# Development Lifecycle of Renewable Projects

11th August 2023

power for good

RES acknowledges the Traditional Custodians of Country throughout Australia and their connections to land, sea and community.

We pay our respect to their Elders past and present and extend that respect to all Aboriginal and Torres Strait Islander peoples.

Artwork by Lawson Dodd

ABOUT US

# Land Acquisition Team

**Alan Finch**
**Land Acquisition Manager**

**Role:**
- Secure land
- Secure third party interests
- Support early New Sites investigations
- Project feasibility inputs

# New Sites Team

**Adam Bittisnich**
**New Sites Team Lead**

**Role:**
- Site Finding
- Site Feasibility
- Stakeholder Mapping
- Project Acquisitions

# Contents

ABOUT US

# The Basics


## FOUNDED IN 1981

RES was founded in 1981 and remains the world's largest independent renewable energy company.


## GLOBAL KNOWLEDGE

RES is active in 14 countries, drawing on the experience of a global team of experts for every project.


## ESTABLISHED REPUTATION

RES leverages a long history of trust and strong relationships with industry operators and suppliers.


## EXTENSIVE EXPERIENCE

RES has developed and constructed more than 22 GW of renewable energy projects across the globe.


## DIVERSE PORTFOLIO

RES currently asset manages over 12 GW of renewable assets around the globe.

ABOUT US

# Sector insight built on local experience

RES was established in Australia in 2004 and now has over 150 employees locally, supported by a team of over 2500 globally.

**> 5 GW** Development portfolio

**> 1.1 GW** Projects achieved financial close/NTP

**> 1.1 GW** Power Purchase Agreements secured

**> 2.05 GW** Portfolios managed for third party owners

# Development

# What Makes a 'Good' Site?

DEVELOPMENT LIFECYCLE

# What makes a good renewable energy site?

## Step 1: Finding Resource

- Wind:
  - Detailed wind data shows wind speeds across a region
  - Data accuracy is improved by taking public and private data and calibrating it with RES owned data from existing monitoring campaigns
  - *Figure 1* shows wind speeds at 150 metres in height, corresponding to the hub-height of the average wind turbine

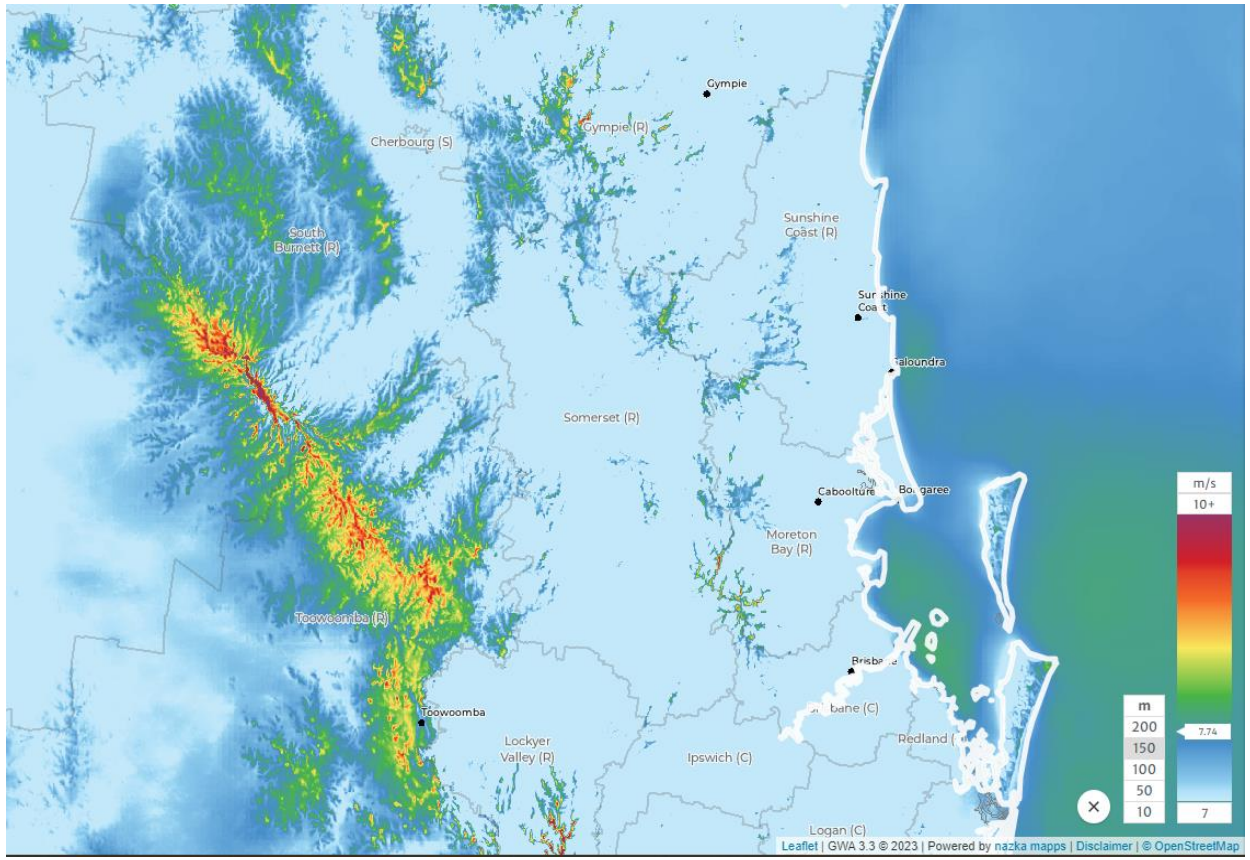



*Figure 1: Average Wind Speed @150m*
*Source: GlobalWindAtlas (EnergyData.Info)*

DEVELOPMENT LIFECYCLE

# What makes a good renewable energy site?

## Step 1: Find Resource

- Solar:
  - Requires sunshine!
  - Solar resource only changes more significantly across large regions
  - Solar resource is also confirmed with on site resource monitoring

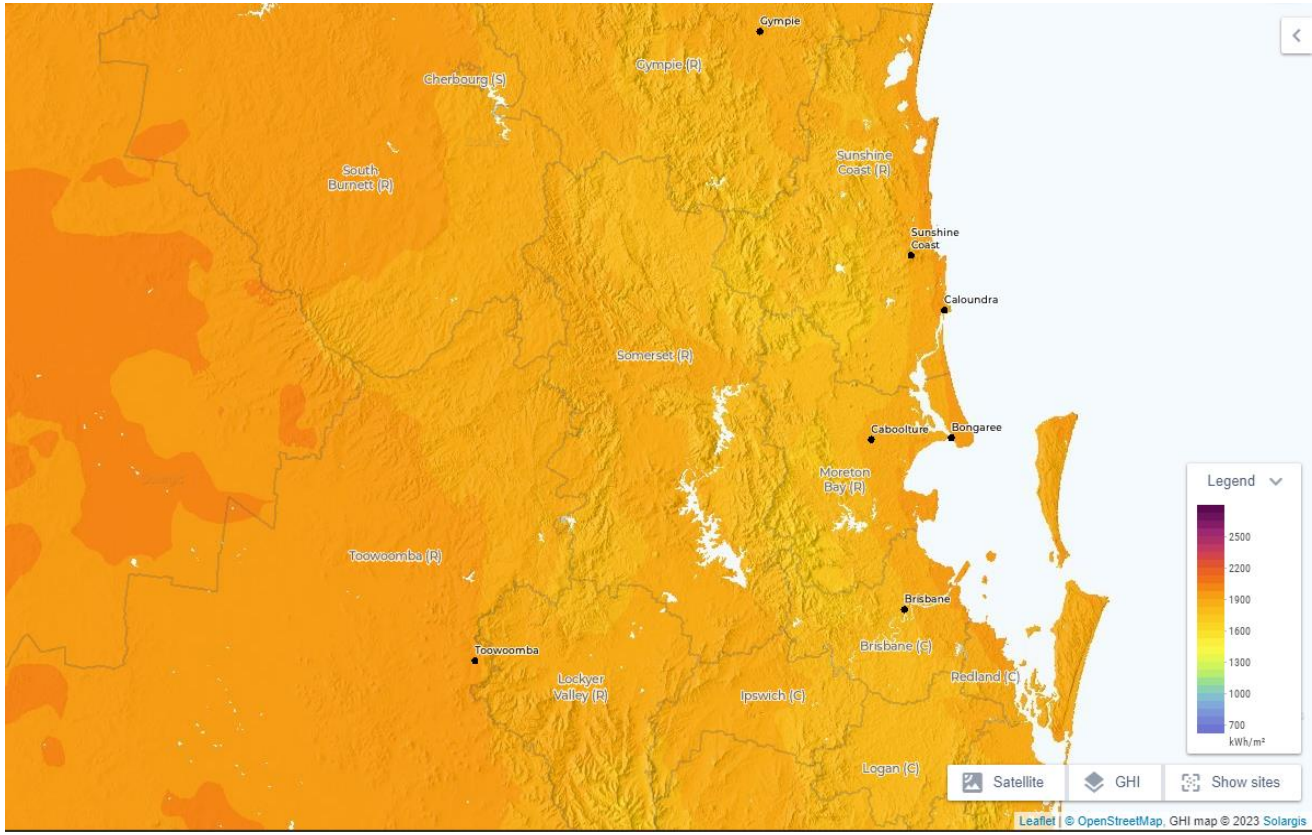



*Figure 2: Global Horizontal Irradiation*
*Source: GlobalWindAtlas (EnergyData.Info)*

DEVELOPMENT LIFECYCLE

# What makes a good renewable energy site?

## Step 2: Find Grid Capacity

- Broad Grid Considerations
  - Capacity available on the network
  - Location /proximity to the Grid
  - Future MLF forecasts
  - Internal modelling to simulate the projects and how they affect the grid or are affected by the grid

- Specific Grid Considerations
  - Connection points and arrangements
  - Augmentations

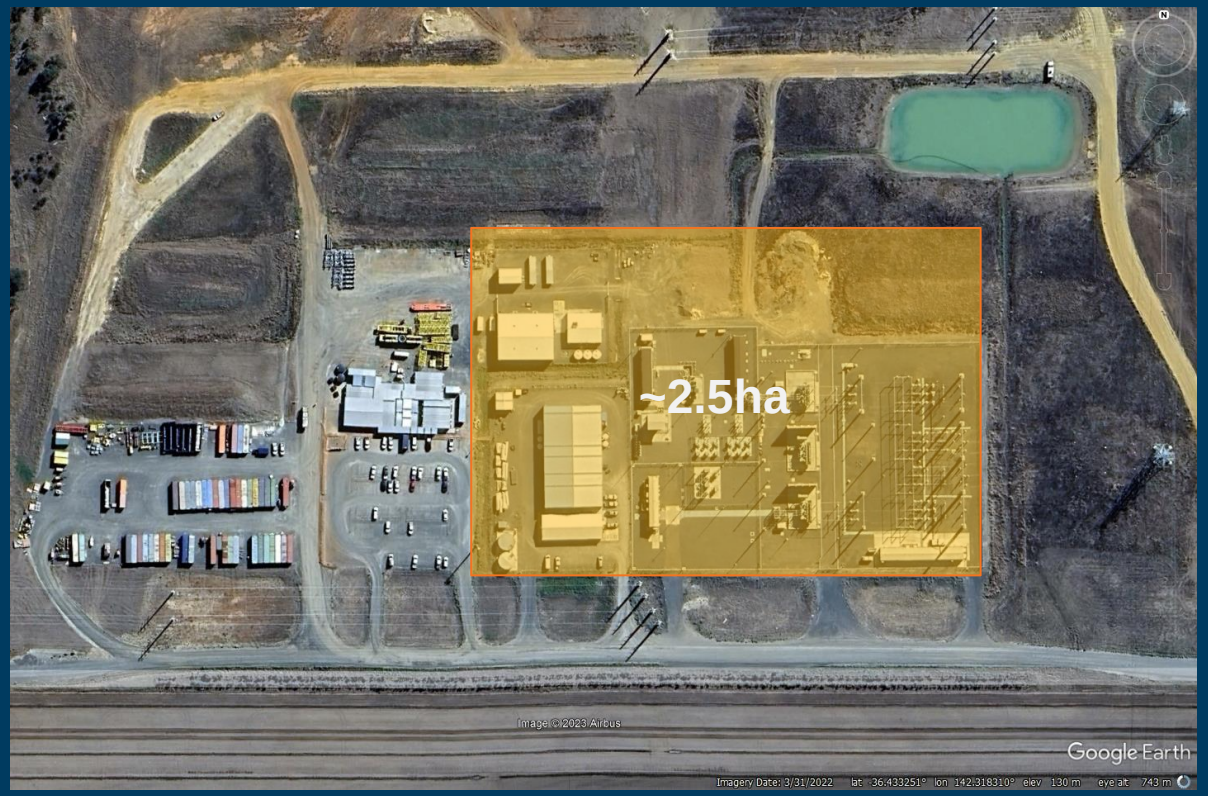



*Figure 3: Murra Warra Terminal Station*
*Source: Google Earth (Image 2023 Airbus)*

DEVELOPMENT LIFECYCLE

# What makes a good renewable energy site?

## Step 3: Find Land

- Wind:
  - Require large cleared areas
  - Requires minimal housing
  - Requires simple access from highways

- Solar:
  - Requires minimal terrain complexity
  - Requires large cleared areas
  - More land allows for more efficient sites

Source: Murra Warra Wind Farm Project Co Pty Ltd

DEVELOPMENT LIFECYCLE

# What makes a good renewable energy site?

## Step 4: Identify Site Constraints

- Wind:
  - Ecology
  - Cultural Heritage
  - Aviation
  - Engineering/Terrain
  - Hydrology
  - Visual Amenity
- Solar
  - Ecology
  - Cultural Heritage
  - Geology
  - Hydrology

Source: Murra Warra Wind Farm Project Co Pty Ltd

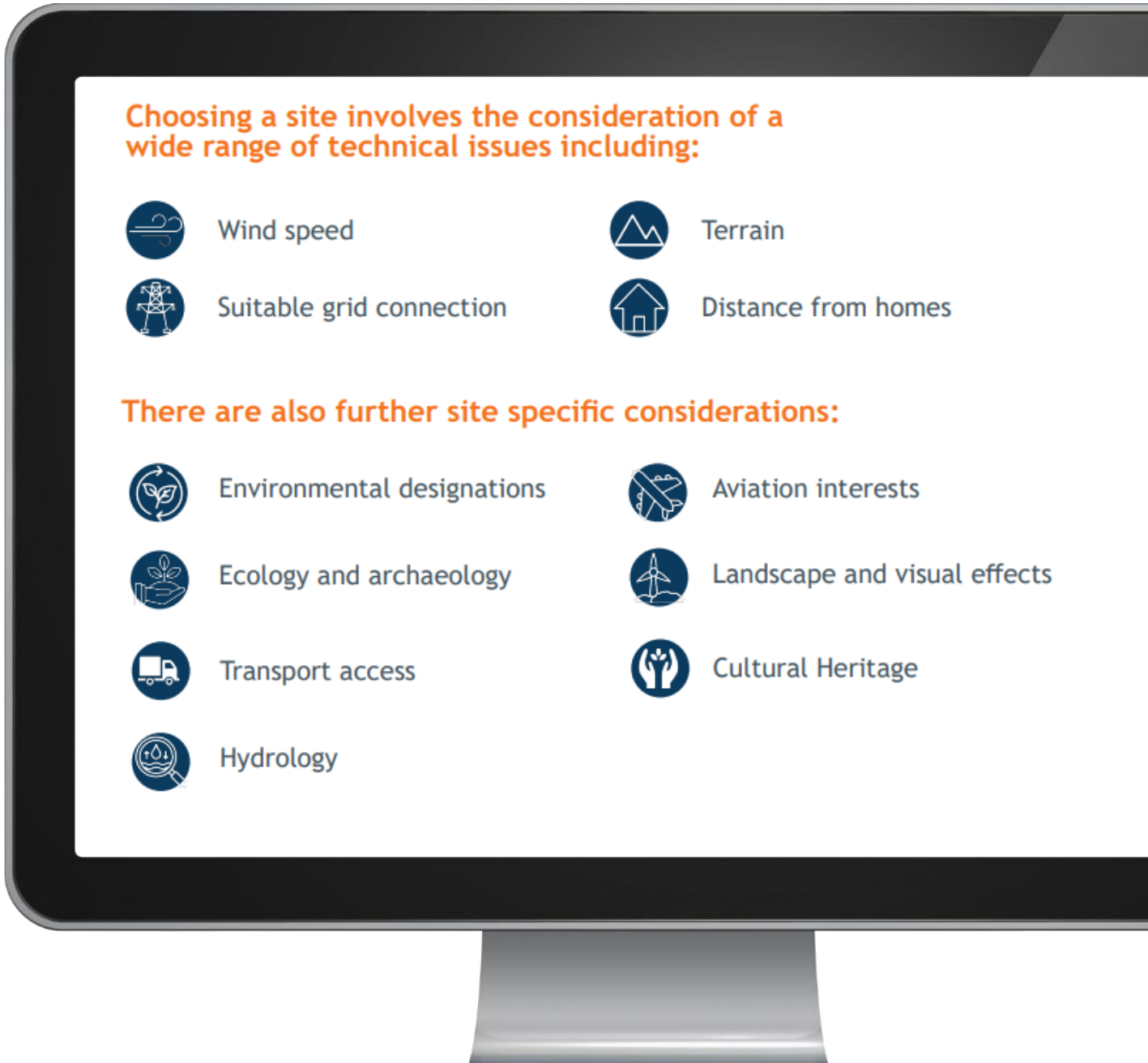
DEVELOPMENT LIFECYCLE

# What makes a good renewable energy site?

## Site Selection Model

- Culmination of key project data to determine most suitable development areas

- Key Inputs
  - Resource/grid/site constraints
  - Access to quality data
  - Human validation and calibration
  - Weighing based on risk profile
- Outputs
  - Derives top quality sites
  - Outperforming market projects
  - Reduced development time
  - Competitive and cheap electricity



DEVELOPMENT LIFECYCLE

# What makes a good renewable energy site?

**Step 5: Identify Stakeholders**

- Wind and Solar:
  - Find willing landowners
  - Community
  - 3rd party interests
  - Railways/Pipelines
  - Cultural Heritage Groups
- Wind:
  - Council
    - Although not primary planning authority
    - Required for most tertiary approvals
      - Met Masts
      - Borrow Pits
      - Road Upgrades
      - Subdivision Approvals

DEVELOPMENT LIFECYCLE

# What makes a good renewable energy site?

## Step 6: Liaise with Stakeholders

- Wind and Solar:
  - Identify compatible land use
  - Negotiate Access Agreements with Landowners
  - Local Government
  - Contact 3rd party
  - Community Engagement

DEVELOPMENT LIFECYCLE

# What makes a good renewable energy site?

## Step 7: Conduct On-Site Due Diligence

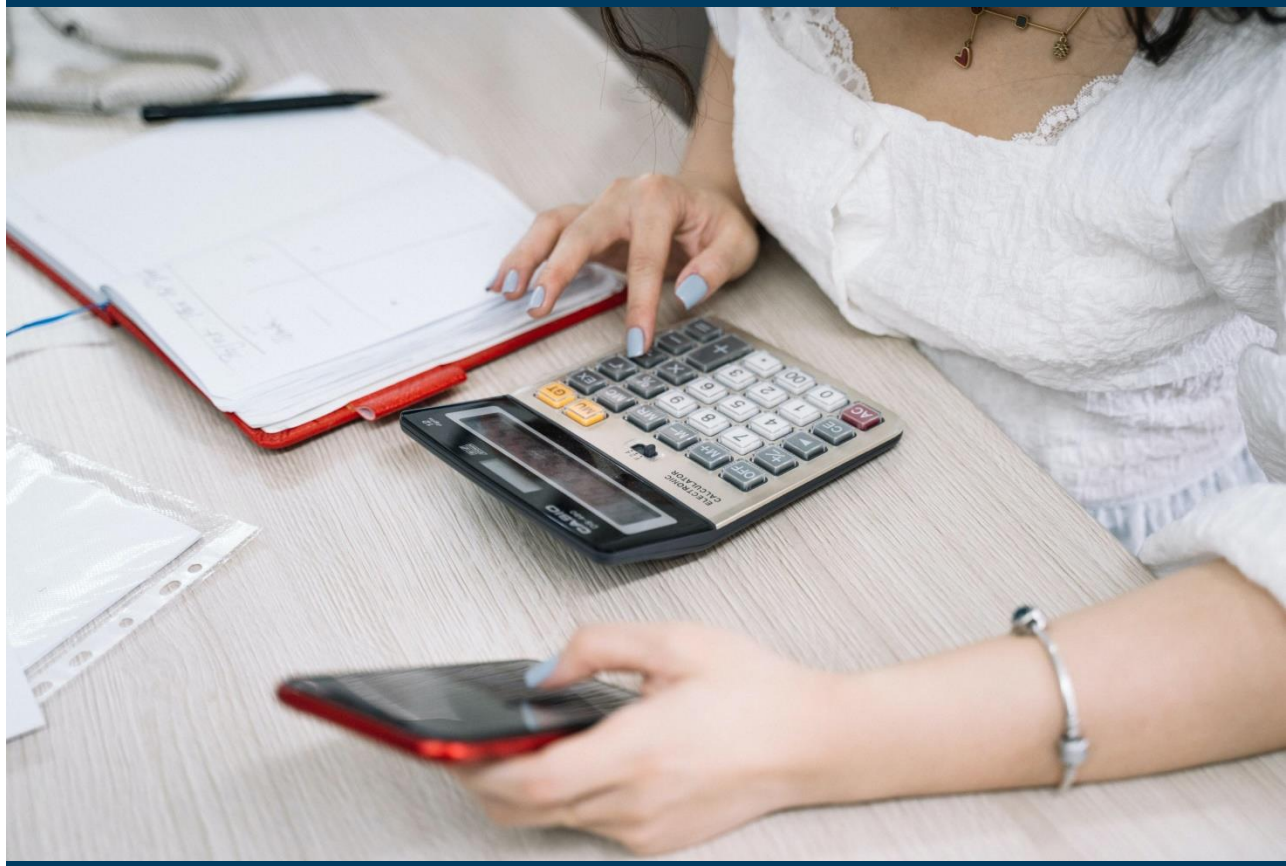
- Wind:
  - Importance of wind monitoring campaign
  - Engineering Assessments
  - Ecology Flora and Fauna Surveys
  - Cultural Heritage Walkover
- Solar:
  - Ecology Flora and Fauna Surveys
  - Cultural Heritage Walkover
  - Hydrology stream identification
  - Gather accurate elevation data

DEVELOPMENT LIFECYCLE

# What makes a good renewable energy site?

## Step 8: Commercial Assessment

- Wind:
  - Identified key risks
  - Gathered on-site constraints
  - Gathered on-site wind data
  - In house design and technical assessment
  - In house grid assessment and costing
- Solar:
  - Identified key risks
  - Gathered on-site constraints
  - In house design and technical assessment
  - In house grid assessment and costing

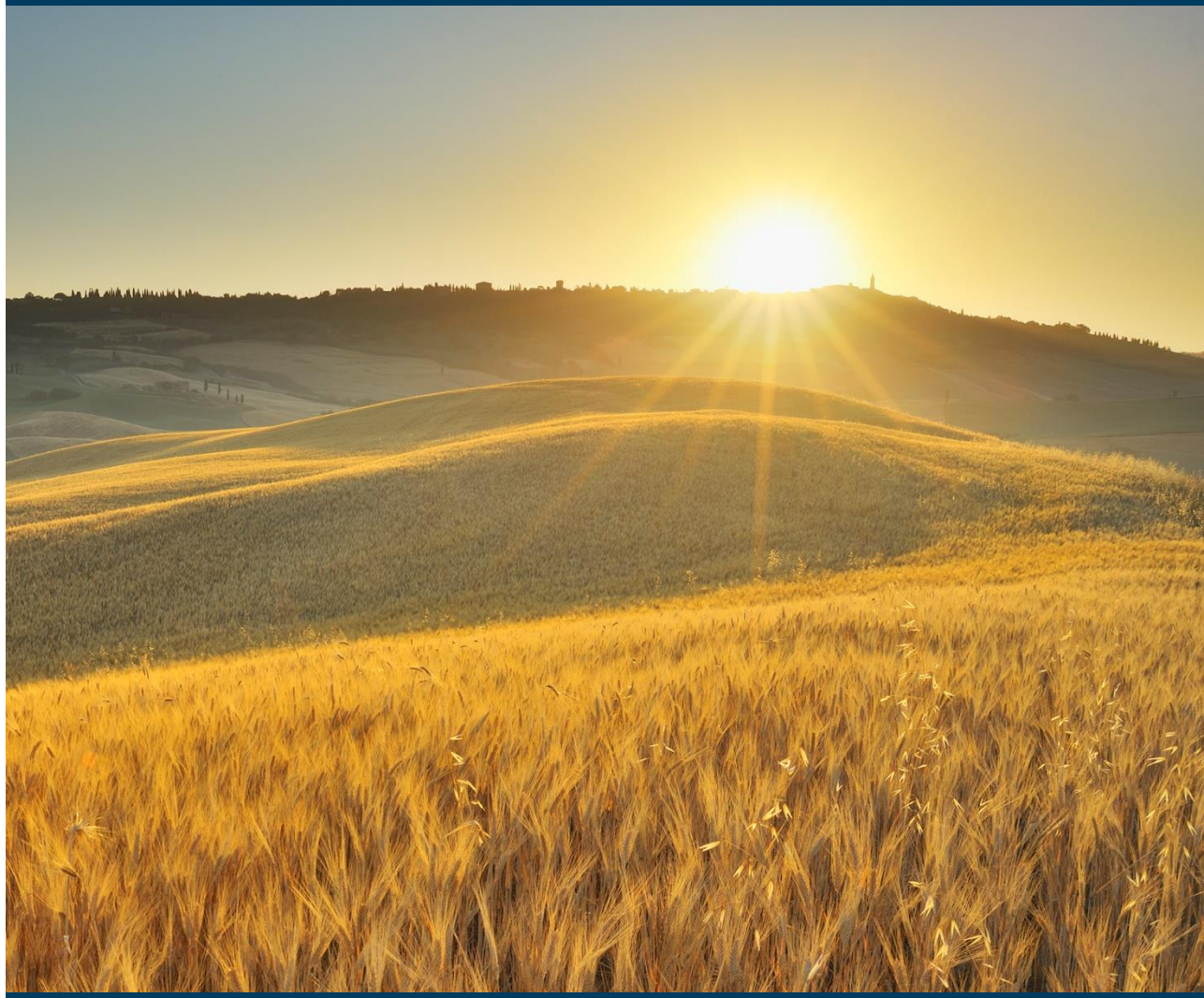


# Land Tenure

RENEWABLES DEVELOPMENT TENURE

# Land Tenure Overview

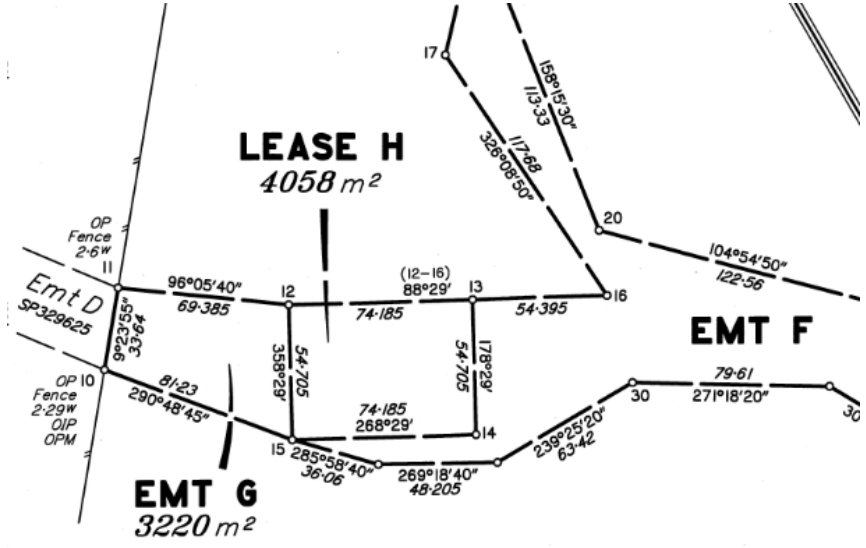
- Typically land tenure for a project is sought through an option to lease or purchase.
- Requires subdivision of switch station for grid connection (transferred to NSP).
- Third party agreements:
  - Pipeline crossing agreements.
  - Wayleaves for rail corridor crossings.
  - Access across land for transport of components.
  - Agreements with resources companies.

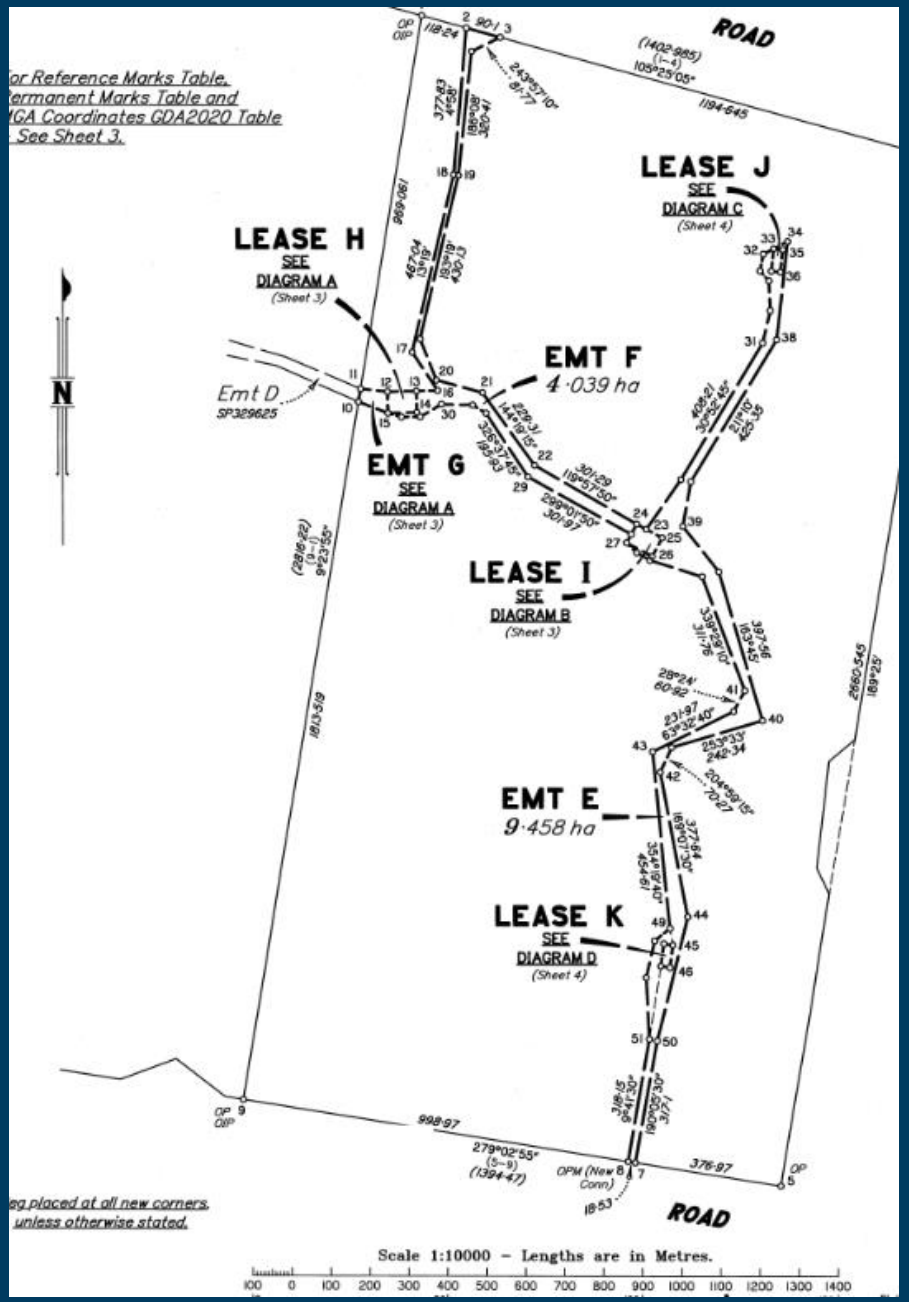


RENEWABLES DEVELOPMENT TENURE

# Wind Farms

- Tenure has historically consisted of lease areas joined by easements.
- The lease contains the turbine.
- The easement provides access rights to the project as well as containing the underground electricity reticulation.

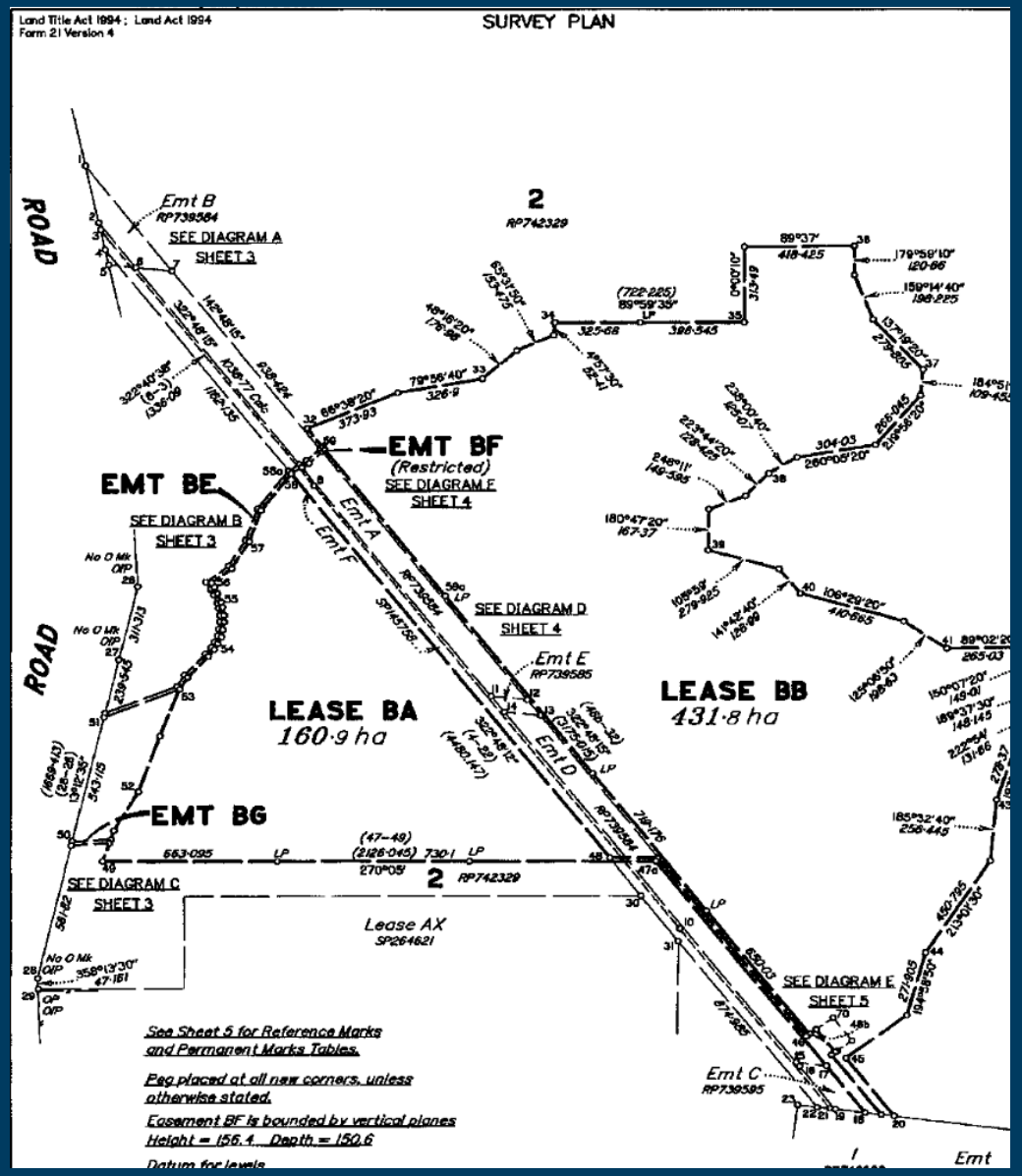


RENEWABLES DEVELOPMENT TENURE

# Solar Farms

- Tenure has historically consisted of a large lease area or multiple lease areas across a lot(s); or
- Tenure might be for the ‘whole of the lot’.
- Where there are multiple leases, the tenure may be connected by easements.
- The example to the right is of the Daydream Solar Farm in Collinsville.



RENEWABLE ENERGY LIFECYCLE

# External Tenure

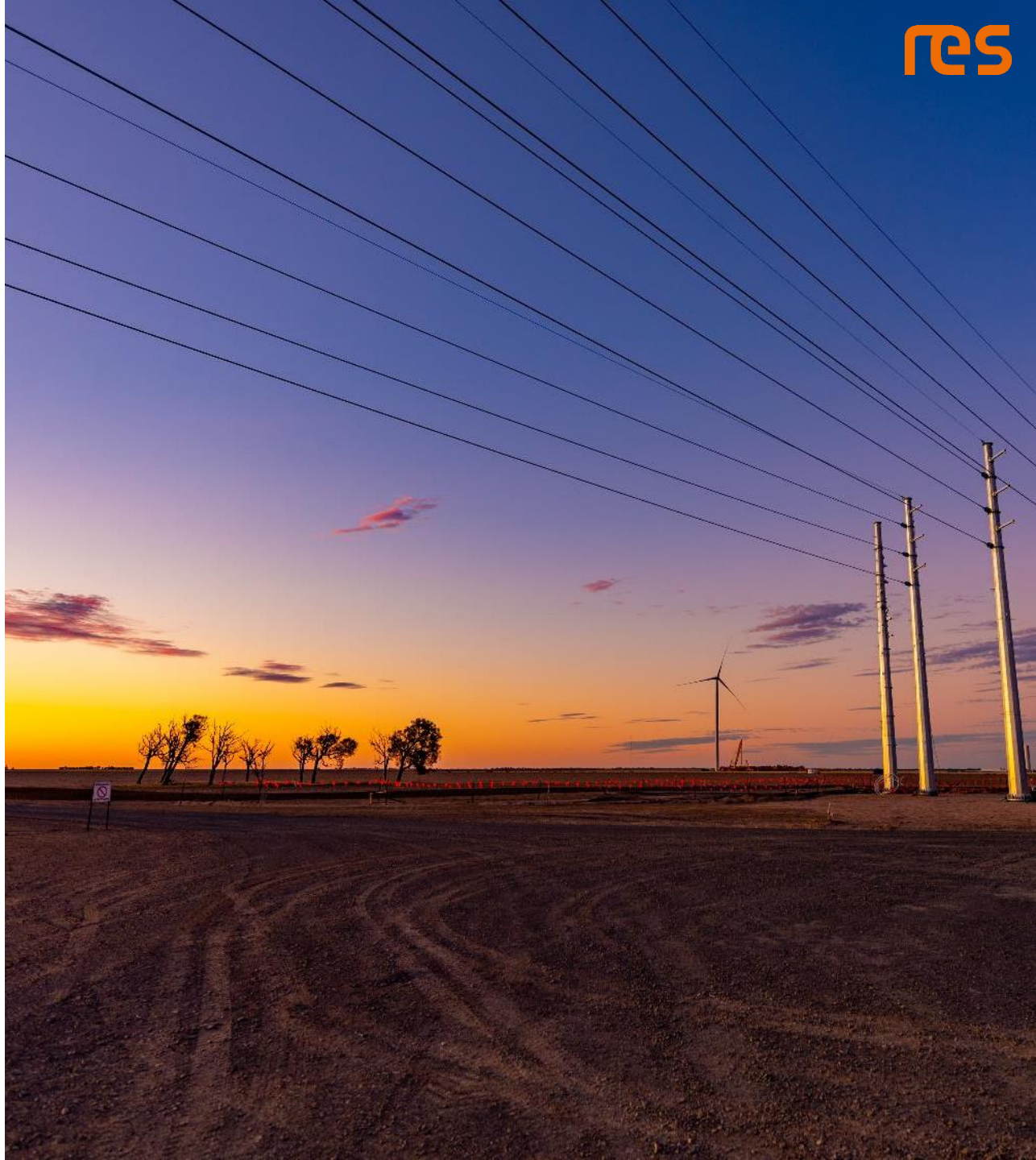
- Required for grid connection if a transmission line is not in a Project area.
- Requires engagement with network services provider (NSP).
- Requires separate approvals.
- Depending on length and connection points will depend on if the developer of the NSP undertakes approval / construction.

# Planning

RENEWABLE ENERGY LIFECYCLE

# General Overview

- Requires land tenure to be secured for Project site.
- Strong confidence in project feasibility
- Strong confidence in landowner participation



RENEWABLE ENERGY LIFECYCLE

# Assessment Manager – QLD Example

- Wind:
  - Application for a material change of use for wind farm development under the *Planning Act 2016*.
  - Assessed against Stage Code 23: Wind farm development.

- Solar and battery storage:
  - Application for a material change of use through the relevant local government.

RENEWABLE ENERGY LIFECYCLE

# Planning Considerations

- Consideration also needs to be given to:
  - Native title
  - State owned land (i.e. change of purpose)
  - Cultural heritage
  - Vegetation management
  - Mining and resources overlays
  - Other land use overlays
  - Environmental management and waste
- Commonwealth approvals may be required for projects with a significant impact on a matter of national environmental significance.
- This is through the *Environmental Protection and Biodiversity Conservation Act 1999*.

# Procurement & Commercial

RENEWABLE ENERGY LIFECYCLE

# Procurement

- Prepare and issue tender documents
- Assess tenders
- Selection of equipment (i.e. wind turbines)
- Selection of construction delivery structure (e.g. EPC v Split contracting)
- Negotiate the supply, construction and maintenance contracts
- Agree and execute early works agreement
- Execute supply, construction and maintenance contracts.

RENEWABLE ENERGY LIFECYCLE

# Commercial Overview

- Prepare financial model
- Determine project financing sources
- Initiate Power Purchase Agreement (PPA) procurement process
- Initiate capital raising process
- Commission due diligence reports for capital raising
- Complete PPA procurement process
- Complete capital raising.

# Financial Close / Notice to Proceed

RENEWABLE ENERGY LIFECYCLE

# Project Proceeding

- Project will then proceed through to Financial Close.
- Following this, option agreements will be exercised.
- Construction commences.

# Construction & Asset Management

# Construction Management


Project Management & Coordination

Site Management

Health, Safety & Environment

Engineering Services

Cultural Heritage

Contract Administration & Compliance

Grid Connection & Registration Support

Reporting

Landowners, Communities & Public Relations

Procurement

Company Services

Transition Support

# Asset Management

NOTE

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