RATCH-Australia Corporation

# Decommissioning and Rehabilitation Plan
## Collector Wind Farm ("CWF")

Version 2.2

July 2019

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| 1.1 | 31 Jan 2012 | Final Draft | David Smith |
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| 2.1 | 07 November 2018 | Final update to satisfy condition F2 | Neil Weston |
| 2.2 | 25 July 2019 | Further update | Neil Weston |

**Table of Contents**

## 1. Statutory, Policy and Planning Context

The proposed Collector Wind Farm (CWF) was approved under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and has now been transferred to State Significant Development (Application No. 10_0156). It has also been declared critical infrastructure under Section 75C of the Act, being a renewable energy project with a peak generating capacity greater than 30MW.

The NSW Wind Energy Guideline for state significant wind energy development was released in December 2016. Section 4.3.4 of the Guideline relates to refurbishment and decommissioning, and sets out three specific requirements:

- Refurbishment of turbines may not require a new development application (DA) or a modification of the existing consent if the terms of the existing consent authorise the refurbishment or decommissioning. The need for a modification or a new DA should be considered by the proponent in each instance by reference to what is proposed for the refurbishment or decommissioning.
- The wind energy project owner or operator, rather than the "host" landowner, must retain responsibility for decommissioning. Proponents must identify and address all relevant issues for decommissioning and rehabilitation in the project EIS and include a commitment that the operator will be responsible for decommissioning and rehabilitation. CWF is fully compliant with this requirement, which is addressed in Section 3.
- Proponents and host landowners should consider refurbishment, decommissioning and rehabilitation when negotiating landowner agreements. CWF is fully compliant with this requirement which is addressed in Section 2.4.

## 2. Introduction

The proposed Collector Wind Farm involves the construction, operation and decommissioning of a wind farm including:

- up to 55 wind turbine generators and associated infrastructure;
- a wind farm substation and transformers;
- underground cabling and an overhead transmission connection;
- operations and maintenance building; and
- access tracks.

CWF is located within the Upper Lachlan Shire approximately 55km north-east of Canberra and 35km south-west of Goulburn, situated in the NSW Southern Tablelands along the Cullerin Range.

The project site falls within the NSW Government's Renewable Energy Precinct No. 4 – ACT/NSW Boarder Region. The project site is bounded to the north by the Hume Highway and to the south by Collector Road.

The proposed layout of the CWF is shown in Figure 1.

### 2.1. Proponent

The Proponent of CWF is RATCH-Australia Developments Pty Ltd Limited, through a fully-owned special purpose subsidiary, Collector Wind Farm Pty Ltd, created specifically to further the project. For the purposes of this decommissioning plan, the Proponent will be referred to as "RATCH-Australia".

### 2.2. Main components of the constructed wind farm

Main elements of the wind farm will include:

- Roads and access tracks
- Crane hardstands and construction lay down areas
- Crossings over waterways
- Underground and overhead electrical cabling
- Turbine, step up transformer and substation footings
- Wind turbine generators (including the tower, nacelle and blades)
- Step up transformers and substation
- Construction compound with temporary site offices and facilities;
- Long-term  Control Room with Storage compound and car park
- Long-term wind-monitoring masts

The decommissioning and or site rehabilitation associated with each of these elements is discussed in Section 5 of this plan.

### 2.3. Expected operational life of the wind farm

It is anticipated the initial operational life of CWF will be 25 years after the completion of commissioning of the full facility. At the end of this initial operating period, three options may be considered for the wind farm

a) Repowering: involves the removal and replacement of the generation equipment within the wind farm with newer, more efficient or more advanced generation equipment, extending its life by 20 to 25 years

b) Refurbishment: involves undertaking a major overhaul of the existing generation equipment, replacing worn or degraded components with new components, extending its life by approximately 10 to 15 years
c) Decommissioning: involves the complete removal of the wind farm and associated infrastructure and components for restoration of the land, in accordance with the requirements of the development approval and of the lease agreements with the project landowners .

## 2.4. Consultation with landowners regarding decommissioning

Ongoing discussions are maintained with each of the host landowners regarding the development and delivery of the project. In the past this has included discussions about decommissioning plans and associated activities. Feedback from these discussions has indicated that some landowners may prefer some elements of the wind farm to remain after decommissioning. This could include roads and access ways, crossings built over water courses, fencing, signage, trees or other planted foliage, and other infrastructure such as some of the turbine hardstands.

It is understood that host landowner decommissioning preferences may change over time, or as a result of changes to land ownership over the life of the wind farm. Given that potential for change, and in accordance with the requirements of the development approval, RATCH-Australia retains full responsibility for decommissioning all elements of the wind farm in accordance with this plan (as updated over time).

Further consultation will be undertaken with the host landowners during the future detailed planning phase of the decommissioning, to understand landowners' requirements at that time, and to update / revise this plan accordingly.

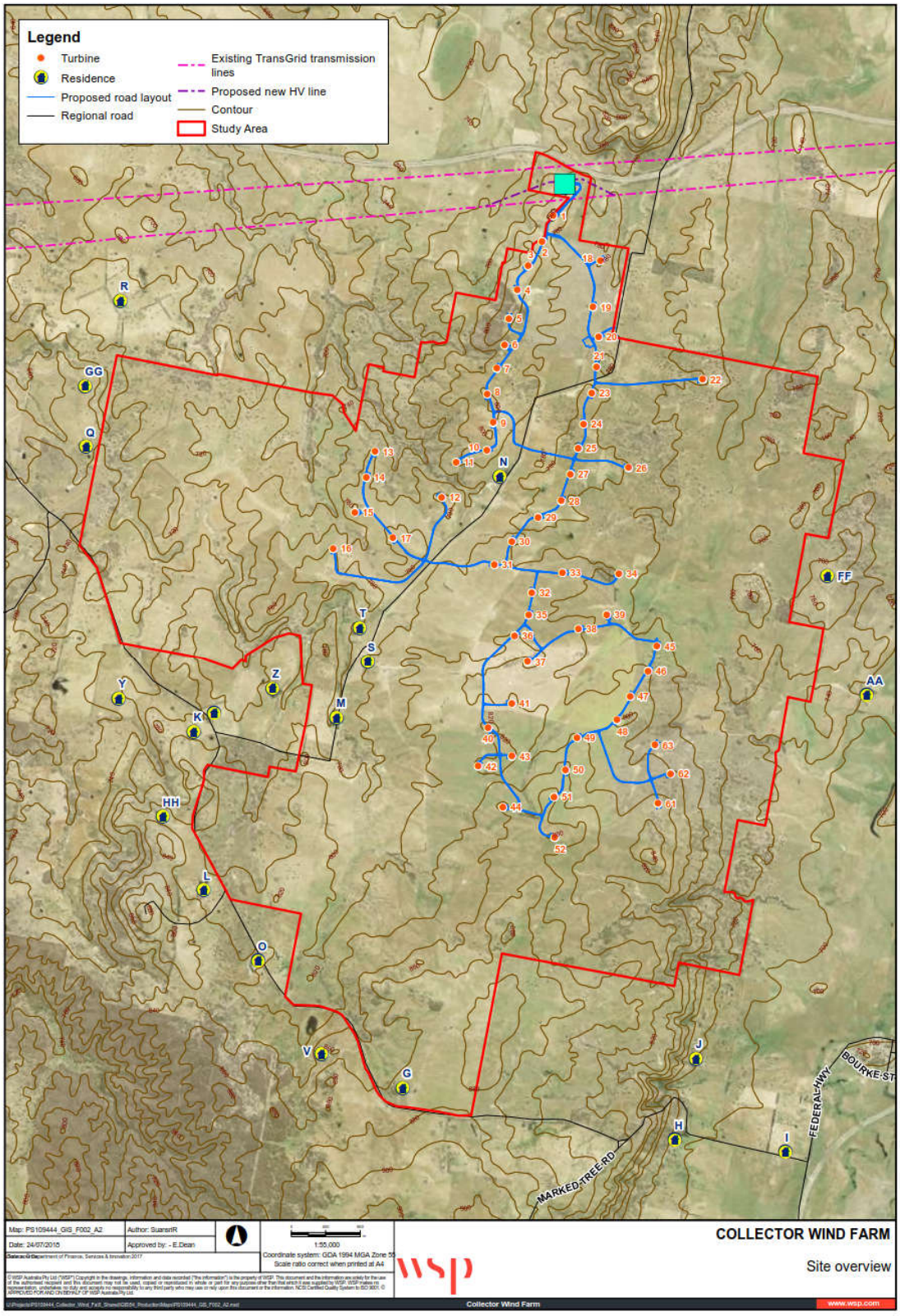


**Figure 1 - Proposed layout, Collector Wind Farm**

## 3. Decommissioning and rehabilitation obligations

RATCH-Australia recognises and accepts full responsibility for wind farm decommissioning in accordance with Condition F1 of the development approval and the lease agreements between RATCH-Australia and all host landowners.

### 3.1. Decommissioning Conditions

The decommissioning would be undertaken in accordance with the *Part F Additional Procedures* conditions of the project approval (MP10_0156), in particular Condition F1.

*Unless otherwise agreed by the Secretary, within 18 months of the cessation of operation of the Project, the site shall be decommissioned and returned by the Proponent, as far as practicable, to its condition prior to the commencement, in consultation with the relevant landowner(s) and to the satisfaction of the Secretary (and in accordance with the Decommissioning and Rehabilitation Plan included in the Collector Wind Farm Environmental Assessment (June 2012)).*

*All generating facilities and associated infrastructure (including but not necessarily limited to the substations and transformers, switchyard, operation and maintenance facility, overhead transmission lines and access roads) shall be removed from the site unless otherwise agreed by the Secretary. Project related infrastructure (including access roads) may only be retained on site, where the Proponent has demonstrated to the satisfaction of the Secretary prior to the commencement of decommissioning, that these components: are permissible under the site's statutory landuse provisions in force upon commencement of the decommissioning; would not pose an ongoing impediment to permissible landuse at the properties; and their retention has been agreed to in writing (with evidence provided to the Secretary) by the relevant landowners.*

In addition, in accordance with Condition A8 and Condition F3, any individual turbine that ceases operating for a period of more than 12 consecutive months shall be dismantled within 18 months of the date that the wind turbine was last used to generate electricity.

### 3.2. Landowner Lease Agreements

The lease agreements with the landowners incorporate specific clauses in regards to actions and responsibilities at “Termination of Term / End of Lease”. In particular, Clause 18.3 defines RATCH-Australia’s responsibility (as Lessee) for “Removal of Lessee’s Property” (ie decommissioning), as follows:

*18.3 Removal of Lessee's Property*

> *Within 12 months after the expiry of the Term or sooner termination of this Lease, during which period the Lessee shall pay to the Lessor the Rent payable immediately prior to the expiry of the Term or sooner termination of this Lease (such Rent to be increased on the anniversary of the date of expiry of the Term or sooner termination of this Lease) and until such time as the Lessee’s obligations under this clause 18.3 has been satisfied the Lessee shall:*

(a) *give back the Leased Area and the Easement Land (excluding the Wind Turbine Generators and the Electrical Plant and any other of the Lessee's Property which shall remain the property of the Lessee) to the Lessor;*

(b) *remove all signs and advertisements;*

(c) *remove from the Land all permanent buildings, fences and other structures and Accessways constructed by the Lessee thereon (other than Permanent Foundations);*

(d) *leave a minimum of 750mm of soil above the Permanent Foundations which the Lessee is not required pursuant to paragraph (c) to remove and grade and contour the surface consistent with surrounding areas;*

(e) *fracture all concrete bases constructed by the Lessee to the extent reasonably practicable so as to allow the development and growth of vegetation;*

(f) *reinstate the Land and the improvements thereon to the condition as at the Commencement Date, including making good any damage caused by the Lessee's Permitted Use, to the Lessor's reasonable satisfaction;*

(g) *restore and revegetate the surface of the Land, to its condition as at the commencement of the Lease, including by sowing grass or pasture seed on the surface on those parts of the Land referred to in this clause in consultation with the Lessor and at all times to the Lessor's reasonable satisfaction;*

(h) *repair any damage caused by the activities listed in this clause 18.3;*

(i) *remove any access tracks or paths constructed by the Lessee across the Land that the Lessor asks the Lessee to remove (acting reasonably);*

(j) *subject to paragraph (k), remove any underground cabling which the Lessor asks the Lessee to remove;*

(k) *not be required to remove any underground cabling under any access tracks or paths which the Lessor has not asked the Lessee to remove;*

(l) *remediate any degradation of the Land caused by the Lessee's use of the Land to the condition as at the Commencement Date, to the Lessor's reasonable satisfaction; and*

(m) *otherwise in accordance with any Authorisation relating to the Wind Farm.*

This obligation on RATCH-Australia is guaranteed by a Lease Security commitment within the lease agreement (Clause 33), whereby a defined cash reserve or bank guarantee (or similar) is set aside prior to full operations commencing. This Security can be called upon by the landowner(s) to undertake decommissioning of the project in the event that RATCH-Australia fails to do so.

## 4. Public consultation prior to decommissioning

Public consultation will be undertaken well in advance of the commencement of the decommissioning of the wind farm.

The key objectives of the consultative process will be to:

- ensure the local community and stakeholders are provided with appropriate information about the planned decommissioning,
- understand key issues of interest or concern within the local community,
- allow for the amendment of plans to accommodate community and / or stakeholder feedback where possible,
- ensure local authorities are kept informed about the proposal,
- ensure an open forum for communication between many diverse stakeholders to resolve any issues or concerns

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

- timing and phasing of the works to minimise impacts on agricultural and farming activities (i.e. avoiding lambing or harvest periods),
- management of traffic on site access tracks, Lerida Rd South, and the intersection between Lerida Rd South and Hume Highway to minimise traffic risks and impacts,
- coordination of local employment, business and contractor opportunities in decommissioning, to ensure local area participation is maximised
- coordination of logistical issues for decommissioning, to ensure adequate availability of contractor accommodation, food, fuel, entertainment etc

The existing Community Consultative Committee ("CCC") for the project will remain active throughout the project up and until the conclusion of the decommissioning phase. The CCC will be available to guide and inform the Proponent on matters of interest to the community, and will provide an additional forum for communication between stakeholders.

## 5. Description of main decommissioning and rehabilitation activities

In accordance with condition F5 of the project approval, a Decommissioning Environmental Management Plan (DEMP) would be prepared for the project. This Plan would be similar to the Construction Environmental Management Plan (CEMP) and would outline the environmental management practices and procedures that are to be followed during decommissioning. The DEMP shall be prepared in consultation with relevant agencies and in accordance with the *Guideline for the Preparation of Environmental Management Plans* (DIPNR 2004).

This chapter provides an outline of key elements to be included in this Decommissioning Environmental Management Plan.

### 5.1. Roads & Access

Roads and access tracks within the project will be constructed using a suitable gravel road base, and will not be sealed. Roads and access tracks are likely to be retained after rehabilitation of the site, dependent on the preferences of the host landowners.

In the event that any roads and tracks are retained, RATCH-Australia will provide all required supporting information to the Secretary of the NSW Department of Planning and Environment (the Secretary) that this is consistent and in compliance with the requirements of condition F1.

Where removal / remediation of the roads and access tracks is required, gravel will be removed from access roads and treated accordingly. The primary objective will be to reuse wherever possible (either on or offsite), with alternatives such as disposal offsite at a pre-approved location.

All drainage structures, including culverts, end sections, stone outlet protection, etc., will be removed and reused where possible, or disposed of accordingly.

Cleared areas of roads or drainage would be backfilled with clean, compatible sub-grade material and be graded to preserve the slope of the surrounding area. The ground will be de-compacted or aerated as appropriate, dressed with appropriate topsoil, and seeded or planted with appropriate grasses or foliage to reintegrate it with the surrounding environment.

In regards to condition F4, prior to any decommissioning commencing, RATCH-Australia will engage an independent, qualified person or team to undertake consultation with the relevant road authority (eg Upper Lachlan Shire Council and NSW Roads & Maritime Services) to manage the use of external roads for decommissioning activities. This will include preparation of a dilapidation survey of Lerida Road South post-commissioning and associated rehabilitation as required.

### 5.2. Crane hardstands and lay down areas

Crane hardstands will be constructed in a similar fashion to the site roads, with a suitable gravel road base and no sealing. . Laydown areas may be constructed in a similar manner, or may simply be large flat, cleared areas set aside in well drained parts of the site.

Removal / remediation of these areas would be undertaken in the same way as for the roads and access tracks (as per 5.1 above), or retained 'as is' at the discretion of the host landowners subject to compliance with condition F1.

### 5.3. Crossings over waterways

The current design of the wind farm layout is designed to avoid any major watercourses that would require bridging or fording, and is based on use of culverts where necessary. Hence it is highly unlikely that that any major rehabilitation would be required. Installed culverts would most likely be retained after rehabilitation of the site, at the discretion of host landowners, or removed and reused / disposed of as described above.

In the unlikely event that any bridges or fords were installed and needed removal, they would be completely dismantled and all materials taken away for re-use or recycling where possible. Where removed materials could not be recycled or reused, they would be disposed of appropriately.

Slopes will be re-graded as close as possible to their former natural grade, and where there had been some disturbance to the water course bed, it would be rehabilitated using stones or material closely replicating the surrounding terrain.

### 5.4. Electrical cabling

The majority of the electrical cabling used in the project to connect the wind turbines to the electrical substation will be installed underground at various depths, from a minimum of 800mm.

Cabling and conduits would not be recovered during decommissioning, and will be completely deactivated prior to abandonment. The cables and conduits contain no materials known to be harmful to the environment, and the process of digging up and removing the underground cabling is considered to have a greater impact on the surrounding environment than leaving them in place.

Should removal of the cabling and conduits be required for any reason, they will be dug up in a manner that results in minimal impact on the surrounds. Any disturbed areas would be backfilled with clean, compatible sub-grade material and would be graded to preserve the slope of the surrounding area. The ground would be de-compacted and / or aerated as appropriate, dressed with appropriate topsoil, and seeded or planted with appropriate grasses or foliage to reintegrate it with the surrounding environment.

Any overhead cabling or transmission lines that may be used on the site would be completely dismantled, removed and recycled where possible. The supporting poles will be removed and the holes filled in with compatible sub-grade material and revegetated as required. In any areas where environmental damage from complete removal could outweigh the benefits, the poles will be sawed flush with the surrounding grade.

### 5.5. Footings

Each wind turbine tower would be erected on a concrete and steel footing. All wind turbines across the site will have gravity footings, requiring approximately 450m$^3$ of steel reinforced concrete to be poured to a depth of approximately 2.5m. The footings are sub-surface, and covered with up to 0.5m of excavated soil, with surface rehabilitation (topsoil & seeding) following completion of construction.

Given the significant amount of disturbance caused on site if the footings were to be excavated and removed, the recognised decommissioning approach is to remove all the protruding cabling, conduit and structure is removed, and then fracture the footing to facilitate natural decomposition / erosion and leave in place below ground. The footings would be covered with a layer of compatible sub-grade material to a minimum depth as defined in the leases with the host landowners and graded to preserve the slope of the surrounding area. The ground will be dressed with appropriate topsoil, and seeded or planted with appropriate grasses or foliage to reintegrate it with the surrounding environment.

### 5.6. Wind turbine generators (including the tower, nacelle and blades)

- Deactivation of turbines and “make safe”

The first step in decommissioning of the wind turbine generators would be to ensure they are fully deactivated from the surrounding electrical infrastructure, are locked down and hence made safe.

Standard manufacturer procedures for lockdown and make safe, as described in the turbine operating manuals would be followed. If the turbines were to be dismantled for resale / reuse, procedures for deactivation and make safe would be documented by the manufacturer or purchaser representatives as required.

- Removal of all liquids and other turbine consumables

Prior to equipment disassembly, liquid waste management specialists would be engage to safely drain all operating fluids (lubricants, oils, greases, coolants, etc.) and remove any consumables from the wind turbines.

Liquid waste and any stored fluids would be recycled as much as possible, and if not possible, disposed of at an approved waste facility. The handling, storage, transportation and disposal of any liquid waste and/or other hazardous materials would be conducted in accordance with the project’s Hazardous Waste Management Plan, Best Management Practices and regulatory compliance.

- Disassembly of blades, nacelle and tower

Based on current market conditions, it is considered likely that the wind turbines will have significant resale value when decommissioned, whether for direct reuse or from the material scrap value. As such, the process of dismantling the blades, towers and nacelle would be undertaken with care and precision to ensure their resale value is retained. Disassembly of the blades, nacelle and tower would broadly be the reverse of their original assembly – involving dismantling of the various components, lowered to ground level by crane for transportation to on-site storage areas or off-site.

Each turbine blade would be lowered whole, and the nacelle would be dismantled and lowered according to manufacturer’s specifications. The tower would be separated into its individual components (as per its installation) and taken away.

- Reuse or recycling of the tower and nacelle

Wind turbine towers and nacelles are typically made up of high quality metallic and alloy materials, as well as a limited amount of plastics and composite materials. It is

anticipated that the towers and nacelles would have significant resale value in the second hand market when the wind farm is decommissioned.

If no resale options exist, the towers and nacelles would be recycled as scrap metal. Ferrous and non-ferrous materials and the various alloys utilised would be separated and sold as scrap. Recycling of scrap metal is widespread throughout Australia and globally, covering all type of metals commonly used in construction and industry. It is anticipated that all of the metallic components of the towers and nacelles would be sold and recycled with very limited quantities requiring appropriate disposal.

Any plastics or composites that could not be reused or recycled would be gathered and would be crushed and compacted and disposed of appropriately.

- Recycling or disposal of turbine blades

Wind turbine blades are typically made up of a range of strong and lightweight plastic, polymer and composite materials such as glass fibre or carbon fibre, plastic polymers such as polyester or epoxy, sandwich core materials such as PVC or PET. The nature of the materials and their fabrication makes it difficult to recycle the blades, and because of the rigorous safety and performance requirements for the blades, it is unlikely they would be able to be re-used separately from the entire wind turbine.

Recycling of the material used in wind turbine blades currently involves pulverisation of the blades into a fine powder, for use as a composite in cement manufacture. As the global wind industry continues to grow, and as increasing numbers of older wind farms require repowering or decommissioning, other commercial options for recycling of wind turbine blades are expected to become available.

If no feasible recycling options are identified or available for the wind turbine blades at the time of decommissioning, the blades would be crushed and compacted and disposed of appropriately.

### 5.7. Site Office / Control Room / Storage Compound and car park

The O&M Building, used for the control of the operating wind farm and to provide facilities for maintenance (including an equipment storage compound and car parking will be built on the site of the construction compound. If requested by the landowner, the building would be maintained in place for appropriate re-use in the rural setting.

If not, the O&M building would be demolished and removed, in accordance with standard demolition practices. Footings for any demolished site buildings would be left in place and rehabilitated in accordance with the principles set out for the turbine foundations (as above).

The associated storage compound and car parking, constructed in a similar way to the turbine hardstands, would be removed / rehabilitated in the same way (as described in 5.2).

### 5.8. Ongoing site monitoring and rehabilitation

The primary objective of any rehabilitation activities is to reintegrate the grade and grass / foliage / vegetation of any disturbed terrain with the surrounding area. It is possible initial grade restoration efforts in some areas will be ineffective, with erosion or other topographic impacts occurring on rehabilitated land. Similarly, it is possible

initial re-seeding or re-grassing efforts, or foliage planting activities may be unsuccessful, with seeds, grass or foliage failing to provide appropriate coverage.

To ensure the rehabilitation of the site is successful for the long term, ongoing site monitoring will be undertaken for a period of up to 2 years post-decommissioning. It is likely such site monitoring will be undertaken by the host landowners. Remedial works will remain the responsibility of RATCH-Australia and be undertaken to ensure any unsuccessful initial site rehabilitation activities are appropriately and successfully rectified.

Remediation activities may include:

- spreading of additional subgrade material, backfill or topsoil
- works to restore drainage to areas when ponding or puddling is occurring, or to prevent excessive stormwater runoff from causing erosion
- aeration or fertilisation of soil to promote growth or grasses or foliage
- replanting of any dead trees or foliage, or reseeding of any dead grasses

## 6. Timeframe for decommissioning activities

It is anticipated all major onsite decommissioning activities would be completed within a period of nine to twelve months, with ongoing site monitoring and rehabilitation activities continuing for up to two years beyond this time.

Figure 2 below sets out the indicative decommissioning schedule.

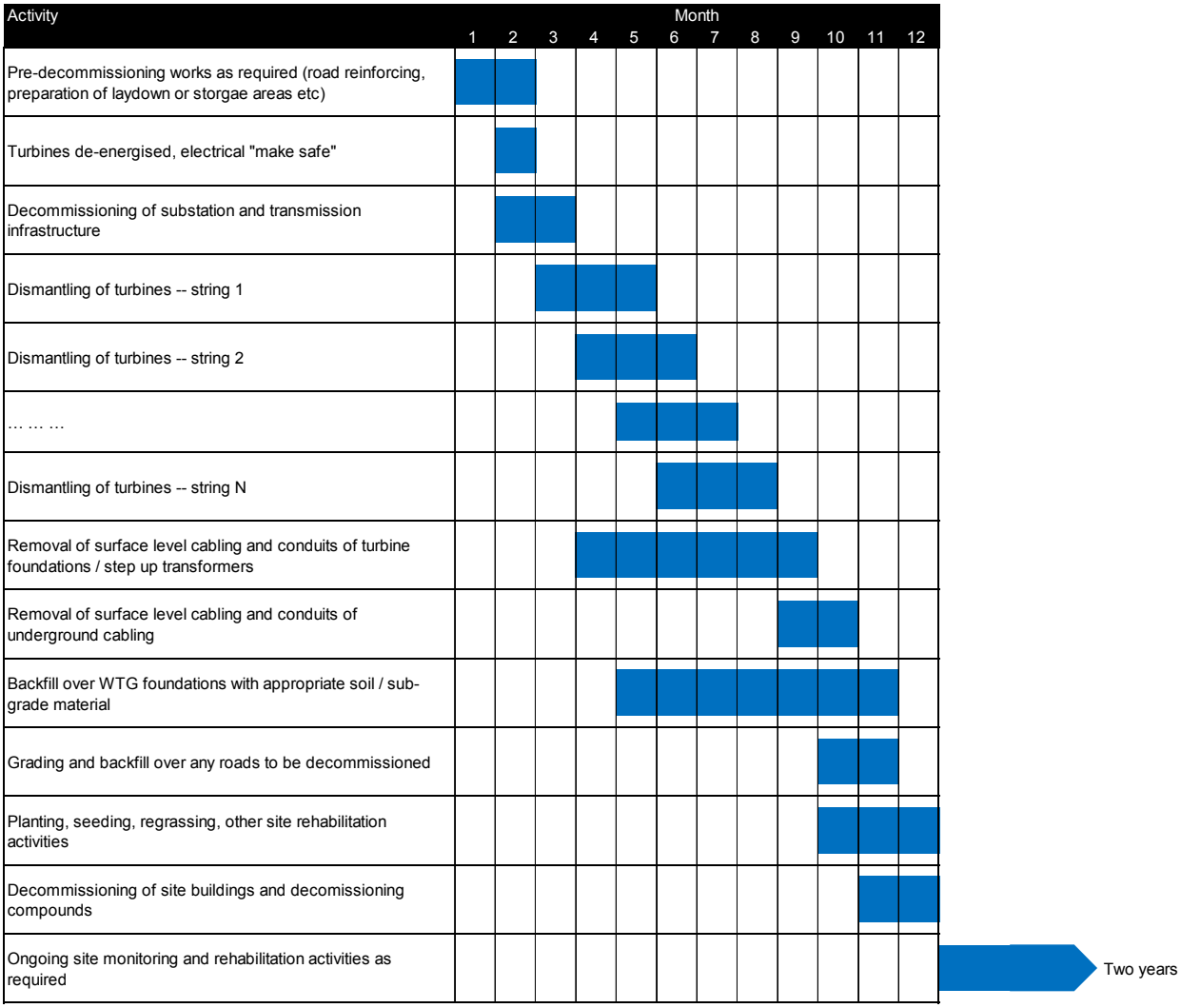


**Figure 2 – Indicative Decommissioning Schedule**

# 7. Transport of the dismantled turbines

A detailed Traffic and Transport Assessment was undertaken for the development application for the project and was included as Appendix H of the Environmental Assessment Report. This section of the Decommissioning and Rehabilitation Plan draws on the results and conclusions of this study.

Prior to decommissioning, RATCH-Australia would engage an independent, qualified person or team to undertake consultation with the relevant road authorities as part of the preparation of the DEMP required under condition F5. This will include assessment of all roads proposed to be used for over-mass and/or over-dimensional transport to determine safe usage of roads for the proposed haulage during decommissioning.

This chapter provides an outline on what is proposed.

## 7.1. Access for trucks and cranes required for decommissioning

Site access is from Hume Highway via an existing intersection with Lerida Road South, and then along Lerida Road South onto the site. All turbine component traffic will access the site via the main site access approximately 2km from the intersection.

Lerida Road South will be upgraded to be fit-for-purpose for construction of the project, and hence will similarly be suitable for use for decommissioning.

Similarly, once onsite, the existing project roads and access tracks (designed for use in construction) would be utilised by vehicles and equipment required for decommissioning.

## 7.2. Transport routes for dismantled components

The decommissioned wind turbines (including towers) may be sold as second hand equipment, recyclable or scrap material. The exact transport route of the components would be determined by the location of the purchaser and the suitability of the transport corridor from the wind farm site, and would be defined in an updated decommissioning plan at the time of decommissioning. Given the proximity of the project to the Hume Highway, access to the national road network should facilitate transport to any destination within Australia.

If the decommissioned turbines or components require shipping then a route similar to the original delivery would most likely be used, depending on the road conditions and road use patterns at that time, with haulage back to Port Kembla for export. The expected delivery route for shipped equipment is shown below in Figure 3.

Notwithstanding the final destination, all egress from the site by heavy and over-dimensional vehicles will turn left (west) from Lerida Road South onto the Hume Highway, in accordance with the obligations under condition D20.

Similarly, use of over-dimensional vehicles on the road network will be subject to securing relevant permits under the Heavy Vehicle National Law in NSW.

### 7.3. Temporary storage areas

Should temporary storage areas be required on site, these would be located in close proximity to main site roads to facilitate easy transport to their eventual destination.

The location of any such temporary storage areas would be determined at the time of decommissioning in consultation with the applicable land owner. It is likely temporary storage areas would use the same locations as the laydown areas identified during the environmental assessment.

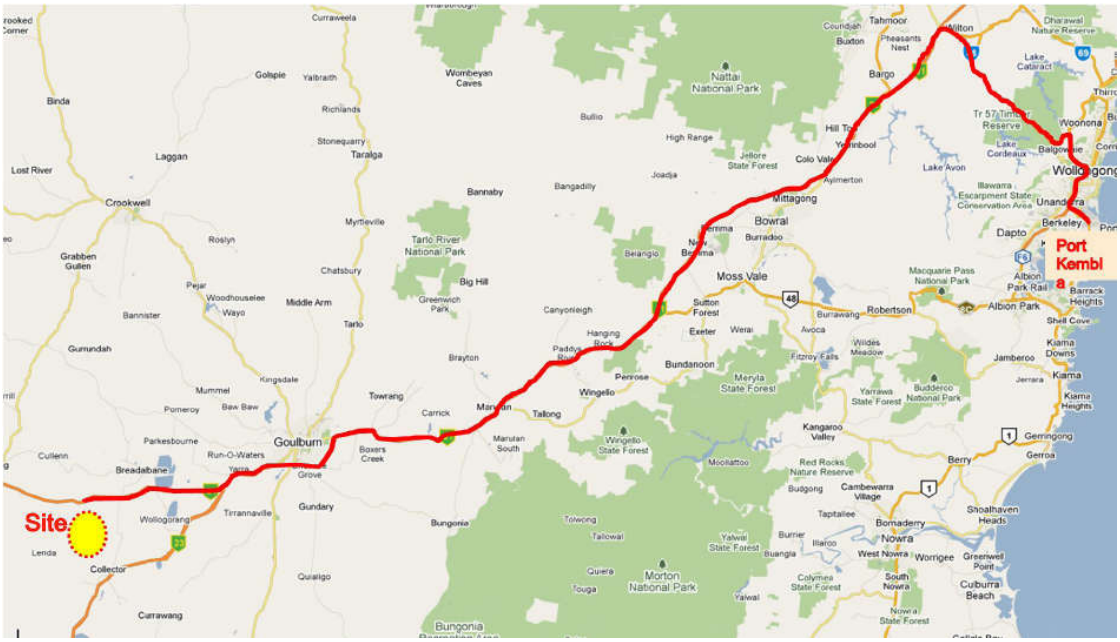


**Figure 3 - current proposed transport route from Port Kembla to Collector wind farm**

# 8. Cost estimate and funding for decommissioning

## 8.1. Cost estimate - 2012

In 2012, RATCH-Australia engaged Sinclair Knight Merz to provide an estimate of the indicative costs of decommissioning. Sinclair Knight Merz undertook a bottom up Order Of Magnitude ("OOM") analysis based on units of work and current unit rates. SKM also made appropriate allowances for income from scrap sales of decommissioned materials.

At the time, SKM estimated the total costs for decommissioning of CWF, based on a project consisting of 68 wind turbines, in accordance with this Decommissioning Plan in 2012 dollars to be approximately $25.5 million. This equates to approximately $375,000 per turbine.

Based on the reduction to the current project size of 55 wind turbines, the equivalent 2012 cost would be around $22.5 million (~$395k per turbine). With a typical CPI estimate of 3% per year, this would be equivalent to around $27 million (~$488k per turbine).

The detailed OOM cost estimate provided by SKM is included as Appendix 1 to this Decommissioning Plan.

## 8.2. Cost estimate - 2019

RATCH-Australia has undertaken additional analysis and benchmarking work to provide further support to assessment of the costs of decommissioning the Collector wind farm.

The project-specific analysis was undertaken for CWF based on the reasonable assumption that decommissioning would require the same equipment, personnel and activities as for turbine installation – including main and support cranes, and over-dimensional haulage vehicles. On this assumption the costs of decommissioning would be similar to those for installation; and from this the wind turbine supplier has provided a cost estimate range of $380k - $420k per turbine (based on contracted costs for equipment haulage and installation).

As a comparison, RATCH-Australia has undertaken benchmarking of similar decommissioning costs from the decommissioning plans in other recent wind farm planning applications in NSW. This data shows cost estimates at the lower end of RATCH-Australia's own data in the range of $200k - $380k per turbine.

## 8.3. Funding for Decommissioning

RATCH-Australia analysis of market data undertaken as part of the development application, and subsequently updated for this revised Plan, (as presented in Appendix 2) shows that the sale value of recovered wind turbines and associated equipment would exceed the estimated costs for decommissioning.

Market prices for recovered / refurbished wind turbines varies significanty dependent on turbine type, condition, capacity etc, with summary details for the multi-MW capacity wind turbines (considered nearest equivalent to the turbines at Collector) given in Table 1 below.

**Table 1 – Second-hand Wind Turbine Prices**

| 2012 Pricing | | | | | |
|---|---|---|---|---|---|
| Broker | Turbine | Size | Unit Price | Exchange rate | Unit Price A$ |
| MWPS | Bonus 1000 | 1MW | EUR240,000 | 1AUD:EUR0.79 | $303,800 |
| MWPS | GE 1.5SLE | 1.5MW | US$1,100,000 | 1AUD:US$1.05 | $1,047,600 |
| MWPS | GE 1.5S | 1.5MW | EUR350,000 | 1AUD:EUR0.79 | $443,000 |
| MWPS | MWT 1000 | 1MW | US$720,000 | 1AUD:US$1.05 | $685,700 |
| MWPS | NEG Micon NM92 | 2.75MW | EUR1,085,000 | 1AUD:EUR0.79 | $1,373,400 |
| Repowering | Vestas V66 | 1.65MW | EUR335,000 | 1AUD:EUR0.79 | $424,000 |
| WTMP | GE 1.5S | 1.5MW | EUR300,000 | 1AUD:EUR0.79 | $379,700 |
| | | | Weighted average per unit | | $665,735 |
| 2019 Pricing | | | | | |
| | Nordex N90 | 2.5MW | EUR360,000 | 1AUD:EUR0.63 | $575,000 |
| | Enercon E70 | 2MW | EUR270,000 | 1AUD:EUR0.63 | $431,250 |
| | Vestas V90 | 3MW | EUR477,500 | 1AUD:EUR0.63 | $762,700 |
| | Gamesa G80 | 2MW | EUR290,000 | 1AUD:EUR0.63 | $463,200 |
| | NEG Micon NM72 | 2MW | EUR115,000 | 1AUD:EUR0.63 | $183,700 |
| | WWD3 D90 | 3MW | EUR1,500,000 | 1AUD:EUR0.63 | $2,395,500 |
| | NEG Micon NM92 | 2.75MW | EUR1,200,000 | 1AUD:EUR0.63 | $1,916,700 |
| | | | Weighted average per unit | | $886,717 |

This analysis indicates that the recovered value of the turbines would exceed the cost of removal and rehabilitation.

## 8.4. Decommissioning Shortfall

Clearly the market value of the recovered turbines, based on current markets, would exceed the cost of decommissioning. However this may change, and this positive cost / sale balance may tip negatively in the future.

In order to manage such a scenario, RATCH-Australia will update this plan in detail 10 years after the completion of commissioning of the full facility plan and every five years after that, with a more detailed analysis of the estimated costs for decommissioning and resale value of the turbines as outlined above.

If, at that time, the analysis shows that the resale value (or scrap value) of the turbines is unlikely to fully cover the costs of decommissioning, RATCH-Australia commits to establishing a dedicated decommissioning reserve to cover decommissioning costs. This reserve would be established out of operating cashflows, with an appropriate percentage of cash generated by the wind farm directed into this reserve over a period of several years, until the reserve was fully cash funded.

## 8.5. Decommissioning Security

Similarly, in the unlikely event that RATCH-Australia was unable to fulfil its decommissioning, the terms of the landowner agreements include provision of a lease security in the form of a cash reserve or bank guarantee to cover the decommissioning costs.

## Appendix 1: Cost estimate for Decommissioning provided by SKM

Sinclair Knight Merz
Cnr of Cordelia and Russell Street
South Brisbane QLD 4101 Australia
PO Box 3848
South Brisbane QLD 4101 Australia

Tel: +61 7 3026 7100
Fax: +61 7 3026 7300
Web: www.globalskm.com

Anthony Yeates
Ratch Australia Corporation Limited
Level 13, 111 Pacific Highway
North Sydney
NSW
2060

*06 March 2012*

*Sinclair Knight Merz 05 03 12.docx*
*QH10392*

Dear Anthony,

We are pleased to provide you with an order of magnitude estimate for the decommissioning of the Collector windfarm.

Our estimate is based on the following:

- 68 WTGs
- Located in Collector near Goulburn in southern NSW.
- Availability of competent labour resources local to the site, therefore no provision for accommodation or travel costs
- Availability of cranes of sufficient capacity local to the site
- Good access to site which is adjacent to Hume Highway, so no transport difficulties
- Turbines approximately 85 metres in height to the nacelle
- Foundations and roads will not be removed. Foundations will be covered to a depth of 300 mm
- Underground cable conduits and culverts will remain in place
- We have also applied industry practice norms for the following:
  - ❖ Contractor's support facilities
  - ❖ Mobilisation and demobilisation
  - ❖ Owner's costs
  - ❖ Fees/bonds/guarantees
  - ❖ Insurances

We have made appropriate allowances for income for scrap, based on discussions with local merchants and our internal database.

Assumptions:

- Excludes Cultural Heritage allowances
- Excludes Human Resources allowances
- Excludes Socio-economic allowances
- Excludes post closure maintenance and monitoring
- Removal of superstructure includes for structure up to 300mm below ground level (included in the 280 tonne allowance for each WTG)
- Excludes allowance for the removal of fuels lubricants and the like from equipment
- Excludes removal of any asbestos and lead etc.
- All roads, access tracks, bridges, culverts to remain
- All hardstands, laydown areas to remain
- All underground cabling to remain
- All foundations to remain (as mentioned above)
- Storage compound, carpark to remain
- All services to remain
- Estimate is conceptual/OOM ± 50%
- WTG weight assumed at 280t ea
- Estimate is current 1st quarter 2012

Please do not hesitate to contact me with any queries.

Yours sincerely

**Brian Eagers**

Phone: +61 07 3026 7598
Fax: +61 07 3026 7444
E-mail: beagers@globalskm.com

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Project: Collector Windfarm | | | | | **Take-off / Estimate Sheet** | | Date : | 6/03/2012 | |
| | no of units | no of members per unit | length | width | height | total | ref | description | unit | quan | rate | amount |
| | | | | | | | **Clean-up Costs** | | | | | |
| | | | | | | | | no allowance for clean up (operational contamination) | n/a | | | |
| | | | | | | | **Decommissioning/demolition** | | | | | |
| | | | | | | | | **Roads and Access Tracks** | | | | |
| | | | | | | | | All roads and crossings left in place | km | 42.00 | - | - |
| | 1 | 1 | 42.00 | 1.00 | 1.00 | 42.00 | | per email | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 42.00 | | | | | | |
| | | | | | | | | **Crane Hardstands and Construction Laydown Areas** | | | | |
| | | | | | | | | All roads and crossings (hardstands) left in place | n/a | - | - | - |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | | | **Bridges and Fords over Waterways (culverts)** | | | | |
| | | | | | | | | All bridges and fords left in place | n/a | - | - | - |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | | | **Underground and Overhead Electrical Cabling** | | | | |

| | | | Project: Collector Windfarm | | | | | **Take-off / Estimate Sheet** | | Date : | 6/03/2012 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | no of units | no of members per unit | length | width | height | total | ref | description | unit | quan | rate | amount |
| | | | | | | | | All underground cabling left in place | n/a | - | - | - |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | | | dismantle and remove all overhead cabling | m | 250.00 | 10.00 | 2,500.00 |
| | 1 | 1 | 250.00 | 1.00 | 1.00 | 250.00 | | 11 Kv lines allow 2 km | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 250.00 | | | | | | |
| | | | | | | | | **Turbine Step-up Transformer and Substation Foundations** | | | | |
| | | | | | | | | All foundations left in place | n/a | - | - | - |
| | | | | | | - | | Assumed all fdns are 300 mm below ground level | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | | | **Wind Turbine Generators (Including tower, nacelle and blades)** | | | | |
| | | | | | | | | Dismantle complete WTG and load for cart away | tonne | 19,040.00 | 600.00 | 11,424,000.00 |
| | 68 | 1 | 280.00 | 1.00 | 1.00 | 19,040.00 | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 19,040.00 | | | | | | |
| | | | | | | | | Allow cranes and support to lower turbines to ground | item | 1.00 | 7,352,800.00 | 7,352,800.00 |
| | 1 | 1 | 1.00 | 1.00 | 1.00 | 1.00 | | see crane calc | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 1.00 | | | | | | |
| | | | | | | | | Allow to cart away to scrap | tonne | 19,040.00 | 16.00 | 304,640.00 |

| | | | Project: Collector Windfarm | | | | | **Take-off / Estimate Sheet** | | Date : | 6/03/2012 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | no of units | no of members per unit | length | width | height | total | ref | description | unit | quan | rate | amount |
| | 68 | 1 | 280.00 | 1.00 | 1.00 | 19,040.00 | | | | | | |
| | | | | | | - | | allow 40.0 m3/ truck&trailer (7.85 x 30% = 2.355 t/m3 vol scrap steel) | | | | |
| | | | | | | - | | say $5.00 /km (1500/trip) | | | | |
| | | | | | | 19,040.00 | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | Allow to dispose of in landfill | m3 | 33,660.00 | 18.00 | 605,880.00 |
| | 68 | 3 | 55.00 | 3.00 | 1.00 | 33,660.00 | | | | | | |
| | | | | | | - | | say structure 300kg / m3 ? (sg approx 1500/m3) | | | | |
| | | | | | | - | | $60.00/tonne | | | | |
| | | | | | | 33,660.00 | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | **Step-up Transformers and sub-stations** | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | Site Office / Control Room / Storage Compound and Carpark | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | Refurb site office to residence | m2 | 200.00 | 500.00 | 100,000.00 |
| | 1 | 1 | 200.00 | 1.00 | 1.00 | 200.00 | say 200 m2 | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 200.00 | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | Dismantle and remove control Room | item | 1.00 | 15,000.00 | 15,000.00 |
| | 1 | 1 | 1.00 | 1.00 | 1.00 | 1.00 | | | | | | |
| | | | | | | - | | say Demountable 6.0 x 2.4 m | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 1.00 | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | Storage Compound and Carpark left in place | n/a | - | - | - |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | Dismantle and remove transformers | n/a | - | | - |
| | | 1 | 1.00 | 1.00 | 1.00 | - | | ( included with WTG weight ) | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | | | | | | | |

| | | | Project: Collector Windfarm | | | | | **Take-off / Estimate Sheet** | | Date : | 6/03/2012 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | no of units | no of members per unit | length | width | height | total | ref | description | unit | quan | rate | amount |
| | | | | | | | | Dismantle and remove sub-stations | n/a | - | | - |
| | | 1 | 1.00 | 1.00 | 1.00 | - | | ( included with WTG weight ) | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | Switchyard | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | Dismantle and remove switch yard and cart away | m2 | 600.00 | 600.00 | 360,000.00 |
| | 1 | 1 | 20.00 | 30.00 | 1.00 | 600.00 | | (20.0 x 30.0 m allow say 1.0 t / m2) | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 600.00 | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | **Fences, Gates and Entrance** | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | Remove complete all fencing and gates | n/a | - | | - |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | Allow to dispose of all fencing and gates in landfill (local) | n/a | - | | - |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | **Contamination** | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | dispose / treat contaminated material as in approved dump areas/landfills | n/a | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | **Rehabilitation** | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | Allow to rip and seed areas of dismantled structures | m2 | 6,800.00 | 5.00 | 34,000.00 |
| | 68 | 1 | 100.00 | 1.00 | 1.00 | 6,800.00 | say 100m2 / WGT | | | | | |
| | | | | | | - | | Large areas $13500/ha | | | | |

| | | | Project: Collector Windfarm | | | | | **Take-off / Estimate Sheet** | | Date : | 6/03/2012 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | no of units | no of members per unit | length | width | height | total | ref | description | unit | quan | rate | amount |
| | | | | | | - | | allow small areas say $50000/ha | | | | |
| | | | | | | 6,800.00 | | | | | | |
| | | | | | | | | Allow 300mm topsoil to dismantled areas | m2 | 6,800.00 | 19.50 | 132,600.00 |
| | 68 | 1 | 100.00 | 1.00 | 1.00 | 6,800.00 | say 100m2 / WGT | say 65/m3 | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 6,800.00 | | | | | | |
| | | | | | | | **Post Closure Monitoring / Maintenance** | | | | | |
| | | | | | | | | Monitoring and maintenance to rehabilitated areas | | | | |
| | | | | | | | | Redo rip and seed areas | m2 | 1,360.00 | 10.00 | 13,600.00 |
| | 68 | 1 | 100.00 | 1.00 | 0.20 | 1,360.00 | allow 20% of orig area | (re-establish for small works say 10/m2) | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 1,360.00 | | | | | | |
| | | | | | | | | Allow monitoring of rehabilitated areas | hrs | 240.00 | 130.00 | 31,200.00 |
| | 2 | 12 | 10.00 | 1.00 | 1.00 | 240.00 | | (allow 1 trip / mth for two years) | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 240.00 | | | | | | |
| | | | | | | | | | | | | 20,376,220.00 |
| | | | | | | | **Indirects** | | | | | |
| | | | | | | | | **Contractors support facilities** | 3% | | | 611,286.60 |
| | | | | | | | | Allow temporary facilities, utilities and services required by the EPCM contractors and Owners team during the plant closure and post closure monitoring phases.(temporary on site facilities, operating costs, roads, power, water, effluent provided for the use of the contractor and others) | | | | |

| | | | Project: Collector Windfarm | | | | | **Take-off / Estimate Sheet** | | Date : | 6/03/2012 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | no of units | no of members per unit | length | width | height | total | ref | description | unit | quan | rate | amount |
| | | | | | | | | | | | | |
| | | | | | | | | **Mob and demob** | 5% | | | 1,018,811.00 |
| | | | | | | | | Allow mobilisation and demobilisation of the EPCM contractors and Owners team during the plant closure and post closure monitoring phases. | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | **Closure management** | 8% | | | 1,630,097.60 |
| | | | | | | | | Allow for engineering design of closure activities, procurement of subcontract services, supervision of subcontractors and the overall management of the closure program. (home office costs for off site engineering and procurement and site office cost which covers closure management on site. | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | **Owners costs** | 3% | | | 611,286.60 |
| | | | | | | | | Allow for costs incurred during the period prior to physical closure for team members, test work and the development of a detailed decommissioning plan. | | | | |
| | | | | | | | | Also Owners engineering and administration staff during the physical closure period including salaries, benefits, travel and accommodation, office rental and running costs. | | | | |
| | | | | | | | | Allow for rates during closure and post monitoring periods. | | | | |
| | | | | | | | | Allow for external consultants, legal, enviromental, HR, community, financial, outplacement fees and the like. | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | **Fees bonds garantees** | 1.50% | | | 1,018,811.00 |
| | | | | | | | | Allow Government fees, bonds, garantees, licenses, approvals and the like required for closure operations. | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | **Insurances** | 1% | | | 203,762.20 |
| | | | | | | | | Allow for insurances during the plant closure, for motor vehicles, public and professional liability. | | | | |

| | | | Project: Collector Windfarm | | | | | **Take-off / Estimate Sheet** | | Date : | 6/03/2012 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | no of units | no of members per unit | length | width | height | total | ref | description | unit | quan | rate | amount |
| | | | | | | | | | | | | |
| | | | | | | | | **Total Estimated Value** | | | | 25,470,275.00 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Project: Collector Windfarm | | | | | **Take-off / Estimate Sheet** | | Date : | 6/03/2012 | |
| | no of units | no of members per unit | length | width | height | total | ref | description | unit | quan | rate | amount |
| | | | | | | | **Cranes - Calculation for WTG's** | | | | | |
| | | | | | | | | **68 WTG's** | | | | |
| | | | | | | | | **5.0 days each with relocate (total 340 days)** | | | | |
| | | | | | | | | Mobilise assemble dismantle demobilise 300 t and 25 t franna | item | 1.00 | 70,000.00 | 70,000.00 |
| | 1 | 1 | 1.00 | 1.00 | 1.00 | 1.00 | | all equip and labour to prepare for demolition | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 1.00 | | | | | | |
| | | | | | | | | 300 t crawler 40 m fixed fly | hr | 3,400.00 | 1,100.00 | 3,740,000.00 |
| | 1 | 340 | 10.00 | 1.00 | 1.00 | 3,400.00 | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 3,400.00 | | | | | | |
| | | | | | | | | 25 t franna | hr | 3,400.00 | 300.00 | 1,020,000.00 |
| | 1 | 340 | 10.00 | 1.00 | 1.00 | 3,400.00 | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 3,400.00 | | | | | | |
| | | | | | | | | trucks support/counterweights | hr | 6,800.00 | 120.00 | 816,000.00 |
| | 2 | 340 | 10.00 | 1.00 | 1.00 | 6,800.00 | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 6,800.00 | | | | | | |
| | | | | | | | | riggers | hr | 8,160.00 | 80.00 | 652,800.00 |
| | 2 | 340 | 12.00 | 1.00 | 1.00 | 8,160.00 | 10 hr + 2 hrs travel / day | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | - | | | | | | |
| | | | | | | 8,160.00 | | | | | | |
| | | | | | | | | Per diem | days | 2,380.00 | 80.00 | 190,400.00 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 7 | 340 | 1.00 | 1.00 | 1.00 | 2,380.00 | | | | | | | |
| | | | | | | - | | | | | | | |
| | | | | | | - | | | | | | | |
| | | | | | | 2,380.00 | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | Travel time | hrs | 4,760.00 | 80.00 | 380,800.00 | |
| | 7 | 340 | 2.00 | 1.00 | 1.00 | 4,760.00 | | | | | | | |
| | | | | | | - | | | | | | | |
| | | | | | | - | | | | | | | |
| | | | | | | 4,760.00 | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | Accommodation | days | 2,380.00 | 160.00 | 380,800.00 | |
| | 7 | 340 | 1.00 | 1.00 | 1.00 | 2,380.00 | | | | | | | |
| | | | | | | - | | | | | | | |
| | | | | | | - | | | | | | | |
| | | | | | | 2,380.00 | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | travel | km | 68,000.00 | 1.50 | 102,000.00 | |
| | 2 | 340 | 100.00 | 1.00 | 1.00 | 68,000.00 | | | | | | | |
| | | | | | | - | | | | | | | |
| | | | | | | - | | | | | | | |
| | | | | | | 68,000.00 | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | **total** | | | | 7,352,800.00 | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

Appendix 2: Summary of used turbines currently for sale in secondary market

RATCH-Australia Corporation

**Analysis of used turbines available for sale**

**February 2012**

**Exchange Rate: 1 AUD = Euro 0.79**

**Exchange Rate: 1 AUD = 1.05 USD**

| Ref | Broker | Turbine | Size kW | Tower metres | Qty | Unit Price | Currency | Equivalent price AUD |
|---|---|---|---|---|---|---|---|---|
| 1 | MWPS | Bonus 1000 | 1,000 | 70 | 1 | 240,000 | Euros | 303,797 |
| 2 | MWPS | Enercon E40 | 600 | 65 | 2 | 210,000 | Euros | 265,823 |
| 3 | MWPS | Enercon E44 | 600 | 65 | 1 | 205,000 | Euros | 259,494 |
| 4 | MWPS | Enercon E40 | 500 | 78 | 2 | 260,000 | Euros | 329,114 |
| 5 | MWPS | Enercon E40 | 500 | 65 | 3 | 180,000 | Euros | 227,848 |
| 6 | MWPS | GE 1.5SLE | 1,500 | 77 | 6 | 1,100,000 | USD | 1,047,619 |
| 7 | MWPS | GE 1.5S | 1,500 | 70 | 4 | 350,000 | Euros | 443,038 |
| 8 | MWPS | Mitsubishi MWT1000 | 1,000 | 69 | 15 | 720,000 | USD | 685,714 |
| 9 | MWPS | NEG Micon NM92 | 2,750 | 70 | 1 | 1,085,000 | Euros | 1,373,418 |
| 10 | MWPS | Vestas V42 & V44 | 600 | 53 | 2 | 165,000 | Euros | 208,861 |
| 11 | Repowering Solutions | Enercon E44 | 600 | 65 | 3 | 175,000 | Euros | 221,519 |
| 12 | Repowering Solutions | Vestas V66 | 1,650 | 70 | 5 | 335,000 | Euros | 424,051 |
| 13 | Repowering Solutions | Enercon E44 | 600 | 65 | 8 | 175,000 | Euros | 221,519 |
| 14 | Repowering Solutions | Vestas V47 | 660 | 65 | 9 | 157,000 | Euros | 198,734 |
| 15 | WTMP | NEG Micon NM52/900 | 900 | 50 | 3 | 250,000 | Euros | 316,456 |
| 16 | WTMP | GE1.5S | 1,500 | 80 | 6 | 300,000 | Euros | 379,747 |
| | | | | | **Weighted avg price per unit** | | **AUD** | **452,744** |
| | | | | | **Rounded avg price per unit** | | **AUD** | **450,000** |

Sort by Manufacturer

Sort by Price

Sort by kW

# Currently Available Second Hand Wind Turbines

Click manufacturer name to see website advert

as of 1st January 2012

Click on price to convert to your currency

| Manufacturer | Model | Qty | Rated Power kW | Frequency | Year | Tower | Rotor | Location | Available | Comments | Currency | Price per Unit |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bonus | 1000 | 1 | 1000 | 50 Hz | 2001 | 70m | 54m | Germany | Immediately | Very good condition | EUR € | 240000 |
| Enercon | E40 | 2 | 600 | 50 Hz | 1999 | 65m | 44m | Germany | Summer 2011 | maintained by Enercon, price excl. dismantle | EUR € | 210000 |
| Enercon | E44 | 1 | 600 | 50 Hz | 1999 | 65m | 44m | Germany | immediately | dismantle, maintained by Enercon | EUR € | 205000 |
| Enercon | E40 | 2 | 500 | 50 Hz | 2002 | 78m | 44m | Germany | Summer 2011 | maintained by Enercon, price excl. dismantle | EUR € | 260000 |
| Enercon | E40 | 3 | 500 | 50 Hz | 1997 | 65m | 44m | Germany | Summer 2011 | incl. 10kV transformer, one unit with new nacelle, maintained by Enercon | EUR € | 180000 |
| General Electric | 1.5 SLE | 6 | 1500 | 60 Hz | 2006 - 2009 | 80m | 77m | USA | immediately | As new, never in operation | USD $ | 1100000 |
| General Electric | 1.5S | 4 | 1500 | 50Hz | 2003 | 64m | 70m | Germany | immediately | transformer with 30 kV, 2 machines got new gearbox | EUR € | 350000 |
| GoldWind | 750 | 80 | 750 | 50 Hz | 2010 | 48.5m | 50 | China | immediately | Warranty options available - full turnkey solution | EUR € | 288000 |
| Mitsubishi | MWT1000 | 15 | 1000 | 60 Hz | 2009/2010 | 69m | 59m | USA | immediately | operation before, 1-2 years warranty left | USD $ | 720000 |
| Mitsubishi | MWT-500 | 18 | 500 | 50 Hz | 1998 | 40m | 41m | Southern Europe | immediately | spare parts, in need of minor work, price excl. | | SOLD |
| NEG Micon | NM92 | 1 | 2750 | 50 Hz | 2007 | 70m | 92m | Netherlands | immediately | Very good condition, price excl. dismantling | EUR € | 1085000 |
| Vestas | V52 | 1 | 850 | 50Hz | 2001 | 65m | 52 | Germany | Summer 2011 | In mint condition, price incl. transformer, excl. dismantle | EUR € | SOLD |
| Vestas | V47 | 1 | 660 | 50 Hz | 2001 | N/A | 47m | Italy | immediately | Installed, Never been In Operation. Can be seen 'As | EUR € | SOLD |
| Vestas | V42 | 1 | 600 | 50Hz | 1999 | 50m | 42 | Germany | Summer 2011 | In mint condition, price incl. transformer, excl. dismantle | EUR € | SOLD |
| Vestas | V44 | 1 | 600 | 50Hz | 1996 | 40m | 44m | Sweden | immediately | New gearbox 2003 New generator 2004 | EUR € | SOLD |
| Vestas | V42 & V44 | 2 | 600 | 50 Hz | 1995 - 1996 | 53m & 63m | 42m & 44m | Germany | Spring 2011 | Good condition, Incl. transformer, price excl. dismantle | EUR € | 165000 |
| WindMaster | 750EG | 4 | 750 | 50Hz | 1998 | 48m | 44m | UK | immediately | priced to sell quick, special auction price, one unit only | EUR € | SOLD |

# List of currently available Second hand WIND TURBINE

Issued/ up-dated: December 2011

Repowering Solutions

| List´s ser. No. | Offer´s reference no. | Title / Technical Data | Price, Scope of Deliveries (SoD) and other commercial and delivering conditions |
|---|---|---|---|

If you want to have more details or a detailed offer and photos, than send us your request and refer with your enquiry to the below mentioned offer's reference-no.

Preliminary note:
We can offer to you with our experienced engineers also engineering services concerning development of wind farms:
a) Wind Resource Assesment & Site Design
b) Site classification & turbine procurement
c) Post-construction analysis,
d) Due diligence
e) Engineering auditing & inspections
f ) Renovated works for wind turbines
If you have other specific need, than send us please your enquiry and we will work on it to find suitable equipment for you and provide you an offer.

| | | | |
|---|---|---|---|
| 1. | REF2342 | **LAGERWAY 18/80KW**<br>Manufacturer: Lagerway<br>Power: 80kW<br>Year of production: 2000<br>Unit: 3<br>Rotor: 18<br>Tower height: 30<br>General condition: Good condition | Price: 58.400,00 €<br>Scope of deliveries: a) Nacelle, b) Rotor, c) Tower, d) Control cabinet<br>Status: Renovated with 2 year warranty<br>Location: Holland<br>Delivery: Has to be negotiated<br>Payment: Has to be negotiated<br>Available: Immediately |
| 3. | REF4002 | **JACOBS**<br>Manufacturer: JACOBS<br>Power: 500KW<br>Year of production: 1996<br>Unit: 6<br>Rotor: 41<br>Tower height: 50<br>General condition: Good condition | Price: 55.000,00 €<br>Scope of deliveries: a) Nacelle, b) Rotor, c) Tower, d) Control cabinet, e) Trafo<br>Dismantling: Including<br>Status: Used<br>Location: Germany<br>Delivery: Has to be negotiated<br>Payment: Has to be negotiated<br>Available: Immediately |
| 5. | REF4020 | **NORDEX N54**<br>Manufacturer: NORDEX<br>Power: 1000<br>Year of production: 2000<br>Unit: 15<br>Rotor: 54<br>Tower height: 60<br>General condition: Good condition | Price: 122.500,00 €<br>Scope of deliveries: a) Nacelle, b) Rotor, c) Tower, d) Control cabinet, e) Trafo<br>Dismantling: Including<br>Status: Used<br>Location: Germany<br>Delivery: Has to be negotiated<br>Payment: Has to be negotiated<br>Available: Immediately |
| 6. | REF4021 | **NEG MICON 1500**<br>Manufacturer: NEG MICON<br>Power: 1500<br>Year of production: 2000<br>Unit: 2<br>Rotor: 67<br>Tower height: 64<br>General condition: Good condition | Price: please give us your price<br>Scope of deliveries: a) Nacelle, b) Rotor, c) Tower, d) Control cabinet, e) Trafo<br>Dismantling: Including<br>Status: Used<br>Location: Germany<br>Delivery: Has to be negotiated |

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|---|---|---|---|
| | | | Payment: Has to be negotiated<br>Available: Immediately |
| 7. | REF4023 | **ENERCON E44**<br>Manufacturer: ENERCON<br>Power: 600<br>Year of production: 2000<br>Unit: 3<br>Rotor: 44<br>Tower height: 65<br>General condition: Good condition | Price: 175.000,00 €<br>Scope of deliveries: a) Nacelle, b) Rotor, c) Tower, d) Control cabinet, e) Trafo<br>Status: Used<br>Location: Germany<br>Delivery: Has to be negotiated<br>Payment: Has to be negotiated<br>Available: Immediately |
| 8. | REF4007 | **VESTAS V66**<br>Manufacturer: VESTAS V 66<br>Power: 1650<br>Year of production: 1999-2001<br>Unit: 5<br>Rotor: 66<br>Tower height: 70M<br>General condition: Good condition | Price: 335.000,00 €<br>Scope of deliveries: a) Nacelle, b) Rotor, c) Tower, d) Control cabinet, e) Trafo<br>Dismantling Excluded<br>Status: Used<br>Location: Germany<br>Delivery: Has to be negotiated<br>Payment: Has to be negotiated<br>Available: Immediately |
| 9. | REF4024 | **VESTAS**<br>Manufacturer: VESTAS V25<br>Power: 200<br>Year of production: 1998<br>Unit: 2<br>Rotor: 25<br>Tower height: 30<br>General condition: Good condition | Price: 65.000,00 €<br>Scope of deliveries: a) Nacelle, b) Rotor, c) Tower, d) Control cabinet<br>Status: Used<br>Location: Denmark<br>Delivery: Has to be negotiated<br>Payment: Has to be negotiated<br>Available: Immediately |
| 11 | REF2353 | **ENERCON E44**<br>Manufacturer: ENERCON<br>Power: 600<br>Year of production: 2000<br>Unit: 8<br>Rotor: 44<br>Tower height: 65<br>General condition: Good condition | Price: 175.000,00 €<br>Scope of deliveries: a) Nacelle, b) Rotor, c) Tower, d) Control cabinet, e) Rotor<br>Status: Used<br>Location: GERMANY<br>Delivery: Has to be negotiated<br>Payment: Has to be negotiated<br>Available: Immediately |
| 14 | REF4026 | **VESTAS**<br>Manufacturer: VESTAS V47<br>Power: 660<br>Year of production: 2000<br>Unit: 9<br>Rotor: 47<br>Tower height: 65<br>General condition: Good condition | Price: 157.000,00 €<br>Scope of deliveries: a) Nacelle, b) Rotor, c) Tower, d) Control cabinet, e) Rotor<br>Dismantling Exclusive<br>Status: Used<br>Location: SPAIN<br>Delivery: Has to be negotiated<br>Payment: Has to be negotiated<br>Available: Immediately |

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|---|---|---|---|
| 16 | REF4012 | **DANWIN**<br>Manufacturer: DANWIND<br>Power: 180<br>Year of production: 1988<br>Unit: 2<br>Rotor: 23<br>Tower height: 30<br>General condition: Good condition | Price: 26.000,00 €<br>Scope of deliveries: a) Nacelle<br>b) Rotor<br>c) Tower<br>d) Control cabinet<br>e) Rotor<br>Dismantling: Exclusive<br>Status: Used<br>Location: DENMARK<br>Delivery: Has to be negotiated<br>Payment: Has to be negotiated<br>Available: Immediately |
| 17 | REF4013 | **WINDWORD W2320**<br>Manufacturer: WINDWORD<br>Power: 160<br>Year of production: 1988<br>Unit: 7<br>Rotor: 23<br>Tower height: 30<br>General condition: Good condition | Price: 25.000,00 €<br>Scope of deliveries: a) Nacelle<br>b) Rotor<br>c) Tower<br>d) Control cabinet<br>e) Rotor<br>Dismantling: Exclusive<br>Status: Used<br>Location: DENMARK<br>Delivery: Has to be negotiated<br>Payment: Has to be negotiated<br>Available: Immediately |
| 18 | REF4014 | **BONUS**<br>Manufacturer: BONUS<br>Power: 150<br>Year of production: 1988<br>Unit: 3<br>Rotor: 23<br>Tower height: 30<br>General condition: Good condition | Price: 34.900,00 €<br>Scope of deliveries: a) Nacelle<br>b) Rotor<br>c) Tower<br>d) Control cabinet<br>e) Rotor<br>Dismantling: Exclusive<br>Status: Used<br>Location: DENMARK<br>Delivery: Has to be negotiated<br>Payment: Has to be negotiated<br>Available: Immediately |

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TURBINE SEARCH FILTER

Manufacturer: All manufacturers
Model: All models
Onshore Type: Onshore
Transformer: Any
Location: All locations

GO
Reset Filter

| Date | Manufacturer | Model | Firm | Power | Rotor Diameter | Quantity | Price | Country |
|---|---|---|---|---|---|---|---|---|
| 08/12/11 | **Neg Micon** | NM92/2750 | Bettink Service & Onderh... | 2750 | 92 | 1 | on request | Netherlands |
| 01/03/12 | **Neg Micon** | NM80/2750 | CSULB | 2750 | 80 | 2 | on request | India |
| 22/01/12 | **Neg Micon** | NM92/2750 | Blue Planet Wind | 2750 | 92 | 2 | on request | Belgium |
| 15/11/11 | **Mitsubishi** | MWT-95 | mericle remodeling | 2400 | 95 | 1 | on request | USA |
| 26/12/11 | **STX Windpower** | STX 72 | STX Windpower BV | 2000 | 70 | 3 | on request | Netherlands |
| 04/11/11 | **Enercon** | E66/1800 | EUROPEAN Energy Online S... | 1800 | 66 | 2 | on request | Germany |
| 11/01/12 | **Enercon** | E66/1800 | East Wind Brokers | 1800 | 66 | 2 | on request | Germany |
| 22/11/11 | **Vestas** | V66/1750 | East Wind Brokers | 1750 | 66 | 3 | on request | Denmark |
| 01/03/12 | **Vestas** | V66/1750 | CSULB | 1750 | 66 | 8 | on request | India |
| 22/01/12 | **Vestas** | V66/1650 | Green-ener-tech aps | 1650 | 66 | 5 | on request | Denmark |
| 31/12/11 | **Vestas** | V66/1650 | EUROPEAN Energy Online S... | 1650 | 66 | 3 | on request | Germany |
| 19/01/12 | **Neg Micon** | NM82/1500 | EUROPEAN Energy Online S... | 1500 | 82 | 1 | on request | Germany |
| 02/11/11 | **GE Energy** | 1.5s | dutchwind | 1500 | 71 | 6 | 300,000 EUR | Germany |
| 19/01/12 | **Neg Micon** | NM64/1500 | EUROPEAN Energy Online S... | 1500 | 64 | 1 | on request | Germany |
| 28/02/12 | **Repower** | MD70 | Wind Nielsen GmbH | 1500 | 70 | 1 | on request | Germany |
| 11/01/12 | **GE Energy** | 1.5sl | East Wind Brokers | 1500 | 77 | 5 | on request | Germany |
| 23/02/12 | **Other** | 1200Watt Super Liberty II | Caspe Viento y Solar | 1200 | 180 | 10 | 899 EUR | Spain |
| 03/01/12 | **Nordex** | N54/1000 | Blue Planet Wind | 1000 | 54 | 1 | 65,000 EUR | Luxembourg |
| 11/01/12 | **Neg Micon** | NM60/1000 | East Wind Brokers | 1000 | 60 | 1 | on request | Germany |
| 11/12/11 | **Other** | Polaris 1MW | E2SOL LLC | 1000 | 62 | 5 | on request | USA |

**Pages:** 1 2 3 4 5 6

# Marketplace

Manufacturer:
all manufactureres

Rated power (kW 1990 - 5020)

View
Country / location:
All countries / locations

Condition:
used

wind-turbine.com

Support

ere are 111 offers for 17 manufacturers available. Selected are all offers for wind turbines with a rated speed ween 1990 and 5020 kW.
Vestas V80-2.0
used Moldova
View offer Details of wind turbine type

1x Nordex N90/2500
used, Year 2009, 80m Germany
€ 360.000
View offer Details of wind turbine type
3x Vestas V80-2.0
used, Year 2004, 78m
View offer Details of wind turbine type
10x Vestas V80-2.0 Nearshore
used, Year 2001, 100m Germany
View offer Details of wind turbine type
1x Bonus B76/2000
used, Year 1995, 60m
View offer Details of wind turbine type
2x Vestas V90-3.0
used, Year 2008, 105m
View offer Details of wind turbine type
4x Vestas V80-2.0
used, Year 2005, 100m
View offer Details of wind turbine type
3x Enercon E-70 E4 2.000
used, Year 2005, 65m Germany
€ 270.000
View offer Details of wind turbine type
8x Nordex N80 Alpha
used, Year 2002, 80m France
View offer Details of wind turbine type
1x Vestas V90
used, Year 2006, 85m Germany
€ 477.500
View offer Details of wind turbine type
6x Gamesa G80
used, Year 2005, 60m Germany
€ 290.000
View offer Details of wind turbine type
2x NEG Micon NM 72/2000
used, Year 2000, 65m Germany
€ 115.000
View offer Details of wind turbine type
8x Vestas V80-2.0
used, Year 2003, 60m
View offer Details of wind turbine type
13x Senvion MM82
used, Year 2003, 59m
View offer Details of wind turbine type
7x Enercon E-66/20.70
used, Year 2003, 85m
View offer Details of wind turbine type
5x Nordex N80 Alpha
used, Year 2002, 80m
View offer Details of wind turbine type
1x Vestas V90
used, Year 2004, 80m
View offer Details of wind turbine type
Vestas V80-2.0
d, Year 2004, 100m
w offer Details of wind turbine type
Vestas V80-2.0
used, Year 2014, 100m United States
€ 23.500

View offer Details of wind turbine type
1x Vestas V90-3.0
used, Year 2008, 78m
View offer Details of wind turbine type
4x Vestas V80-2.0
used, Year 2002, 78m
View offer Details of wind turbine type
2x Vestas V80-2.0
used, Year 2002, 78m
View offer Details of wind turbine type
2x Vestas V80-2.0
used, Year 2001, 60m
View offer Details of wind turbine type
1x WinWinD WWD-3 D90
used, Year 2005, 90m Finland
€ 1.500.000
View offer Details of wind turbine type
1x Vestas V90-3.0
used, Year 2013, 80m
View offer Details of wind turbine type
3x Enercon E-70 E4 2.000
used, Year 2005, 65m Germany
View offer Details of wind turbine type
3x Vestas V90
used, Year 2007, 105m Germany
€ 6.285.000
View offer Details of wind turbine type
2x Nordex N80 Alpha
used, Year 2002, 80m
View offer Details of wind turbine type
2x Gamesa G87
used, Year 2005, 78m
View offer Details of wind turbine type
3x NEG Micon NM 92/2750
used, Year 2004, 80m Netherlands
€ 1.200.000
View offer Details of wind turbine type
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