

---

## INDUSTRY OVERVIEW

---

*This section contains certain information which is derived from official government publications and industry sources as well as a report we commissioned from Euromonitor, an Independent Third Party. We believe that the sources of this information are appropriate sources for such information and have taken reasonable care in extracting and reproducing such information. We have no reason to believe that such information is false or misleading or that any fact has been omitted that would render such information false or misleading. The information derived from the above sources has not been independently verified by us.*

*The information from official government publications may not be consistent with information available from other sources within or outside the PRC. We, our affiliates or advisers, the [●] or their affiliates or advisers, or any party involved in the [●] do not make any representation as to the accuracy, completeness or fairness of such information from official government publications and, accordingly, you should not unduly rely on such information from official government publications.*

### COMMISSIONED REPORT FROM EUROMONITOR

We commissioned Euromonitor, an Independent Third Party, to conduct a detailed analysis of and produce the Euromonitor's report on, among other things, the PRC's industrial automation system and sludge treatment product market in relation to the paper-making industry for inclusion in this document. The report commissioned has been prepared by Euromonitor independent of our influence. We paid Euromonitor fees of about USD45,400. Established in 1972, Euromonitor has offices around the world, analysts in 80 countries and market research on every key trend and driver, provides strategy research to support corporate strategic reviews, new business planning, product and brand management, competition strategies and inform supplier relationships.

### THE INDUSTRIAL AUTOMATION SYSTEM MARKET IN THE PRC'S PAPER-MAKING INDUSTRY

#### **The PRC's industrial automation system market at a glance**

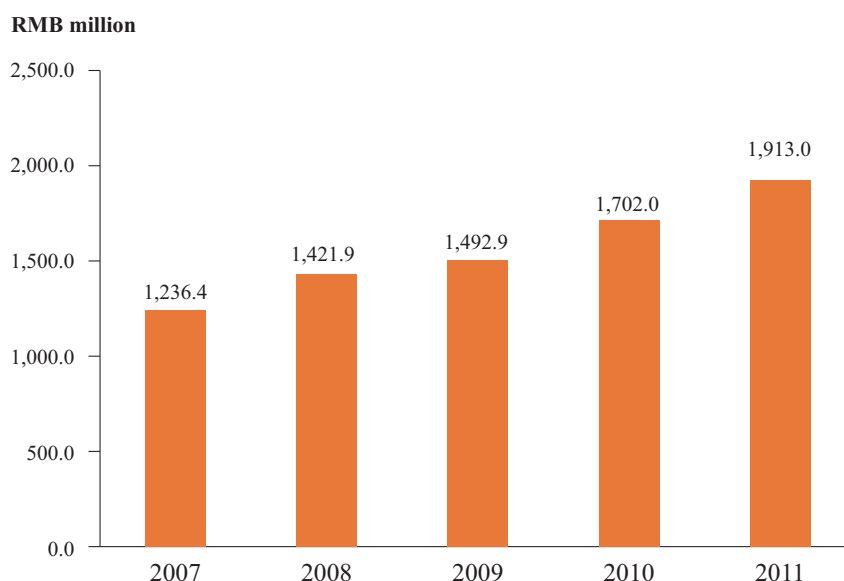
Industrial automation systems are widely used in manufacturing industries in the PRC, which include paper-making, chemicals, electricity, petrochemicals, metallurgy and mining. In 2011, the industrial automation system market in the PRC reached RMB92.0 billion in terms of sales revenue and chemical, electricity, petrochemical and metallurgy industries in aggregate accounted for over 50.0% of the market share.

## INDUSTRY OVERVIEW

### Market status quo of industrial automation system in the paper-making industry

Industrial automation systems for the paper-making industry emerged in the PRC in the 1990s and have been developing rapidly along with the robust economic growth in the PRC over the past 20 years. Although growth of the industrial automation system market experienced some fluctuations due to the 2008 global financial crisis, the PRC economy has rebounded since then and the industrial automation system market for the paper-making industry reached RMB1.9 billion by the end of 2011, which accounted for approximately 2.1% of the entire industrial automation system market in the PRC.

#### Market size of the industrial automation system market for the PRC’s paper-making industry



Source: Euromonitor

The industrial automation system market for the PRC’s paper-making industry can be classified into three segments according to the production capacity of the individual paper-making machine, and such classification is widely recognised in the industry. Industrial automation systems catering for paper-making machines with a production capacity of more than 400,000 tonnes of paper products per year fall under the high-end segment; industrial automation systems catering for paper-making machines with a capacity between 300,000 and 400,000 tonnes of paper products per year fall under the middle-end segment; and industrial automation systems catering for paper-making machines with a production capacity of less than 300,000 tonnes of paper products per year fall under the low-end segment. Each paper manufacturer may own several paper-making machines of varying production capacities. The high-end segment accounted for approximately 40.0% to 50.0% in terms of market share for the industrial automation system market. Approximately 40.0% of the high-end segment can be attributed to world-renowned manufacturers, namely the PRC subsidiary of a Swiss company which shares are listed on Stockholm Stock Exchange (“Company A”), the PRC subsidiary of a German-based international technology company (“Company B”) and the PRC subsidiary of

---

## INDUSTRY OVERVIEW

---

a global supplier of technology and services for various industries and which shares are listed on NASDAQ OMX Helsinki Limited ("Company C"). With the PRC's largest paper manufacturers, which mainly use industrial automation systems in the high-end segment, as their stable customers, the dominant position of these three companies in the industrial automation system market for the PRC's paper-making industry is apparent. The middle-end segment of the industrial automation system market for the PRC's paper-making industry is dominated by local manufacturers based in the PRC such as Huazhang Technology, which compete for customers based on their technological strengths or competitive pricing and target a large number of medium-sized paper manufacturers which mainly use industrial automation systems in the middle-end segment. Huazhang Technology has the capability to produce middle-end industrial automation systems which cater for paper-making machines with a production capacity between 300,000 and 400,000 tonnes of paper products per year. Our sales of middle-end industrial automation systems accounted for approximately 11.2%, 41.6% and 36.4% of our revenue from sales of industrial automation systems to our paper-making customers for the two years ended 30 June 2011 and 2012 and the six months ended 31 December 2012 respectively. The low-end segment is relatively fragmented with scores of small industrial automation companies competing for the smaller and less lucrative parts of the market.

### **Major types of industrial automation system for the PRC's paper-making industry**

In the industrial automation system market, drive control system, distributed control system, quality control system, machine control system and motor control centre are the major product types. Among these products, the drive control system accounted for approximately 50.0% of the overall market in terms of contract value, making it the most important product of the market. The drive control system transmits power and controls the speed of machinery and electrical flow. The distributed control system and machine control system are both automated control systems that incorporate computing and internet technologies, and they control a variety of signals through corresponding platform softwares. The quality control system performs quantitative control, water control, thickness control and scanning in the production process, and is a key factor of quality control in the paper-making process. The motor control centre controls the electricity supply that allows for the operation of all systems used within the production process.

### **Drivers of the industrial automation system market for the PRC's paper-making industry**

The PRC achieved a GDP growth of over 10.0% in the past five years. The growing economy propelled the demand for paper products, which in turn accelerated the development of industrial automation systems for the paper-making industry.

## INDUSTRY OVERVIEW

During the 10th (2001-2005) and 11th Five-Year Plan (2006-2010) periods, the PRC government issued a plan for a national forestry-paper integrated project, which encouraged further developments and technological innovations in the paper-making industry, and consequently leading to the growth of the industrial automation system market.

The PRC's current annual consumption of paper is only approximately 16.7% of that in developed countries. It is expected that the demand for a variety of paper types including packaging paper, stationary paper and household paper will continue to increase as a result of economic growth and urbanisation in the PRC.

### Competitive landscape

The top five companies in the industrial automation system market for the PRC's paper-making industry accounted for approximately 59.7% of the total market share in 2011. All of them possess mature technologies, stable customer bases and relatively large market shares. Please refer to the paragraph headed "Competitive strengths of our Group" under the section headed "Business" in this document for further details about the competitive strengths of our Group.

The following table sets out the companies which are believed to have a major presence/market share in the industrial automation product market for the PRC's paper making industry by sales volume and market share in 2011:

<b>Rank</b>	<b>Company Name</b>	<b>Sales Value</b> <i>(approximately</i> <i>RMB Million)</i>	<b>Market Share</b> <i>(%)</i>
1	Company A	402.0	21.0%
2	Company B	390.0	20.4%
3	Company C	139.9	7.3%
4	Huazhang Technology	108.1	5.7%
5	Company D	101.0	5.3%
	Others	772.0	40.3%
	Total	<u>1,913.0</u>	<u>100.0%</u>

Source: Euromonitor

---

## INDUSTRY OVERVIEW

---

The table below sets out the background information and the principal business of companies which are believed to have major presence/market share in the industrial automation system market for the PRC's paper-making industry in 2011:

<b>Name of company</b>	<b>Background information</b>
Company A	Company A, headquartered in Zurich, Switzerland, is a Fortune 500 company and a leading manufacturer in power and automation technologies that enable power, utility and industrial customers to improve their performance while mitigating their environmental impact. Company A operates in more than 100 countries and has approximately 130,000 employees.
Company B	Company B, headquartered in Munich, Germany, is one of the world's largest electronics and electrical engineering companies. Company B has a complete line of businesses is operating in China, including information and telecommunication, automation and control, power, transport, medical, lighting and home appliance. Company B has approximately 460,800 employees in 190 countries and regions around the world.
Company C	Company C, headquartered in Finland, is one of the world's leading engineering and technology companies. Company C has around 28,000 professional employees in more than 100 countries and regions around the world to offer a full range of products and solutions to customers in construction, energy, mining, pulp and paper industries.
Company D	Company D is a diversified technology and manufacturing company, and its businesses include aerospace products and services, buildings and construction, household and industrial process controls, automotive, turbo charger and specialty materials. Company D is headquartered in Morris County, New Jersey, USA.

### **Market entry barriers**

The industrial automation system market is relatively mature and thus there are fewer opportunities for new entrants as many of the large paper manufacturers have already been equipped with industrial automation systems procured from world-renowned companies. It is also relatively difficult for new entrants to break through cost barriers due to intense price competition in the low-end market. Medium-sized paper manufacturers usually purchase products from leading domestic suppliers as they are able to provide products of stable quality. World-renowned companies have dominated the high-end segment since they enjoy the advantages of early entry into the market, high production capacities and possess advanced technologies.

## INDUSTRY OVERVIEW

### Raw material cost

The major parts and components used in industrial automation systems include inverters, low voltage components and modules. Each of the above parts and components has a wide range of prices depending on their specification and each industrial automation system requires a variety of each type of the above parts and components depending on a number of factors such as the output level required for the related machinery and budget of the users. The market prices of each of the above parts and components with the same specifications remained relatively steady in the past.

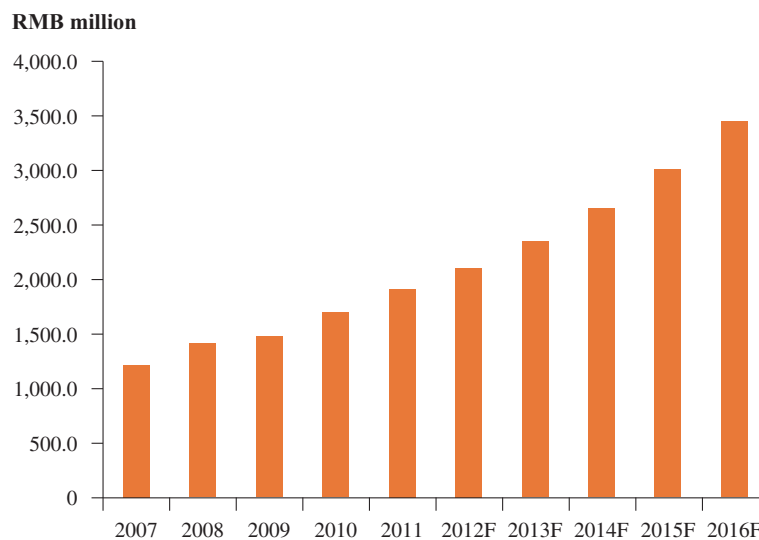
### Gross profit of industrial automation systems

The low-end market is characterised by constant price wars between smaller companies, which leads to a lower gross profit rate of around 20.0%. Due to narrow profit margins, companies in the low-end market find it difficult to expand. The overall gross profit rate in the middle-end market is likely to remain steady at approximately 30.0% to 40.0%. The market shares of PRC companies have increased due to competitive pricing and technological upgrades. The overall gross profit rate for the high-end market is approximately 50.0% due to relatively mature technologies and strong research capabilities.

### Market outlook

The size of the industrial automation system market is predicted to reach approximately RMB3.4 billion by 2016, approximately 1.8 times higher than that in 2011.

#### Prediction on market size of the industrial automation system market for the PRC's paper-making industry



Source: Euromonitor

---

## INDUSTRY OVERVIEW

---

### **Growth rate of the high-end, middle-end and low-end segments**

The growth rate for the low-end market is predicted to be around 5.0%. In the high-end market, demand for large-scale paper machines is expected to be relatively low with an estimated growth rate of approximately 5.0% to 10.0%. While expanding into the low-end segment, large-and-medium sized local manufacturers based in the PRC in the middle-end market are expected to venture into the high-end segment and compete directly with high-end segment companies. Market players in the middle-end market are likely to increase their market share in the industrial automation system market for the PRC's paper-making industry, and the growth rate is estimated to be around 15.0%, the highest among the three segments.

### **Future market competition**

As the industrial automation system market is relatively mature, competition in the future will focus on the capability in research and development of new technologies and the provision of after-sales services. New technologies focusing on better integration and coordination of the entire system, and after-sales services such as on-site technical support and the level of responsiveness will be the determining factors to the success of a company.

### **New technologies**

Integrated automation is the concept of constructing a single system that combines all the functions that can be found in various systems, thus simplifying the overall structure of a system and reducing the use of interface units. It provides a unified technical environment for all automation applications, such as unified data management, communication, configuration, and editing software. In addition, systems in the future will utilise various control modes including self-adaptation, self-diagnosis, optimization, and other advanced technologies in their software design and enhance the reliability of those systems.

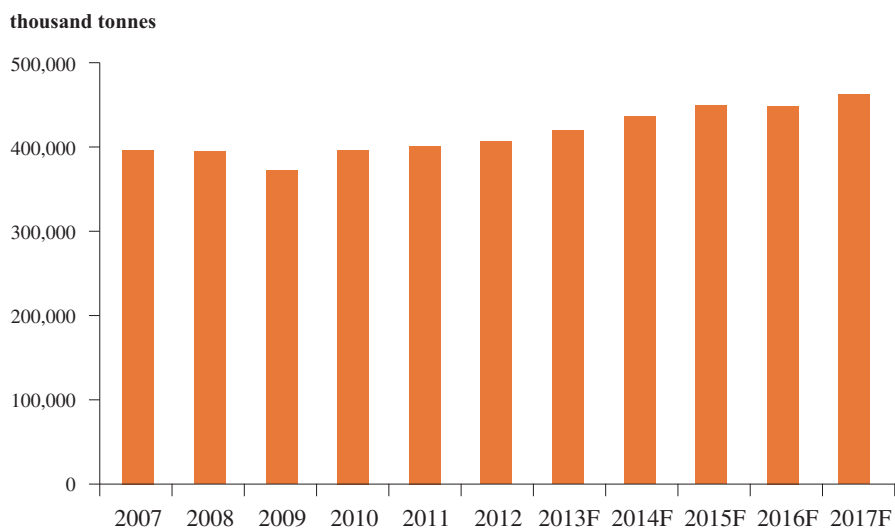
## **OVERVIEW OF THE GLOBAL PAPER-MAKING INDUSTRY**

The global paper-making industry has grown in the recent years, and its total output reached approximately 399.0 million tonnes for the year 2011, representing a growth of approximately 1.2% as compared to the year 2010. There are several types of paper products, including but not limited to newsprint paper, printing paper, and packaging paper. Although the rise of information technology has led to an increased use of the internet, email and digital devices for reading books and newspapers etc., and the global output of newsprint paper has reduced from approximately 8.3% for the year 2010 to approximately 7.9% for the year 2011, the growth of the world's total output of paper and paperboard products was not significantly affected as newsprint paper only accounted for approximately 8.0% of the world's total output in both 2010 and 2011. In 2011, corrugated paper and printing paper which accounted for approximately 35.6% and 27.7% of the world's total output of paper and

## INDUSTRY OVERVIEW

paperboard products, had experienced a growth of approximately 2.4% and a slight decrease of approximately 0.8% respectively as compared to year 2010. The chart below sets out the historic and forecast global consumption levels for paper and paperboard products:

### Global consumption levels of paper and paperboard



Source: RISI

Currently, the per capita consumption of paper for the year 2011 in developed countries such as the U.S. (approximately 230.0 kg), Japan (approximately 219.0 kg) and Germany (approximately 260.0 kg) is significantly higher than that in developing countries such as China (approximately 70.0 kg), Brazil (approximately 52.0 kg) and India (approximately 10.0 kg). The total consumption of paper in developing countries has grown steadily over the past few years, in particular the Asia region which accounted for approximately 43.0% of the world's total output of paper and paperboard products in 2011 and achieved a growth of approximately 5.0% in year 2011 as compared to year 2010. As such, the world's overall consumption of paper and paperboard products still managed to maintain an overall growth as the growth in total consumption of paper and paperboard products in the Asia region was larger than the slight decrease in the total consumption of paper and paperboard products of developed countries in the European and North America regions.

### Impact of the global paper demand trends on the PRC's paper-making industry

The global output of paper and paperboard products has increased steadily in the recent years, despite the slight decrease in the global output for newsprint paper. Although China is one of the countries with the highest output of paper and paperboard products, the amount of paper and paperboard products for export purposes only constituted less than 5.0% of the PRC's total paper and paperboard products output in 2012. As such, the PRC's paper-making industry was not significantly affected by the global demand for paper and paperboard products given the relatively low level of exports.

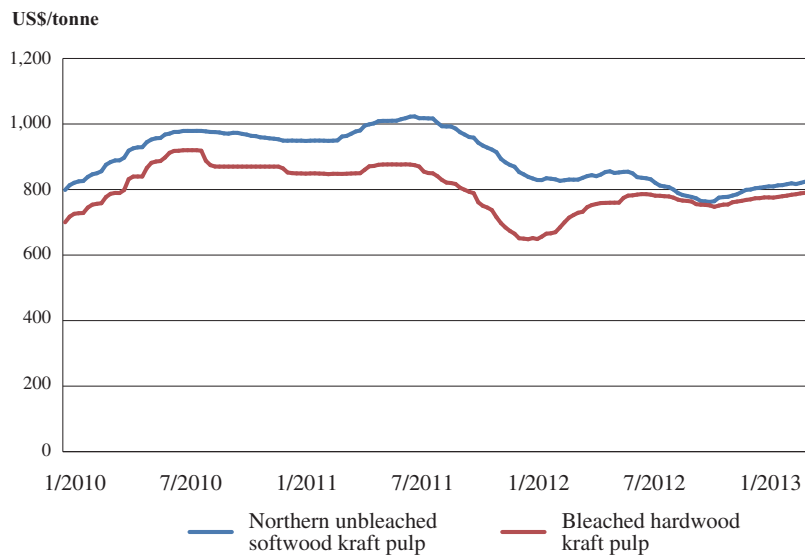


## INDUSTRY OVERVIEW

### Market price trend of paper pulp

Paper pulp is the main raw material for all paper and paperboard products. Therefore the global price trend of paper pulp would indirectly affect the global price trends of the various types of paper and paperboard products. Due to the global financial crisis and the economy downturn in the past few years, manufacturers of paper pulp have attempted to sell paper pulp at lower prices in order to increase their sales, resulting in relatively low prices for paper pulp in the year 2012 as compared to previous years. It is expected that such a trend will continue into the year 2013 and the prices of paper pulp will only gradually increase as the economy recovers.

The chart below sets out the market price trend of paper pulp delivered at European ports:



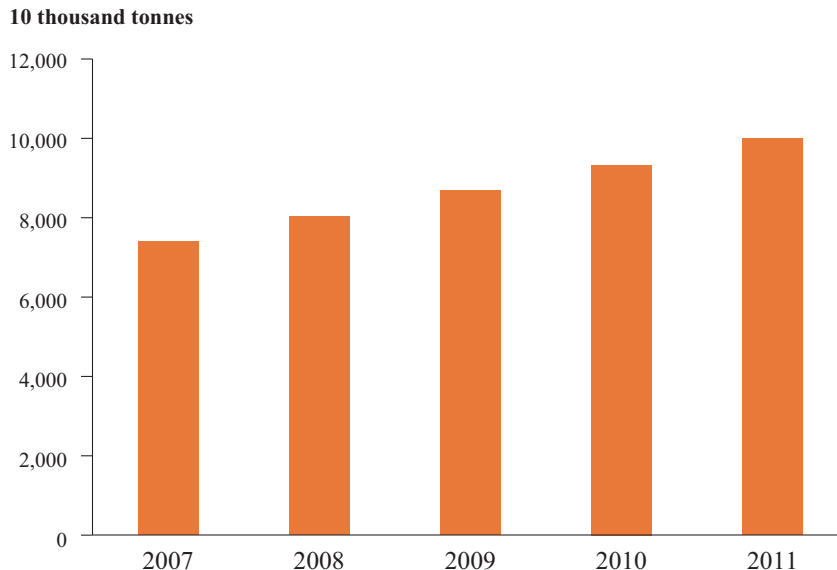
Source: Bloomberg

### OVERVIEW OF THE PRC'S PAPER-MAKING INDUSTRY

The development of the industrial automation systems is closely linked to the growth of the PRC's paper-making industry, which has achieved rapid growth consistent with the PRC's GDP growth over the past five years. The PRC's total production output and consumption of paper and paperboard products ranked first in the world in 2011.

## INDUSTRY OVERVIEW

### Output of paper and paperboard in the PRC



Source: Annual report of the PRC's Paper-Making industry, 2007-2011

According to the *2011 Annual Report of the PRC's Paper-Making Industry*, the PRC's aggregate production output of paper and paperboard reached 99.3 million tonnes in 2011, up by 7.1% compared to 2010 and 35.1% compared to 2007, representing a CAGR of 7.8% from 2007 to 2011 and outpacing the world-average rate of 2%. However, the PRC's per capita consumption of paper and paperboard was only approximately 73.0 kilograms in 2011 and despite an increase of approximately 5.0 kilograms over 2010, this figure lags behind the average per-capita consumption level of developed economies. For example, per capita consumption of paper and paperboard was about 240.0 and 220.0 kilograms in the US and Japan in 2011 respectively. As such, the PRC's paper-making industry harbours enormous potential.

There were around 10 paper-making companies in the PRC that had an annual capacity of over one million tonne each by the end of 2010, and their combined output accounted for around 30.0% of the PRC's total output. The aggregate production output of the 30 largest companies accounted for approximately 43.0% of the PRC's overall output, indicating that the PRC's paper-making industry is relatively concentrated. The mergers and acquisitions of leading companies together with their respective expansion of capacity will further increase the concentration of the industry. By 2011 there were around 11 companies that had a capacity of one million tonne each.

Few PRC paper-making companies have the ability to compete on an international level. Most of the paper-making companies are small in size and low in efficiency. By the end of 2011, there were approximately 2,600 paper-making companies with an annual income of at least RMB5.0 million in the PRC, of which approximately 30 were considered large enterprises (i.e. with more than 1,000 employees and an annual total income of more than RMB400.0 million) and accounted for merely around 1.3% of the total. Approximately 400 companies

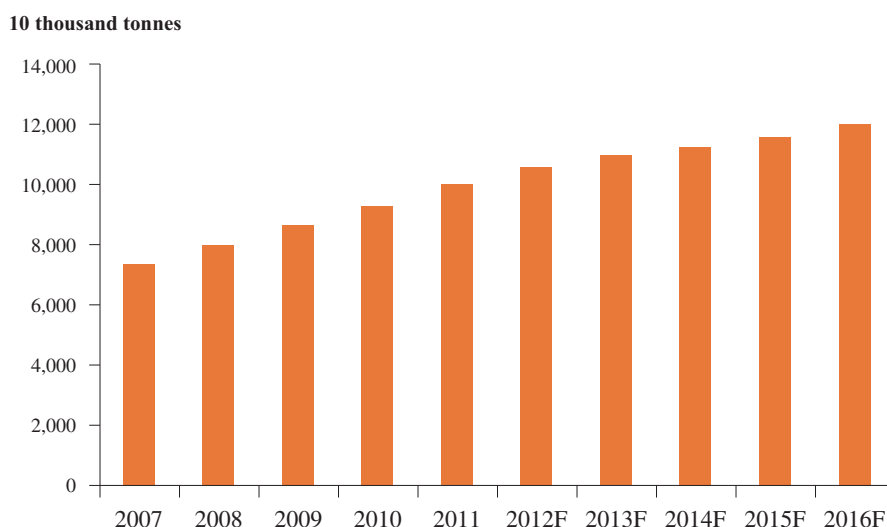
## INDUSTRY OVERVIEW

were considered to be medium-sized (with more than 300 employees and an annual income of more than RMB20.0 million), accounting for approximately 15.3% of the market. There were also approximately 2,185 small-sized companies (with more than 20 employees and an annual income of more than RMB5 million), which accounted for about 83.4% of the market.

### FORECASTS FOR THE PRC'S PAPER-MAKING INDUSTRY

The PRC has become the largest paper-making country in the world, and the paper-making industry is expected to grow as demand continues to grow. It is anticipated that the production volume of paper and paper board in the PRC will reach approximately 119.0 million tonnes by 2016.

#### Output of paper and paperboard in the PRC



Source: Euromonitor

Euromonitor estimated that by 2016 the total production output of paper and paperboards will reach approximately 119.0 million tonnes, up by 19.8% compared with 2011, with a CAGR of 3.2% from 2012 to 2016 which is considerably lower than the CAGR of 7.8% from 2007 to 2011.

It is expected that the expansion of domestic consumption and increasing per capita income during the 12th Five-Year Plan period, the growth of certain paper types that are closely related to consumption, such as packaging paper and tissue paper, will outpace the GDP growth for the corresponding period. As downstream industries develop, namely industries that process the output of other raw material producing industries into a finished or different product, the PRC is expected to become the largest producer and consumer market of corrugated paper and box paperboard in the world.

## INDUSTRY OVERVIEW

Currently, the PRC lacks self-initiated innovation in the field of paper and pulp making machines and depends largely on imported production equipment. The 12th Five-Year Plan period will see the PRC's paper-making industry rely more on domestic paper machines and step up the research and development in this area with the goal of increasing self-sufficiency from approximately 30% to 50%. This encompasses increasing the speed and functionality of paper machines while cutting down energy consumption level. The new generation of domestic paper machines will be highly-automated and provide a complete solution for paper-making.

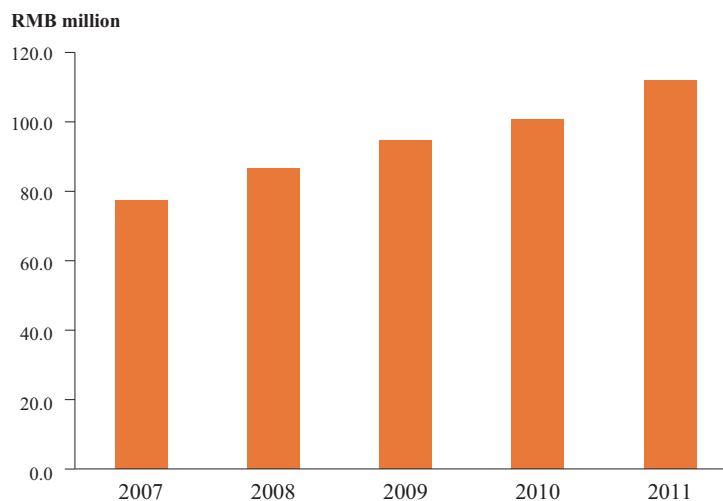
During the 12th Five-Year Plan period, the NDRC will support qualified paper manufacturers to apply for [●] in the PRC and overseas stock markets, and encourage listed paper manufacturers to recapitalise through private placement or issuing convertible bonds. Incentives in various forms will also be given to environmental-friendly and ecological enterprises.

### THE SLUDGE TREATMENT PRODUCT MARKET IN THE PRC'S PAPER-MAKING INDUSTRY

#### Introduction of sludge treatment products

Sludge treatment products for the paper-making industry commonly used in the PRC are the belt filter press and filter press. Belt filter presses are widely used in food processing and other manufacturing industries. Filter presses have been used in chemical, pharmaceutical and other manufacturing industries. Both the belt filter press and filter press are used for the separation of solid from liquid in the handling of industrial waste in order to reduce sludge disposal costs and are widely used in paper-making industry. The following charts show the market size and growth rate of the markets of belt filter press and filter for the PRC's paper-making industry respectively.

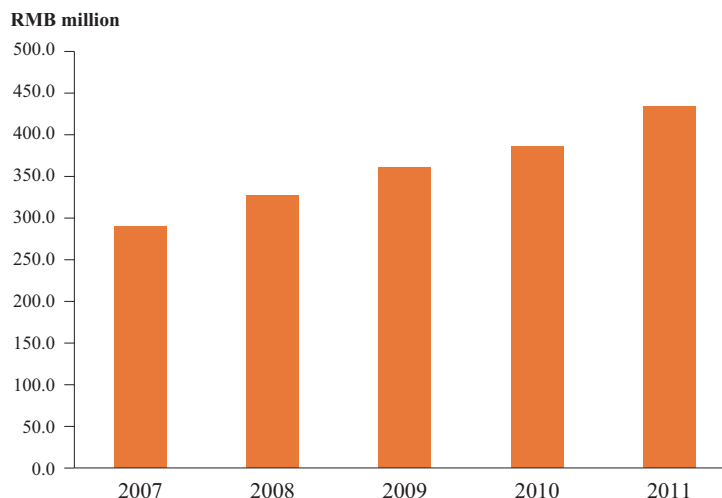
**Market size of the belt filter press market  
for the PRC's paper-making industry**



Source: Euromonitor

## INDUSTRY OVERVIEW

### Market size of the filter press market for the PRC’s paper-making industry



Source: Euromonitor

From 2007 to 2011, the PRC’s paper sludge treatment product market has been growing in size under the support of the PRC government’s environmental protection policies. The 2008 global financial crisis caused many paper-making enterprises to halt their environmental-protection projects due to funding reasons. However, the paper-making industry rebounded quickly in 2011 due to increased demand and favourable governmental policies. In 2011, the market sizes for belt filter press and filter press reached approximately RMB111.3 million and RMB430.8 million respectively.

### Major types of sludge treatment products

Filter presses have clear advantages over ordinary belt filter presses, such as higher capacity and higher dehydrating rates. The steel-belt filter press is a new product which is used for semi-drying and dewatering large quantities of sludge generated from the paper-making, printing and dyeing, publication and coal washing industries, producing Filter Cakes with a water content of approximately 35.0% to 50.0%. Rubber tape vacuum filters are a kind of highly efficient solid and liquid separating product that uses Filter Cloth as a medium and functions by means of gravity and vacuum suction. The water content of the Filter Cakes after the dewatering process is approximately 50.0% to 60.0%.

### Market entry barriers

Due to various market entry barriers, new entrants find it difficult to enter the PRC’s sludge treatment product market. Firstly, as there are varying requirements by customers for filter presses, it is necessary for sludge treatment product manufacturers to have a technical team and adequate research and development capabilities to cater for such varying requirements, thus creating technological barriers for the sludge treatment product market. Secondly, most of the leading sludge treatment product manufacturers own patents to their

## INDUSTRY OVERVIEW

self-developed technologies and have increased awareness of the patent protections available to them, thus making it more difficult for new entrants to utilise the same technologies. Thirdly, as the belt filter press and filter press markets are highly concentrated, only widely recognised manufacturers have the ability to compete for a share of the market. Most users of sludge treatment products are inclined to build long-term relationships with designated suppliers as constant change of suppliers would incur higher costs and risks for them.

### Competitive landscape

#### *Belt filter press market*

In 2011, the market size for the belt filter press in terms of sales value was approximately RMB111.3 million. There are currently around 100 enterprises supplying belt filter presses for dewatering paper sludge, and they are mainly located in Zhejiang Province, Jiangsu Province, Foshan of Guangdong Province, Shanghai and Dezhou of Shandong Province. The five largest companies in the belt filter press market for the PRC's paper-making industry accounted for a total of approximately 63.4% of the overall market share in terms of sales volume in 2011, and their competition mainly lies in large and middle-sized belt filter press and services. As production of larger products require manufacturers to have greater capital strength and more advanced techniques, a very limited number of companies have access to this segment. The five largest companies compete for a larger market share through pricing, technological research and development, better integration services, wider range of applications and a larger sales network. Our Group generated a small amount of revenue from the sales of steel-belt filter press in 2011 as we only received the first order for our steel-belt filter press, which was one of the product types of belt filter press, in March 2010 and first recognised revenue from sales of such product in December 2010. Our Group had a market share of approximately 2.6% of the belt filter market in 2011 based on our sales for the same year. The following table sets out the companies which are believed to have a major presence/market share in the belt filter press market for the PRC's paper-making industry by sales volume and market share in 2011:

Ranking	Company name	Sales value (approximately RMB million)	Market share (%)
1	Company E	37.5	33.7
2	Company F	10.5	9.4
3	Company G	10.0	9.0
4	Company H	9.0	8.1
5	Company I	3.6	3.2
–	Others	40.7	36.6
–	Total	111.3	100.0

Source: Euromonitor

---

## INDUSTRY OVERVIEW

---

The table below sets out the background information and the principal business of companies which are believed to have major presence/market share in the belt filter press market for the PRC's paper-making industry in 2011:

<b>Name of company</b>	<b>Background information</b>
Company E	Company E, whose production base is situated at Foshan's Chancheng West Industrial Zone and Sanshui Leping Industrial Zone, is a foreign-invested subsidiary wholly owned by its holding company in Austria. Company E supplies machinery products and technologies for pulp and paper, environmental, animal and aquatic feed, iron and steel, water, electricity and chemical industries, as well as industrial automation control systems, components and related services. Its main products include the spiral belt filter press. Company E has set up offices in Beijing, Shanghai, Hangzhou and other cities with more than 800 employees in the PRC.
Company F	Company F specializes in design and production of environmental-protection products, and has its production facilities based in Binhai Economic-Technological Development Zone, a national development zone, in Weifang, Shandong Province. Company F produces spiral sludge dehydrators, multi-round-plate sludge dehydrators and other environmental protection products, which are mainly used in the environmental-protection and food processing industries.
Company G	Company G was founded in 1867 and is a family business from Europe. It operates in more than 50 countries in the world and has approximately 40,000 employees globally. Company G's main products include the spiral belt filter presses. Company G's technologies and products are widely used in every aspect of the paper industry, such as newsprint, tissues, etc.
Company H	Company H is a comprehensive supplier of filters, hybrid system automation systems and solutions. Company H's main products include the belt filter press. Its products are used in pharmaceutical, sugar-refining, ceramics, fishing boats, paper, printing, chemicals, environmental-protection, and sewage treatment industries.

## INDUSTRY OVERVIEW

Name of company	Background information
Company I	Company I is a machine manufacturer and supplier of liquid/solid separation products. Company I's main products include various types of belt filter presses, filter presses and accessory product. Its products are widely used in industrial wastewater and sewage treatment of many industries such as chemical, oil refining, pharmaceuticals, metallurgy, food, sugar, and ceramics.

### *Filter press market*

In 2011, the market size for the filter press in terms of sales value was approximately RMB430.8 million. There are currently approximately 200 filter press manufacturers supplying the PRC's paper-making industry, and they are mainly located in Hangzhou of Zhejiang Province, Wuxi of Jiangsu Province, Shanghai, Dezhou of Shandong Province, Hengshui of Hebei Province, and Yuzhou of Henan Province. The five largest companies in the filter press market for the PRC's paper-making industry accounted for a total of approximately 54.6% of the overall market share in terms of sales volume in 2011. The following table sets out the companies which are believed to have a major presence/market share in the filter press market for the PRC's paper-making industry by sales volume and market share in 2011:

Ranking	Company name	Sales value (approximately RMB million)	Market share (%)
1	Company J	85.0	19.7
2	Company K	70.0	16.2
3	Company L	52.5	12.2
4	Company M	15.0	3.5
5	Huazhang Technology	12.8	3.0
–	Others	195.5	45.4
–	Total	430.8	100

Source: Euromonitor



---

## INDUSTRY OVERVIEW

---

The table below sets out the background information and principal business of the companies which are believed to have major presence/market share in the PRC's filter press market for the PRC's paper-making industry in 2011:

<b>Name of company</b>	<b>Background information</b>
Company J	Company J specialises in research and development, manufacturing, sales and services of filter presses. Company J has set up more than 150 offices around the country and has more than 1,000 distributors and dealers. Company J has also set up overseas offices in the US, Europe and Australia. Company J has developed eight series of products with nearly 200 different specifications tailored to market demands. Its products are widely used for liquid/solid separation in textile, oil, chemical, metallurgy, mining, pharmaceutical, food, starch, environmental-protection and wastewater treatment industries.
Company K	Company K is a manufacturer, distributor and service provider of filter presses. Company K has a team of more than 500 sales and technical specialists. It also has around 45 dealers and service providers overseas. Its products are exported to around 123 countries and regions including Europe, US, Russia, Japan, Brazil, South Africa and Australia. Company K's main products include the high-pressure membrane filter press which is used in sludge treatment by the paper industry.
Company L	Company L's products include various types of filter presses and filters, which are widely used in mining, electricity, oil exploitation and refining, chemical, metallurgy, pharmaceuticals, and food and beverage industries. Its products are distributed around China and exported to some 20 countries and regions including Russia, Japan, South Korea, Thailand, South Africa, India, Indonesia, Germany and the Philippines.
Company M	Company M, founded in 1992, is a supplier of professional filters, integrated systems and services driven by technological innovation. The company was listed on the Shenzhen Stock Exchange's Growth Enterprises Market board in September of 2011. Company M offers a full range of filter products, solutions and services, including: model selection, installation, testing, training, technical support and after-sales services. Company M's filters are widely used in environmental-protection, chemical, metallurgy, oil, printing, ceramics, food, pharmaceutical, construction material and non-ferrous metal industries. Its products are widely distributed in the PRC and overseas to more than 40 countries and regions.

## INDUSTRY OVERVIEW

Please refer to the paragraph headed “Competitive strengths of our Group” under the section headed “Business” in this document for further details about the competitive strengths of our Group.

### DRIVERS OF THE SLUDGE TREATMENT PRODUCT INDUSTRY

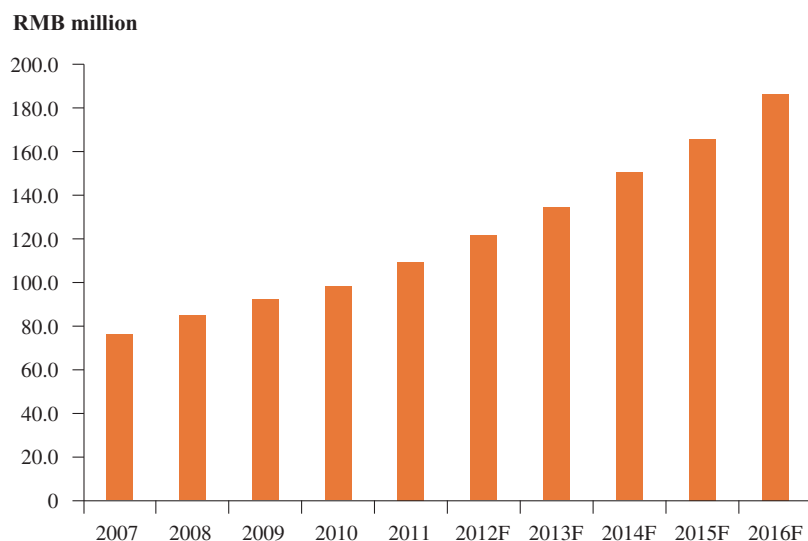
The PRC has maintained rapid economic growth in recent years, which provided sound conditions for the development of the paper-making industry and environmental-protection product industry. Paper-making enterprises are now willing to invest more in environmental-protection facilities and as such there is potential for growth of the sludge treatment product industry.

The PRC government has also paid more attention to environmental issues in recent years by introducing a series of policies and plans which have set forth new requirements and guidances for the paper-making industry to reduce pollution and energy-consumption levels, which will in turn encourage paper manufacturers to utilise sludge treatment products.

### FORECASTS FOR THE SLUDGE TREATMENT PRODUCT INDUSTRY

Given the steady growth of the PRC paper-making industry, the sludge treatment product industry is expected to continue to grow for the years 2012 to 2016. The following charts show prediction of the market size and growth rate of the belt filter press and filter press for the PRC’s paper-making industry.

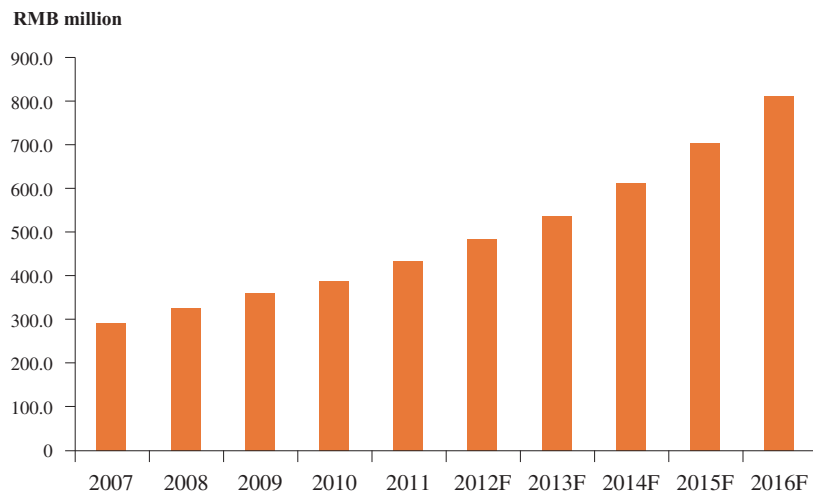
**Market size of the belt filter press market  
for the PRC’s paper-making industry**



Source: Euromonitor

## INDUSTRY OVERVIEW

### Market size of the filter press market for the PRC's paper-making industry



Source: Euromonitor

As the PRC government continues to raise the standards of environmental protection and as the belt filter press industry continues to develop new products, the competitive strengths of new belt filter press products are being brought to light. New products will be valued more by large paper-making manufacturers and the high-end market. It is predicted that the belt filter press industry for paper-making companies will keep growing at a double-digit CAGR over the next 5 years.

For the filter press industry, new products like the membrane filter press and the frame filter presses have gradually replaced ordinary filter presses. Market competition in the future will focus on the research and development of technology, sales of integrated systems, large projects and brand building. The filter press industry is predicted to grow faster than the belt filter press and its market size will approach approximately RMB800.0 million by 2016.

#### Demand for high quality and technologically advanced products

The PRC government encourages large and middle-sized paper manufacturers to [●] more in environmental protection facilities. This has facilitated the growth in demand for efficient, high quality and technologically advanced belt filter presses and filter presses for the paper-making industry even though the growth rate of paper output is decreasing.

As the 12th Five-Year Plan urges the paper-making industry to increase its market concentration, the sludge treatment product industry is also likely to increase its market concentration. High-end paper-making enterprises will continue to purchase from high-end product suppliers with guaranteed quality products and complete services. The lower-end market will be characterised by constant price wars amongst smaller sludge treatment product manufacturers. New areas of the market, such as dredging sludge and dewatering sludge of tap water, will also face increasing competition in the future.

## INDUSTRY OVERVIEW

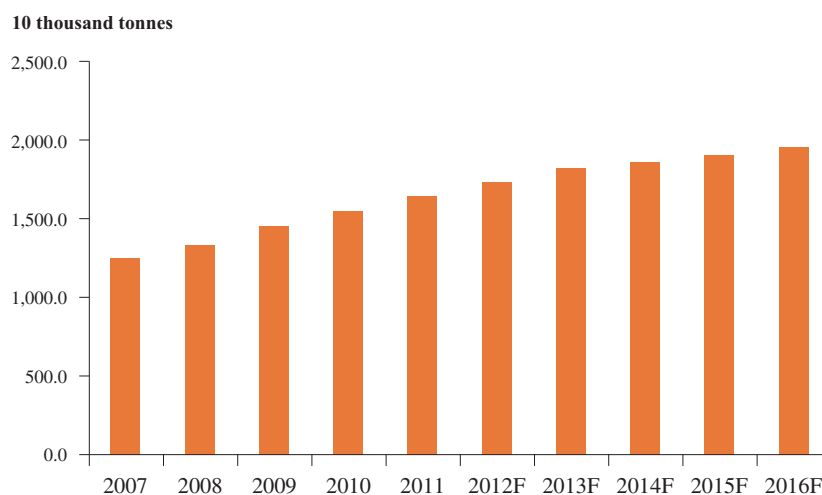
### THE PRC'S PAPER-MAKING SLUDGE TREATMENT PRODUCT MARKET

During the 11th Five-Year Plan, the PRC's sludge treatment product market grew quickly in terms of capacity and efficiency while the total amount of sludge kept increasing. According to the *Report on Sludge Treatment and Disposal Market in the PRC (2011)*, about 80.0% of the sludge was not treated and disposed of properly.

Apart from cities and towns, the PRC has thousands of industry specialty development zones and their output of industry sludge was not strictly treated and disposed as well. In the 12th Five-Year Plan, the government indicated that the requirements for sludge treatment will be higher and regulations will be more strictly enforced.

As paper sludge is the outcome of wastewater disposal in the paper-making industry, the production output of paper sludge is closely linked to the volume of the industry's wastewater emissions, which is determined by the overall development of the paper-making industry and the authorities' requirements and standards in terms of environmental protection.

#### Total output of paper sludge produced by the PRC's paper-making industry



Source: Euromonitor

The PRC's paper-making industry produced a total of approximately 16.4 million tonnes of sludge in 2011 representing a year-on-year growth of 6.7%. It is predicted that the total output of paper sludge produced by the PRC's paper-making industry will grow at a CAGR of 3.4% between 2011 and 2016 and will be influenced by the following factors over the next five years:

1. according to the 12th Five-Year Plan of the PRC's paper-making industry, the total production output of the industry is to be controlled, while more emphasis will be placed on environmental protection such as recycling, emission reduction and disposal of waste pollutants. Therefore the output of paper and paperboards is

---

## INDUSTRY OVERVIEW

---

unlikely to grow substantially, and study results have proven that the PRC's total output of paper products has been decelerating, leading to reduced generation of paper sludge; and

- standards for Pollutant Emissions of Pulp and the Paper-Making Industry(GB3544-2008), revised on 1 August 2008, raised the limits of various waste emissions, increasing the disposal rate and depth of wastewater in the PRC's pulp and paper-making industry. Additionally, paper-making enterprises have reinforced their commitment to wastewater and sludge recycling and the application of recycling solutions in order to meet the new elevated standards and to reduce the cost of waste treatment. Thus, the growth of paper sludge production has been slowing down yearly.

From 2007 to 2011, the amount of sludge produced per tonne of paper and paperboards in the PRC's paper-making industry reduced annually, and this trend is likely to continue over the next five years, given the PRC government's move to foster more environmental-friendly production in the paper-making industry. The 12th Five-Year Plan has clearly set the goal for leading enterprises towards clean production, energy saving and emission reduction, and has put in place policies to give incentives for environmentally conscious enterprises such as simplified approval procedures for construction projects. Incentive policies also encourage paper manufacturers to recycle and reuse paper wastes like black liquor pulp, sludge, ashes, and concentrated wastewater for purposes like producing biomass energy. If these paper manufacturers are to take measures to reduce waste as encouraged, the amount of sludge produced per tonne of paper and paperboards will decrease on a yearly basis.

Euromonitor's report focuses on industrial automation system and sludge treatment product market in the paper-making industry in the PRC. Primary research involved qualitative and quantitative based trade interviews not identified by numbers of survey samples, but by the assessment of the quality of answers received, and the intelligent and transparent analysis of that data. Euromonitor conducted trade interviews with multiple organisations such as: paper manufacturers, sewage treatment factories, industrial automation system and sludge treatment product manufacturers and distributors for the paper-making industry. A data set and conclusions are reached by independently building segment consensus. Secondary research involved top-down central research with bottom-up intelligence to present a more comprehensive and accurate picture of the industrial automation system and sludge treatment product market in the paper-making industry in the PRC.

Euromonitor used multiple secondary and primary sources to validate any data or information collected with no reliance on any single-source. Furthermore, a test of each respondent's information and views against those of others is applied to ensure reliability and to eliminate bias from various sources. Specifically for ensuring forecasting accuracy, Euromonitor adopted its standard practice of both quantitative as well as qualitative forecasting in terms of the market size, growth trends, on the basis of a comprehensive and in-depth review of the market development history, and a cross check with established government and industry figures, trade interviews, and statistical analysis tools where possible.