

# Comparison of Pooled Eucalypt Timber Investment Growth Rates

Prepared by IndustryEdge P/L for Forest Enterprises Australia Ltd  
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## Introduction

Forest Enterprises Australia Ltd (FEA) is a significant ASX-listed forestry and an increasingly emerging forest products company.

FEA has vigorously pursued its long-term stated strategic goal of vertical integration through innovation and technology. It has developed, and continues to increase, a substantial volume of independent private plantation forest resource to process through its innovative, advanced processing facilities and market through both its well-established and developing brands.

Headquartered in Launceston Tasmania, FEA currently manages over 50,000 hectares of hardwood Eucalyptus plantations in Tasmania, New South Wales and Queensland. It will be processing and adding value to both its hardwood and softwood resource through its new state-of-the-art facility at Bell Bay in northern Tasmania producing an output next year of approximately 400,000 tonnes of logs branded as EcoAsh® and BassPine™ products. This volume, which is expected to grow to over 650,000 tonnes within a five year timeframe, makes FEA the largest plantation-based saw miller in Tasmania.

Additionally, during 2008 FEA will be exporting around 500,000 tonnes of woodchips through SmartFibre Pty Ltd, a joint venture plantation based woodchip export operation also located in Bell Bay Tasmania.

FEA was established in 1985 and planted its first plantations on behalf of private clients in 1987. Tasmanian Forests Trust No 1, its inaugural public forestry investment, was launched in 1993, and was one of the first public hardwood forestry investment schemes in Australia. Since then FEA has offered 15 consecutive MIS projects, concentrating on eucalypt plantations. The plantations established under the 1993 Project were planted during the spring of 1993, thinned in 2004 and are now scheduled to be clearfall harvested during the autumn of 2008.

FEA has commissioned *IndustryEdge* to prepare a report that would allow the growers of its inaugural project to compare the growth rate of their pooled investment with growth rates of comparable pooled investments established elsewhere in Australia during the same period. The brief also required *IndustryEdge* to report on any available growth data on eucalyptus plantations established by other forestry investment managers during the following five years.

*IndustryEdge* is a leading provider of market intelligence on the pulp and paper industry throughout Australasia. Its market analysis is communicated to subscribers through a wide range of monthly and annual publications, including its flagship monthly market intelligence report, *Pulp & Paper Edge*, as well as through client-focused consulting services.

The sources of the data used by *IndustryEdge* to prepare this report are all publicly available. They include reports produced by the three major research companies assessing plantation MIS schemes, namely Australian Agribusiness Group (AAG), Adviser Edge Investment Research and Lonsec. *IndustryEdge* has also referred to relevant offer documents (prospectuses and product disclosure statements), websites, ASX releases, and information provided to growers.

## Background

The ultimate indicator of the growth rate for a timber plantation is the volume of logs or woodchips delivered to the point of sale after the plantation has been harvested. The volume of logs in a stack is difficult to accurately determine, Logs and woodchips are usually sold by weight (as measured by a weighbridge), and can be converted to volume by a conversion factor. The volume that is sold is grown in the plantation over a period of time that is usually called the rotation period. Because some Managed Investment Scheme plantations are established up to 12 months after the majority of growers make their investment, the rotation period for a proportion of the pooled investment may be less than the period of the totalled pooled investment, but usually the final harvesting may occur over a period of time that reflects different planting times as well as variations in growth rates in any particular pool or age class.

To facilitate growth rate comparisons between different plantations grown over different rotation periods, the most common method of expressing a growth rate is by a **Mean Annual Increment (MAI)**, which is the average volume of timber grown per hectare divided by the rotation period. MAI is expressed as m<sup>3</sup>/ha/yr.

It is also important to realise that growth rates vary between species on any given area or site. Managers usually grow a particular species to maximise volume growth and value.

If a plantation has not yet been harvested, it is possible to assess the *standing timber volume* through a rigorous sampling procedure known as a plantation *inventory* where the height and diameter of individual trees are measured in a systematic series of plots used to calculate the overall standing timber volume. This method can be used to assess plantations of any age, but the estimate for young plantations is likely to have a significant statistical extrapolation error. However, by age 8, the potential of a location and the silvicultural history of a site are reflected in the trees and the standing timber volume can usually give a clear indication of the likely volume of timber available to harvest at the end of the rotation.

In looking at the standing timber volume and what is sold from a site, there are inevitably some volume losses incurred during harvesting (from stumps, breakages, short logs) or losses in fines and debarking from in-forest chipping, and the *recoverable timber volume* will be less than the standing timber volume by an amount equal to the *harvesting losses* commonly between 5% and 10% of the standing timber volume.

Plantation growth rates vary with age. Although they are subject to variations caused by climatic factors (such as rainfall and temperature), geographic factors (such as soil type and depth), and silvicultural factors (such as quality of land preparation, planting and tending), the standing timber volume in a plantation over time will track along fairly predictable *growth curves* of the type displayed in Figure 1.

Similarly, when the standing timber volume is divided by the age in years at measurement, the MAI at each point during its growth can be derived. MAIs will usually track along fairly predictable growth curves of the type displayed in Figure 2.

The development of growth curves is a highly technical area of expertise, and developed by managers over a long period of time as plantations are continually measured and reconciled with final harvest volumes.

Although some sampling error is present with young plantations, this decreases with age when a plantation is assessed at age 8 or later. When the standing timber volume of a plantation (or MAI at that age) is compared with a suitable set of growth curves for the species, there is a good indication of the likely standing volume at harvest. After allowing for normal harvesting losses, the approximate recoverable timber volume likely to be available for sale at the end of the rotation becomes evident.

Figure 1

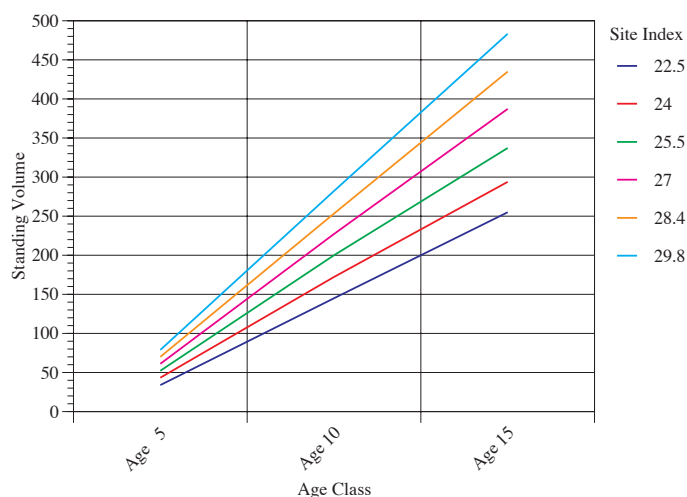
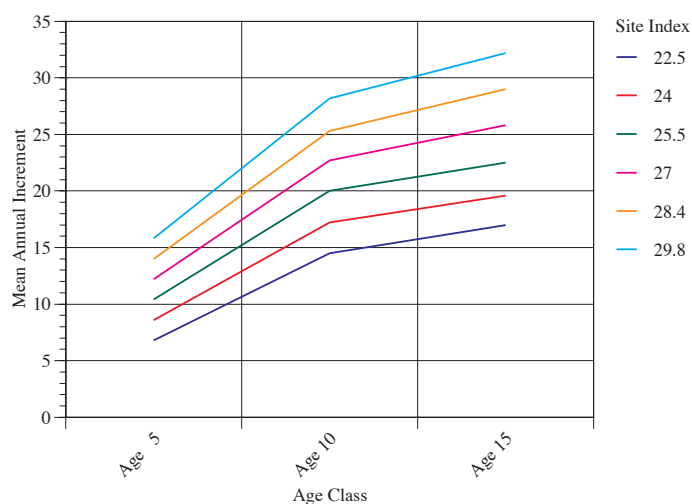


Figure 2



## Performance to Date of Hardwood Plantations

Some of the early timber plantations established during the target period (1992 – 2000) have been harvested and some general public information is available on actual volume recovered during harvest. Additionally, various timber plantation managers have made inventory data available on their websites or provided them to research houses which, in turn, have published them with the approval of the respective managers.

It is not always clear if the data presented is total assessed volume or estimated recoverable volume or, for that matter, if the actual intensity of the forest inventory is consistent between managers.

Over is a summary of growth rate data known to *IndustryEdge* relative to the target period.

## Timbercorp Limited

Timbercorp Limited (Timbercorp) promoted its first public hardwood timber project in 1992. Until the early 2000s, Timbercorp indicated in its investment documents that it expected timber growth rates between 27-30 m<sup>3</sup>/ha/yr over a 10 year rotation, which would generate yields at harvest of between 270 - 300 m<sup>3</sup>/ha.

Timbercorp has completed harvesting its 1992, 1993, 1994 and 1995 projects, but minimal details have been published.

In respect to the 1992 project, a Press Release<sup>1</sup> made in 2003 implied a yield of 200 m<sup>3</sup>/ha, which is 26% less than the lowest end of its forecast range. Timbercorp provided its estimated yield details to AAG<sup>2</sup> which has stated that “Results to date show yields averaging approximately 20 m<sup>3</sup>/ha/yr which is well below company expectations of 27 – 30 m<sup>3</sup>/ha/yr”.

Timbercorp has also provided AAG with yield estimates for its 1996 to 1999 projects of 20m<sup>3</sup>/ha/yr, which are also well below the lowest end the forecast range stated in the relevant investment documents. In discussing these disappointing yields, Timbercorp has pointed to: *“issues surrounding what by today’s standards appear to be inferior land selection, unimproved genetics and below average rainfall as some of the contributing factors.”*

### Overview of Timbercorp’s Yield Estimates for Past Projects 1996-2001

Project	Age at Inventory (Years)	Expected MAI Yield (m <sup>3</sup> /ha/yr)
1996	10	20
1997	9	20
1998	8	20
1999	7	20
2000	6	21
2001	5	22

In its more recent projects, Timbercorp has lowered its offer document yield expectation to a growth rate of 27.5 m<sup>3</sup>/ha/yr and adopted a more flexible rotation length of between 8 and 12 years. Timbercorp has indicated that, with industry improvements in silviculture (eg genetics and nutrition) and more rigorous land selection criteria, it believes that it will be possible to achieve closer to its targeted yields for its newer hardwood timber projects.

## Great Southern Limited

Great Southern Limited (Great Southern) released its first hardwood timber project in 1994. Until the early 2000s, it indicated in its investment disclosure documents that it expected growth rates of between 25 - 30 m<sup>3</sup>/ha/yr over a 10 year rotation<sup>3</sup>, which would generate volumes at harvest between 250 and 300 m<sup>3</sup>/ha.

Great Southern has completed harvesting its 1994 and 1995 projects and has reported harvest volumes of 123 m<sup>3</sup>/ha and 166 m<sup>3</sup>/ha<sup>4</sup> respectively, which equate to MAIs of 12.3 m<sup>3</sup>/ha/yr and 16.6 m<sup>3</sup>/ha/yr – assuming a ten year rotation period. Great Southern, being aware of a potential shortfall of timber volume at harvest, acquired additional areas of plantation in recent years and has added timber harvested from these plantations into its 1994 and 1995 project pools to enhance the returns to its growers<sup>5</sup>.

Great Southern has also completed harvest on its 1996 project and has reported an average yield of 197 tonnes/ha, which is equivalent to approximately 197 m<sup>3</sup>/ha<sup>6</sup> and an MAI of 19.7 m<sup>3</sup>/ha/yr. It used ‘reserve plantations’ to again enhance grower’s return to the equivalent of 250 m<sup>3</sup>/ha<sup>7</sup> which was the lower end of the yield forecast in the investment documents.

Although its later projects have not yet been harvested, Great Southern has conducted detailed inventory on these plantations and AAG has published the results<sup>8</sup>. Plantations in Great Southern’s 1997 project had an estimated MAI growth rate at age 9 of between 14-18 m<sup>3</sup>/ha/yr. Plantations in its 1998 project had an estimated MAI growth rate at age 8 also between 14-18 m<sup>3</sup>/ha/yr. With only one and two years to grow, it is reasonable to expect that these projects are unlikely to obtain their original targeted timber volumes. Additionally, based on these estimates, these projects are also unlikely to exceed the harvested yield of the 1996 project which is 21% less than the lowest end of the forecasted range.

## Overview of Great Southern's Yield Estimates for Past Projects 1996 - 2001

Project	Age at Inventory (Years)	Expected MAI Yield (m <sup>3</sup> /ha/yr)
1996	10	18-21
1997	9	14-18
1998	8	14-18
1999	7	15-20
2000	6	16-21
2001	5	17-22

Overall, the timber growth rates achieved on the early Great Southern Plantations have been below those anticipated at the time of investment and AAG point out that they *“are likely to be approximately 20% down on forecasts.”*

Great Southern has pointed out that the plantation growth rates for these plantations have been impacted by some specific site issues and the recent below average rainfall conditions<sup>9</sup>. It also notes, as do the research houses<sup>10</sup>, that since at least the year 2000, it has been using more rigorous site selection processes and, combined with the general industry improvements in establishment techniques and fertilizer regimes, Great Southern expects that the growth rates for its later projects may be closer to those indicated in the respective PDSs.

## Integrated Tree Cropping Limited

Integrated Tree Cropping Limited (ITC) first offered a hardwood timber project in 1998. Although it has not commenced harvesting plantations in its first project, it has been harvesting plantations established through early projects by other managers and companies that have since come under ITC's control.

ITC has, however, conducted detailed inventory of their early projects and these are reported on the ITC website<sup>11</sup>. For the 1998 project the document posted on the website reports a weighted average standing volume of 112 m<sup>3</sup>/ha at age 8, equivalent to an MAI growth rate of 14m<sup>3</sup>/ha/year. However, because ITC use a “Plantation Unit” for their investment unit instead of a hectare, the unit size for each project varies. In the AAG report<sup>13</sup>, an MAI growth rate of 16 m<sup>3</sup>/unit/yr is indicated which would give a standing volume of 128 m<sup>3</sup>/unit. All reports from ITC and the research houses acknowledge that this project and subsequent ITC projects (until at least 2001) will fail to reach the MAI growth rates indicated ITC's original investment documents.

### ITC Yield Estimates for Past Projects 1998-2000

Project	Age at Inventory (Years)	Weighted Average Standing Volume (m <sup>3</sup> )	Subsequent Estimated MAI (m <sup>3</sup> /ha/yr)
1998	8	112	14
1999 – WA	7	51-65	7-9
1999 – Green Triangle	7	69-97	10-14
1999 – Esperance	7	37-50	5-7
2000 – Esperance	6	48	8
2000 – Green Triangle	6	71	12
2000 – WA	6	67	11
2000 – Queensland	6	23	4

ITC has also pointed to the significant improvements in their management regimes and site selection processes, and it has lowered its the growth rate expectations for the more recent ITC projects to be more in line with achieved results and stated expectations , especially now that ITC offers sufficient land (known as a Plantation Unit) to achieve the required volume during the term of the project.

## Gunns Plantation Limited

Gunns Limited (Gunns) commenced its growth into Managed Investment forestry plantations in 2000. Gunns also acquired the significant plantation assets and experience of North Forest Products Ltd and, to a lesser extent, Boral Ltd and has extensive freehold plantations to base the modelling in their projects.

Hardwood plantation trees in Gunns projects are grown on a 13 – 18 year basis to produce pulpwood and veneer logs.

Currently there is no published data to draw observations on the early projects of Gunns, as the plantations would be generally considered too young to assess for accurate estimates, although some thinning has already occurred.

Generally, it is not unreasonable to expect Gunns' projects to perform in a similar capacity to those of FEA.

## Forest Enterprises Australia Limited

Forest Enterprises Australia Limited (FEA) are establishing eucalyptus plantations on a 13 - 16 year rotation to produce sawlogs and pulp logs, unlike Great Southern, Timbercorp and ITC (and Gunns with its Option 1) that establish eucalypt plantations grow timber targeted solely at the woodchip market.

Because of FEA's slightly longer rotation term, its inaugural project 1993 is only now approaching harvest. FEA investment documents to 1998<sup>12</sup> projected an MAI target for recoverable timber of 25 m<sup>3</sup>/ha/yr, resulting in a target harvest volume of 375 m<sup>3</sup>/ha. FEA has announced<sup>13</sup> that the pre-harvest inventory for the plantations in the 1993 project indicates that the growth rate of recoverable timber is estimated to be 29 m<sup>3</sup>/ha/yr, which results in a yield of more than 400 m<sup>3</sup>/ha. The estimated results are around 16% higher than the targeted volume of timber indicated in the investment document. In addition to this, approximately 60% of the logs are expected to be classified as sawlogs which will attract a higher return to the investor than pulp logs.

FEA has also reported the standing volumes and MAIs for their other early projects, based on an inventory conducted in 2006<sup>14</sup>. The timber harvest volume for the early FEA projects should meet or significantly exceed the respective targets, in all except the 1995 project which is comparable with the best yields being reported by other companies.

### Overview of FEA's Yield Estimated for Past Projects 1993 - 1998

Project Year	Age at Inventory (years)	Target MAI (m <sup>3</sup> /ha/yr)	Expected MAI (m <sup>3</sup> /ha/yr)
1993	13	25	32
1994	12	25	36
1995	11	25	20
1996	10	25	29
1997	9	25	24
1998	8	25	26
1999-2001	5-7	25 - 28	n/a

As pointed out by all eucalypt MIS managers, the industry has made significant advances in silvicultural management since the late 1990s due to new genetic material being deployed, a better understanding of nutrient management, and tighter operational controls coupled with tighter land selection protocols. Although the growth performance of FEA's plantations established between 1993-1998 has been exceptional when compared with its industry peers, FEA has also taken advantage of these industry-wide advances.

## Conclusion

The early eucalypt projects with plantations managed for pulpwood generally forecast growth rates in the MAI range between 25 and 30 m<sup>3</sup>/ha/yr, with the estimate made by FEA being at the conservative end of this range.

In general, the published and reported growth rates of these early projects which have been harvested have been disappointing with actual yields for most companies being around 20% below the lowest end of their forecast range. The exception to date has been FEA – the anticipated return for its inaugural project should not only exceed the growth rate forecast by 16%, but exceed the actual harvested plantation yield of its peers by between 45% and 75%.

Some inventory information has been reported for the younger plantations of these managers and the trend seems likely to continue. The expected yields from these plantations are also likely to be around 20% below the forecast volumes, until at least the 1999 plantings. Again the exception appears to be FEA - its younger plantations (except 1995) are likely to meet and exceed the respective investment forecast.

Since 2000, an industry wide improvement in silvicultural practices has occurred based on early experiences, research conducted by forestry companies and bodies (such as CSIRO), and an increase in the involvement of forestry professionals. A better understanding of site parameters has led to tighter site selection procedures, research has led to better nutrient management and improved genetics, and more rigorous control of operations has led to better deployment of these improved silvicultural regimes.

All companies have benefited from these industry- wide improvements, and will continue to do so into the future providing that there is ongoing research and development. In addition the emergence of the potential of solid wood products as a plantation objective will change the way forests will be managed.

This being said, site characteristics such as land quality and climatic factors will remain relatively constant and the key factors that determine growth rate potential of the species currently being used. The routine of reserve plantations and the use of variably sized “plantation units” does provide a pragmatic and logical solution to site constraints in some growing areas.

## Footnotes

<sup>1</sup> *Timbercorp Press Release 10 April 2003*

<sup>2</sup> *AAG Report on Timbercorp 2007 (Single Payment) Timberlot Project page B5, March 2007*

<sup>3</sup> *Great Southern Plantations 1994 to 2000 PDSs, AAG Great Southern Plantations 2007 page B6, May 2007*

<sup>4</sup> *AAG report of Great Southern Plantations 2007 page B6, Lonsec report Great Southern 2008 High Value Timber Project page 10, February 2008*

<sup>5</sup> *Lonsec Great Southern 2008 High Value Timber Project page 10, February 2008, Great Southern Plantations 1994 Project Grower Returns, Great Southern Plantations 1995 Project Grower Returns*

<sup>6</sup> *Great Southern Plantations 1996 Project, Harvest Update, August 2007*

<sup>7</sup> *Great Southern Plantations 1996 Project, Investment Update, December 2007*

<sup>8</sup> *AAG Great Southern Plantations 2007 page B6, May 2007*

<sup>9</sup> *Great Southern Plantations 1994 Project Grower Returns, Great Southern Plantations 1995 Project Grower Returns*

<sup>10</sup> *Great Southern Plantations Project 2007 PDS, AGG Great Southern Plantations 2007 Project, May 2007*

<sup>11</sup> [http://www.itclimited.com.au/default.asp?V\\_DOC\\_ID=834](http://www.itclimited.com.au/default.asp?V_DOC_ID=834)

<sup>12</sup> *Disclosure documents for FEA's Projects from 1993 - 1998*

<sup>13</sup> *FEA Fact Sheet No 1, December 2007*

<sup>14</sup> *AAG Report on FEA Plantations Project 2007, page B6, May 2007*

## Disclaimer

Robert Eastment, Director, *IndustryEdge* Pty Ltd, has prepared this independent report for Forest Enterprises Australia Limited. In preparing this report, *IndustryEdge* has relied on information given to it by the referenced documents. *Industry Edge* has not independently verified this information. *IndustryEdge* has also collected independent information about hardwood plantations. This independent report contains the opinion of *IndustryEdge* on the potential growth rates of the major managed investment schemes for the production of hardwood pulplogs. Nothing in this report is, or should be relied upon, as a promise by *IndustryEdge* the growth rates are accurate as published. No person may rely on this independent report for any other purpose or in any other context. *IndustryEdge* has not been involved in the preparation of any other aspect of growth rate reviews and is not liable for any other aspect of analysis of growth rate reviews.

