

# PRELIMINARY DECOMMISSIONING AND REHABILITATION MANAGEMENT PLAN

Narrogin Wind Farm

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# CONTENTS

<b>1</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	Overview.....	1
1.2	Document Purpose .....	1
1.3	Document Validity and Review .....	1
<b>2</b>	<b>PROPONENT COMMITMENTS .....</b>	<b>2</b>
2.1	Decommissioning Principle .....	2
2.2	Funding.....	2
<b>3</b>	<b>CONSULTATION .....</b>	<b>3</b>
3.1	Wind farm landowners consultation .....	3
3.2	Community consultation.....	3
<b>4</b>	<b>DECOMMISSIONING SCOPE OF WORKS .....</b>	<b>4</b>
4.1	Wind turbine generators.....	4
4.2	Foundations .....	4
4.3	Access roads .....	5
4.4	Crane hardstands and laydown areas.....	5
4.5	Underground electrical cabling and overhead powerlines .....	5
4.6	Overhead powerlines .....	6
4.7	Substation.....	6
4.8	Operation and maintenance facilities .....	6
4.9	Meteorological towers and wind monitoring masts .....	6
4.10	Fencing.....	6
<b>5</b>	<b>RESOURCE MANAGEMENT .....</b>	<b>7</b>
5.1	Waste Hierarchy .....	7

<b>6</b>	<b>LAND REHABILITATION.....</b>	<b>8</b>
6.1	Objectives.....	8
6.2	Extent of rehabilitation works .....	8
6.3	On-going monitoring .....	9

# 1 INTRODUCTION

## 1.1 Overview

The Narrogin Wind Farm is a 200MW wind farm located approximately 160 km south-east of Perth, Western Australia. The Narrogin Wind Farm Project will be located on freehold land in WA, approximately 7km east of Williams and 10km west of Narrogin. The project can connect into the state's South West Interconnected System (SWIS) via an existing 220 kV transmission line near its southern boundary.

This Decommissioning and Rehabilitation Management Plan has been developed to outline the Proponent's approach to managing the wind farm and associated infrastructure at the end of life.

## 1.2 Document Purpose

The purpose of this management plan is to outline:

- The Proponent's commitment to decommission and rehabilitation,
- Decommissioning methodologies for turbines and turbine infrastructure, removal of concrete footings, removal of site services including power, water and any supporting pipelines/infrastructure not proposed to be retained as part of the final land use for the site.
- Environmental impact management including management of traffic throughout the decommissioning process.
- Predicted waste streams and appropriate management measures.

## 1.3 Document Validity and Review

This management plan shall be reviewed every five years following the commencement of construction.

The review shall consider:

- technology evolution for the recycling and reuse of equipment and material,
- markets for used and scrap materials,
- costs of contractors, plant and equipment to be used during decommissioning,
- changes in environmental conditions,
- changes in legislation and guidelines,
- lessons learnt from similar projects, and
- any project approvals required to undertake decommissioning and rehabilitation.

## 2 PROPONENT COMMITMENTS

### 2.1 Decommissioning Principle

The expected operational life of the wind farm will be up to 25 to 30 years. At the end of the operational life the wind farm will be decommissioned and removed from service in accordance with this plan. The decommissioning and rehabilitation of the wind farm project site at the end of its commercial life is at the proponent's obligation and cost.

### 2.2 Funding

It should be noted that it is possible that the sale value of recovered turbine materials and other equipment to exceed the costs of their dismantling and site rehabilitation. Should this positive cost / sale be less than the cost of decommissioning the Proponent has agreed to ensure an appropriate financial instrument is put in place to ensure the works can be funded.

As part of the periodic review of this document the costs of decommissioning will be evaluated and the value of the financial security adjusted to ensure it is sufficiently funded.

## 3 CONSULTATION

### 3.1 Wind farm landowners consultation

Discussions will be held with each of the landowners regarding the decommissioning and rehabilitation process. Landholders may prefer some components of the wind farm infrastructure to remain on their land after the decommissioning process to assist with farming practices and to add commercial value to their properties. This includes infrastructure such as roads, fences and storage facilities.

It is recognised that landowner requirements may change over time, or if ownership of the land changes during the operation life of the wind farm. Consultation with landholders will be undertaken again at the final stages of the decommissioning and rehabilitation process to ascertain their requirements at that time.

### 3.2 Community consultation

Consultation with the local community will be carried out by the proponent in advance of the wind farm decommissioning and rehabilitation works. The objectives of the consultation process will be to:

- Ensure the local community and stakeholders are provided with appropriate information about the planned decommissioning.
- Allow the amendment of plans to accommodate community or stakeholder feedback where possible.
- Ensure an open forum for communication between community and stakeholders to resolve any issues or concerns.

Key issues to be addressed during the community consultation will include:

- Timing and phases of the decommissioning project to minimise impacts on agriculture and farming areas.
- Maximise local employment and contractor involvement in the decommissioning and rehabilitation where possible.
- Management and coordination of traffic on rural and main roads to minimise impacts on local traffic.
- Management and coordination of logistics to ensure the availability of accommodation and local services (i.e. food, fuel, supplies) during decommissioning and rehabilitation works phases.

## 4 DECOMMISSIONING SCOPE OF WORKS

The following section summarises the decommissioning of each component of the wind farm. The landholders may request that certain infrastructure is retained on the land. These requests will be considered by the proponent during the consultation period of the decommissioning program.

The Proponent will engage the appropriate contractors to undertake the dismantling, transportation and land rehabilitation works. The dismantling, removal and land rehabilitation works are expected to take approximately 12 months from commencement.

### 4.1 Wind turbine generators

The work sequence is likely to be as follows:

- Removal and appropriate disposal of all consumable items such as oil, grease, lubricants and coolants. These items will be disposed of at an authorised waste facility.
- Dismantle the turbine blades, nacelle and tower. Dismantling will require the use of cranes.
- Components will then be transported by truck to an offsite storage area prior to sale.
- All waste metallic components are expected to sold or recycled.
- All non-metallic materials that cannot be reused or recycled will be disposed of at an authorised waste facility.
- All civil material that cannot be reused onsite for rehabilitation purposes will be removed from site and disposed of at an authorised waste facility.

### 4.2 Foundations

The foundations for the WTG's are likely to be a mix of both gravity and rock anchor. The final design of foundation for each turbine is yet to be decided. The gravity foundation is a large block of steel reinforced concrete below the surface, while a rock anchor foundation drills deep into the ground and fixes steel cables in the rock. A combination of both footing types may be used, depending on the specific geology at each WTG site.

Both foundation types will require a large concrete and steel footing above the ground surface for the WTG.

The foundation will not be removed, in its entirety, during decommissioning. The underground foundation is not likely to cause any environmental harm by remaining in situ. Any producing components (cables, concrete, conduit etc.) will be removed. The top 600mm of the foundation will be removed. The surface of the remaining foundation will be roughened using a jack hammer / rock breaker to create a cracked and rough surface. A layer of subgrade material (approximately



400mm) and then a 100-200mm layer of topsoil will be installed over the remaining foundation. Rehabilitation will allow the area where there foundations are present to be used for agriculture (the land use prior to the wind turbines being constructed) or an alternative land use if required in consultation with the landowner.

### **4.3 Access roads**

The access roads will be constructed using a road base mix with gravel topping. The access tracks generally consist of a 6-7 m wide cross section. Some access tracks may be up to 10 m in key locations to allow movement of a large crane and oversize vehicles between the turbine sites during the construction phase. The width may also vary where crossing of drainage lines is required or where significant cut and fill is required. It is likely that the landholders will seek to retain most of the access tracks at the time of decommissioning.

If the removal of access tracks is required, the gravel topping, and road base layer will be removed from site and transported to a licensed disposal location or suitable backfill location. The cleared access road areas will be rehabilitated back to the original land use (grazing or cropping land).

### **4.4 Crane hardstands and laydown areas**

Crane hard stands will be constructed using the same method and materials as the access tracks. The hardstands are likely to have a higher level of compactness than access tracks as they are primarily used by large cranes when constructing WTG's. Laydown areas will be constructed using the same method and materials as access tracks. The laydown areas are used to store materials and turbine components during the construction period. At the completion of construction part of the laydown area at each location will be rehabilitated as the entire pad will not be required during the operation of the wind farm. The final design will determine the area to be retained.

It is possible that the landholders will seek to retain some of the hardstand and laydown areas at the time of decommissioning. All hardstands and laydown areas to be removed will be done so as per the access tracks. The cleared hardstand areas will be rehabilitated.

### **4.5 Underground electrical cabling and overhead powerlines**

All electrical cables are likely to be installed at depths underground of at least 600 mm where they follow access tracks and up to 1200 mm where they transect paddocks. Underground cabling will not be removed during decommissioning. Cables are not considered to be harmful to the environment and the process of digging the cabling up will cause more damage to the environment than leaving them in situ.

## 4.6 Overhead powerlines

All overhead electrical cabling and powerlines will be dismantled, removed and materials reused or sold as scrap, where possible. Any footings associated with the removed powerlines will be cut off at a minimum of 600 mm below ground level and the areas rehabilitated.

## 4.7 Substation

The substation and all related infrastructure will be dismantled and removed from site during decommissioning. All footings and concrete will be removed, and the area rehabilitated.

## 4.8 Operation and maintenance facilities

Operation and maintenance facilities are likely to include offices, amenities, storage, control rooms, workshops and car parks. It is expected that some of these facilities will be retained by the landholders. These requests will be considered by the proponent during the consultation period of the decommissioning program.

Any facilities requiring removal will be dismantled and re-used, sold as scrap material or disposed of at an authorized waste facility. The car park(s) will be rehabilitated as per the access tracks.

## 4.9 Meteorological towers and wind monitoring masts

The meteorological towers and wind monitoring masts will be approximately 160 m in height. The towers and masts will be dismantled and removed from site during the decommissioning period. Any footings associated with the removed towers and masts will be cut off at a minimum of 600 mm below ground level and the areas rehabilitated.

## 4.10 Fencing

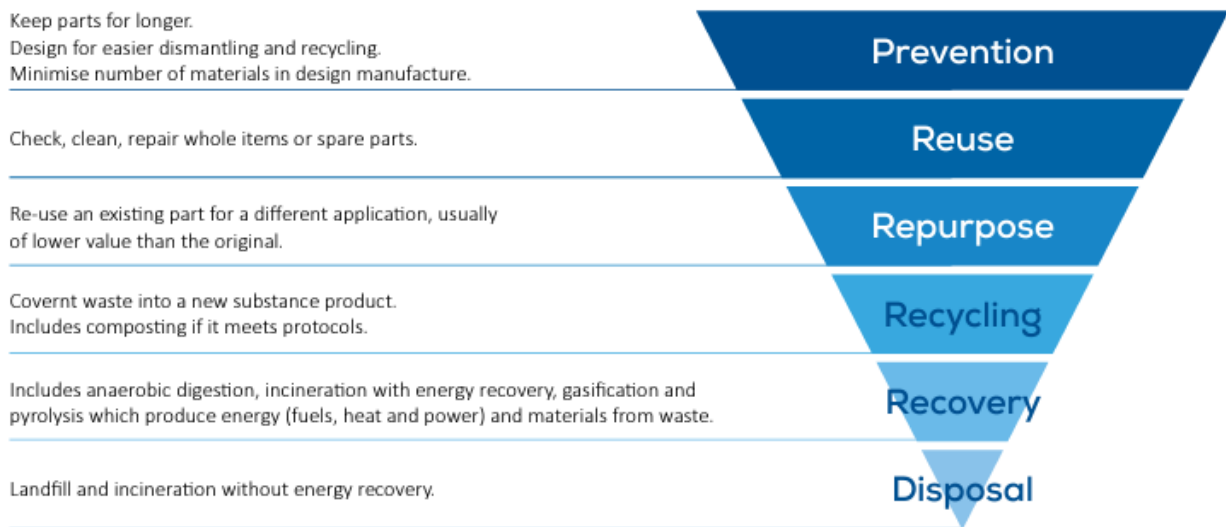
Stock fencing will be installed as part of the project to manage livestock. It is also likely that fencing and gate upgrades to the existing landowner boundary fences will be required. Security fencing will also be required at the substation, fencing may be required at meteorological towers, wind monitoring masts, and operational and maintenance facilities.

The upgrades to boundary fences and gates will benefit the landholders farming practices. The fencing materials and gates will remain on-site. The fencing from the substation, meteorological towers and wind monitoring masts and operational and maintenance facilities will be dismantled and removed from site. The material will be either on sold or sold as scrap material. Any concrete footings associated with the fencing will be removed and disposed of at an authorised waste facility.

## 5 RESOURCE MANAGEMENT

### 5.1 Waste Hierarchy

Wind turbines and associated infrastructure provide valuable resources that can be reintroduced into the circular economy. The prerequisite for this is a clean separation of materials and innovative recycling processes. An efficient use of resources (and material avoidance) is the highest level of the waste hierarchy. A preferably long-term use should be aimed for, as this is the most sustainable use. However, at some point in time, wind turbines will reach the end of their life and valuable resources must be returned to the material cycle. Methods in the following waste hierarchy should be considered:



Source: ETIPWind - How wind is going circular

The preference is to sell all components of the wind farm as recovered equipment. Components not sold as recovered equipment will be sold as scrap or salvage material. The re-sale of components and/or sale of scrap material will assist in funding the decommissioning and rehabilitation works.

## 6 LAND REHABILITATION

### 6.1 Objectives

The general objective of the rehabilitation stage is to return the disturbed areas at the site to preconstruction conditions. Any land disturbed during the construction, operation or decommissioning of the wind farm will be rehabilitated. This includes some areas containing native vegetation and cropping areas.

### 6.2 Extent of rehabilitation works

The rehabilitation will involve the following:

- Removing the top 600 mm of turbine foundations.
- Fracturing the remaining foundation.
- Filling areas with a clean sub-grade material and compacted and formed to match the surrounding area.
- Placement of clean and suitable topsoil.
- Ripping areas to promote resource and seed traps.
- Placement of rocks and vegetative material to reduce erosion and promote resource and seed traps.
- Direct seeding, hand seeding or tube stock revegetation using indigenous species in areas of native vegetation where required.
- Returning areas to pasture.
- Ongoing vertebrate pest and weed control.
- Monitoring progress of the rehabilitation.

It is expected that the following areas will be rehabilitated:

- The foundation area of each of the wind turbines,
- Access roads not acquired by the landholder,
- Crane hardstands and laydown areas not acquired by the landholder,
- The substation site,
- The areas of operation and maintenance facilities (including carpark) areas not acquired by the landholder, and
- The areas where concrete footings are removed (power poles, meteorological towers and wind monitoring masts and fence posts).

### 6.3 On-going monitoring

The planned rehabilitation activities are designed to reintegrate any disturbed area with the surrounding land and existing vegetation to a condition similar to that existing prior to construction. It is possible initial rehabilitation works may be ineffective in some areas due to erosion, farming intrusion or topographical effects impacting the rehabilitated area.

Similarly, it is possible initial reseeding, re-grassing or vegetative replanting activities may be unsuccessful due to inappropriate coverage or weather effects. To ensure the rehabilitation program is successful in the longer term, periodical site monitoring will be undertaken for up to 2 years following decommissioning. It is likely the monitoring will be undertaken by the host landowners in the first instance and any remediation works carried out by the Proponent as required.

Rehabilitation remediation works may include;

- Application of additional water to newly planted vegetation,
- Remedy of poor drainage areas where runoff is insufficient or to prevent erosion,
- Aeration or fertilisation of topsoil to enhance vegetation growth,
- Replanting of any dead vegetation,
- Applying additional backfill material or topsoil, and
- Fencing to keep farming practises and livestock away from rehabilitated areas until established.