the Regional Economic Development Strategy has been developed. This strategy, which is managed by the

Mackay Whitsunday Regional Economic Development Corporation, provides a guideline for economic development activities within the region over the next few years.

The Project directly meets a number of strategy objectives and goals as outlined in this strategy.

In particular, the Project meets the following strategies and goals:

- Strategy 1: Position the region as a leader in applied knowledge (research and development, skills and training) in key sectors:
 - Goal (c) Research and development related to renewable energy technologies.
- Strategy 2: Build on the region’s existing export strengths:
 - Goal (d) Presence of energy research and development in region (including solar).
- Strategy 3: Diversify and add value to regional products and services to protect the economic base.

Green Industry Diversification Project

The Mackay Whitsunday Regional Economic Development Corporation has recently initiated the Green Industry Diversification Project to ensure the long term sustainability of the region. The aim of this project is to attract and develop “green industries”, suitable for the Mackay-Isaac-Whitsunday Region with the goal of reducing the regional carbon footprint, changing external perceptions, attracting new skills to the region and diversifying the regional economic base. The Project also meets the objectives of the Green Industry Diversification Project.

This Project meets many of the goals of these plans and will deliver long term, sustainable community benefits to the region.

Project visualisation to support communication

The Project utilises a new technology. To aid communicating the visual and technical aspects of the project, a photo simulation that will demonstrate the visual amenity has been developed.

A real-time application has also been prepared that will allow stakeholders to ‘fly over’ and explore the site providing an invaluable experience of what the site will be like once construction is complete.

The use of visualisation can aid in communicating technical projects to an audience and help stakeholders visualise project elements, not easily explained through verbal details or blueprints. Enabling stakeholders to see a tangible outcome through the use of photo

simulation, 3D modelling and 3D animation tools helps build project understanding, consensus and public trust.

Both of these visual tools have proven invaluable during the preliminary stakeholder communications completed to-date.

Project opportunities

Through the development of the Stakeholder and Community Engagement Strategy various opportunities to improve the value of the Project for RAC and stakeholders were identified. These include:

- Continuing industry development in the region which is of economic significance to the State of Queensland.
- Development of a new solar industry, providing diversification to existing industries
- Opportunities for advanced education and research through research partner organisations such as The University of Queensland
- Opportunity to reinvigorate the Project site increasing visual amenity
- Maintaining the established position of RAC and the Collinsville site with the local and regional community and other key stakeholders
- Employment, economic and social benefits including:
 - further employment opportunities for about 50 skilled and unskilled workers during construction of the power station, solar field and associated infrastructure
 - ongoing employment opportunities during operation of the ‘Energy Park’
 - skill development and diversification through the establishment of a new industry and the subsequent export of these skills to other parts of Queensland, Australia and overseas
 - stimulus to local business.
- Build on the reputation of RAC as a leader in solar energy and clean energy

Network Transmission Line Relocation Study

The location of the solar mirror field is affected by a Powerlink transmission line which transverses the Project site. To identify the optimal location for the solar mirror field, RAC reviewed the potential to relocate the transmission line or alternatively purchase an adjacent block of land and relocate the solar mirror field itself.

To determine the costs, timeframes, responsibilities and risks associated with relocating a portion of the Powerlink transmission line, RAC commissioned Powerlink to complete a Network Transmission Line Relocation Study. This report examines:

- Strategic aspects of Powerlink’s network operations and development plans in the area affected by this transmission assets relocation request to determine if the request can be accommodated;
- The feasibility of realigning Powerlink’s transmission line affected by RACL’s development plans, including identifying a possible corridor suitable for the relocation;
- The scope of works required to be undertaken by Powerlink to relocate the transmission lines;
- The estimated cost of the relocation works (+/- 30%);
- A desktop analysis of the issues likely to impact the relocation of the transmission line; and
- RACL’s obligations in the relocation of any transmission assets.

Learnings and Knowledge gained

On review of the costs and associated timeframe and project risks associated with the relocation of the Powerlink transmission line, RAC determined that the purchase of the adjacent block and relocation of the solar mirror field was a more cost effective and lower risk alternative. The Powerlink Network Transmission Line Relocation Study is confidential.

It is noted that Powerlink is under no obligation to move, relocate or reposition any infrastructure and will not exercise its statutory powers to obtain land rights and development approvals for network relocations such as that being sought by RACL.

Planning Study Report from Ergon Energy

Ergon Energy Corporation Limited (EECL) has completed a Planning Study Report, outlining a preliminary project scope and estimate to connect the 30MW solar thermal project to EECL’s 33 kV switchyard at Collinsville.

The details of this report are commercial in confidence. Outlined in the following section are the non-commercial in confidence learnings and knowledge gained from the preliminary report.

Learnings and Knowledge gained

One of the potential benefits of siting a solar-thermal project on an existing power station site is the ability to re-use some of the existing electrical connection infrastructure. In the case of the Project, this was not a viable alternative, however EECL’s Planning Study Report did identify some advantages for the Project, including:

- Land or Easement Requirements

- Property Acquisition – the required land is owned by RAC, and can be gifted to EECL;
- Environmental Issues - As it is an extension to an existing site, no unusual environmental issues are anticipated. An allowance will be made for environmental impact assessment to be carried out on the new area to be acquired for the switchyard extension;
- Cultural Heritage - As this is an extension to an existing site, no cultural heritage issues are expected;
- Vegetation Offsets - No external feeder works are required under this work request and therefore no offsets are required;
- Access Track Issues - Existing substation access is expected to be used;
- Centre Line Survey - No external feeder works are required under this work request; and
- Native Title Constraints - As this is an extension to an existing site, it is assumed that the property will not be subject to Native Title. This is to be confirmed.
- Existing site services may be extended
 - The security fencing may be modified and extended to cover the new connection;
 - Potential use of existing communication systems; and
 - The existing switchyard earthing system may be extended to cover the new switchyard area.

As the Project will require a substantial amount of new brownfield works, the Project will be exposed to the usual risks associated with new electrical connections into the local network service provider, including:

- Delivery delays in long lead time items;
- Unexpected construction difficulties;
- Weather disruptions during construction;
- Delays in completion of associated projects related specifically to the augmentation at Collinsville 33 kV switchyard
- Delays in getting access and required outages at Collinsville 33 kV switchyard to carry out the busbar extension works and tie in of 33kV feeders;
- Project cost risks