

Goldfields solar energy project

A preliminary assessment prepared
for the Department of Primary
Industries and Regional Development

Summary report
May 2018



Department of
**Primary Industries and
Regional Development**



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Summary report

There are a number of land, network, and commercial challenges that are currently inhibiting the development of large-scale solar energy projects in the Goldfields. This report describes the nature of these challenges and proposes a number of options to help facilitate solar energy projects within the unique constraints of the Goldfields.

Background

In February 2017, the Western Australian Labor Party announced it would commence a feasibility study for a major solar energy project in the Goldfields to secure the future energy needs for Kalgoorlie-Boulder and the wider region.¹ With large parcels of undeveloped land, excellent solar resources, and high industrial demand for electricity on a local network at capacity, at face value the Goldfields provides many of the right conditions for the development of a large-scale solar energy project. Funding for a feasibility study was announced as part of the 2017-18 State Budget with the Department of Primary Industries and Regional Development (DPIRD) taking a coordinating role, supported by a multi-agency reference group.

¹ WA Labor. 2017. *Plan for the Goldfields*. https://www.markmcgowan.com.au/files/Plan_For_The_Goldfields.pdf.

² While the initial brief included scope to investigate different types of large-scale solar generation technology, this report has focused on solar photovoltaics (PV). Alternative solar technologies such as concentrated solar power (CSP) technology (which generates solar power using mirrors and

Scope of work

To inform the direction of the feasibility study, DPIRD commissioned Ernst & Young (EY) to conduct a preliminary assessment into the viability of a large-scale solar energy project in the Goldfields.

The objectives of the preliminary assessment were to:

- ▶ Carry out a qualitative assessment of the potential viability of a large-scale solar project² in Kalgoorlie-Boulder and/or the surrounding region
- ▶ Gain an understanding of the key issues surrounding investment in such a project
- ▶ Outline options to help facilitate solar energy projects within the unique constraints of the Goldfields

Approach

The preliminary assessment was the culmination of twelve weeks of data/information gathering and analysis informed by:

- ▶ Extensive consultation with public and private stakeholders in both Perth and Kalgoorlie³
- ▶ Input and feedback from a reference group with representatives from DPIRD, the Goldfields-Esperance Development Commission (GEDC), the Public Utilities Office (PUO), and Western Power
- ▶ EY's local and global renewable energy subject matter resources
- ▶ A review of available literature

Summary findings

At first glance, there may appear to be a strong case for large-scale solar energy projects to support future energy needs in the Goldfields region:

- ▶ The region contains large parcels of flat, undeveloped land and excellent solar resources
- ▶ While there is little public data available on the exact amount, there is understood to be 50 to 120 megawatts (MW) of latent demand for grid electricity

lenses to concentrate an area of sunlight, or solar thermal energy, onto a small area) have not been considered as we understand synchronised generation technologies such as CSP may be problematic from a network stability perspective in the Goldfields.

³ Due to the sensitive nature of information provided by public and private stakeholders through the consultation process, individual stakeholder names have been omitted.

- ▶ The capacity of the Goldfields Gas Pipeline is fully contracted with no current proposals for expansion
- ▶ Solar is a relatively low cost energy alternative to fossil fuel-based generation both from the network and from local gas and diesel fired generation perspective
- ▶ There is strong community and business support for solar projects, driven by concerted local efforts to address current and future energy requirements
- ▶ Numerous mining companies in the region have expressed a desire to move towards greater incorporation of renewables into their energy mix

However, a more detailed examination of relevant economic, regulatory, and policy considerations shows that investment in a large-scale solar project in the Goldfields is anything but straightforward. A number of significant land, network, and commercial challenges are currently stalling development.

Firstly, there is no suitable freehold land and potential land sites are complicated by mining rights and a patchwork of land tenure.

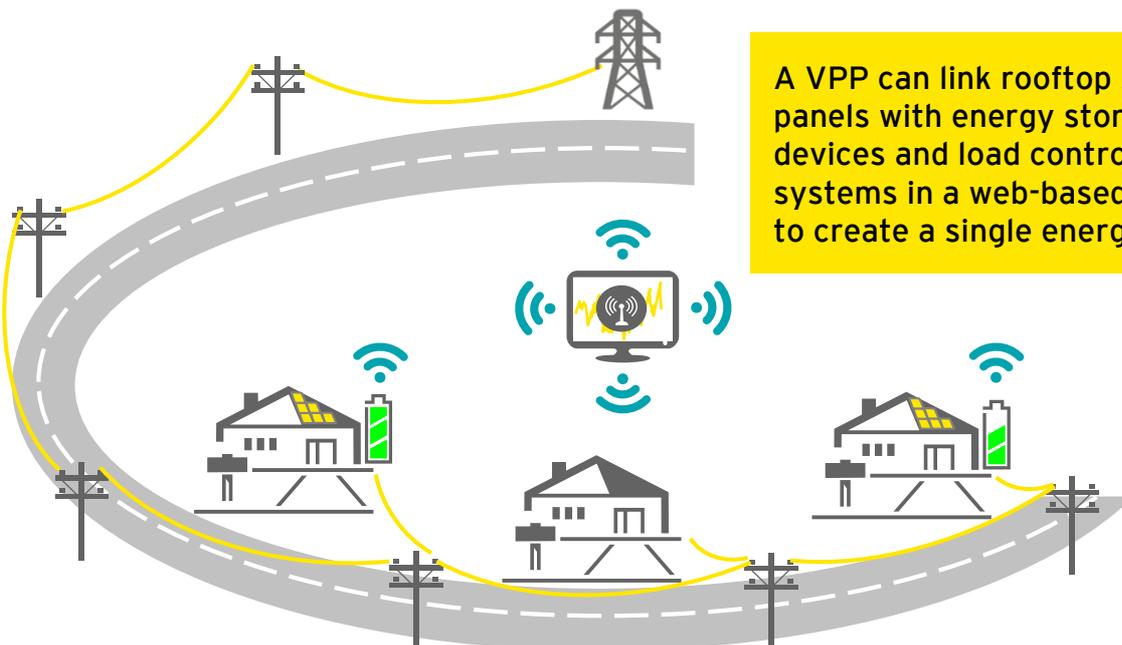
Secondly, existing connections and access rules and their related contractual arrangements make it hard for new generation facilities, such as large-scale solar farms, to connect to the Western Power network in the Goldfields. This challenge represents the biggest impediment to the development of large-scale solar energy projects in the region. There is no easy fix, although the State Government's recent announcement to move to a constrained network access model should provide a pathway for new projects to gain network access from 2022.

Thirdly, commercial challenges exist if a large-scale solar project is going to support mining loads in the region. Most mining companies find it difficult to

commit to the long payback periods required by solar developers. This is because forecasting energy requirements beyond five years is challenging given the short life of many gold mines and commodity price uncertainty. Solar developers also require investment grade counterparties, which makes it harder for smaller miners to enter into contracts with them. The commercial challenges are, of themselves, unlikely to be an insurmountable barrier to solar projects proceeding but, when combined with the land and network issues, they create challenging circumstances for getting solar projects up in the Goldfields.

Notwithstanding the challenges, there are a number of options which could support development of large-scale solar projects in the Goldfields. These options primarily involve avoiding network connections via private sector behind-the-meter solutions, and for some options using the power of the *Mining Act 1978* to fast-track development of power generation and transmission facilities on suitable sites. Feasible options to help facilitate solar energy projects include:

1. Developing a virtual power plant (VPP) in the city of Kalgoorlie-Boulder.
 - ▶ A VPP is a distributed rooftop solar and battery technology system that aggregates capacity and is able to be dispatched in the same way as a centralised power station. This could provide Western Power with greater capacity to meet peak demands
 - ▶ A VPP bypasses many of the land and network connection challenges currently facing large-scale solar projects in the Goldfields
 - ▶ A possibility could be to install a VPP on existing public housing. This could provide public housing tenants access to renewable energy and potentially lower electricity charges



A VPP can link rooftop solar panels with energy storage devices and load control systems in a web-based network to create a single energy supply

2. Supporting private sector development of solar behind-the-meter.
 - ▶ A large scale, behind-the-meter solar facility could be developed by the private sector to support existing large industrial loads
 - ▶ Land has been identified in proximity to existing loads that could be made available for renewable energy development
3. Progressing land tenure changes and preparing for constrained network access.
 - ▶ In preparation for the implementation of constrained network access expected sometime in 2022, land tenure changes could be progressed to make land available for prospective solar developers
 - ▶ This activity could include excising parcels of pastoral land of 1000-2000 hectares for development of a large-scale solar project post 2022
 - ▶ Setting aside Crown land for industrial purposes, possibly including renewable energy, is already underway, with the City of Kalgoorlie-Boulder collaborating with relevant agencies to identify a number of potential industrial land parcels for future projects

It must be acknowledged that while installing solar capacity in the Goldfields may help meet demand during the day, many mining loads operate on a 24/7 basis. Therefore, the installation of solar capacity alone will not necessarily provide the power required to meet the demands of full-time mining loads without storage capability or firming capacity.

We also note that Western Power is currently working hard to increase supply to large mining loads through a more flexible and commercial approach to supply-side management. Western Power is confident that much of the latent demand can be met by providing customers with access to non-firm (non-reference service) supply. This is possible because load in the Goldfields doesn't peak very often so, while electricity is fully contracted, it is rarely fully utilised. In addition, Western Power has outlined a number of planned works (to be completed by 2021-22) to augment the network and increase network capacity. We note this capacity has already

been contracted so it is likely that Western Power will still offer non-firm supply to meet demand after works are complete.

Notwithstanding Western Power's efforts, the inability to obtain grid electricity is impacting expansion plans for some mining companies. With upside growth scenarios suggesting total industry output will increase by over 15 per cent by 2029-30, there is still the potential for network capacity constraints to curtail future growth. As a result, improving energy reliability remains a critical issue for the Goldfields given its reliance on energy imports and concerns about reliability of supply.

In summary, it is likely that some solar will be developed by the private sector in the Goldfields but given the nature of the current challenges it will take time and likely require the support of government in the area of land availability.

The actions that could be considered to support the development of large-scale solar projects in the Goldfields are:

- ▶ Exploring the opportunity to develop a VPP in the city of Kalgoorlie- Boulder
- ▶ Engaging with large mining companies to support their investment in solar through making adjacent land available for renewable energy
- ▶ Commencing a process to facilitate access to pastoral land for solar development

These actions are not intended to be exclusive of one another. They can be commenced immediately and pursued concurrently. Importantly, these actions can deliver a number of benefits, including:

- ▶ Increasing the amount of energy available in the Goldfields region, including potentially delivering up to 75 MW of electricity before 2022
- ▶ Supporting management of peak demand and grid stability
- ▶ Promoting innovation through trialling of new technology
- ▶ Potentially reducing costs for public housing tenants
- ▶ Establishing a process for land to be available for large-scale solar developments post 2022
- ▶ Contributing to a reduced emissions economy.

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