



NSW GOVERNMENT
Department of Planning

MAJOR PROJECT ASSESSMENT: *Kyoto Energy Park*



Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

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EXECUTIVE SUMMARY

Pamada Pty Limited (the Proponent) has sought project approval to construct and operate the Kyoto Energy Park project comprising the development of multiple renewable energy generating facilities (wind, solar and mini hydro) and associated infrastructure at two sites to the west of the township of Scone in the Upper Hunter local government area. The project also includes two options for transmission line connection to the existing electricity grid (66 kilovolt option to a substation at Scone or 132 kilovolt option to a substation at Muswellbrook) in the Upper Hunter and Muswellbrook local government areas, of which only one option is proposed to be built depending on the final capacity of the project. The facility would have a maximum generating capacity of 113 megawatts comprising 71.4-102 megawatts from up to 34 x 2.1-3 megawatt wind turbines, 3-10 megawatts from the photovoltaic component and one megawatt from the closed loop mini-hydro plant. The project is expected to generate up to 466 construction jobs and up to 10-15 full time equivalent operational jobs and would involve a capital investment value of \$140-190 million.

The Department received a total of 123 public submissions on the project. Of these 20% supported the project, 59% objected to the project and 21% did not state a specific position, although identifying concerns or comments for consideration by the Department. In addition, submissions were received from 10 Commonwealth and State public authorities (Department of Defence; Civil Aviation Safety Authority; AirServices Australia; the former Department of Environment and Climate Change and former Department of Water and Energy now incorporated into the Department of Environment, Climate Change and Water; the Department of Lands; the former Department of Primary Industries now incorporated into Industry and Investment NSW; Rural Fire Services; and the Hunter-Central Rivers Catchment Management Authority) and one State-owned corporation (EnergyAustralia) as well as submissions from Muswellbrook Council and the Upper Hunter Shire Council. The Hunter-Central Rivers Catchment Management Authority objected to the project unless it was modified to ensure a "maintain or improve" outcome with respect to native vegetation loss. Support for the proposal was received from Energy Australia. None of the other government agencies provided support or objected to the project, however raised issues for the Department's consideration in its assessment.

Key issues raised in submissions largely related to the wind turbine component of the project. Issues raised included: noise (mainly low frequency and infra sound impacts), visual (including shadow flicker and blade glint), flora and fauna (including impacts to bird and bat species from rotor collisions), aviation hazard impacts on Scone airport, electro-magnetic interference, traffic and transport, landuse and amenity concerns and community contributions. In response to concerns raised in submission in relation to the intrusion of certain turbines on the flight procedures and air space of Scone acrodrome, the Proponent modified its project as part of its Response to Submissions to remove eight wind turbines originally proposed (from the 42 originally identified in the Environmental Assessment). The Proponent identified that the removal of the turbines would also have benefits with respect to reducing noise and visual concerns at nearest receivers.

The Department has assessed the Proponent's Environmental Assessment, Response to Submissions and Statement of Commitments and submissions received by public agencies and the community on the project and considers the key issues associated with the project relate to noise, visual and flora and fauna impacts. Based on its assessment, the Department accepts the need for the project with respect to helping to address the State's electricity requirements as well as addressing local electricity demand and considers that the project would entail significant greenhouse gas benefits by resulting in no net greenhouse gas emissions during operation. In this regard, the Department considers the project to be entirely consistent with priorities E2 (*a reliable electricity supply with increased use of renewable energy*) and E3 (*cleaner air with progress on greenhouse gas reductions*) of the NSW State Plan.

The Department is also satisfied that the Proponent has undertaken an appropriate and conservative level of assessment of all components of the project. The Department's assessment indicates that significant residual noise impacts are likely at a single resident, which warrants special consideration and has recommended conditions of approval granting acquisition rights to this resident on the grounds of noise impact. The Department's assessment also indicates that some residual amenity impacts may occur at surrounding residents from visual intrusion, even after the implementation of all reasonable and feasible mitigation measures. Whilst the Department does not consider the residual impact to be sufficient to outweigh the strategic benefits of the project

such as to warrant project refusal, the Department considers that some form of community contribution which would provide tangible benefits to the local community as a means of offsetting potential residual impacts, to be justified and warranted. In this regard, the Department has recommended conditions of approval requiring the Proponent to provide an annual contribution of \$86,700 to fund local community enhancement initiatives including (but are not necessarily limited to) improvements to community infrastructure and services, sustainability initiatives and opportunities for local economic and tourist development. With respect to flora and fauna impacts, the Department is satisfied that impacts in relation to potential rotor collisions can be effectively managed through the implementation of an appropriate adaptive bid and bat management plan. In relation to direct impacts on native vegetation and habitat, the Department has recommended conditions of approval requiring the provision of an offset package at a ratio of at least 2:1, to ensure that vegetation impacts are appropriately offset consistent with "maintain and improve" principles. With respect to the transmission line options, the Department considers that either option can be developed in manner that does not lead to unacceptable environmental or amenity impacts.

On the above basis, the Department has recommended full project approval (i.e. approval to construct) for all components of the project. Whilst only one transmission line connection to the existing grid network will be required for the project, the Department has recommended full project approval for both preferred options (on the condition that only one would be developed) to provide maximum flexibility for the Proponent in determining a final option based on project capacity, network constraints and easement negotiations.

The Department has formulated stringent recommended conditions of approval in relation to noise, visual, flora and fauna, aviation hazard, traffic and transport, and community contributions to protect public amenity, ensure that the project achieves acceptable environmental standards and offset residual impacts.

On balance, the Department considers the project to be justified and in the public interest and should be approved subject to the Department's recommended conditions of approval and the Proponent's Statement of Commitments.

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1. BACKGROUND

Pamada Pty Ltd (the Proponent) proposes to construct and operate a range of renewable energy generating facilities on two private landholdings approximately eight to 14 kilometres west and north-west of the township of Scone in the Upper Hunter Valley. The energy generating components comprise up to 34 wind turbines, a solar photovoltaic plant, a mini hydro plant and associated ancillary infrastructure including manager's residence and visitors and education centre. The proposal also includes transmission line options for connection to the existing high voltage transmission network at Scone or Muswellbrook.

1.1 Study Site

With the exception of the transmission line connection to the existing electricity network, the entirety of the project would be confined to two private landholdings, owned by a single landowner located within the Upper Hunter local government area: 'Mountain station' (1995 hectares in size) located approximately nine to 14 kilometres to the west of Scone and 'Middlebrook station' (2032 hectares in size) located approximately eight to 13 kilometres to the north-west of Scone (refer Figure 1). The properties comprise a mixture of cleared rural grazing land and remnant vegetation and are characterised by undulating hilly terrain with generally north-south oriented ridgelines which are part of the Glen Range. Watercourses within and surrounding the site comprise ephemeral drainage lines including Middle Brook located on the eastern side of the Middlebrook Station and Upper Dart Brook which flows to the west of Middlebrook Station and along Bunnan Road. The sites are located on either side of and are accessed by Bunnan Road which is an arterial road linking Scone to the township of Bunnan to the west.

Existing landuse on Mountain and Middlebrook Stations comprise pastoral grazing and farm based tourism including farm stay accommodation (Middlebrook Station) and four wheel drive tours. Private airstrips are located at both stations and are used by the landowner for agricultural aerial spraying and tourist flights. Both properties also contain Trigonometric (trig) stations: Myall Trig station at Mountain Station and Robertson's Knob Trig Station at Middlebrook Station. An existing gravel and road base quarry, leased and operated by Clifford Quarries is located at Middlebrook Station and is accessed via Bunnan Road. A total of seven dwellings and one building for tourist accommodation are located within the site (all on Middlebrook Station), each dwelling owned by the landowner of the two properties. Of these, the closest dwelling is located approximately 800-900 metres from the nearest turbine on Middlebrook Station.

Two transmissions line options are proposed (refer Figure 2) which mainly traverse existing transmission line corridors:

- Option 1 (dashed dark blue line) involves a 66 kilovolt transmission line connection to the newly constructed EnergyAustralia substation at Scone, traversing land located entirely within the Upper Hunter local government area. Approximately 72% of the route would involve upgrade to the existing 11 kilovolt transmission line within existing transmission line corridors. The line is proposed to travel from Mountain station east to Moobi Road using either Crown road easement and private land or Crown road easement and Yarrandi Road. The line would then proceed east along Moobi Road to just west of the Scone Township. From this point the line is proposed to travel to the Scone substation (located on the eastern side of the New England Highway at Scone) along two possible routes. The first option skirts the western outskirts of the township of Scone by traversing through Liverpool Road, Orthes Street and Kingdon Street and then along the eastern side of the Scone Sports Complex. The second option would by pass the township altogether by travelling south from the intersection of Moobi, Saturn and Liverpool Roads though private land along the western and then the southern side of the Scone Sports Complex. From the sports complex, the line would traverse to south of the Scone Golf Club, crossing the railway line and New England Highway to reach the substation; or
- Option 2 (light blue line) involves a 132 kilovolt transmission line connection to the newly constructed EnergyAustralia substation north of Muswellbrook traversing land within the Upper Hunter and Muswellbrook local government areas. Approximately 85% of the route would involve upgrade to the existing 11 kilovolt transmission line within existing transmission line corridors. This route travels south from Mountain and Middlebrook stations following Bunnan Road, Yarrandi Road, Moobi Road, Nandowra Road and Back Muswellbrook Road. From Back Muswellbrook Road the line is proposed to travel to the substation along two possible routes: either via Kyuga Road and the New England Highway or via Kyuga Road, Burtons Lane and the New England Highway. Both routes would cross the railway line and New England Highway at the same

location and proceed east to the Muswellbrook substation (located on the eastern side of New England Highway). Transmission Line Option 2 would completely bypass the townships of Scone and Muswellbrook.

All road and rail crossing associated with the transmission lines would involve stringing of wires from one side of the road/ rail corridor to the other rather than any direct disturbance to the infrastructure.

Figure 1: Proposal Site (Proponent's Environment Assessment, Exhibited June-July 2009)

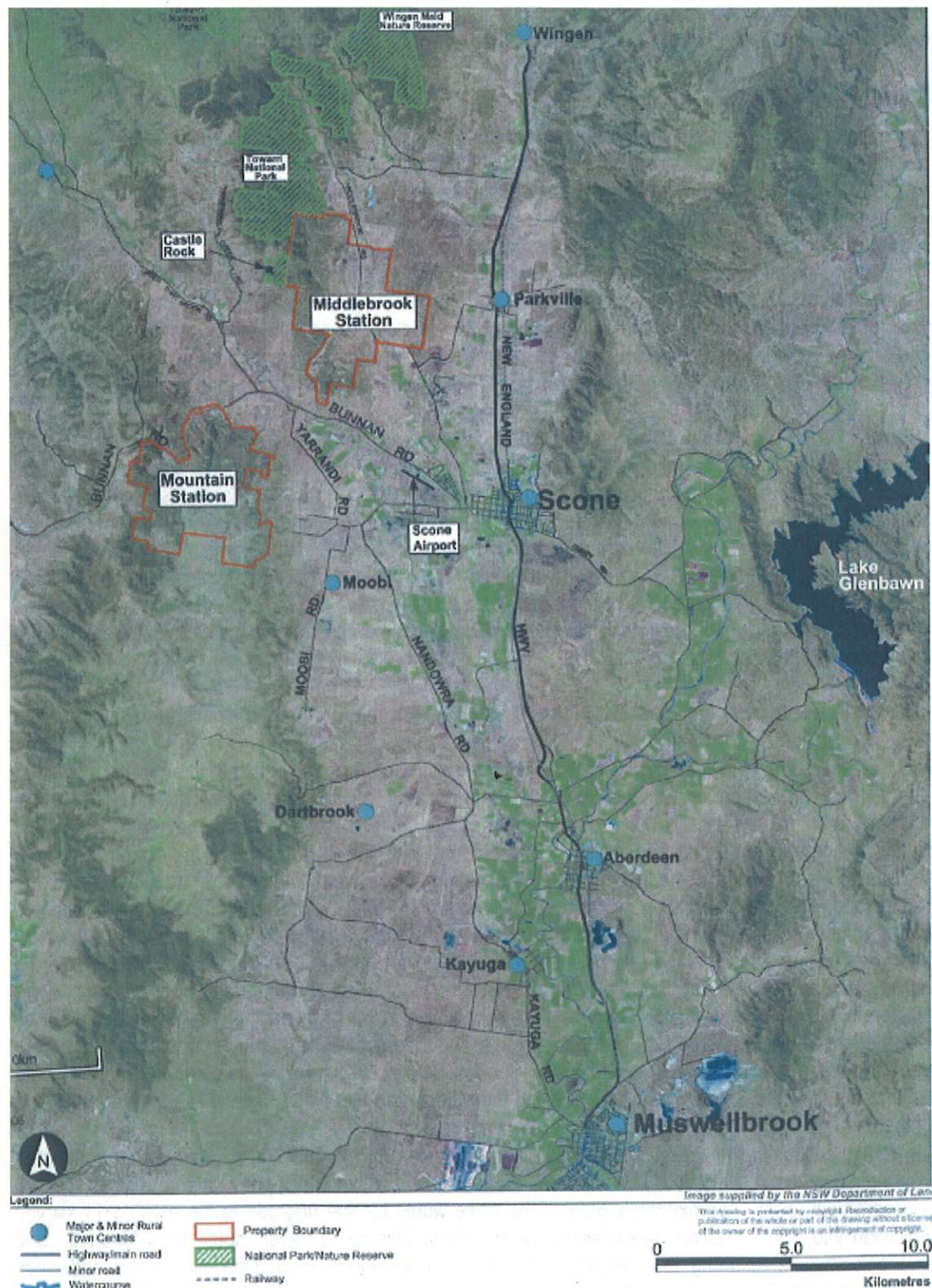
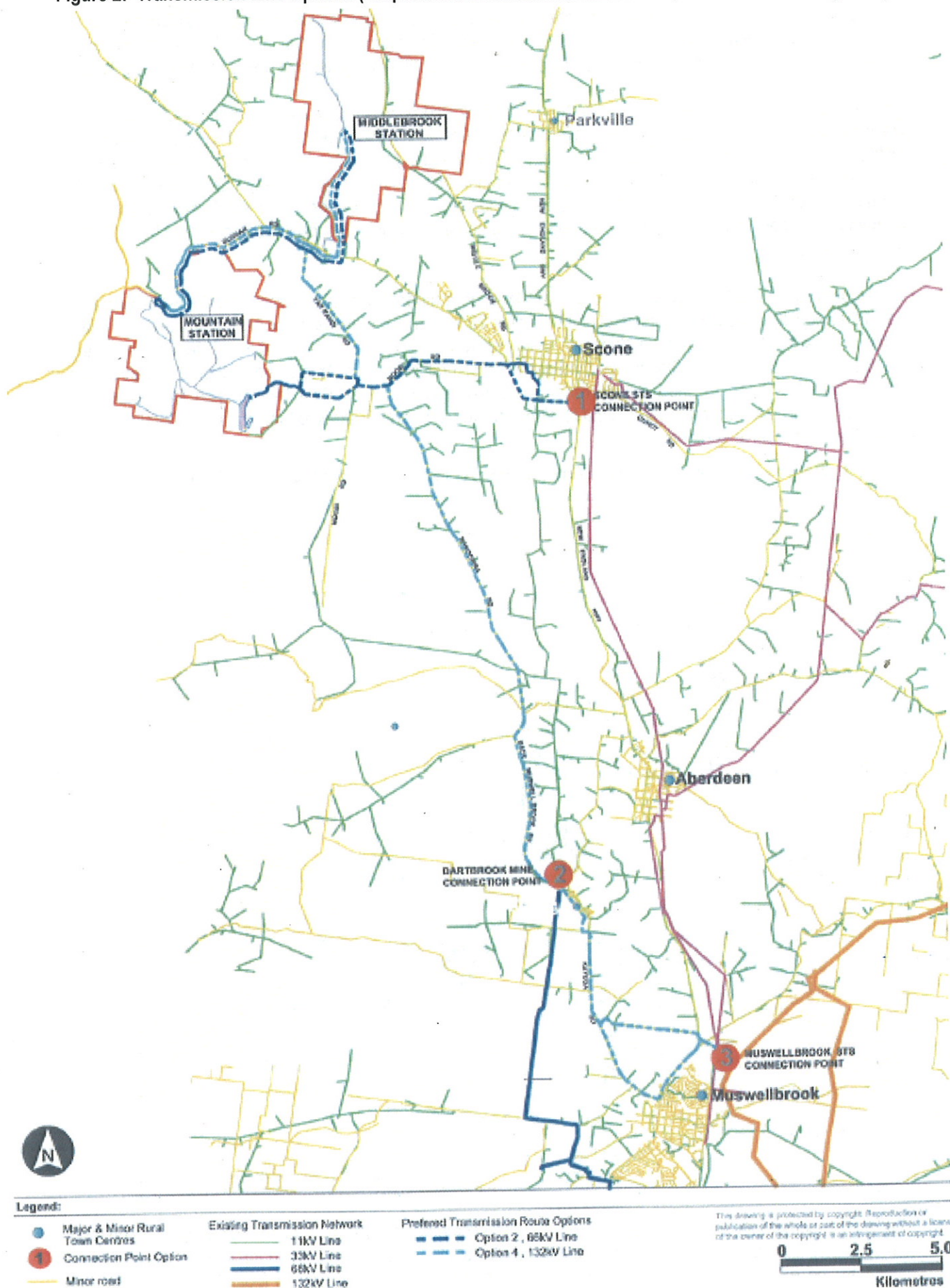


Figure 2: Transmission Line Options (Proponent's Environment Assessment, Exhibited June-July 2009)



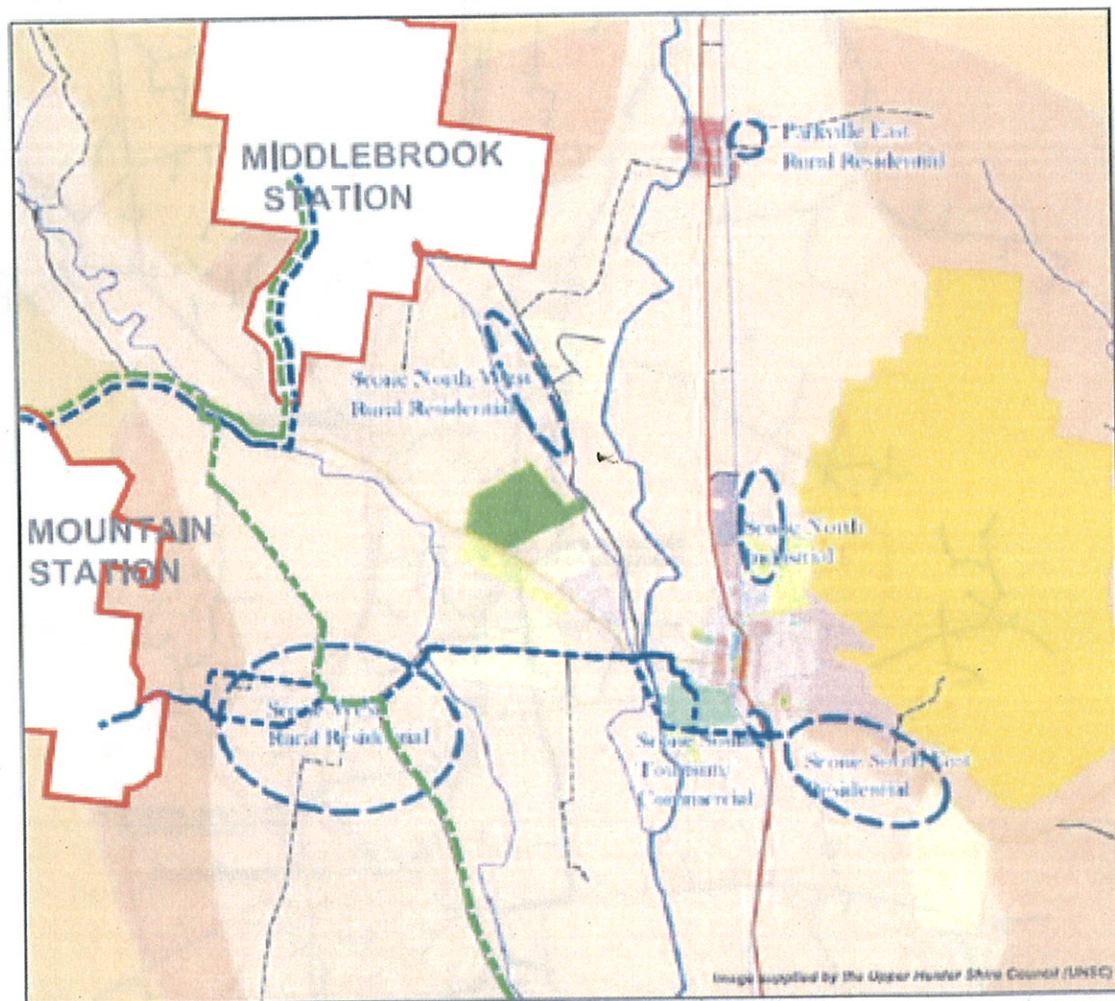
1.2 Surrounding Land Use

The Upper Hunter region is rural in character with grazing, agriculture, equine industries, viticulture and an expanding coal mining industry comprising key landuses. Nearest conservation areas to the site comprise Towarri National Park and Wingen Maid Nature Reserve located directly to the north west of Middlebrook Station.

The nearest urban settlement to the site is the township of Scone which comprises the primary service town to the surrounding area. Nearest sensitive receivers to the project (which are not owned by the landowner of Middlebrook and Mountain Stations) comprise rural residential properties, the closest of which is located approximately 1.3 kilometres from the proposed generation facilities on Mountain Station and approximately 2.3 kilometres from the nearest turbines at Middlebrook Station. A 15 lot rural residential subdivision is located off Bunnan Road approximately 1.5 kilometres north of the nearest turbine at Mountain Station, of which one lot has been developed.

The Upper Hunter Land Use Strategy (2007) has identified a number of potential future residential investigation areas that would be subject to consideration in the next 25 years. Two of these areas have been identified within approximately five kilometres of the study site (refer Figure 3): the Scone North West Rural Residential Area to the south east of Middlebrook Station and the Scone West Rural Residential Area to the east of Mountain Station. Neither area has been rezoned or subdivided for development to date. Both transmission line options are proposed to traverse the Scone West Rural Residential Area, however is expected to be almost entirely confined to existing road reserve corridors.

Figure 3: Future Land Use (Proponent's Environment Assessment, Exhibited June-July 2009)



The Scone aerodrome is located approximately five kilometres to the east of the Mountain Station and approximately four kilometres south east of Middlebrook Station. Nearest coal mining interests to the study site comprises the existing Dartbrook mine approximately 14 kilometres south east of Mountain Station and the proposed Bickhem mine approximately 18 kilometres to the north-west of Middlebrook Station.

2. PROPOSED DEVELOPMENT

2.1 Project Description

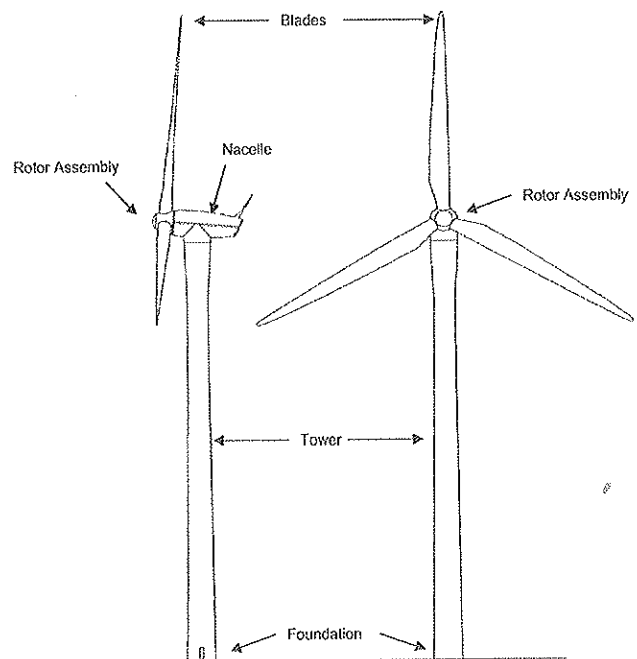
The Proponent proposes to construct and operate renewable-energy generation facilities (wind, solar and hydro) and associated infrastructure in two privately owned properties to the west and north-west of Scone in the Upper Hunter region of New South Wales. The proposal would have a total generating capacity of up to 113 megawatts (71.4-102 megawatts from the wind turbines, 3-10 megawatts from the solar component and one megawatt from the mini-hydro plant). The key components of the project are described below.

Wind Turbines

The project involves the construction and operation of 34 wind turbines each with a generating capacity of between 2.1 to three megawatts (71.4-102 megawatts in total). Turbines one to 31 are proposed to be located at Mountain Station with turbines 32 to 34 located at Middlebrook Station. The layout of the turbines is shown in Figure 7.

The dimensions and capacity of each turbine will be dependent on the model of turbine chosen for the proposal, however is expected to be no greater than three megawatts and a total maximum height of 150 metres (from the tip of the rotor blade to the base of the tower) with maximum tower height of 105 metres (refer Figure 4). Each turbine would be operated by an automated control system within the nacelle, commencing rotor operation at wind speeds of approximately 11-18 kilometres per hour and shutting down at high wind conditions in excess of 90 kilometres per hour to prevent damage. Maximum generating capacity would be reached at winds speeds of round 44 - 54 kilometres per hour.

Figure 4: Typical Wind Turbine (Proponent's Environment Assessment, Exhibited June-July 2009)



Each turbine would require an approximately 3-5 metre diameters footprint for installation of footings as well as an approximately 20 by 30 metre hard stand area at each turbine for siting the cranes that would be used for turbine assembly. The crane hardstand area would not be permanent (i.e. constructed from road base and allowed to regenerate following construction).

Solar Photovoltaic Farm

The solar component of the proposal involves the construction and operation of a 3-10 megawatt solar photovoltaic plant on the Mt Moobi plateau at Mountain Station (refer Figure 5). The type of photovoltaic structure to be installed has yet to be determined and will be chosen from the following options (refer Figure 5):

- up to 100 x 0.1 megawatt fixed tilt modules requiring a total footprint of approximately 8.1 hectares;
- up to 1000 x 0.01 megawatt single-axis tracker modules requiring a total footprint of approximately 6.5 hectares;
- up to 1000 x 0.01 megawatt double axis tracker modules requiring a total footprint of approximately 4 hectares; and
- up to 150 x 0.035 megawatt photovoltaic concentrator modules requiring a total footprint of approximately 4 hectares.

Mini Hydro Plant

The hydro component of the proposal would comprise a closed loop facility designed to generate electricity in short bursts (and therefore suitable for peak electricity generation) through the rapid discharge of water from high

to low elevation to run up to 5 x 200 kilovolt hydro turbines (one megawatt in total) from the resulting kinetic energy (refer Figure 6). The plant would be located at Mountain Station and used to contribute electricity to the grid during peak demand to generate revenue during high electricity pricing and for load balancing of intermittent power generation mainly from wind turbine generators to minimise the variability (and thereby maximise the quality) of power output to the grid from the proposal as whole. Power generated by the wind and solar components of the proposal during periods of low energy demand would be used to pump the discharged water back from low to high elevation into holding tanks. Being a closed loop plant, there would be no ongoing operational water demand apart from limited top-up requirements which would be partly met through on site rainwater capture. The total maximum capacity of the holding tanks is yet to be finalised but is expected to be around five megalitres.

Figure 5: Examples of Solar Photovoltaic Structures (Proponent's Environment Assessment, Exhibited June-July 2009)

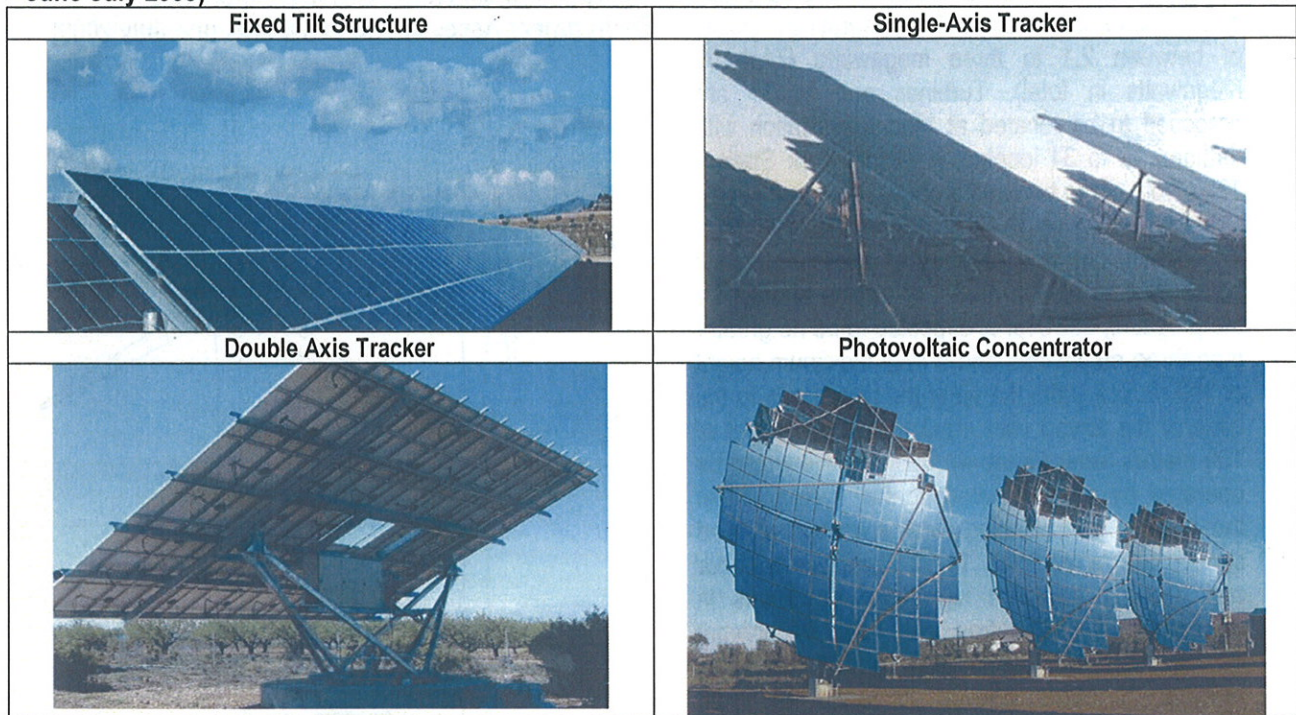
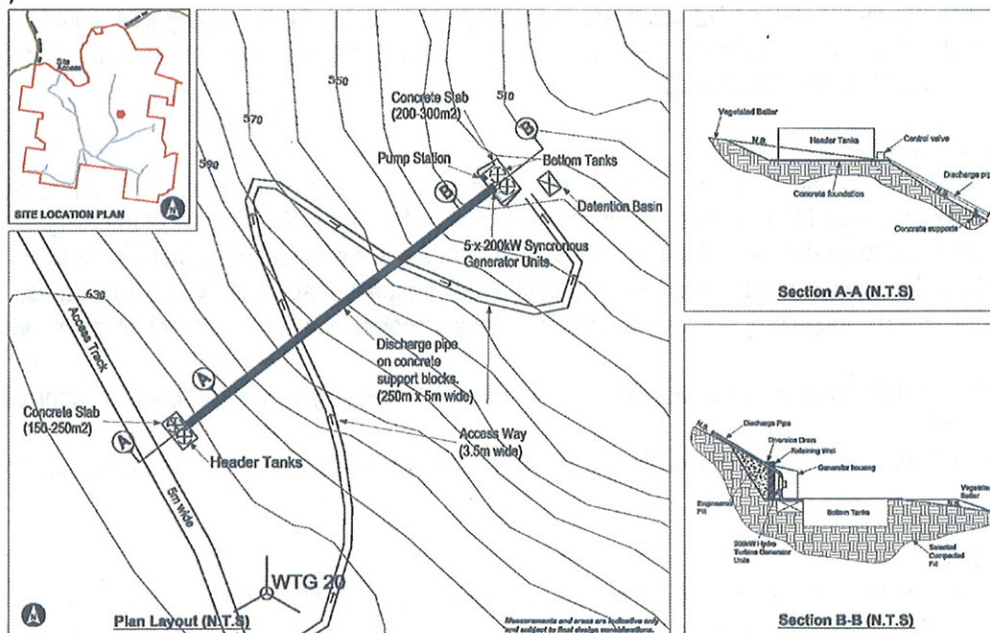


Figure 6: Mini Hydro Plant – Indicative Design (Proponent's Environment Assessment, Exhibited June-July 2009)



Ancillary Infrastructure

Key ancillary infrastructure associated with the project comprise (refer Figure 7):

- an electricity substation at Mountain Station approximately 60 by 40 meters in size including switchyard and control room;
- underground 33 kilovolt reticulation cabling comprising approximately 14.9 kilometres of cabling at Mountain Station and 6.2 kilometres of cabling at Middlebrook Station that would be buried in trenches approximately 1.5 metres deep and 0.75 metres wide;
- overhead 33 kilovolt transmission line across Bunnan Road connecting the internal transmission network at Middlebrook Station to the Mountain Station substation;
- overhead transmission line connection of the proposal to the existing high voltage electricity network comprising either a 66 kilovolt connection to the EnergyAustralia substation at Scone (Option 1) or a 132 kilovolt connection to the EnergyAustralia substation north of Muswellbrook (Option 2) (refer Figure 2). Option 1 is the preferred option should the final energy park have a capacity of less than 90 megawatts, whilst Option 2 is preferred should the proposal have a final capacity in excess of 90 megawatts;
- the upgrade or extension of existing access roads within Mountain and Middlebrook stations to five metres width and no greater than 14% gradient. This would comprise approximately 13.8 kilometres of road within Mountain Station (including the upgrade of approximately 11.7 kilometres of existing track). Approximately 9.4 kilometres of road (including the upgrade of approximately nine kilometres of existing track) was originally proposed within Middlebrook Station. However, the number of turbines proposed at this site has significantly reduced (refer Section 2.2) and consequently, the length of access track required at Middlebrook Station is expected to be considerably less than originally proposed;
- upgrade of the existing Mountain Station site access via Bunnan Road to provide appropriate site clearances for vehicles (the existing site access to Middlebrook Station is considered to be adequate);
- a single storey, 4-5 bedroom house at Mountain Station to accommodate the site manager;
- a single storey Visitors and Education Centre sited adjacent to the Mt Moobi solar farm on Mountain Station. The centre is expected to have an internal floor space of approximately 400-600 square metres and provide tourist and educational functions such as educational displays on the energy park and the locality (including indigenous cultural values), a viewing platform and provisions for conferences and educational research into the park. The centre would incorporate up to 15 car spaces; and
- a single storey maintenance shed at Mountain Station approximately 40 by 15 metres in size for housing routine maintenance stores and equipment, a work shop and staff amenity facilities.

In addition to the above, it is expected that a temporary site office and depot, lay-down area and concrete-batching plant would be located at Mountain Station during the construction period, sited in already disturbed areas.

Staging, Employment and Capital Investment

The proposal is expected to be constructed in approximately 20 months and have an operational life of between 25-30 years. It is anticipated that the 66 or 132 kilovolt transmission line connection to the existing high voltage transmission network would be constructed by the Proponent in accordance with the design standards and requirements of the network operator (EnergyAustralia) and subsequently dedicated to EnergyAustralia for ongoing management and maintenance as part of its overall network, subject to final negotiation.

At the end of project design life (unless the components are refurbished or replaced with new available technology, subject to relevant planning approval), the project would be fully decommissioned and rehabilitated. This would include dismantling and removal of all generating components and associated infrastructure (including underground internal transmission cabling and substation) and rehabilitation of associated disturbance areas including access tracks. The building structures on site (manager's residence, Visitor and Education Centre and maintenance shed) may be dismantled or retained on site for a residual use or function. The ongoing function of the 66 or 132 kilovolt transmission line connection would be subject to normal network planning and management decisions by the network operator.

The project is expected to generate up to 466 construction jobs and up to 10-15 full time equivalent operational jobs and involve a capital cost of between \$140-190 million.

Figure 7: Proposal Components at Mountain Station and Middlebrook Station (Proponent's Response to Submissions, August 2009)

