

Taking Stock

Adding Sustainability Variables to Asian Sectoral Analysis

February 2006

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Pulp, Paper & Timber

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CONTENTS

INTRODUCTION.....3

COUNTRY AND SECTOR DYNAMICS.....4

What the sector looks like today.....4

Cross-cutting issues — disclosure.....11

Long-term sector outlook.....12

INCREASING REGULATORY RISK FUELS THE SUSTAINABILITY CHALLENGE.....13

Illegal logging: set to remain the overriding sustainability challenge.....13

Social conflict creates an unstable operating environment.....17

CHINA IS RESHAPING ASIAN AND GLOBAL DEMAND.....20

Companies face potential raw material deficits.....20

Suitable plantation land is a scarce resource.....23

GOOD PRACTICE STANDARDS ARE SHAPING THE COMPETITIVE ENVIRONMENT.....27

Sustainable forest management standards are becoming the sector's de facto enforcement tool.....27

THE LONGER TERM : EMERGING RISKS AND OPPORTUNITIES.....30

Two crucial investment drivers.....30

INVESTOR QUESTIONS FOR COMPANIES.....34

RESOURCES.....35

Sustainability

Sustainability is a systemic concept, relating to the continuity of economic, social, institutional and environmental aspects of development. In the terms of the 1987 Brundtland Report of the UN's World Commission on Environment and Development, sustainability is: "Meeting the needs of the present generation without compromising the ability of future generations to meet their needs." The key concept for investors is the need to address a range of environmental, social, and governance (ESG) factors which will inevitably shape long-term returns as markets respond to changing resource requirements and public priorities.

INTRODUCTION

The development of the Asian pulp, paper and timber sector is influenced by a suite of issues including weak political institutions, social conflict, unsustainable management of natural resources, lack of transparency, pervasive illegal practices and complex national regulation. These issues represent both risks and opportunities for investors in Asia's pulp, paper and timber companies.

The sector is nothing if not complex from a sustainability standpoint, largely due to the sector's dependency on raw materials from natural and plantation forests often in remote and inaccessible locations. It supplies a range of wood products to global markets, with raw materials sourced from some of the world's most fragile environments. The sustainable management of these materials is a significant global challenge and is essential to secure the long-term sustainability of Asian based companies operating in the sector.

The sector is highly capital intensive and the financial community plays a significant role in its development. The relatively short-term outlook of mainstream investors, however, is often at odds with the longer-term objectives of sustainable forest management, a tool which is fundamental to addressing the existing and emerging sustainability risks.

In this report, we assess these issues in the context of Asia's most broadly held large and mid-capitalization listed pulp, paper & timber companies. We believe that the most important sustainability themes for investors in Asian pulp, paper & timber companies will be:

- **Forest law enforcement, governance and social conflict** Increasing regulatory risk as a result of poor forest law enforcement and continuing social conflict is likely to plague the sector in the long term
- **The sustainable supply of raw materials** Security of sustainable supply is a crucial long-term value driver for the regions' relatively small listed universe of pulp, paper and timber companies
- **Emerging good practice standards** Whilst Asian listed pulp, paper and timber companies would appear to lag their developed market peers in responsiveness to the sustainability agenda, emerging good practice standards provide new competitive opportunities
- **Technology and carbon economy** New technology and evolution of the carbon economy provide both long term risks and opportunities

COUNTRY AND SECTOR DYNAMICS

What the sector looks like today

China has emerged as a dominant force in the wood products market, both regionally and globally

Historically, the pulp, paper and timber industry has been consumer driven by developed economies. However, a look at the current top five leading countries in terms of production, consumption, import and export of the main forest product categories globally, reveals China as a leading producer, consumer and importer of wood products. From both a global and particularly a regional perspective, it is clear that since the late 1990s China has emerged as a dominant force in the wood products market place.

Figure 1 Market Overview: Top Five Leading Countries Globally in the Pulp, Paper and Timber Sector (2003)*

Wood Product	Production		Consumption		Imports		Exports				
	%		%		%		%				
	A	W	A	W	A	W	A	W			
Industrial Roundwood	USA		USA		China	51	23	Russia			
	Canada		Canada		Finland			USA			
	Russia		China	46	8	Japan	24	11	New Zealand		
	Brazil		Brazil		Sweden			Malaysia	65		
	China	43	6	Russia		Korea	14	6	Canada		
Wood Based Panels	China	57	20	USA		USA		Canada			
	USA			China	59	21	China	30	8	Malaysia	38
	Canada			Germany			Japan	28	8	Germany	
	Germany			Japan	14	5	Germany			Indonesia	33
	Indonesia	10	3	Korea	9	3	UK			China	18
Wood Pulp	USA			USA			China	48	17	Canada	
	Canada			Canada			USA			USA	
	Finland			Japan	35	7	Germany			Sweden	
	Sweden			China	31	6	Italy			Brazil	
	Japan	43	6	Finland			Korea	17	6	Finland	
Paper, Paperboard	USA			USA			USA			Canada	
	China	38	12	China	40	13	China	47	10	Finland	
	Japan	31	9	Japan	29	10	Germany			Germany	
	Canada			Germany			UK			Sweden	
	Germany			UK			France			USA	

W – World, A - Asia

* Indicating contribution of Asian companies to Asian (A) and World (W) trade.

Data Source : Food and Agriculture Organisation of the United Nations Forest Products Yearbook 1999-2003

Other important players in Asia include Japan and the Republic of Korea mainly as importers, and both Indonesia and Malaysia mainly as exporters. Despite China's increasing importance, there has historically been little consolidated information published on the growth of the China market and its implications. In response to this, in 2004 the International Forestry Review (IFR) published a special edition comprising a series of up to date research papers focusing on this topic. The following assessment draws upon elements of IFR's research, details of which are provided in the resources section of this report.

Figure 2 Sector Dynamics within the Region (2003)

Roundwood Responsible for 43% of the region's industrial roundwood production, China is a leading producer of softwood and jointly with Indonesia, a leader in the production of hardwood. It also dominates roundwood consumption and is responsible for 53% of imports in the region. On the export side, Malaysia accounts for 65% of trade.

Note: Roundwood is all wood removed whether round or split, including sawnwood, veneer logs, pulp wood. Industrial roundwood includes roundwood used in the production of other goods including saw logs, veneer, pulp wood — round and split wood and excluding wood fuel.

Wood-based panels China accounts for 57% of wood panel production in the region, and with Japan is also a lead importer. Malaysia and Indonesia are leading exporters of wood based panels accounting for 38% and 33% of Asian exports respectively.

Wood pulp Japan and Indonesia are leading producers of wood pulp with 43% and 23% of the Asian market respectively, although China is not far behind with 17%. Japan and China are also leading consumers of wood pulp, being responsible for 48% of imports in the region, followed by Korea and Japan with 17% each. The export of wood pulp is dominated by Indonesia accounting for 82% of wood pulp exports in the region.

Paper, paperboard Accounting for 38%, 40% and 47% respectively, China is Asia's leading producer, consumer and importer of paper and paperboard, followed by Japan. It is also the region's leading exporter of paper and paperboard followed by Korea, Indonesia and Thailand.

Source: Based on statistics sourced from the Food and Agriculture Organisation of the United Nations Wood Products Yearbook 2003

Wood which supplies the Asian pulp, paper and timber sector is harvested from:

- state/government owned forests including government regulated concessions/tenures
- non-forest land
- areas zoned for agricultural development
- operations in other regions such as Africa and South America

Timber has traditionally been sourced unsustainably, largely from clear felling natural forests. However there is an increasing trend towards harvesting from fast growing high yield (FGHY) plantations, such as species of acacia, albizia and eucalyptus, in an attempt to offset potential shortfalls in wood supplies. In order to establish plantations of such species, it is, however, often necessary to first clear fell what is most likely natural forest land. Significant deforestation has taken place in major producing countries and several countries are now considered to be past 'peak harvesting'.

Figure 3 Status of Timber Production

Country	Overall status	Comment	* De-forestation rate 1990 -2000 (%)
Cambodia	Past peak harvesting	Exploring increased plantation development. Chinese investors active in this area	0.6
Indonesia	Past peak harvesting, de-forestation significant and declining logging due to depletion of accessible forest resources. Deforestation rate – 1.6 million hectares annually	Natural forests unlikely to sustain wood processing sector, without investment in plantations. Significant processing capacity, but struggling to operate at full capacity. Plantations under development, but most mills rely on mixed tropical hardwoods harvested from natural forests	1.2
China	Logging ban introduced in 1998. Significant variation exists in estimates of timber forests	Statistics indicate that remaining natural forest in China is young and significant illegal logging and overcutting persists. Plantation forests do not yet provide sufficient quantities of fibre to satisfy demand. Serious data discrepancies exist in all major statistical areas**	-1.2
Laos	Past peak harvesting		0.14
Malaysia	Past peak harvesting. Forest products exports 30% of total government revenues in Sabah and Sarawak		1.2
Thailand	Past peak harvesting. Deforestation slowing down	Invested extensively in plantations, however, the success of plantations is debatable	0.7
Myanmar	Large scale timber production, relatively limited plantations, heavy reliance on natural forests. Deforestation severe. Production in border areas thought to be peaking	At current harvesting rates border areas responsible for supplying timber to China have between 10 and 15 years of economically accessible resources remaining	1.4
PNG	Large scale timber production, relatively limited plantations, heavy reliance on natural forests. Most already allocated to concessions	Expected to have fully allocated its forestlands within 3 to 6 years, exhausting natural forest timber resources after another 10 years. Small processing industry	0.4
Vietnam	Past peak harvesting. Deforestation severe but stabilized	Increasing plantation development, but productivity poor	(0.5)

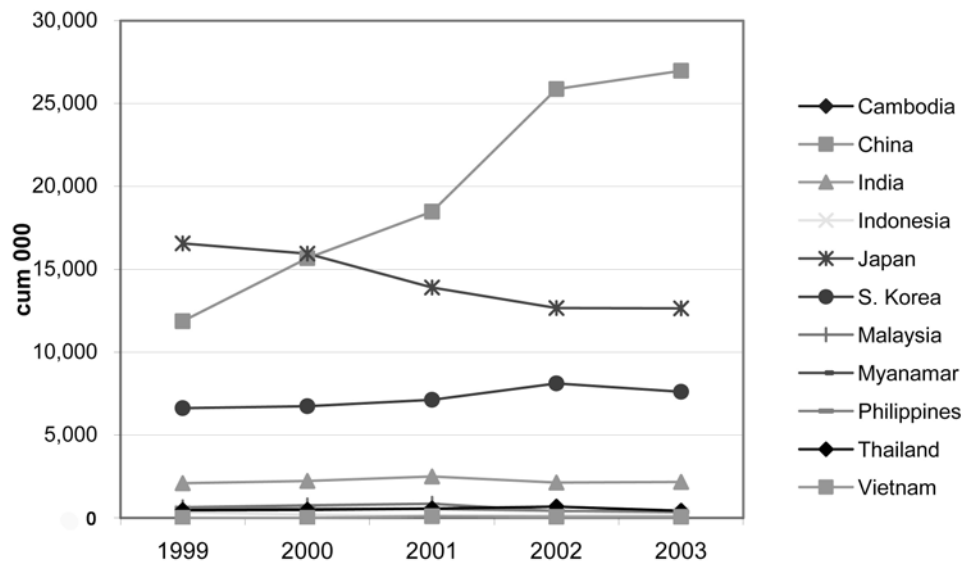
* Data sourced from the World Bank's Little Green Data Book, 2005

** An Assessment of China's Forest Resources, G Bull, S Nilsson, 2004

Source: data synthesized from Kartsegiris et al 2004

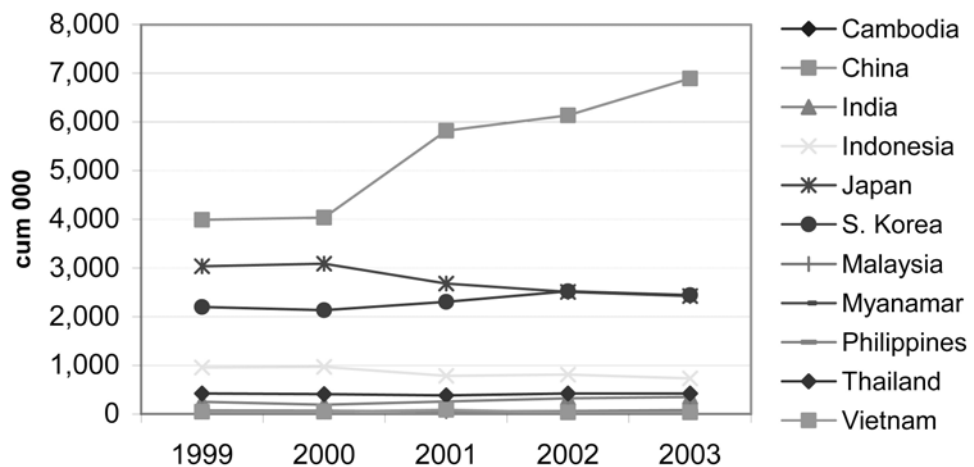
Demand for timber and wood products, however, continues to rise. The rapid increase in Chinese demand for wood products is perhaps the most striking trend. From 1999 to 2003, China's industrial roundwood imports doubled, rising from 11 million Cu.m to over 26.31 million Cu.m with a commensurate change in value from US\$1.4 billion to US\$ 2.85 billion. Top suppliers include Russia, Malaysia, Papua New Guinea and Gabon. Wood pulp imports have shown similar growth, rising from 11% of the global market in 1999 to 17% in 2003, nearly half of which is supplied from three countries: Canada, Indonesia and Russia.

Figure 4a Roundwood Imports Asia 1999-2003



Source: Food and Agricultural Organization, yearbook 2003

Figure 4b Wood Pulp Imports Asia 1999-2003



Source: Food and Agricultural Organization, yearbook 2003

China's escalating demand for imported timber has been stimulated by the Government's decision in 1998 to restrict domestic logging. The restrictions were imposed in response to widespread flooding along the Yangtse River, which was largely attributed to deforestation. These restrictions were initially applied to state owned forests in 12 provinces and later extended to 18 provinces. It's estimated that 41.8 million ha of natural forests are affected, with an estimated reduction in harvest of 19.9 million m³ by 2003¹. The overall outcome has been escalating imports from within the region.

Chinese demand has been triggered by logging restrictions

In terms of the landscape of pulp, paper and timber companies, the listed universe in Asia is relatively small. As of March 2005, only 42 Asian stocks had market capitalizations of over US\$100 million and only five over US\$500 million. Total market capitalization of the sector in Asia is in the region of US\$15-16 billion. Of these companies, 12 are Chinese and seven of the larger stocks are ranked by PwC amongst the 100 largest pulp, paper and timber companies in the world.

Figure 5 Larger Regional Listed Pulp, Paper & Timber Companies

Market	Company	Market Cap* (US\$mm)
China	Shandong Chenming	625
	Shandong Huatai	326
	Fujian Qingshan Paper	169
	Jilin Forest	154
	Henan Ying-A	144
	Shandong Bohui	141
	Minfeng Special Paper	135
	Yueyang Paper	134
	Zhejiang Kan Specialty Materials	125
	Fujian Nanzhi	110
	Shanying Paper	109
	Mudanjiang Heng Feng Paper	94
	Hong Kong	Lee & Man Manufacturers
India	Ballarpur Industries	404
Indonesia	Indah Kiat (APP)**	618
	Tjiwi Kimia (APP)**	428
	Fajar Surya Wise	242
	Barito Pacific	155
Korea	Hansol Paper	765
Taiwan	Yuen Foong Yu Paper	534
	Chung Hwa Pulp	237
Thailand	Advance Agro PCL	338

Market Cap Source: Bloomberg, December 2005

* As at 30 December 2005, or last official day of trading

** APP's subsidiaries Indah Kiat and Tjiwi Kimia are listed on the Jakarta and Surabaya Stock exchanges

¹ PwC note that insufficient reporting information in China limits the number of China based companies included in the top 100

² Although delisted, the Indonesian APRIL Group continues to be one of the largest pulp, paper manufactures in Asia.

Figure 6 Landscape of the Asian Pulp, Paper and Timber Listed Universe

Country (Stock Exchange)	Companies Listed*
China	12
Hong Kong	2
India	1
Indonesia	5
Korea	5
Malaysia	8
Taiwan	5
Thailand	3

*Companies with a market capitalization over US\$100 million.

Of the listed companies above, the majority are paper/pulp/building product companies. Three are in the forestry industry: Malaysia (2) and China (1).

Although small, the listed universe of Asian pulp, paper and timber companies is important to the sector globally

Although the listed universe of Asian pulp, paper and timber companies is relatively small, the sector has significant direct and indirect impacts on both the global industry and financial market developments in Asia. The sector is highly capital intensive in nature with capital costs for pulp production estimated to be in the region of US\$ 1,000 per tonne of annual capacity. As a result, despite the small size of the listed universe, it is structurally important to the sector's development.

The 1990s saw tremendous growth in Asian pulp and paper capacity as investments from a range of sources poured into the sector, arguably with limited due diligence by the investment community as to general operating, social and environmental risks. Recent research² indicates that since 2000, pulp/paper producers in developing countries and those in transition raised US\$37.8billion in debt and equity.

Funding for the sector is primarily provided by banks rather than equity markets. Driven by recognition of sustainability risk factors, some of the larger financial institutions such as IFC, Citigroup, JP Morgan, ING Barings, HSBC, ABN Amro, and Rabobank have adopted formal policies and safeguards to control and, in some cases, restrict lending to the forestry sector. A number of leading banks have also signed the Equator Principles which aim to provide a framework for financial institutions to manage environmental and social issues in project financing. It is worth pointing out, however, that since financing patterns of the sector do not generally involve project finance, the banks need not apply these principles to the majority of their pulp, paper and timber funding. Nevertheless some banks do apply the Equator Principles to financial products in addition to project finance.

Figure 7 The Equator Principles

The Equator Principles — 'a framework for financial institutions to manage environmental and social issues in project financing'

An initiative based on the International Finance Corporation (IFC) guidelines, the Equator Principles provide guidance for managing social and environmental issues associated with the financing of development projects with a total capital cost of \$50 million or more. Institutions that adopt the Principles should categorize all loans according to the Principles' set of criteria and place conditions on, monitor and even reject loans which raise questions on or conflict with the Principles's ESG policies and processes. www.equator-principles.com

Finance institutions that have adopted the Equator Principles (as of 27/2/06) include:

ABN AMRO Bank, N.V. Banco Bradesco, Banco do Brasil, Banco Itau,, Banco Itau BBA, Bank of America, BMO Financial Group, BTMU, Barclays plc, BBVA, BES Group, Calyon, CIBC, Citigroup Inc., Credit Suisse Group, Caja Navarra, Dexia Group, Dresdner Bank, EKF, FMO, Fortis, HSBC Group, HVB Group, ING Group, JPMorgan Chase, KBC, Manulife, MCC, Mizuho Corporate Bank, Millennium bcp , Nedbank Group, Rabobank Group, Royal Bank of Canada, Scotiabank, Standard Chartered Bank, SMBC, The Royal Bank of Scotland, Unibanco, Wells Fargo, WestLB AG, Westpac Banking Corporation

Nevertheless, leading financial institutions have been challenged when lending to the sector, including the well publicized allegations by Rainforest Action Network against the U.S. banks Citigroup and JP Morgan. It is, therefore, of little surprise that there is also increasing pressure by the NGO community to re-evaluate lending and underwriting commitments to the sector.

Cross-cutting issues — disclosure

Asian companies provide less readily accessible disclosure of ESG risks than their European and North American counterparts. In general, disclosure in Asia focuses on the traditional environmental risks arising from the operation of pulp and paper mills rather than focusing on the wider ESG risks of the sector, such as raw materials supply.

The issue of disclosure within the sector is likely to remain a significant challenge for investors

Listing documents, sustainability reports and annual reports are the main vehicles for disclosure of ESG issues by global pulp, paper and timber companies. As of mid 2005, 26 such companies worldwide had reported with reference to, or in accordance with the Global Reporting Initiative (GRI), including Georgia Pacific, International Paper, Sappi, Stora Enso, UPM Kymmene and Weyerhaeuser. These companies have taken the opportunity to report on and provide insights into global best practices such as the strategic importance of recovered fibre and use of recovered paper as a raw materials source.

In Asia, reporting by companies in the sector is limited. Examples include Siam Kraft Industry's (a subsidiary of the Siam Cement Group) Sustainability Report and Hansol Paper's Environmental Report. A number of Asian companies such as Advance Agro and Barito Pacific also provide limited environmental and social disclosure on their websites, albeit to varying degrees.

Forward looking and transparent companies will develop and disclose strategies for the use of raw materials

Not surprisingly, those companies that have faced high profile ESG related problems, such as Barito Pacific, APRIL and APP are more candid about the sustainability risks of their operations. Lack of informative disclosure on ESG issues can be considered a missed opportunity as forward looking and more transparent global companies take the lead. In Asia, APRIL has taken the lead on such disclosures, providing substantive details of its raw material supplies, expected yields and plans for attaining a sustainable supply to fuel its operations.

Beyond the company level, there is also inadequate country trade data. According to the International Tropical Timber Organisation (ITTO), several countries do not currently provide accurate industry data, making it difficult to provide complete sector risk assessments. There are also significant discrepancies between ITTO trade data and the UN FAO global trade data. Illegal activities further exacerbate the challenge of obtaining reliable trade data.

The issue of disclosure within the sector and availability of robust data on the sustainability risks is, therefore, likely to remain a significant challenge to investors analyzing the sector, particularly with respect to the Chinese pulp, paper and timber companies.

Long-term sector outlook

The sector is set to experience dramatic structural changes including geographical shifts in demand and supply

The sector is set to experience dramatic structural changes including geographical shifts in demand and supply which pose both sustainability risks and opportunities. The pulp, paper and forest products industries are classic cyclical sectors. The demand for forest products is closely linked with GDP and is heavily influenced by housing markets, hence it is not surprising that emerging markets and high growth economies, such as China, are significantly pushing up global demand for the industry's products.

Despite concerns over raw material supplies, it is clear that further expansion is on the horizon with significant planned and current investments emerging in Asia and globally. This is likely to trigger further debt financing, listings and re-listings in the region as well as secondary offerings, particularly for Chinese pulp, paper and timber companies. The Indonesian companies APP and APRIL are thought to be considering re-listing in the future.

As pressure on combating illegal logging continues to mount globally, we also expect both the public and private sector to step up environmental procurement requirements, demanding wood products from sustainable sources as evidenced by chain of custody and certification schemes.

Given the constraints on raw material supplies we also expect to see opportunities for technology development with respect to non wood fibre pulp production as well as continued increasing demand for recovered fibres.

INCREASING REGULATORY RISK FUELS THE SUSTAINABILITY CHALLENGE

Two issues that have historically characterized the pulp, paper and timber trade in Asia are illegal wood and social conflict. Sector leaders will likely spend significant resources in addressing these issues, or face increasing regulatory risk and an unstable operating environment.

Generally, government owned forest land in Asia is typically leased to private enterprises through forest concessions. Abuse of this concession system in Asia would appear to be common and in part facilitates much of the illegal activity and social conflict facing the sector. These concessions provide a mechanism for allocating forest harvesting rights to a third party, usually private companies and communities. Depending on the country, concessions require payment of specific fees and impose numerous conditions on the concession holder, including limitations on the extent of harvest as well as requirements relating to reforestation and penalties for damage. They can be long-term in the range of 20-35 years, a period notably longer than the time horizons of Asia's mainstream investors. Concession agreements are not generally disclosed and, reportedly, problems frequently arise due to inadequate management and oversight. Weak forest law enforcement and governance in managing concessions therefore provides a fertile environment for unsustainable and illegal practices and social conflict, and can pose a potential business risk for concession holders.

Abuse of the concession system facilitates much of the illegal activity and conflict facing the sector

Illegal logging: set to remain the overriding sustainability challenge

The definition of legality with respect to the timber trade is a subject of much debate which further compounds the challenge in tackling the issue, particularly in defining the extent of the problem.

Illegal logging is typically defined as:

- harvesting timber without authority /in violation of national laws
- harvesting timber without and/or in breach of concession permit requirements
- failure to declare harvests to avoid taxation and other legal payments
- violation of international trading agreements
- use of false documentation

Source: Adapted from "illegal logging" as defined in AF&PA, 2004

The supply of illegal wood to the pulp, paper and timber trade globally is a significant sustainability issue which raises the question of financial risk as well as ethics. Both the scale and the pervasive nature of illegal logging in Asia threatens the reputation and branding of companies operating within the sector and incurs significant losses in taxation and other revenues of local governments. It also impacts the profitability of companies operating in the sector legally and is becoming a significant international trade issue. Recent research published by the American Forest & Paper Association indicates that illegal logging is responsible for depressing world market prices for timber by an average of 7-16%³.

Indonesia has been a focal point for the illegal logging debate, and has the highest rate of illegal logging in the region

Indonesia has been a focal point for the illegal logging debate. With an estimated 60%⁴ of its timber production from illegal sources, it has the highest rate of illegal logging in the region. The country's decentralized system of control has exacerbated the situation and reportedly facilitated widespread corruption and mismanagement of forest tenures. Land clearing activities in the country continue to be licensed by district forestry agencies that do not have the appropriate provincial authorisation and in fact directly contravene government regulations against the issuance of such licenses⁵. In light of this, the Ministry of Forestry is currently undertaking a review of the validity of industrial timber plantation licenses issued by Governors or heads of districts. It has been reported⁶ that 34 companies received licenses from heads of districts in Riau to clear 289,809 ha of natural forest, mainly for customers APRIL and APP.

If Indonesia were to significantly reduce illegal logging, it has been estimated that between 3.5 and 4 million m³ would need to be replaced by other suppliers in the three key markets for Indonesian lumber — China, Malaysia and Japan⁷.

Other countries where illegal logging is significant and inevitably impacts international trade include China and Russia. China is significant with respect not only to reported illegal activity in the form of logging over quotas, but also as one of the world's largest importers of timber and pulp from countries with poor forest law and governance such as Indonesia, Russia and Myanmar.

The impact of illegal logging on both the environment and local communities can be devastating. The problems range from the permanent loss of extremely valuable forest land, with high biodiversity, to instances of violent social conflict with local communities.

Figure 8 Biodiversity

Biodiversity may be defined as the variability among living organisms, including the variability within and between species and within and between ecosystems; biodiversity is fundamental to survival for many plant and animal species. The world's forests are exceptionally rich in biodiversity. They provide habitats for the majority of terrestrial species and are important both economically and socially.

Given the changing market dynamics and increasing pressure on forest resources in the region, the problem of illegal wood is unlikely to be solved in the short-term and will remain a significant sustainability risk at least for the medium term, despite on-going national and multilateral efforts to combat the problem. This stems from the nature of these activities which have largely been facilitated by a mixture of weak rule of law, corrupt political institutions and complex local laws and regulations. This is not to mention the sheer range of interests that can be involved including government officials such as customs officers and the military; multinationals; regional brokers and dealers; and members of the local communities themselves. Indications are that Asian companies in the sector are further introducing similarly unsustainable practices overseas as they continue to invest in operations in countries such as Africa, Russia and South America⁸. The recent activities of the Malaysian company Rimbunan Hijau in Papua New Guinea and related allegations over labour abuses illustrate the potential for lower standards to be introduced away from home markets.

Multi-lateral and bilateral efforts which aim to address these issues include:

- **Forest Law Enforcement and Governance (FLEG)** where timber producing countries have declared their intention to address illegal wood
- **Forest Law Enforcement, Governance and Trade (FLEGT)** led by the EU, the FLEGT Action Plan addresses voluntary partnership agreements, public procurement, private initiatives, and financing and investment safeguards. EU member states are engaging producers in bilateral negotiations to further partnerships in implementing the EU's Timber Licensing system. This involves exporting countries providing a certificate of origin to customs of the importing country
- **Memorandum of Understandings** China and Indonesia have signed an MOU to address illegal logging, although it would appear that little progress has been made following the initial announcement of the agreement

Importantly, the legality of timber is becoming a trade issue. European markets are increasingly demanding independently verified legal wood products and timber from suppliers as a condition for their entry into European markets. This is a significant issue for Asian pulp, paper and timber companies as this requirement extends to Asian suppliers.

"Illegal logging activities in neighbouring countries have become such a critical issue that buyers in the UK are now asking for legality certifications to prove that plywood they purchase are from legal sources"

Jaya Tiasa Annual Report, 2004

Addressing the problem of illegal wood should be a priority for companies in the sector. Those that disclose sustainability information generally state their intention to use only legal wood and cite certification, audits and Chain of Custody (COC) systems as the mechanisms by which this is achieved. Chain of-custody is the route taken by raw materials from the forest to the consumer

and a COC system should be able to determine the custodian of timber at any point in the supply chain. These systems typically can involve procedures, documentation and, in some cases, sophisticated wood tracking and labeling systems, such as radio frequency identification labels (RFID). However COC systems can be logistically difficult and expensive to implement alongside various national schemes. There are also two internationally recognised chain of custody systems:

- the Programme of Endorsement of Forest Certification (PEFC)
- the Forest Stewardship Council's (FSC) own scheme

However, lack of mutual recognition of the different schemes has created some confusion.

For investors, the key to addressing the issue of illegal wood is evidence of robust and audited COC and timber tracking systems

For mainstream investors, the key to addressing the issue of illegal wood is without doubt evidence of robust and audited COC and timber tracking systems, on the basis that companies which are unable to provide assurances of legality are exposing themselves to unacceptable regulatory and reputational risk. The increasing pressure of deforestation on raw material supplies in the region, at least in the short to medium term, is also expected to increase the likelihood of illegal logs entering the market place and further fuel global concerns over deforestation. Without doubt, illegal logging is set to remain a significant sustainability risk to companies operating in the sector. Companies which can demonstrate legal supplies will inevitably increase their attractiveness to investors and place themselves in a stronger competitive position as global markets increasingly demand evidence of legality.

Figure 9 Examples of Companies Addressing Legal Wood

Asia	APP	Despite allegations over the legality of its timber, APP reports that it implements its own COC system and provides verification that pulpwood entering its mills is legal.
	APRIL	APRIL reportedly has a wood purchasing policy to prevent the purchase of illegal wood, such that wood tracking audits are conducted for verification. In response to customer requests, APRIL indicates that a COC system is implemented to demonstrate that paper it supplies is from plantation fibre (acacia), distinguishing it from mixed hardwood. Riau Andalan Pulp & Paper (part of the APRIL Group) still reportedly rely heavily on supplies from natural forests. Therefore only a small portion of its paper production is from plantation fibre.
	Barito Pacific	Barito Pacific reports that it is progressively implementing a COC and timber tracking system. Greenpeace has however recently accused the company of trafficking in illegal logs.
	Jaya Tiasa	Jaya Tiasa reports that it has previously engaged the Tropical Forest Trust to verify legality of supplies.
World	UPM-Kymmene	UPM reports that it implements a GIS tracking system to trace the origin of imported wood from Russia. It ensures that all of its European operations have certified COC systems. To address the differences in certified COC schemes, globally UPM plans to implement a generic COC system covering all forest certification schemes. The aim is to show the real share of certified fibre in its products.
	Stora Enso	Stora Enso use traceability systems as the means to ensuring all wood and fibre originate from legal sources and strive for third party verification systems through ISO or Chain of Custody.

Social conflict creates an unstable operating environment

Throughout Asia, there is significant dependence on forest resources by local communities. This dependence creates an extremely sensitive environment within which pulp, paper and timber companies operate. Without sufficient due care, diligence, a strong legal framework and enforcement, unsustainable logging activities and pulp mill operations can further impoverish rural communities and can lead to social conflict. Such conflict is complex and highly variable depending on demographics, the value of wood resources, the occurrence of illegal logging and local governance.

Where land is appropriated for plantations or logging purposes, the issue of ownership and tenure of forestry assets in Asia is typically the root cause of social conflict associated with the sector. In addition, conflict occurs between communities and pulp/paper companies as a result of environmental pollution from pulp and paper mills affecting community land, property and livelihoods. Such social conflict has gained prominence in Asia due to a range of factors including:

- level of dependence of local communities on forest resources throughout Asia. As an example, the International Institute for Environment and Development (IIED) estimates that in India 15% of the population derives some subsistence from forest land
- loss of livelihood through land-take and inequable distribution of the benefits of logging
- concessions implemented without engagement of the affected communities and consideration of landuse rights
- adverse environmental impacts from plantations and the operation of pulp mills affecting local livelihoods
- loss of access to resources and loss of property rights
- land tenure issues such as the marginalization of forest dwelling communities that have no formal property rights, or rights of access
- poor working conditions for locals employed in the industry

The investment community may not be aware that there have been violent demonstrations and even occurrences of death associated with the activities of pulp, paper and timber companies. The extent of such conflict is rarely widely reported in the general media. Several listed companies have been involved in instances of social conflict as a result of their operations and in some instances have lost legal judgments. Examples of Asian companies which have faced community problems include:

- **Barito Pacific** has been forced to cease operations at its forestry management units in Moluccas as a result of local riots
- **Indah Kiat (APP subsidiary)** Indigenous people's land rights have created social conflict with the Sakai people over claims of clear-cutting forest lands in Riau province, Indonesia. Conflict involved blockading the road between the pulp mill and the plantation supplying wood
- **Advance Agro** Local villagers from Laemkowchan village, situated close to one of Advance Agro's mills in Thailand, have reportedly encountered problems including lack of water affecting their rice paddies as a result of nearby eucalyptus plantations, soil degradation and the ingress of polluting water
- **APRIL** As detailed in its 2004 Sustainability Report, APRIL faces ongoing land disputes with the Gunung Sahilan community in Sumatra, Indonesia. The conflict started in 1993 when APRIL was granted land which was disputed to belong to Gunung Sahilan. There followed disruptive action including road blockades. Although some settlements have been reached, claims against the company are still being made. Nearly one quarter of APRIL's total concession area of 330,000 hectares has been subject to various land claims
- **Rimbunan Hijau** Part owner of a the listed company Jaya Tiasa, the Malaysian logging firm Rimbunan Hijau and one of its financiers Citigroup have been the subject of intense public criticism over allegations concerning the company's behaviour in Papua New Guinea, including human rights abuses as well as illegal harvesting and trafficking of timber. Citigroup has subsequently announced that Rimbunan Hijau will need to comply with Citigroup's Environmental and Social Policy to qualify for financing

Although social conflict is a significant challenge to the sector, some companies endeavour to reduce the associated risks through improving community relations at the grassroots level. This may involve engaging local communities, purchasing fibre from community land and implementing land dispute resolution procedures. Dealing with local communities, however, requires understanding of often complex situations, communication and mediation skills. Without these competencies, successfully addressing social conflict and negating the associated risks is unlikely to be successful.

Figure 10 The Case Of Asia Pulp & Paper (APP)

Headquartered in Singapore and one of the largest paper companies in the world, APP is the holding company for Sinar Mas subsidiaries in the pulp and paper sector. Listed on the New York Stock Exchange in 1995 and delisted six years later, APP announced in 2001 that it could no longer repay its debts estimated to be between US\$11 and 13 billion, the world's largest debt default in the emerging markets. The company had previously raised US\$311 million, US\$228 million and US\$400 million in three offerings in 1995, 1997 and 1999 respectively, in addition to significant funding through bank loans and bond issues. Two of its subsidiaries Indah Kiat and Tjiwi Kimia are still listed on the Jakarta and Surabaya stock exchanges. Indah Kiat accounts for approximating 70% of APP's pulp output.

Closer examination of APP's actions indicate that many of the sustainability risks highlighted in this paper are applicable to the company and, in conjunction with the Asian Crisis and low global pulp and paper prices, may have contributed to the difficulties now facing the company.

Heralded as a low cost producer in the 1990s, APP had a competitive advantage as the holder of concession rights to over 500,000 hectares of tropical hardwood forests in the region. Throughout the 1990s, APP embarked on an ambitious expansion strategy, investing heavily and increasing its production capacity, notably with an eye on the expanding China market. This strategy however did not appear to address several sustainability risks, perhaps the most significant being the sustainable supply of raw materials to fuel new production capacity, such that:

- A significant proportion of production capacity was met by clear cutting natural tropical forests both legally and illegally. Clear cutting natural forests even legally is a strategy which not only gives rise to significant social and environmental impacts, but which also result in serious damage to the company's reputation
- Even with significant investment in plantations, it would be several years before the new capacity could be supplied by sustainable plantations. In the meantime, APP likely incurred further costs by buying in raw materials or sourcing materials from natural forests. It is unclear how much the shortfall in meeting capacity contributed to APP's financial problems; however, it is worth bearing in mind that wood fibre reportedly accounts for about 60 percent of Indah Kiat's costs
- The legality of some of APP's wood supply was questionable. Indah Kiat was prosecuted for utilizing illegal timber
- Land-take for APP plantations, suppliers logging practices and the impacts of APP's pulp paper mills affected local communities causing community unrest and social conflict and, in some instances, successful legal action against the company

Although APP now has a sustainability action plan, the company continues to be embroiled in controversy regarding these very same issues. Notably, the feasibility of the plan has been subject to criticism by industry experts. In April 2005, a subsidiary of APP commenced operations of its new pulp mill in Hainan, China, constructed with investment of 9.5 billion yuan (US\$1.15 billion). The mill, with an annual capacity of 1 million tons of pulp, is reportedly the largest of its kind in China. Concerns are being raised over the sourcing of the requisite raw materials to feed such large capacity. In parallel, APP's logging activities in Yunnan Province, China, have been the subject of legal action with the State Forestry Administration taking official action. In addition, there have been protests boycotting APP's products.

In 2004, research by WWF Indonesia⁹ indicated that in 2003, APP's Indonesian pulp mill consumed in excess of 4,000,000m³ of illegal timber authorized from land clearing permits licensed by district governments without the appropriate provincial authorization. This amounted to 47% of Indah Kiat's timber consumption.

CHINA IS RESHAPING ASIAN AND GLOBAL DEMAND

Companies face potential raw material deficits

The question of both global and regional raw materials supply is crucial and companies may face potential raw material deficits as production capacities rise across the region. Between 1996 and 2003, growth in pulp production capacity in Asia represented over 65% of global growth with Indonesia and China responsible for much of this. Indeed, one of the most striking factors is shaping the outlook for the pulp, paper and timber sector in Asia is China's increasing demand for wood products and its importance as a producer, consumer and trading partner.

Recent research on China's pulp and paper sector by He and Barr¹⁰ provides medium-term forecasts covering the period 2003-2010 indicating that, for paper and paperboard, aggregate demand is predicted to increase by as much as 42%, with a commensurate increase in domestic production. Demand is expected to increase most significantly for printing and writing paper, as well as containerboard, which rely on virgin wood fibre more than the other grades. China alone is expected to account for over 30% of growth in global paper and paperboard consumption.

He and Barr also predict rising demand for fibre furnish, with aggregate demand estimated to increase by as much as 48% with an upper estimate of 62%. In terms of individual contributors, wood pulp demand is estimated to increase by as much as 65%, with domestic production expected to account for 50% of the growth, the remainder coming from imports. Recovered paper demand is predicted to increase by 80%, with domestic collection of recycled paper expected to account for 50% of this demand growth.

Against this background of increasing demand for paper, paperboard and fibre furnish, non-wood pulp is expected to decrease by 15%. Notably, in recent years the PRC Government has closed down many highly polluting non-wood pulp mills. However, indications are that technological developments in chemical recovery may be able to address some of the pollution problems associated with non-wood pulp production.

Figure 11 Definition of Raw Materials

Paper and paperboard includes newsprint, printing and writing paper, tissue, containerboard, boxboard

Fibre furnish includes wood pulp, non-wood pulp, recovered paper

Non-wood pulp includes bamboo, bagasse, reeds, wheatstraw

Note: Timberwood vs pulpwood production — timber production relies on felling of old growth forests for the most prized logs. Pulpwood production relies on harvesting large monoculture farms of fast-growing species. Market pulp — pulp produced for sale on the market as opposed to pulp produced to supply an integrated paper mill.

As He and Barr point out, these estimates imply increasing pressure on domestic wood supplies and the need for increased imports as well as significant new domestic capacity. Due to the requisite land and infrastructure requirements, the latter is expected to result in the establishment of green field mills in addition to capacity expansion. Due diligence by the financial community on a range of issues such as water availability, land tenure, supporting infrastructure and labour supply, will therefore be essential in assessing whether companies can meet growth forecasts at acceptable costs.

To meet its growing demand, China is in the midst of an aggressive programme to develop the pulp, paper and timber sector. In its tenth 5 year plan covering the period 2001-2005, the Chinese government stated its intention to prioritise pulp and paper capacity expansion with a focus on the south eastern provinces. In 2001, the State Development and Planning Commission issued a list of 42 priority pulp-paper projects for the integration of fibre supply, wood pulp production and high-grade paper production¹¹.

China is in the midst of an aggressive programme to develop the pulp, paper and timber sector

In an attempt to fuel the requisite investment and fund the new and expanding capacity, the Central Government's intention, as with other sectors, is to invite foreign investment. Such investment is being invited to fund a forestation and paper making program that is expected to involve Yuan 200 billion (US\$ 24 billion). The authorities will reportedly allow qualified paper making companies to float shares on the stock market and will encourage the merger, joint ventures and regrouping of state-owned enterprises with private and foreign investors. Capital to fuel this development is proving to be relatively low cost, with the Government providing a range of financial subsidies and tax incentives to potential financiers and investors.

Asian companies, both listed and non-listed, that are known to be investing in China are provided in figure 12. These companies are inevitably susceptible to the risk of raw material deficits and the associated sustainability issues.

The increasing demand for recovered paper may provide some short term opportunities for venture capital investors, particularly in relation to China where such recycled fibre is already in high demand and expected to rise, and where collection systems are currently insufficient to maximise paper recovery. However, it is worth bearing in mind that as estimated by He and Barr, recovered paper is likely to account for as much as three quarters of the new growth in China's overall fibre demand from 2003 to 2010 and this is likely to have "a profound effect" on the global market. Industry experts in this area reportedly believe that ultimately China will be unable to satisfy its demand for recovered paper from imports as well as its domestic market. The end result being to potentially drive up world prices of recovered paper, possibly pushing the balance back in favour of wood pulp. The opportunities to be gained from use of recovered paper therefore remains an area for further research.

Figure 12 Examples of Pulp/Paper Capacity Expansion Projects in China (US\$ millions)

Company	Capacity 1000 t/a	Pulp/paper Grade	Location	Timing
Asian Listed Companies				
Lee & Man Paper Manufacturing	250	Unbleached testliner	Jiangsu	2004
	350	Recycled	Jiangsu	2004
	400	Testliner	Guangdong	2005
Shandong Chenming	400	Folding boxboard	Shandong	2005
Shandong Huatai	450	Newsprint	Shandong	2005
Yuen Foong Yu Paper	500	Testliner	Jiangsu	na
	500	Testliner	na	na
Yueyang Paper	300	Folding boxboard	Hunan	na
Total	3,150			
APP and APRIL				
APP Hainan Jinhai pulp	1000	Bleached hardwood	Hainan	2005
APP Ningxing Zhonghua	700	Pulp duplex board	Zhejiang	2004
APP Gold East paper	700	Coated wood free	Jiangsu	2005/200
APRIL	400	Uncoated wood free	Guangdong	2006/200
APRIL	1000	Hardwood	Shandong	na
Total	3,800			
Other: non listed companies and/or international companies	6,780			
Total	13,730			

Note: In addition, Chung Wha Pulp & Paper and Shinmoorim Paper are also reported to be involved in expansion projects in China.

na - not available

Source of data: Jaako Poyry Consulting, Presentation in Beijing, September 2004

Shandong Chenming in its Annual Report 2004 indicates that its work for 2005 will include:

"Building a network of production bases and purchasing process. Establish wood supplying base by means of joint venture, to establish an integrated wood, pulp, paper production chain"

On the international front, examples of key industry players which have recently invested in, or are assessing the feasibility of Chinese ventures include some of the biggest names in the sector such as Stora Enso, International Paper, Oji Paper, UPM Kymmene Corp. Notably, at the end of 2004, UPM withdrew from a proposed plantation joint venture in China reportedly because of local conditions including the overall availability of wood in the region and the cost of wood¹².

As a result, China's pulp, paper and timber sector is in transition from an industry characterized by a large number of small polluting non-wood pulp mills to one depending on large capacity and capital intensive wood pulp mills built

to international standards. The development of Bleached Kraft Pulp (BKP) capacity, however, is constrained by limited supply of local raw materials since it requires high quality raw materials from plantations. There is also likely to be an increase in mechanical pulp mills which use smaller diameter lower quality wood, have a higher fibre yield, use less wood, and are smaller in scale than chemical pulp mills.

China's pulp, paper and timber sector is in transition from a large number of small polluting non-wood pulp mills to large capacity and capital intensive wood pulp mills

The nature as well as the extent of pulp and paper capacity expansion projects taking place, particularly in Southern China, is a cause for concern. Projects are being planned and executed on what would appear to be a fast track basis, often within the same locality and without sufficient feasibility studies. There is a very real risk that China's forest resources will be insufficient to meet forecast demands in the region. Industry estimates indicate this situation could persist for the next 20 years, despite the central Government's ambitious plans on plantation development.

Without a sustainable supply of raw materials to fuel China's expanding pulp, paper and timber sector, operations will likely be increasingly dependant on relatively higher cost imports from countries such as Russia, Indonesia, Thailand and Myanmar, where illegal logging is also pervasive and sustainable forestry management is not widely practiced. The question of wood shortages in China remains a subject of much debate within the industry and a fibre shortage seems likely.

The question of wood shortages in China remains a subject of much debate within the industry and a fibre shortage seems likely

This situation has significant implications concerning the associated sustainability risks. For Asian investors, this scenario inevitably places a higher priority on raw materials supply and the development of sustainable fibre strategies. In terms of attracting finance, an integrated mill is more likely to attract investment than a non integrated mill, which may have difficulty in securing raw material supplies.

Suitable plantation land is a scarce resource

It is expected that wood fibre to meet forecast pulp capacity in China will be sourced almost exclusively from plantations. Indeed, one of six main programmes for the State Forest Administration in China is guiding extensive plantation development, which includes significant plans for the south eastern provinces.

As an alternative to clear felling natural forests, the expansion of sustainably managed fast growth high yield plantations (FGHY) plantations can be beneficial. Advocates maintain that such plantations reduce pressure on existing natural forest resources and assist in meeting capacity requirements as a result of high yield short rotations, thus placing less reliance on buying in raw materials in a costly market.

When planned and managed properly, such plantations can arguably prevent soil erosion and flooding and offset CO₂ emissions. On the other hand, it is argued that fast growing species such as Acacia and Eucalyptus can significantly lower the water table and deplete the soil of nutrients. There is also a risk in

countries, where legal enforcement and political institutions are weak that natural forest is purposely cleared for plantations and or illegitimately claimed as being degraded and therefore open to clearance for plantation establishment.

Based on estimates of known current projects/plans in South China as at the end of 2004, as presented by Barr and Cossalter, projected pulp capacity could, if all plans go ahead, be in the region of 5,500,000 tonnes per annum for the medium to long term. Based on a scenario of a relatively low Mean Annual Increment (MAI) figure of 12-18 m³/ha/yr, reflecting the generally poor soil conditions of eucalyptus plantations in most parts of coastal Guangxi and Hainan, the net plantation area requires ranges between 2.3 to 1.5 million hectares.

Recognising that yields are highly variable, such that higher quality plantations can achieve yields more in the region of MAIs 25-30 m³/ha/yr and assuming a higher percentage of the cut i.e. 95% available for commercial use, an alternative scenario developed for this paper estimates a net plantation area of between 800,000 and 960,000 hectares. However, it should be borne in mind that such yields reportedly represent less than 20% of the total area planted in Guangdong¹³.

The land required for plantations to accommodate these scenarios, regardless, is substantial. The two scenarios also highlight the challenge to investors in ascertaining data where there is a high degree of variability such as site specificity and where there are few reliable benchmarks.

Figure 13a Projection of Plantation Area Required to Meet Increased Pulp Capacity — Scenario 1: lower MAI, lower commercial volume

Capacity Pulp	Required Wood	Net Plantation Area Required		
		MAI – 12 m ³ /ha/yr	MAI - 15 m ³ /ha/yr	MAI - 18 m ³ /ha/yr
adt/yr	M ³			
5,500,000	<u>22,825,000</u>	2,376,000	1,902,000	1,584,000

Assumptions: wood required is based on the assumption that 4.15m³ of roundwood is needed to produce 1.0 Adt of Bleached Hardwood Kraft Pulp (BHKP). Net plantation area is based on the assumption that plantations are managed on a 5 year rotation and 20% of harvested volume is not commercial.

Adt - air dried tonnes , MAI – Mean Annual Increment

Source: Data reproduced from Barr and Cossalter, 2004

Figure 13b Projection of Plantation Area Required to Meet Increased Pulp Capacity —Scenario 2: increased MAI, increased commercial volume

Capacity Pulp	Required Wood	Net Plantation Area Required	
adt/yr	M ³	$\frac{\text{MAI} - 25}{\text{m}^3/\text{ha/yr}}$	$\frac{\text{MAI} - 30}{\text{m}^3/\text{ha/yr}}$
5,500,000	22,825,000	961,202	800,931

Assumptions: wood required is based on the assumption that 4.15m³ of roundwood is needed to produce 1.0 Adt of Bleached Hardwood Kraft Pulp (BHKP) (base on Barr and Cossalter, 2004). Net Plantation area is based on the assumption that plantations are managed on a 5 year rotation and 5% of harvested volume is not commercial.

Adt - air dried tonnes , MAI – Mean Annual Increment

Source: ASrIA, 2005

Despite the Government's plans for plantation development, there are currently no widely accepted and accurate estimates of land availability. Indeed, recent research by Bull and Nilsson¹⁴ indicate discrepancies between Government and independent research statistics on resource availability. There are also conflicting reports as to the ability of China's forest resources to meet competing demands for wood, including wood for fuel, protection of biodiversity and for water catchment purposes. Waste land, community and farm land is expected to be the main resource for the wood products industry, which in itself raises a number of risk factors concerning the cost effectiveness of securing the requisite resource base and potential social conflict. Furthermore, the piecemeal and fragmented nature of China's plantation base, as well as hilly topography and inadequate supporting infrastructure, raise further questions over the establishment of cost-effective commercial plantations of the kind required by the pulp, paper and timber industry.

Detailed research by Barr and Cossalter¹⁵ into the plantation base for two significant integrated pulp/paper projects in China (APP Hainan and the UPM Fuxing Mill¹⁶ in Zhanjiang) indicate that pulpwood deficits are a real issue for companies seeking to develop capacity in China's south eastern provinces.

Major producers elsewhere in the region have also failed to achieve their targeted fibre yields from plantations, with the result of having by necessity to source wood elsewhere and extend the planned time period to meet the requisite yields. This has reportedly been a problem for Indonesian producers such as Indah Kiat, Wira Katva Sakti and APRIL.

On reviewing recent research into the development of plantations in China, we see a number of material risks associated with large scale plantations, including¹⁷:

- low soil fertility
- excessive use of high performing clones giving rise to lack of diversity and increased susceptibility to pests and disease

- loss of production through typhoon damage. The effects of typhoons is considered by some industry experts to be potentially significant and under evaluated
- potential over-harvesting and illegal logging as indicated by discrepancies in removal statistics
- lack of sufficiently robust data on forest growth and resources

The issues related to raw material supplies are significant for all companies operating in the region. However, those companies which are expanding capacity rapidly in China, particularly the south eastern provinces, are at most risk of raw material deficits and legal wood issues, given the uncertainty over forest resources and the constraints to establishing commercial plantations.

Pulpwood deficits are a real issue for companies in China's south eastern provinces

We see fibre supply developing as a crucial issue for investors and funders. While in the past, investors were encouraged to look only at high growth demand drivers, fibre supply constraints have the potential to undermine margins for less capable operators. As correct assessment of raw material supplies is a key determinant of earnings growth, failure to obtain sufficient and consistent supplies is therefore likely to lead to share price correction. Companies with their own plantations will arguably be in a stronger position than those who buy in pulp should the shortage in raw material supply be realized. An important issue from an investors' perspective is, therefore, a company's decision as to whether it leases timberland for the longer term or buys from private suppliers. The ability of plantation yields to meet mill production capacities in this context requires careful examination.

If projects being executed and planned over the period 2004-2008 are completed, projections of increasing market pulp capacity alone suggest a possible 20-25% rise in global capacity. A significant portion of this production capacity is coming on line and being planned in Asia, most notably in China. However, there is increasing pressure on forests resources in the region to meet competing demands, due to a combination of log bans such as those in China, reduced concessions and reduced harvesting, particularly in Malaysia and Indonesia.

GOOD PRACTICE STANDARDS ARE SHAPING THE COMPETITIVE ENVIRONMENT

Sustainable forest management standards are becoming the sector's de facto enforcement tool

Given the complex regulatory environment and operating risks facing the sector, sustainable forest management (SFM) standards and certification schemes are emerging as the primary mechanisms whereby pulp, paper and timber companies can demonstrate effective management of sustainability risks. The industry's customer base is slowly but surely demanding that wood products are from legal and sustainably managed sources. In addition, the requirements of finance institutions and prominent buyers, including both the public and private sectors, is driving the demand for SFM schemes. Whilst this development is clearly beneficial in terms of reducing sustainability risks, it can be confusing to investors since numerous standards now exist. Such standards include:

The industry's customer base is demanding timber and wood products from legal and sustainably managed sources

- global schemes such as the Forest Stewardship Council (FSC) Certification Scheme
- national schemes such as Indonesia's standard developed by Lembaga Ekolabel Indonesia (LEI) and the Malaysian Timber Council's Timber Certification Scheme
- regional schemes such as the Sustainable Forestry Initiative (SFI)
- individual company schemes often developed with reference to the elements of other schemes such as FSC

"The multiplicity of forest certification systems is impractical for us, and confusing to our customers. We are therefore working to encourage the mutual recognition of different forest certification schemes"

Stora Enso Annual Report, 2004

Although currently no one scheme is being universally adopted by companies in Asia, the FSC scheme is growing in recognition internationally. In response to the proliferation of schemes, WWF and the World Bank have formed an alliance which recognizes 11 essential criteria for certification schemes¹⁸. The Alliance further aims to have 200 million hectares of the world's production forests independently certified by the end of 2005, however, it would appear that only 10% of this original target will be reached within this timeframe.

The United Nations Economic Commission for Europe (UNECE)¹⁹ estimates that certified forests, largely plantations, represent less than 6.5% of the total extent of forests globally, with the majority being in Europe and North America.

Figure 14 Sustainable Forest Management Certification Schemes — FSC Certification

The most recognized of the various schemes is the Forest Stewardship Council's (FSC) Forest Management (FM) and Chain of Custody (COC) Schemes which are generally considered to contain all necessary elements for ensuring responsible forest management. FSC certification provides third party verification by an accredited certification body that a company is managing its forestry operations in line with FSC's internationally recognised standards. The COC certification provides a further guarantee, in relation to the production of FSC-certified products, that the integrity of the wood from certified forests is maintained throughout the processing chain.

Ten principles are the basis of FSC forest management standards:-

- | | |
|--|--|
| <ul style="list-style-type: none"> Compliance with Laws and FSC Principles Tenure and Use Rights and Responsibilities Indigenous People's Rights Community Relations and Workers' Rights Benefits from the Forest | <ul style="list-style-type: none"> Environmental Impact Management Plan Monitoring and Assessment Maintenance of High Value Forests Plantations |
|--|--|

The majority of wood entering pulp/ paper mills in the Asia Pacific region is not certified

Not surprisingly, the majority of wood entering pulp and paper mills in the Asia Pacific region is not certified, and Asia's contribution to FSC certification globally is just 1% of the 53 million hectares certified globally. However, some companies in the region are aligning themselves with the requirements of schemes such as FSC and LEI. To date, none of the larger listed Asian companies had FSC or LEI certification for their operations, although some are reportedly working towards it.

Another important trend in the sector is the increasing use of COC to provide verification of the legality of wood. UNECE estimate in their 2004-2005 Forest Product Annual Market Review that COC certificates increased by 30% from the previous year, reaching a total of 6000 certificates issued by FSC and PEFC. China is reported to have the highest volume of COCs outside UNECE and is now producing certified products for export , mainly to North America and Europe.

As well as certification schemes which are beginning to influence the sector, there are also other initiatives designed to address the issue of sustainable forest management e.g. the Forests Dialogue (TFD) and those involving forest trade networks, such as the Global Forest Trade Network (GFTN). GFTN is a WWF initiative which is focused on "eliminating illegal logging and improving the management of valuable and threatened forests", through the development of trade links between companies concerned about sustainable forestry. Supporters currently include the Tropical Forest Trust (TFT), Lembaga Tropika Indonesia (LATIN), Smartwood, SGS Qualifor, The Nature Conservancy (TNC), GTZ Sustainable Forest Management Project, the European Union Forest Liaison Bureau, Tropical Forest Foundation (TFF), and Center for International Forestry Research (CIFOR), Lembaga Ekolabel Indonesia (LEI), Forest Stewardship Council (FSC) and ProForestIn the Asia Pacific region.

Some of the world's largest paper companies, as well as retailers of wood products, support certification schemes. International Paper, Georgia-Pacific and Weyerhaeuser all state a commitment to sustainable forestry by supporting the Sustainable Forestry Initiative (SFI), and Stora Enso is committed to maximising wood sourced from certified forests. For producers, certification is increasingly about market access. Moreover, access to capital is increasingly influenced by forest certification. Finance institutions which either consider or require FSC or similar certification schemes and management initiatives as part of forest sector investment policies include IFC, HSBC, ABN Amro, JP Morgan Chase and Rabobank.

For producers, certification is increasingly about market access

For customers, there is increasing interest in sustainable wood as a result of consumer demand in both private and public sectors. The Swedish retailer IKEA supports FSC certification and through its Staircase Model requires suppliers to progressively achieve certification. Home Depot gives preference to the purchase of wood and wood products originating from certified forests wherever feasible, and B&Q has recently committed its key stores to COC certification. Purchasing certified products is increasingly being seen as an effective risk management tool.

In Asia, the market place is not driven by certified products as it is in developed countries. However, international consumer demand is a potential driver. The fact that prominent international buyers sourcing wood from Asia are requiring sustainable forest management provides an indication that certification is likely to increase in importance in Asian markets.

Figure 15 Example of Asian Companies

APRIL	Planning for LEI certification for 159,000 hectares of its fibre plantations in Indonesia, with final certification in the first half of 2005.
Barito Pacific	Certifying its forestry operations through audits undertaken by Independent Assessment Institutions (IAI) which meet FSC and LEI requirements. Anticipates increasing demand from international markets for labelled products.

In addition to these industry focused schemes, there are also the more process-related standards ISO 14001:2004 Environmental management standard²⁰, OHSAS 18001 Occupational Health and Safety²¹ and the Social Accountability Standard SA 8000. It is extremely common place for companies in the sector, including Asian listed companies, to be ISO 14001 certified. However, investors should bear in mind that certification does not guarantee an absolute level of environmental performance, nor that material sustainability risks are being managed.

From an investor's perspective, on a medium-term view the emergence of market driven standards and certification schemes have the potential to become a key strategic tool. As global customers become more focused on sustainable supply, there will be a meaningful opportunity for those suppliers who can deliver certified pulp and timber. Investors should view certification to ISO 14001, OHSAS 18000 and SA 8000 as a starting point for further analysis and not the end point²².

THE LONGER TERM : EMERGING RISKS AND OPPORTUNITIES

Two crucial investment drivers

Two emerging investment issues with positive and negative implications over the longer term are new technology and carbon management and sequestration.

Research and development of new technology As pressures on raw materials supply in the region are expected at least for the medium term, companies are, as a matter of strategic development, responding by implementing research programmes to increase plantation yields. In particular, many companies are undertaking R&D into the use of clones. Whilst this has obvious benefits from a business perspective, there are also significant risks. In China for example, recent research by Barr and Cossalter has raised concerns over the lack of genetic diversity in large scale plantations in Western Guangdong, as the expansion of eucalyptus plantations has not been supported by the ongoing selection of new and superior clones such that "The new clonal eucalyptus plantations of western Guangdong lack the minimum threshold of diversity that would place the risks of pest disease at a reasonable or acceptable level."

The literature points to the fact that despite extensive research, 90% of plantations in the province consist of only three clones. More worryingly, it further highlights a new disease in the region which has recently caused concern amongst plantation managers.

The risk to companies involved in plantation establishment is further heightened by the interest of NGO activist groups regarding the use of genetically modified organisms. This is a highly emotive subject and raises ethical issues which are highlighted by the role forests play in ecosystems and their importance to local livelihoods. The lack of reliable baseline data on forest resources and COC issues further heighten the potential risk to such companies should problems related to genetic diversity in Chinese plantations occur.

Figure 16 Examples of R&D

Advance Agro	A genetic engineering research programme in the development of fast growth trees
APP	Targeting to reach a Mean Annual Increment (MAI) of 70m ³ /ha/year for its industrial plantations. Although such a figure is regarded by some industry experts as being extremely optimistic
APRIL	Genetic deployment department established to manage the deployment of genetic materials in plantations
Ballarpur	Identification and production of high yielding clones
Jaya Tiasa	Developing new hybrids for site adaptability

In addition to this research, there are increasing opportunities for new technologies that are less reliant on wood fibre, particularly tropical hardwood such as:

- rubberwood to be used as an alternative for valuable tropical hardwoods such as ramin, meranti and teak amongst others. Malaysia is, however, currently considering restricting exports to secure supplies for the local market
- the processing of coconut oil into some furniture and household products
- use of bamboo in reconstituted panels and board product as a result of new technologies
- the use of smaller diameter plantation logs for certain products as opposed to larger logs from natural forests
- the use of palm oil and palm oil fibre in mechanical and chemical pulping processes
- substitution between hardwoods and soft woods is also being researched, as a possibility, as technology improves
- new substitutes for finished wood products such as medium density fibreboard, (MDF), oriented strand board (OSB) and particle board are increasingly being used as a more resource effective substitute for plywood, requiring fewer logs per unit volume of product
- Use of straw pulp — work is progressing in advancing technology to address chemical recovery issues which have led to some of the pollution problems associated with the production of straw pulp

As carbon markets develop, there are emerging opportunities for companies to engage in carbon sequestration activities

Carbon management and sequestration — a risk and opportunity As carbon markets develop, there may be emerging opportunities for pulp, paper and timber companies to engage in carbon sequestration projects. These opportunities may present themselves in the form of Clean Development Mechanism (CDM) projects under the Kyoto Protocol, or as independent initiatives by organizations to establish carbon management strategies (this last is most likely in developed countries). Such projects have the potential to provide an additional revenue stream for Asian companies in the sector through payment for sequestered carbon. Given the increasing market demand for sustainable forest management, there is also the opportunity to gain a competitive edge. However it should be recognized that currently there appears to be no universal consensus concerning the management and monitoring of such projects.

Carbon sequestration describes the capture and storage of carbon by soils, forests and the ocean. The term 'carbon sink' refers to the location /reservoir of storage such as forests. Carbon can be sequestered both by planting forests or protecting them. As an example, a strategy for offsetting carbon emissions could be the use of reduced impact logging (RIL) as demonstrated by the Malaysian company Rakyat Berjaya Sdn. Bhd and the New England Power Company of Massachusetts, USA²³. RIL is already encouraged on traditional environmental grounds since its aim is to substantially reduce the damage to the forest incurred in the logging process. However, it is also now recognized as a means of sequestering carbon since it reduces carbon released as a result of damaged/dead biomass. Although RIL is more expensive than conventional logging, the payment for the sequestered carbon is intended to cover these additional costs. Such an initiative thus provides the opportunity to improve sustainable forest management at no extra cost and potentially gain a competitive edge by responding to market demands for such management.

Currently, the extent of potential forestry sequestration projects is unclear and the carbon sequestration market is complex, with many imponderables such as accepted verification methods. Australia has, however, made some progress in this area²⁴. Not surprisingly there is also extremely limited disclosure on carbon related risks and opportunities by the listed companies reviewed. For countries where deforestation is significant such as Indonesia, Thailand and Vietnam, there may also be the potential for increased incremental costs associated with the progressive loss of carbon sinks.

Figure 17 Energy Use, Carbon, and Climate Change is Important to the Pulp, Paper and Timber Sector

- After the burning of fossil fuels, land use change (due largely to deforestation) is a significant cause of increasing carbon in the atmosphere. As carbon sinks, forests have the potential to absorb one tenth of global carbon emissions. Deforestation is estimated to be responsible for the build-up of up 30% of atmospheric carbon globally over the past 150 years and, therefore, conserving forests as well as sequestering carbon through forest projects are important variables in the carbon economy
- Pulp and paper production is energy-intensive; however mills can generate substantial quantities of energy for their own needs through the use of black liquor from kraft pulping and other residues, such as bark as a fuel for cogeneration, providing steam and electricity. Chemical pulp mills can export energy and integrated pulp/paper mills are likely to be substantially self sufficient in heat and power. Paper mills and mechanical and recovered paper processes are net energy users. Notably, energy consumption can vary significantly from company to company
- Forests, and therefore the raw materials of the industry, are themselves vulnerable to the effects of climate change. Impacts of climate change are thought to affect 1,600 million hectares of existing tropical forests

As demands for renewable energy increase, wood fuel is potentially an important source of energy as an alternative to fossil fuel. However, the increase in wood fuel inevitably means the loss of forest land, assuming it is not plantation supplied. Wood fuel currently amounts to 40% of forestry products world wide (including industrial roundwood, sawnwood, wood-based panels, pulp, paper) and 62% in Asia.

Figure 18 The Kyoto Protocol — The Basics

The Kyoto Protocol and the Pulp, Paper and Timber Sector: UNFCCC and the Kyoto protocol have significant implications for the pulp, paper and timber sector. Following its entry into force, developed nations (Annex 1 countries) that have ratified the protocol must adhere to carbon emission reduction targets based on 1990 levels as a baseline. Specifically, changes in carbon stocks through afforestation, deforestation and reforestation are to contribute to meeting commitments. An instrument of Kyoto, the Clean Development Mechanism (CDM), allows such countries to achieve reductions in national emissions through investing in carbon reduction initiatives in developing countries and thereby obtaining credits.

Based on the European Union Directive 2003/87/EC, pulp/paper companies in Europe are covered by the European Union Greenhouse Gas Emission Trading Scheme (EU ETS)

The adoption of new technology, which places less dependency on wood resources and which possibly facilitates additional revenue streams from sequestered carbon, will in the medium to long term potentially provide opportunities for mainstream investors. For integrated pulp and paper companies, investors need to carefully examine the ability of companies to develop cost effective commercial plantations that can yield a sustainable supply of wood. This is crucial to the successful operation of such companies in the sector. In the longer term investors should also be seeking to identify and encourage forward thinking companies which have at least started to strategically address the issue of carbon management.

INVESTOR QUESTIONS FOR COMPANIES

Corporate policy

- What is the source of your raw materials, plantations and/or clear felling for natural forests and / or recovered fibre?
- What strategy is employed to ensure a sustainable supply of raw materials?
- Does your company have a carbon management strategy? How does your company view carbon sequestration?

Regulatory issues

- How does your company keep abreast of the changing regulatory environment and assess regulatory risk?
- How much, if any, timber required for your operations is sourced from certified forests?
- How does your company ensure that timber supplied is from legal sources?
- What are your companies practices and/or intentions regarding Forest Products Certification?
- How does your company address the issue of land tenure?
- How does your company deal with conflicts which may arise as a result of the company's activities?

Operating issues

- What types of research and development does your company engage in?
- How does your company keep track of developments in consumer markets and how does your company respond to ESG consumer trends?

RESOURCES

Company websites

- Advance Agro www.advanceagro.com
- Asia Pacific International Resources Holdings Ltd. www.aprilasia.com/process_products.html
- Asia Pulp and Paper www.asiapulppaper.com
- Ballarpur Industries —Annual Report 2003-2004 www.bilt.com
- Barito Pacific www.ebarito.com
- Hansol Paper www.hansol--paper.com/main.htm
- International Paper www.internationalpaper.com
- Jaya Tiasa www.jayatiasa.net
- Stora Enso www.storaenso.com
- UPM Kymmene Corp. w3.upm-kymmene.com
- Weyerhaeuser www.weyerhaeuser.com

Examples of Sustainability Reporting

- APRIL 2004 Sustainability Report —Moving Forward www.aprilasia.com/news/SR2004_final.pdf
- Ballarpur Industries —Annual Report 2003-2004 www.bilt.com
- Barito Pacific www.ebarito.com
- Hansol Paper Environmental Report 2000 www.hansol--paper.com/2_investment/3_annual_report.htm
- International Paper www.internationalpaper.com/PDF/PDFs%20for%20Papers/sustainability_repor1.pdf
- Shandong Shenming —Annual Report 2004 www.cninfo.com.cn/finalpage/2005-03-29/15151595.PDF
- Stora Enso Sustainability Report 2004 search.storaenso.com/mini/2004/files/pdf/big/SE_SR_GB.pdf
- Siam Kraft —Sustainability Report 2002 www.siamkraft.com/GRI%20Report%202001.pdf
- UPM Kymmene Corp. [w3.upm-kymmene.com/upm/internet/cms/upmcms.nsf/\\$all/68EF26ED0B00CA32C2256F7E0049B07E?OpenDocument&qm=menu,8,0,0](http://w3.upm-kymmene.com/upm/internet/cms/upmcms.nsf/$all/68EF26ED0B00CA32C2256F7E0049B07E?OpenDocument&qm=menu,8,0,0)
- Weyerhaeuser www.weyerhaeuser.com/environment/sustainability/default.asp

Useful web-based resources

- | | |
|--|--|
| • Centre for International Forestry Research (CIFOR) | www.cifor.cgiar.org |
| • Confederation of European Paper Industries
—Comparative Matrix of Certification Schemes | forestandtradeasia.org/files/CEPI_matrix.pdf |
| • Forest Stewardship Council | www.fsc.org/en |
| • International Finance Corporation | www.ifc.org/sustainability |
| • International Tropical Timber Organisation | www.itto.or.jp |
| • Programme for Endorsement of Forest Certification Scheme | www.pefc.org/internet/html |

Papers & further reading

- AF&PA, 2004. *"Illegal Logging and Global Wood Markets: the Competitive Impacts on the US Wood Products Industry"*
- Barr C., Cossalter C., 2004. *"China's Development of Plantation-based Wood Pulp Industry: Government Policies, Financial Incentives and Investment Trends"*. International Forestry Review Vol. 6(3-4), 2004
- Bull G.G., Nilsson S., 2004. *"An Assessment of China's Forest Resources"*. International Forestry Review Vol. 6(3-4), 2004
- Citigroup 2004. *"Pulp, Paper & Forest Products"*. Analyst Research
- FAO 2004. *"State of the World's Forests 2005"*
- He D and Barr C., 2004. *"China's Pulp and Paper Sector: An Analysis of Supply-Demand and Medium Term Projections"*. International Forestry Review Vol. 6(3-4), 2004
- Katsigiris et al 2004. Katsigiris E., Bull G.O., White A., Barr C., Barney K., Bun Y., Kahrl F., King T., Lankin A., Lebedev A., Shearmen P., SheiunGauz A., Yufang Su, Weyerhauser H. *"The China Forest Products Trade: Overview of Asia-Pacific Supplying Countries, Impacts and Implications"*. International Forestry Review Vol. 6(3-4), 2004
- Pulp & Paper 2004. *"China the Final Frontier"*
- Sizer N., Plouvier, D., 2000. *"Increased Investment and Trade by Transnational Logging Companies in Africa, the Caribbean and the Pacific"*
- Spek, M., 2005. *"An Appraisal of Risk Assessment and Safeguard Procedures Applicable to Pulp Mill Investments"*. CIFOR 2005

End notes

- 1 Food and Agricultural Organisation — Forest Plantation Thematic Papers — The Role of Plantations as Substitutes for Natural Forests in Wood Supply. Lessons from The Asian-Pacific Region
- 2 Spek, M, 2005. *"An Appraisal of Risk Assessment and Safeguard Procedures Applicable to Pulp Mill Investments"* CIFOR 2005
- 3 AF&PA, 2004. "Illegal" Logging and Global Wood Markets: the Competitive Impacts on the US Wood Products Industry
- 4 ibid
- 5 WWF Indonesia , January 2004. Legality And Cost Of Timber Consumed By APP's Mills In Indonesia
- 6 WWF Wahli, Jikalauhari, July 2005. Logging Moratorium for Companies with Questionable Industrial Timber Plantation Licenses
- 7 AF&PA, 2004. "Illegal" Logging and Global Wood Markets: the Competitive Impacts on the US Wood Products Industry
- 8 For information on the activities of companies overseas refer to *"Increased Investment and Trade by Transnational Logging Companies in Africa, the Caribbean and the Pacific, Implications for the Sustainable Management and Conservation of Tropical Forests, Nigel Sizer, Dominic Plouvier, WWF, 2000"*
- 9 WWF Indonesia, January 2004. Legality And Cost Of Timber Consumed By APP'S Mills in Indonesia
- 10 International Forestry Review Vol.6(3-4), 2004. China's pulp and paper sector: an analysis of supply-demand and medium term projections
- 11 Cossalter C, Canberra, April 2004
- 12 ibid
- 13 Personnel communication Christian Cossalter, July 2005
- 14 International Forestry Review Vol. 6(3-4), 2004. An Assessment of China's forest resources
- 15 International Forestry Review Vol 6 (3-4), 2004. China's Development of Plantation-based Wood Pulp Industry: Government Policies, Financial Incentives and Investment Trends
- 16 UPM has since pulled out of the venture
- 17 For further information refer to Barr C.and Cossalter C., 2004
- 18 Questionnaire for Assessing the Comprehensiveness of Certification Schemes/System (www.forest-alliance.org)
- 19 Forest Products Annual Market Review, Timber Bulletin Volume LVII (2004), No.3, United Nations Economic Commission for Europe
- 20 ISO 14001: 2004 Environmental management systems —Requirements with guidance for use
- 21 OHSAS 18001 —Occupational Health and Safety Assessment Series Standard
- 22 ASrIA Briefing Note: ISO 14001: 2004 What do Investors Need to Know (www.asria.org/publications)
- 23 A collaborative project with CIFOR (www.cifor.cgiar.org)
- 24 For further information refer to www.forest.nsw.gov.au/env_services/carbon/credits/default.asp

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Sophie le Clue, Associate Director of Association for Sustainable & Responsible Investment in Asia. Sophie has a background in environmental protection. She started her career in the UK in 1989 working for an engineering consultants before moving to Hong Kong, where she has gained 13 years experience in environmental assessment and research in the Asia Pacific region. Her experience includes working on sustainability related issues for both the private sector in a consultant capacity as well as for the non profit sector. For several years she has been involved in sustainable development initiatives in Hong Kong and has been devoting time to furthering the interest and knowledge of sustainability and sustainable development locally through working with corporates, government and business associations, and including specific training to inform finance institutions about environmental and social considerations in project lending.

Sponsored by the International Finance Corporation (IFC) Sustainable Financial Markets Facility

ASrIA wishes to thank the IFC for its sponsorship of the project and the report ***Taking Stock: Adding Sustainability Variables to Asian Sectoral Analysis***. IFC's support has been provided via its Sustainable Financial Markets Facility (SFMF), a multi-donor technical assistance facility established to promote environmentally and socially responsible business practices in the financial sector in emerging markets. The SFMF is currently funded by IFC and the Governments of the Netherlands, Switzerland, Norway, Italy, Luxembourg and the UK. IFC is the private sector arm of the World Bank Group (www.ifc.org).

Editorial team: These reports were prepared by a multi-disciplinary team of Asia-based researchers. Their work benefited from significant peer review from sector specialists and investment professionals. We wish to thank Claire McLetchie for her contribution to the peer review process. From ASrIA, Carissa Chan Siu Wai managed the layout and design while David St. Maur Sheil coordinated the editorial process with support from Sweetea Motwani and Sophie le Clue. Finally, we wish to express our thanks to the IFC for their sponsorship of ***Taking Stock***.

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IFC's financial support to ASrIA for the *Taking Stock* report series is provided via the Corporation's Sustainable Financial Markets Facility (SFMF), a donor-funded technical assistance program focusing on socially and environmentally sustainable business practices in IFC's financial intermediaries and in the emerging market financial sector at large. SFMF in turn benefits from the generous financial support of IFC and the Governments of the Netherlands, Norway, Switzerland, Italy, Luxembourg and the UK.