

INDUSTRY OVERVIEW

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INTRODUCTION

Increasing awareness of climate change has resulted in global efforts to accelerate the promotion of recycling and reusing, which is aimed at reducing the final volumes of waste for disposal. The ultimate objective is to establish a cleaner economy with an efficient use of resources. As an alternative to disposal, waste recovery directly reduces land, water and air pollution. The recycling of recovered waste conserves energy and resources by providing an additional source of secondary raw materials (*recyclates*). Compared with using primary raw materials, using recyclates obviates certain energy-intensive processing steps, thereby directly reducing carbon footprint and energy consumption.

Energy and carbon savings per tonne of product made from recyclates versus primary materials

Product	Type	% reduced of energy	Million British	Equivalent in barrels of oil saved	Tonnes of carbon dioxide reduced/ (increased)
			Thermal Units saved		
Paper	Newsprint	45	20.9	4.0	(0.03)
	Print/Writing	35	20.8	4.0	(0.03)
	Linerboard	26	12.3	2.3	0.07
	Boxboard	26	12.8	2.4	0.04
Aluminium	n/a	95	196.0	37.2	13.80
Glass	n/a	31	4.7	0.9	0.39
Plastic	PET	57	57.9	11.0	0.99
	PE	75	56.7	10.8	0.35
	PP	74	53.6	10.2	1.32
Steel.....	n/a	61	14.3	2.7	1.52

Source: Bureau of International Recycling

On a global basis, paper is the single most abundant source of recyclable solid waste and its proportion to total recyclable solid waste continues to grow. The benefits of recycling waste paper significantly outstrip those from other waste materials, despite its modest per tonne savings rates.

Regulations

The Basel Convention is the most comprehensive agreement aimed at protecting health and saving the planet from the effects of increasing waste. At present, leading economies including the United States, the European Union, Japan and the PRC do not have explicit laws on waste recovery and recycling. Paper and board manufacturers in the PRC prefer to import waste paper from overseas suppliers and limit local sourcing to reliable suppliers with transparent standards. In early 2007, to help regulate the waste paper collection industry, the PRC government released the Waste Paper Recycling Requirements GB 20811-2006, which is a set of standards specifying the standard grades of recovered paper and board.

In Hong Kong, the Environmental Protection Department has established policies and frameworks to publicize, encourage and assist businesses and consumers to engage in recycling of waste. The Policy Framework set by the Hong Kong Government for the Management of Municipal Solid Waste (2005-2014) was presented in December 2005 and is intended to reduce solid waste by 1% per year from 2006 to 2014.

SOLID WASTE MANAGEMENT PRACTICES

Until the 1970s, burial (or landfilling) and incineration were the preferred methods for waste management. Waste management has since developed into a hierarchical approach that aims to prioritize the practice of “3Rs” (reduce, reuse and recycle), and minimize disposal and environmental destruction. Among the 3Rs, recycling offers the most practicable solution to managing waste.

Comparison of waste management practices and options

Practice	Pros	Cons	Comments
3Rs — reduce	<ul style="list-style-type: none">● Direct conservation of resources and energy● Zero waste potential	<ul style="list-style-type: none">● Re-engineering of manufacturing and product design required	<ul style="list-style-type: none">● Very limited application
3Rs — recover and recycle	<ul style="list-style-type: none">● Direct reduction of waste quantity for disposal● Conservation of natural resources● Indirectly recapture energy content by recycling part-processed materials● Potential carbon credit eligibility	<ul style="list-style-type: none">● Careful planning and management is required to sort each material by type and grade● Recovery is labor intensive	<ul style="list-style-type: none">● Well developed techniques developed over three decades and still innovating● Manufacturers well adapted to using recovered materials● Market acceptance for recycled products
3Rs — reuse	<ul style="list-style-type: none">● Simple process	<ul style="list-style-type: none">● Few products can be reused● Hygiene factor● Product redesign	<ul style="list-style-type: none">● Zero waste concept will drive more innovations but premature to have significant impact
Disposal — Incineration	<ul style="list-style-type: none">● Energy recovery● Complete destruction of many hazardous wastes● Significant reduction of waste volume	<ul style="list-style-type: none">● Emission of toxic compounds like dioxin● Flue-gas scrubbing and fly-ash treatment are costly	<ul style="list-style-type: none">● Some countries like China continue to offer incentives for incinerator investments● Costs US\$120-250 per tonne
Disposal — Land filling	<ul style="list-style-type: none">● Relatively cost effective● Flexible to accommodate huge quantities and variety of wastes● Land reclamation capable	<ul style="list-style-type: none">● Costlier to operate to a high standard● Ground water pollution● Land-use intensive, particularly in urban areas● Lengthy rehabilitation after closure	<ul style="list-style-type: none">● Nearly all governments are discouraging land filling by making it cumbersome and costly● Costs US\$20-50 per tonne

Due to economic growth and rising affluence, municipal waste has increased more rapidly than population growth in many countries in recent years. The composition of municipal solid waste varies from country to country, but typically, paper waste represents the single highest weight-percentage of the recyclable contents. The high quantity of paper waste generation makes it a prioritized recovery stream.

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Municipal solid waste composition in Asia, America and Europe

Region (% by weight)	Food waste	Paper/ cardboard	Wood	Textiles	Rubber/ leather	Plastic	Metal	Glass	Other
Asia									
Eastern Asia	26.2	18.8	3.5	3.5	1.0	14.3	2.7	3.1	7.4
South-Central Asia	40.3	11.3	7.9	2.5	0.8	6.4	3.8	3.5	21.9
South-Eastern Asia	43.5	12.9	9.9	2.7	0.9	7.2	3.3	4.0	16.3
Western Asia & Middle East	41.1	18.0	9.8	2.9	0.6	6.3	1.3	2.2	5.4
America									
North America	33.9	23.2	6.2	3.9	1.4	8.5	4.6	6.5	9.8
Central America	43.8	13.7	13.5	2.6	1.8	6.7	2.6	3.7	12.3
South America.....	44.9	17.1	4.7	2.6	0.7	10.8	2.9	3.3	13.0
Caribbean	46.9	17.0	2.4	5.1	1.9	9.9	5.0	5.7	3.5
Europe									
Eastern Europe.....	30.1	21.8	7.5	4.7	1.4	6.2	3.6	10.0	14.6
Northern Europe.....	23.8	30.6	10.0	2.0	n/a	13.0	7.0	8.0	n/a
Southern Europe	36.9	17.0	10.6	n/a	n/a	n/a	n/a	n/a	n/a
Western Europe.....	24.2	27.5	11.0	n/a	n/a	n/a	n/a	n/a	n/a

Source: International Panel on Climate Change — 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Notes:

- (1) Municipal waste includes all waste collected within a community and includes waste from households, commerce, businesses and some light industries.
- (2) Data is based on weight of wet waste of municipal solid waste without industrial waste at generation around year 2000.
- (3) The region-specific values are calculated from national, partly incomplete composition data. The percentages given may therefore not add up to 100%. Some regions may not have data for some waste types.

Waste Paper Recovery Industry Value Chain

Waste paper comes in different types and grades depending on the recovery source. The basic “upstream” recovery steps from collection to storage are primarily to decontaminate and sort to increase or raise material-type purity. The upstream industry is largely fragmented and consists of fully integrated players involved in the entire recovery-to-recycling chain. The downstream recycling and processing steps involve the conversion of pulp into new paper products, where the Chinese paper market consists of major paper mill customers with relatively few vertically integrated mills.

Upstream processes dictate the segregation and grading of material to provide the right specifications to downstream recycling mills. Upstream sorting and segregation play an important role in maximizing the efficiency of the recycling process, starting from an efficient collection and separation of waste paper by grades and types. While upstream steps are labor intensive and demand manual sorting, downstream recycling plants are capital and technology intensive. Upstream markets tend to be polarized with a few dominant (mainly vertically-integrated players) operators.

Vertical integration offers finer segregation control to optimize efficiency. Integrated operations offer significant benefits, avoiding double-handling of wastes and allowing optimization of upstream steps. Additional integration into waste management services could add further benefits to the waste source, designing a collection system to increase pre-sorting or finer separation of waste paper types.

Increasing waste recovery demands greater high-grading recovered paper. The trend of increasing recovery utilization, collecting a greater portion of paper and packaging waste, is likely to result in a corresponding decline in quality, particularly in terms of contamination and type selectivity. Waste management services will play an increasingly important role in high-grading and narrowing the selectivity of recovered material by modifying and even redesigning collection practices in order to enhance the quality. For a fully integrated operation with waste management services, having the ability to tailor collection will have a direct impact on competitiveness through potential standardization across multiple sources, reduction of upstream operating costs and processing overheads.

PRC AND HONG KONG ECONOMY OVERVIEW

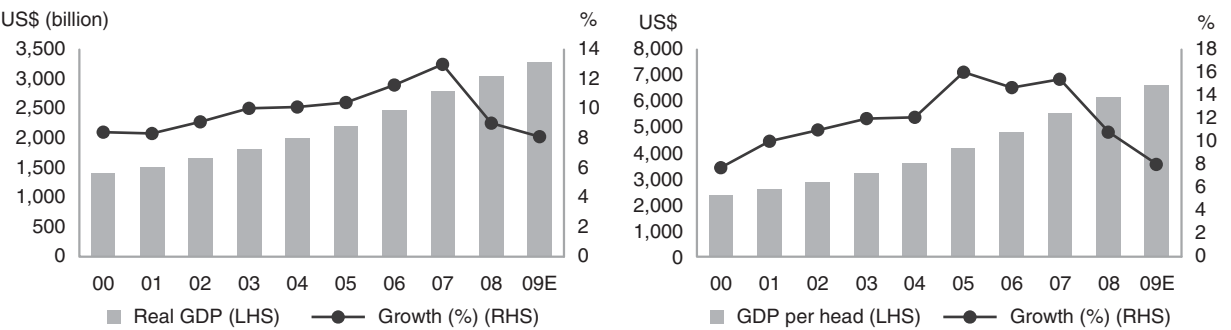
PRC

The PRC economy has been one of the fastest growing in the world over the last 10 years. According to EIU estimates, PRC real GDP per capita grew at an CAGR of 10.2% over the past eight years (2000-2008). Economic growth slowed slightly in 2008 to 9% but is expected to continue on a strong positive growth trajectory with real GDP growth in 2009 expected to reach 8.1%.

The rapid economic growth and growth in private consumption has brought a rise in living standards and purchasing power of the consumer. According to EIU estimates, private consumption per capita for 2008 was US\$1,174 and is expected to rise to US\$1,290 in 2009, representing a rise of 9.9% year on year. According to EIU, as of 2008, the PRC has a population of over 1.3 billion and per capita income in the PRC rose from US\$2,353 in 2000 to US\$6,140 in 2008, a CAGR of 13%. This rapid growth in per capita income will place the PRC as one of the largest consumer markets in the world.

The PRC has also established its presence as a manufacturing and export center of the world, with total exports growing at a CAGR of 25% in the period from 2000-2008. Due to the global economic downturn, the PRC is expected in 2009 to post its first decline in exports in over a decade but according to EIU, the trend is expected to reverse as the economy recovers.

The PRC’s Real GDP and GDP per capita

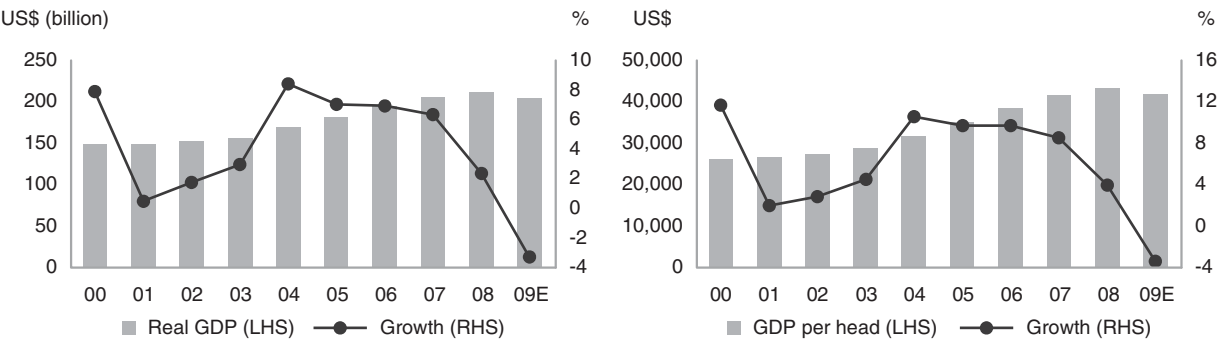


Source: EIU

Hong Kong

The Hong Kong economy grew at a CAGR of 4.5% for the 2000-2008 period. The Hong Kong economy is significantly more developed as compared to the PRC. For 2008, Hong Kong had a GDP per capita income of US\$43,710 as opposed to the PRC which had a GDP per capita of US\$6,140. Private consumption in Hong Kong has also grown steadily albeit at a slower pace compared to the PRC. The economy grew at a CAGR of 3.2% for the period 2000-2008. The Hong Kong economy is highly dependent on entrepot trade. For 2008, the total value of exports from Hong Kong was US\$365 billion and the sector has experienced a CAGR of 7.6% over the 2000-2008 period.

Hong Kong’s Real GDP and GDP per capita



Source: EIU

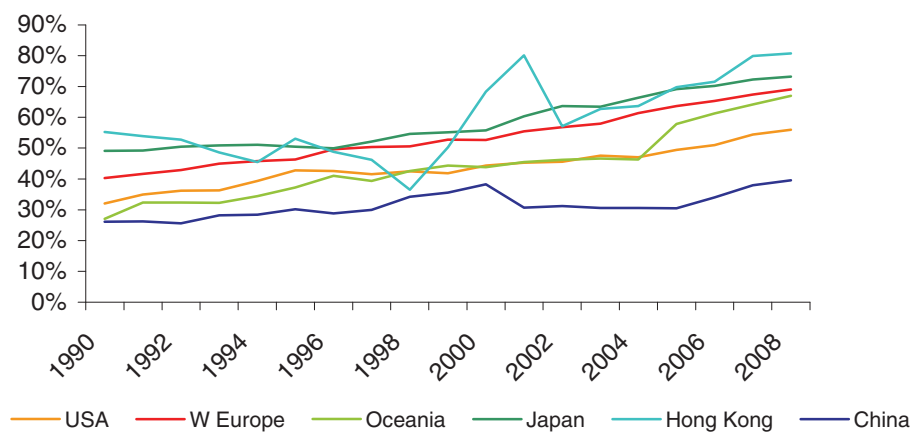
WASTE PAPER RECOVERY INDUSTRY

Paper is the largest and fastest growing portion of waste streams and is the major target for recovery and recycling. This economic bias towards waste paper recovery has gained more attention with the increasing importance placed on conservation and climate change agenda. Driven by a growing demand for paper and boards, there is now a greater appetite for secondary fibers from waste paper, with an increasing demand in seeking more virgin pulp substitutes to reduce raw material costs.

Global Supply and Demand of Recovered Waste Paper

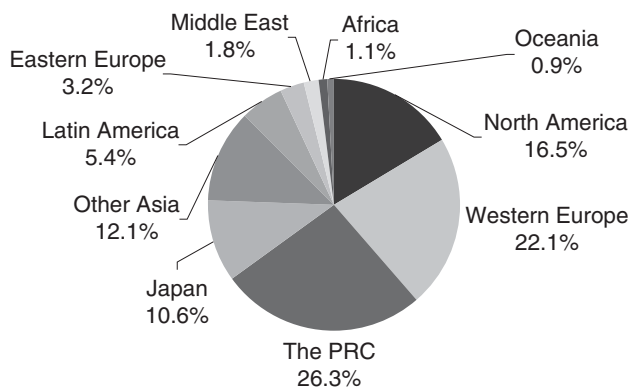
Efforts by governments around the world to minimize the use of landfills and incinerators have resulted in increasing ecologically motivated policies and regulations which have driven up costs for landfill and incineration methods. The costs and environmental factors have thus led to a bias towards waste paper recovery globally as waste paper recovery become more cost effective.

Increasing supply from rising waste recovery rates



According to RISI, the PRC paper industry is 54% dependent on waste paper imported from the US, Europe and Asia. The PRC consumed 26% of the world’s waste paper supply in 2008, outstripping the second and third largest waste paper consumption regions, being Western Europe and North America. On the other hand, Hong Kong, lacking its own paper mills, exported more than 96% of its recovered waste paper to the PRC in 2007.

Global consumption of recovered waste paper in 2008



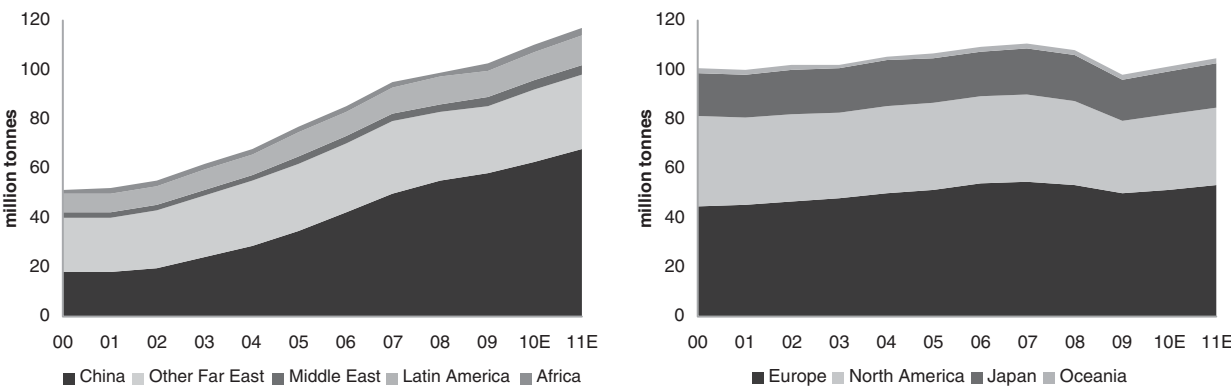
Source: RISI

Note:

(1) 26% of the world’s recovered waste paper in 2008 (211 million tonnes) was consumed by the PRC.

Regionally, significant imbalances of supply and demand exist for waste paper, resulting in exports by countries with surpluses and imports by countries with deficits.

Historical and projected recovered waste paper usage



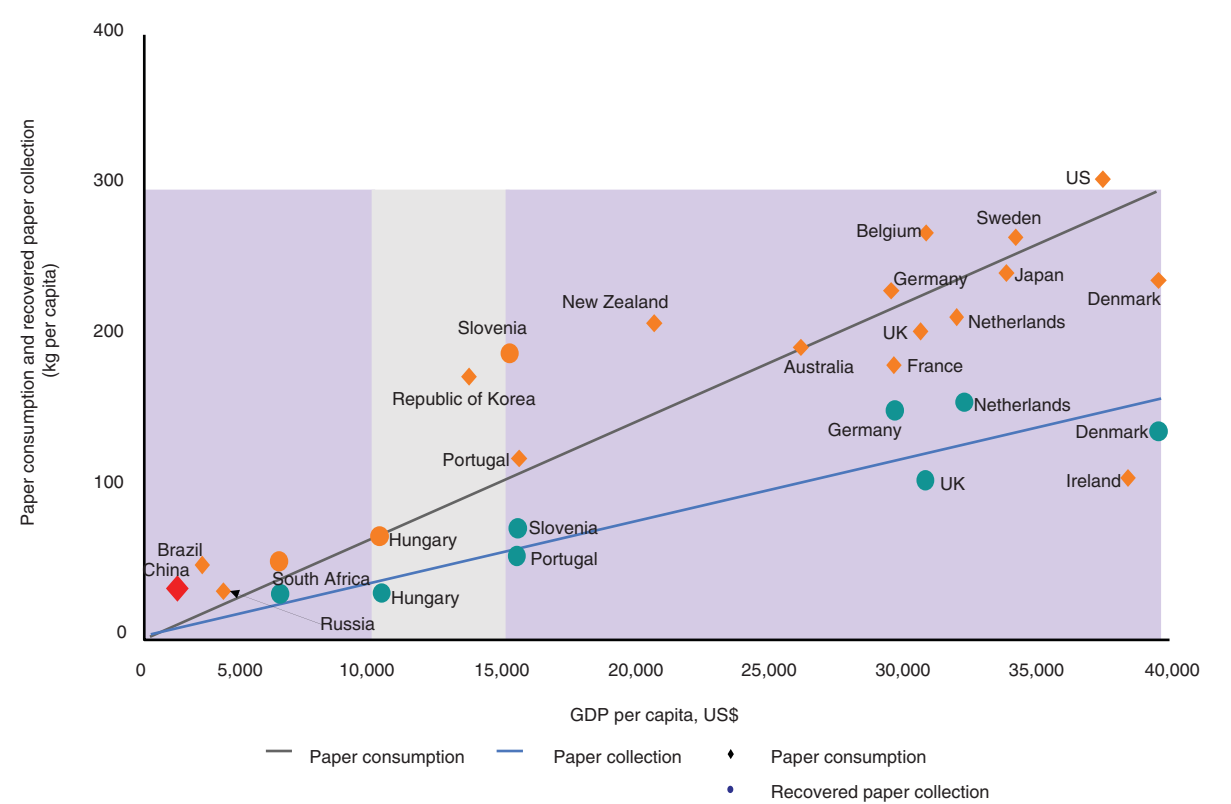
Source: RISI

Industry trend

Economic growth is one of the key drivers. There is a clear positive relationship between GDP and both paper consumption and waste paper collection in terms of weight per capita. Developed countries typically have higher per capita consumption of paper as well as higher waste paper recovery rates. This is due to the inter-dependent relationship between rising consumer affluence and the correlated increase in paper consumption, thereby causing a corresponding rise in recovery rates to meet the demand for more paper products. As demonstrated by Poyry, in terms of percentage recovery rates, a rise in the GDP per capita have a large impact or positive influence on the supply of and demand for waste paper.

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Positive correlations between GDP per capita and both paper consumption and waste paper collection



Source: Poyry (2003)

Trend of higher collection but greater challenges in availability, quality and prices. The long term trend of increasing waste paper collection is set to continue. Higher concentrations of high-grade waste paper (that is, readily sorted or already well segregated) are more likely to be more plentiful in large commercial or industrial sources whereas waste segregation and collection are more challenging in metropolitan areas. Higher collection rates will however demand increased efforts in categorizing and sorting the different grades of recovered waste paper.

Increase in competitive edge of fully integrated operators along with rising waste paper collection. Vertically integrated collector-recyclers with comprehensive waste management networks are likely to benefit from this trend. Waste management services provide the necessary tools to control the waste segregation process at source and is capable of separating inferior and low value materials from the waste paper collected at the earlier stage so as to ensure the specification required for the downstream recycling mills are attained.

Market Size and Trends in Hong Kong/the PRC

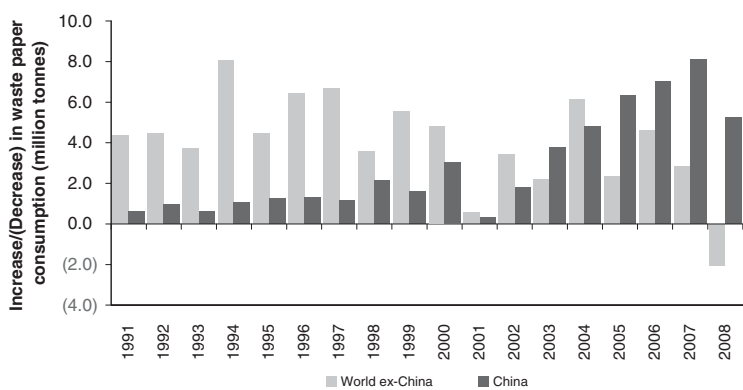
The markets in the PRC and Hong Kong are inter-dependent. Upstream, collection and recovery of waste paper exist in both markets albeit with very different intensity levels. There is no downstream recycling

process in Hong Kong. Space limitations and higher costs of operations and environmental compliance in Hong Kong resulted in a large reduction of waste paper recycling capacity in 2007. Thus, the PRC represents most of the downstream recycling capacity for both markets. Recovered waste paper in Hong Kong is transported to the PRC for recycling.

Market in the PRC

The PRC has become the focus of the global waste paper market. In the past 18 years, the PRC’s paper consumption has grown from 4.3 million tonnes in 1990 to 55.5 million tonnes in 2008, a 13 fold increase or a CAGR of 15.3%. Its paper mills have grown increasingly dependent on waste paper as secondary raw materials. The increase in waste paper consumption in the PRC alone exceeded that of the rest of the world in total in 2003. The PRC now accounts for the bulk of global waste paper consumption growth.

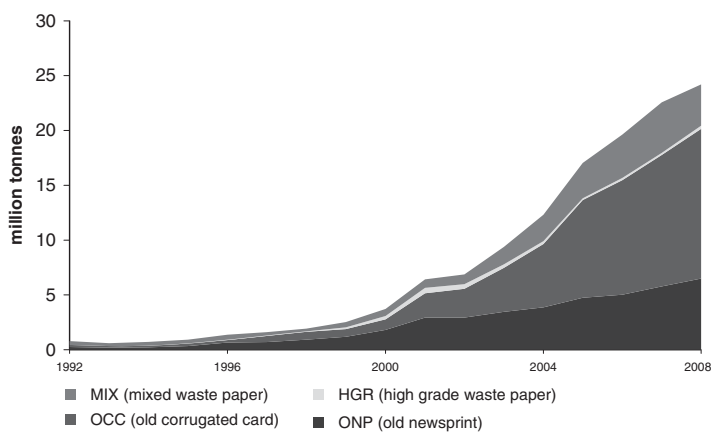
Global and PRC waste paper consumption



Source: RISI

The PRC has relied heavily on imported waste paper for its paper and board industry. Availability of locally sourced waste paper has remained fairly stable at over 17 million tonnes per year. Therefore capacity growth was fueled entirely by the supply of and demand for imported waste paper. High levels of imports are unlikely to decline in the foreseeable future and Hong Kong will remain an important source because of its proximity and the intensity of its collection efforts. Packaging needs are driving the industry, which is reflected in the import mix of grades. Old corrugated cards (OCC) volume increased 13 fold in the past eight years or 39% per year and accounted for 56% of total imported waste paper although there is little demand for high grade waste paper (HGR), where the volume declined over the past five years.

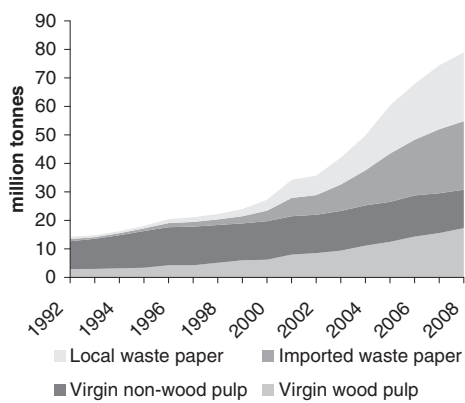
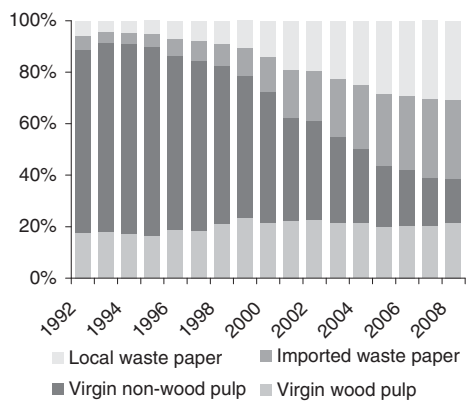
PRC recovered paper imports by paper type



Source: RISI

Consumption of total fibers grew at 10.9% per year since 2000 and secondary fiber (derived from waste paper) consumption grew at 15% per year.

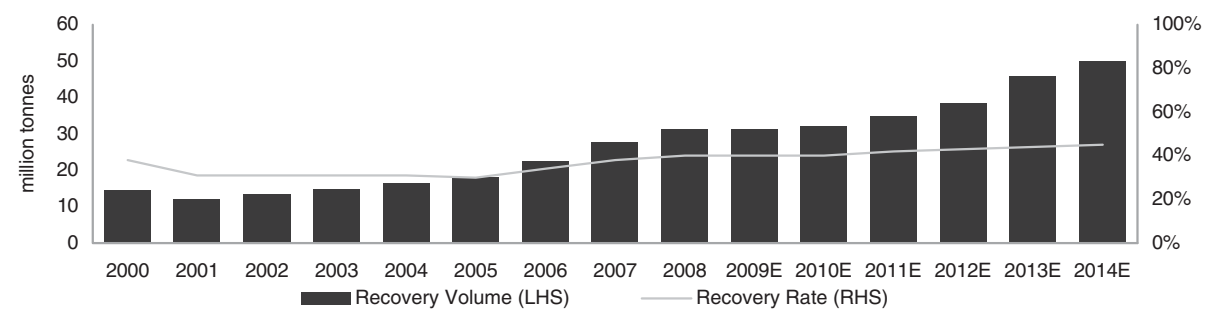
Historical growth and proportion of waste paper vs. virgin (wood and non-wood) pulp in PRC



Source: RISI

In the PRC, the majority of mills tend to be smaller in scale, which utilize a combination of vegetable fibers and recovered paper. Over the years, thousands of these smaller sized mills have been forced to cease operation, making improved recovery of domestic waste paper a critical necessity.

PRC waste paper recovery volume and rate



Source: RISI

The PRC’s recovery rates are lower than those of Hong Kong. Lower consumer spending only offers part of the explanation. The PRC’s economy, with large trade surpluses and huge exports, effectively cause a “loss” of a significant supply in packaging materials. This directly inhibits both the pace and level of increase in waste paper recovery rate which is likely to remain below 50% in the coming years and well below that of Hong Kong. Nevertheless, in absolute terms, the PRC waste paper recovery quantity is about 30 times that of Hong Kong. With such huge and growing volumes, a 0.3% increase in recovery rate would result in an incremental volume equal to that of the whole of Hong Kong. According to RISI, The Group was the largest waste paper collector in the China Region in 2009.

Top Four Waste Paper collectors/recyclers in the China Region in 2009

Name	Annual processing capacity (tonnes)
1. The Group	877,000
2. China Hao Ran Recycling Co. Ltd.	500,000
3. Jiangsu Wulian Recycled Resource, Vtiliyalion Industry Group	200,000
4. Zhejiang Resource Development Co., Ltd.	150,000

Source: RISI

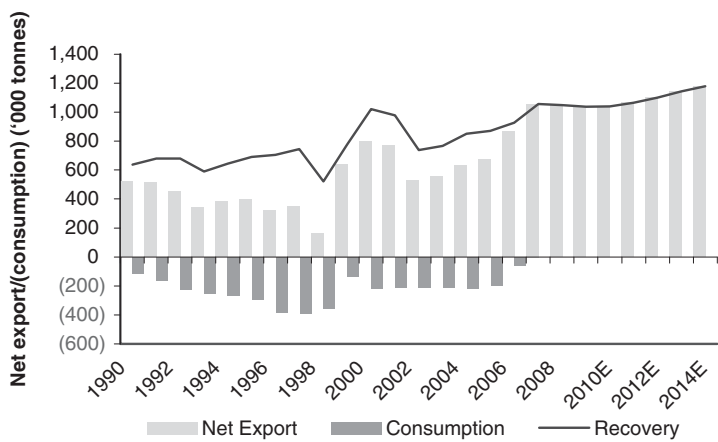
The PRC has a highly fragmented waste paper sector. Even at 100% capacity utilization, the top four players by volume represent only around 5% of the annual total of 32 million tonnes of waste paper recovered in 2009.

Market in Hong Kong

Hong Kong’s recovered waste paper is almost fully exported. Prior to 2007, Hong Kong had its own recycling facilities and consumed up to 69% of all recovered paper in 1998. Today, all of Hong Kong’s recycling capacity is located in the PRC.

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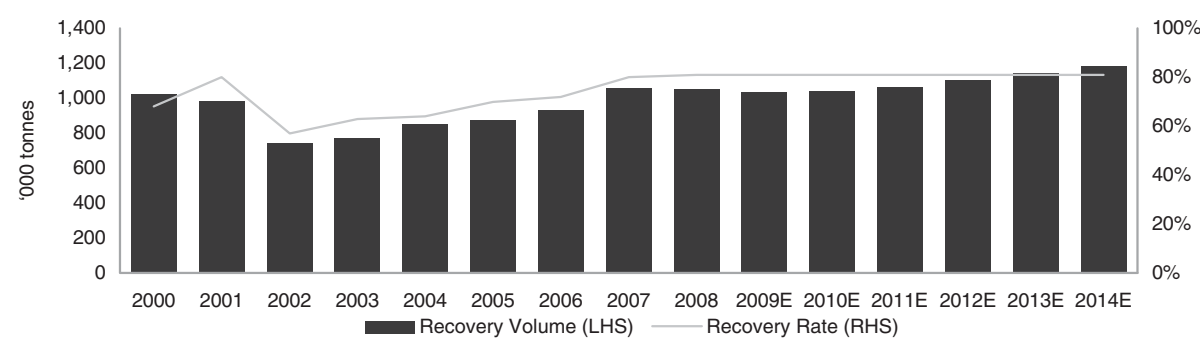
Consumption of recovered waste paper in Hong Kong



Source: RISI

Hong Kong has among the highest recovery rates globally with recovery rates projected at around 81%.

Hong Kong waste paper recovery volume and rate



Source: RISI

The market is polarized with the top three players commanding almost 45% of the total annual recovered volume of just over 1 million tonnes. Our market share is 25% and is 2.5 times larger than the second largest player, where the remaining 55% of the market is highly fragmented. With such a fragmented market, significant consolidation opportunities exist, particularly for vertically integrated operators.

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Top three Waste Paper Collectors in Hong Kong in 2009

Name	Annual processing tonnes
1. The Group	261,000
2. Hoi Kong Waste Paper & Metal Co.	100,000
3. Wai Sang Waste Paper & Metal Co.	100,000

Source: RISI

RECYCLED TISSUE AND BATHROOM PAPER INDUSTRY

Tissue and bathroom paper demand growth in the PRC has shown considerable resilience, maintaining an annual growth rate of 7.5% since 2000. However, the overall average of tissue consumption in the PRC remains only one third of the global average. Market share of premium products has doubled to 30% over the past five years, while low end straw pulp and conventional recovered paper based tissue has seen reduced market shares. Recycled paper can be used as a raw material to produce medium to premium grade tissue products. To date, deinked pulp products have grown to dominate tissue markets in Japan and Europe and RPL expects similar changes to the PRC’s tissue market to eventually follow.

Tissue consumption and growth in selected countries

Year ('000 tonnes)	US	China	Japan	Germany	UK	Hong Kong
2004	7,165	3,017	1,755	1,263	977	101
2005	7,116	3,259	1,807	1,287	990	108
2006	7,163	3,485	1,821	1,333	997	110
2007	7,288	3,701	1,800	1,357	1,039	110
2008	7,440	4,015	1,841	1,381	1,030	116
Growth ⁽¹⁾	3.8%	33.1%	4.9%	9.3%	5.4%	14.9%

Source: RISI

Note:

(1) Percentage change over the period from 2004 to 2008

The tissue industry, a global market of close to 30 million tonnes, is divided into the consumer (or at home or end-user) market and the institutional (or away-from-home or commercial) market. While the consumer market is often dominated by virgin fiber based tissue products, the institutional market is dominated by recycled pulp-based tissue products especially in developed regions.

According to RISI, at home markets account for 76% of the global market and away-from-home markets account for 24%. Large differences exist between developed and less developed economies where developed nations tend to have higher than average away-from-home market shares (for example, North America at 32% and Western Europe at 29%), while developing regions have lower than average away-from-home market shares. For the PRC market, RISI estimates that the away-from-home market contributes 10% of the total tissue market, of which bathroom tissue accounts for the largest proportion

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(being approximately 46%), followed by napkins (being approximately 28%) and towels (being approximately 13%). Away-from-home market size was estimated at a minimum of some 50,000 tonnes in the PRC in 1996 which grew to 394,000 tonnes in 2006. Bathroom paper dominates the tissue category both in the at home and away-from-home markets. Folded products include facials and hankies, napkins and wipes. Bathroom paper is predominantly the first commodity to successfully penetrate a market.

According to RISI, in terms of geographical distribution, North America and Western Europe are the two leading tissue paper consumption regions. In 2007, global tissue consumption was 27.5 million tonnes, with over half of the consumption in North America and Western Europe.

Market Size and Trends in the PRC

According to RISI, tissue consumption in the PRC has had a stable annual growth trend of 7.5% since 2000, slightly lower than total GDP growth but clearly higher than most countries in the world. Tissue consumption is expected to further grow in the region of 8% per year until 2014. Production in the PRC exceeds domestic consumption. Exports accounted for about 10% of the PRC's tissue production in 2008 and have grown at an average rate of 17% per year since 2004. According to RISI, tissue paper products are manufactured mainly in China with some very small operators in Hong Kong. There are currently no sizable tissue paper manufacturers in Macau.

Supply, demand and growth of the PRC's tissue product market

Year ('000 tonnes)	Production	Foreign Trade Including Converted Products		Consumption
		Imports	Exports	
2004.....	3,223	37	243	3,017
2005.....	3,502	34	277	3,259
2006.....	3,793	31	339	3,485
2007.....	4,100	26	425	3,701
2008.....	4,437	25	447	4,015
CAGR Growth ⁽¹⁾	8.3%	-9.3%	89.0%	7.4%

Source: RISI

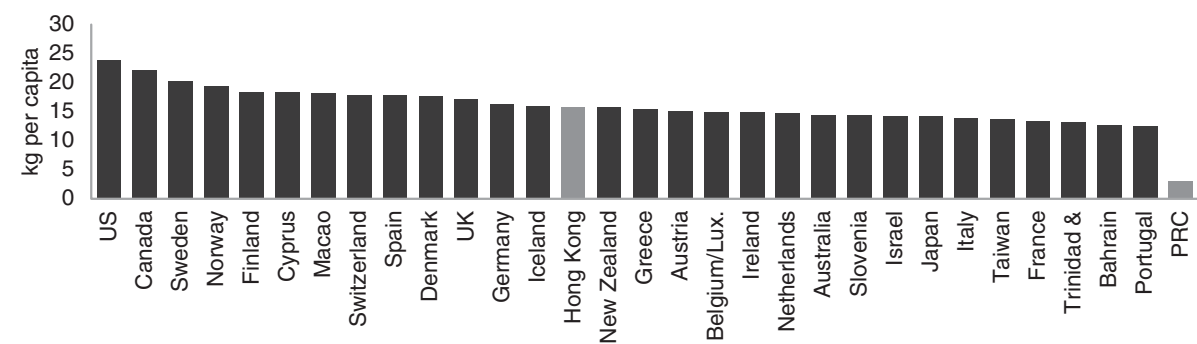
Note:

(1) Compound annual growth rate over 2004-2008 period.

The PRC's average annual consumption per capita is 3 kg, although large variations exist between city and rural populations. Growth potential is more than just theoretical given the world average annual consumption per capita of 10 kg and the average annual consumption per capita for Shanghai and Beijing have already surpassed 10 kg. Estimates of consumption levels of city populations are somewhat imprecise, but figures for Shanghai and Beijing are between 11 and 12 kg per capita.

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Per capita tissue consumption by country in 2008



Source: RISI

Tissue is a disposable product for one-time usage. Environmental benefits derived from making tissue from recovered waste paper are obvious. The effects are thus more pronounced with the use of locally recovered waste paper integrated into tissue manufacturing when compared with utilizing imported waste paper. Economically, cost savings could be as high as several hundred dollars per tonne of tissue produced, depending on the process and quality requirements of the final product. Fiber costs represent the largest manufacturing costs of tissue and recycled pulp is cheaper than virgin pulp even after offsetting recycling costs. Since 2003, the market share of premium tissue products has risen from 15% to 30% in 2008. For most consumers in the PRC, premium products are often associated with virgin pulp, and recycled pulp-based products are often regarded as inferior. Globally, the share of recovered waste paper as raw material to produce tissue products has remained stable at approximately 50% since 1994. Corresponding data for the PRC and the rest of Asia (excluding Japan) show little difference from the global pattern, with 42.9% for 1994 and 48.5% projected for 2012. Greater demand (and production) of higher quality tissue products in the PRC is expected to be satisfied by changes to tissue making processes similar to those in Europe, Japan and North America.

Market share of tissue by quality group in the PRC

	Tissue quality	Share
100% imported chemical wood pulp	Premium	30%
100% wood pulp (imported or local), or mixed pulp (wood pulp and non-wood pulp: bamboo, sugar cane, reed, wheat straw), or white paper cuttings and non-wood pulp (bamboo, sugar cane and weed)	Medium	35%
Mixed recovered paper, local wheat/rice straw, other pulps.....	Value to low	35%

Source: RISI

Key market players

The PRC’s tissue manufacturing industry is fragmented. The combined capacity of the top ten manufacturers contributed nearly 45% of the PRC’s total production in 2008. With continual closures of

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small facilities for environmental reasons and the PRC government’s stated plan for large modern plants, the PRC’s tissue industry is set for consolidation. The top three producers largely focus on virgin fiber based tissue products under their own brands. Within this group of top ten producers, we are considered unique given that we focus on recycled paper based tissue products.

Leading tissue manufacturers in the PRC ranked by 2009 installed capacity

Rank	Company	Capacity (1,000 tonnes/ annum)	Remarks
1	APP China	487	Three additional paper machines each having annual capacity of 60,000 tonnes planned
2	Hengan Paper Group	438	Three additional paper machines each having annual capacity of 60,000 tonnes and a few smaller ones on order
3	Vinda Paper (SCA participation 19%)	327	Several new smaller paper machines forthcoming
4	Guangzhou Zhongshun Paper Industry Group	269	Several new smaller paper machines on order
5	Ningxia Zijinhua Paper	100	No recent expansion news
6	The Group.....	82	Two additional paper machines each having annual capacity of 22,440 tonnes
7	Ningxia Meijie Paper, Helan, Ningxia	80	Expansion ongoing
8	Guangxi Guitang Group (including JieBao Co.).....	75	Plans to increase capacity by 100,000 tonnes per annum; schedule not known
9	Shengda Group Jiangsu Sund Paper	70	Expansion ongoing
10	Shanghai Orient Champion Group	68	Expansion ongoing

Source: RISI

Industry trend for recycled tissue paper product

Deink pulp’s entry into the PRC will change the market. Paper mill effluents from old facilities have been a focus of the PRC’s anti-pollution drive. From just before August 2008, old straw pulp and recovered paper mills with low capacity (1,000 tonnes per year) have been forced to cease operation. The emerging trend is to follow technological developments in both Europe and Japan where DIP has potential growth to dominate the recycled paper based tissue market.

Higher value products without expensive virgin pulp. Cost benefits of utilizing recovered products relative to virgin pulp are highly dependent on regional specifics and the quality of the recovered waste paper based tissue. Between pure virgin pulp and pure recovered products, a wide range of intermediate grades exists. Depth of processing and therefore rejected materials for disposal (such as DIP rejects from the deinking process) also influences cost.

Although part of the manufacturing cost benefit from usage of recovered waste paper use (versus virgin pulp) will be absorbed by increased energy usage in the process of making tissue products (printing ink and often the ash content is removed from the recovered paper), quality remains the major determinant in the tissue product pricing. DIP based tissue products may reach medium to premium quality without any need for the addition of virgin pulp.

Consumer perception needs changing. Acceptance by end users in the PRC and therefore market penetration of DIP products remains low. Short and medium term marketing efforts are required to educate the public on the benefits of recovered paper products.

With growing prosperity in developing economies, end users are placing more emphasis on quality. Relatively inferior properties of 100% recycled products (aesthetics and softness) face declining demand. As the market evolves, intermediate grade products offering an attractive compromise of price and quality tend to become products of choice. In Western Europe, DIP tissues and their market have a long and successful history. By the 1980s, it had already become a well-established product for a decade. It has arguably reached market saturation today. Its success depended on ongoing marketing efforts. OEM for supermarkets also help boosts its popularity as the supply structure allows more competitive pricing. For the PRC, DIP-based tissue products still need to establish its place in the market which already exists in North America and Europe. In North America and Europe, top characteristics include surface and bulk softness, thickness or bulk, aesthetics (often brightness and absence of visible dirt spots) and strengths (burst, tensile strength, elasticity).

CONFIDENTIAL MATERIAL DESTRUCTION SERVICE INDUSTRY

Confidential materials destruction service or secured document destruction service is a small sector in Hong Kong, about 60,000 tonnes per year, with an estimated growth of 8% per year to 2014. Entry barriers are deceptively high. While start-up capital costs of equipment can be low, costs of security systems and procedures are significantly higher. Operational overheads are high and gaining customers' trust is the key hurdle to increasing market share. Regulatory changes are likely to present new barriers as well as new demand. While destruction services are often integrated into document warehousing services in the highly fragmented markets in Europe and the United States, low volumes in Hong Kong create a more advantageous setting for sharing of similar overheads with waste paper recovery and recycling operations. They in turn benefit from this source of high-grade waste.

Destruction of confidential materials has become an increasingly regulated function. Generators of these materials, ranging from medical institutions, banks to government departments, have two options: devise procedures and install shredders to ensure proper destruction internally or out-source to specialized secured services. Outsourcing to shredding service providers has grown significantly in Europe and North America, but it is still in its infancy stage in Hong Kong.

The market is relatively opaque, but was estimated to have a value of over US\$3 billion in the United States in 2005. Threat of civil liabilities, greater simplicity of destroying all office paper and increased recycling targets have all contributed to this volume growth. About 30% of all recovered waste paper goes through secured shredding in both continents. Operators generally follow the standards set by NAID, a U.S. based association for service providers and equipment suppliers. Its certification and security audit process, as well as its published code of practice have gradually become the main guideline for operators worldwide. In the Asia Pacific, there are currently 44 certified members across six countries.

Certified members of NAID in the Asia Pacific region

Country	Number of certified Members	Remarks
Australia	31	31 members from 16 companies, including global brands: Iron Mountain, Recall
Hong Kong	1	Our Company
Singapore	3	Global brands: Recall, Shred-it
Thailand	2	Global brand: Recall
Taiwan	2	Global brand: Recall
New Zealand	5	5 members from 3 companies, global brand: Recall

Source: NAID

Hong Kong Market

Interviews with operators suggest that current CMDS market collections do not exceed 60,000 tonnes per year in Hong Kong as of 2009. This figure refers to gross collection volume, including non-paper materials such as metal and plastic bindings and staples. The net volume of Hong Kong’s recovered confidential paper is likely to be between 40,000 tonnes to 50,000 tonnes per year, or 4% to 5% of the 1.1 million tonnes of total recovered waste paper within Hong Kong. This ratio is expected to remain well short of the 30% attained by European and North American countries in the absence of similarly stringent and prescriptive regulations. Industry participants estimate that Hong Kong’s secured document destruction volume will increase by 40% to 50% within the next five years, or at an annual rate of around 8%. Total volumes would then rise to 56,000 to 75,000 tonnes per year or around 8% of total recovered paper, keeping pace with general waste paper volume growth.

Top service providers in Hong Kong

The Hong Kong market is dominated by our Company with over 50% market share. There has been a significant increase in our collection volume after winning a significant portion of Hong Kong Government contracts, and we are currently the sole certified member of NAID in Hong Kong. There are also other competitors in the confidential material destruction service market, such as Skylight Recycling Systems (a division of Greengrowth Co. Ltd), Paper Recycling Destruction Services Company and Yong Jia Confidential Document Processing Company. In recent years, with rising waste paper prices, customers have become increasingly insistent on sharing the value of waste paper through rebates. In the absence of published and definitive data on either the market size or the activities of the key players, interviews with waste paper industry operators suggest consistently that the Hong Kong market is dominated by our Company.

Industry trends

Demand mainly from government and financial institutions with growth from non-bank private enterprises. The existing customer base for third party shredding is still very small, estimated at around twenty regular users. The two main sources of current demand are government offices and banks, each accounting for approximately 40%, with the remaining 20% of demand from other private companies. Qualitatively, most of the growth is expected to come from other non-bank private companies.

Tangible benefits for integrated paper recyclers engaging in confidential material destruction services. Incremental capital investments are required for security systems in existing facilities equipped with high capacity shredders and balers for general waste paper processing. This is a one-stop value-added service with mutual benefits to both customers and recyclers. With suitably planned waste management services, the availability of high grade waste paper will offer material cost reduction opportunities particularly in sorting and optimization for recycling processes.

Trends for secured shredding and paper recycling coincide. Voluntary efforts to both simplify and widen document destruction coincide with paper recovery and recycling trends. Out-sourced secured destruction is expected to grow from current levels. Waste recovery and recycling operations seeking high-grading of materials are likely to create momentum for growth in this sub-sector, perhaps more so than regulatory push. The industry is anticipating tighter regulations for privacy and information protection although the timing and extent of future changes are unclear. Voluntary efforts integrated into general waste management practices for high-grading of waste paper are likely to remain the main driver of the sector in the foreseeable future.

COMPETITIVE EDGE OF FULLY INTEGRATED OPERATORS MORE PRONOUNCED WITH RISING COLLECTION

Vertically integrated collector-recyclers with comprehensive waste management networks are likely to benefit from this trend. Waste management services provide the necessary tools to control the waste segregation process at source and is capable of separating inferior and low value materials from the waste paper collected at the earlier stage so as to ensure the specification required for the downstream recycling mills are attained. The presence of in-house recycling mills is able to optimize the upstream collection process in order to achieve better overall grading and specifications for the sorted waste paper required at the downstream paper mills' processes.

A far less visible advantage comes from business system integration throughout the value-chain. This is especially important with increasing regulations and obligations to monitor and report compliance. Working capital reduction and avoidance of liabilities could result in measurable direct economic benefits.

Indirectly, shorter lead times, more tailored customer services and reduced errors from double administrative handling are potentially anti-commoditization. However, little of these benefits are likely to be visible to investors without their comparative absence.

The recovered paper market in China is still evolving. Although there are other paper manufacturers throughout China who use recovered paper extensively as a raw material, very few companies have developed waste paper recovery and sorting functions that complement their recycling businesses. Our Company has a presence in all the major links in the waste paper value chain and is the largest vertically integrated paper recycler in China in 2009.

BACKGROUND INFORMATION ON ASSOCIATIONS AND INDUSTRY GROUPS

Provided below is the information on some of the industry associations and groups relating to our business, many of which are referred to in this prospectus.

Bureau of International Recycling (BIR) — BIR is an international trade federation representing the world's recycling industry, covering in particular ferrous and non-ferrous metals, paper and textiles. About 800 companies and national federations from over 70 countries are affiliated with BIR. Together they offer an international forum for industrial exchange and business contacts. They provide their expertise to other industrial sectors and political groups in order to promote recycling.

2006 IPCC Guidelines for National Greenhouse Gas Inventories — 2006 IPCC Guidelines provide methodologies for estimating national inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases.

Hong Kong Government Environmental Protection Department (HKEPD) — HKEPD is the Hong Kong Government's lead environmental protection agency, which provides detailed information on waste generation, reduction and management in Hong Kong. Detailed information is organized into various categories, namely, Problems & Solutions, Data & Statistics, Public Consultation, Study Reports, Guidelines & References, Waste Reduction Programs, Waste Collectors & Recyclers and Waste Management Facilities. This information is deemed to be policy-independent data.

Waste Management in China: Issues and recommendations — This paper was prepared by the East Asia and Pacific Urban Development Sector Unit (EASUR), and contributes to China's municipal solid waste discussions by presenting updated and relatively accurate projections of municipal waste quantities and composition. Key trends are documented and possible responses are proposed.

The Economist Intelligence Unit (EIU) — EIU provides a constant flow of analysis and forecasts on more than 200 countries and six key industries. They help executives make informed business decisions through dependable intelligence delivered online, in print, in customized research as well as through conferences and peer interchange.

Resource Information Systems Inc. (RISI) — RISI is a leading information provider for the global forest products industry. Founded in 1985, RISI quickly established itself as the premier source of independent economic analysis for the global forest products industry.

REPORT COMMISSIONED FROM RPL

We commissioned RPL, an independent renewable energy and resource sustainability consultant, to conduct an analysis of, and to report on, waste management, waste paper recycling, recycled tissue and the secured document shredding industry in Hong Kong and the PRC. The amount of fees we paid for the report was US\$30,000.

RPL's independent research was undertaken through secondary and primary research obtained from various sources within the waste paper industry. Primary research involved interviewing leading industry participants including waste paper merchants, equipment supplier business owners, and marketing executives of waste paper, secured shredding service providers. Secondary research involved reviewing company reports, independent research, analyses, data and opinions of industry experts as well as RPL's own information archives. Projected total consumption and total sales value in the PRC were obtained from RISI and through interviews with industry experts and participants.