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COMMERCIAL-IN-CONFIDENCE

Report prepared on behalf of Unisearch Limited

for

Environmental Forest Farms Management
Your reference: Mr Jochen Diedler

by

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Marketing Consultant

MARKETING REPORT FOR PDS: PROJECT NO 3

14 May 2004
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CONTENTS

Page

MARKETING REPORT

This Report has been prepared for inclusion in the Kiri Park Project 2004 Product Disclosure Statement ("PDS") to be dated in or about May 2004 and to be issued by Environmental Forest Farms Management Limited. This Report is also to be used for marketing and promotional purposes for the Kiri Park Project 2004.

Unisearch Limited has been requested to prepare a report on marketing the timber end product from trees belonging to the genus Paulownia.

The Unisearch Limited consultant James Muir is a qualified architect and landscape architect who has 25 years experience in major landscape, soil evaluation, nursery establishment and plant propagation projects plus 20 years experience in high tech. timber furniture manufacturing, importing and associated value added timber technologies. He is also currently engaged in a major research initiatives with the University of Technology Sydney and CSIRO assessing the performance of new materials through the application of nano-particles and associated nano-technologies applied to various substrates to develop new composite assemblies for use in the building industry, with the objective of enhancing their performance over a range uses. Part of this research involves the development of new timber composites with modified surfaces to prevent photo-damage when exposed to insulation.

BACKGROUND INFORMATION

Paulownia, has been cultivated in its native China over several centuries. It is a broad leaf deciduous tree belonging to the hardwoods. The prime characteristics of the species within this genus being its ease of propagation, fast growth, and its ability to produce good quality timber with a wide range of uses. It is widely distributed throughout its native habitat in China, where, because of its deep lateral root system and open crown, it is used extensively for intercropping in agro-forestry projects. Paulownia timber has been traditionally exported from China, and more recently from the southern states of America, primarily to the Japanese market.

The Chinese Academy of Forestry lists nine species of Paulownia with two of the species being considered most suitable for plantations in Australia. It is varietals of these species

that is being tissue culture propagated by Environmental Forest Farms Management Limited.

The Timber is straight grained, light, soft and odourless. When grown under intensive plantation conditions it is knot free.

TIMBER PROPERTIES

Weight and Quality

Grown under conditions that produce a straight, concentric growth ringed stem these species and varietals are capable of producing high quality, exceptionally light timber. The density varies between species and site conditions. The wood is pliable with a low strength and is not suitable for use as structural elements in building. However, the strength-to-weight ratio of Paulownia timber is higher than other equivalent species and is suitable for several uses where a soft but relatively high strength wood is required.

Stability

Longitudinal and tangential shrinkage of Paulownia timber is less than other commonly used coniferous and broad-leaved timbers. Coupling this characteristic with the fact that it is not prone to deforming, warping, or splitting makes it suitable for the manufacture of several highly finished timber products.

Insulating Properties

The thermal conductivity of Paulownia is among the lowest values recorded for timber, resulting in its high insulation properties.

Durability and Rot Resistance

Work carried out by the Queensland Forestry Research Institute on accelerated in ground durability trials has shown that the heartwood of Paulownia wasted at twice the rate of non-durable pine sapwood. This appears to confirm the work undertaken by New Zealand Forestry Research Institute (Haslett et al, 1992).

Seasoning

Upon felling the moisture content of Paulownia wood is very high, averaging 188%. However, the timber air dries to 12% over a relatively short period of time, dependent on temperature and humidity conditions, without the need for kiln drying, representing cost savings to timber processors.

Machinability

Paulownia timber is very easy on machine tools, with its overall performance in manufacture being dependent on its grading. Higher grade plantation timbers produce very good results and do not exhibit the furriness and proneness to chipping of the lower grades, which is caused by the presence of tension or reaction wood in the log.

Timber Colour and Grain

When dried and machined, Paulownia is odourless, light to honey coloured, straight grained with a silky, satin appearance.

TIMBER UTILISATION

Paulownia has several uses in the value added timber market where low shrinkage, easy to work timber is required. Its end use determined by age, growing conditions and plantation management.

Its potential for physical densification used in the production of laminates would appear to be suitable for the various species within this genus. Physical densification of rotary peeled veneers could be expected to achieve up to 30% increase in strength and widen its use in the timber panel and furniture industry.

Table 1 below provides an indication of some of Paulownia's end uses related to age at harvest.

Architrave's & Mouldings	8+ growing seasons
Barrels, Beehives & Packing Cases	8+ growing seasons
Bathroom – Kitchen Cabinets & Doors	10+ growing seasons densified or 10+ growing seasons
Boat Aircraft, Car & Caravan Interiors	8+ growing seasons densified or 8+ growing seasons
Domestic furniture components	8+ growing seasons
Interior solid core veneered &timber doors	6+ growing seasons with densified veneer
Gift, ornamental & storage items	6+growing seasons
Industrial models	6+ growing seasons
Sandwich core and general wood-working	6+ growing seasons
Composite soundproofing & insulation panels	6+ growing seasons
Composite wall, dividing & ceiling panels	6+ growing seasons with densified veneer
Picture frames	8+growing seasons
Plantation shutters and blind slats	10+ growing seasons
Boat Building and surfboards	10+ growing seasons

Table 1 Some End Uses of Paulownia

OVERVIEW - WORLD TRADE IN TIMBER AND MARKET DEMAND

Timber is a major commodity traded on the international market where several supplier tropical timber countries are no longer being willing to sell non value added product into the international market, which has directly contributed to the increasing trend in trade shifting from logs (unprocessed timber) and sawn (semi-processed timber), to composite timber products such as lamipanel, and other composite boards such as Oriented strand boards (OSB), veneer and plywood (processed timber).

It is clear, that with this impending shortage of unprocessed and semi-processed timber from the tropical rainforests world wide, alternative sources of plantation timbers will have

to be found over the next 10 - 20 years to cover the shortfall and meet world demand for timber based products, with Paulownia well placed to fulfill part of this expected demand.

The current situation from traditional supplier countries is as follows:

The Philippines

Various national governments such as the Philippines government imposed bans on the exportation of sawn timber originating from its forests, which had been averaging around 700,000 m^3 per annum at the start of the 80's, eased recently and then re-imposed June 1999.

Thailand

Thailand having depleted its forest resources moved from being a significant exporter to the status of a net importer.

Indonesia

Indonesia effectively stopped shipments from its forests by imposing prohibitive export duties starting in 1989. This decision by the Indonesian government not only impacts on their timber industries but also on those operations in other net exporting nations.

Indonesia has since developed policies to convert its 3.5million m^3 of sawnwood exports into higher value added product. Figures published for 1996 show that out of a total production of 7,338,000 m^3 of sawnwood only 429,000 m^3 is now exported with an additional 33,000 m^3 being imported into the country principally from African nations.

Malaysia

In the late 1980s, huge volumes of tropical hardwoods were flowing from East Malaysia (Sabah and Sarawak) mainly to other Asian markets such as Japan, Korea and Mainland China. Since that time, there has been a halving of log exports from the Malaysian States. Sabah banned all log exports, except those from plantations in 1993, while Sarawak has been decreasing production and exports in line with the recommendations made by the ITTO mission invited to address the Malaysian government on measures to achieve sustainable forest management.

In addition species identified as being endangered under the Convention in International Trade in Endangered Species (CITES), and currently being flouted by the illegal log trade is also of grave concern, for in the case of Ramin, a timber now only surviving in Indonesia, will be completely cut out within eight years at present levels of harvest. The various Shorea species (Meranti) are also in a similar situation and certification is essential if there is to be a continuing supply of these species onto the world market in the future. At present the situation is not hopeful.

As a consequence policies are being developed in the European Union to ensure that only timber and timber product from renewable resources will be accepted into the marketplace. Protocols are currently being developed (Montreal and Helsinki) to assist in implementing a certification system establishing not only the timbers origin, but also the chain of custody of the value added products from this resource to encourage the further development of timber grown under plantation conditions.

Concurrent with the above situation, consumer awareness of the environmental impacts of purchases of tropical hardwoods continues to increase in the key tropical timber markets of the USA and the EU, bringing with it an increased demand for products produced in a more 'environmentally friendly' manner, such as from sustainably managed plantations. Independent certification, such as that provided by the Forest Stewardship Council (FSC) is seen as a way of boosting consumer confidence as well as providing supply countries with incentives for sustainable forest management, especially if a premium price were able to be secured for 'certified' timber. Chain of custody tracking, certification, labeling and other measures aimed at boosting consumer confidence could become especially important as selected tropical hardwoods from plantations become more widely available.

The above initiatives provide an opportunity to penetrate this market with specific value added products from sustainable Australian plantations to substitute for species such as Ramin and WRC.

CERTIFICATION

The major forest certification schemes are a result of the Montreal and Helsinki Processes, The Amazon Co-operation Treaty and the International Tropical Timber Organisations' "Guidelines for the Sustainable Management of natural Tropical Forests."

There are currently five major international forest certification schemes and in descending order of area of forest certified these are; the Pan European Forest Certification Scheme (PEFC, 41%), The Forest Stewardship Council (FSC, 25%), the Sustainable Forest Initiative (SFI, 15%), the American Tree Farm System (ATFS, 12%), and the Canadian Standards Association (CSA, 6%). Based on mid 2002 figures only an estimated 124 million hectares *(UN/ECE, 2003)* or 2.8% of the worlds forests have been certified through the above international or regional schemes, with 92% of all certified forests located in temperate industrialized countries, that are already well managed, or nearly so, as they have the financial and technological means as well the capacity to implement sound management practices. This is not the case in developing countries in the tropics, which account for the remaining 8% of certified forests.

The area of FSC-certified forests in South America, Asia and Africa totalled 2.8 million hectares with most of that area being plantation forest, mainly consisting of tropical and sub-tropical coniferous species. Up to now there has not been any evidence of a significant amount of the tropical hardwoods coming under any system of certification which does not auger well for the future of reliable supply from these sources.

The Australian Situation

Australia is developing an Australian Forestry Standard aiming to provide a certification for all forestry types in Australia, which include plantations and native forests, as well as public and private forests. This standard is also being developed to ensure that issues unique to this country or regions are incorporated in the certification process to overcome some of the perceived and real problems associated the FSC system whilst including Australia's obligations under the Montreal Process and Indicators, to which it is a signatory, ensuring mutual recognition of schemes between countries.

Notwithstanding the above, several Australian producers have gained recognition and compliance under the ISO 9000 and 14000 series of standards seen as compatible with the objectives of the FSC system. Currently one of Australia's largest agribusiness and investment managers is pursuing certification of its forest estate of 960,000 hectares through the FSC using ISO 14001 as its environmental and management standard.

Other developments regarding certification of product include the appointment of an FSC representative since May 2003 to assist in implementing the FSC process in Australia and to help in the creation of a fully-fledged initiative and national standards development process for our forests.

The Institute of Foresters Australia (IFA) whilst supporting the development and implementation of appropriate forest certification schemes for application in Australia, does not express support for either of the major certification schemes, viewing them as too restrictive. The IFA seemingly favouring some industry based self-regulating system such as the PEFC, which also has its critics. All that can be said is that the debate regarding the most appropriate certification system for this country has only just begun between the various stakeholders.

WORLD PLANTATION FORESTS

At present plantation forests only make up a very small proportion of the world's total forest area. It is estimated that in 1995 the global area of plantation forests totaled 123.7 million hectares, approximately 3.5 percent of global forest area, exclusive of the extensive agricultural plantations of rubber, oil palm or coconut.

Current statistics listed in Table 1 below shows that Asia is the region with the largest proportion of plantation forests, with these plantations comprising 45 percent of the global plantation forest area.

Each of the following five countries; China, United States, Russian Federation, India and Japan, have in excess of 10 million hectares of plantation forests. Collectively these five countries account for 65 percent of the global plantation resource. A further 13

countries have an area of plantation forest exceeding one million hectares each, leaving 18 countries accounting for 87 percent of the world's plantation forests.

Country or Region	Industrial Plantation Area (million hectares)	Non-Industrial Plantation Area (million hectares)	Total Plantation Forest Area (million hectares)
NORTH AMERICA (Total)	18.4	0	18.4
CENTRAL AMERICA	0.5	0.3	0.8
SOUTH AMERICA	5.4	2.8	8.2
ASIA (Total)	41.8	15.1	56.9
China	*17.5*	*3.9*	*21.4*
India	*4.1*	*8.3*	*12.4*
Japan	*10.7*	*0*	*10.7*
OCEANIA	2.7	0.01	2.7
Australia	*1.6*	*0*	*1.6*
AFRICA	3.6	2.2	5.7
EUROPE	8.7	0	8.7
FORMER USSR (Total)	22.2	0	22.2
Russian Federation	*17.1*	*0*	*17.1*

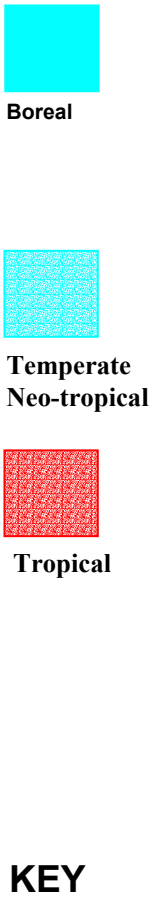
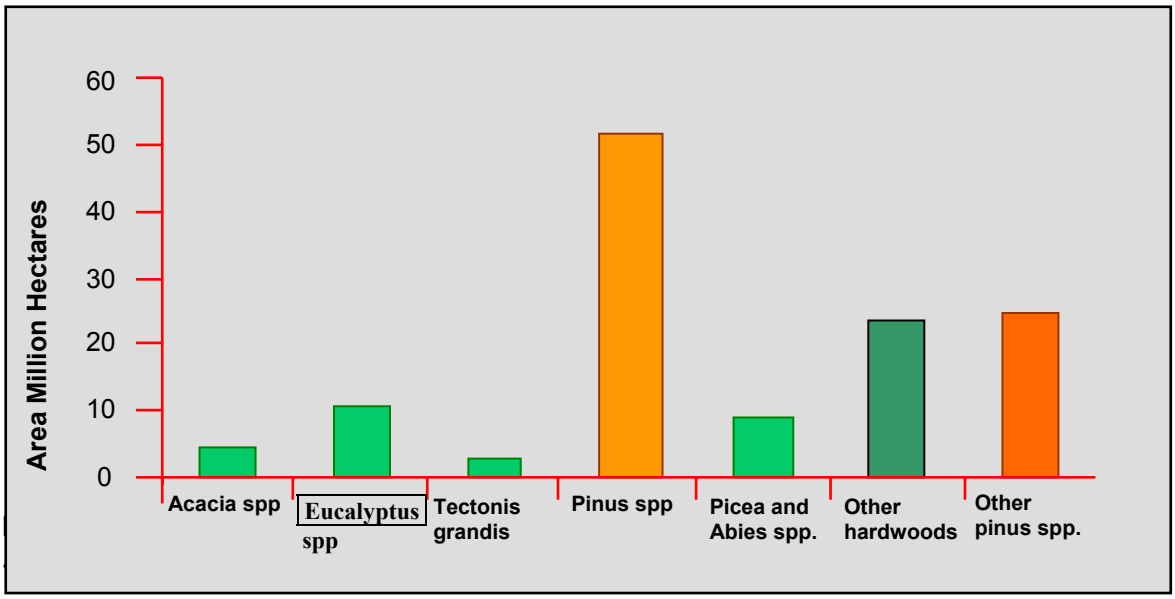


TABLE 1 SHOWING GLOBAL PLANTATION DISTRIBUTION
After Pandey, (1997). ECE-FAO (2000)

Breaking down the figures listed in Table 1 above reveals that plantation forests in temperate and boreal countries cover approximately 68 million hectares.

Up to the present softwood species have dominated the temperate and boreal plantation forests; and are estimated to cover 61 million hectares or 89 percent of plantation resource in these countries, with temperate and boreal hardwood plantations estimated to only cover about 8 million hectares.

Figure 1 shows the global distribution of the major genera and species grown under plantation conditions.



If all forest plantations in Europe and the former-USSR are assumed to be for industrial purposes, then global area of industrial forest plantations in 1995 is estimated at 103.3 million hectares representing 83.5 percent of total world forest plantation areas.

Age classes

FAO has recently published a study that derives representative age class structures on a country-by-country basis, to benefit and inform plantation developers on expected yields for selected species stands at various ages bringing consistency to future published data.

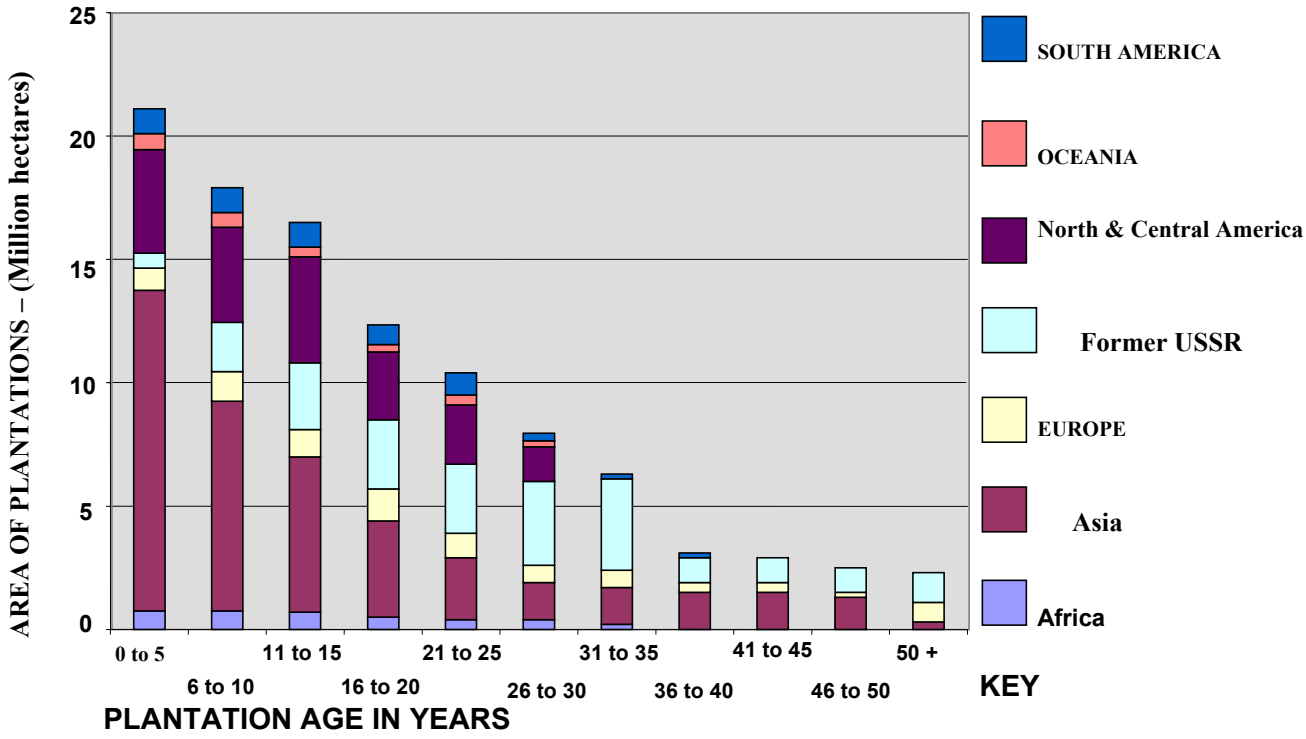


Figure 2: Derived industrial plantation age-class structure by region in 1997
Source of statistics: FAO, 2003

Two dominant trends are apparent in the regional age-class data (Figure 2). With the preponderance of Asian plantations compared with the other regions, being clearly evident. This is particularly the case for plantations established during the past decade. Asian hardwood plantations constitute 40 percent of the global total, and 57 percent of the plantations established since 1985. There is also a very high proportion of forest plantations aged less than 15 years, particularly in developing countries (Figure 2). On the basis of the above figures projected to in (2003), 54 percent of industrial plantations are less than 20 years of age, with 21 percent planted between 1990 and 1995. Only 2.2 percent of plantations shown in Figure 2 are aged more than 50 years. A further 15.6 percent are between 30 and 50 years of age. This pivot chart shows the accelerating rates of new plantation establishment, while at the same time reflecting the rate of harvesting mature plantations in the older age-classes with the general shortening of rotation times in many countries.

Viewing the data contained in the pivot chart (Figure 2), requires recognition of the fact that the hardwood species typically grown under plantation conditions and listed in

Figure 1 are generally grown with specific end uses in mind and require a wide range rotation periods. Typical rotation periods are 15 years for E globulus, primarily used for pulp manufacture and 40+ years for other Eucalypt species used for general construction purposes. First class joinery timbers are still typically taken from natural forest resources growing on a 100 years rotation. Paulownia spp., which would be included under the classification other hardwoods in Figure 2 is capable of producing joinery quality timber on a 10 to 15 year rotation placing it in a highly competitive situation as a short rotation crop.

The central conclusion from the analysis is that role of plantation forests in meeting future wood and fiber demands, will increase during the next 30 years, irrespective of future rates of plantation establishment. By 2010 the annual yield of plantation grown industrial round-wood is estimated to increase from its current 414 million to around 600 million m^3/yr.

The most significant forest plantation increases in the immediate future will be in countries where specific public planting programs are in force, most notably China and India.

In Europe, plantation establishment is likely to be mainly dictated by the life span of EU incentive policies. Europe is largely self-sufficient in terms of wood-fiber volumes and development of a larger than present plantation-based export trade seems an unlikely development.

South America and Oceania (which includes Australia) are likely to continue to expand forest plantation areas under the perception that real competitive advantage in plantation growing is held in these regions. Plantation profitability in the Asia Pacific Region is likely to be determined by conditions in North American and Asian markets and by wood and fiber supplies from forests in these regions which will be increasingly in short supply caused by unsustainable logging practices. Of key interest along with further plantation development will be the natural forest wood supply trends in the US Pacific- Northwest, Canada, Indonesia and Malaysia.

Plantation forest establishment in the former-USSR and Africa seems unlikely to accelerate in the immediate future. In the former-USSR countries, economic difficulties are likely to mean plantation investment will be of relatively low priority, particularly given the extensive natural forest resource in several of these countries.
In Africa, the absence of strong infrastructure is likely to remain a significant competitive disadvantage for many countries in that region.

In Australia timber resources are undergoing similar pressures to those globally with policies in place for significant expansion of plantation activity to arrest the decline in native forests to meet future demand.

Australian forests cover about 20% of the country or 164 million hectares most of it open savannah woodland. Native forests have long been a source of wood and other forest products with plantations rapidly increasing and adding to the supply. As at the end of 2002 plantations in Australia made up less than 1% *(1.569 million hectares)* of the forest area but contributed 60% of the timber produced. Softwood plantations making up 62% *(0.9796 million hectares)* of this area, with hardwood plantations making up an additional 37% *(0.5878 million hectares)* and unknown type plantation areas making up the remaining 1% or 0.1411 hectares. Most Australian plantations are located in areas where rainfall exceeds 700mm per annum, with suitable soils for tree growth, close to processing and transportation facilities.

The domestic market for sawn timber is expected to rise from 4.45 million m^3 in 1999/2000 to 5.2-5.6 million m^3 by the year 2030. Since 1995, 1.377 million hectares of new plantations have been established in Australia. Of these plantations, 71% are softwood and 29% hardwood, with the percentage of hardwood plantations continuing to increase. In 1999, out of the total of 94,812 hectares planted, 84,632 hectares were hardwood, representing 89% of the total for that year *(National Forest Inventory 2000).* These hardwood plantations predominately established to supply the short fibre woodchip market in Japan. However, that said, recent developments in the hardwood industry indicate that they are moving toward using several native Australian hardwoods for joinery and cabinet making purposes concomitant with new modification technologies being developed within the industry.

The rate of further plantation expansion and development being predicated on:

- Access to remaining natural forests being limited, due to economic viability, political pressure, and the need to conserve bio-diversity and old growth forests.
- New value added composite products such as, various timber panels (Lamipanel and solid core veneered products for example) requiring particular grades of timber with quality control and certification of the chain of custody from plantation to manufactured article being asked for in several markets. These requirements are partially satisfied by plantation timber where quality control and origin can be assured.
- Land availability for plantations that will, in all likelihood, come from degraded land previously used for agriculture, or from a change of use in cases where the previous use is longer economically viable.
- The species propagated being linked to identified markets for the end product.
- Well-managed industrial wood plantations especially in the southern hemisphere being capable of yields that are substantially higher than those obtained from natural forests.

The development of plantations, and in particular the development of hardwood plantations is a necessity for there is a current shortage of joinery and furniture grade timbers. This presents an opportunity to establish such species as Paulownia spp. grown under sustainable plantation conditions as a substitute and ultimately as a replacement for imported species such as Western Red Cedar from North America, Meranti (Shorea spp.) imported from the Asia Pacific region. This potential being based on scarcity, diminishing supply and increasing cost of the above species. In plantations in this country as part of a long term solution, as the shortage cannot be rectified in the short term. It also represents an opportunity to develop markets for the manufacture of value added products from Australian hardwoods to niche markets in Australia, and overseas, focussing on Europe (EEC), USA and selected Asia Pacific nations, such as Japan and China.

IDENTIFIED USES AND MARKETS FOR PAULOWNIA

VENEERS

The following prices cover a range of costs for this commodity. First quality veneers imported from Germany, Malaysia and the United States cost AUD 3417.00, AUD 2000.00, and AUD 2333.00 respectively per cubic metre. Lower grade veneer stock from New Zealand costs AUD 391.00 per cubic metre. Paulownia with its inherent pliability straight grain, blonde wood, capable of being stained to any colour, sold as a densified veneer would have the appearance of the higher quality veneers with good bending characteristics, and should attract a premium price when offered for sale on the international and local markets.

PLYWOODS

As far as the average prices for plywood are concerned, the substitution of paulownia in the plywood market would not seem to be a viable proposition based on price alone for the categories interior, structural and other plywoods. However, that said there would appear to be a niche market for Paulownia to be used in the production of overlaid plywood on a lower cost ply substrate for top end market applications.

PLANTATION SHUTTERS AND BLINDS

Plantation shutter manufacturers are currently evaluating paulownia as a replacement for Western Red Cedar, which has a similar density, inherent temperature and moisture stability. It also has the added advantage that the sawdust produced by its machining is not toxic to operators, as is the case with Western Red Cedar.

BOAT BUILDING INDUSTRY

Boat builders in the United States have been using this timber for the strip plank construction of Formula 1 and Formula 2 powerboats for racing. These race at speeds of 180 to 210 km/hr. Paulownia being chosen in this instance for its strength to weight ratio, and as a replacement for balsa and birch. The same builders are also currently investigating the use of end grain Paulownia to replace end grain balsa for making structural canopies for the same reasons. Paulownia's properties also makes it suitable for the production of surfboards and other marine craft. Initial enquiries in the Australian market to a group of naval architects has received a favourable response with one of their number wishing to

design a prototype boat using Paulownia after having analysed the mechanical properties of the timber. One prime advantage being, that paulownia can be finished with two coats of marine grade epoxy (E-glass) without the absorption problems associated with balsa, which absorbed large amounts of epoxy, adding weight to the boat. (American Paulownia Association, Newsletter Vol. 8, No. 4, October 1999)

The low density of Paulownia, and its' characteristically straight grain is a factor enabling high tolerance production and close fitting of elements where required for mechanical and glued joints. Ease of machining is a significant factor in the life of machinery, blades and personnel, which can have a noticeable effect on resulting cost of timber products.

PAULOWNIA IN THE INTERNATIONAL MARKET

Except for the Chinese and Japanese markets paulownia has not had a wide exposure to the international marketplace and was virtually unknown until recent times in the European environment until the establishment of Paulownia plantations in Italy. It was introduced in the USA during the latter part of the nineteenth century, but its value as a timber crop was not realised until comparatively recent times with the bulk of sales being made into the Japanese market.

The development of niche markets for value added products would be achieved by exploiting the intrinsic suitability of this materials mechanical, grain and colour properties to the proposed end uses. Identified products being Veneer stock overlaid plywood, Coreboards/lamipanels with spare veneers, coreboards/lamipanels with densified paulownia veneers. These products targeted at the European furniture industry. Other specialist strip plank and end grain uses in the boat building industry are currently under investigation following the example cited above.

THE JAPANESE MARKET

Penetration of the Japanese market is not seen as an option for the present crops of fast grown Paulownia from Australia. There may be the potential to export high-grade, slow grown Paulownia timber to Japan at a later date, where 90% of the slow-grown Paulownia is presently sold. The caveat here is that the Japanese only pay a premium price for slow grown old logs.

In the overall Japanese market the price of the timber can vary from $400 for lower grades to up to $6,500 / m^3 for the higher-grade slow grown timber.

THE UNITED STATES

The United States is the world's number one importer and number two exporter of forest products with total trade valued in the range USD 40-60 billion per year.

Paulownia has been established in the US since the late nineteenth century and rapidly colonized several areas over a wide range of climates and in several states such as New Jersey, Maryland, Virginia, North Carolina, South Carolina and Tennessee.

Its value as a timber crop was not realised until the last twenty years when sales of older trees were established in the Japanese market. These trees were of the order of sixty to eighty years of age. Of particular interest were the trees in the Appalachian foothills, which had close growth rings six to eight per 25 mm. Trees of this quality were attracting prices of $US2,535/ m^3 – $US3,400/ m^3.

The United States growers have now established plantations of Paulownia. These trees are between eight and twelve years old with some crops just reaching their first harvest.

The United States does represent a market for Australian grown Paulownia for the sale of value added product provided that our dollar is not valued upwards to such an extent that our costs of production become uncompetitive.

SOCIETAL AND ENVIRONMENTAL BENEFITS

In the Australian environment, Plantation forestry can be particularly beneficial in high rainfall areas with sandy soils, a condition particularly suited to paulownia spp. These being key areas within the landscape where the benefit of plantation establishment are the highest. Sandy soils are key recharge areas, so in most cases planting trees will reduce the water infiltrating the soil and limit rising water tables. Sandy soils are also more prone to wind and water erosion, as the attractive forces between the soil particles are lower than other soils such as clays. Trees absorb much of the wind energy and lessen the impact of raindrops on the soil coupled with leaf litter this is an effective

control by slowing runoff and lessening erosional processes.

Soil acidity is generally higher in sandy soils with its pH decreasing around five times faster under intensive agriculture on sandy soils. Planting trees has been shown to halt the decline in pH in soils and may even lead to increase in soil pH in highly acid soils

Other benefits from plantations would be the establishment of value adding facilities in close proximity increasing employment opportunities for country communities.

SOME MARKET OBSERVATIONS

For the reasons already given, Paulownia also has the potential to become a natural import replacement species for WRC and Ramin particularly in the manufacture of blind slats' plantation shutters and other value added products. Imports of WRC have been steadily declining linked to the scarcity of prime grade material made available to the Australian market sourced mainly from British Columbia and to significant price increases.

Up to comparatively recent times timber has been traded on the world market as a major commodity, but now the trend in trade has been shifting from logs (unprocessed timber) and sawn (semi-processed timber), to composite timber products such as lamipanel, other composite boards such as solid core (SC), Oriented strand boards (OSB), veneers and plywood (processed timber).

This supply shift has been brought about by the increasing scarcity of timber resources resulting from global deforestation and over cutting, particularly in the Asia-Pacific, Mesoamerica, South America and African regions. This has resulted in several supplier countries no longer being willing to sell non value added product into the international market.

The shift of supply potential away from traditional tropical timber supply sources has brought profound changes to the market. What we are dealing with is a market that is in flux and with potential new supply coming from within the expanded European common market resulting in a loss of market from traditional supply countries such as

Africa and South East Asia. In addition at one extreme, mutual recognition of standards and increased supplies of certified timber could result in most European timber supplies being certified more or less automatically. This could induce timber specifiers to stipulate certified timber as one of their requirements alongside grade, class, and mechanical properties for example. This in turn could make it difficult for non-certified timber to compete in the market further eroding the market for uncertified tropical timber. At the other extreme buyers groups and companies fail to achieve any market advantage from certification and abandon specifying certified timber.

Other factors found to influence the loss of traditional markets for tropical timbers have been identified as: (FAO, 2003)

- Change in fashion from dark coloured species to lighter coloured species;
- Increased competition from other wood, as well as non-wood products (e.g. plastics in window manufacture);
- Reduced margins within the timber industry 'squeezing' tropical timber profitability;
- Policy changes by exporting countries (especially South-East Asia), shifting export emphasis from primary products (logs, sawn-wood, plywood and veneers) to secondary processed products (see above).

Notwithstanding the above, the same study also revealed some positive signs regarding the future supply of tropical timbers resulting from;

- The public perception of timber changing, with wood products in general being seen by many as a 'green' material;
- Mounting concern over the environmental credentials of substitute materials, particularly plastics;
- Evidence suggesting a reversal in the trend for lighter coloured species with darker woods gaining popularity in some market areas.

The supply of plantation timber from both known and lesser-known species will increase in the future. The opportunity for marketing products from these materials is dependent on product development and value adding through the manufacture of secondary processed products by individual exporting countries. The development and

rapid adoption of refined or new processing technologies are important to achieving and maintaining competitive advantage for timber processing industries. In specialist cabinet and joinery class timbers, the trend will be for the source country to value add the sawn product in the form of mouldings and semi finished components before shipping to their various consumer markets.

Overall, the future of tropical timbers in the global market are seen to be in the maintenance of existing 'traditional' markets (joinery and furniture components) with the possible regaining of some market share lost in recent years.

This represents an opportunity for sustainably managed and certified plantation timbers to penetrate this market with specific value added products from sustainable plantations to substitute for species such as Swietenia, Khaya, Shorea spp., Lauan, Ramin and Kapur in increasingly short supply.

CONCLUSION

Subject to suitable species selection within this genus, Paulownia, has been and should continue to be successfully grown in this country, making a valuable contribution to Australia's diminishing timber resources. Species within this genus are more environmentally friendly than Pine, whose needles, combined with runoff, are known to affect stream ecosystems.

Present evidence suggests that the production and marketing of value added Paulownia products, have the potential in the medium term to open up extensive overseas markets for value added products, in addition to those produced for the domestic market, where it can substitute for the import of mixed tropical hardwoods and Western Red Cedar.

With the growing world population primarily concentrated in the Asia Pacific region, concomitant with the expected future economic growth and raising of standard of living in this region ensures an increasing demand for timber products.

Price for paulownia varies according to grade and age at harvest with the commodity generally being quoted in US$. Information obtained both locally, and from other

sources indicate that the current prices for paulownia sawn timber of C grade bought out of China at US$847 to US$965 per m^3.

Grade	Price per cubic metre $US									
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
AA		3390.4	Material of these grades virtually unobtainable as wild paulownia supply in USA has been substantially logged and sold to the Japanese. Trees of these grades being, 60-80 years of age.							
A		2542.8								
B		1059.5								
C		847.6			912	958				965
D		635.7			640	645				660
E		423.8			425	426				495

Sources: University of Virginia (Stringer and Graves, 1992)

Tennessee Forest Products Bulletin. Vol. 21 April June 1997

Mitsui and Co. 1997 Huey Bros. Timber Merchants, Tennessee. (Matt Huey 1997)

Southern Star Timber (Perth WA) 2001.

Table 1 Showing Paulownia Pricing for Sawn Timber over Ten Years 1991-2001 inclusive

From an historical analysis of Paulownia prices achieved over the past 10 years on the international market shows that C grade paulownia sawn timber has risen from US$847.60 m^3 in 1991-1992 to US$965.00 m^3 in year 1999-2000, with the price flattening over the past five years. The flattening of price being brought about by two factors:

1. The short supply of old growth paulownia grown in the USA which initially set the price in1991-1992 and its substitution using Paulownia sourced from other grower countries such as China, and Argentina.
2. This alternative source of supply was not P. tomentosa (marketed out of the US) but mainly consisted of different species (P. Elongata and P. fortunei),which more accurately reflects the species and grades being grown in Australia

The above two points coupled with a cheaper cost of production out of the alternative supplying countries has in my professional opinion also contributed to the apparent initial flattening in the international price paid for this commodity. This flattening is

viewed as a one off short term effect, which will be negated in the medium term by superior quality plantation stock, further product development, the penetration of new markets and increased sales of product into the existing markets.

In the case of Paulownia substituting for WRC from the temperate coastal forests of British Columbia, Paulownia grown under plantation conditions exhibiting 'best management' practices appears to be a viable replacement for several uses of this timber, which is becoming scarce and is gradually being priced out of the market.

Current prices for WRC are up to \$2,175 / m^3.

The viability of Paulownia acting as a replacement species for WRC is further reinforced by several events that have occurred over the past year:

- In Canada a recent analysis estimated that since 1998 forest logging concessions on the west coast of British Columbia (the major source of WRC) have avoided paying CAD 149 million to the government of British Columbia by 'grade setting', which included an inaccurately high proportion of low value wood in the samples used by the government to set the stumpage fee. This situation has to be rectified.
- The imposition of a 27.2% duty by the United States on Canadian lumber imports based on the claim that Canadian lumber imports are sold at about 30% of their true commercial price and are being dumped into the US as a result of heavy subsidies from the Canadian Government to appease the timber lobby in Canada is an ongoing matter which will take time to resolve. The affect of this ongoing dispute has not as yet shown any significant change in price of lumber from Canada and particularly from British Columbian WRC sales.
- Under any reduced supply scenario resulting from this dispute, the cost of WRC could also reasonably be expected to rise from its present level of \$1,350 / m^3 for random length mixed grades and \$2,500 / m^3 for prime grade material.

Paulownia prices achieved over the past ten years on the international market show that:

- B grade Paulownia on the current market can be expected to achieve a price of USD \$1035 / m^3

- C grade Paulownia sawn timber has risen from USD 847 / m^3 in 1991-1992 to USD 965 / m^3 1999-2000
- D grade Paulownia sawn timber has risen from USD 635 / m^3 in 1991-1992 to USD 660 / m^3 in 1999-2000
- E grade Paulownia sawn timber has risen from USD 423 / m^3 in 1991-1992 to USD 495 / m^3 in1999-2000

Based on an exchange rate of $0.70c to USD the present day price for the three grades of Paulownia listed above are as follows:

- B Grade $1,478 / m^3
- C grade $1,378 / m^3
- D grade $943 / m^3
- E grade $707 / m^3

The grades for paulownia sawn timber quoted above are based on the Chinese grading system developed by The Agricultural Science Research Centre City of Zhuhai, Guangdon Province, and in the absence of a recognized Australian standard for Paulownia log grading this has been adopted for the purposes of this report. The only other grading system, which was developed in the United states, applies only to slow grown aged Paulownia and does not translate for the short rotation times proposed for Australian grown Paulownia. A précis of these two grading systems form Appendix "A" to this report

Under the Chinese system adopted it is reasonable to use the C and D grades for the pricing quoted in this report and which is equivalent to the B and C grades quoted in Section 1 of the Product Disclosure Statement. In my professional opinion, it is not possible to produce A grade timber in this country on the rotation times proposed, and in this report's pricing this grade has not been considered.

Based on a review of information made available from world market sales of this commodity, yield, price and harvest costs are reasonable and the Responsible Entity has taken a realistic approach in the PDS. The approach of the Responsible Entity takes no account of the impact of the short supply of the species Paulownia will replace or

substitute for, which will be more evident by the time of harvest.

In the interim timber price projections for 2001 – 2015 *(World Bank 2001)* stated that timber prices (tropical logs and sawn wood) are projected to rise in real terms at an average annual rate of 1.8%.

The conclusion that Paulownia spp will grow well and achieve commercial quantities of timber is based on my knowledge of Paulownia spp. and analysis of suitable environmental parameters existing in Australia for its propagation. I declare that this is an independent report, as I have no interest in the Environmental Forest Farms Memorandum or in the Project.

Mr James Muir

Marketing Consultant

APPENDIX A

1.00 GRADING

1.01 Chinese Grading System

The following grading schedule developed by The Agricultural Science Research Centre City of Zhuhai, Guangdon Province has been adopted for the grading of the species within this genus for the purposes of this report with the addition of the following qualification:

That for any butt log belonging to the B, C, or D grading, that the principle of pith eccentricity not being >10% be specified as a requirement under this grading system as set out below for "Pith Location" rather than as undefined under this grading system.

Grade	**Age of Tree (Years)**	**Scaling Diameter (mm)**	**Min. No. of Clear Faces**	**Log Length (metres)**
AA	40+	400	4	5.0
A	20-40	300	4	5.0
B	8-20	250	4 (1knot)	4.0
C	5-8	200	3	4.0
D	<5	200	2	3.0

Grade	**Log Position**	**Pith Location**
AA	Butt	Centre
A	Butt	Centre
B	Butt or Upper (first extension)	Undefined
C	Butt or Upper (first extension)	Undefined
D	Butt or Upper (first extension)	Undefined

1.02 Grading Specifications

Scaling Diameter	Diameter inside the bark at the small or upper end of the log
Minimum clear Faces	The outside circumference of the log is divided into quarters; a face is a section on the outside of the log, which is one quarter of the circumference running the entire length of the log. B grade logs can only have one knot in the log surface.
Log Length	The minimum length required for a grade
Log Position	Butt denotes the lowest main stem log adjacent to the ground. Upper refers to the first extension log above the butt log
Pith Location	For grade AA and A the pith is required to be in the centre of the log, all other grades may have an off centred or eccentric pith with the mean pith offset from the centre of the log being <10% for the butt logs in all other grades.
Colour	Light Colour, they can be tinted yellow, green, or a medium grey. Whitish logs are preferred especially in the higher grades (AA, A, B)
Increment Variability	For AA logs the ring width must be consistent across the log. Small variations in ring width can be tolerated in A and B logs. However, higher prices are paid if the ring width is constant.
Ring Shake and Stain	Paulownia logs can contain a relatively high amount of ring shake and stain. Stains in the logs when cut (primarily purple) devalue the log, as can ring shake.

2.00 United States Log Grading System

Under the United States grading system developed by Jeffrey W. Stringer and Donald H. Graves from the University of Virginia. The following grade specifications can be used as a guideline for determining the relative value of Paulownia logs. While there is NOT a recognized standard for Paulownia log grading in the United States, these specifications are widely used throughout central and southeastern states for buying logs. Pricing is sensitive to these grading specifications, market fluctuations, and subjective criteria such as colour, increment variability, length, ring shake, stain, etc.

Grade	**Rings per inch**	**Scaling Diameter**	**Min. Clear Faces**	**Log Length**	**Relative Price per board foot (1992 US$)**	**Relative Price per cubic metre (1992 US$)**
		(inches)	(number)	(feet)		
AA	8	16	4	6.5	8.00	3390
A	6	12	4	6.5	6.00	2543
B	6	10	4 (1 knot)	6.5	2.50	1060
C	4	8	3	5	2.00	848
D	4	8	2	5	1.50	636
E	<4	6	0	5	1.00	424

Grade	**LOG POSITION**	**PITH LOCATION**
AA	Butt	Centre
A	Butt	Centre
B	Butt or Upper	Undefined
C	Butt or Upper	Undefined
D	Butt or Upper	Undefined
E	Butt or upper	Undefined

Grading Specifications

Rings per inch: The number of allowable growth rings per inch of log diameter. Normally this value is averaged across the entire cross-sectional diameter (see increment variability)

Scaling Diameter: Diameter inside the bark at the small end of the log.

Minimum Clear Faces: The outside circumference of the log is divided into quarters; a face is a section on the outside of the log which is one quarter of the circumference running the entire length of the log. B grade logs can only have 1 knot on the log surface.

Log Length: The minimum length required for a grade

Relative Price: Average price paid per board foot for each grade in 1991. While the absolute value may fluctuate, the relative difference between the grades should remain stable. [Note: in some instances lower grade logs (D and E) may not be merchantable.]

Log Position: Butt denotes main stem logs next to the ground. Uppers are any logs above the butt in the main stem or branches, (first extension in case of Paulownia).

Pith Location: For grade AA and A the pith is required to be in the centre of the log; all other grades may have an off-centred or eccentric pith.

2.01 Subjective Criteria

The following criteria are not included in the grading specifications but may affect price. The relative impact of these criteria on price contingent on the buyer and market conditions.

Colour: While Paulownia logs are generally white they can be tinted yellow, green, or a medium grey. Whitish logs are preferred, especially in the higher grades (AA, A, B).

Increment Variability: For AA logs the ring width must be consistent across the log. Small variations in ring width can be tolerated in A and B logs. However, higher prices are paid if ring width is constant, especially in the outer half to two thirds of the diameter.

Ring Shake and Stain: Paulownia logs can contain a relative high amount of ring shake and stain. Stains in the log s when cut (primarily purple) devalue the log, as can ring shake. Do not cut Paulownia trees in the late spring or summer as the logs can develop a tan stain which decreases their value. Higher grades are more sensitive.

Predominant Uses-Japanese Market	
AA	Koto (high priced, stringed musical instrument)
A	Tansu, and Furniture– show parts and Koto
B	Tansu and furniture-show parts
C	Tansu and furniture-generic parts (backs, interior parts)
D	Furniture–generic parts
E	Common use-bowls, shoes, boxes, etc.

Predominant Uses-European Market (projected)	
AA	High grade sliced veneers, shutter and venetian blind slats for natural finish, and special mouldings
A	Sliced veneers, shutter and venetian blind slats for painting, edge strips and mouldings
B	Rotary cut veneers, core stock for lamipanel, mouldings
C	Core stock for doors, rotary cut veneer, plywood and densified products for laminated beams etc.
D	Core stock for surf boards, boat building core, centre core for laminated beams, spare veneer, plywood and densified product
E	Core stock, and spare veneer, oriented strand board (OSB).