# Report on forestry aspects of the Synergy Displacement Tender #2

March 2008

Prepared for Babcock and Brown


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## INTRODUCTION

Babcock and Brown has been invited to tender for the supply of Capacity Credits and associated electricity, all associated RECs, Green Power Rights and any new environmental rights from renewable energy sources located in Western Australia. The Fifth Estate Consultancy (the Fifth Estate) understands that Babcock and Brown has submited a tender for the provision of the supply using wood and forest based fuels. This report contains the findings, conclusions and opinions of the Fifth Estate following review of information and field inspections in relation to those fuels. This report by the Fifth Estate is limited to the specific areas covered in the scope of works outlined below.

The Fifth Estate and, specifically, Craig Taylor, a Principal of the Fifth Estate, has extensive experience in the forest and forest products industry, particularly relating to the procurement and ongoing supply of forest resources. Craig Taylor is a professional forester with over 20 years industry and consulting experience in the industry. Full details of our credentials are available on request.

## DISCLAIMER AND LIMITATIONS

This report is the opinion of the Fifth Estate and is based on a proposal dated January 2007. In preparing this report, The Fifth Estate has relied on information provided by Babcock and Brown and their advisors. The information provided appears reasonable, however some of the information can not be independently verified. Nothing in the report is, or should be relied upon as, a promise by the Fifth Estate as to the availability, future growth, yields, costs or wood and forest based fuels available to Babcock and Brown. Actual results and details may be different from the opinion contained in this report, as anticipated events may not occur as expected and the variation may be significant, especially where fuel availability is based on extrapolating from samples and costings are based on equipment and methodologies which are in use overseas but are currently untried in Australia. The Fifth Estate has no responsibility to update this report for events and circumstances occurring after the date of this report.

Craig Taylor

Principal

## SCOPE OF WORKS

Babcock and Brown proposes to use wood and forest based fuels for the generation and supply of Capacity Credits, associated electricity, associated RECs, Green Power Rights and new environmental rights. The Fifth Estate investigated the following aspects of the proposed fuel supply:

- The availability and sustainability of the required quantity of wood and forest based fuel,
- The proposed purchase contracts under which the wood and forest based fuels will be procured,
- The suppliers' capacity to meet the quantity and quality of wood and forest based fuels specified in the purchase contracts,
- The capacity of the fuel suppliers and/or Babcock and Brown to, where relevant, harvest, gather, collect and transport the wood and forest based fuels,
- The reasonableness and sustainability of the costing associated with the procurement, harvesting, gathering, collecting and transporting of the wood and forest based fuels,
- Any other risks associated with the supply of wood and forest based fuel.

To enable the Fifth Estate to investigate and report on each of the points above, we undertook the following:

- Reviewed relevant internal (Babcock and Brown) and external documents, reports and other information used to support Babcock and Brown's assumptions relating to the wood and forest based fuels,
- Reviewed relevant supply contracts including the source of the fuel and for the provision of the necessary harvesting, gathering, collecting and transporting services,
- Interviews with proposed suppliers of fuel and services.

This Scope of Works required travel to Western Australia to investigate the fuel sources, and the proposed harvesting, gathering, collecting and transporting methods. The technology and methodology proposed be used to undertake the harvesting, gathering, collecting and transporting of the wood and forest based fuel is relatively new to Australia and there are few experienced suppliers of the necessary services. One other relevant operation in Queensland was investigated.

## FUEL SUPPLY

It is proposed that the total fuel requirement of 380,000 green tonnes per annum will come from a number of sources:

- Residues from the clearfall of pine (softwood) plantations owned by the Western Australia Forest Products Commission (FPC)
- Residues from the clearfall of *Eucalyptus globulus* or Blue gum (hardwood) plantations owned by Western Australia Chip and Pulp (WACAP but also commonly referred to as WAPRES)
- Residues from *Eucalyptus globulus* plantations owned and/or managed by Great Southern Plantations.
- Residues from the clearfall of *Eucalyptus globulus* plantations owned by Integrated Tree Cropping (ITC)

This report will consider each of these supply sources by addressing the points in the Scope of Works.

### Forest Products Commission

The Fifth Estate has reviewed the contract for residue supply entitled "Head Agreement for Production Contract No. 2893 (Sale of Plantation Residue)" and a Deed of Variation (Draft of 11 December 2007) between Western Australia Biomass Pty Limited and the General Manager of the Forest Products Commission. We have been advised by Babcock and Brown that the details of the draft Deed of Variation have been agreed to by FPC. The Fifth Estate's review has been confined to the specific issues associated with the supply of plantation residues. We have not reviewed and do not provide an opinion on the document associated with the contract; "Form of Consent Deed with Financing Entity".

The key terms of and details of Production Contract No. 2983 (Sale of Plantation Residue), hereafter referred to as the FPC contract, are:

**Quantity:** the contract contains minimum supply requirements on the FPC for 150,000 tonnes of Timber Residues per annum for the first 10 years of the contract term and 100,000 tonnes per annum for succeeding years. The contract also provides an agreement from the FPC to grant to Western Australian Biomass *"the exclusive right to purchase all Timber Residue from any Site; all or part of which is located within a radius of 100 km from the Facility Site".* (A map showing the location of the FPC plantations and distance to the site are is included as Appendix 3 of this report.) The contract requires the FPC to make available all its Timber Residues to Western Australia Biomass, however the definitions are important.

The key definitions are:

- Timber Residue: These are defined as: Unprocessed plantation pine thinnings and pine log residues including bole wood, branches and limbs of trees, stumps and residues of plantation logging operations including bark (largely exclusive of foliage). This is a broad and helpful definition for Western Australia Biomass as is covers all of the residue material suitable as fuel and, when read in conjunction with the "exclusive right" clause above, provides Western Australian Biomass with quality and quantity certainty at the minimum level.

- Tonne: These are the units of measure for sale and are determined by weighbridge measurements. Therefore, the quantity measured is "green tonnes", that is, including moisture. From Western Australia Biomass's viewpoint, the value to of the Plantation Residues is the "dry tonnes", that is, excluding the moisture. It is therefore in Western Australia Biomass's interest to purchase the Plantation Residues as dry as possible and in FPC's interest to sell them with the highest moisture content possible. Trials have been undertaken that show moisture content will be below 45% which is the assumption in the costings. Over the course of the year it is reasonable to assume that the moisture content will average lass than 45% which is consistent with our expectations.
- Site: The definition of Site is broad and again, when read in conjunction with the *"exclusive right"* clause above, provides Western Australian Biomass with the necessary surety. The definition includes all FPC pine plantations where there is an appropriately planned harvest.

Although the FPC is contracted to the minimum supply quantities, Western Australia Biomass needs to get some comfort that the quantity will actually be available; that is, the FPC will be able to meet its contractual requirements.

Biomass recovery from plantations following harvesting has not previously been done on a commercial scale in Australia. The Fifth Estate has examined information provided by Babcock and Brown and the FPC in a draft report "Plantation Residue and Fuel summary – South West Green Power Project" and information provided by Babcock and Brown's advisers. The report outlines the methodology and results of samples of recovered fuel following harvesting operations. The availability estimates contained in the report have "conservative" and "optimistic" estimates and in our opinion, the conservative estimate should be used in the first instance.

| Period | Green Tonnes/annum available (conservative) |
|---|---|
| 2006-2010 | 177,920 |
| 2011-2015 | 137,480 |
| 2016-2020 | 95,200 |
| 2021-2025 | 199,560 |
| 2026-2030 | 103,920 |

A number of FPC harvest sites have been inspected by the Fifth Estate and the amount of biomass available appeared to be in excess of the conservative estimates. This conservative position is also inconsistent with the minimum commitment of 150,000 Tonnes per annum.

Upon further investigation, we have discovered that the trial plots only included bole (woody stems) material less than 75 mm in diameter. Although the volume of wood greater than 75 mm diameter was excluded from the trials, it is included in the FPC contract. In our experience, and based on our field observations, that there is a high volume of this size material available as Plantation Residues following harvesting. This is because most conventional harvesting operations require a minimum length log of 3 metres and a minimum bole diameter of 100 mm. Therefore all logs shorter than 3 metres in length and between 75

mm and 100 mm diameter are available as Plantation Residues but were excluded from the trial measurements.

**Quality:** The key quality issue is the moisture content as (discussed above) and calorific values. Western Australia Biomass will rely on samples taken earlier in relation to calorific values. We have no specific expertise in this area however we have seen trial results (in an Excel spreadsheet *"070322 Copy of cmm070219 national power"*). These results (shown below and including Blue Gum) are consistent with our previous experience and in our opinion it is appropriate to use these values. Note that the moisture contents in the trial may be below what is expected under operational conditions however it has no impact on the Gross Dry Calorific Value.

| National Power Biomass Analysis Results | | | | | | |
|---|---|---|---|---|---|---|
| **Sample Description**[1] | **Moisture (%)** | (% dry basis) | | | **Gross Dry Calorific Value (MJ/kg)** | **Gross Wet Calorific Value (MJ/kg)** |
| | | **Ash Yield** | **Sulphur** | **Chlorine** | | |
| 1 Radiata pine | 32.2 | 0.46 | 0.02 | 0.02 | 20.2 | 13.7 |
| 2 Blue Gum screened | 11.7 | 1.9 | 0.04 | 0.20 | 19.2 | 16.9 |

Further trials have been undertaken which support these findings. Details are included in "Trial Results", Appendix 1 of this report.

**Term:** The term of the agreement is 20 years which, in the context of traditional wood supply contracts, is a long agreement. In our opinion the FPC will have Plantation Residues available for this period (as the plantations that will supply the residues have already been planted) and the term is appropriate.

**Price:** The price per tonne is a small component of the delivered cost of the fuel and therefore must be considered in context the overall costing of the delivered fuel. The other components of the delivered cost are the harvesting and delivery costs. These costs will be discussed later in this report. The contract imposes a maximum limit on the haulage distance.

In our opinion, the price per tonne is appropriate.

**Price review:** There are two components to the price review. Firstly there is a standard annual CPI increase (*"Indexed"*) for the term of the contract. The low starting price and the relatively small effect of the price on the total delivered cost of the fuel will reduce the impact, however it should be noted that other low value forest products prices have generally not increased at the rate of CPI over the last 25 years.

The parties also agree to have a general price review every 5 years. Wood supply contracts often have a mark-to-market provision after a fixed period (say 2-5 years) to ensure the annual CPI increases do not result in a price unrelated to the general market.

[1] Sample: ID CMM/07/0219

## WACAP

We have reviewed the Final Supply Agreement between WA Chip and Pulp Co Pty Ltd and Western Australia Biomass and a Deed of Variation. We have also visited WACAP harvesting sites equivalent to sites where fuel is proposed to be sourced. The fuel will be sourced from harvesting residues following the clearfall of hardwood (*Eucalyptus globulus* or Tasmanian Blue Gum) plantations. The key terms and details of the WACAP contract are as follows:

**Quantity:** The contract does not oblige WACAP to supply a minimum quantity of Fuel however it does oblige WACAP to supply all of the Fuel from the Plantation Area exclusively to Western Australia Biomass. The Plantation Area is defined as the area of WACAP plantations within 100 km of the power plant. In our opinion, this is a particularly favourable clause for Western Australia Biomass. The contract also states that WACAP expects there is likely to be 150,000 tonnes of fuel available for sale.

Fuel is defined in the contract as "Unprocessed eucalypt plantation residues including bole wood, branches and limbs of trees and residues of logging operations including bark, woodchips and woodchip fines and other processing residues derived from the Plantation Area" which, in our opinion, appropriately describes the residues available following harvest.

Details of a number of fuel quantity trials have been provided to the Fifth Estate indicating that in at least 50 tonnes per hectare of green biomass is available on average from the WACAP plantations following harvesting. This information is supported by plantation biomass growth models that have recently been developed for assessing the amount of carbon sequestered by Blue Gum plantations.

Using this trial data, the quantity available from the Plantation area has been calculated and provided in a PDF document "WAPRES (WACAP) Biomass Availability 2009 through to 2014". The document projects that, based on WAPRES' harvesting plan, they will be able to supply the following quantities:

| Year | Biomass Available (green tonnes) |
|---|---|
| 2009 | 82,596 |
| 2010 | 175,357 |
| 2011 | 171,171 |
| 2012 | 125,321 |
| 2013 | 175,258 |
| 2014 | 175,893 |

Although the quantity is below 150,000 in 2012, smoothing of the harvest plan will be able to even out supply with the average from 2010 onwards 164,600 tonnes per annum. In our opinion, WAPRES will be able to supply approximately this annual volume.

**Quality:** Moisture content is assumed to be 45% of the total fuel mass. If the actual moisture content of the fuel differs from 45%, the calculation of the quantity delivered is adjusted to

account for the difference. This is an important and valuable clause as WA Biomass will not be exposed to the quantity and price risk associated with variable moisture content of the fuel.

Similarly, we have seen trial results (in an excel spreadsheet *"070322 Copy of cmm070219 natioanal power"*) for the Blue Gum calorific value and they are consistent with our previous experience. (See earlier comments and table showing Blue Gum values.)

**Term:** The term of the contract is 7 years with automatic 5 year extensions unless either party provides a minimum of 9 months notice prior to the expiry of the current contact period. In our opinion, this is an appropriate term and, given WAPRES's expected harvesting activity, the initial term is likely to be extended.

**Price:** The price per tonne is a small component of the delivered cost of the fuel and therefore must be considered in context the overall costing of the delivered fuel which is discussed later in this report.

In our opinion, the slightly higher price for the Blue Gum residues (compared to pine) is justified as WA Biomass' collection costs are likely to be lower; Blue Gum harvest residues will be already at the roadside whereas pine residues will be in the plantation coupes.

**Price Review:** The price review structure is based on annual CPI increases. There is no mark-to market clause (the contract is significantly shorter than the FPC contract).

There is in the second component where WACAP will receive 20% of the additional net post-tax revenue from any new renewable energy product created, from the portion of fuel consumed by the biomass plant which has been harvested from the WACAP plantations. In our opinion, this mechanism is reasonable.

## Great Southern Plantations

We have reviewed the Fuel Supply Agreement between Great Southern Managers Australia Limited (GSP) and WA Biomass and the Draft Deed of Variation dated 16 November 2007.

**Quantity:** GSP has supplied their planned harvesting data for the plantations they manage within 100 km of the WA Biomass site. Of this area, approximately 23,500 ha is planned to be harvested between 2010 and 2016 and of this total, approximately 13,000 hectares are leased by ITC and included in their supply volumes.

For the years 2009-2014 GSP will be a marginal supplier of approximately 15,000 tonnes per annum. For the years 2015-2020, the harvest area ramps up significantly as shown in the table below. The conservative estimate of 50 tonnes of fuel per hectare has been used to calculate the available fuel. There is, however, no commitment from GSP to supply specific tonnages.

| Operating Year | Number of hectares Planted | Estimated Fuel available following harvesting (t) |
|---|---|---|
| 01/07/2007 – 20/06/2008 | 300 | 15,000 |
| 01/07/2008 – 20/06/2009 | 300 | 15,000 |
| 01/07/2009 – 20/06/2010 | 300 | 15,000 |
| 01/07/2010 – 20/06/2011 | 300 | 15,000 |
| 01/07/2011 – 20/06/2012 | 300 | 15,000 |
| 01/07/2012 – 20/06/2013 | 300 | 15,000 |
| 01/07/2013 – 20/06/2014 | 300 | 15,000 |
| 01/07/2014 – 20/06/2015 | 3,000 | 150,000 |
| 01/07/2015 – 20/06/2016 | 3,000 | 150,000 |
| 01/07/2016 – 20/06/2017 | 3,000 | 150,000 |
| 01/07/2017 – 20/06/2018 | 2,500 | 125,000 |
| 01/07/2018 – 20/06/2019 | 2,500 | 125,000 |
| 01/07/2019 – 20/06/2020 | 2,500 | 125,000 |

The contract provides WA Biomass with adequate supply security as GSP agrees to make available the lesser of:

1. all the fuel available from the planted hectares in the table or
2. all the fuel available from all their harvest area.

**Quality:** The moisture content assumption and adjustment are as per the WACAP contract.

**Term:** The term of the contract is until 2020 with agreement required from both parties to extend for 5 years. GSP is not in a position to offer a longer term as there is no certainty (although highly likely) that they will plant or re-plant the same area of plantation in the future.

**Price:** The price per tonne is a small component of the delivered cost of the fuel and therefore must be considered in context the overall costing of the delivered fuel which is discussed later in this report.

In our opinion, the slightly higher price for the Blue Gum residues (compared to pine) is justified as WA Biomass' collection costs are likely to be lower; Blue Gum harvest residues will be already at the roadside whereas pine residues will be in the plantation coupes.

**Price Review:** The price review structure is based on annual CPI increases. There is no mark-to market clause even though this is a relatively long contract.

There is in the second component where GSP will receive 20% of the additional revenue from any new renewable energy product created by a new law from the portion of fuel consumed by the biomass plant which has been harvested from the GSP plantations. In our opinion, this mechanism is reasonable. There is also a clause that allows GSP to receive 20% of the

additional revenue from any increase in the value of the Renewable Energy Certificates (REC) greater than a CPI increase. There is no downside price protection for WA Biomass.

## Integrated Tree Cropping (ITC)

ITC has advised it has approximately 16,000 hectares of plantation under management. The majority of the land is either owned or under the control of GSP. ITC leases the land from GSP. Under the leasing arrangement, ITC must harvest and dissolve the leases by the year 2014 when the control of the land reverts back to GSP.

As a consequence, ITC will harvest approximately 3,000 hectares per annum through 2009-2013 inclusive. Using a weighted of 50 tonnes per hectare, ITC has the potential to supply 150,000 tonnes per annum.

We have reviewed the reviewed the Fuel Supply Agreement between ITC and WA Biomass Draft Deed of Variation dated 16 November 2007 which are very similar to the GSP contract. Only where the key terms differ are they referred to in this section of the report.

**Quantity:** WA Biomass has exclusive rights to all the fuel produced from ITC's plantations within 100 km of the site. The contract confirms the harvest area but very conservatively estimates 80,000 tonnes per annum is available (just 27 tonnes per hectare) for the 5 years to 2014.

Planning beyond this period by ITC is not possible as the plantations are yet to be established. However, it is reasonable to assume that the ITC previously leased estates will at least remain at their current size but the fuel volume at harvest will come under the control of GSP.

**Price:** The price per tonne is a small component of the delivered cost of the fuel and therefore must be considered in context the overall costing of the delivered fuel which is discussed later in this report.

In our opinion, the slightly higher price for the Blue Gum residues (compared to pine) is justified as WA Biomass' collection costs are likely to be lower; Blue Gum harvest residues will be already at the roadside whereas pine residues will be in the plantation coupes.

**Price Review:** The price review structure includes annual CPI increases. There is mark-to market clause every 3 years should the contract remain in force.

There is no payment for additional revenue from any new renewable energy product nor from any increase in the value of the Renewable Energy Certificates (REC).

## Other resources – Hansol

GSP has recently entered into an agreement to purchase the Hansol plantations with the transaction to due be completed in mid 2008. The plantations cover approximately 15,000 hectares in the region and Hansol is harvesting them on a sustainable basis, that is, approximately 1,500 hectares per annum. Using the 50 tonnes per hectare assumption, this will yield approximately 75,000 tonnes of biomass per annum. Although not contracted, it is highly likely that this volume would be available to WA Biomass.

There are other smaller Blue Gum plantation owners and managers in the region and it is likely that they will also be looking to secure sales of harvesting residue biomass.

## Summary of availability

The table below shows that there is adequate volume in the region to supply the necessary 380,000 tonnes of biomass for the power station. Although only a relatively small proportion of the volume is guaranteed under contract, in our opinion there is little risk of WA Biomass not being able to secure the necessary volume on a sustainable basis. We draw this conclusion based on the following:

1. The removal of residues following harvesting provides both an operational and financial benefit for the plantation owners and managers. The removal of plantation residues reduces the cost and increases the area available for replanting
2. The plantations from which the Radiata Pine supply is based (FPC) are already established and will be harvested over the next 30 years.
3. FPC plans to replant its pine plantations after harvesting, providing potential supply beyond 30 years.
4. The Blue Gum plantations (WACAP. ITC, GSP and Hansol) already established will be harvested over the next 10 years.
5. Much of the Blue Gum plantation base is owned and managed by companies operating Managed Investment Schemes. These operations have recently been through a Federal Government review and the Government has announced policies continuing to support the industry.
6. The Blue Gum biomass estimates are supported by recent research using "imperial" (using actual measured data) and "process" (where sophisticated models calibrated using actual measured data) model results.

| **Source** | **Conservative estimates of biomass available (tonnes per annum)** | |
|---|---|---|
| | 2009-2014 | 2015-2020+ |
| FPC | 150,000 | 150,000 |
| WAPRES | 150,000 | 164,000 |
| GSP | 15,000 | 150,000 |
| ITC | 80,000 | 0 |
| Hansol | 75,000 | 75,000 |
| Other | ? | ? |
| **Total** | **470,000** | **539,000** |

It should also be noted that there are numerous other smaller plantation owners and managers located in the region. In our opinion, the residues from these plantations are likely to become available to WA Biomass but the quantities are unknown.

# FUEL COLLECTION

## Environmental Consultants International

It is proposed that the fuel collection be undertaken by Environmental Consultants International Pty Ltd. (ECI). ECI is a specialist forestry contracting company with an emphasis on forest harvesting and plantation management. ECI is part of an international group of companies which specialises in vegetation management and is one of the few forestry contracting companies that operates Australia wide.

We have had a number of meetings with ECI, have been provided with background information and contacted some of their existing clients. From this ECI is, in our opinion, an appropriate company to provide the fuel collection and delivery services for Western Australia Biomass. Specifically they:

- have the experience to manage large forest based contracts,
- have good internal management systems,
- are innovative and in some areas are leaders in the development and use of technology,
- have the experience and skills to develop costing for contracts that allows them to be competitive whilst maintaining profitability,
- have a reputation for engaging good sub-contractors, and
- have a reputation for employing experienced and quality staff.

A large scale plantation based biomass recovery operation has not previously been undertaken in Australia. As a result, there is some uncertainty in assessing key factors relating to the cost of delivering collecting and processing the plantation residues. This risk has been mitigated by:

- WA Biomass owning the harvesting and processing equipment. Paying the financing costs is the most common difficulty for harvesting contractors when setting up a new operation and this risk has been removed with WA Biomass owning the equipment.
- WA Biomass paying the fuel cost for the harvesting and processing equipment.
- WA Biomass paying for standard repairs and maintenance for the harvesting and processing equipment.
- Selecting a contractor that has the demonstrated ability to appropriately cost operations.
- Selecting a contractor that has experience in new operations, and in the development and application of new technology.
- Selecting equipment that is currently in use in comparable processes in Australia.

The specific equipment that will be utilised in the recovery and processing of the plantations residues has been selected. The technology being utilised is similar to that being used in other biomass production in Australia, and is similar to machinery used for plantation residues and technology currently overseas.

## Production costs

ECI/WA Biomass have provided costings (in an Excel spreadsheet titled *COSTINGSMANJIMUPWAPRESSITE19thDecember2007*) for their proposal on the assumption that Moorbark processors will be used in conjunction with skidders and excavators. In our opinion, this is appropriate as the Moorbark machinery appears capable of performing the task in both Radiata Pine and Blue Gum plantations. This type of processing machinery requires a high level of maintenance, and ECI plans to have sufficient capacity to allow one processor to be undergoing maintenance at any one time without affecting production. This is considered prudent. ECI has also provided costings on the maintenance of the equipment (to be paid by WA Biomass).

We have reviewed ECI's costings and, in our opinion, they appear reasonable. Although this type of equipment selected has not been used at the proposed scale in plantation operations in Australia, it has been utilised extensively overseas and in the processing of green waste in Australia. The models are conservatively based on operating the machinery only 8 hours per day so that any additional operating time will allow for the fixed costs (primarily financing/depreciation) to be spread over a greater production volume. Additional operating hours will, however, push up the wages component of the costs (to be borne by ECI) and potentially increase the maintenance cost (to be borne by Western Australian Biomass) per tonne of output.

Also offsetting risk of higher than anticipated costs due to lower than anticipated productivity is the fuel price used. The model has been developed incorporating the recent fuel price increases.

The model provided shows the operating cost for the machinery and the ECI Management Fee. Details of the make up of the ECI management fee are not included but it is assumed that all operator and supervisor wages are included in this fee. The total production cost per tonne appears reasonable however it is at the lower end of the range of cost expectations.

## Haulage costs

We have been provided with haulage costs in the previously mentioned spreadsheet. These costs have been calculated using the following variables:

- distance from forest to the power plant,
- density of the process fuel (differs for Radiata Pine and Blue Gum), and
- proportion of Radiata Pine and Blue Gum.

The haulage costs appear to be reasonable and there may be some conservatism in the costing due to the base rate per tonne per kilometre used before density adjustments. In our opinion, the haulage rates are competitive but should also allow for a reasonable margin for ECI.

## ECI contract

We have reviewed the proposed contract between ECI and Western Australia Biomass (PDF document: *1203837_1_Executable Harvest & Haulage Agreement 8_05_07*). Generally, the performance obligations on ECI are more detailed and more onerous than is common in most

harvest and haulage supply contracts. Offsetting this, much of the financial risk that normally lies with the forestry contractor is being borne by WA Biomass.

The contract details the specifications for the processed biomass (defined as Fuel Chip) which require ECI to produce and deliver the Fuel Chip. These specifications are particularly tight with respect to:

- Fuel Chip size and the distribution of acceptable sizes,
- moisture content,
- contamination, and
- ash, nitrogen, chlorine and chloride content.

The chemical issues (moisture content, ash etc.) have been investigated by way of trials for Radiata Pine and Blue Gums as shown in an earlier table in this report. ECI will be able to control the moisture content by managing harvesting and processing times, and through stockpiling unprocessed plantation residues. They will, however, have little or no ability to control the other chemical factors.

Delivering Fuel Chips to the required size specification is likely to require substantial trials and fine tuning once the equipment has been finally determined. Different machinery set-ups may be required for Radiata Pine and Blue Gum. Confidence in ECI's ability to meet the specification can be drawn from the fact that biomass fuel is successfully produced from urban green waste which contains a very wide range of raw materials.

Although challenges are expected in the commissioning phase, in our opinion, ECI should be able to deliver Fuel Chips to the specifications contained in the contract.

The 20 year term is favourable for WA Biomass and is long for a contract of this nature.

The landed price will be adjusted by the CPI each year which should ensure ECI remains viable.

## CONCLUSIONS

The utilisation of plantations residues for biomass production and its use as fuel has not previously been undertaken in Australia on the scale proposed by WA Biomass but has been commonly utilised overseas. Some of the key issues have been assessed through trials. The most significant risks are:

- The quantity of residual biomass available following conventional log harvesting operations, and
- The productivity of the machinery proposed to be used.

It is our opinion that the proposed procurement, operations, contracts and costings are reasonable and that Western Australian Biomass has arrangements in place to adequately deal with the risks.