Australian National University

YAMATJI SOUTHERN REGIONAL CORPORATION

Yamatji Land Estate
Clean Energy Scoping Project

Rapid Assessment
Summary Report

Cover and inside cover photos of Southern Yamatji Country

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Images

Images used throughout this document are of Southern Yamatji Country and Widi Mob Country, taken by Yamatji Southern Regional Corporation staff.

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Why do a Rapid Assessment?

In 2020, the Hutt River, Mullewa Wadjari, Southern Yamatji and Widi Mob native title claimant groups settled the Yamatji Nation Indigenous Land Use Agreement with the Western Australian Government. Among other benefits, the agreement sets aside 1385 land parcels that have a total land area of 1,538 km². These land parcels make up the Yamatji Land Estate, and have the broad purpose of supporting the cultural, social, and economic development of the Yamatji Nation through self-determination.

Yamatji Southern Regional Corporation (YSRC) is interested in exploring the possibility of developing clean energy projects on the Yamatji Land Estate.

This map shows the best quality **solar energy**, red marking the highest quality.

This map shows the best quality **wind energy**, red marking the highest quality.

Location of the Yamatji Nation Indigenous Land Use Agreement.

The Mid West region of Western Australia is known for having some of the best clean energy resources across the whole of Australia.

These heat maps were produced by the 100% Renewable Energy Group at the Australian National University.

You can view the maps here: *https://re100.eng.anu.edu.au/heatmaps/*

Both heat maps show that the Yamatji Land Estate is located in a region of particular excellence for producing wind and solar energy.

Why is clean energy important?

Australia, like the rest of the world, is working to lower the amount of carbon emissions in the air to combat climate change.

One way to do this is by making our electricity from clean energy sources that have limited impact on the environment and are renewable (meaning we won't run out). We can make clean energy from the wind and sun, instead of burning fossil fuels like coal, gas and diesel, which produce carbon emissions and air pollution.

Developing clean energy projects on the Yamatji Land Estate could support self-determination and economic empowerment for Yamatji Nation, including more business opportunities and jobs.

Not only could YSRC participate in the Mid West regional economy, but also in the national transition to clean energy.

Who did we work with?

YSRC partnered with the Australian National University to provide technical expertise for the **Rapid Assessment** of the clean energy potential of the Yamatji Land Estate. This will help YSRC to make informed decisions.

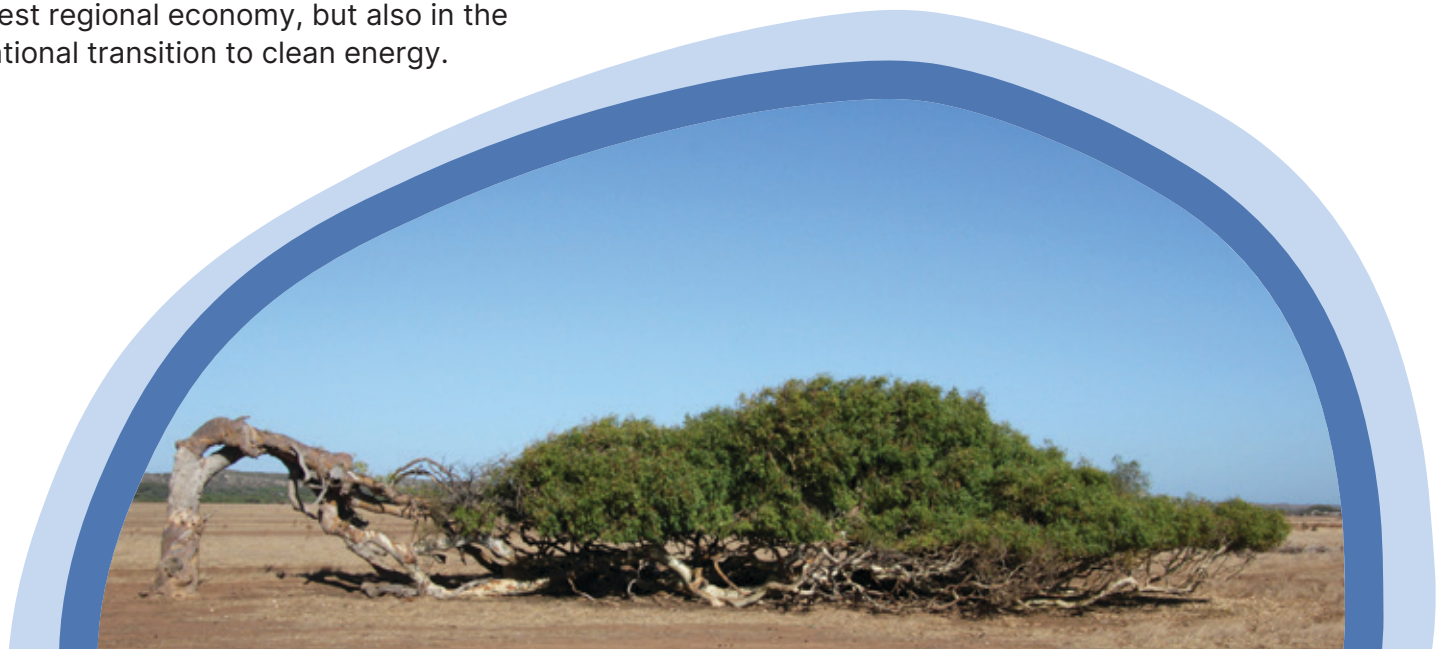
YSRC also partnered with the Government of Western Australia Mid West Development Commission and Department of Primary Industries and Regional Development to access expert advice.

About the Summary Report

This report provides a non-technical summary of the key findings from the **Rapid Assessment**.

This is an overview of where the best clean energy resources are on the Yamatji Land Estate. It includes key outcomes, recommendations and next steps.

The **Rapid Assessment** is not intended to provide a complete picture of the potential for clean energy development on the Yamatji Land Estate. It is only a first step in shortlisting land areas with the best potential for development. More detailed investigation and stakeholder engagement is needed to shorten the list to just a few land areas that could provide the best returns on investment in clean energy projects.



What is a Rapid Assessment?

The **Rapid Assessment** scoped the clean energy generation potential on the 1,385 land parcels of the Yamatji Land Estate.

The aim was to explore the possibility of developing clean energy projects like solar farms, wind farms, hybrid energy systems (mixed wind and solar) and microgrids (local solar and battery systems that can function separately to the electricity network).

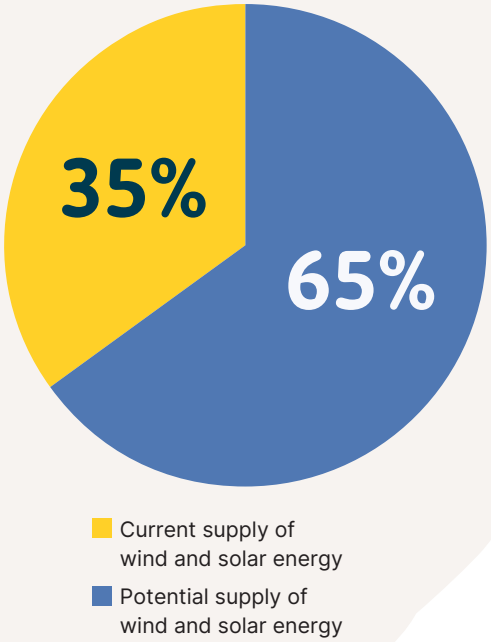
The **Rapid Assessment** looked at:

- Where on the Yamatji Land Estate is there good wind and solar energy generation potential?
- What are the key government plans and policies to encourage and develop clean energy projects?
- Who are the key stakeholders, and how can they assist the YSRC to develop clean energy projects?
- What other things need to be considered when planning for clean energy development?
  - What are some of the benefits?
  - What are some of the risks?

Did you know?

Wind and solar supply around 35% of energy in the electricity network (also known as the 'power grid') across the southwest of Western Australia, including the Mid West region.

This means governments are looking for more solar and wind farms so that more of our power supply can come from clean energy.



What did we do?

Step one:

We checked the Yamatji Land Estate's 1,385 land parcels for:

- The **quality** of wind and solar energy, measured in MW capacity (MW or 'megawatts' is used to measure large amounts of power).
- How close they are to **energy demand**, like the electricity network, mining activities, and transport networks like ports, rail and roads.
- **Development costs** to connect to electricity network transmission lines (power lines).
- Its capacity to support small scale **microgrids**.

Step two:

We **grouped** the land parcels into **173 land clusters** to make development of commercial scale wind and solar farms more practical.

- Some land parcels are close to each other. Land parcels that are **less than 1 km** away from each other were grouped together.
- The land parcels are all **different sizes**. Some are as small as the kitchen in your house. Small land parcels might not be suitable for development alone but could be if grouped with others close by.

When grouped, the size of land clusters range between around 1 km² and up to 700 km², which is about six times the size of Geraldton.

Step three:

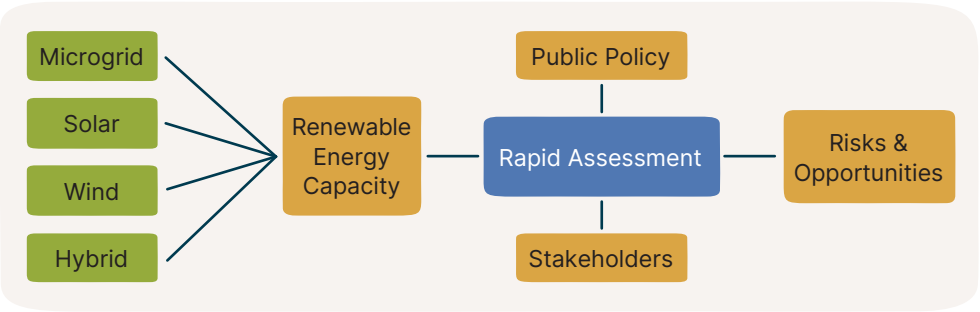
We **sorted** the 173 land clusters to find the best for wind, solar and hybrid. They were shortlisted based on:

- The **quality** of clean energy - most important.
- The **distance** away from energy demand - second most important.
- The **size** of land clusters - less important.
- The potential for a **hybrid** (mixed solar and wind) system - least important.

Step four:

We also looked at:

- **Government policy and planning** processes to better understand how governments are moving towards clean energy and how YSRC can participate.
- **Agencies and stakeholders** to identify who YSRC could work with and get support from.
- The **opportunities and risks** that need to be considered for developing clean energy projects on the Yamatji Land Estate.



Yamatji Land Estate and Electricity Network Map

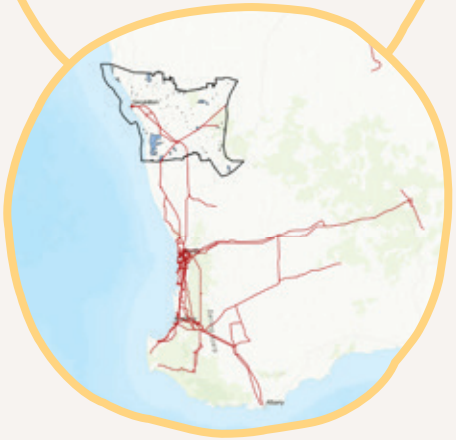
Did you know?

The electricity network is called the South West Interconnected System – **SWIS**.

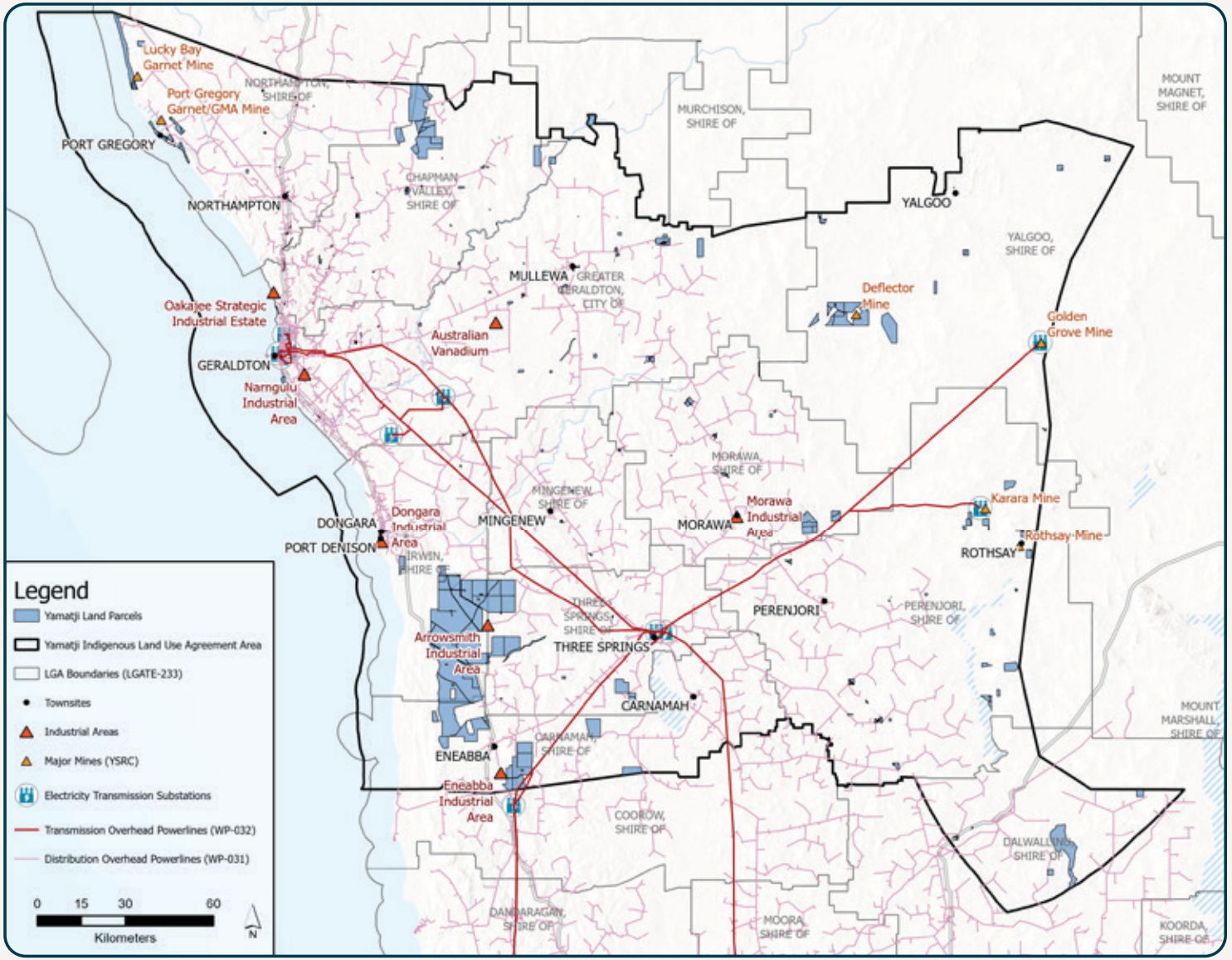
The SWIS supplies power to over 2.3 million people and businesses.

As you can see on the big map, most of the Yamatji Land Estate is connected to the SWIS - but not all, including the Shire of Yalgoo.

The SWIS is operated by state-government owned **Western Power**. **Synergy** is also government-owned and is responsible for buying and selling power.



This map shows the whole SWIS.



What did the Rapid Assessment find?

Microgrids

At **step one** of the Rapid Assessment, we checked the clean energy capacity of all 1,385 land parcels of the Yamatji Land Estate.

Outcome

Out of the 1385 land parcels, there are 263 options to choose from to create a microgrid.

What is a microgrid?

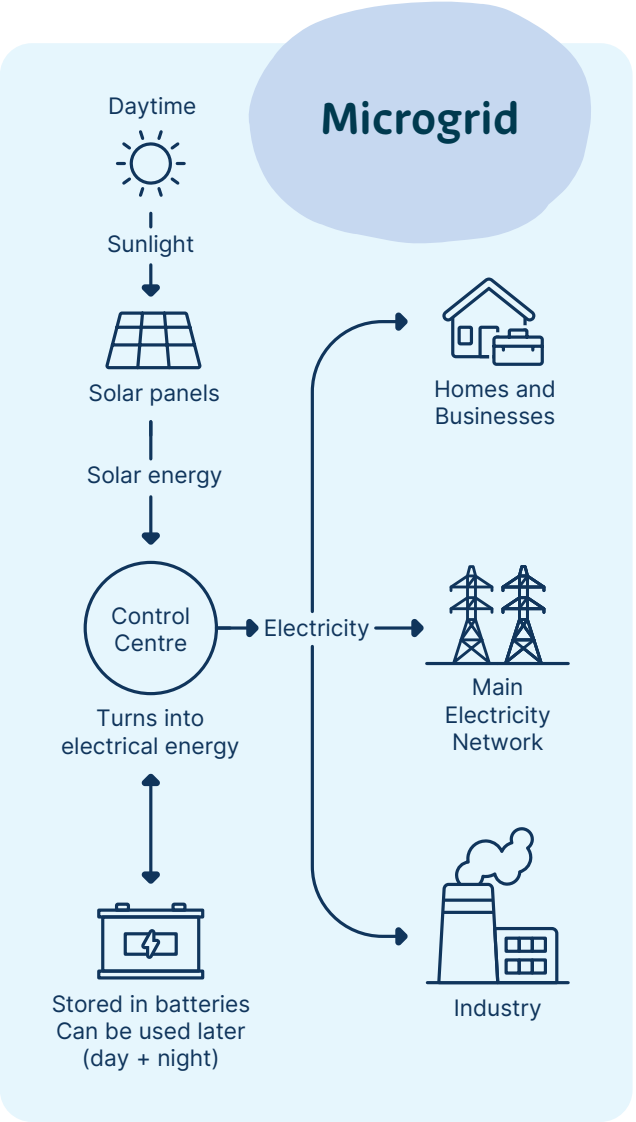
- Microgrids are usually small scale, which means they can be built quickly.
- They are usually made up of solar panels and battery storage, which means they can still provide power overnight when the sun isn't shining or when there is a power cut.
- They can operate
  - alone, separate from the electricity network, or
  - as backup during power cuts when connected to the electricity network.

We found that microgrids are a good option in many locations across the Yamatji Land Estate for:

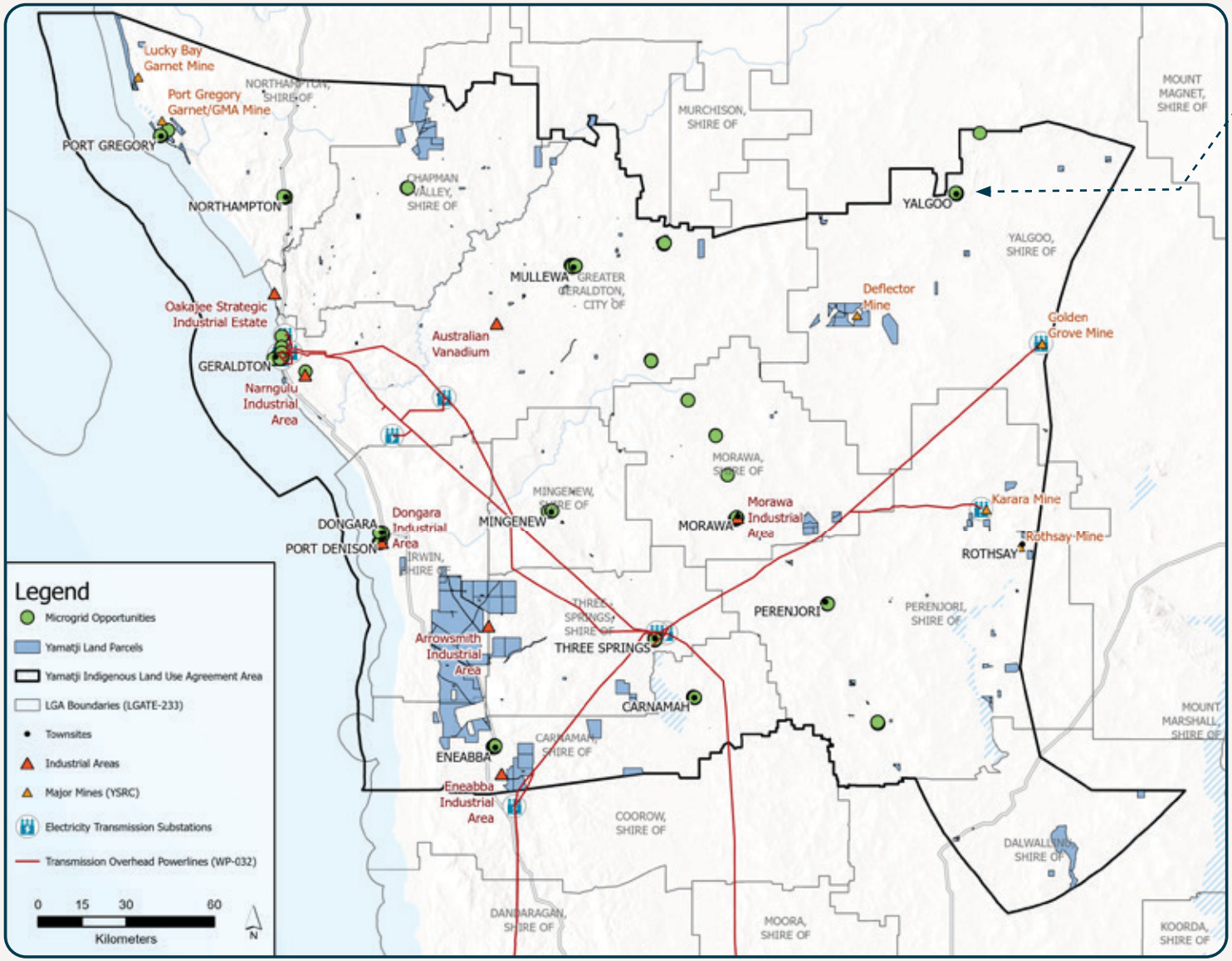
- Residential and commercial areas in and around towns.
- Industrial areas, including mining.

About batteries - Solar panels can only produce power when the sun is shining. Only some power is produced when it's cloudy and rainy, and none at all at nighttime.

- Building a microgrid means that power can be stored in a battery to be used when the sun isn't shining or during a power cut. Storing power in a battery system makes your electricity more reliable.



Microgrid map



For example: Yalgoo township

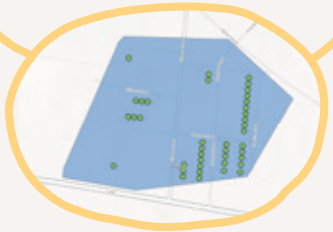
Land parcels are not suited for commercial scale solar farms, because the land area is too small and too far away (57 km) from the electricity network.

However, local land parcels could support a small solar and battery microgrid to supply electricity to residents and local businesses.

Did you know?

Yalgoo uses three 0.23 MW diesel generators to supply the electricity needs of all the 136 homes and businesses in Yalgoo.

This group of land parcels below at Yalgoo could provide up to 8 MW – that could supply electricity to nearly 3,000 houses. So, a microgrid with solar and batteries built across multiple land parcels could easily replace the diesel generators.



What else did we find?

At **step two**, we grouped the land parcels into land clusters to make commercial scale development more practical.

Outcome

The 1,385 land parcels were grouped into 173 land clusters.

At **step three**, we ranked each land cluster based on

1. **Quality (most important)**
   The quality of clean energy - MW capacity.
2. **Distance (second most important)**
   The distance the land cluster is from high electricity demand.
3. **Size (less important)**
   The land area (hectares) of the land cluster.
4. **Hybrid potential (least important)**
   Potential and benefit of a hybrid energy system (combined wind and solar).

The **quality** of solar and wind energy across the whole of the Yamatji Land Estate is excellent!

Why does distance matter?

Costs go up as you move away from the electricity network because more infrastructure is needed to connect to the network.

- Solar farms - for every 10 km of new transmission line needed to connect the project to the electricity network, the total project cost increases by 2%.
- Wind farms - when the project is more than 100 km away from the electricity network, development costs can be more than 10% of the total cost of the wind farm.

Costs also go up the further away the clean energy project is from **transport networks**. Building and maintaining solar and wind farms can be expensive. Existing roads that provide direct access can limit costs, but building new roads is costly and will need to follow government planning processes.

Why does land size matter?

Put simply: the bigger the land area, the bigger the project can be. With a bigger project, more clean energy can be generated which will reduce overall project costs.

Photo of Southern Yamatji Country

Solar Energy

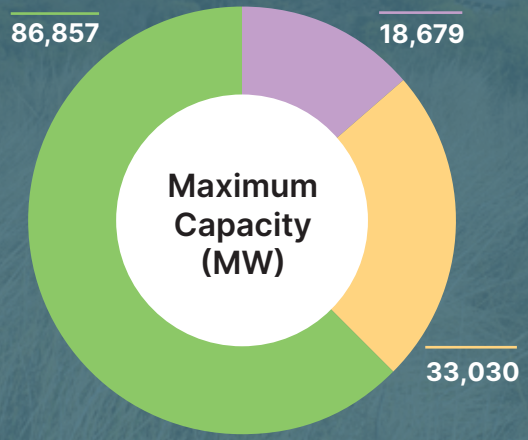
The Yamatji Land Estate has great potential for solar energy generation!

In fact, the quality of solar energy across the Yamatji Land Estate is 6% higher than in Perth and 2% higher than the largest operating solar farm in Western Australia, the Merredin Solar Farm.

This means that developing solar farms on the Yamatji Land Estate has a strong **competitive advantage** (something that makes them more attractive than other business in the same industry).

Land Cluster Capacity
Solar Energy Generation

Of the 173 land clusters



These land clusters can deliver on average around 1 MW of energy per hectare

Outcome

Of the 173 land clusters, 58 have the BEST potential for solar farms.

Why are these 58 land clusters the BEST for solar?

- They all have **excellent** quality solar energy.
- They are **close** to the electricity network.
- Their **size** suits commercial scale development.

The BEST land clusters for solar are usually less than 20 km away from the electricity network.

What about GOOD and OK land clusters?

The GOOD and OK land clusters still have excellent solar energy quality and may be large but are further away from the electricity network.

Why are there so many options?

- Solar farms can be easily adapted to different spaces, so **both small and large** farms can be cost effective, depending on the purpose.

For example, large land clusters could be good for commercial scale solar farms. Small land clusters could be good for local energy supply or microgrids.

What is a solar farm?

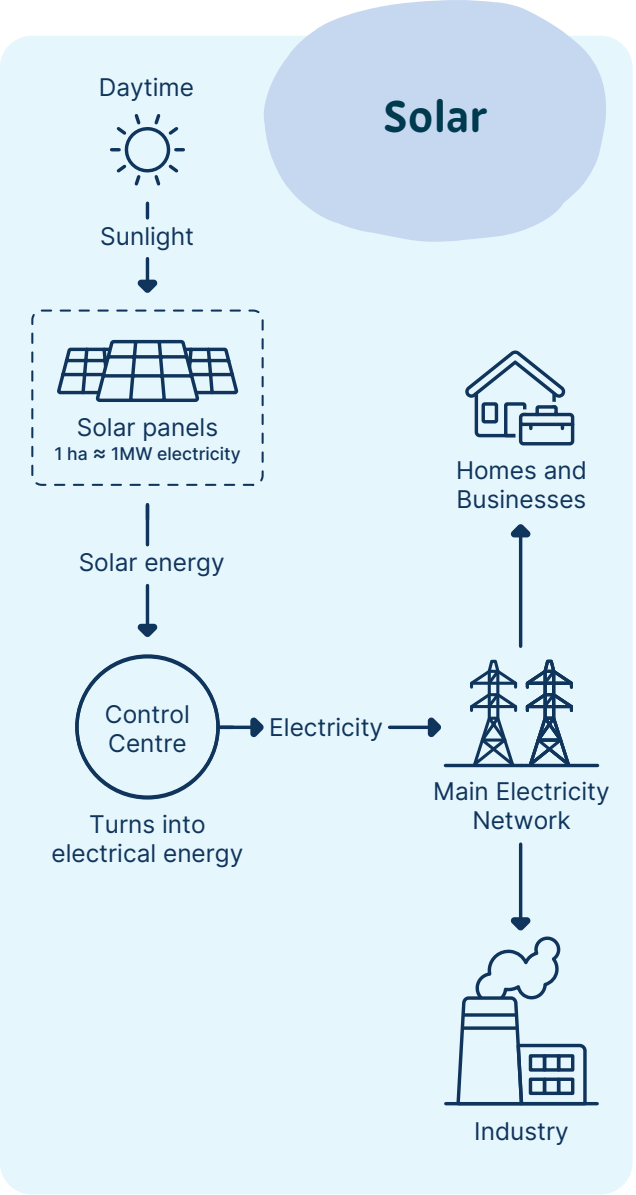
Solar farms are made up of lots of solar panels. These panels capture sunlight and convert it into energy. This means solar farms are dependent on daylight and good weather conditions.

Electricity is transported from the solar farm via transmission lines to the main electricity network.

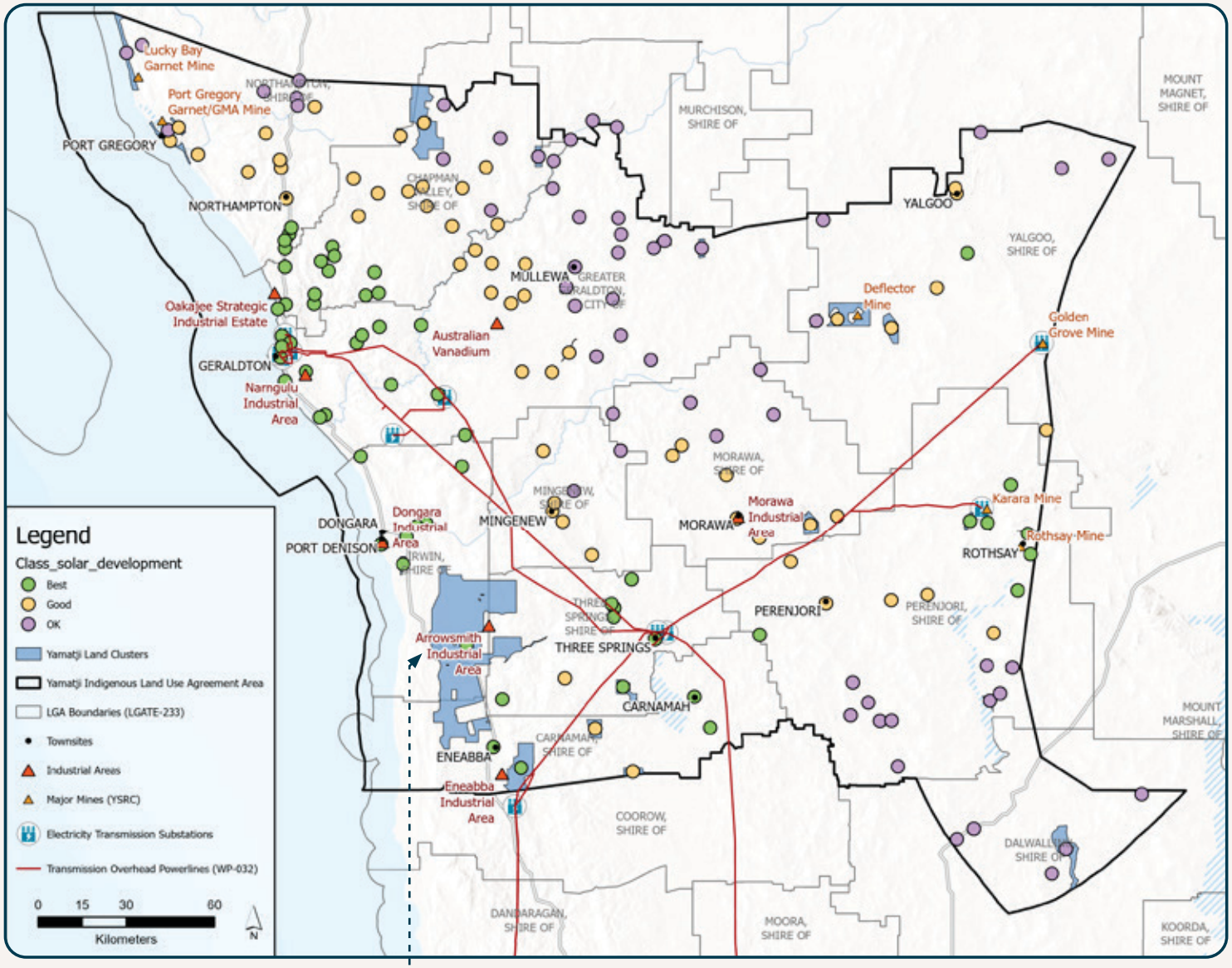
Considerations

Solar farms can include battery storage infrastructure to supply more regular electricity when the sun is not shining.

Solar panels are mounted close to the ground. They are usually built close together and can cover much of the land's surface area. This means land may need to be cleared of vegetation. Though, building solar farms where there are existing agricultural activities could also be an option. Some solar farms in Australia graze sheep on the grass growing underneath the solar panels. Overseas, agricultural crops are grown under panels.



Solar Energy Map



Did you know?

If solar farms were built on all 58 BEST land clusters, they would produce enough electricity to power around **30 million homes**! That is nearly 36 times more homes than across the Perth region.

This land cluster is Ranked Number 1 for solar.

Distance

- 22 km away from electricity network
- 0 km away from industry
- 0 km away from transport

Size

- This is the biggest land cluster

It could deliver up to 71,529 MW of energy.

Photo of Widi Mob Country

Wind Energy

The Yamatji Land Estate has great potential for wind energy generation!

In fact, wind energy on the Yamatji Land Estate is on average one third (33%) **stronger** than that on existing wind farms across Australia.

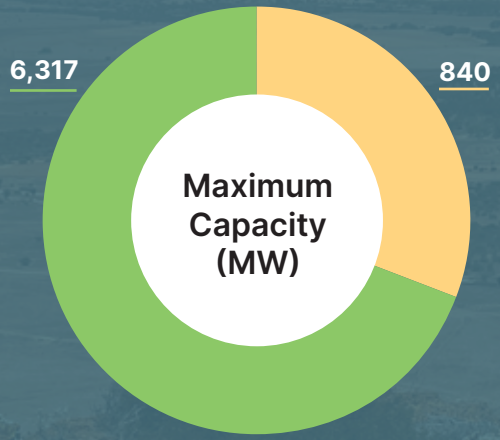
This means that developing wind farms on the Yamatji Land Estate has a strong **competitive advantage**.

Land Cluster Capacity
Wind Energy Generation

Of the 173 land clusters

BEST **9**

GOOD **4**



These land clusters can deliver on average around 0.6 MW of energy per hectare.

Outcome

There are 9 land clusters with the BEST wind energy generation potential.

The other 160 land clusters are **not suitable** for wind farms.

Why are those 160 land clusters not suitable?

- Land clusters are too small. Wind turbine blades need enough space between each other to work properly. This means they need more land.
- They are too far away from the electricity network, making it too expensive to build.

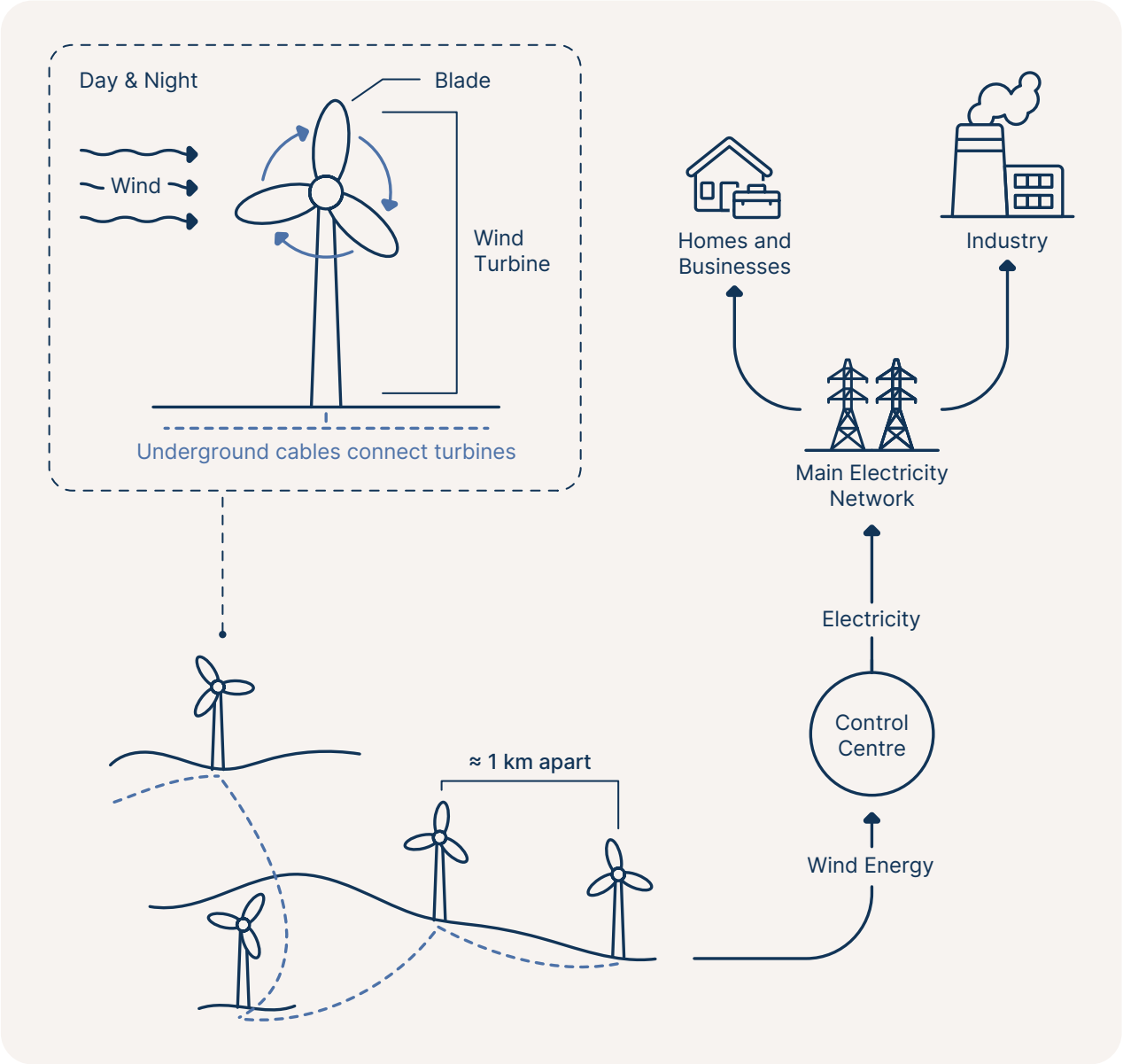
How are wind farms different to solar farms?

Unlike solar, wind energy can be produced at night. This reduces the need for battery storage.

Also, compared to solar farms, wind farms need a **bigger land area** to allow enough space between each wind turbine. Wind turbines generally need about a 1 km gap between each other to operate at their best.

Although wind farms need a large land area, each wind turbine takes up a small space, only 2-3% of the land surface. This means only 2-3% of the land area would need to be cleared of vegetation to fit the wind turbines.

Unlike solar panels that usually connect to each other above the ground, wind turbines are connected by underground cables.



Wind Energy Map

This land cluster near Eneabba is Ranked Number 1 for wind.

Distance

- 4 km away from electricity network
- 14 km away from industry
- 0 km away from transport

Size

- Land cluster is a good size

It could deliver up to 460 MW of clean energy.

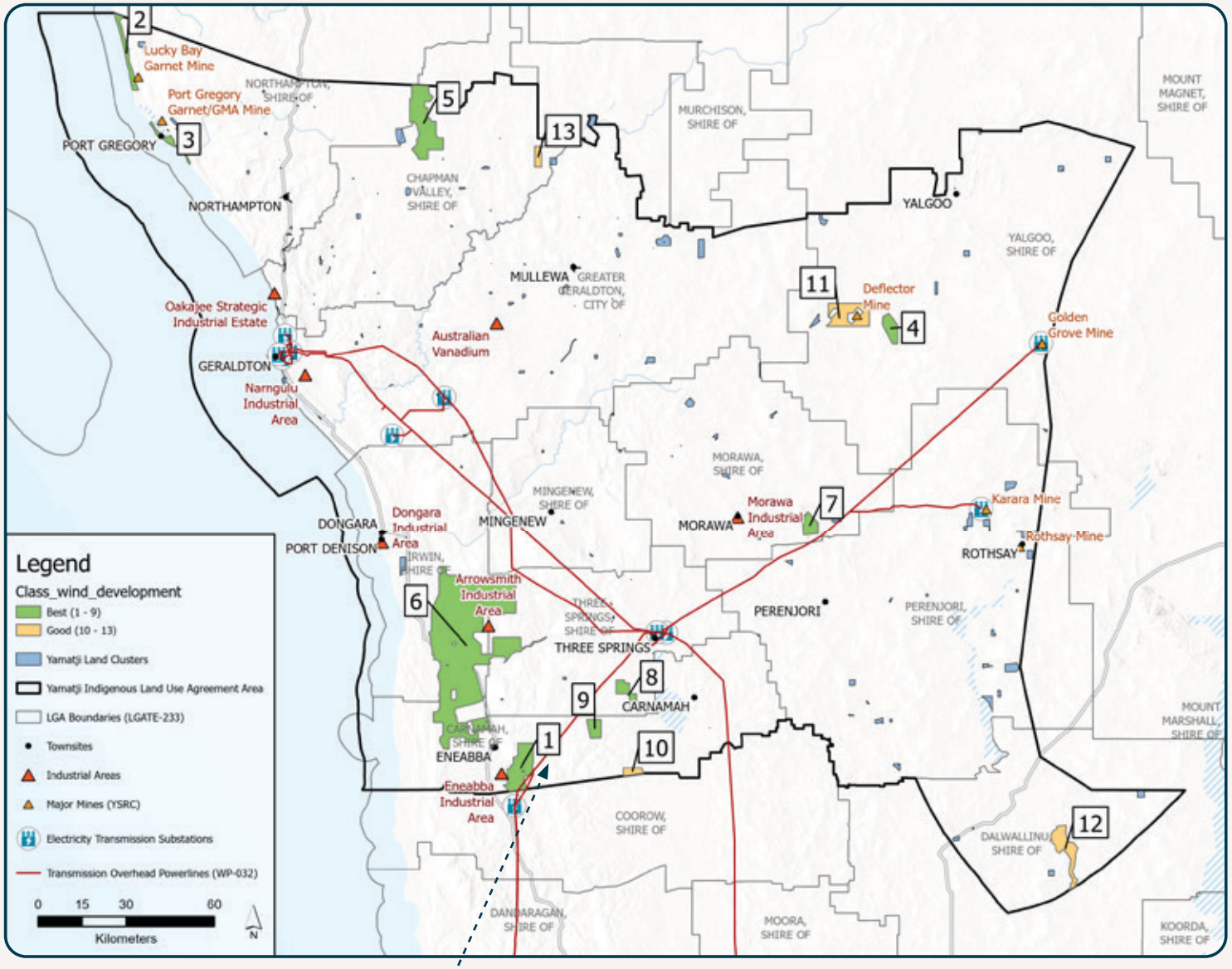


Photo of Widi Mob Country

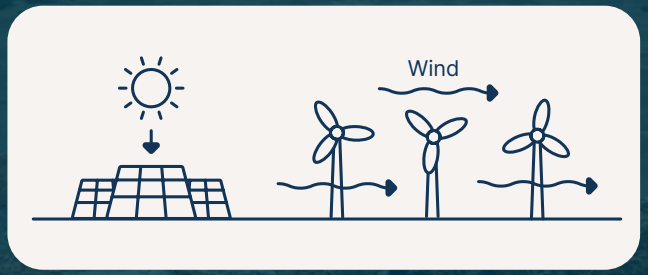
Hybrid Energy

What is a hybrid energy system?

Wind turbines and solar panels can be built together as one "hybrid" system. There are advantages to developing a hybrid clean energy system.

- Cables and wires can be shared, making it cheaper to build.
- Less reliance on batteries, since wind energy can be produced day and night.
- Wind and solar systems built together can **generate more clean energy** on the same area of land.

This makes developing hybrid (wind and solar) energy systems on the Yamatji Land Estate **attractive**.

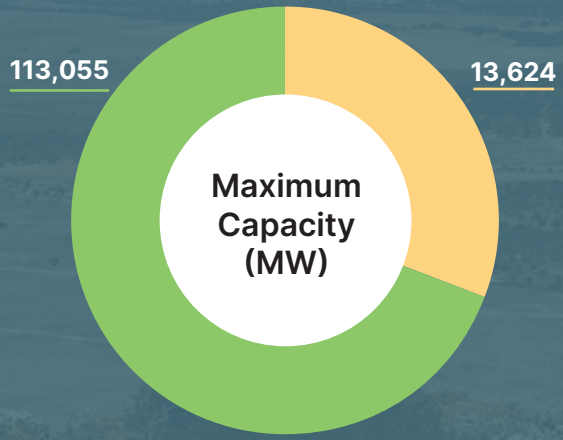


Land Cluster Capacity

Hybrid Energy Generation

Of the 173 land clusters

BEST **10** GOOD **3**



The other 160 land clusters are **not suitable** for hybrid clean energy development.

Outcome

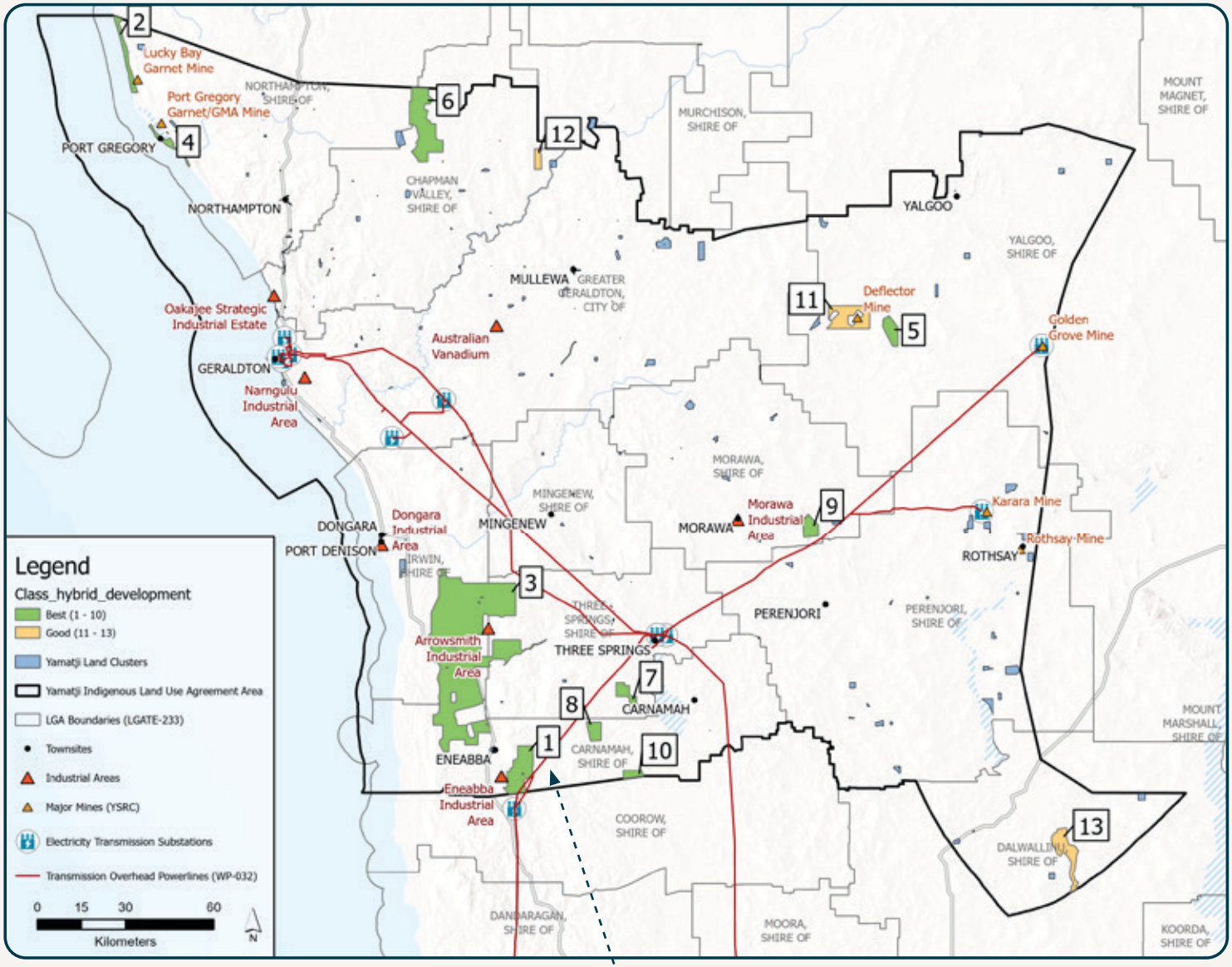
There are 10 land clusters with the BEST hybrid energy generation potential.

Considerations

Developing hybrid (wind and solar) energy systems on the Yamatji Land Estate seems **attractive**. However, other factors need to be considered, such as the size of land needed for wind turbines and solar panels.

While hybrid systems can provide more reliable energy, the system becomes a bit more complicated than if it was just a wind or solar system on its own. A hybrid wind and solar farm manages power from two different energy resources using specialised equipment, which may increase project costs.

Hybrid Energy Map



Did you know?

If all the BEST hybrid energy systems were built, they could produce enough electricity to power around 3 million houses for a full year! That is nearly 4 times all the houses across Perth. If they were developed just as wind farms, they would power 387,400 households – nearly half of the houses in Perth.

This land cluster near Eneabba is Ranked Number 1 for hybrid.

Distance

- 4 km away from electricity network
- 14 km away from industry
- 0 km away from transport

Size

- Land cluster is a good size

It could deliver up to 8,137 MW of clean energy.

What does this all mean?

Photo of Southern Yamatji Country

Outcome

Out of the 173 land clusters, 65 are classed as having the BEST potential for clean energy development (solar, wind and hybrid).

The 65 land clusters with the BEST potential for clean energy projects:

- have excellent wind and solar energy generation potential
- are close to high energy demand – the electricity network, industrial areas and mining, and towns and commercial areas
- are close to transport services – like roads
- the size of land is big enough to support clean energy projects.

However, more information is needed to make good choices about these development options. Looking more closely at each land cluster's unique values will help to design a clean energy project uniquely suited to that land cluster. **Luckily, YSRC has a lot of options!**

Outcome

Only some of the 65 land clusters shortlisted for clean energy development and some of the 263 land parcels suitable for microgrids need to be developed to meet future energy needs.

If all 65 land clusters were fully developed for clean energy projects, they would produce 200,000 MW capacity.

That's way more than we need now and in the future. The Western Australian Government estimates that the demand in electricity will increase to 7,200 MW by 2042. So only a small number of land clusters need to be developed to meet future demand.

What can you do with this clean energy?

If some of the land clusters were developed, clean energy could be sold:

1. To the energy market through energy retailers (the company that homes and businesses buy their electricity and gas from) - like Synergy or Horizon Power.
    a. Customers can purchase clean energy certificates through Synergy's GreenPower program.
2. Direct to end users (e.g. towns and businesses, industries like mining and agriculture) through:
    a. Power Purchase Agreements (PPAs)
    b. Microgrids.
3. Partner with a clean energy developer and negotiate terms based on the returns made from selling clean energy to end users.

What is a Power Purchase Agreement (PPA)?

- The owner of the wind or solar farm can sell their energy to a customer for the life of the agreement.
    - Customers are usually industries or retailers, like Synergy.
- Power can be purchased at a set rate or the market rate.
- Power can be sold directly to the customer (e.g. a microgrid near a mine), or the electricity network (through the 'Wholesale Energy Market').
- PPAs usually last between 5 and 20 years. The lifespan of solar panels and wind turbines is usually 20 to 30 years. After then they need to be replaced.

Photo of Southern Yamatji Country

Who might be interested in your clean energy?

1. Energy retailers like Synergy and Horizon.

Why?

- The government plans to **reduce coal and gas fired power** in the electricity network and will need more clean energy to provide an alternative.
- By 2042, **energy demand** across the electricity network between Moora and Oakajee is expected to increase by 1,800 MW.
  - About 1,700 MW of this is linked to new industry in the Mid West Region.
- The **government plans** to change the power supply in remote communities like Yalgoo from diesel and gas to clean energy in the next 5 to 10 years using **microgrids**.

Outcome

The 65 BEST land clusters shortlisted for clean energy can support the growing energy demands of the electricity network, industrial areas, active mines and towns.

What is happening to keep up with growing power demand?

Through Western Power, the WA Government is upgrading the northern section of the electricity network:

- New higher voltage transmission lines to deliver more energy
  - between Eneabba and Three Springs by 2027
  - between Three Springs and Oakajee by 2034.
- Substations (where energy is changed into electricity and supplied to houses and businesses) at Three Springs and Mungarra towns to increase clean energy supply.
- Development of the Mid West Energy Hub near the Oakajee Strategic Industrial Area.

2. Mines

There are lots of active mines across the Mid West Region. Many rely on gas to generate power. They are looking for solutions to access clean energy for their operations. Some active mines are shown on the previous maps.

3. Industrial Areas

Industrial areas are hubs for processing, manufacturing and exporting resources like iron and other metals, critical minerals, and hydrogen. New industrial areas are being developed, and existing areas are being expanded to better service industry and to grow mining activity. The major industrial areas shown in the previous maps highlight just some of the major industry activity in the area, such as:

- Oakajee Strategic Industrial Area
- Narngulu Industrial Estate linking Oakajee and the Geraldton Port
- Dongara Industrial Estate
- Arrowsmith Industrial Area
- Morawa Industrial Estate
- Eneabba Industrial Area

4. Towns

Local governments are looking to access cheap and reliable clean energy to power homes and local businesses. A microgrid with solar and battery storage could be especially suitable for towns that are not connected to the electricity network, such as Yalgoo.

Who can help you with making decisions?

These key agencies can help you to shortlist options and identify priorities.

State government agencies:

- Mid West Development Commission
- Department of Primary Industries and Regional Development
- Department of Energy, Mines, Industry Regulation and Safety
- Department of Planning, Lands and Heritage
- Department of Jobs, Tourism, Science and Innovation
- Energy Policy WA
- DevelopmentWA
- PoweringWA
- Western Power

These government agencies are important because they support

- **planning** – when and what upgrades are happening to the electricity network and industrial growth areas
- **building relationships with industry** – not just mining, but agriculture too.

Recommendation

First, work with key government agencies to help with decisions. Then, engage with others when ready.

Federal government agencies:

- Department of Climate Change, Energy, Environment and Water
  - Powering Australia
  - First Nations Clean Energy Strategy
- Clean Energy Finance Corporation
  - Powering the Regions Industrial Transformation
  - Advancing Renewables Program
  - Regional Microgrids Program

These government agencies are important because they provide **funding**.

First Nations Agencies

- Yamatji Marlpa Aboriginal Corporation
- First Nations Clean Energy Network
- Indigenous Land and Sea Corporation
- National Native Title Council
- Indigenous Business Australia
- National Indigenous Australians Agency

These First Nations agencies are important because they support

- **capacity building** – business and jobs
- local experience and **expert knowledge**
- **advocating** for your rights and interests
- some even provide **funding**.

Create positive impact

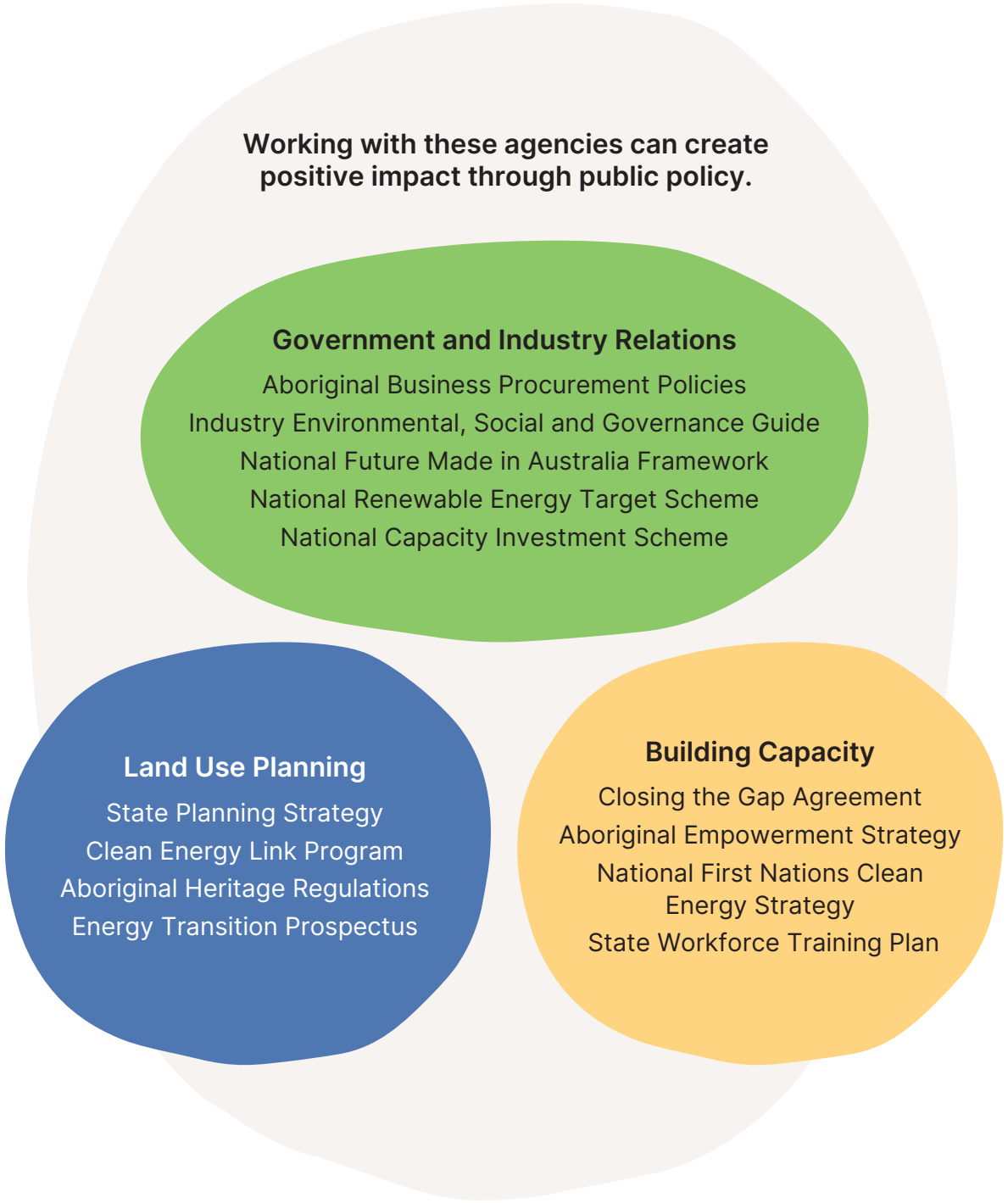
There are over **50 other agencies** who are also interested in the clean energy industry and can offer support.

Regional

- WA Planning Commission
- Mid West Ports Authority
- Department of Water and Environmental Regulation, Environmental Protection Agency
- Regional Development Australia
- Grower Group Alliance
- Department of Biodiversity, Conservation and Attractions
- Local Governments

Jobs and training

- Department of Training and Workforce Development
- Midwest Employment and Economic Development Aboriginal Corporation
- Geraldton Jobs and Skills Centre
- Central Regional TAFE



Create opportunities

Social

Job diversity and security
Skills and training
Health and wellbeing
Community cohesion
Financial stability and resilience

Cultural

Cultural values are respected
Greater protection of culture and heritage
Yamatji rights and interests are valued

Environmental

Natural resources are protected
Healthy Country - healthy people
Lower carbon pollution
Reduced impacts of climate change
Customary knowledge is valued

Political

Access to clean and reliable energy to power communities
Gain political capital as an active participant in the clean energy industry

Governance

Self-determination and empowerment
Improved governance practices (economic, environment, social and cultural values)
Access to information

Economic

Participate in the clean energy industry
Increased procurement of First Nations business
Market advantage through Supply Nation certification
Participate in the regional economy

What don't we know?

The aim of the ***Rapid Assessment*** was to explore the potential for clean energy development on the Yamatji Land Estate.

It has found that 65 land clusters have the best potential.

But it hasn't looked at each of the land clusters in detail.

There are still **gaps in information** that need to be considered to help narrow down and prioritise options to make decisions. These include:

- How does the development of each land cluster compare?
- How do project risks impact the overall return on investment?
- What is the value of each clean energy project over its lifetime?
- How much power can it supply and store?
- What is the financial value of selling that power?
  - Will anyone buy that power from you?
- How much finance is needed to cover the initial investments and operational costs?
  - Are funding agencies or clean energy developers interested in financing your project?
  - Which land clusters are the best options?
  - Do you have an advantage, and can you compete in the clean energy market?

- Are **other land use interests** more suitable than clean energy development?
  For example,
  - Some small land parcels might be better to lease or develop for housing, a community centre, or other types of businesses.
  - Some large land clusters may be better suited for agriculture, carbon farming or other businesses.
  - Others may be better left alone because they have high natural and cultural values.

What else don't we know?

What are Yamatji values?

- Do you want to be a major player in the clean energy industry in the Mid West Region?
- Do you want to secure jobs and business through a clean energy project?
- Do you want to take on all the financial risks of development or partner with another agency to share those risks?
- Do you have the institutional capacity to manage the development and upkeep of a clean energy project?
- Do you prefer not to own the project and just receive revenue from a lease agreement?
- What are the overall impacts and benefits for Yamatji from clean energy project development?

Other considerations

The Yamatji Land Estate has a range of tenures, including freehold, managed reserves with power to lease, and Native Title Retention Areas. Any future development will depend on understanding and securing appropriate land tenure, and obtaining planning approvals.

Looking in more detail at the 65 land clusters will help to **decide**

- The type of partnership you want with clean energy developers, industry and governments.
- Whether to use the land for a different purpose.
- If cultural and environmental monitors need to be factored into the development proposal.
- The terms in an agreement that benefit your interests.

Recommendation

The 263 land parcels suitable for microgrids and 65 land clusters shortlisted for commercial scale development need to be explored further to **shorten** the list and **identify** priority areas for development.

What are some risks to clean energy development?

Social

- Government programs fail to support local skills and training
- Government and industry sectors are not supporting equity and business partnerships when accessing land
- Community resistance to projects
- Conflict with developers

Governance

- Complex governance and regulatory environment
- Poor communication and lack of access to information – poor planning decisions
- Industry fails best practice with First Nations
- Lack of risk assessment and mitigation strategies

Cultural

- Harm to cultural sites and heritage
- Disregard of cultural monitoring in energy planning
- Damage to people and environment

Environmental

- Damage to the environment
- Changing climate causing more natural hazards
- Energy planning doesn't account for unique natural values and Yamatji knowledge
- Limited regulation of industry

Technical

- Lack of in-house expertise to maintain projects
- Costs to replace aging infrastructure
- Skills shortages
- Lack of infrastructure in regional areas

Economic

- Limited program investment in First Nations institutional capacity
- Lack of incentives for industry to share benefits
- Low institutional capacity to take on financial risks
- Lack of access to finance
- Market competition
- Excluded from business supply chains

Political

- Poor industry attitudes to First Nations rights and interests
- Excluded from regional economy and decisions
- Lack of government recognition

Recommendation

Do clean energy planning to set goals, look into the risks, then decide on a project.

Summary of key outcomes

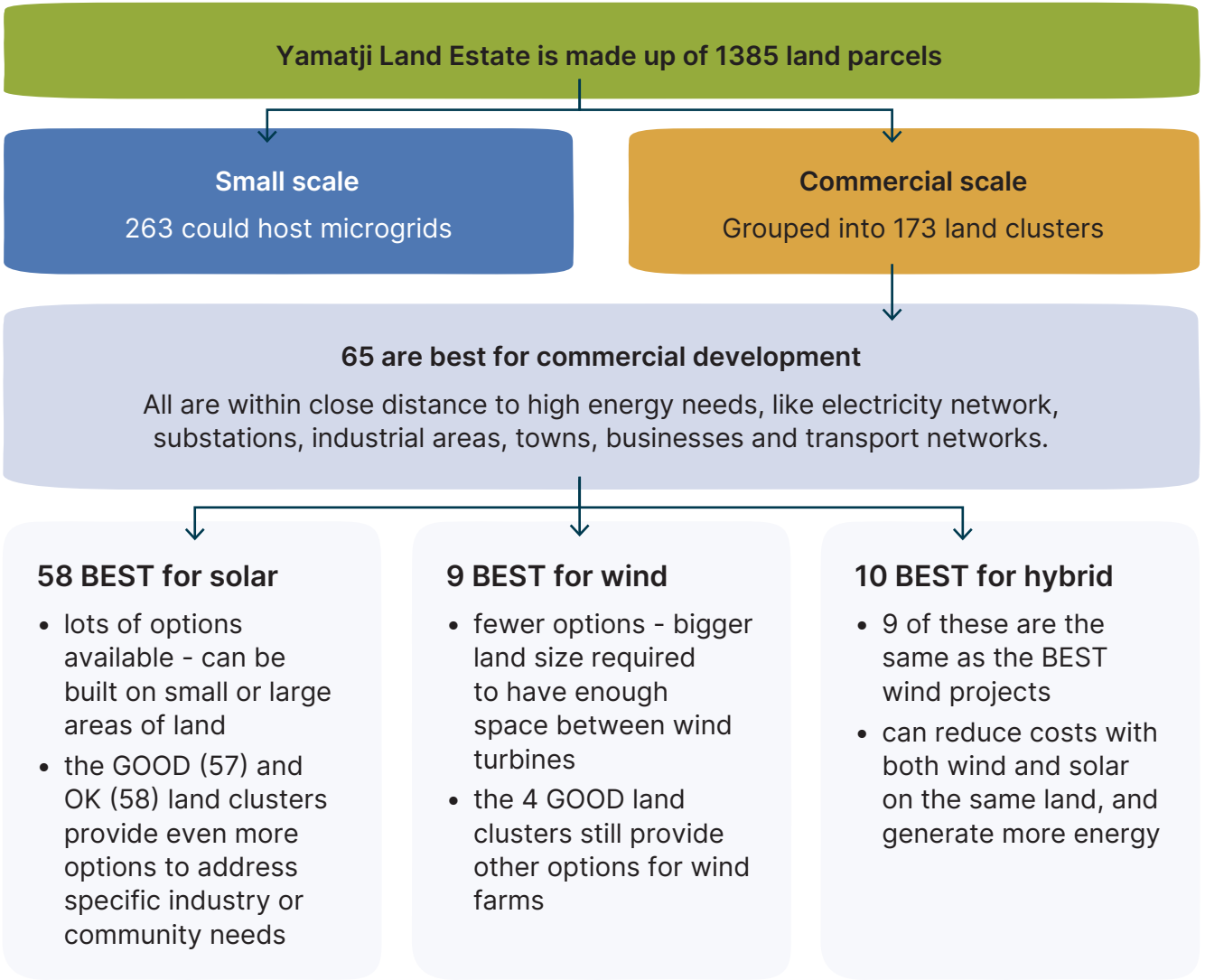
The Yamatji Land Estate has excellent capacity for clean energy generation. This is a **strong market advantage**.

- Solar energy generation capacity is higher than Perth
- Wind energy generation capacity is above average compared to other wind farms across Australia

All 65 shortlisted land clusters align with:

- **government plans** to increase clean energy supply across the Mid West Region
- planned **infrastructure upgrades** to the electricity network and planned development of industrial areas
- **industry need** to move away from using gas and coal generated energy to clean energy
- **town plans** to secure cheap and reliable energy for residential and commercial areas

YSRC could incorporate a clean energy business and obtain Supply Nation certification, then partner with a clean energy developer to sell electricity to energy retailers, industry, towns, and businesses.



Key recommendation and next steps

If all 263 land parcels suitable for microgrids and 65 land clusters best suited for commercial scale clean energy projects were developed, they would supply *way* more energy than needed now and in the future!

Only a few of the shortlisted land parcels and land clusters need to be considered for clean energy projects.

Key recommendation

Further examination of these land parcels and land clusters is needed to cut down the list and select priority areas for development.

First step, work with key agencies to help with decision-making. Then, engage with other agencies when ready. For example:

- Mid West Development Commission and Department of Primary Industries and Regional Development can identify priority areas relevant to upgrades to the electricity network and industrial areas.
- Department of Planning, Lands and Heritage and Local Governments can support development relevant to town planning rules.
- Department of Energy, Mines, Industry Regulation and Safety can identify industry partners who may be interested in working with you.
- Department of Jobs, Tourism, Science and Innovation can identify opportunities to support business opportunities in strategic industrial areas and job pathways in in the clean energy industry.
- Energy Policy WA can assist with understanding the power demand across the electricity network and how the Yamatji Land Estate can supply this demand.
- First Nations Clean Energy Network can provide support and facilitate government and industry relationships and provide expertise.

Second step, prioritise land options:

- Carry out more detailed design of energy systems. This will help to assess how YSRC-owned clean energy resources can be included in the electricity network, and to better understand energy system capacity and other energy transmission needs.
- Check other land values. Land may be better suited for other commercial interests and must be considered in the context of natural and cultural values.
- Use Yamatji Nation values to decide on your interests and the types of benefits you want to gain from participating in clean energy development. These values can provide indicators to measure impacts over time.
- Identify key risks and strategies to manage any negative impacts of proposed clean energy projects.
- Do ‘cost-benefit analysis’ to compare the value of potential clean energy projects on priority areas.

Once you decide on a priority clean energy project:

- Engage with clean energy developers through a tender process to negotiate the best agreement that meets Yamatji values and goals.
- Access finance through private investors or funding agencies like
  - Australian Renewable Energy Agency
    - microgrid and commercial scale development programs - to help with infrastructure costs and feasibility studies.
  - Indigenous Business Australia or Indigenous Land and Sea Corporation
    - to build capacity and partnerships in clean energy projects.
  - Australian Government's First Nations Clean Energy Strategy funding program
    - to build capacity.
- Engage other agencies like Central Regional TAFE to support Yamatji people who might be interested in working in the industry.
- Monitor impact over the life of the project to measure benefits and improve the approach for the next clean energy project.

Glossary of terms

- **Battery storage** – batteries store unused electricity generated by solar or other energy sources. It is especially useful to capture excess solar energy so that it can be used at nighttime.
- **Carbon emissions** – gases (such as carbon dioxide or methane) that are released into the air, mostly from burning fossil fuels. These are harmful to the planet and contribute to climate change. Most countries in the world are trying to reduce their carbon emissions.
- **Clean energy** – energy sources that have limited impact on the environment and are renewable (meaning we won't run out).
- **Clean energy generation** – creating clean energy from sun or wind.
- **Clean energy project** – an individual development project to create clean energy (such as a wind farm).
- **Climate change** – the long-term changes in temperature and weather patterns, in particular caused by humans burning fossil fuels.
- **Competitive advantage** – a factor that makes a business more attractive than other businesses in the same industry (e.g. better or cheaper services).
- **Electricity network** – also called the 'grid', these are the bigger poles and wires that transport electricity over long distances from power stations to the consumers. In the Mid West region, the South West Interconnected System (SWIS) is the electricity network.
- **Electricity substations** – where gas, wind and solar energy are changed into electrical power and supplied to houses and businesses via the electricity network.
- **Energy retailer** – the company that homes and businesses buy their electricity and gas from.
- **Fossil fuels** – sources of energy such as coal, oil and gas, which are non-renewable (meaning they are limited – we will run out of them eventually).
- **Hybrid (clean) energy system** – this is a mixed clean energy system, including both wind turbines and solar panels together as one system.
- **Land clusters** – these are land parcels grouped by the researchers to make commercial scale development more practical.
- **Land parcels** – these are the 1385 land parcels set aside by the WA Government as part of the Yamatji Nation Indigenous Land Use Agreement. These land parcels make up the Yamatji Land Estate, and have the broad purpose of supporting the cultural, social, and economic development of the Yamatji Nation through self-determination.
- **Microgrid** – a smaller energy system, usually solar and battery storage, which can operate separately to the electricity network, or be used as a backup in case of power cuts.

- **Mid West region** – this is the WA Government's name for the region within which the Yamatji Nation Indigenous Land Use Agreement sits.
- **MW capacity** – MW stands for 'megawatt' and is a way of measuring power (like electricity) at a large scale.
- **Quality (of clean energy)** – the strength of wind or sun resources. High-quality energy resources typically result in lower generation costs, making green electricity more competitive in the electricity market.
- **Return on investment** – this is a term describing the profit made from an initial investment cost.
- **Solar energy** – solar panels capture solar radiation and convert it into electricity (this includes household rooftop solar and solar farms).
- **Solar farm** – a larger area on which solar panels are installed (usually greater than one hectare in size).
- **Transmission lines** – also known as power lines, these are the small poles and wires that connect houses and industry to the electricity network.
- **Wind energy** – wind turbines are rotated by the wind, which is converted into electricity.
- **Wind farm** – a large area on which wind turbines are installed.

Photo of Southern Yamatji Country

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