

Condong Co-generation Facility: Fuel Plan

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Sunshine Electricity Joint Venture



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Glossary of terms

Term	Definition
<i>Bagasse</i>	The residue after juice is extracted from sugar cane in the sugar cane milling process or from grapes after the juice has been extracted (Department of Environment and Conservation 2005).
<i>Bio-material</i>	Material derived from living organisms, also known as biomass.
<i>Camphor laurel (Cinnamomum camphora)</i>	An exotic woody weed declared a Class 4 noxious weed under the Noxious Weeds Act 1993 in the local government areas of Ballina, Bellingen, Blue Mountains, Byron, Clarence Valley, Far North Coast County Council, Ku-ring-gai, Kyogle, Lismore, Nambucca, Richmond Valley, Ryde, Hornsby, Tweed and Willoughby (This means that the growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority, and the plant may not be sold, propagated or knowingly distributed).
<i>Cane-based fuel</i>	Bagasse or cane trash.
<i>Cane trash</i>	Cane plant material which is separate to sugar cane billets.
<i>Co-generation</i>	A high-efficiency method of energy generation that produces either electricity or mechanical power and valuable heat from a single fuel source (This is sometimes known as combined heat and power.).
<i>Co-generation facility</i>	A power plant that operates according to the principles of co-generation.
<i>Crush season</i>	The period during which a sugar mill operates its crushing process (This is typically June to December, but varies annually according to climatic conditions.)
<i>Delta Electricity Australia P/L</i>	A wholly owned subsidiary of Delta Electricity (an electricity generating company formed on 1 March 1996, which produces electricity at several facilities, using coal and biomass materials)
<i>Electricity generating work (1 – for reporting purposes)</i>	A work (including any associated facilities) that supplies, or is capable of supplying, more than 200 kilowatts of electricity (as per the NSW Protection of the Environment Operations (General) Regulation 1998).
<i>Electricity generating work (2 – for licensing purposes)</i>	Includes facilities that supply or are capable of supplying more than 30 megawatts of electrical power from energy sources (including coal, gas, bio-material or hydro-electric stations), but not including from solar powered generators (as per the NSW Protection of the Environment Operations Act 1997).
<i>Forest bio-material</i>	The bio-material comprised in trees (as per the NSW Protection of the Environment Operations (General) Regulation 1998).
<i>Joint venture (Sunshine Electricity)</i>	A business enterprise comprising Delta Electricity Australia and Sunshine Renewable Energy.

Term	Definition
<i>Native forest bio-material</i>	<p>Bio-material made up of Australian trees, other than:</p> <p>a) bio-material obtained from:</p> <ul style="list-style-type: none"> i) <i>an authorised plantation within the meaning of the Plantations and Reafforestation Act 1999, or</i> ii) <i>an existing plantation within the meaning of Section 9 of the Plantations and Reafforestation Act 1999, or</i> iii) <i>land on which exempt farm forestry (within the meaning of the Plantations and Reafforestation Act 1999) is being carried out, or</i> iv) <i>land on which ancillary plantation operations (within the meaning of Section 9 of the Plantations and Reafforestation Act 1999) are being carried out, or</i> <p>b) sawdust or other sawmill waste, or</p> <p>c) waste arising from wood processing or the manufacture of wooden products, other than waste arising from activities (such as wood chipping or the manufacture of railway sleepers) carried out at the location from which the Australian native trees are harvested (as per the NSW Protection of the Environment Operations (General) Regulation 1998).</p>
<i>NSW Sugar Milling Co-operative Limited (NSW SMC)</i>	A registered Co-operative of canegrowers in the Northern Rivers area of NSW. NSW SMC owns and operates 3 sugar mills (Condong, Broadwater & Harwood) and is a 50% shareholder in a sugar refinery at Harwood.
<i>Plantation</i>	An intensively managed stand of trees of native or exotic species created by the regular placement of seedlings or seed (To be declared as suitable to generate renewable energy, a plantation may not be on land cleared after 1989 (as per the Commonwealth Renewable Energy (Electricity) Regulations 2001.).
<i>Sawmill waste</i>	Residues, such as sawdust, chips, off-cuts and wood wastes produced in the process of sawing wood into planks, boards or other timber products.
<i>Sunshine Renewable Energy P/L</i>	A wholly owned subsidiary of NSW Sugar Milling Cooperative Limited.
<i>Waste arising from wood processing</i>	<p>Includes waste from wood processing or the manufacture of wooden products, other than waste arising from activities (such as wood chopping or the manufacture of railway sleepers) carried out at the location from which the Australian native trees were harvested. This is likely to include:</p> <ul style="list-style-type: none"> ▪ primary wood waste from urban sources; that is, wood waste from landfill and transfer stations (for example, from urban and roadside tree lopping and removals from urban areas) ▪ secondary wood waste; that is, products in the later stages of the wood product cycle. This could include second-hand or recycled timber or timber products or waste products (for example, from the construction of buildings), including timber off-cuts and timber from demolished buildings (Department of Environment and Conservation 2005).

1. Introduction

1.1 Purpose and structure of the Fuel Plan

Delta Electricity Australia and Sunshine Renewable Energy propose to jointly construct and own a co-generation facility at Condong in northern New South Wales (NSW) for the purposes of generating steam for the neighbouring Condong sugar mill, generating electricity for use by Condong sugar mill and sale to the electricity network, and to dispose of surplus bagasse and cane trash. Operation of the plant will be by agreement with the NSW Sugar Milling Co-operative, the owners of the Condong Sugar Mill.

This Fuel Plan describes, among other things, fuel supply, fuel sources for the proposed plant, the management of those resources and fuel security. The Plan was developed by Delta Electricity and NSW Sugar Milling Co-operative.

This Fuel Plan is structured as follows:

- *Section 1: Introduction* - defines the scope of the Fuel Plan, and identifies the general location and relevant parties' roles and responsibilities.
- *Section 2: Fuel types* - identifies fuel sources, their general availability, potential sources and quality requirements.
- *Section 3: Composition of fuel supply* - describes the intended quantities and proportions of fuel to be used, allowing for seasonal variations.
- *Section 4: Security of fuel supply* - considers the impact of external events on the supply and use of fuel at Condong co-generation facility.
- *Section 5: Fuel management procedures* - describes on-site management of fuel resources, for both normal and abnormal conditions, as well as ongoing reporting.

This document does not assess environmental impacts of the co-generation facility, as these issues are considered within other documents, including the *Statement of Environmental Effects – Condong Cogeneration facility* (Worley Resources and Energy 2000), the associated *Statement of Environmental Effects – Proposed Overland Conveyor System for Condong Co-generation Facility Condong, Tweed Shire* (Leddy Sergiacomi and Associates Pty Ltd 2002) and associated conditions of approval (dated 7 July 2003 and 26 October 2006).

1.2 Facility location

Condong is a village in the far north of NSW, within the Tweed Shire Local Government Area. It is approximately 4.5 kilometres (km) from the centre of Murwillumbah. The Condong Sugar Mill site is at 123–153 McLeod Street, Condong. The co-generation facility is proposed to be located within the existing boundary of the Condong Sugar Mill.

A fuel stockpile of approximately 6 ha will operate on the eastern side of the Pacific Highway, and an overhead conveyor will link the stockpile with the main site.

A regional view of the facility location is shown in *Figure 1.1*, including the approximate layout of the mill, stockpile area, the town of Condong and the Pacific Highway.

Condong is predominantly a rural area. The sugar mill supports the agricultural industry of the area. Land use is typically sugar cane plantations, while patches of forest can be found throughout the region. The Tweed River is immediately west of the site, and runs in a northerly direction.

1.3 Overview of facility operations

Co-generation is a process that generates two forms of useful energy, which at Condong are heat (as steam), and electricity. The proposed co-generation facility at Condong will replace existing boilers and power generation equipment, and is scheduled to commence operation in mid-2007.

The co-generation facility will comprise a high efficiency boiler designed to produce up to 155 tonnes of steam per hour. A portion of this steam will supply the needs of the sugar milling processes at the Condong Sugar Mill. The remainder will drive a generator with 30 MW capacity, which will firstly supply the cogeneration plant and sugar mill electricity requirements, with excess electricity (of approximately 24 MW during the crushing season) being exported to the grid.

Other significant equipment at the facility will include:

- flue gas cleaning equipment and an exhaust stack
- a water treatment plant
- a cooling tower
- a biomass fuel handling facility, including an overhead conveyor to the stockpile site
- interconnections to external utilities, including water and electricity.

The main fuel source will be cane-based fuels, as supplied from the NSW Sugar Milling Co-operative (the NSW SMC). Therefore, during crush season (the operational period of sugar mill, typically June to December, depending on harvest conditions), the boiler will operate at 90–100% of its design capacity, and at around 70% of its capacity for the remainder of the year.

The co-generation facility will operate continuously, except for maintenance periods. The mode of operation will vary between crushing season and non-crushing season.

During the crushing season the cogeneration plant will provide electricity and steam to the mill and receive cane based fuel from the mill. The cane based fuel received is expected to be well in excess of requirements during this period and the surplus will be



stored in the stockpile. The bulk of the electricity generated will be sent to the local electricity network.



In non-crush mode the cogeneration plant will consume stored cane based fuels and wood fuels. Electricity generated during this period will be sent to the local electricity network.

The fuel stockpile will be located east of the Pacific Highway, and connected to the site by a bi-directional conveyor above the highway. Cane-based fuel will be received directly, via interconnecting conveyors from the sugar mill. Woody fuels will be received as external deliveries to the stockpile according to demand.

1.4 Roles and responsibilities

The co-generation facility is to be owned by a joint venture between Delta Electricity Australia Pty Ltd, and Sunshine Renewable Energy Pty Ltd. The joint venturers will be responsible for reporting in accordance with statutory and other requirements, as detailed in *Section 5.3*.

Delta Electricity will be registered as the 'generator' (as defined in the National Electricity Code), and will provide the National Electricity Market Management Company (NEMMCO), or other appropriate body, with the information required to fulfil this role.

The joint venture parties will co-ordinate registration and the associated reporting requirements for the co-generation facility with the Office of the Renewable Energy Regulator. Any further emissions trading schemes or green energy certificates would also be co-ordinated by agreement between the joint venture parties.

Day-to-day operation of the co-generation facility will be by agreement with the joint venture parties. At the time of writing, operations will be undertaken by the NSW SMC in accordance with this Fuel Plan. The site is owned by the NSW SMC (and leased to the Joint Venture), and the current Environment Protection Licence will be revised to include these activities (Palmer, by email, 2006).

The Forestry Unit of the NSW Premier's Department is responsible for auditing this Fuel Plan. This role will comprise an analysis of the information used within the plan, a review of its interpretation, and a review of the plan as a whole.

2. Fuel types

This Section describes the types of fuels and their specifications for use at the Condong co-generation facility. For each fuel type, the general availability and potential sources of these materials are discussed.

Whilst the description in this Section represents the current intentions of the joint venture parties, variations to agricultural and commercial conditions may lead to variations in the day-to-day operations of the facility. Seasonal variations and contingency plans are discussed in *Sections 3 and 4* respectively.

A broad area was considered in regard to its potential to supply fuel to the co-generation facility. However practical and economic constraints would apply, as the Department of Energy Utilities and Sustainability's *NSW Bioenergy Handbook (2004)* notes: 'transport costs will limit power station size, as it will generally only be economic to transport feedstocks 50-100 km' (p45). Furthermore, the proposed co-generation facility at Condong is the only one able to operate with both cane-based and woody fuels within a 100 km radius of Condong.

2.1 Cane-based products

2.1.1 Overview of cane-based products

Biomaterials from cane plantations are processed into three products: extracted juice, bagasse (the dry fibres from which the juice has been extracted), and cane trash (non-juice-producing parts of the cane plant, such as leaves and cane tops). 'Cane-based products' are bagasse and cane trash that are suitable for use as fuel in the co-generation facility.

The local area at Condong is dominated by agricultural land uses, with sugar-cane plantations the most significant. Cane-based products are delivered by farmers to the NSW SMC's sugar mill, in accordance with individual agreements.

2.1.2 Supply at Condong

Bagasse is an output from the sugar milling process. As part of this project the usual bagasse source (cane billets) will be supplemented by the trash (leaves of the cane plant) which would otherwise be burned in the field. As a result, the co-generation facility's cane-based fuel will typically be provided via a conveyor from the mill and will be consumed immediately. Where it is excess to current requirements, surplus fuel will be sent to the stockpile via the overhead conveyor for reclaim at a later date.

A proportion of the cane-based fuel could be delivered to the co-generation facility separately from supply by the sugar mill. This may happen where cane trash is harvested as a separate component, or where cane-based fuel is provided by another site as excess to its needs or storage.

Bagasse supply is dependent on harvesting and production levels at the sugar mill. Similarly, cane trash supply is variable but traditionally is burnt in-field. Cane trash is of no value in the production of sugar but may be left in fields as soil cover.

For this project, it is proposed that cane trash will generally be harvested together with usable cane, and the two products will be transported together to improve transport efficiency. Some trash may be retained in fields as soil cover. Once delivered to the mill, there are a number of options for the use of bagasse and cane-trash. In order of priority, these are:

- as a mud-filtering aid
- for immediate on-site power generation
- stockpiled for future power generation
- where the total cane-based fuel exceeds the annual identified requirements, these may be stockpiled for future power generation, provided to another co-generation facility, or sold to another party for various uses.

While use as a mud-filtering aid is the highest priority for bagasse, only a small quantity of material is required, depending on seasonal conditions. The supply of cane-based products during crush season is expected to be sufficient for immediate fuel consumption, with stockpiling of excess. It is less likely that the supply of cane-based products will exceed annual fuel consumption demand.

Cane-based fuel in the region has been assessed as suitable to supply the majority of fuel requirements for the co-generation facility. The estimated fuel quantities and proportions of different types are discussed further in *Section 3. Figure 2.1* shows the distribution of cane production areas.

The quantities of cane-based fuel available from individual sources will depend on annual production levels and the arrangements made between farmers and the sugar mill. However, a generic assessment of regional supply is shown in *Table 2.1*.

Table 2.1 Regional supply of cane-based products

Area	Potential standing crop at harvest time (tonnes)
Condong Sugar Mill feed area	300,000 – combined bagasse and cane trash
Harwood Sugar Mill feed area	144,000 – potential surplus of cane-based fuel

(Hurt, 2006, by email.)

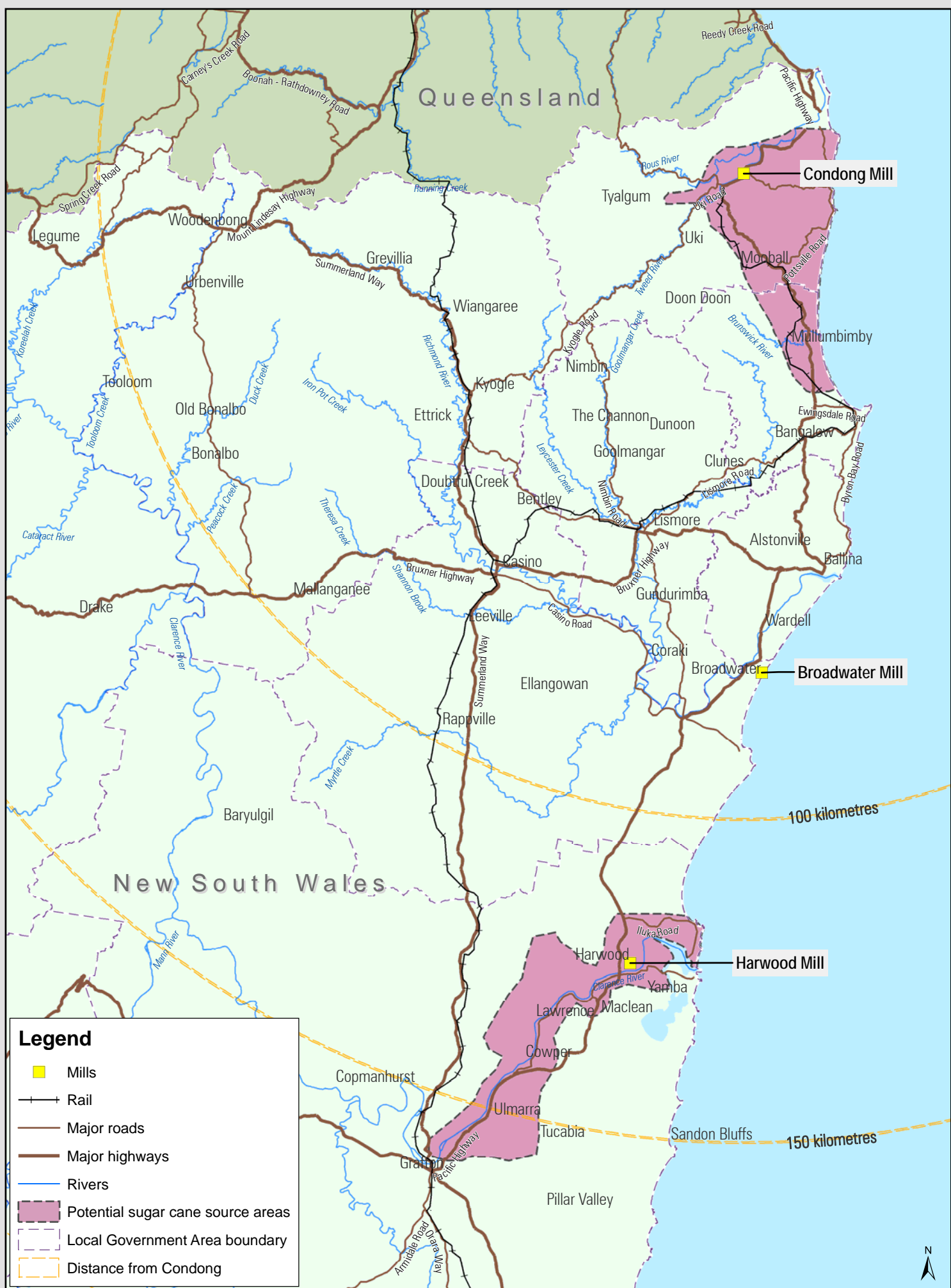


Figure 2.1 Location map of cane production areas

2.1.3 Fuel input specifications

Management of the fuel resources prior to arrival on-site will be achieved through product quality specifications.

For bagasse, the following specifications will apply:

- maximum moisture content of 53%
- average moisture content not exceeding 48% in any consecutive 12 month period
- maximum ash content 15% of dry weight.

For cane trash, the following specifications will apply:

- moisture content between 10% and 60% (measured on an as-received basis)
- maximum ash content 11% of dry weight.

The thermal efficiency of cane-based fuel varies due to factors such as the input moisture content, the proportion of cane trash to bagasse, and the efficiency of bagasse processing. Woody fuels

2.1.4 Overview of woody fuels

A range of fuels derived from wood can be used for co-generation. At Condong, identified potential sources of woody fuels are wood residues from sawmills and camphor laurel (*Cinnamomum camphora*) cleared by local land owners.

Wood residues derived from sawmill operations are a potential fuel. Residues comprise off-cuts, chips below a useful size, and sawdust. The available supply of woody fuels depends on many factors, including:

- factors that affect sawmill production rates
- production efficiency and wastage rates at sawmills
- alternative markets such as pine chip or reprocessing for compost and soil conditioners.

As the quantity and price of available material varies, a commercial decision will be made as to the quantities required. *Section 4* considers the potential impact of supply fluctuations on the operation of the co-generation facility.

Camphor laurel is the exotic tree *Cinnamomum camphora*. It is considered a woody weed under the *Noxious Weeds Act 1993*, and has been declared a Class 4 noxious weed in a number of North Coast and northern Sydney local government areas, including:

- | | |
|-------------------------------|---------------------------|
| ▪ Ballina Shire Council | ▪ Lismore City Council |
| ▪ Bellingen Shire Council | ▪ Nambucca Shire Council |
| ▪ Blue Mountains City Council | ▪ Richmond Valley Council |

- Byron Shire Council
- Clarence Valley Council
- Far North Coast County Council
- Ku-ring-gai Council
- Kyogle Council
- Ryde City Council
- The Council of the Shire of Hornsby
- Tweed Shire Council
- Willoughby City Council.

Camphor laurel and any associated material could also be used as fuel. However, as the plant is a Class 4 noxious weed under the *Noxious Weeds Act 1993*, the following requirements will apply:

- The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority.
- The plant may not be sold, propagated or knowingly distributed.

2.1.5 Supply at Condong

Wood residue supply will be sourced from sawmills within a distance that is economically viable. However, harvesting and supply of camphor laurel is subject to a number of physical constraints such as distance, physical access to standing trees, dominance of camphor laurel within a given area, and the presence of suitably sized clusters of camphor laurel, all of which will impact the economic viability of clearing and transport. All woody fuel suppliers will be required to comply with relevant environmental legislation.

Woody fuels are anticipated to supply the remainder of fuel requirements at the Condong facility, when stockpiled cane-based product from the crushing season is exhausted. The estimated fuel quantities and proportions of different types are discussed further in *Section 3*. *Figure 2.2* shows the location of nearby sawmills and harvestable clusters of camphor laurel trees (derived from State Forests 2000).

The quantities available from individual sources will depend on annual production levels, arrangements made between sawmills or land owners (for camphor laurel), and the nominated operator that would arrange supply of the fuel. Whilst exact quantities will vary, a generic assessment of regional supply is provided in *Table 2.2*.

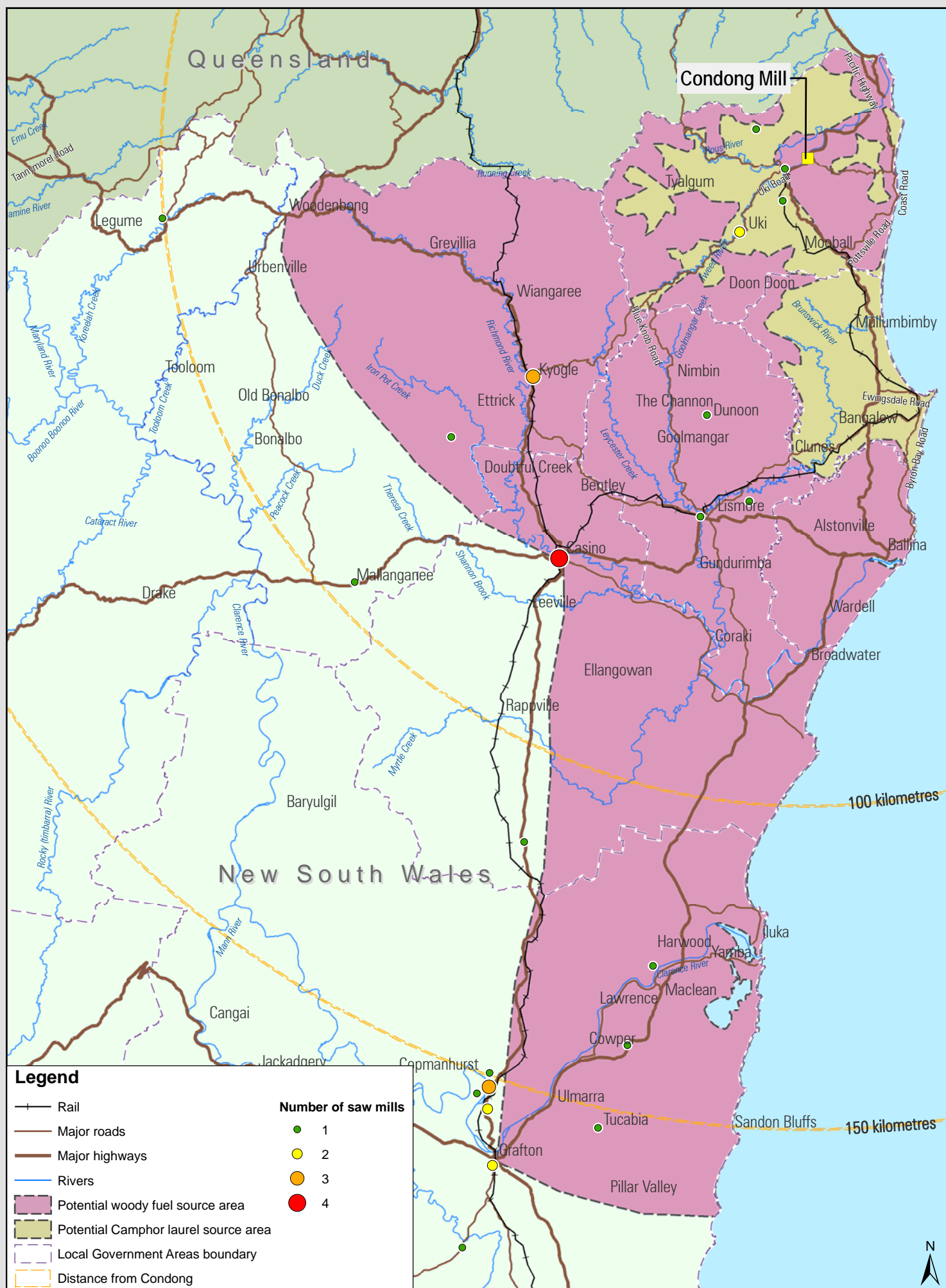


Figure 2.2 Location map of woody fuel sources and saw mills

Table 2.2 Regional supply of woody fuels

Area	Material available ¹	Quantity
Tweed Shire Council	Camphor laurel	2,428,580 tonnes
Byron Shire Council	Camphor laurel	3,075,190 tonnes
Within 100 km of site	Number of sawmills	16 sawmills
Within 100 km of site	Sawmill residue	50,000 tonnes per annum
100 – 150 km of site	Number of sawmills	6 sawmills
100 – 150 km of site	Sawmill residue	40,000 tonnes per annum
150 – 200 km of site	Number of sawmills	11 sawmills
150 – 200 km of site	Sawmill residue	60,000 tonnes per annum

Note 1/Source: For Camphor laurel, this is economically available supply (*An assessment of the availability of Camphor laurel as fuel for the Condong and Broadwater cogeneration bioenergy projects*, State Forests NSW, 2000). For sawmill waste, this is available quantity (Hurt, 2006, by email.)

2.1.6 Fuel input specifications

Where woody fuels are used for co-generation, they will need to comply with the following requirements:

- (NSW) Protection of the Environment Operations (General) Regulation 1998, in particular Part 3B: Burning of bio-material in electricity generating works
- (Commonwealth) Renewable Energy (Electricity) Regulation 2001 for materials classified as sustainable fuels
- any control requirements determined under the (NSW) *Noxious Weeds Act 1993* or associated legislation
- any site-specific requirements determined from time to time based on operating requirements, or specified within the site's Environment Protection Licence, when re-issued by the (NSW) Department of Environment and Conservation.

Chapter 3B of the Protection of the Environment Operations (General) Regulation 1998 details requirements for burning of bio-material in electricity generating works. Under this regulation, native forest bio-material may not be used for power generation; however, specific materials are excluded from the definition, such as sawdust or other sawmill residues, and authorised plantations. These requirements will apply to all fuels as a minimum quality specification, ensuring only appropriate materials are used. The Department of Conservation provides *Guidelines for the Burning of Bio-material – Record Keeping and Reporting Requirements for Electricity Generating Facilities* (2005). Section 5.3 incorporates these requirements into overall reporting requirements.

Fuel supplied will also need to comply with the requirements of the (Commonwealth) Renewable Energy (Electricity) Regulation 2001 to be considered an 'eligible renewable energy source'. Under this legislation, the registered owner of the co-generation facility would create one Renewable Energy Certificate for each MWh of electricity exported to the Grid. Therefore, the joint venture will seek accreditation of the co-generation facility with the Office of the Renewable Energy Regulator. In particular, woody fuel may be supplied from plantation forests managed under the Plantation Code of Practice, or from

forestry operations that have an Integrated Forestry Operations Approval under Part 4 of the (NSW) *Forestry and National Park Estate Act 1998*.

The requirements of the above legislation generally prohibit the use of native forests directly for fuel, or the harvesting of such forests for the primary purpose of energy production. Camphor laurel, as a noxious weed, complies with the legislation, as do genuine sawmill residues. Wood by-products from manufacturing processes, such as packing cases, pallets and recycled timbers, are also compliant sources.

The following materials will not be used:

- timber treated with copper chromium arsenate or pentachlorophenol; as these are prohibited articles under the Protection of the Environment Operations (Clean Air) Regulation 2002, except in licensed incinerators
- thinnings and harvest residues from native forest management
- native forest bio-materials, except as sawmill residues.

The thermal efficiency of woody fuels varies due to factors such as the age and seasoning of the wood, fuel density, moisture content and input material. A literature review provided thermal efficiency estimates of 2.6–6.1 MW hours/tonne, including as received through to dry, ash-free product (Commonwealth Scientific and Industrial Research Organisation 2002; Department of Energy, Utilities and Sustainability 2004; Department of Environment and Heritage 2005b; Worley Resources and Energy 2000).

3. Composition of fuel supply

This Section describes the intended fuel quantities to be used for co-generation, and likely proportions of each type based on seasonal variations.

3.1 Fuel requirements

The proposed co-generation facility has a nameplate capacity of 30 MW, and will operate year-round. Cane-based products and woody fuels cannot be burnt simultaneously, and sugar cane is the primary fuel source for the co-generation facility.

Annually, a base-load of 300,000 tonnes of cane-based fuel is anticipated to be supplied, based on crop yields. Additional supply will then be provided in the form of either cane-based fuel or woody fuel, depending on availability and operational factors. The supplementary fuel requirement is estimated at 95,000 tonnes of cane-based fuel, or 75,000 tonnes of woody fuel or some combination. As fuels have different thermal efficiencies, quantities are not directly comparable.

3.2 Fuel mix and seasonal variation

Detailed fuel planning will occur annually to identify the likely cane harvest yield and, therefore, the quantities of cane-based and woody fuels. This planning will take into account the potential for more cane-based fuel to become available in the future, for example, due to larger crop sizes resulting from favourable weather conditions or improved farming practices. In this case, the use of woody fuel would decrease. Generally, fuel is anticipated to be around 80% cane-based fuel and 20% woody fuels, in any given year. Cane-based fuel will be given priority over woody fuels.

During crush season, all cane-based products from the mill will be supplied directly to the co-generation facility for immediate use. Crush season is the period where the sugar mill operates, and is typically from June to December, depending on annual conditions. During this period, cane-based fuel will provide all of the cogeneration plant's fuel requirements.

Surplus material supplied during the crushing season will be stored at the stockpile site. The stockpiled material will then meet the demand for a period after crush season, until this fuel supply is exhausted.

Fuel requirements after this point will then be supplied from woody fuel, as identified in *Section 2.2*.

Distillate fuel oil may be used for start-up or as emergency fuel in the boiler. Only minimal amounts of distillate fuel will be used, comprising approximately 0.06% (by weight) of total annual fuel consumption (Worley Resources and Energy 2000).

4. Security of fuel supply

This Section considers options available to the joint venture partners should limitations to supply occur.

The details of the co-generation facility operations will vary according to commercial requirements. Such details include start/stop times and selection of fuel sources from those available. The decision to use woody fuels against the purchase of surplus cane-based fuels from elsewhere will be made on a needs basis, and will consider both commercial and operational factors.

Supply constraints may occur as an absolute limit to supply, or as an economic limitation. An absolute limit to supply could occur during drought conditions, or if bushfires burn *in situ* reserves of cane fuels or woody fuels. Economic factors may limit the suitability of more distant fuel supplies, for example, where transport costs increase, or if the price of electricity falls.

As the co-generation facility is not considered critical energy generation infrastructure, should these physical or economic constraints arise, the co-generation facility could reduce operations until more favourable conditions return.

5. Fuel management procedures

This Section details key aspects of procedures to control environmental issues associated with fuel supply and handling during regular and abnormal (contingency) conditions. Associated reporting requirements are also detailed.

5.1 Site management measures

Site management measures will comply with the requirements of the development consent, legal requirements, other obligations such as voluntary schemes, and good operating practice.

5.1.1 Delivery of fuels

As noted in *Section 2*, cane-based fuels will be delivered directly from the sugar mill site to the co-generation facility by conveyor. Woody fuels will be supplied by truck to the stockpile site for immediate transfer to the cogeneration plant (by conveyor) or for storage.

For cane-based fuels, the use of conveyors will allow direct transfer of materials from the sugar mill to the co-generation plant, minimising handling and transport distances. Woody fuel handling will also be minimised by appropriate storage at the nearby stockpile site and use of the conveyor system. Fuel handling is detailed in *Section 5.1.3*.

Supply of cane-based fuels will be by agreement between the NSW SMC and the owners and/or operator of the co-generation facility.

Supply of woody fuels will be through procurement and transport contracts. These will specify appropriate delivery times, arrangements such as the provision of receival bins, and management practices, such as dust and load control. Records of compliance with these requirements, or otherwise, will be kept in accordance with the record-keeping and reporting procedures in *Section 5.3.5*.

5.1.2 Fuel quality control

As part of the fuel management process, minimum quality requirements will be specified and implemented for both cane-based and woody fuels.

For cane-based fuels, key quality parameters are moisture content and ash content. Quality will be measured by standard laboratory analyses of aggregated samples, taken from the point on the conveyor system where the cane-based fuel has been delivered to the co-generation facility. Separate samples will be taken for bagasse and cane trash, with moisture content measured using 8-hour samples, and ash content measured by 24-hour samples. Details of quality requirements are listed in *Section 2.1.3* and *2.2.3*.

Where fuel does not meet the fuel input requirements detailed in *Section 2*, contingency plans will be implemented, as described in *Section 5.2.2*.

5.1.3 On-site fuel handling

To ensure on-site handling of fuels has minimal impacts and complies with legal requirements, a number of procedures were identified at the planning stage. These include management of water and dust at the stockpile site, as well as general fuel handling. *Section 3* discusses fuel quantity requirements and inventory management, while *Section 4* considers overall fuel supply management in terms of security.

Fuel suppliers will be required to operate in accordance with good industry practice to minimise environmental impacts during transport. For example, all loads will be covered, and any spills cleaned up.

The stockpile itself will be located east of the Pacific Highway. An overland conveyor will transfer fuel directly to the co-generation facility.

The stockpile site will be bunded with an elevated wall around the perimeter to minimise potential for flooding impacts. A stormwater holding sump will be located adjacent to the stockpile, and stormwater will then pass through a solids interceptor system, finally draining via existing surface flow paths to the Tweed River. During dry weather, water run-off from the stockpile area collected in the holding sump will be used for dust suppression of active stockpile areas.

The stockpiled fuel will be protected from wind and rain with tarpaulins while inactive.

Run-off will pass through a retention system aimed at reducing levels of particulate contaminants, before flowing to the Tweed River.

Staff will be nominated to undertake regular site inspections in order to monitor sediment transfer and potential for release of site run-off to ensure protection of waterways.

Handling procedures for the stockpiled fuel, such as loading, unloading, use of the overhead conveyor, and vehicular transport, will control dust generation. As a minimum, mitigation measures will include:

- enclosure of transfer conveyors
- dust separation units on conveyor ventilation points
- skirting seals and curtains adjacent to conveyor belts
- dual scrapers at the head discharge point of belt conveyors
- minimisation of free fall height into chutes
- misting at loading areas to reduce wind-borne, fugitive dust.

Dust extracted from the system could be returned to the fuel feed system, or may be combined with ash for application to cane fields.

5.2 Site contingency planning

This Section identifies how fuel will be managed under conditions that are non-standard, such as during emergencies or maintenance works on the site.

5.2.1 Excess supply conditions

Excess supply will be managed through appropriate inventory control. It is not anticipated that supply would ever exceed available storage capacity, as the need to purchase woody fuel will be determined by assessing currently available cane-based fuel stocks. Woody fuels will only then be arranged when a need for supply is identified and capacity at the stockpile site is available.

Nevertheless, a number of measures are available to manage this risk. Should supply exceed medium-term demand, the initial response would be to reduce purchases of woody fuel. Other options are also available, such as increasing the stored bulk density (i.e. compacting stockpiles to improve storage space).

5.2.2 Contamination of supply

Where supplied fuel is non-compliant with the quality requirements identified in *Section 2*, the following remedial procedures will be applied.

Where fuel falls outside the quality requirements, this may reduce the operating efficiency, cause physical constraints or lead to impacts on the operation of the co-generation facility. *Table 5.1* lists key potential non-compliances, their potential impact, and potential remedial actions.

Table 5.1 Implication of non-compliance with fuel specification

Non-compliance Issue	Impact on operations	Potential remedial action
Excess moisture content	Reduced efficiency of operation	Monitor and enforce quality specifications Alter stockpile and inventory controls to vary batches of fuel used
Moisture content too low	Additional water demand	Monitor and enforce quality specifications Alter stockpile and inventory controls to vary batches of fuel used
Oversized woody fuel	Wood chips too large to enter boiler or combust appropriately	Screening of fuel Arrange chipping of stockpiled material Enforce quality specifications
High ash content in cane-based product	Fouling or slagging of boiler May require additional maintenance	Alter rate of fuel consumption Alter proportion of bagasse to cane trash Review harvesting procedures

5.2.3 Start-up

For the initial facility start-up, start-up following maintenance, and combustion support during extreme furnace stability problems, distillate fuel oil will be used, which will be stored on-site for such occasions. It is expected that in any year, distillate may be used for a maximum of 200 hours to support combustion of biomass fuels.

The use of non-renewable fuels, such as distillate fuel oil, will be recorded and reported against the energy generated from this use. It will be excluded from any claims made for generation of renewable energy. It is anticipated that the need for distillate fuel oil will be minimal. The estimated usage is in the order of 0.06% of fuel use, by weight (Worley Resources and Energy 2000).

5.3 Reporting

The co-generation facility owner, or the operator on behalf of the owner, must report and keep records in accordance with the Protection of the Environment Operations (Control of Burning Regulation) 2000 and the *Guidelines for the Burning of Bio-material: Record Keeping and Reporting Requirements for Electricity Generating Facilities* (Department of Environment and Conservation 2005). Reporting is also required in accordance with any Environment Protection Licence, and a range of voluntary environmental schemes and company reporting activities.

The following set of recording and reporting procedures will be undertaken as a minimum to assist in meeting reporting requirements.

5.3.1 Receipt of fuel

As material is supplied to the facility, the operator, on behalf of the owner, will make a record of the fuel received, as follows:

- the name of the supplier
- the date of supply
- type of material (For bio-material, this will allow classification into: bagasse, exotic woody weeds, non-woody energy crops, other bio-material, plantation bio-material, sawdust and sawmill waste, waste arising from wood processing and woody planted energy crops.)
- location from which it was harvested or sourced
- the quantity, as tonnes dry weight.

Suppliers must also provide auditable evidence to substantiate the source of the wood waste supplied, and any accreditations claimed.

5.3.2 Fuel register

A fuel register will be kept as a running summary ledger, with the following details:

- for the start of the reporting period, the opening balance of the inventory for each material on-site that is to be used for electricity generation
- the date on which the materials entered or left the premises, together with the other information specified above
- for the close of the reporting period, the closing balance of the inventory for each material on-site to be used for electricity generation.

In addition, records will be kept of the co-generation facility's electricity generation, and net sent out generation, that is, electricity exported to the distribution network.

5.3.3 Monthly reporting

From the above records and others, the operator will prepare and submit a monthly plant performance report to the owner. The report must be submitted no later than the end of the first full working week of the month for the previous month's performance.

The report will give details of the following:

- energy production (steam and electricity)
- auxiliary energy consumption (steam and electricity)
- fuel consumption
- fuel stockpile report (inventory, incoming, outgoing)
- fuel quality
- efficiency

- hours of operation (for boilers and turbine generators)
- forced outages of boilers and turbine generators (cause and duration)
- equivalent availability factor (rolling 12 month average)
- out of limits operation
- equipment failure
- maintenance backlog
- environmental compliance
- occupational health and safety compliance
- ash discarded and quality
- water usage and quality
- outages of boilers and turbine generator for planned and unplanned maintenance (cause and duration)
- outages of boilers and turbine generators following major shut down maintenance, whether planned or unplanned (cause and duration).

5.3.4 Annual reporting

From these records, an annual bio-material report will be completed and submitted to the Department of Environment and Conservation, in the form shown in *Appendix A*, or as updated by the Department of Environment and Conservation from time to time. The reporting period for the joint venture ends on 1 June of each year. The relevant documents will, therefore, be submitted no more than 60 days later (that is, by 30 July of that year). The report will identify if any fuel other than bio-material has been used, and the proportion of that fuel(s).

The annual reports provided to the Department of Environment and Conservation will be certified by an independent auditor. The auditor will be a registered auditor under Part 9.2 of the *Corporations Act 2001* or an environmental auditor as accredited by the Quality Society of Australasia (Department of Environment and Conservation 2005).

Should the Office of the Renewable Energy Regulator approve accreditation of the co-generation facility as a renewable energy facility, additional reporting would be required. The party nominated by the Regulator will provide annual reports, using the documentation above. Records of electricity generated will be in the form nominated by the legislation, including electricity sent out, electricity used on-site, and any proportion generated using non-renewable fuels, such as distillate. These reports will be reviewed by an approved independent verifier in accordance with the Regulator's guidelines (Department of Environment and Heritage 2005b).

Reports provided to the Department of Environment and Conservation and the Office of the Renewable Energy Regulator will be made public only as required by those organisations. Supporting records will be made available to auditors as requested.

5.3.5 Storage and additional requirements

All records identified will be preserved for a minimum of 4 years after the end of the relevant reporting period.

To support the records kept by the facility, woody fuel suppliers will be required to provide records of the material supplied. Specifically, each supplier must keep detailed records of each vehicle trip, showing the time, date and quantity of the woody fuel delivery, and the receival bin or stockpile it was delivered to.

6. References

Commonwealth Scientific and Industrial Research Organisation 2002, *Biofuel database*, accessed online at:

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Department of Energy, Utilities and Sustainability (NSW), 2004, *NSW Bioenergy Handbook*, Sydney, NSW

Department of Environment and Conservation (NSW) 2005, *Guidelines for the Burning of Bio-material: Record Keeping and Reporting Requirements for Electricity Generating Facilities*, Sydney, NSW

Department of Environment and Heritage (Cth) 2005a, *AGO Factors and Methods Workbook, December 2005*, Australian Greenhouse Office

Department of Environment and Heritage (Cth), 2005b, *Independent Verification Guidelines*, Australian Greenhouse Office

Hurt 2006, Email regarding Fuel Plan, dated 23/10/2006

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Macquarie University 2005, *Macquarie Dictionary, fourth edition*, accessed online at:

<http://www.macquariedictionary.com.au>, viewed on 27/10/2006

Palmer 2006, Email attachment *Response to PB questions of 29 Sept (CP 3.10.06).doc*, dated 3/10/2006

State Forests NSW 2000, *An assessment of the availability of Camphor laurel as fuel for the Condong and Broadwater cogeneration bioenergy projects*, Hardwood Plantations Division, Grafton, NSW

Worley Resources and Energy 2000, *Statement of Environmental Effects – Condong cogeneration facility*, Sunshine Energy

Appendix A

Annual bio-material report template

APPENDIX

ANNUAL BIO-MATERIAL REPORT

Please note that this form may be amended without notice. Visit the DEC website at www.environment.nsw.gov.au/legal/notices.htm for the most recent version.

PART A: GENERAL INFORMATION

Premises to which report applies: _____

Common name of premises (if different from above): _____

Environment Protection Licence No. (if applicable): _____

Address of premises (including Lot and DP number): _____

Name of occupier of premises: _____

Reporting period: ____/____/____ to ____/____/____
DD MM YY DD MM YY

The Annual Bio-material Report ('the Report') must be completed after the end of the reporting period and lodged with the EPA within 60 days of the end of the reporting period. Penalties will apply if the Report is not received within this time. The maximum penalties are:

- 200 penalty units¹ in the case of a corporation
- 100 penalty units¹ in the case of an individual

How to complete your Annual Bio-material Report

You will need to:

- complete Parts A, B and C of this form
- have an independent auditor certify the information contained in the Report and complete Part D of this form.

¹ 'Penalty unit' is defined in section 17 of the *Crimes (Sentencing Procedure) Act 1999*.

PART B: REPORTING REQUIREMENTS

For the reporting period in Part A:

1. Provide the amount of electricity generated (in kilowatt hours) at the electricity generating works during the reporting period:

Total amount of electricity generated: _____

2. Provide the amount of electricity generated (in kilowatt hours) at the electricity generating works by burning bio-material of any kind during the reporting period:

Total amount of electricity generated from bio-material of any kind: _____

3. Provide the total amount (in tonnes dry weight) of bio-material of any kind used during the reporting period:

Total amount of bio-material of any kind used: _____

PART C: SIGNATURE

The Annual Bio-material Report may be signed only by an authorised representative of the company/premises who has legal authority to sign it.

The various ways in which, and people by whom, an Annual Bio-material Report may be signed are set out in the categories below. Please **tick the box** next to the category that describes how this Report will be signed. If you are uncertain about who is entitled to sign, or which category to tick, please phone the DEC Service Centre on 133 372.

If the occupier of the premises is:	The Annual Bio-material Report must be signed and certified in one of these ways:
An individual	<input type="checkbox"/> by the individual
More than one individual	<input type="checkbox"/> by all individuals who occupy the premises
A co-operative	<input type="checkbox"/> by fixing the common seal of the co-operative; or <input type="checkbox"/> by two people, one of whom is the director of the co-operative and one of whom is a director or officer of the co-operative.
A company	<input type="checkbox"/> by fixing the common seal in accordance with the Corporations Act, or <input type="checkbox"/> by two directors; or <input type="checkbox"/> by a director and a company secretary; or <input type="checkbox"/> if it is a proprietary company that has a sole director who is also the sole company secretary, then by that director; or <input type="checkbox"/> otherwise in accordance with the Corporations Act
A public authority (other than a council)	<input type="checkbox"/> by the Chief Executive Officer of the public authority or an employee delegated to sign on the public authority's behalf in accordance with its legislation.
A local council	<input type="checkbox"/> by the council in accordance with s. 377 of the Local Government Act; or <input type="checkbox"/> by affixing the seal of the council in a manner authorised under this Act.

It is an offence to supply any information in this form that is false or misleading in a material respect, or to certify a statement that is false or misleading in a material respect. There is a maximum penalty of 200 penalty units for a corporation or 100 penalty units for an individual².

I/We _____ (state name/s), being the occupier of the above premises, declare that:

- the occupier of the premises occupied the premises during the reporting period in which the bio-material was burnt, and
- no native forest bio-material within the meaning of Clause 57L of the Protection of the Environment Operations (General) Regulation 1998 was burnt during the reporting period.

I/We declare that the information contained in Parts A and B of this Annual Bio-material Report is not false or misleading in a material respect.

SIGNATURE: _____

SIGNATURE _____

NAME: _____
(please print)

NAME _____
(please print)

POSITION: _____

POSITION: _____

DATE: _____

DATE: _____

SEAL:
(if signing under seal)

(Please ensure that the appropriate box above has been ticked)

² 'Penalty unit' is defined in section 17 of the *Crimes (Sentencing Procedure) Act 1999*.

PART D: INDEPENDENT AUDIT CERTIFICATION STATEMENT – BURNING OF BIO-MATERIAL

Details of auditor:

Member of (tick as appropriate):

- ☐ Quality Society of Australasia (QSA)
- ☐ Certified Practising Accountants (CPA)
- ☐ Institute of Chartered Accountants (ICA)
- ☐ Accreditation by Australian Securities and Investment Commission (ASIC)

Membership/Accreditation number: _____

Name: _____ Company: _____

Address: _____

Postcode: _____

Phone: _____ Fax: _____

Details of facility:

Occupier of the premises: _____

Premises: _____

Environment Protection Licence No. (if licensed): _____

I have audited Parts A, B and C of the attached Annual Bio-material Report (the report) for the above specified facility for the period [.....]. The signatory in Part C of the report is responsible for the report. I have conducted an independent audit of the report in order to express an opinion on it to the New South Wales Environment Protection Authority (EPA) for the purposes of fulfilling the requirements of Clause 57N of the Protection of the Environment Operations (General) Regulation 1998.

The report has been prepared pursuant to Clause 57N of the Protection of the Environment Operations (General) Regulation 1998 for the purpose of reporting:

- the total amount of electricity generated;
- the total amount of electricity generated from bio-material; and
- the total amount (in tonnes dry weight) of bio-material used by the electricity generating works during the reporting period.

I disclaim any assumption of responsibility for any reliance on the report to any party other than the EPA or for any purpose other than that for which it was prepared.

My audit has been conducted in accordance with the Australian Auditing Standards, I undertook the procedures described in the attachment³ to form an opinion whether in all material respects, the report is presented fairly in accordance with Clause 57N of the Protection of the Environment Operations (General) Regulation 1998.

The following opinion has been formed on the above basis.

³ Please attach a brief description of the procedures followed in the course of the Audit to enable you to reach this opinion.

Audit Opinion

In my opinion, the Annual Bio-material Report of _____ (occupier of premises) does present/does not present⁴ (delete as appropriate) a true and fair representation of:

- compliance with Chapter 3B of the Protection of the Environment Operations (General) Regulation 1998, and
- compliance with the requirements of the EPA's *Guidelines for the Burning of Bio-material*.

Signed: _____ Date: _____

Print name: _____

Please send completed form to:

Licence Administration and Revenue
Department of Environment and Conservation (NSW)
PO Box A290, Sydney South NSW 1232

⁴ If the Annual Bio-material Report does not, in your opinion, form a true and fair representation of these matters, please provide reasons in a separate attached statement.