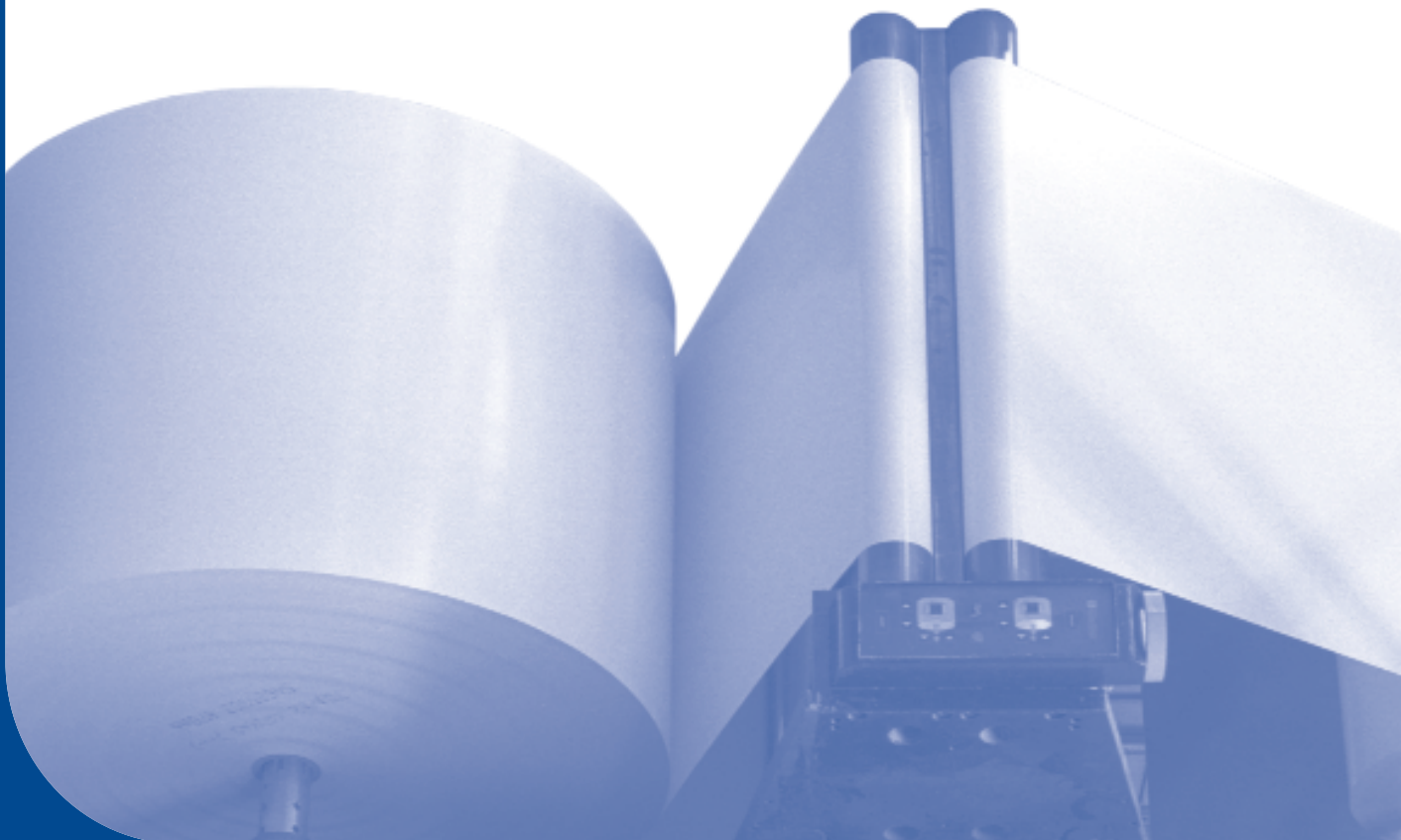




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# Sources and Acknowledgement

The EMGE WORLD GRAPHIC PAPER report contains data and 5-year forecasts for paper demand, supply and price around the world.

To compile these reports we have used an extensive range of sources, including all published information available to EMGE & Co. Ltd. In addition to published data, we have made reference to much industry data, which companies have been willing to share with us non-confidentially.

Furthermore, we have applied our own market research resources to gather additional information, and included information from other co-operating companies.

The EMGE databases are updated daily. We publish these forecast reports twice a year (March/April and September/October), with new data and revised 5-year forecasts.

The forecast timescale is 2011 to 2016.

# Definitions

Paper activity data are based on Volumes as sold, measured in metric tonnes (data have been converted from short tons to metric tonnes where appropriate).

The grades referred to in this study encompass Printing/Writing Paper grades as described below in their respective definitions (*some regional differences in definition do exist*). A separate study on “World Newsprint Markets” is also available.

**Uncoated Mechanical (UM)** - includes offset and gravure uncoated woodcontaining printing & writing papers, generally in the basis weight range >54gsm (e.g. SC Magazine), but including Directory, Improved Newsprint and other lightweight grades.

**Coated Mechanical (CM)** - includes offset and gravure coated woodcontaining printing & writing papers (>10% mechanical pulp), generally in the basis weight range 54-80gsm; but also includes ultra-lightweight coateds & heavyweight coated woodcontaining (as well as LWC & MWC) in sheets & reels.

**Coated Woodfree (CWF)** - includes coated Woodfree printing & writing papers (<10% mechanical pulp), generally in the basis weight range 80-300gsm; both 1 & 2-side coated free in sheets & reels are included.

**Uncoated Woodfree (UWF)** - includes uncoated Woodfree printing & writing papers (<10% mechanical pulp), generally in the basis weight range 60-150gsm; in folio sheets, reels and cut-size, covering both bulk grades and uncoated specialities.

**Coated** = Coated Mechanical + Coated Woodfree

**Woodfree** = Uncoated Woodfree + Coated Woodfree

**Printing & Writing (P&W)** = Uncoated Mechanical + Coated Mechanical + Coated Woodfree + Uncoated Woodfree

**Graphic Paper** = Printing & Writing + Newsprint

**Demand / Consumption** - calculated as Production + Imports - Exports

**Production / Output** - paper mill saleable production

**Trade** - Net Exports, i.e. Production - Consumption

**Capacity** - Annual Machine Capacity, based on technical, not market, conditions

**Operating Rate** - Theoretical Ratio of Production to Capacity

**M/c** – Machine

Details of Country groupings in the Regional Tables are shown in the Country Data World-wide section (see page 49).

# Report Contents

EMGE's WORLD GRAPHIC PAPER report (WGP), provides a unique and comprehensive database of world markets, assessing the current situation and the market outlook for the complete range of products in all world regions.

*World Graphic Papers - a unique, global and fundamental perspective on the prospects for this important and dynamic industry.*

The aim is to provide an objective update of the prospects for world paper markets – i.e. Coated Woodfree, Uncoated Woodfree, Coated Mechanical and Uncoated Mechanical (including Improved Newsprint).

The WGP report provides revised and updated forecasts of Demand, Trade, Output, Capacity and Operating Rates. The report covers the future global and regional demand-supply balance, by paper grade. The forecast timescale is 2011 to 2016.

*New forecasts for Demand-Supply from 2011 to 2016.*

In order to assess the impact of consolidation and changing industry structure, the report provides detailed rankings of Leading Suppliers, by grade, region and total. At the request of our clients, these tables include regional summaries.

*Detailed rankings of Leading Suppliers, by grade and region.*

Furthermore, we have incorporated special research into the Herfindahl-Hirschman Index, which is an index based on market shares which is used by the Authorities to gauge the levels of concentration in an industry. We have applied this index to the Paper Industry and coined the term the Pi-HHi (pronounced "pie-high").

*EMGE's Pi-HHi – Herfindahl Hirschman Index.*

We also provide country-by-country data for 2011. In addition, the report incorporates the latest information regarding capacity changes and investments, including M&A activity.

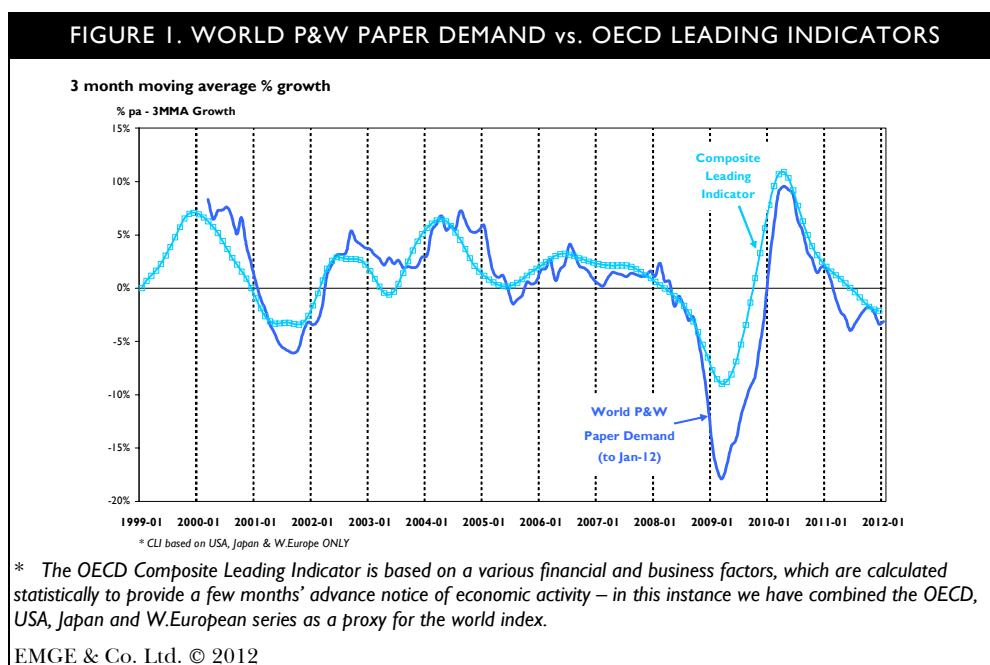
*Incorporating the latest announcements for capacity changes and investments.*

As well as a comprehensive collection of market data, great care has been taken to assess machine capacity in detail. The capacity data used are mainly based on announced, financed and confirmed plans, as well as some assumptions and forecasts made by EMGE (e.g. unspecified closures). The report provides additional information on all announced plans, whether decided or not (see tables of Machine Investment Listings on page 73, which compare "decided" and "undecided" machines).

**EMGE & Co. Ltd.**  
**March 2012**

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# Introduction



The **EMGE WORLD GRAPHIC PAPER FORECAST** report is a comprehensive, unique and independent assessment of the future for the paper industry. The latest report ("WORLD GRAPHIC PAPER - MARCH 2012") is an update in the **EMGE** series WORLD GRAPHIC PAPER, covering fundamental global market issues.

The above chart shows that global paper demand has been on weakening since the first half of 2010, again broadly in line with the OECD leading indicators of economic growth. Having turned negative during 2011, Pr/Wr paper demand for the full year fell by -2.2%, with publication papers (CWF -3.4%, CM -3.3%, UM -3.9%) suffering worse than UWF (-0.5%).

Looking forward, economic pointers around the world are currently quite mixed. Falling inflation in many markets (notably China and India) has given rise to hopes that these countries will now be able to ease fiscal conditions to promote stronger growth. In addition, recent signs from the USA, suggest that a modest economic recovery is underway. In Europe, however, government spending cuts have led to predictions of a brief recession in Europe this year, while worries about sovereign debt in the Eurozone persist.

Based on all the data available and combining the latest developments in the markets, we review past and current market conditions and examine the drivers and prospects for future change, to provide subscribers with an updated outlook for demand, trade, investment, capacity, operating rates for the world Printing and Writing paper markets.

The following table shows the summary global forces for each asset group:  
**(MMBILION 2015)**

Positive pressure on  
 commodity prices  
 increased demand for  
 gas and oil due to  
 low stock levels in  
 several countries  
 strong commodity

TABLE 2 GLOBAL FUTURE MARKET SUMMARY							
2015 values, % per unit of output or capacity							
	2015	2014	2013	2012	2011	2010	2009
<b>Energy - Woodstock</b>							
Woodstock	20.1%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Energy price	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%
Woodstock	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Energy price	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%
Energy price	0%	0%	0%	0%	0%	0%	0%
<b>Energy - Woodstock</b>							
Woodstock	20.1%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Energy price	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%
Woodstock	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Energy price	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%
Energy price	0%	0%	0%	0%	0%	0%	0%
<b>Energy - Woodstock</b>							
Woodstock	20.1%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Energy price	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%
Woodstock	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Energy price	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%
Energy price	0%	0%	0%	0%	0%	0%	0%
<b>Energy - Woodstock</b>							
Woodstock	20.1%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Energy price	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%
Woodstock	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Energy price	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%
Energy price	0%	0%	0%	0%	0%	0%	0%
<b>Energy - Woodstock</b>							
Woodstock	20.1%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Energy price	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%
Woodstock	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Energy price	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%	+1.5%
Energy price	0%	0%	0%	0%	0%	0%	0%

Source: ENGE, 2015, 2014, 2013, 2012, 2011, 2010, 2009

## Summary

TABLE 1. MARKET PERFORM. - WORLD IP BLOCK, TOTAL TRADE							
USD million							
Segment	2011	2012	2013	2014	2015	2016	2017 change
Whisky	2,000	2,050	2,000	2,010	2,010	2,010	+2%
Other Spirit	1,100	1,000	1,000	1,100	1,000	1,000	+2%
Beverage	2,700	2,700	2,700	2,700	2,700	2,700	+2%
Food Service	500	500	500	500	500	500	+2%
Beer	800	800	800	800	800	800	+2%
Wine	1,000	1,000	1,000	1,000	1,000	1,000	+2%
Other Beverage	1,100	1,100	1,100	1,100	1,100	1,100	+2%
Snack	500	500	500	500	500	500	+2%
Total	8,200	8,150	8,100	8,110	8,110	8,110	+2%
Europe Total	3,000	3,000	3,000	3,000	3,000	3,000	+2%
Asia Total	3,000	3,000	3,000	3,000	3,000	3,000	+2%
Source: EMGE, 2011-2017							
growth % per							
Segment	2011	2012	2013	2014	2015	2016	2017
Whisky	+2%	+2%	+2%	+2%	+2%	+2%	+2%
Other Spirit	+2%	+2%	+2%	+2%	+2%	+2%	+2%
Beverage	+2%	+2%	+2%	+2%	+2%	+2%	+2%
Food Service	+2%	+2%	+2%	+2%	+2%	+2%	+2%
Beer	+2%	+2%	+2%	+2%	+2%	+2%	+2%
Wine	+2%	+2%	+2%	+2%	+2%	+2%	+2%
Other Beverage	+2%	+2%	+2%	+2%	+2%	+2%	+2%
Snack	+2%	+2%	+2%	+2%	+2%	+2%	+2%
Total	+2%	+2%	+2%	+2%	+2%	+2%	+2%
Europe Total	+2%	+2%	+2%	+2%	+2%	+2%	+2%
Asia Total	+2%	+2%	+2%	+2%	+2%	+2%	+2%
Source: EMGE, 2011-2017							

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**This forecast includes:**

- A marginal (-0.4% pa) average global paper demand decline from 2011-2014.
- The current decline in demand is forecast not only due to the panic over Greece but also to the current decline in demand in Europe, the US and Japan recovering step by step from last year's mortgage/real estate, and losses expected from the Olympic Games and the Euro 2012 football championship this summer, as well as the US Presidential Election later this year. The current fall in paper demand is predicted to slow and reverse, turning to growth during 2012.
- However, after 2012, we forecast a very weak 2013, with the USA cutting new budget spending soon following the Presidential Election. This is expected to slow the US economy and to impact the rest of the world in 2013, and this will negatively affect paper demand.
- Once the market has adjusted to the US spending cuts, we expect China's government to respond by spending more to stimulate economic growth. This is expected to help to improve consumer and business confidence, thus driving a recovery and a return to growth (including paper demand) during 2014, strengthening further in 2015. For global paper demand, there will be no lasting fundamental strength in this recovery, however, and a new decline in demand is predicted for 2014.
- Regionally, demand growth in emerging markets and declines in mature markets are predicted to add up to a marginal (-0.4%) overall decline in global Printing/Writing demand for the 2011-2014 period.
- With demand forecast to edge downwards, capacity management will again be the most important issue during the forecast period, as the industry is already suffering from overcapacity. Based on current confirmed plans, **Base Capacity** would rise slightly (by an average of 0.4% pa) during the forecast period, or a total of 2.4 million tonnes, with closures in mature markets being outweighed by investments, mostly in Asia. With declining global demand, this would worsen the oversupply situation.
- However, we are predicting that there will be even more capacity closures in mature and Asian markets, that have not yet been announced. These "Unpermitted" closures are also forecast to be accompanied by net pre-announced investments in Asia. All of these forecast **Unpermitted Capacity** closures and investments are expected to add up to 4 million tonnes of additional capacity being taken out of the market.
- Combining the **Base Capacity** and these **Unpermitted Capacity** developments, our **EMGE Forecast Capacity** shows a marginal drop in global P/W paper capacity (averaging -0.2% pa for 2011-2014).
- With demand and capacity both predicted to fall only slightly, we are forecasting that the global paper market will be generally oversupplied for most of the forecast period, although we do expect temporary periods of balanced supply and demand.
- Western Europe is forecast to remain the main paper exporting region, particularly in Mechanical grades, while China will continue to grow as an exporter, adding LWP to the CWP that it already exports.

## Major events since last forecast

**About 1 trillion sqm of new closures announced; inflationary economic cycle appears to be resubstanting**

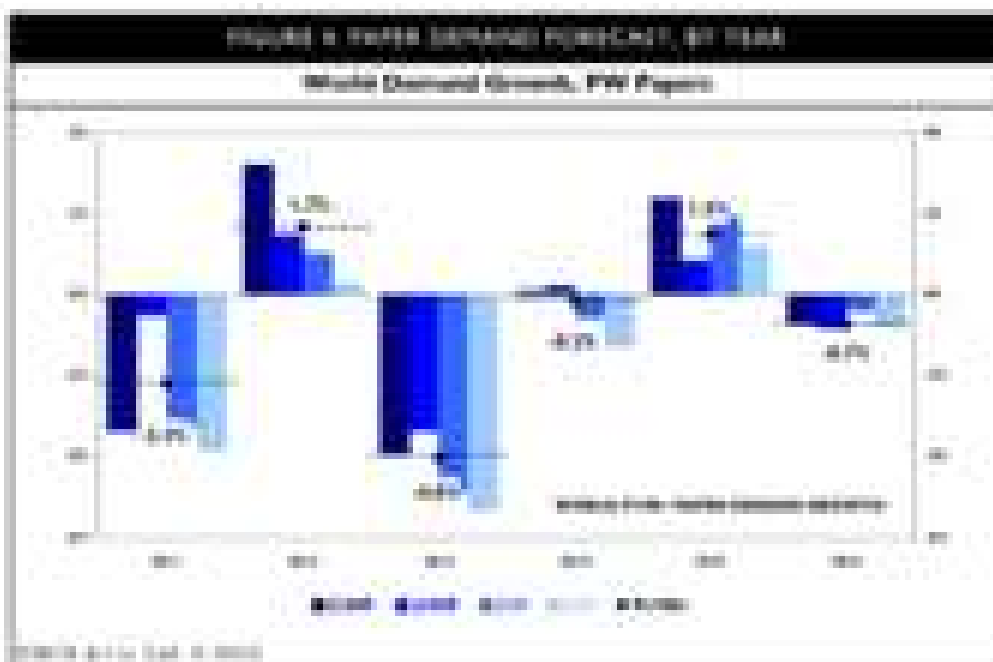
In this section, we provide a brief overview of the most important new developments that have taken place since our last report, and which have affected our new forecasts.

- We warned in our last report that far more closures would be necessary to prevent huge overcapacity, but the industry has taken firm action and announced new closures, which will remove 1.8 million more sqm of PFM paper capacity from the market than had been planned by the time we published our last World Graphic Papers report. Almost half of this will result from closures in North America this year (2011).
- Greece has, for now, avoided default, having as the tax revenue qualified to receive its loan extension of bailout funding. This has eased short-term worries about stability in the Eurozone, although some analysts are saying the problem of Greece's finances is merely being delayed, not resolved. In any case, a loss of an influence on confidence in the short term, but it could well turn to head again during the bailout period.
- The US economy, meanwhile, has strengthened again, with GDP growth accelerating from just +0% in the second quarter of 2011 to +1.8% in the third quarter and +2% in the fourth quarter. Unemployment has also now fallen to a three-year low of 8.3%. This is expected to help slow the decline in paper demand, as well as giving the government breathing space to delay big spending cuts until after the Presidential Election in November this year.
- Although the prices of oil and many other commodities remain high, the year-on-year percentage increases have slowed considerably since our last World Graphic Papers report. This has reduced inflationary pressures around the world, which has encouraged several major economies to step in with reserve fund financing programmes, which we expect to promote growth in the short term, at least.

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## A. Demand

### A.1 Demand Overview



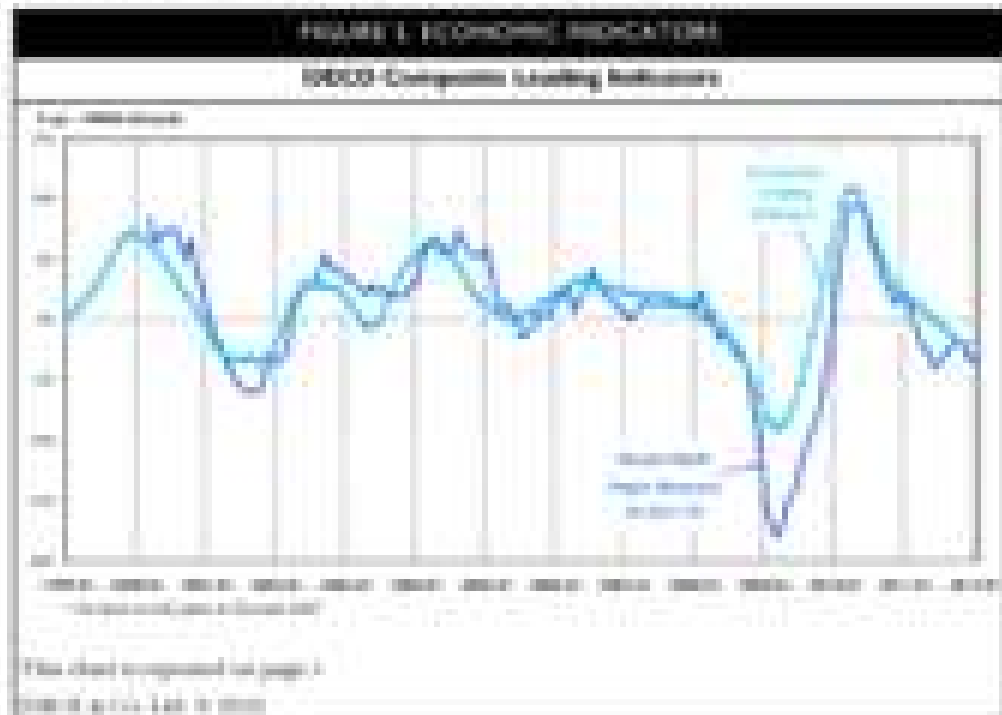
In our view, the outlook for world paper demand remains negative in the long term, which is reflected in our forecast for the period 2013-2018 (-0.4%). This is a balance of a negative outlook in mature markets, with more positive prospects in emerging markets.

The negative outlook in mature markets is mainly due to competition from New Media, which are winning more and advertising spend from print media, including print. The few remaining sources of growth in mature markets are outweighed by the negative.

New Media are also growing heavily in emerging markets, but despite this, printed media remain strongly in growth too, with print advertising growing by double figures in China and India and also strongly in other major developing markets, like Brazil, thanks to growing middle class and disposable income. Developing countries are also seeing growth in commercially-based business, which is driving consumption of graphics.

Nevertheless, New Media are growing even more strongly than printed media and we expect the negative influence from mature markets to become more of an issue in emerging markets in the long-term future.

## 4.2 Demand: Short-term global developments



We examine the long-term, structural influences on demand here in this report, but first we outline how we believe the economic and paper market cycles will affect the paper market further.

The *Forecast* section will look at the near-term (quarter A2) and regional (A.1) developments and how they are influencing the short-term outlook, and this will be followed by our long-term outlook (A.4), including underlying structural influences on paper demand.

In the short term, declining consumer paper demand since early 2011 has been accompanied by a steady weakening of the otherwise global economic outlook (see chart). However, there are some signs that this could be about to turn around, we believe.

Inflationary pressures in many countries, especially in developing regions, checked off money supply as a notable influence in the second half of 2011. However, inflation has now been falling for several months in many cases, and governments/central banks are turning towards measures that will promote economic growth, rather than measures that will curb inflation.

- The US economy, which has struggled ever since the declining housing market popped the subprime loan bubble, has been improving in recent months, with growth strengthening to 1.7% in Q4 2011 and unemployment falling to a 3 year low.
- The short-term worries over the stability of the Eurozone and a potential Greek default appear to have calmed for now, as Greece managed to avoid default for the moment and has reorganized some of its debts. This is a potential upside for Consumer Confidence.
- Signs further ahead (by perhaps three months), the Olympic Games and the Euro 2012 football championships are expected to boost spending and the "feel good" factor, which we expect to keep the business cycle on an upward trend until the latter part of the year. In addition, the US Presidential Elections in November 2012 are expected to provide a market cheer some boost to advertising and economic activity generally this year.

The slide shows the forecast highlighting Japan's growth potential. It is a copy.



There are still negative rates of interest.

-Oil prices have risen considerably (although they are currently falling again), and further rises could not stop a new inflationary phase. This would almost certainly deepen economic growth.

-Many governments are still using spending, which may prevent economic growth and lead to unemployment. Several big markets appear to be managing the balancing act quite well, but they remain a risk.

However, we previously said that fears (about a Greek default and possibly the break-up of the Eurozone) were either too serious or not serious enough. If the latter thing happens, then consumers and businesses were not afraid enough. But for now, it has not happened, so perhaps they were more afraid than they needed to be.

Our belief that people's fears were exaggerated was one of the assumptions behind our previous short-term forecast and that remains the case for the forecast.

On the face, and using the scenario for positive factors mentioned previously, we are predicting global real GDP demand growth of +1.7% this year, led by developing markets, but even helped by growth in some mature markets (not China).

TABLE 7 DEMAND GROWTH BY REGION AND MARKET (2011)

2011	% growth (2011 over 2010)				Printing Printing
	Europe Market	Asia Market	Europe Pack	Asia Pack	
Alloys	1.7%	1.7%	0.7%	0.8%	1.0%
Other metals	0.7%	0.8%	1.0%	1.7%	0.8%
Alloys	1.7%	1.7%	0.8%	0.8%	0.7%
Other metals	1.7%	1.0%	1.7%	1.7%	0.8%
Paper	1.4%	0.8%	1.4%	0.8%	1.7%
Other	0.8%	1.0%	0.8%	1.0%	1.0%
Other metals/Pack	1.7%	1.7%	1.7%	1.7%	1.7%
Overall	1.0%	1.0%	1.0%	1.0%	0.8%
Total	1.0%	1.0%	1.0%	0.8%	1.0%
Europe Total	1.0%	1.0%	0.7%	1.0%	1.0%
Asia Total	1.0%	1.7%	1.0%	0.7%	0.7%

Source: EMG&amp;E, 2011

It is too early yet to say whether slower declines in global paper demand in late 2011/early 2012 already mark the start of the mini-recovery that we are forecasting for this year.

However, with China expected to ease financial conditions further, with India posting stronger growth, with the US economy already improving plus further factors expected from several national factors (Olympics, etc.), we believe just such a mini-recovery will begin over 2H, indeed it has's already.

This is also predicted to help the current weakness in paper prices, helped by pulp prices, which are already rising up since the start of this year (especially hardwood pulp). This could mean some replenishment of inventories in the first half of 2012, although we would expect actual rising paper prices to face a subsequent backlash in the form of falling order volumes before the end of the year.

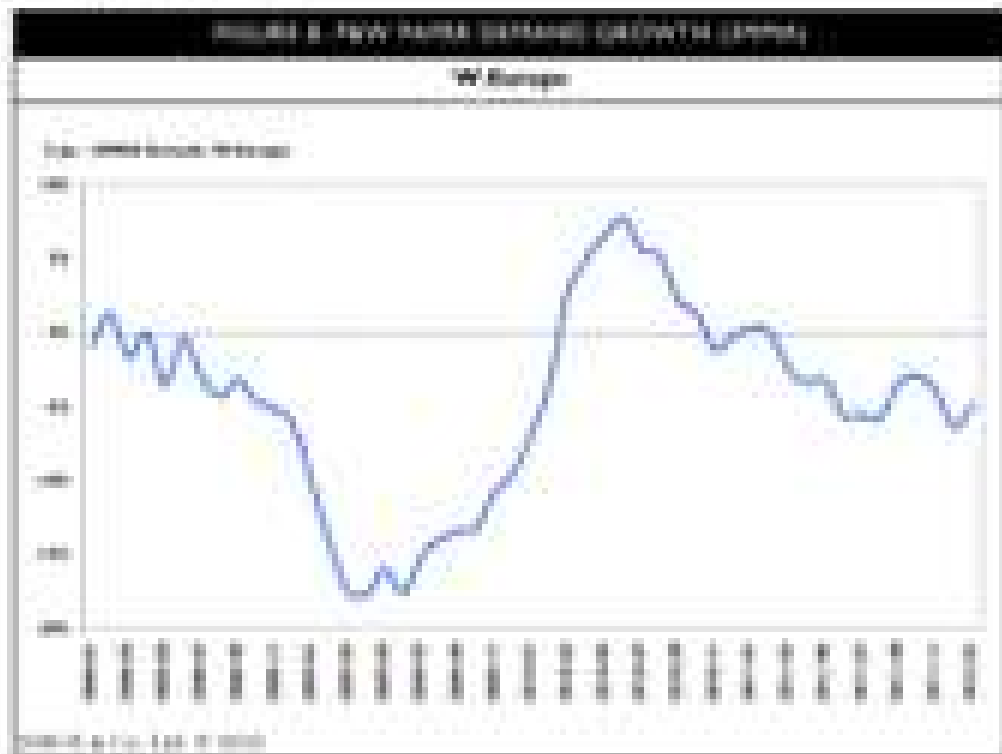
To summarize, then, there has been no real financial crisis so far, so we maintain our pricing because that the current decline in demand will bottom out very soon, with demand breaking back through as growth during the course of 2012. Rising prices could keep the mini-recovery short lived, however, although we do not expect the recovery to last into 2013 in any case.

The following pages look to cover short-term paper market developments by region.



## A.3 Demand: Market-driven developments in regional markets

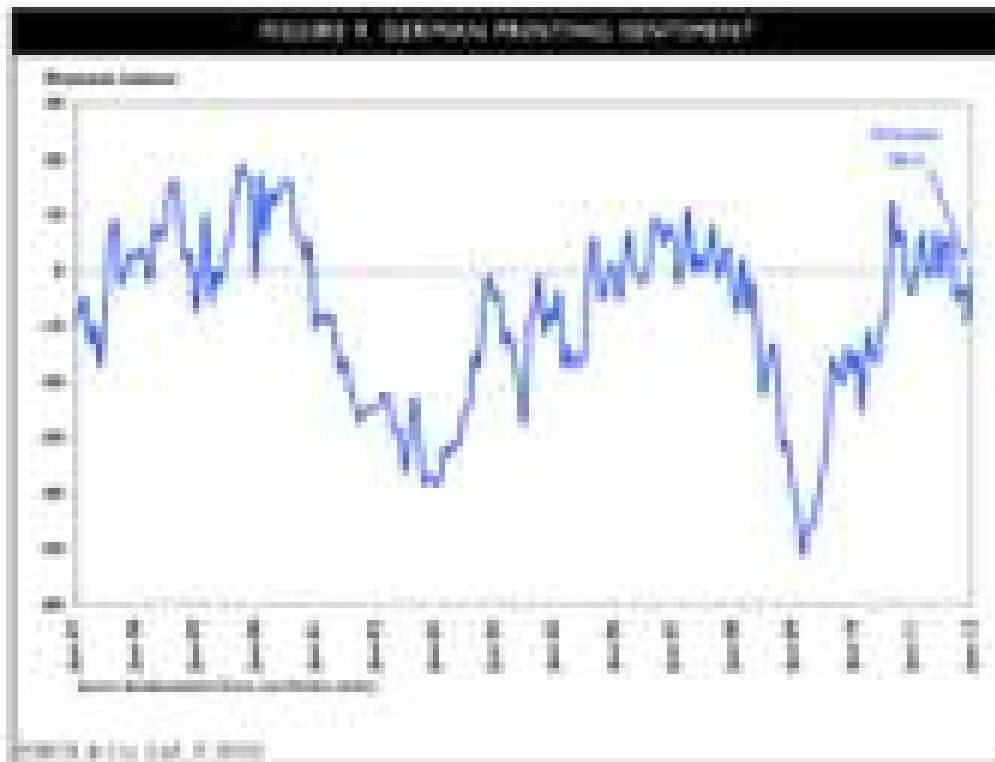
### A.3.1 Western Europe



After a temporary mini-recovery in the early and middle parts of 2010, apparent paper demand growth in Western Europe has been very decline and has not been rising since early 2011 (see chart). The 3 month moving average (3month) growth rate accelerated sharply, temporarily for a year or so until just 2011, but since then, it has rather flattened out at around 0%.

In our view, the real demand for paper is unlikely to get much weaker than this, because the demand drivers suggest the average declines are not worse than this. The main of the demand drivers is regular consumption of printed books, which is seeing declines of roughly -10%, while newspaper volumes are falling by up to 40% in some cases (although less in Germany), and other sectors are suffering considerably smaller declines, too (e.g. German magazines are seeing only a moderate drop in circulation and roughly stable advertising as of the second half of 2010).

We believe an aggregate of the major sources of paper consumption would suggest that real demand may even be falling by less than 0%. This would in turn suggest there has been some relaxation in inventory volumes, and as prices were under downward pressure in 2011, inventory reduction would fit the phase of the business cycle.

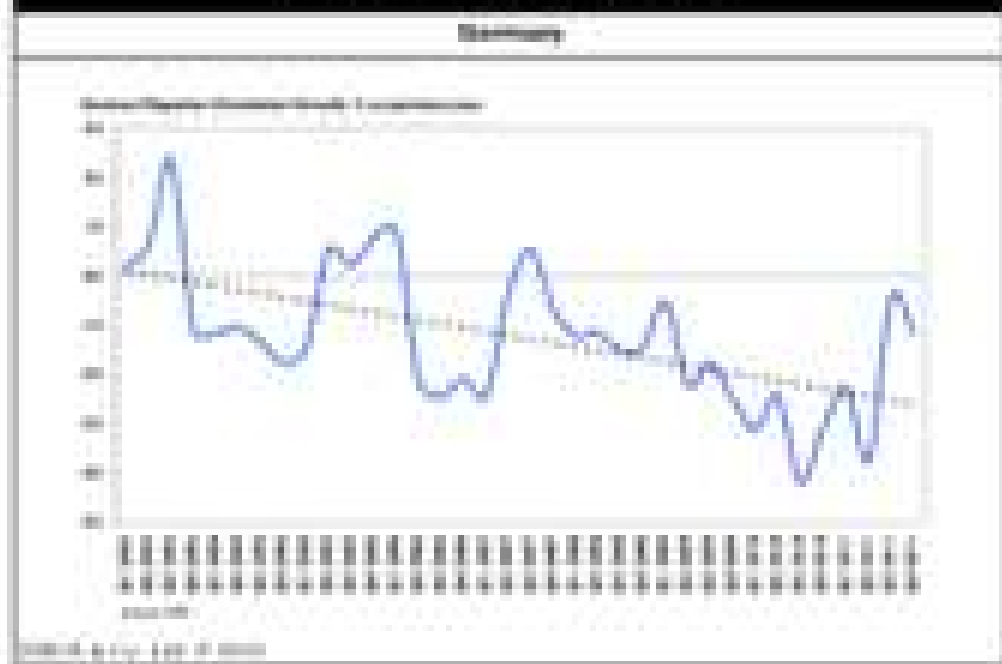


As the indicators from services and non-services firms (both mixed) as there were also mixed signs in the printing sector.

The UK printing industry was no exception. The January 2012 Printing Outlook Survey by the British Print Industries Federation showed a rise in demand and output at British printing firms, although the increase was less than had been forecast. Exports in particular weakened, and concerns over the Eurozone. The Survey also showed that virtually no British printing firms are running at capacity.

Until February 2012, business had been weakening in the German printing sector, with industry sentiment in negative territory for four months in a row for the first time since mid-2010, and the current business and very pessimistic future expectations, both for demand and output rates. However, the picture changed quite radically in February, as sentiment improved back to neutral. However, this was not due to improved business conditions, as these actually worsened in February. It was future expectations which improved dramatically, despite the downturn in actual, current business.

## FIGURE 16. NEGATIVE CORRELATION

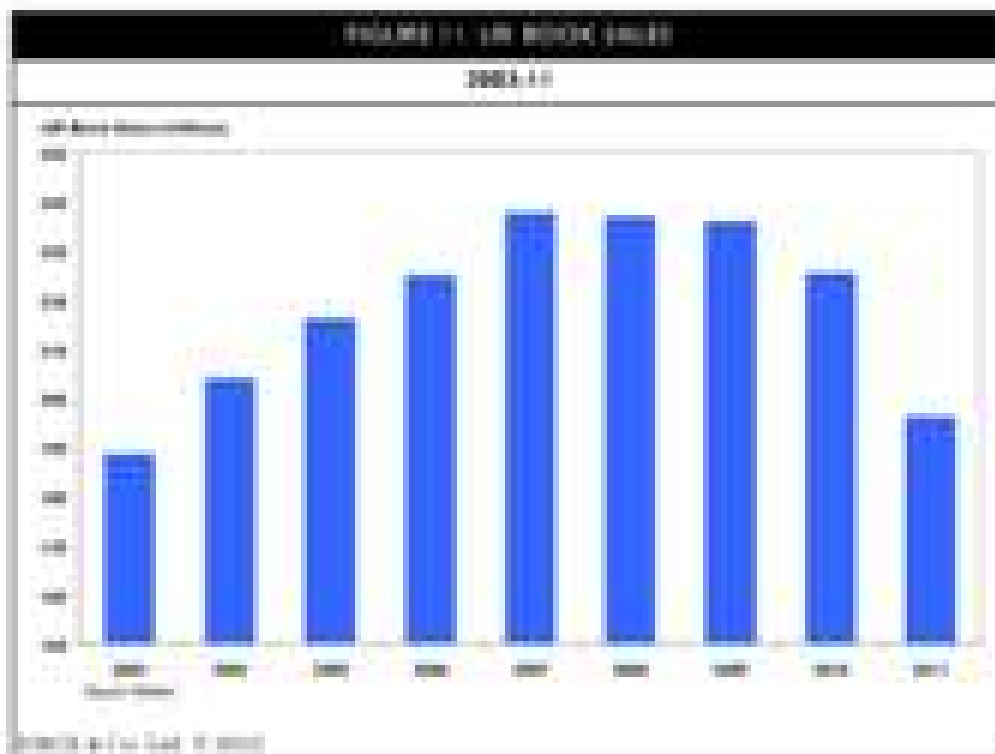


We measured whether the relations from and/or across sectors have been robust in the negative sector, however, recent patterns have been generally negative, although not as negative as in other sectors, e.g. health and real.

In the UK, negative sector correlation has weakened from moderate growth in early 2011 to a decline in the second half of last year. The ABC figures showed a -1.4% drop in Total Average from Feb Conditions, although this was helped to be on a rise for the first, not including negatives which have stopped publishing. As such, we believe it is probable that this year the first half general UK negative correlation in H1 2011 be further than -1.4%.

In Germany, negative correlation has been falling by around -1.3% to -1% with no clear sign in the past year that the trend is becoming significantly worse (although the long-term trend suggests that is well). In terms of negative advertising, Germany has seen a slowdown during the past year, although 2011 did end up being a year of growth (+1.3%). However, that comprised growth of more than +2% in the first half of 2011, giving us roughly zero in the second half of the year, followed by a decline in January 2011.

According to our beliefs, for much of this year, unless there is Europe, as well as activity centered around the Euro 2012 football championships and the Olympic Games, will help to increase consumption, bringing into European trade and encouraging more marketing/advertising spend. This should help Unilever and Colgate Multinational Papers and to a lesser extent, Colgate Multinational, and we are predicting that the current decline could turn around enough to produce a short period of growth, before a return to falling demand before the end of 2012.



Quite in contrast to negatives, which are felt from collapsing global banks and far more under stress (mainly from a reclassification, which we will examine in the *Long Term Structural* section of this report). There have already been double-digit losses in global bank operations in some markets in 2011 and more expected, but all these developments are already recognized and built into our existing forecasts.

In the global bank sector, sales of global banks fell last year in at least the UK, Spain and Ireland (according to *Market Research*), but we believe this was also the case in many other European markets, too. In the UK specifically, the number of new banks bought in 2011 fell by -17%, according to *Market Research* data, and then continued to January, with a further drop of -12% in the first four weeks of this year. *Market Research* commented that much of the decline is being widely interpreted as the impact of what is being seen to a factor, especially in the Adult Finance segment. Separately, it has also just been announced that the renowned *Europacific Securities* (a 11-year-old bank) will no longer be present.

In the real sector, movements continue vary from country to country although the sector remains clearly in decline, if not in Europe's largest markets and key goals. In Germany, for example, *Deutsche Post (DP)* reports that "sales volumes continue to gradually decline", whereas the downturn is rather deeper in the UK, where the country's leading real sector, *Royal Mail*, reported a -48% drop in sales volume in the half year to September 2011. Further falls are also expected to result from a new reform because the UK

government and the direct marketing industry, to set up a website this year that will enable households to opt out of receiving all advertising mail. This is not a sector where we expect much cyclical improvement in the short term.

Although up-to-date published data are not available for all sectors, we believe retail sales and sales in Western Europe are also contributing to real drops in paper consumption, with areas of growth (such as total German magazine advertising last year) few and far between.

The printing sector, meanwhile, is rather more difficult to analyse, but there is just a hint that the industry believes better times may be just around the corner.

However, it is far to say that if we are correct in our short-term forecast, and that an improvement is about to begin in the coming months, that there is little sign of it in the available data so far. Nevertheless, we believe there is good reason to expect that to happen, and we expect the data to begin reflecting it by the second quarter at the latest, and probably sooner.

### 4.1.2 North America



In North America, demand from the USA accounts for around 80% of the total (as of 2011), with Canada making up the rest.

In the depressed US market, some of the major drivers of paper demand have continued to weaken, and there are virtually no plus points at the moment.

The slowing growth in magazine advertising, for example, continued in the second half of 2011, with year-over-year growth weakening from +1.1% in the first half of the year to -1.2% for the first three quarters of 2011, and then -3.2% for the full year. But in a slump of 4% in the first quarter of 2011, this followed broadly stable (+0.1%) magazine advertising in 2010.

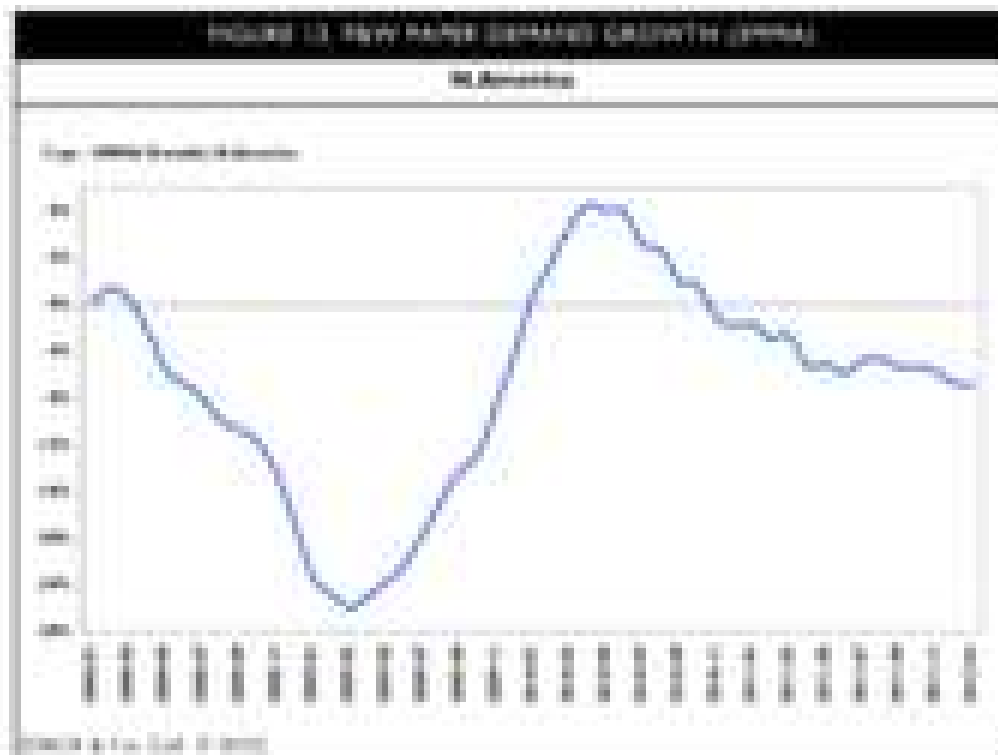
The trend in mail volumes has also been weakening. The United States Postal Service has reported a decline of 4% in total mail volumes in the fourth quarter of 2011. This compared with a -1.7% fall for the full 2010/2011 financial year, with first-class mail and mailed periodicals (the more paper-intensive pieces of mail falling more strongly than other forms of mail (eg. postage, etc.))

The story of weakening growth is similar in the printed book sector. According to Nielsen BookScan, sales of printed books in the USA fell by -8.2% in 2011, following a drop of -4.4% in 2010.

Overall, however, the market trends in several end-use sectors have not been showing up in the print sector. Although turnover in this sector is generally in decline, there is no obvious worsening trend and indeed, there are still occasional periods of year-on-year growth in individual months (such as August and September 2011), which is very much in contrast with paper demand. Thus, print turnover has been in decline following the better August and September, but at no worse rate than for most of the rest of 2011. In total, US printing companies' turnover fell by around -1% in both 2010 and 2011, and this trend broadly continues, with a drop of -2.4% in January 2012.

Separately, US unemployment has eased slightly in recent months, and economic prospects in the USA have generally been improving. This should mean, for example, less downward pressure on office paper consumption.

Looking to the short-term outlook, several forecasting firms predict that US advertising expenditure will rise by around +4% this year, helped by spending on the Olympic Games and the US Presidential election. However, media and advertising businesses, PagineGialle, is predicting that print will not share in this growth, forecasting a drop of -5.2% in magazine advertising. This would mean a continuation of the currently worsening trend in this sector. Considering the short-term upside factors we have mentioned, we expect PagineGialle's predictions to turn out to be slightly pessimistic for this year.



North American paper demand, meanwhile, has been on a downward trend since the commencement of 2009, and has been in decline since late-2008 (see chart). And unlike Western Europe, the fall in apparent demand for paper has been broadly in line with the broader end-use partners' market declines in full trade sites, real estates and magazines (advertising, for example, would roughly average out at 40%).

As mentioned in our last World Graphic Papers report, however, the current downward trend in North American paper demand has slowed, although it has not yet bottomed out. There has been some economic improvement, as we previously forecast, although the influence of that on paper demand has not yet become apparent.

But, with added support from the Olympic Games and US Presidential Elections this year, we expect continued improvement in the business cycle and some of this is produced or fed through to paper demand very soon, as the start of an improving demand trend should become visible in reported data by around March.

We are forecasting that the decline in paper demand will ease this year to 3.2%.



### 4.1.3 Japan - growth for now, but with risks



We said in our last *World Graphic Papers* report that we believed there were reasons to expect a short-term improvement in the economy and paper demand here in Japan. The one most likely related to expected government spending to repair damage from the earthquake/tsunami took in March 2011.

The government spending and the short-term improvement in paper demand did indeed take place (see chart for paper demand), with paper demand growth apparently at around +2% to +3% in late 2011, with all remaining clearly in positive territory.

Increasingly, paper demand has actually been rather stronger than the interest rate and cost indicators might suggest in recent months. For example, demand growth in the 9 months to January 2011 has been stronger in the *Coated Mechanical* sector, which we associate to a large extent with the negative sector. However, growth has not been especially robust in the negative sector. Although there have been some individual months of growth, the negative sector in Japan has actually seen its losses fall more often than grow since the bottom in March 2011. And Japan's advertising giant, *Dentsu*, further reported declines of 1% in negative advertising in both January and February 2011.



Leading the sustained growth in magazine advertising (not shown) during the current phase of paper demand growth, that which magazine advertising was limited by expanded editorial or circulation has been growing. We actually consider both of these to be possible, as coverage of the non-entertainment domain and its alternative will have been increasing that both editors and consumers agreed, we believe.

However, in our view, there is also more to the story of recent paper demand growth than just consumption of magazine papers; even though Coated Paperboard paper demand has been growing more strongly than what Printing & Writing grades, there has been no growth in total revenue, see:

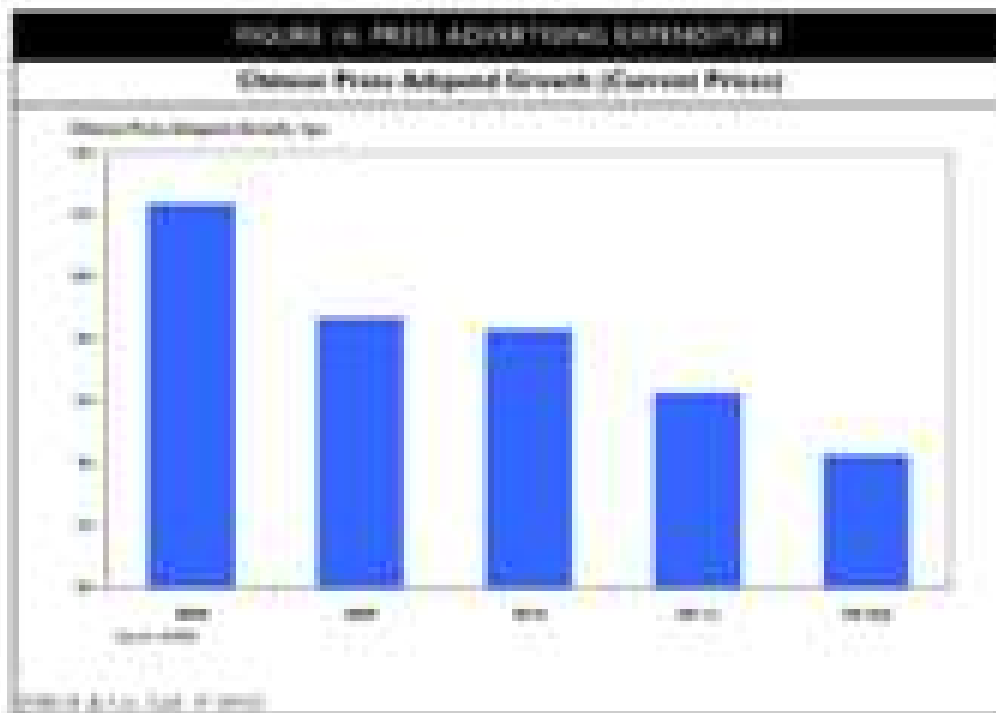
In Domest’s annual advertising revenue for the full year 2018, total magazine advertising expenditures is reported to have fallen by 1.2%, marking the 4<sup>th</sup> consecutive year of declines. However, this occurred as a year over to the year, with an underpinning very weak March. However, since the total effectiveness of the current had been lowered, paper’s advertising actually generally became more active in their spending generally. The included growth in some months in comparison such as “Marketing/Promotion” and “Creative” advertising, which we believe will include a proportion of printed materials, as well as other media.

The overall expenditure on advertising and marketing grew strongly (see separate comment on Consumer/Packaging), and after a strong finish to the year, has needed to be roughly regained in the past couple of months.

However, in the very short term, we expect strong growth compared with the immediate economic aftermath of a year ago, and government spending will continue, which should support employment levels. A major downside risk, however, is power shortages affecting production, as Japan is now producing virtually no nuclear power any more, and there are serious questions about whether there will be enough power available at peak times.

Against the background of all these factors, and considering the stage of our forecast economic/crisis cycle, we are forecasting continued, although slower (+1.1%) paper demand growth in 2011.

### U.S. China of India



There have been concerns to reduce monetary stimulus following efforts to boost India and China could slow economic growth. And indeed, in the fourth quarter of 2011, both countries did see a modest slowdown, although this is relative to their previously very rapid growth.

China's economic growth slowed from +9.7% to +9.1% in the third quarter of 2011 and further to +8.7% in the fourth quarter, resulting in full-year growth of +9.2%. None of these rates are what anyone might call slow. In addition, the Chinese government has reduced its official target rate of economic growth for 2012 to +7.5%. However, China regularly faces its target growth rates, and has recently been easing fiscal conditions, suggesting that it is now targeting growth ahead of controlling inflation. Many analysts expect growth to beat targets again this year, with several recently upgrading their forecasts for Chinese growth in 2012.

Relating specifically to paper demand drivers, CTR Market Research reports that the average growth for advertising in all traditional media in China last year was +12%, although the rate decelerated in the fourth quarter of 2011. CTR forecasts that 2012 will see advertising growth of +11%, and WARC made a similar prediction of +11.5%, while PwycGlobal was more optimistic, with a +15.1% forecast. WARC predicts that print (not ebook) will perform below the market average, however, forecasting growth of +4.7% growth in advertising in 2012 for newspapers and magazines combined.

Others are more upbeat, however. GroupM, for example, earlier believed that Chinese magazine advertising would grow by +10% in 2012. And CTR reports that advertising expenditure in print media last year was broadly in line with the average for all traditional media, with magazine in China seeing +14% growth. Magazines gained some market share from newspapers, particularly in the transportation sector. CTR said Magazines were also credited with having success in targeting high-end consumer groups, with a leading share of magazine advertising being for personal care products. This is a good sign for magazines, as growth in advertising for high-end products and services has been very strong, as the Chinese population's standard of living and financial situation improves.

In our view, the rise in advertising and marketing expenditure will contribute to paper demand growth, although at less than a 1:1 ratio. This is partly because we expect that magazine publishers will be looking to improve profit margins, following a period of strong cost inflation, and will thus likely increase their prices for advertising, as well as not counting every new advertising page with a page of editorial.

Other forms of printed marketing materials may benefit more directly, being viewed as a cost, rather than a source of direct profit erosion.

Furthermore, with economic growth expected to continue at a very healthy pace, with a rising share of middle class jobs being created, office paper consumption is expected to be limited, at best.

Thus, we are forecasting healthy growth in demand for news paper grades for much of the year.

FIGURE 17: GLOBAL PAPER PRICES IN GROWTH



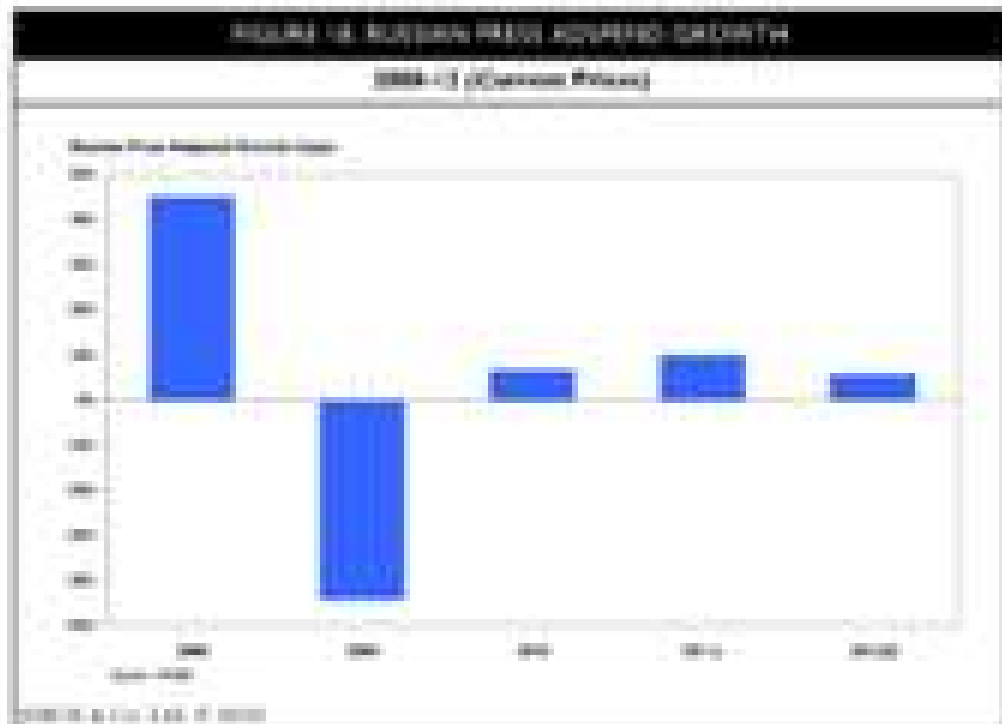
In India, moreover, economic growth slowed from +7.7% to +6.2% in the third quarter of 2011, but the slowdown appears to have been short-lived, with growth strengthening considerably in the fourth quarter of 2011, according to the International Monetary Fund. And the Indian government recently predicted that growth would accelerate further again to the +8% to +9% range.

In terms of paper demand drivers, according to Arife Inaba, vice of TMI Media Research, price softening in India grew by +44% in the first half of 2011, accelerating again to +17% for the year to September of 2011. For this year, WARC and PaperGlobal expect a moderate recovery, but still very rapid growth, even then, at around +12% to +14%. PriceWaterhouseCoopers earlier forecast that Indian price softening would grow by an average of almost +12% in 2012. PriceWaterhouseCoopers also earlier predicted that circulation increase in print media will grow by +15% or better in 2012.

Outside of publishing, Office Paper demand is also growing at double-digit rates, due to rapid growth of India's service sector, which is no doubt one of the factors that caused International Paper to enter the Indian market last year, with the purchase of Andhra Pradesh Paper Mills. Separately, moreover in the Indian education system is also creating healthy demand for school-related printed resources.

In our view, partly due to government policies and partly due to expansion and enrollment of the country's middle classes, we see China and India as two of the fastest net sources of paper demand growth in the short-term (and longer term, too).

### 4.1.3. Europe – Europe



The Consensus Economic Forecasts for 2012 GDP growth in Western Europe have been steadily downgraded every month over the past 8 months, from 1.42% back in September 2011 to just +0.8% in February 2012. While growth there will be expected to be counterbalanced by an expected steep decline in Greece this year (see chart above), this reflects the overall average growth. (In this report, Greece is included in "Other Europe").

Despite the slowing expectations, economic growth is nonetheless expected to be moderately healthy. This is predicted to feed through to marketing and advertising, with price performance far better than in years where markets. In addition, the economic growth is also expected to help reduce unemployment, lowering consumption of office papers.

Looking at advertising specifically, we expect a boost in the middle of the year from the Euro 2012 football championships in Poland and The Ukraine. And both the economy and especially advertising are expected to grow strongly in Russia this year, and we expect some split-year rate value increases in Eastern Europe.

Media investment company, PlangoGlobal, is forecasting that advertising revenues in 2012 will grow by +7.7% in Central and Eastern Europe this year. Group M is predicting slightly slower, but still very healthy, growth of +5% this year. (See below).

Against this economic and media background, our short-term paper demand forecast is for growth of +4.7% in 2012.

### 4.1.3 Latin America

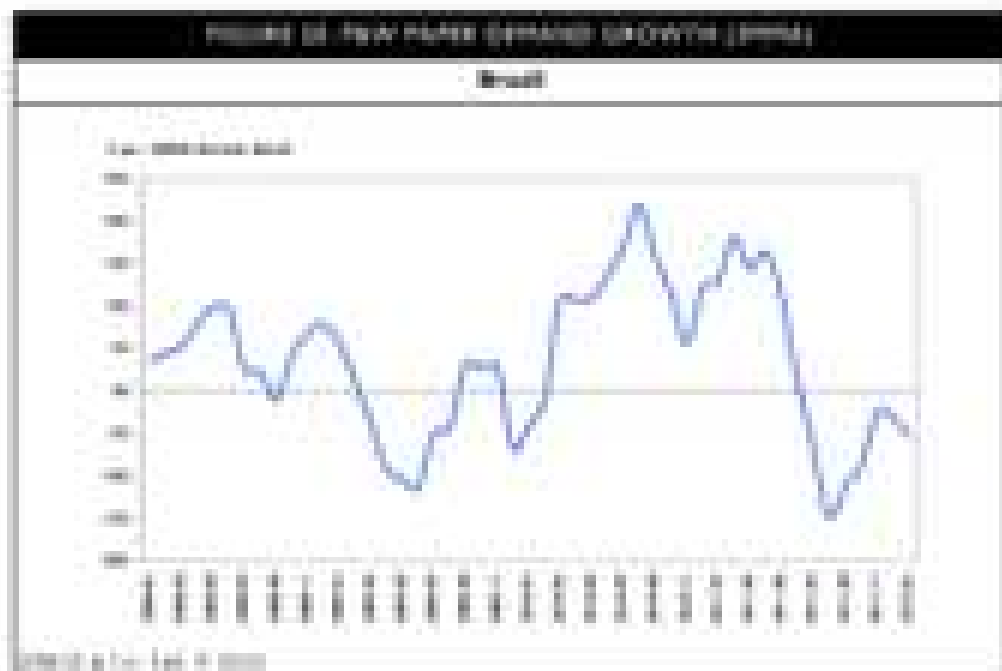


In the Latin America region, following strong economic growth in 2010 and for most of 2011, the economic outlook cooled slightly in the latter part of 2011, although it now appears to have stabilized. The Colombian Economic Forecast for 2012 slipped down last month from +4.1% in September 2011 to +3.8% in January 2012, before edging up to +3.8% in February.

However, advertising is one segment of the economy that is outperforming the general economy, with companies keen to secure a growing middle class and its growing disposable income. MagazineCielos, for example, is predicting +13% growth in advertising expenditure in Latin America this year, led by Argentina (+26.4%) and Brazil (+11.8%). And for print media specifically, WARC earlier forecast for 2012 an acceleration from strong single-digit growth in 2011.

This is in line with our own forecast of stronger growth in 2012, due to the shape of the business cycle explained earlier in this report.





In Brazil, essentially, by far the largest market in the region, the Institute Verificador de Comércio (Verification Institute) has reported a slowdown in magazine circulation in the second half of 2011, leaving the growth for the full year at only +0.2%.

Advertising-based value added, in common, growing by +1% in 2011, is not unique. For the year, Group M and WARC are forecasting growth of around +1% at all, in real terms. Also this year, price levels are expected to underperform the average growth, while still performing fairly well. This also happened to be the case in 2011, for example, according to the InterMedia Project, a regular study by PriceWaterhouseCoopers for Brazilian magazine "Media & Marketing" (rough translation "Media & Communication"), Brazilian magazines achieved advertising growth of +1.4% in the first three quarters of 2011, in second half of the average growth for all media.

To a large extent, reaction from the paper grades influenced by increasing and advertising. Increased Woodfree Demand makes up a big part of the Latin American market. In this sector, we expect demand to track economic activity reasonably closely, relying on business investment and office equipment markets. As mentioned on the previous page, economic expectations have softened recently, but we still expect moderately healthy activity in 2012, although timing the as strong as the growth in advertising.

Despite generally robust indicators, Brazil (which accounts for more than 40% of Latin American paper consumption) has recently reported falling paper demand in each of the last 8 months (see chart above). Much of the rise due to paper buyers reducing inventory following massive inventory building during 2010 (apparent demand edged by more than

+30% in several months during 2010, putting full-year growth above +10%. Thus, we believe the declines in recent months are largely unrelated to real paper consumption.

In fact, we expect the inventory reduction phase to end very soon, and for apparent demand to grow again in Brazil, and by extension, boosting the Latin America total, too. Our forecast for 2013 is for Latin American paper demand to grow by +1.7%.

## A.4 Demand: Long-term outlook

### A.4.1 The market cycle in 2013

In the previous section, we discussed the short-term outlook for global and regional paper demand, focusing on 2012. Demand forecasts for 2013 are based on a very weak year in 2012. Just the chance of 2012's "reformed" former (China, Euro-Zone) limited US Presidential stimulus would be a negative driver. But most likely, importantly, we are also expecting the US to raise its operating rate in 2013, subsequently impacting the rest of the world in 2013 (see next page for more details).



The previous section of this report examined the short-term outlook for global and regional paper demand, focusing on 2012.

After 2012, our forecasts are then based on a very weak year in 2012.

Just the chance of 2012's "reformed" former (China, Euro-Zone) limited US Presidential stimulus would be a negative driver. But most likely, importantly, we are also expecting the US to raise its operating rate in 2013, subsequently impacting the rest of the world in 2013 (see next page for more details).



One of the major reasons behind our forecast of a very poor 2011 is that the USA urgently needs to cut its public spending to reduce its budget deficit. The US deficit erased deep into previously uncharted territory during the financial crisis in 2009, and has been hovering around US\$ 1.5-1.8 trillion since (see chart).

Economic growth plans will not, in our view, be enough to bridge the gap between the US government's income and spending, as spending will have to be cut, and we expect it to be cut fairly drastically. However, we do not expect the President to make the biggest – and most unpopular – cuts before the election in November this year, although we do expect them to begin shortly after work resumption conditions get started.

We expect the target rate to take place in 2011, which will slow the US economy to 2.5%, with the consequences being felt by the US's trading partners around the world. Slowdown in those countries will then affect a second tier of trading partners, and so on.

Given the market has adjusted to the post-2008 spending cuts in the USA, we expect China to lead the recovery out of this slowdown, by focusing its fiscal policy to respond to the slower US growth, helping to prevent the slowdown from becoming a global crisis, as it did in 2009. In addition, as most major economies outside of the USA will already have made some progress on reducing their own deficits by this point, we expect more resilience in those economies, going from the potential for a quiet recovery.

In terms of paper demand, we expect the weaker period to last through 2011 and bottom out in 2012, resulting in growth lower than last year and strengthening from 2013. However,

we are forecasting a recovery from weakness, rather than any real strength, and the upturn is not expected to be sustained. Due to this, and also because we believe global demand will be slightly negative in the long term, we are then predicting a modest drop in paper demand in 2014.

Factors from the cyclical stage of our business from year to year, the major long-term structural influences on paper demand (e.g. competition with electronic media, environmental/sustainable related consumption habits, etc.) during the forecast period are negative in the mature markets. Because the mature markets are (for now) generally larger than the emerging markets, we expect this negative influence to outweigh growth in the emerging markets, most of the time.

We take a look at some of the long-term demand factors on the following pages.

### 3.4.2 Lead & Lapse progression

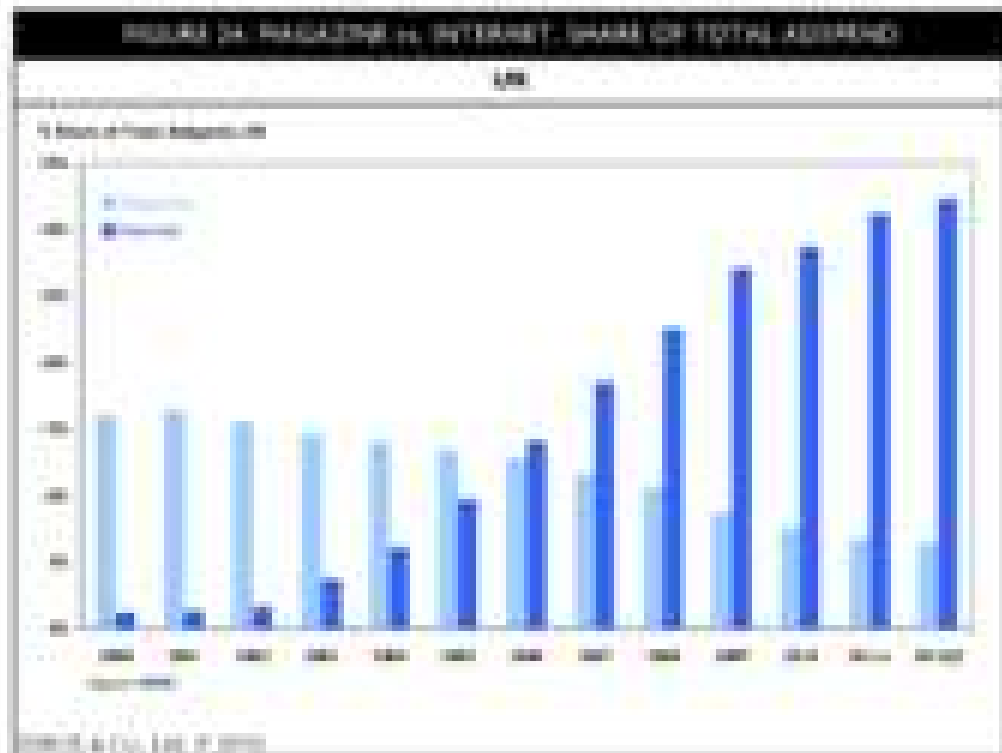


One of the negative structural impacts of paper demand is inefficient consumption: markets aimed at cutting spending, while both business and administrative users also lower consumption, create lower sustainability. We call this the "Lead & Lapse" effect.

This is mostly an issue in developed markets, and it mainly affects office papers and mail volumes, as especially illustrated by Western Europe and Canada, as well as some Central Woodfree for mailings. The technological developments that have made such products easy to replace now called printing being the widespread default using an electronic system and printers, which marketing and mailing mailings can easily be replaced by email lists or PDF downloads from email and Cloud-based sources.

Our research suggests that this process will be the potential for significant further reductions in corporate/industrial paper demand, and we expect this to be a continued major concern for demand in mature/developed regions in the long term.

### 3.1.3 Competition with electronic (or New) media



Our forecast in this World-Wide-Paper report also factors in negative effects of competition with electronic media. We have frequently discussed the effect of electronic storage of documents on computer hard drives (instead of physical files), replacement of media-billing (instead of letters/bills), advertising on and consumption of news/entertainment, etc. on the Internet (instead of magazines), as well the use of advertising on console and computer games (and mobile phones – points which are now well established).

This is especially the case in mature markets, but in the longer term, we expect to see these influences becoming gradually more important in developing markets, too, as they will more widespread high-speed Internet access.

There are new forms of electronic competition that we will take a closer look at here, however, as they are on the verge of new breakthroughs – one in terms of penetration (in residential) and one in terms of how it is used (B2C, business or social networking solutions). We will consider residential in this section, while we felt that the potential expansion of B2C social networking merits its own forecast.

### *e-readers/tablets*

We have already discussed the effect of e-readers/tablets, such as the Amazon Kindle, Apple iPad, etc. on Magazines in previous reports. However, with the 2<sup>nd</sup> generation iPad just launching as we go to press and the Kindle Fire having launched last year just, this is a sector that looks set to expand on its already rapid growth.

First, some context of where we are today. Despite the rapid growth in both global sales of e-readers/tablets and not yet anywhere near as widespread as other screen-based media, such as PCs and laptops. Globally, Apple sales of the iPad reached \$5 billion by the end of 2012, and the device is believed to have a share of somewhat more than half of the tablet-reader market. If we roughly estimate total global penetration of e-readers/tablets at 100 million devices or so, it is clear that tablet's readers still have a long way to go to rival other media (e.g. print media are used by billions of people worldwide, as is television, both of which dwarf the current reach of tablet's readers).

This may be one reason why the current evidence suggests these devices are not (yet) having a massive impact their print counterparts, even in mature markets. The German market is a prime example. German magazine advertising grew last year, on the whole. And although German magazine circulation has been falling by around -1.5% to -2% for the last two or three years, this is actually less than a continuation of a trend that began many years before e-readers and tablets arrived.

Apart from the comparatively limited spread of e-readers/tablets so far, there is another possible explanation for this - surveys suggest that users generally do not feel the e-readers/tablet versions of magazines in their current form. However, the more widespread these devices become, the more we would expect publisher/technology firms to develop versions that consumers increasingly do like. And in this 2<sup>nd</sup> iPad/Kindle Fire phase, further strong sales growth is expected for tablets in the short term. Longer term, we expect their use will indeed become truly widespread, especially when the cost of e-readers/tablets falls far enough.

As we have said in previous World Graphic Papers reports, we have no doubt that e-readers/tablets will take market share away from printed media, although we do expect this share to remain a secondary medium for some years. We include a moderate negative impact from e-readers and tablets during the forecast period, rather than a collapse, affecting Uncoated and Coated Mechanical Papers and to a lesser extent, Coated Woodfree. This will especially be the case in those markets where e-readers/tablets are most popular (e.g. North America in particular, but increasingly in Western Europe).

When it comes to the impact of e-readers and tablets on printed media, it is actually printed books that are far more under threat. There have already been double-digit



issues in printed book circulation in some markets in 2011 and more expected for all these developments are already recognized and built into our existing forecasts.

In the printed book sector, sales of printed books fell last year in at least the US, Spain and Ireland (according to Nielsen BookScan), but we believe this was also the case in many other European markets, too. In the US specifically, the number of print books bought in 2010 fell by 12%, according to Nielsen BookScan data, and this continued in January, with a further drop of -12% in the first four weeks of the year. Nielsen BookScan commented that much of the decline is being widely recognized as the impact of sales moving over to eBooks, especially in the Adult Fiction segment.

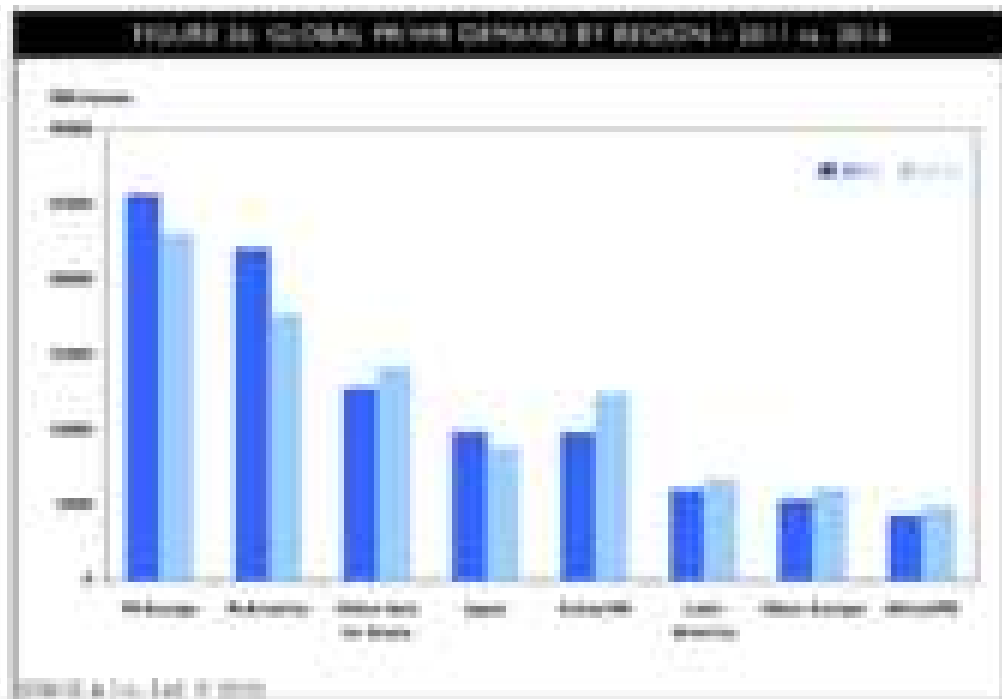
However, although the printed book sector is suffering badly, other areas of print are proving more resilient, as mentioned, and there are even some areas of growth or potential growth (e.g. colour printing, mobile printing, multi-media channel marketing). Our long-term view is that print's share of the media market will erode fairly gradually, rather than collapse suddenly.

## Emerging Markets



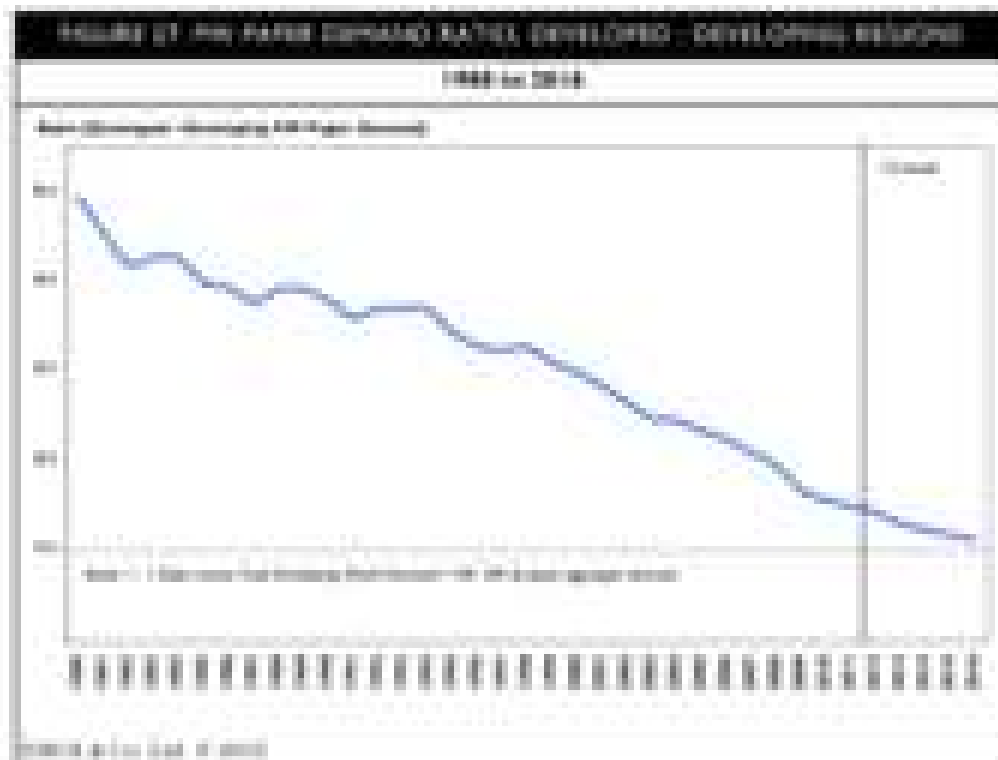
A further upside is price-value growth in several emerging markets, as we looked in the earlier section on China and India, for example. This is despite very strong growth in Asia Pacific overall, with countries like Korea leading in placing new printed school books in favor of cheap electronic tablets towards the end of our forecast period.

Competition with Asia Pacific is expected to impact consumption of printed media in emerging markets, but with price currently enjoying double-digit growth in several markets with increasingly fewer stable ones, and rising disposable income, emerging markets are still predicted to be a source of paper demand growth throughout the forecast period (see chart).



Paper demand growth in emerging markets is, however, forecast to be outweighed by declines in mature markets (which accounted for 40% of global paper demand in 2011) in the long term.

Overall, our forecast that the downturn in mature markets will slightly outweigh growth in emerging markets, adding up to a slight decrease in global long-term paper demand (10.4%pa for 2011-2016).



Looking at the long-term impact of these developments, our forecast of demand growing in emerging markets but declining in mature regions is expected to accelerate the Widespread shift in the power base of the global paper industry.

Since the year 2000, for example, the combined mature market bloc of North America, Western Europe and Japan has seen their share of global paper demand fall from 71% to the current 60% (down from 67% a year earlier), while their share of global paper capacity has declined from 71% to 67% (down from 68% a year earlier).

According to our current forecasts, these shares will fall further to 57% of world demand and 57% of global capacity by 2016.

Looking at the Widespread shift over the last 3 decades, the dominance of mature markets has seen their share of demand fall from a 57 ratio (developed vs. developing markets) to well below 2:1 ratio. And this is forecast to fall inside to parity (1:1) by 2016.

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## 4.3 Diversified Career

### How far will social networking expand past years advertising?

In past World Credit Paper reports, we have examined in detail the effect of expanding on-line advertising expenditure, and the consequent losses of ad spend on traditional media, including print media. We have long expected price to continue being advertising market share, and such future losses have already been included in our forecasts for paper demand for some years now.

However, there are now potential threats to traditional media, apart from simply on-line advertising. We would like to examine two of what we currently perceive to be potentially major future challenges for both advertising-revenue and reader numbers:

**(1) Consumer-company interaction on Social Network Media.** By this we mean companies engaging with self-declared consumers/clients directly, and in some cases even creating one direct dialogue with them on social network sites, especially on Facebook.

**(2) User-generated endorsements/recommendations of products/services on Social Networks, especially sites like Pinterest, as well as Facebook, Twitter, etc.**

The current threat stems in terms of advertising spend on the (1) i.e. Facebook, in the longer term. (2) i.e. user-generated endorsements/recommendations also have the potential to be a major influence on marketing spend.

#### **(1) Consumer-company interaction on Social Network Media**

According to Comscore, a company that monitors and measures internet activity and behaviour, the reach of Social Networks like Facebook, Twitter, Google+, LinkedIn, Pinterest, etc, has been growing dramatically in recent months and it now account 85% of internet users in most European countries, and even higher in some, with the estimated average for Europe being about 75%.

And Facebook is the clear leader of the pack, with over 800-million active users worldwide, including an estimated 150-million unique visitors in Europe alone. And although penetration is lower in other countries and regions (Facebook so far reaches only 20-30% of internet users in India and Brazil, for example), the numbers of users in those two example countries doubled and tripled in 2011, as the penetration is expanding rapidly. (China is an exception, because Facebook access is restricted in that country). And Facebook is succeeding in turning its reach into revenue - according to eMarketer, Facebook's global advertising revenue is expected to double to US\$1.8 billion this year alone.

It is not the growth of user numbers that we consider a potential stress, because – after all, if most of the population is already on-line and the reach amongst those people averages more than 70% already, then there is limited scope for further growth. Having said that, we do assume some continued loss of time spent consuming/print made by each user, and these losses are already part of our existing forecasts.

Quite apart from this, though, we believe the potential new threat is in how Facebook itself is developing. In 2011, there was a dramatic rise in the amount of interaction between companies and consumers on Facebook. This resulted from consumers volunteering to receive communications from companies, either by clicking “Like” on the company/product/service page on Facebook or simply by the consumer liking the company/product/service as something they like on their general profile. Already the brand Coca-Cola has around 40 million Fans of its Facebook page, growing by around 10 million in just the past 3 months.

The preferences of these Fans are then communicated to the people in the user’s network (“Friends”), which encourages more users to click “Like”. Some companies have also begun chosen to use their Facebook page to engage direct communication from consumers, often setting up a two-way dialogue between consumer and company (although until now companies remain a small minority, so far).

Despite Coca-Cola’s culture of Fans, this is usually still in the embryonic stage, and we do not doubt that there will be a considerable upsurge in this type of B2C communication/marketing/advertising via Facebook in particular (and possibly other social networking websites, if they can develop similarly-effective functionality). There is a clear benefit for businesses in creating a positive image, as well as giving valuable direct access to consumers, for communication of whatever message a company wants to put on (e.g. marketing, advertising).

However, while all the excitement around goes, we caution against getting caught up in the hype immediately. There are actually many reasons why this might not have a massive impact, but perhaps only a moderate influence on advertising in other media. There is a great deal of research, for example, showing that many companies are not using this opportunity very well, and are usually annoying consumers, rather than engaging them positively. In addition, not all companies have the opportunity that a company like Coca-Cola has, to use of this as a communication opportunity. For example, many companies/product/services are what is known in the advertising world as “low excitement” (i.e. boring brands, which will often find it difficult to gain, e.g. Facebook fans).

Another reason why we are not immediately assuming this will be a huge revolution is the type of consumers who make up Facebook’s user user base. True, the overall membership is very broad, but there is a difference between the types of people who use

is regularly - and follow all of the news and updates from all of their "friends" and "Liked" companies - and the type of people who only log in occasionally to check their messages and who rarely look at news or updates. As such, it is not at all clear whether the consumers that companies want to access are actually on Facebook often enough for it to be a very effective marketing medium.

Despite these challenges, the potential upside for companies using Facebook (and potential downsides for print advertising) cannot be ignored.

Even if B2C interactive marketing/communications on social networks turns out only to be useful for some types of companies to reach a limited audience effectively, this will still require manpower and therefore budget to be allocated to this activity. Which means that spending might need to be cut from other marketing/advertising activities at times when budgets are tight. And if a Social Media marketing turns out to be extremely successful, then businesses might even divert money from other marketing/advertising efforts to support their social networking marketing even at times of healthy profits when budgets are more generous.

We mentioned earlier that Facebook's massive success with users in the developed world means that it is less of a future threat to print in terms of losing readers/users, as it has already attracted a far-reaching audience penetration. In emerging markets, there is perhaps greater potential, but there is already too convincing evidence that the growing middle classes in countries like China, India and Brazil, etc. are "leapfrogging" print media to go straight on-line, while growing print, indeed, print media in all of these named examples are seeing advertising growth rates in double-digit percentages, which suggests a strong future on the short to medium term, at the very least.

#### **2.4. User-generated content and communication of production costs on Social Networks**

Back in the mature markets, though, there is another type of potential new threat to print. In the case of printed magazines, we see a potential major threat from Social Networks which reaches around content/line sharing, such as Pinterest. The theory being that if people can find a Social Network which gives them much of what they currently get from print media (or something just as good), then the print version would be at risk. This applies both to editorial content and to advertising - users are not only providing/finding or content that interests and entertains (i.e. competing with editorial content of magazines and other media), but they are also recommending products and services (competing with advertising in magazines and other media). **Effectively, the power of communication is increasingly moving towards the user.**

A prime example is the Pinterest website, which, as mentioned earlier is a community sharing site and which is growing fast. And there is a risk that this and other social



research indicates could potentially be a major driver in consumption of both editorial and advertising in print, as well as other media. The driver is that such sites would result in peer-generated content emerging as consumers' primary source of information/entertainment.

This would not only impact consumption of magazines (and other traditional media), but even more fundamentally, it could reduce the effectiveness of advertising as consumers read less and less on computer communication (e.g. adverts), increasingly focusing on the communication they find their peers. Currently, businesses are reluctant to advertising campaigns to get their message out, but if consumers increasingly see each other (e.g. personal endorsements and viral messages on Facebook etc.), rather than adverts, to find out what new things are coming, improving, reliable or good, then traditional advertising could potentially become less powerful.

Increasingly, although this is already a potentially big threat, it is also potentially an opportunity. Because if advertising becomes less powerful, we could imagine companies reacting in two different ways. On the one hand, they could decide it is not worth seeing money on traditional advertising, if consumers are learning more to each other than on advertisements. On the other hand, advertisers may feel there are no almost alternatives (we have already discussed the potential limitations of marketing/communication via social media), and react by advertising more, probably with multi-channel campaigns, just to have the same effect as before. This could well benefit print/ad-driven marketing.

To summarize, social networking media could be about to start a new expansion phase, in terms of engaging businesses, although it is too early yet to know whether this will actually happen in a big way. At this early stage, it is difficult to distinguish between hype and reality. It has yet to be established how effective and valuable Social Networks marketing will be to the advertising/marketer, how much companies are likely to spend on it and how this might affect other parts of their media spending mix. We hope these developments will soon become clearer. For now, though, it is important to distinguish whether this is just part of the continued trend of Internet and Online Advertising (already forecasted in the EMGE paper demand forecasts), whether it will add further downward pressure to the existing negative demand trends, or even indirectly contribute somewhat to paper consumption.

To analyse the impact effectively, we will also need to observe the real impact of spending on other media, too. For example, despite all the hype about Social Networks in developed markets, Germany still reported growth in print magazine advertising last year, so we will need to see some clearer evidence of how much print is likely to lose out.

And as mentioned above, there is just a chance that this could just be an opportunity for print, too.

## B.1. Supply – Base Capacity

Without additional closures, capacity will rise as demand falls, worsening overcapacity.

**FIGURE B.1. BASE CAPACITY BY REGION**

Capacity : '000 tonnes

'000 tonnes	2011	2012	2013	2014	2015	2016	2017-18
<b>Printing/Writing Papers</b>							
Europe	2700	2600	2600	2600	2600	2600	2700
Other Europe	300	300	300	300	300	300	300
Asia Pacific	2300	2300	2300	2300	2300	2300	2300
Latin America	300	300	300	300	300	300	300
Japan	1000	950	950	950	950	950	950
USA/NAFTA	1000	1000	1000	1000	1000	1000	1000
Other North America	1000	1000	1000	1000	1000	1000	1000
Australia	100	100	100	100	100	100	100
<b>Total</b>	<b>11300</b>	<b>11200</b>	<b>11200</b>	<b>11200</b>	<b>11200</b>	<b>11200</b>	<b>11300</b>
Europe Total	3000	3000	3000	3000	3000	3000	3000
Asia Total	3300	3300	3300	3300	3300	3300	3300

Source: ENR, based on ENR 2014

Asia Pacific is projected

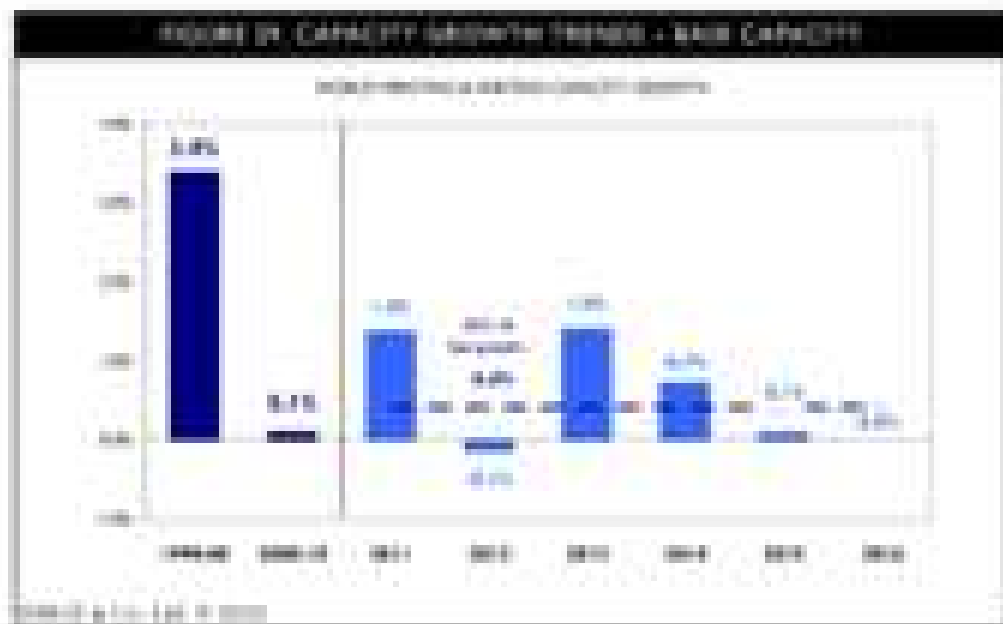
to remain the largest

market for the region

Based on known plant and projects both for capacity increases and closures (i.e. when we call **Base Capacity**), global Printing/Writing paper capacity is projected to be broadly stable or increasing throughout our forecast, with expansion mainly in Asia, counterbalancing or outstripping closures in mature markets.

Over the whole forecast period to 2018, global Printing/Writing paper capacity is projected to grow by a net total of almost 1.4 million tpa, i.e. an average annual rate of 0.4%.

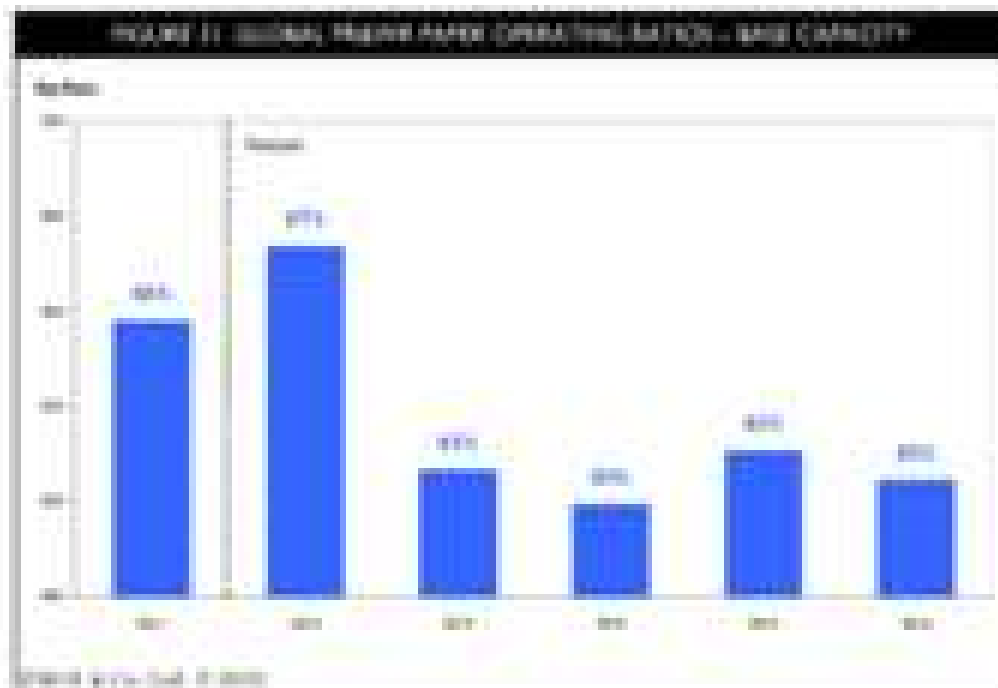
This is considerably lower than our last forecast, due to more new capacity closures announced particularly in mature markets. Nevertheless, the net effect is 1.4 million tpa of capacity increases planned in a paper industry that already suffers from overcapacity and can no longer rely on long-term demand growth. This highlights the challenge facing the industry as there are more capacity still. Otherwise, global Printing/Writing Operating Rates could hit an 82% (see page 20). As pointed out even more strongly will be the huge volume of pulp-to-be announced recently, suggests that the industry is committed to holding the line.



Based on currently known plans, global PMA's paper capacity is usually projected to fall throughout this year. However, total capacity is expected to grow again in 2012 and by smaller amounts in the subsequent years.

Of the total 2.4 million up from capacity forecast to 2016, regional differences are almost twice, which means to state that the vast majority of the world's capacity increases will take place in China.





With the drop in global demand forecast to slow this year, while capacity will fall, world Pinner/Writing Operating Ratios are forecast on average 67%, up from 65% last year. However, worse is forecast as follows, unless there are more big capacity closures. This is especially the case in 2012, with global paper demand forecast to fall by 4%, while base capacity is slated to rise by 11.4%.

Combining our demand forecast with the **Base Capacity** program outlined on the previous page, the result would be **global paper excess capacity** **persisting** **throughout** **the** **forecast** **period**. In fact, according to our **Base Capacity** program, Operating Ratios would average below 60% in every single forecast year after 2012.

Having said this, with almost 2 billion lbs of new capacity announced (in the space of time since our last report (which follows 2 billion lbs of closures announced in the previous 6 months), we are forecasting that the industry will continue to succeed in coming up with further major capacity cutbacks during the forecast period. Given deferring this, we also predict some more investments, now, over and above those that have been confirmed to date, especially in Asia. Our forecast for these additional investments and closures are added to the **Base Capacity** to produce our **Forecast Capacity** (see following section).

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## B.2. Supply – Forecast Capacity

**Additional power to the West: There is build news and slow news**



The Base Capacity projections do not include any additional Unspecified Capacity increases. The projections may implement or reduce uncommitted. The version of our Supply analysis assumes both Base and Unspecified Capacity together, to result in EPGC's **Forecast Capacity**.

Unlike the Base Capacity projections, which are based only on what is currently known, our Forecast Capacity makes certain assumptions using our analysis and understanding of the power industry.

Combining both known and projected investments, our Forecast Capacity shows large capacity growth in Asia being outweighed by closures in mature markets. This adds up to a global Forecast Capacity decline of 1.4 million sp by 2014.

The net reductions in Fossil/Firing Paper capacity over the forecast period amount to 1.7 million sp in US Europe, 1.4 million sp in SE America and 1 million sp in Japan, outweighs net growth of 4.0 million sp forecast in China, focused on Windfarms.

This involves several assumptions by EPGC about Unspecified investments and closures, which are summarized on the following page.

FIGURE 11: EXPENSE - UNORDERED CHANGE (POWER PAPER)							
Capacity - '000 tonnes							
2013 quarter	2011	2012	2013	2014	2015	2016	2017-18
<b>By/On (Plant)</b>							
Wires		-	-100	-100	-100		-100
On Cables							
Wires		-	-100	-100	-100		-100
On Cables							
Wire		-	-100	-100	-	-	-100
<b>On Plant</b>				100	100	100	100
On Plant		100	100	100	100		-100
On Plant		100	100	100	100	100	100
<b>On the Plant</b>				100	100	100	100
On the Plant		-	-100	-100	-100	-	-100
On the Plant		-	-100	-100	-	100	-100
<b>Overall</b>							
Total		-100	-100	-100	-100	-100	-100

For this forecast, the main assumptions (over and above what is currently known) are:

- The markets with the weakest forecast demand will see significant additional capacity closures (see table).
- We are also predicting considerable capacity closures in Asia, where we expect some new machine investments to replace older (relatively uncompetitive) capacity, at growing capacity average demand.
- However, we are also predicting additional ("Unspecified") investments in Asia. These are broadly expected as follows and the predicted additional closures in the region:
- These, plus the investments already confirmed, will largely outweigh the predicted Unspecified closures globally, so our forecast is for substantial net capacity growth on a worldwide basis.

The combination of our predicted Unspecified investments and closures will up to a net 4 million ton of capacity closures over the next 3 years, over and above the reductions that have already been announced. We realize that this sounds ambitious, but the industry has

announced around 8 million gpa of capacity in just the past year, so papermakers have already demonstrated that they are firmly committed to the process.

Regarding timing of the closures, we expect a timing similar to the predicted pulp market in 2013, with large-scale capacity closures predicted in both 2013 and 2014.

All of the confirmed and Unspecified Investments/Closures add up to our Forecast Capacity (less plus Unspecified changes per below).







We are forecasting that capacity will fall in the regions where demand is also predicted to fall (i.e. North America, Western Europe and Japan) over 2013-15.

Because previous closures have reduced the number of remaining small, older power facilities in Western Europe and North America, the future closures that we are predicting in these regions will be especially painful for papermakers. To keep the remaining capacity competitive enough to withstand competition from overseas, papermakers in these regions may be driven to further consolidation, a scenario which that is not shown (see page four).

Meanwhile, on top of the many confirmed capacity investments in Asia, there is also a long list of unconfirmed expansion projects, especially in China and India (see following pages). We are predicting that a portion of these will never be commissioned or confirmed during the course of the forecast period, further adding to the forecast capacity additions. These additions are expected to occur heavily overtoppy in some cases, bringing the forecast of a considerable volume of older, inefficient capacity.



### C. J. Davis

**FIGURE 16. NEW PAPER PLANT CAPACITY - India**

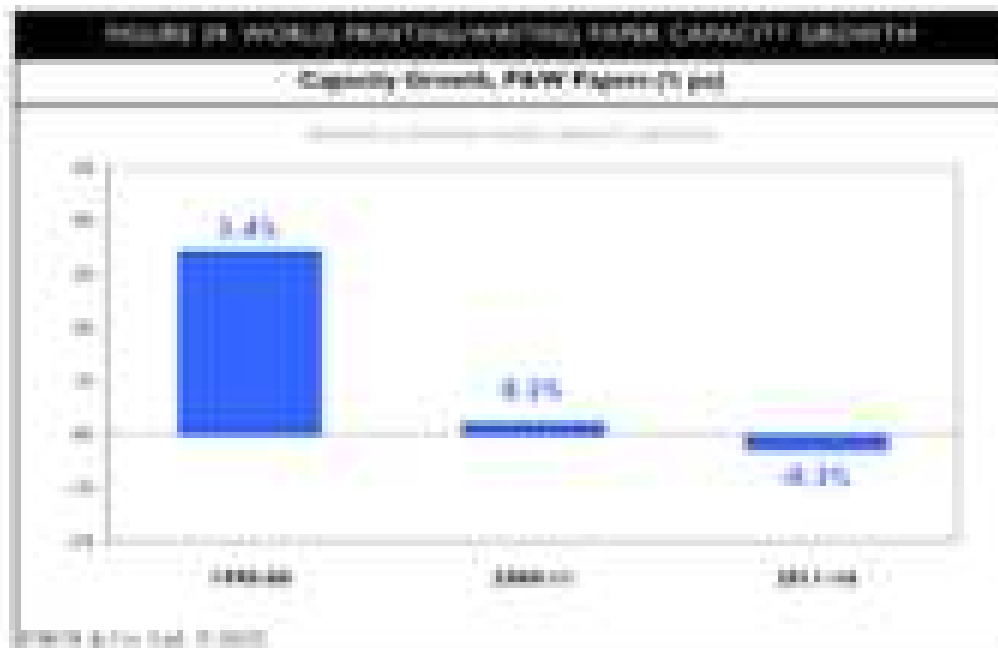
New Machines - India				
Company	Mill	Start-up	State	Capacity
ITP	Subansari	2012-13	WB	200
J Paper	Jaipur	2012	WB	100
New Mill	Chennai	2012-13	WB	20
Aditya Paper	Jaipur	2012	WB	200
Green Paper	Chennai	2012	WB	200
ITP	Subansari	2012-13	WB	20
<b>Paper Mills (P/M) announced</b>				<b>8 P/M's</b>
Green Paper	Jaipur	2012	WB	20
MT Paper	WB	2012	WB	100
Gay Paper Mill	Chennai	2012	WB	100
ITP Subansari	WB	2012	WB	200
Green Paper	Jaipur	2012	WB	200
Green Paper	Jaipur	2012	WB	200
<b>Other Potential (P/M) (P/M) announced</b>				<b>1 P/M's</b>

Source: C. J. Davis, 2011

India has been increasing capacity in new capacity and we are forecasting that the country's need to import paper will fall, especially in the Uncoated Woodfree market.

There are five projects to add around a million tonnes of new capacity in India. In addition to those, the list of projects for construction projects in India adds another million tonnes, over and above those included in our forecasts (see table). International Paper's entry into the Indian market is expected to push this project forward in the medium term (although the company has not announced any major investments so far).

However, we do not expect India to become a major exporter of paper in the short to medium term, because the producers are focused mainly on strong domestic demand (e.g. Indian demand for Co-100 paper is growing by double-digit percentage rates).



Global P&W capacity growth has simply slowed from 3.4% during the 1990s to virtually zero in the new millennium. Our forecast Capacity actually sees global capacity decline slightly (-0.2% p.a. on average) over the 2011-2014 period, with capacity growth in Asia being largely outweighed by capacity declines in other regions.

The combination of net capacity growth in newspaper Asia and declines in mature regions will accelerate the migration of papermaking capacity from "West" to "East", and our forecast is for the large mature markets (North America, Western Europe and Japan) to see their share of global capacity fall from 67% in 2011 to 57% by 2014.

These developments will also have a direct effect on the balance of inter-regional trade – see "Trade" section, which follows on Page 14.

Our global capacity forecasts by paper grade are shown in the table below. These reflect broadly stable Woodfree capacity, while Mechanical Paper capacity is expected to fall slightly. This is largely due to Asia investing mainly in Woodfree capacity, while closures will be focused on Western Europe, which consumes Mechanical globally.

**TABLE 12 GLOBAL CAPACITY GROWTH, WORLD, BY GRADE**

	2012	2013	2014	2015	2016	2017-18
Wood	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%
Mech	0.0%	0.0%	-0.1%	-0.1%	-0.1%	0.0%
Other	3.4%	0.0%	-0.2%	0.0%	0.0%	-0.2%
Total	0.0%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%
Asia	-0.1%	-0.1%	-0.1%	-0.1%	0.0%	-0.1%

EMG&E (c) Ltd. 2013

## Capacity Projections - by Year and region

FIGURE 41. CAPACITY FORECAST CHANGES, BY REGION - CWT								
COATED WOODPANEL								
Year, cwt	2011	2012	2013	2014	2015	2016	2017	2018
	Flow	Net	Net	Net	Net	Net	Net	Flow
Midwest	0	0	0	0	0	0	0	0
West Coast	0	0	0	0	0	0	0	0
Mid-South	0	0	0	0	0	0	0	0
East America	0	0	0	0	0	0	0	0
Japan	0	0	0	0	0	0	0	0
China	0	0	0	0	0	0	0	0
Other Regions/Rest	0	0	0	0	0	0	0	0
GLOBAL	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0
Supply Total	0	0	0	0	0	0	0	0
Net Total	0	0	0	0	0	0	0	0

EMC&amp;E © 2012, EMC&amp;E.COM

FIGURE 42. CAPACITY FORECAST CHANGES, BY REGION - CWT								
UNGRADED WOODPANEL								
Year, cwt	2011	2012	2013	2014	2015	2016	2017	2018
	Flow	Net	Net	Net	Net	Net	Net	Flow
Midwest	0	0	0	0	0	0	0	0
West Coast	0	0	0	0	0	0	0	0
Mid-South	0	0	0	0	0	0	0	0
East America	0	0	0	0	0	0	0	0
Japan	0	0	0	0	0	0	0	0
China	0	0	0	0	0	0	0	0
Other Regions/Rest	0	0	0	0	0	0	0	0
GLOBAL	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0
Supply Total	0	0	0	0	0	0	0	0
Net Total	0	0	0	0	0	0	0	0

EMC&amp;E © 2012, EMC&amp;E.COM

TABLE 14. CAPACITY FORECAST CHANGES BY REGION - CH

CONSTRICTED MECHANICAL								
REG. CH	2017	2017	2018	2018	2019	2019	2020	2020
	Cap	Req	Req	Req	Req	Req	Req	Cap
Europe	400	100	270	0	0	0	0	400
Asia Pacific	0	0	0	0	0	0	0	0
Americas	100	110	0	200	0	0	200	100
Latin America	100	0	0	0	0	0	0	100
Middle East	100	0	0	0	0	0	0	100
Africa	100	110	100	0	0	0	0	100
Other Areas (incl. India)	0	0	0	0	0	0	0	0
<b>Total</b>	<b>1000</b>	<b>400</b>	<b>440</b>	<b>200</b>	<b>0</b>	<b>0</b>	<b>400</b>	<b>1000</b>
Europe Total	400	100	270	0	0	0	0	400
Asia Total	0	0	0	0	0	0	0	0

Source: EMGGE, Q1 2019

TABLE 15. CAPACITY FORECAST CHANGES BY REGION - CH

UNCONSTRICTED MECHANICAL								
REG. CH	2017	2017	2018	2018	2019	2019	2020	2020
	Cap	Req	Req	Req	Req	Req	Req	Cap
Europe	100	100	20	0	0	0	0	100
Asia Pacific	100	0	0	0	0	0	0	100
Americas	400	400	0	0	0	0	0	400
Latin America	100	0	0	0	0	0	0	100
Middle East	100	0	0	0	0	0	0	100
Africa	100	0	0	0	0	0	0	100
Other Areas (incl. India)	100	0	0	0	0	0	0	100
<b>Total</b>	<b>1000</b>	<b>900</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1000</b>
Europe Total	100	100	20	0	0	0	0	100
Asia Total	100	0	0	0	0	0	0	100

Source: EMGGE, Q1 2019

FIGURE 16. CAPACITY FORECAST CHANGES BY REGION - COATED

COATED PAPERS									
2019, Coated Papers	2019	2020	2021	2022	2023	2024	2025	2026	2027
	Cap	Rev	Rev	Rev	Rev	Rev	Rev	Rev	Rev
NA Europe	1,000	1,000	1,000	1,000	1,000	0	1,000	1,000	
Other Europe	0	0	0	0	0	0	0	0	0
Indonesia	0	0	0	0	0	0	0	0	0
Latin America	0	0	0	0	0	0	0	0	0
Asia	0	0	0	0	0	0	0	0	0
China	0	0	0	0	0	0	0	0	0
Other Greater China	0	0	0	0	0	0	0	0	0
Middle East	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>	<b>0</b>	<b>1,000</b>	<b>1,000</b>	<b>0</b>
Change Total	1,000	1,000	1,000	1,000	1,000	0	1,000	1,000	0
Rev Total	1,000	1,000	1,000	1,000	1,000	0	1,000	1,000	0

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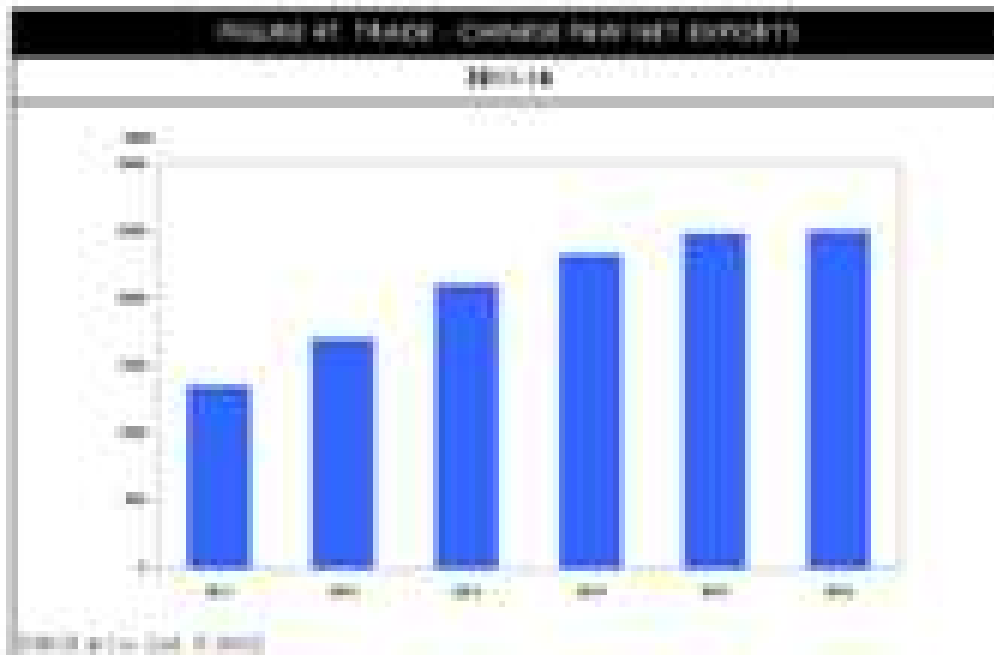
FIGURE 16. CAPACITY FORECAST CHANGES BY REGION - FIBER PAPER

FIBER PAPER & SPECIALTIES									
2019, Fiber Papers	2019	2020	2021	2022	2023	2024	2025	2026	2027
	Cap	Rev	Rev	Rev	Rev	Rev	Rev	Rev	Rev
NA Europe	1,000	1,000	1,000	1,000	1,000	0	1,000	1,000	
Other Europe	0	0	0	0	0	0	0	0	0
Indonesia	0	0	0	0	0	0	0	0	0
Latin America	0	0	0	0	0	0	0	0	0
Asia	0	0	0	0	0	0	0	0	0
China	0	0	0	0	0	0	0	0	0
Other Greater China	0	0	0	0	0	0	0	0	0
Middle East	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>	<b>1,000</b>	<b>0</b>	<b>1,000</b>	<b>1,000</b>	<b>0</b>
Change Total	1,000	1,000	1,000	1,000	1,000	0	1,000	1,000	0
Rev Total	1,000	1,000	1,000	1,000	1,000	0	1,000	1,000	0

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## C. World Trade

### China to increase net exporter of UWF, as well as CWF



We mentioned in the previous Chapter that capacity reports are reported to show capacity is low with strong demand, but this total capacity would far exceed capacity that demand. This is especially true for China, where heavy overcapacity is expected to develop.

China has already transformed itself from an importer to a top-side exporter of particularly Coastal Woodfish in recent years, although it has not yet become a net exporter of CWF. Increasingly, however, the capacity investments in China are favoring an Unmilled Woodfish route over Coastal Woodfish. Considering the country's recent record in a declining paper exports, as well as the predicted over-supply of Unmilled Woodfish on the domestic market when new capacity comes on stream, we predict that China will be exporting well over 80,000 cu of Unmilled Woodfish by 2024, moving to growing emerging markets. This will be alongside more than half a million tonnes of forest growth in net exports of CWF, over the same period, putting the country's total net exports of FWFs paper from 1.4 million to 2.3 million cu by 2024 (see above chart).

There is also a potential upside risk as China's CWF export markets, as there will be ample spare capacity to export a lot more than we are forecasting. However, we expect it will take some time to develop its Unmilled Woodfish export business.



## EU Trade Profile – by Region

- Overall economic for
- Global or Western
- Eastern Europe and Russia
- China's economic growth
- Asia's economic growth
- Europe's economic growth
- Emerging market economies
- Oil price volatility, demand
- Energy related market
- Commodity market
- Manufacturing sector
- Core & emerging equity



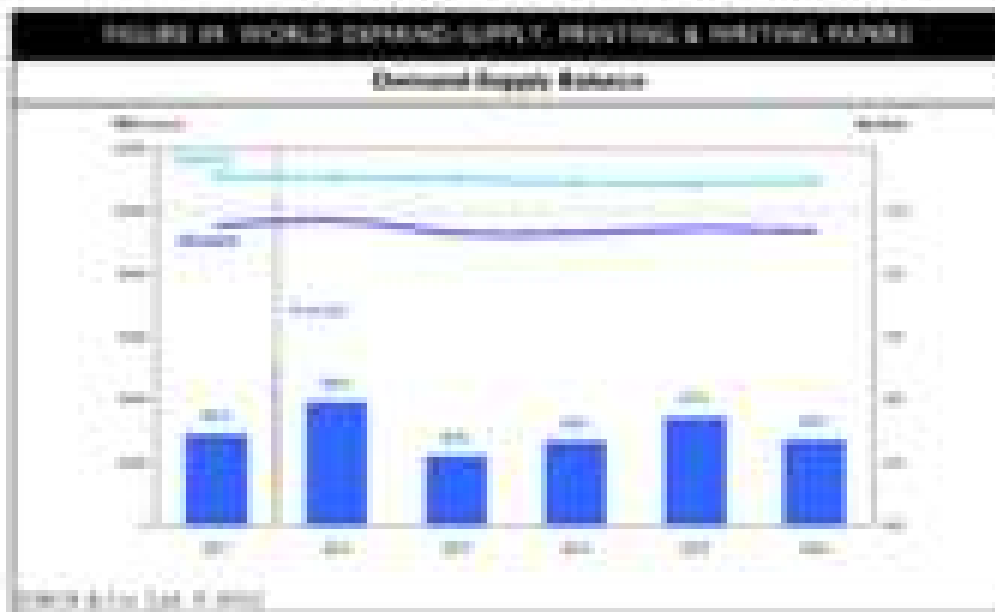
In addition to growing Chinese Woodfree exports, rapidly increasing exports are also produced to offset global trade, as India will become less dependent on imports.

These factors will all have an impact on Western Europe, which is forecast to lose out somewhat in global trade of paper, as it moves rapidly to increase manufacturing, and as China exports more and India exports less Woodfree Paper. Despite this, Western Europe is predicted to remain by far the world's dominant paper importing region, especially in Nonwovens grades, where it is the clear world leader, with growth prospects in developing markets (as mentioned being growth in the regions outside of developed markets earlier in this report). Western Europe's net trade balance, then, is expected to fall from 7 million tons of Printing & Writing papers in 2011 to 4.4 million tons in 2016.

Overall, trade flows are expected to increase between exporters and the growing emerging markets where capacity is not increasing very rapidly. In contrast, we predict that it will become increasingly challenging to export to mature markets, due to forecast falling demand in those regions.

## D. World Supply–Demand Balance

Additional capacity (shown not required) to prevent oversupply



As we explained in the *Forecast Capacity* section earlier, even the massive volume of new and existing closures that we are forecasting (4 million tpa) over and above those that have already been announced will only result in a marginal drop in global capacity over the forecast period. This is because new capacity in Asia is forecast to balance out Europe closures, both in Asia itself and in various markets.

We are forecasting an average drop of 0.1Mtpa in capacity, while global demand is projected to decline by 0.1Mtpa, on average, reversing the general trend of papermakers closing capacity in line with falling demand, mostly in mature markets. In such capacity and demand forecast to fall by similar volumes, the market oversupply is expected to persist throughout most of the forecast period, although they does not exclude the possibility of temporary periods of balanced supply and demand. On an annual average basis, operating rates are projected to vary from 85% to 87% during the forecast period (see above chart).

If the additional capacity rollbacks that we are predicting do not take place, then there is a serious risk of even heavier oversupply in the global market. However, large volumes (around 2 million tpa) of new closures announced this year has helped (and around 0.5 million tpa more in the past year) suggest the paper industry is being encouraged to reduce capacity in line with drops in demand.

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## E. Prices & Value

Value is back on long-term trend



The above chart shows the historical development of Demand, and (i.e. inflation-adjusted) Price and Value, of an important item. The term "Value" here refers to the owner's apparent Revenue (expressed here as an index, and adjusted for inflation), calculated as Value = Price multiplied by Tonnage.

The "Value" of paper (i.e. the total apparent amount of money spent on paper) has moved from an upward trend in the 1970's to a declining trend since the start of the new millennium.

We have argued in the past that the declining Value trend showed that the market was no longer willing/able to increase the total budget spent on Paper overall, regardless of how much paper (tonnage) it used. We also argued that if paper users were no longer prepared to pay more for paper, that there would, at times, be a downward reaction in demand when prices rise (i.e. Price-Chelastic Demand). This results in a downward rise for paper demand.

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## F. Industry Consolidation

Emerging industry in mature markets (e.g. Europe) tends to consolidate

TABLE 10. EMERGENT MARKET CONSOLIDATION SUMMARY

Market	North America	Europe	Rest of World	World
Global Woodline	2500	1000	100	3600
Global Mechanical	2000	400	100	2500
Global Paper	1700	1700	500	3900
Global Mechanical Paper	1500	2000	400	3900
Printing & Writing	100	100	100	300
Global Paper	1800	1700	300	3800
Mechanical Paper	1200	500	200	1900
Regional Paper	1200	1700	300	3200

\* Figures are estimates with a "high treatment" or high volume paper in 2000  
 Source: EMERGENT, 2000

In the mature regions of North America and Western Europe, the level of paper industry consolidation is generally considered to be high. With the exception of Europe's Woodline sector, the "Western" paper industry is close to or above the estimated 4000 level of 1000 or 2000 or more, which would empirically indicate that they are highly consolidated.

However, we believe mergers and acquisitions are likely to be on the agenda for more and more companies in the coming years. As more companies are sold, the remaining companies will consist of fewer and fewer production units, meaning that further closures could end a company's economic activity. We believe that, if any, companies will voluntarily step out of the industry, preferring to be bought or to pursue a merger route.

In North America, there would seem to be little scope for further consolidation in Global Woodline, as that sector is very highly consolidated already. However, further mergers in North America have suggested that deals may still be possible in the Uncoated Woodline and in the Mechanical Paper sectors.

In Europe, meanwhile, we have already argued that Mechanical Paper mills are likely to benefit from growing negative incentives in export markets which do not produce Mechanical Paper themselves. However, a moderately declining demand business is not expected to attract more activity. Consequently, a deliberate merger should be unlikely in the highly-consolidated Uncoated Mechanical sector, but if the authorities are prepared to

consider all Mechanical / Negative Papers as a single sector, then there could still be room for measures.

It is the European Woodfree sector where consolidation seems most likely, however. For one thing, it is in Woodfree that export markets are expected to get tougher for European mills, largely due to Asian capacity expansion, as explained earlier. In addition, domestic demand is also under pressure, due to a range of factors, as explained in the Demand section of this report. At least as important as these factors is that Europe's Woodfree Paper Industry is fragmented, and there is clearly room for merger/acquisitions – especially in Unbleached Woodfree, which will come under increasing pressure from the upcoming wave of new Asian capacity.

When the new Asian capacity comes on stream, we do not expect it will just be Western facilities that will come under pressure, however. Following large-volume capacity closures and price rationalizations, the surviving (larger, more modern) facilities in the West are more efficient than they have been for years. The same process has begun, e.g. in China, with large numbers of very small mills being closed, but we believe much capacity will remain that will prove to be uncompetitive when the new Asian capacity creates heavy regional overcapacity. The closures of such inefficient plants are expected to raise the level of consolidation in those markets, although in comparison with mature markets, the industry in Asia will remain highly fragmented for some time, we expect.

### *Pricing of Demand*

We will briefly repeat here a warning that the increasingly consolidated paper industries in Western markets carry a downside demand risk. More consolidation may help Western papermakers to raise prices when demand is poor and the market oversupplied (surely when costs are rising), but pushing through price rises when paper consumers are suffering falling demand carries an even greater downside risk in terms of long-term paper demand volumes.

## I. LEADING SUPPLIERS – 2012

Top Five supplier P/Wh global market share approaching 50%

### I.1 Leading Suppliers – Coated Unbleached Papers

FIGURE 11. LEADING SUPPLIERS – 2012 CAPACITY, COATED UNBLEACHED PAPER						
Capacity, 000						
Company	Region	Group Total	North America		Other Region	World Share
			Domestic	Foreign		
1. <b>APL</b>	Europe	1,000			1,000	11.7%
2. <b>APP</b>	North America	1,000	710	290	0	11.7%
3. <b>WPM</b>	Asia	1,000		1,000		11.7%
4. <b>STAN</b>	Europe	1,000		1,000	0	11.7%
5. <b>UPM</b>	Europe	1,000		1,000	0	11.7%
6. <b>SCM</b>	Europe	700		700		8.2%
7. <b>WAL</b>	Asia	700			700	8.2%
8. <b>WAL</b>	Asia	600		600		7.0%
9. <b>WAL</b>	Asia	600			600	7.0%
10. <b>WAL</b>	Asia	600			600	7.0%
11. <b>WPM</b>	Asia	500		500		5.9%
12. <b>WPM</b>	Asia	500		500		5.9%
13. <b>WPM</b>	Asia	500		500		5.9%
14. <b>WPM</b>	Asia	500		500		5.9%
15. <b>WPM</b>	Asia	500		500		5.9%
<b>World Capacity</b>		<b>8,510</b>	<b>400</b>	<b>2,010</b>	<b>1,600</b>	<b>100%</b>
<b>Top 5 Share of Capacity</b>			<b>46%</b>	<b>23%</b>	<b>47%</b>	<b>46%</b>
<b>Notes:</b>			<b>2,100</b>	<b>1,000</b>	<b>700</b>	<b>800</b>

(Notes: = 2012 figure unless indicated otherwise; n/a indicates 2011 figure; % share based on 2012 capacity)

Source: ENR, ENR.com, 8/2012



The following table shows the different regional positions in base data:

TABLE 10: LEANING-CTS WITHIN DATA SUPPLIER - WORLD AND REGION			
2020 Income			
Company	In	2020 Forecast (P1000)	Share
<b>WORLD</b>			<b>(270)</b>
1. AM	America	100	37.0%
2. JPM	East Asia	100	37.0%
3. EUROPE	EM	100	37.0%
4. OTHER-EM	Other	100	37.0%
5. JEM	Other	100	37.0%
<b>Total</b>		<b>2700</b>	<b>100%</b>
<b>AMERICA</b>			<b>(270)</b>
1. AMERICAL	EM	100	37.0%
2. JPM	East Asia	100	37.0%
3. EUROPE	EM	100	37.0%
4. OTHER-EM	Other	100	37.0%
5. JEM	Other	100	37.0%
<b>Total</b>		<b>2700</b>	<b>100%</b>
<b>EUROPE</b>			<b>(270)</b>
1. JPM	East Asia	100	37.0%
2. EUROPE	EM	100	37.0%
3. OTHER-EM	Other	100	37.0%
4. JEM	Other	100	37.0%
5. AMERICAL	EM	100	37.0%
<b>Total</b>		<b>2700</b>	<b>100%</b>
<b>REST OF WORLD</b>			<b>(270)</b>
1. AM	America	100	37.0%
2. EUROPE	EM	100	37.0%
3. OTHER-EM	Other	100	37.0%
4. AMERICAL	EM	100	37.0%
5. JEM	Other	100	37.0%
<b>Total</b>		<b>2700</b>	<b>100%</b>

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## 1.2 Leading Suppliers – Forecasted Bleedline Papers

FIGURE 14. LEADING SUPPLIERS – 2022 CAPACITY, USD, WOODPANEL MARKET						
Capacity (kmt)						
Company	Market	Group Total	North America	Europe	Other Regions	World Share
1. ST	Wood	6000	2070	1500	1000	6.0%
2. COWI	Wood	5000	1000			5.0%
3. APP	Various	3000			2000	3.0%
4. UPM	Pulp & Paper	2900		1000	700	2.9%
5. WOODS	Pulp & Paper	2000		1000	500	2.0%
6. WOODS	Various	1800		1000		1.8%
7. SAPPORO PAPER	Wood	1800			1000	1.8%
8. WOODS	Wood	1800		1000		1.8%
9. APP	Various	1800			1000	1.8%
10. SAPPORO PAPER	Wood	1800				1.8%
11. SAPPORO PAPER	Wood	1700			700	1.7%
12. SAPPORO PAPER	Wood	1700			700	1.7%
13. SAPPORO PAPER	Wood	1700			700	1.7%
14. SAPPORO PAPER	Wood	1700			700	1.7%
<b>World Capacity</b>		<b>28000</b>	<b>8000</b>	<b>10000</b>	<b>20000</b>	<b>100%</b>
<b>Top 3 Share of Capacity</b>			<b>29%</b>	<b>15%</b>	<b>6%</b>	<b>50%</b>
<b>Market</b>			<b>2000</b>	<b>1000</b>	<b>2000</b>	<b>100%</b>

(Notes: 2022 figure based on preliminary 2022 capacity data. Includes capacity under "Other Regions" (High Capacity))

Source: ENR, ENR.com, ENR.com

The following tables show the different regional positions in more detail.

TABLE 10. LEADING LINE WATER SUPPLIERS - WORLD AND REGION			
1999 Income			
Company	In	2012 Revenue (P.000)	Share
<b>WORLD</b>			<b>(210)</b>
1. A	USA	400	1.9%
2. SUEZ	France	370	1.8%
3. AEP	Spain	300	1.4%
4. UFM	France	190	0.9%
5. SUEZ	France	180	0.9%
<b>Total</b>		<b>1,440</b>	<b>6%</b>
<b>AMERICA</b>			<b>(200)</b>
1. SUEZ	France	330	1.5%
2. A	USA	310	1.4%
3. SUEZ	USA	130	0.6%
4. SUEZ	USA	90	0.4%
5. SUEZ	USA	40	0.2%
<b>Total</b>		<b>800</b>	<b>4%</b>
<b>EUROPE</b>			<b>(400)</b>
1. SUEZ	France	180	0.8%
2. SUEZ	France	150	0.7%
3. SUEZ	France	100	0.5%
4. UFM	France	100	0.5%
5. A	USA	70	0.3%
<b>Total</b>		<b>500</b>	<b>2%</b>
<b>REST OF WORLD</b>			<b>(170)</b>
1. A	USA	100	0.5%
2. SUEZ	France	50	0.2%
3. A	USA	50	0.2%
4. SUEZ	France	50	0.2%
5. SUEZ	France	20	0.1%
<b>Total</b>		<b>270</b>	<b>1%</b>

Source: ENR, ENR, ENR, ENR

### 7.3 Leading Suppliers - Coated Mechanical

Global Market of Industrial Fasteners - Market Size						
Coated Mechanical						
Company	Revenue	Group	North	Europe	Asia	World
		Total	Americas	Europe	Region	Share
1. USI	Revenue	100%	100%	100%	100%	100%
2. USI	Fasteners	100%		100%	100%	100%
3. USI (USI)	Revenue	100%		100%	100%	100%
4. USI (USI)	USI	100%	100%			100%
5. USI (USI)	USI	100%		100%		100%
6. USI (USI)	USI	100%	100%			100%
7. USI (USI)	USI	100%		100%		100%
8. USI (USI)	USI	100%			100%	100%
9. USI (USI)	USI	100%			100%	100%
10. USI (USI)	USI	100%			100%	100%
11. USI (USI)	USI	100%			100%	100%
12. USI (USI)	USI	100%			100%	100%
13. USI (USI)	USI	100%			100%	100%
14. USI (USI)	USI	100%			100%	100%
15. USI (USI)	USI	100%			100%	100%
16. USI (USI)	USI	100%			100%	100%
17. USI (USI)	USI	100%			100%	100%
18. USI (USI)	USI	100%			100%	100%
19. USI (USI)	USI	100%			100%	100%
20. USI (USI)	USI	100%			100%	100%
21. USI (USI)	USI	100%			100%	100%
22. USI (USI)	USI	100%			100%	100%
23. USI (USI)	USI	100%			100%	100%
24. USI (USI)	USI	100%			100%	100%
25. USI (USI)	USI	100%			100%	100%
26. USI (USI)	USI	100%			100%	100%
27. USI (USI)	USI	100%			100%	100%
28. USI (USI)	USI	100%			100%	100%
29. USI (USI)	USI	100%			100%	100%
30. USI (USI)	USI	100%			100%	100%
31. USI (USI)	USI	100%			100%	100%
32. USI (USI)	USI	100%			100%	100%
33. USI (USI)	USI	100%			100%	100%
34. USI (USI)	USI	100%			100%	100%
35. USI (USI)	USI	100%			100%	100%
36. USI (USI)	USI	100%			100%	100%
37. USI (USI)	USI	100%			100%	100%
38. USI (USI)	USI	100%			100%	100%
39. USI (USI)	USI	100%			100%	100%
40. USI (USI)	USI	100%			100%	100%
41. USI (USI)	USI	100%			100%	100%
42. USI (USI)	USI	100%			100%	100%
43. USI (USI)	USI	100%			100%	100%
44. USI (USI)	USI	100%			100%	100%
45. USI (USI)	USI	100%			100%	100%
46. USI (USI)	USI	100%			100%	100%
47. USI (USI)	USI	100%			100%	100%
48. USI (USI)	USI	100%			100%	100%
49. USI (USI)	USI	100%			100%	100%
50. USI (USI)	USI	100%			100%	100%
51. USI (USI)	USI	100%			100%	100%
52. USI (USI)	USI	100%			100%	100%
53. USI (USI)	USI	100%			100%	100%
54. USI (USI)	USI	100%			100%	100%
55. USI (USI)	USI	100%			100%	100%
56. USI (USI)	USI	100%			100%	100%
57. USI (USI)	USI	100%			100%	100%
58. USI (USI)	USI	100%			100%	100%
59. USI (USI)	USI	100%			100%	100%
60. USI (USI)	USI	100%			100%	100%
61. USI (USI)	USI	100%			100%	100%
62. USI (USI)	USI	100%			100%	100%
63. USI (USI)	USI	100%			100%	100%
64. USI (USI)	USI	100%			100%	100%
65. USI (USI)	USI	100%			100%	100%
66. USI (USI)	USI	100%			100%	100%
67. USI (USI)	USI	100%			100%	100%
68. USI (USI)	USI	100%			100%	100%
69. USI (USI)	USI	100%			100%	100%
70. USI (USI)	USI	100%			100%	100%
71. USI (USI)	USI	100%			100%	100%
72. USI (USI)	USI	100%			100%	100%
73. USI (USI)	USI	100%			100%	100%
74. USI (USI)	USI	100%			100%	100%
75. USI (USI)	USI	100%			100%	100%
76. USI (USI)	USI	100%			100%	100%
77. USI (USI)	USI	100%			100%	100%
78. USI (USI)	USI	100%			100%	100%
79. USI (USI)	USI	100%			100%	100%
80. USI (USI)	USI	100%			100%	100%
81. USI (USI)	USI	100%			100%	100%
82. USI (USI)	USI	100%			100%	100%
83. USI (USI)	USI	100%			100%	100%
84. USI (USI)	USI	100%			100%	100%
85. USI (USI)	USI	100%			100%	100%
86. USI (USI)	USI	100%			100%	100%
87. USI (USI)	USI	100%			100%	100%
88. USI (USI)	USI	100%			100%	100%
89. USI (USI)	USI	100%			100%	100%
90. USI (USI)	USI	100%			100%	100%
91. USI (USI)	USI	100%			100%	100%
92. USI (USI)	USI	100%			100%	100%
93. USI (USI)	USI	100%			100%	100%
94. USI (USI)	USI	100%			100%	100%
95. USI (USI)	USI	100%			100%	100%
96. USI (USI)	USI	100%			100%	100%
97. USI (USI)	USI	100%			100%	100%
98. USI (USI)	USI	100%			100%	100%
99. USI (USI)	USI	100%			100%	100%
100. USI (USI)	USI	100%			100%	100%

The following table gives the different regional positions in more detail.

FIGURE 17. LEADING CTO TECHNOLOGY SUPPLIERS - REVENUE AND REGION			
2022 Revenue			
Company	In	2022 Revenue (P.000)	Share
<b>WORLD</b>			(27%)
1. IBM	Global	100	10%
2. SAP	Global	80	8%
3. Oracle Corp.	Global	70	7%
4. Microsoft	US	60	6%
5. Adobe	US	50	5%
<b>Total</b>		<b>260</b>	<b>26%</b>
<b>AMERICA</b>			(27%)
1. Microsoft	US	110	11%
2. Salesforce	US	80	8%
3. Amazon	Global	60	6%
4. IBM	Global	50	5%
5. Google	Global	40	4%
<b>Total</b>		<b>240</b>	<b>24%</b>
<b>EUROPE</b>			(27%)
1. IBM	Global	80	8%
2. SAP	Global	70	7%
3. Oracle Corp.	Global	60	6%
4. Adobe	US	50	5%
5. Microsoft Corp.	Global	40	4%
<b>Total</b>		<b>200</b>	<b>20%</b>
<b>REST OF WORLD</b>			(27%)
1. SAP AG	Global	60	6%
2. Oracle Corp.	Global	50	5%
3. Microsoft Corp.	Global	40	4%
4. Amazon	Global	30	3%
5. Oracle Corp.	Global	20	2%
<b>Total</b>		<b>100</b>	<b>10%</b>

Source: IBM, SAP, Oracle, Microsoft

### Top 10 Leading Suppliers – Electrical Mechanical

Market in Selected Countries – Top Capacity and Sales						
Capacity (MW)						
Company	Region	Group Total	North America	Europe	Other Regions	World Share
1. ABB	Global	1000	100	600		11.7%
2. Siemens	Global	970		970	0	11.7%
3. Schneider	Global	700	100			8.7%
4. Hitachi (ABB)	Europe	600		100	100	7.6%
5. Eaton	Global	500	100			6.2%
6. GE	Global	400		200		5.0%
7. Fuji Electric	Global	370		370		4.6%
8. ABB	Global	300	100			3.7%
9. Siemens	Global	200	100		100	2.5%
10. Schneider	Europe	100			100	1.3%
11. Schneider	Global	100	100			1.3%
12. Schneider	Global	100	100			1.3%
13. Schneider	Global	100			100	1.3%
14. Schneider	Global	100	100			1.3%
15. Schneider	Global	100			100	1.3%
<b>World Capacity</b>		<b>8500</b>	<b>2510</b>	<b>6110</b>	<b>2220</b>	<b>100%</b>
<b>Top 10 Share of Capacity</b>			<b>30%</b>	<b>28%</b>	<b>10%</b>	<b>68%</b>
<b>Market</b>		<b>1420</b>	<b>2000</b>	<b>600</b>	<b>620</b>	

Market is 2024 figure unless indicated otherwise. Data is in million MW unless "Tera" (abbreviated)  
 Source: ENR Global, 2024

The following tables show the different regional positions in more detail.

TABLE 01 - EMGGE LINC. HIGH SUPPLY - WORLD AND REGION			
1995 - 2000			
Company	In	EMGGE Capacity (T/ANN)	Share
<b>WORLD</b>			<b>(200)</b>
1. JFE	Japan	100	50.0%
2. POSCO	South Korea	70	35.0%
3. NIPPON	Japan	50	25.0%
4. HANSA STEEL	Germany	40	20.0%
5. HYUNDAI STEEL	South Korea	20	10.0%
<b>Total</b>		<b>200</b>	<b>100%</b>
<b>AMERICA</b>			<b>(140)</b>
1. POSCO	South Korea	70	50.0%
2. HYUNDAI STEEL	South Korea	40	28.6%
3. JFE	Japan	30	21.4%
4. NIPPON	Japan	20	14.3%
5. HANSA STEEL	Germany	10	7.1%
<b>Total</b>		<b>140</b>	<b>100%</b>
<b>EUROPE</b>			<b>(200)</b>
1. JFE	Japan	100	50.0%
2. POSCO	South Korea	70	35.0%
3. NIPPON	Japan	50	25.0%
4. HANSA STEEL	Germany	40	20.0%
5. HYUNDAI STEEL	South Korea	20	10.0%
<b>Total</b>		<b>200</b>	<b>100%</b>
<b>REST OF WORLD</b>			<b>(60)</b>
1. POSCO	South Korea	30	50.0%
2. NIPPON	Japan	20	33.3%
3. HANSA STEEL	Germany	10	16.7%
4. POSCO	South Korea	10	16.7%
5. NIPPON	Japan	10	16.7%
<b>Total</b>		<b>60</b>	<b>100%</b>

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## 2.3 Leading Suppliers - Global Players

Market of Graphite Anodes - Top 10 Capacity, TWh, Coated						
Capacity, TWh						
Company	Material	Group Total	North America	Europe	Other Regions	Share
1. UBE	Graphite	1000	1000	0	0	10.0%
2. UBE	Graphite	1000	0	1000	0	10.0%
3. UBE	Graphite	1000	0	0	1000	10.0%
4. UBE (China)	Graphite	1000	0	0	1000	10.0%
5. Mitsubishi	Graphite	1000	0	0	0	10.0%
6. Kubota	Graphite	1000	0	0	0	10.0%
7. Mitsubishi	Graphite	1000	0	0	1000	10.0%
8. Mitsubishi	Graphite	1000	0	0	1000	10.0%
9. UBE (China)	Graphite	1000	0	0	1000	10.0%
10. UBE (China)	Graphite	1000	0	0	1000	10.0%
11. UBE (China)	Graphite	1000	0	0	1000	10.0%
12. Mitsubishi	Graphite	1000	0	0	1000	10.0%
13. Mitsubishi	Graphite	1000	0	0	1000	10.0%
14. Mitsubishi	Graphite	1000	0	0	1000	10.0%
15. Mitsubishi	Graphite	1000	0	0	1000	10.0%
<b>World Capacity</b>		<b>10000</b>	<b>1000</b>	<b>10000</b>	<b>10000</b>	<b>100%</b>
<b>Top 10 Share of Capacity</b>			<b>10%</b>	<b>10%</b>	<b>10%</b>	<b>30%</b>
<b>Market</b>			<b>1000</b>	<b>10000</b>	<b>1000</b>	<b>30%</b>

Market = 2022 figure unless indicated otherwise (note: 1000 = 1000 million TWh) (assumed)  
 Source: EMG&E, 2023



The following table shows the different regional positions in base debt:

FIGURE 4 - LEADING COUNTRIES FROM SUPPLIERS - WORLD AND REGIONAL			
1995 Income			
Company	Co.	2012 Country (Pct of 2012)	Share
<b>WORLD</b>			(47%)
1. JPM	United States	21%	44%
2. Lloyds	United Kingdom	10%	21%
3. Cit	United States	10%	21%
4. Citigroup	United States	10%	21%
5. Standard	USA	10%	21%
<b>Total</b>		<b>60%</b>	<b>12%</b>
<b>AMERICA</b>			(24%)
1. Standard	USA	10%	21%
2. Citigroup	USA	10%	21%
3. JPM	United States	10%	21%
4. Wells Fargo	United States	10%	21%
5. Cit	United States	10%	21%
<b>Total</b>		<b>50%</b>	<b>10%</b>
<b>EUROPE</b>			(24%)
1. JPM	United Kingdom	10%	21%
2. Cit	United States	10%	21%
3. Citigroup	United States	10%	21%
4. BNP	France	10%	21%
5. Citicorp	United States	10%	21%
<b>Total</b>		<b>50%</b>	<b>10%</b>
<b>REST OF WORLD</b>			(47%)
1. Cit	United States	10%	21%
2. Citicorp	United States	10%	21%
3. Citigroup	United States	10%	21%
4. Citicorp	United States	10%	21%
5. Citicorp	United States	10%	21%
<b>Total</b>		<b>50%</b>	<b>10%</b>

Source: BCG, Ltd. © 2012

### 2.4 Leading Suppliers – Woodfree Paper

TABLE 2.4: LEADING SUPPLIERS - 2017 CAPACITY, WOODFREE PAPER						
Capacity (ktp)						
Company	Product	Group Total	North America	Europe	Other Regions	World Share
1. AP	Logans	2,000			2,000	1.0%
2. P	WSP	1,800	200	1,100	500	0.9%
3. UPM	Woodfree	1,700	100	1,000	600	0.8%
4. UPM	Wood	1,600		1,600	0	0.8%
5. Norske	Wood	1,500	100		1,400	0.7%
6. UPM (incl. UPM)	Wood	1,400		1,400	0	0.7%
7. Norske (incl. Norske)	Wood	1,300		1,300	0	0.7%
8. Norske (incl. Norske)	Wood	1,100		1,100	0	0.6%
9. Norske	WSP	1,000	100		900	0.5%
10. Norske	WSP (incl. Norske)	1,000		1,000	0	0.5%
11. Norske (incl. Norske)	Wood	1,000		1,000	0	0.5%
12. Norske (incl. Norske)	Wood	1,000		1,000	0	0.5%
13. Norske (incl. Norske)	Wood	1,000		1,000	0	0.5%
14. Norske (incl. Norske)	Wood	1,000		1,000	0	0.5%
15. Norske	WSP	1,000		1,000	0	0.5%
<b>World Capacity</b>		<b>20,100</b>	<b>4,000</b>	<b>17,200</b>	<b>2,900</b>	<b>100%</b>
<b>Top 5 Share of Capacity</b>			<b>17%</b>	<b>89%</b>	<b>0%</b>	<b>27%</b>
<b>Market</b>			<b>1,270</b>	<b>1,000</b>	<b>500</b>	<b>600</b>

Notes: 1) 2017 figure capacity includes capacity that is scheduled to close by the end of 2017 (assumed).  
 Source: ENR Global, 2018

The following table shows the different regional positions in base metal:

TABLE 16: LEADING WOODPULP PAPER SUPPLIERS - WORLD AND REGION			
2009 Income			
Company	In	2012 Capacity (T/1000)	Share
<b>WORLD</b>			<b>(270)</b>
1. AP	Japan	200	73%
2. W	USA	200	73%
3. APW	South Africa	210	77%
4. APW	France	240	89%
5. APW/NA	China	240	89%
<b>Top 5</b>		<b>1090</b>	<b>40%</b>
<b>AMERICA</b>			<b>(1470)</b>
1. APW/NA	China	240	16%
2. W	USA	200	14%
3. APW/NA	USA	170	12%
4. APW	USA	150	10%
5. APW	South Africa	140	10%
<b>Top 5</b>		<b>800</b>	<b>5%</b>
<b>EUROPE</b>			<b>(200)</b>
1. APW/NA/NA	France	210	105%
2. APW	France	240	120%
3. APW	South Africa	200	100%
4. APW/NA/NA	France	140	70%
5. APW/NA/NA	France	130	65%
<b>Top 5</b>		<b>820</b>	<b>40%</b>
<b>REST OF WORLD</b>			<b>(270)</b>
1. AP	Japan	200	73%
2. APW/NA/NA	China	240	89%
3. APW/NA/NA	China	240	89%
4. APW/NA	China	150	55%
5. APW/NA	China	140	52%
<b>Top 5</b>		<b>1070</b>	<b>40%</b>

### 1.7 Leading Suppliers – Magazine Paper Suppliers

TABLE 10. LEADING SUPPLIERS – MAGAZINE PAPER SUPPLIERS						
Capacity (MM)						
Company	Region	Group Total	North America	Europe	Other Regions	World Share
1. UPM	North	2,070	1,000	1,070		22%
2. Stone Paper	North	2,000		2,000	0	22%
3. Mondi Group	North	1,710	1,710			19%
4. Munksjo (SAPPI)	Europe	1,700		1,700	0	17%
5. UPM	NA	1,600		1,600	0	17%
6. Smurfit	NA	1,500	1,500			16%
7. SAPPPI	NA	1,310		1,310		14%
8. UPM	Europe	1,200		1,200		13%
9. G. Heubach	Europe	800			800	9%
10. International Paper	North	700	700			8%
11. Stone Paper	NA	700	700			8%
12. SAPPPI (SAPPI)	Europe	700			700	8%
13. Munksjo	Europe	700		700		8%
14. International Paper (SAPPI)	NA	600			600	7%
15. International Paper	Europe	600			600	7%
<b>World Capacity</b>		<b>9,500</b>	<b>3,100</b>	<b>2,700</b>	<b>3,700</b>	<b>100%</b>
<b>Top 5 Share of Capacity</b>			<b>40%</b>	<b>28%</b>	<b>30%</b>	<b>98%</b>
<b>Market</b>			<b>1,270</b>	<b>1,700</b>	<b>500</b>	<b>500</b>

Notes: (1) All paper capacity includes magazine paper – in addition, 100 million tons of paper (uncoated) (2) All capacity in MM

The following table gives the different regional positions in base metal.

TABLE 11. LEADING PRODUCE BASE SUPPLERS - WORLD AND REGION			
1995 tonnes			
Company	Co.	2012 Capacity (P1000)	Share
<b>WORLD</b>			<b>(170)</b>
1. JPM	Spain	670	39%
2. Umicore	Spain	600	35%
3. Antares	Spain	510	30%
4. Antares Zinc	Spain	180	11%
5. JPM	UK	100	6%
<b>Total</b>		<b>1,660</b>	<b>98%</b>
<b>AMERICA</b>			<b>(1470)</b>
1. Antares	Spain	510	35%
2. Umicore	UK	100	7%
3. JPM Zinc	Spain	80	6%
4. Antares Zinc	UK	70	5%
5. JPM	Spain	60	4%
<b>Total</b>		<b>820</b>	<b>55%</b>
<b>EUROPE</b>			<b>(170)</b>
1. JPM	Spain	60	35%
2. Umicore	Spain	50	30%
3. Antares Zinc	Spain	40	24%
4. JPM	UK	10	6%
5. Antares	UK	10	6%
<b>Total</b>		<b>170</b>	<b>100%</b>
<b>REST OF WORLD</b>			<b>(10)</b>
1. JPM	Spain	10	100%
2. Umicore	Spain	0	0%
3. Antares Zinc	Spain	0	0%
4. Antares	Spain	0	0%
5. Umicore	Spain	0	0%
<b>Total</b>		<b>10</b>	<b>100%</b>

Source: ENR, Ltd. Ltd. © 2013

### Top Leading Suppliers – Proving Oil Blending

Table 10: Leading Suppliers – Oil Capacity, Proving and Refining						
Capacity (MM)						
Company	Region	Group Total	North America	Europe	Other Regions	World Share
1. Shell	Global	1004	100	600	304	1.7%
2. Exxon Mobil	Global	970		590	380	1.7%
3. BP	Europe	800		600	200	1.7%
4. Oryx	Sub-Cont	600	100	500	0	1.7%
5. Ar	Oil	500	200	100	200	1.6%
6. Petrobras	Latin	500	10		490	1.2%
7. Chevron	Global	500	200			1.2%
8. Refining	Oil	400	200			1.2%
9. Enbridge	NA	300		300		1.2%
10. Saudi Aramco	Global	300			300	1.2%
11. Equinor	Latin	200		0	200	1.2%
12. Shellchem	Global	200	200			1.2%
13. Petrobrás (Ref)	Global	200		200	0	1.2%
14. Oryx	Sub-Cont	200	100	100	0	1.2%
15. Petrobrás (Refining)	Global	200		200		1.2%
<b>World Capacity</b>		<b>57,110</b>	<b>22,440</b>	<b>26,200</b>	<b>8,470</b>	<b>100%</b>
<b>Top 5 Share of Capacity</b>			<b>40%</b>	<b>27%</b>	<b>17%</b>	<b>19%</b>
<b>Market</b>			<b>200</b>	<b>600</b>	<b>300</b>	<b>300</b>

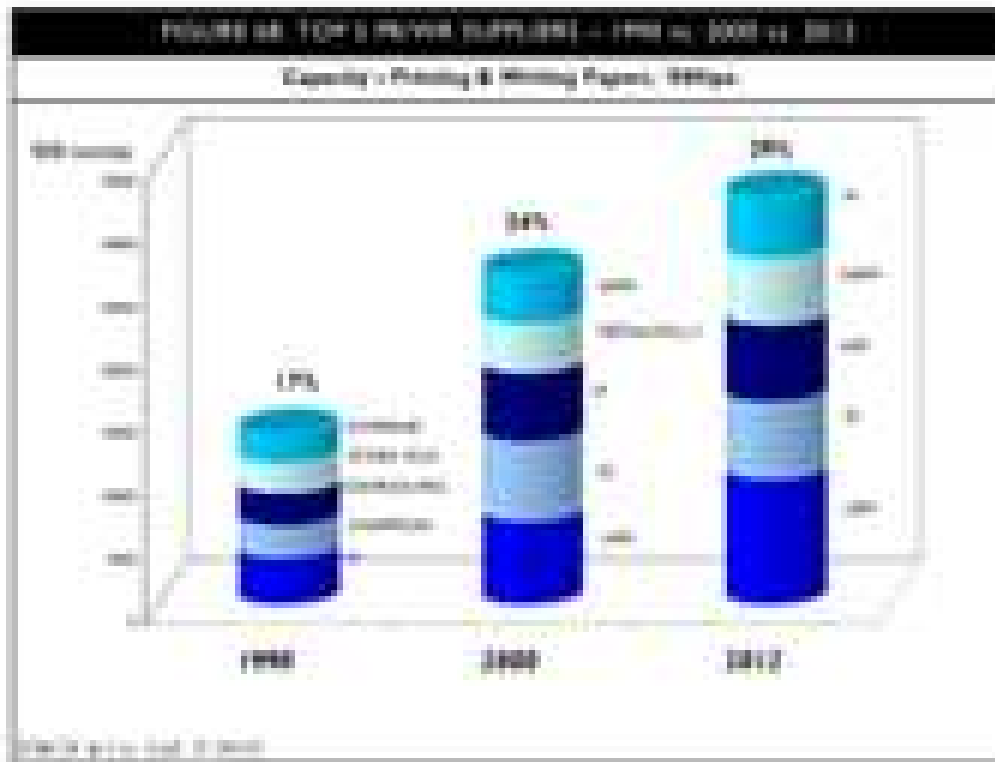
Notes: (1) Oil Refining includes capacity for base oil production (2) Refining (3) Refining (4) Refining (5) Refining (6) Refining (7) Refining (8) Refining (9) Refining (10) Refining (11) Refining (12) Refining (13) Refining (14) Refining (15) Refining

Source: ENR Global Energy Intelligence, March 2019

The following table shows the different regional positions in base debt:

TABLE 40. LEADING PAPER PAPER SUPPLIERS - WORLD AND REGION			
1999 Issues			
Company	Co.	1999 Issuance (\$100M)	Share
<b>WORLD</b>			<b>(200)</b>
1. JPM	France	800	40%
2. Citicorp	France	600	30%
3. JPM	Japan	400	20%
4. JPM	United States	100	5%
5. JP	USA	50	3%
<b>Total</b>		<b>2,000</b>	<b>100%</b>
<b>AMERICA</b>			<b>(700)</b>
1. Citicorp	France	300	43%
2. JPM	USA	200	29%
3. JP	USA	100	14%
4. Citicorp	France	50	7%
5. Citicorp	USA	50	7%
<b>Total</b>		<b>700</b>	<b>100%</b>
<b>EUROPE</b>			<b>(700)</b>
1. JPM	France	300	43%
2. Citicorp	France	200	29%
3. JPM	United States	100	14%
4. JPM	JP	50	7%
5. Netherlands	France	50	7%
<b>Total</b>		<b>700</b>	<b>100%</b>
<b>REST OF WORLD</b>			<b>(200)</b>
1. JP	Japan	100	50%
2. Citicorp	USA	50	25%
3. Citicorp	France	50	25%
4. Citicorp	USA	50	25%
5. Citicorp	USA	50	25%
<b>Total</b>		<b>200</b>	<b>100%</b>

Source: J.P. Morgan & Co.



The above chart shows how the share of the leading 5 companies has increased from 17% to 19% to a forecast 28% this year.



### Top Leading Suppliers - Americas

TABLE OF LEADING SUPPLIERS - AMERICAS			
Company	IC	2015 Capacity (T/yr)	Share
<b>Cement Manufacture</b>			<b>(1780)</b>
1. Holcim	USA	1400	78.6%
2. Cem	USA/Canada	170	9.6%
3. Buzzi Unicem	USA	60	3.4%
4. Opolcemex	Mexico	30	1.7%
5. Nucor	USA	20	1.1%
<b>Top 5</b>		<b>1680</b>	<b>95%</b>
<b>Concrete Manufacture</b>			<b>(2010)</b>
1. Holcim	USA	800	40%
2. B	USA	500	25%
3. Cem	USA	300	15%
4. Opolcemex	USA	100	5%
5. Nucor	USA	60	3%
<b>Top 5</b>		<b>1760</b>	<b>88%</b>
<b>Cement Manufacture</b>			<b>(1770)</b>
1. Holcim	USA	1100	62%
2. Opolcemex	USA	60	3.4%
3. Buzzi Unicem	USA	300	17%
4. Cem	USA	60	3.4%
5. Nucor	USA	20	1.1%
<b>Top 5</b>		<b>1540</b>	<b>87%</b>
<b>Concrete Manufacture</b>			<b>(1620)</b>
1. Buzzi Unicem	USA	1000	62%
2. Opolcemex	USA	60	3.7%
3. Cem	USA	40	2.5%
4. Nucor	USA	20	1.2%
5. Opolcemex	USA	20	1.2%
<b>Top 5</b>		<b>1140</b>	<b>71%</b>
<b>Printing &amp; Writing</b>			<b>(710)</b>
1. Holcim	USA	300	42%
2. Holcim	USA	210	29%
3. B	USA	170	24%
4. Buzzi Unicem	USA	110	15%
5. Opolcemex	USA	60	8%
<b>Top 5</b>		<b>850</b>	<b>80%</b>

Source: Global Vantage, 2015

### 7.10 Leading Suppliers - Europe

FIGURE 7.10 LEADING SUPPLIERS SUPPLY CHAIN - EUROPE				
Company	In	2012 Capacity (P/mt)	Share	
<b>Coated Woodfree</b>				
			(7400)	
1. SAPPI	Switzerland	2000	27.1%	
2. KIMBLY CLAY	Spain	1500	20.3%	
3. STORA ENSO	Finland	1200	16.2%	
4. SCA	Finland	1200	16.2%	
5. MITSUBISHI	Japan	1300	17.5%	
<b>Top 5</b>		<b>6300</b>	<b>85%</b>	
<b>Uncoated Woodfree</b>				
			(440)	
1. MITSUBISHI	Japan	100	22.7%	
2. SCA	Finland	100	22.7%	
3. STORA ENSO	Finland	100	22.7%	
4. SAPPI	Switzerland	100	22.7%	
5. KIMBLY CLAY	Spain	100	22.7%	
<b>Top 5</b>		<b>400</b>	<b>91%</b>	
<b>Coated Mechanical</b>				
			(2700)	
1. SAPPI	Finland	800	29.6%	
2. SAPPI	Switzerland	700	25.9%	
3. STORA ENSO	Finland	500	18.5%	
4. MITSUBISHI	Japan	400	14.8%	
5. KIMBLY CLAY	Spain	100	3.7%	
<b>Top 5</b>		<b>2600</b>	<b>96%</b>	
<b>Uncoated Mechanical</b>				
			(2400)	
1. SAPPI	Finland	800	33.3%	
2. STORA ENSO	Finland	700	29.2%	
3. KIMBLY CLAY	Spain	300	12.5%	
4. SCA	Finland	200	8.3%	
5. MITSUBISHI	Japan	100	4.2%	
<b>Top 5</b>		<b>2100</b>	<b>87%</b>	
<b>Printing / Writing</b>				
			(700)	
1. SAPPI	Finland	400	57.1%	
2. STORA ENSO	Finland	200	28.6%	
3. SAPPI	Switzerland	100	14.3%	
4. MITSUBISHI	Japan	100	14.3%	
5. MITSUBISHI	Japan	100	14.3%	
<b>Top 5</b>		<b>700</b>	<b>100%</b>	

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## 1.11 Leading Suppliers - Rest of the World

TABLE 11. LEADING SUPPLIERS - REST OF THE WORLD			
Company	in	2012 Capacity (T/ann)	Share
<b>Control Woodline</b>			<b>(21%)</b>
1. <b>WPI</b>	Indonesia	1000	21.4%
2. <b>WPI</b>	China	1000	21.4%
3. <b>WPI</b>	China	1000	21.4%
4. <b>WPI</b>	China	1000	21.4%
5. <b>WPI</b>	China	1000	21.4%
<b>Top 5</b>		<b>5000</b>	<b>107%</b>
<b>Unassess Woodline</b>			<b>(21%)</b>
1. <b>WPI</b>	Indonesia	1000	21.4%
2. <b>WPI</b>	China	1000	21.4%
3. <b>WPI</b>	China	1000	21.4%
4. <b>WPI</b>	Indonesia	1000	21.4%
5. <b>WPI</b>	China	1000	21.4%
<b>Top 5</b>		<b>5000</b>	<b>107%</b>
<b>Control Mechanical</b>			<b>(7%)</b>
1. <b>WPI</b>	China	1000	14.3%
2. <b>WPI</b>	China	1000	14.3%
3. <b>WPI</b>	China	1000	14.3%
4. <b>WPI</b>	China	1000	14.3%
5. <b>WPI</b>	China	1000	14.3%
<b>Top 5</b>		<b>5000</b>	<b>71%</b>
<b>Unassess Mechanical</b>			<b>(6%)</b>
1. <b>WPI</b>	China	1000	14.3%
2. <b>WPI</b>	China	1000	14.3%
3. <b>WPI</b>	China	1000	14.3%
4. <b>WPI</b>	China	1000	14.3%
5. <b>WPI</b>	China	1000	14.3%
<b>Top 5</b>		<b>5000</b>	<b>71%</b>
<b>Printing / Wrapping</b>			<b>(6%)</b>
1. <b>WPI</b>	China	1000	14.3%
2. <b>WPI</b>	China	1000	14.3%
3. <b>WPI</b>	China	1000	14.3%
4. <b>WPI</b>	China	1000	14.3%
5. <b>WPI</b>	China	1000	14.3%
<b>Top 5</b>		<b>5000</b>	<b>71%</b>

Source: Global Vantage, 2013

1.12 Leading Suppliers - Global World

FIGURE 12. LEADING PAPER SUPPLIERS - 2019M			
Company	in	2019 Capacity (Th m3)	Share
<b>Coated Woodfree</b>			<b>(24%)</b>
1. WIPAC	WIPAC	100	10.0%
2. WIPAC	WIPAC	100	10.0%
3. WIPAC	WIPAC	100	10.0%
4. WIPAC	WIPAC	100	10.0%
5. WIPAC	WIPAC	100	10.0%
<b>Top 5</b>		<b>500</b>	<b>50%</b>
<b>Uncoated Woodfree</b>			<b>(24%)</b>
1. WIPAC	WIPAC	100	10.0%
2. WIPAC	WIPAC	100	10.0%
3. WIPAC	WIPAC	100	10.0%
4. WIPAC	WIPAC	100	10.0%
5. WIPAC	WIPAC	100	10.0%
<b>Top 5</b>		<b>500</b>	<b>50%</b>
<b>Coated Mechanical</b>			<b>(27%)</b>
1. WIPAC	WIPAC	100	10.0%
2. WIPAC	WIPAC	100	10.0%
3. WIPAC	WIPAC	100	10.0%
4. WIPAC	WIPAC	100	10.0%
5. WIPAC	WIPAC	100	10.0%
<b>Top 5</b>		<b>500</b>	<b>50%</b>
<b>Uncoated Mechanical</b>			<b>(24%)</b>
1. WIPAC	WIPAC	100	10.0%
2. WIPAC	WIPAC	100	10.0%
3. WIPAC	WIPAC	100	10.0%
4. WIPAC	WIPAC	100	10.0%
5. WIPAC	WIPAC	100	10.0%
<b>Top 5</b>		<b>500</b>	<b>50%</b>
<b>Printing / Writing</b>			<b>(24%)</b>
1. WIPAC	WIPAC	100	10.0%
2. WIPAC	WIPAC	100	10.0%
3. WIPAC	WIPAC	100	10.0%
4. WIPAC	WIPAC	100	10.0%
5. WIPAC	WIPAC	100	10.0%
<b>Top 5</b>		<b>500</b>	<b>50%</b>

Source: Global Forests, 2019

### 1.11 Leading Suppliers – Notes on selected APQ's activity

FIGURE 11. LEADING SUPPLIERS – NOTES ON PMA ACTIVITY

Company	Comments
AGRIUMCORP	Includes Green Paper (Green) & Super (Green) (20%)
AMCOR	Weight for base systems and Highbase
INTERNATIONAL PAPER	Includes Inorganic (Blue) Super (Green) & PMA (Blue)
MPPI	Includes IT (Blue)
NEENAH	Includes Neenah Super (Blue) and Super (Blue) (20%)
ORR	Includes ORR (Blue) and Super (Blue) (20%)
PTMA (20%)	Includes Super Paper (Green) and Green Paper (20%)
WIPAC	Includes Highbase Paper (Blue) (20%) & Super (20%)

Includes Mechanical for articles reported through Equinox

2022 as of July 31, 2022

## 2. Coated Woodfree - Forecasts

### 2.1. Demand - Coated Woodfree

FIGURE 16: DEMAND FORECAST - WORLD BY REGION, COATED WOODFREE							
1000 tonnes							
Demand	2017	2018	2019	2020	2021	2022	2017-2022
Europe	2000	2020	2000	2000	2000	2000	+2%
Other Europe	1000	1000	1000	1000	1000	1000	+0%
Asia/Pacific	2000	2000	2000	2000	2000	2000	+0%
Latin America	1000	1000	1000	1000	1000	1000	+0%
MENA	2000	2000	2000	2000	2000	2000	+0%
Central	2000	2000	2000	2000	2000	2000	+0%
Other North America	2000	2000	2000	2000	2000	2000	+0%
Australia	2000	2000	2000	2000	2000	2000	+0%
<b>Total</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>	<b>+0%</b>
Europe Total	10%	10%	10%	10%	10%	10%	+0%
Asia Total	20%	20%	20%	20%	20%	20%	+0%
Source: ENCI, ENP, ENR, ENI, ENA, ENO, ENL, ENM, ENB, ENF, ENG, ENH, ENI, ENJ, ENK, ENL, ENM, ENN, ENO, ENP, ENQ, ENR, ENS, ENT, ENU, ENV, ENW, ENX, ENY, ENZ							
growth %/pt							
Demand	2017	2018	2019	2020	2021	2022	
Europe	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Other Europe	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Asia/Pacific	0.0%	-0.0%	0.0%	-0.0%	-0.0%	-0.0%	
Latin America	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
MENA	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Central	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Other North America	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Australia	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
<b>Total</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	
Europe Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Asia Total	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Source: ENCI, ENP, ENR, ENI, ENA, ENO, ENL, ENM, ENN, ENO, ENP, ENQ, ENR, ENS, ENT, ENU, ENV, ENW, ENX, ENY, ENZ							

## 2.2. Trade Show - Coated Woodfree

FIGURE 76. TRADE FORECAST, WORLD BY REGION, COATED WOODFREE

USD \$mm							
Trade	2017	2018	2019	2020	2021	2022	2023-24
Europe	1700	1600	1710	1870	1900	1910	1800
Other Europe	-100	-100	-100	-100	-100	-100	-100
Asia Pacific	100	100	100	100	100	100	100
Latin America	1000	1000	1000	1000	1000	1000	1000
Middle East	100	100	100	100	100	100	100
Other Africa, ME	100	100	100	100	100	100	100
Australia	100	100	100	100	100	100	100
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Europe Total	1600	1500	1610	1770	1800	1810	1700
Rest Total	1000	1000	1000	1000	1000	1000	1000

Source: IMC, Ltd. © 2018

## 2.3. Output - Coated Woodfree

FIGURE 77. OUTPUT FORECAST, WORLD BY REGION, COATED WOODFREE

USD \$mm							
Region	2017	2018	2019	2020	2021	2022	2023-24
Europe	1600	1500	1610	1770	1800	1810	1700
Other Europe	100	100	100	100	100	100	100
Asia Pacific	1000	1000	1000	1000	1000	1000	1000
Latin America	100	100	100	100	100	100	100
Middle East	1000	1000	1000	1000	1000	1000	1000
Other Africa, ME	1000	1000	1000	1000	1000	1000	1000
Australia	100	100	100	100	100	100	100
<b>Total</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>	<b>10000</b>
Europe Total	1700	1600	1710	1870	1900	1910	1800
Rest Total	10000	10000	10000	10000	10000	10000	10000

Source: IMC, Ltd. © 2018

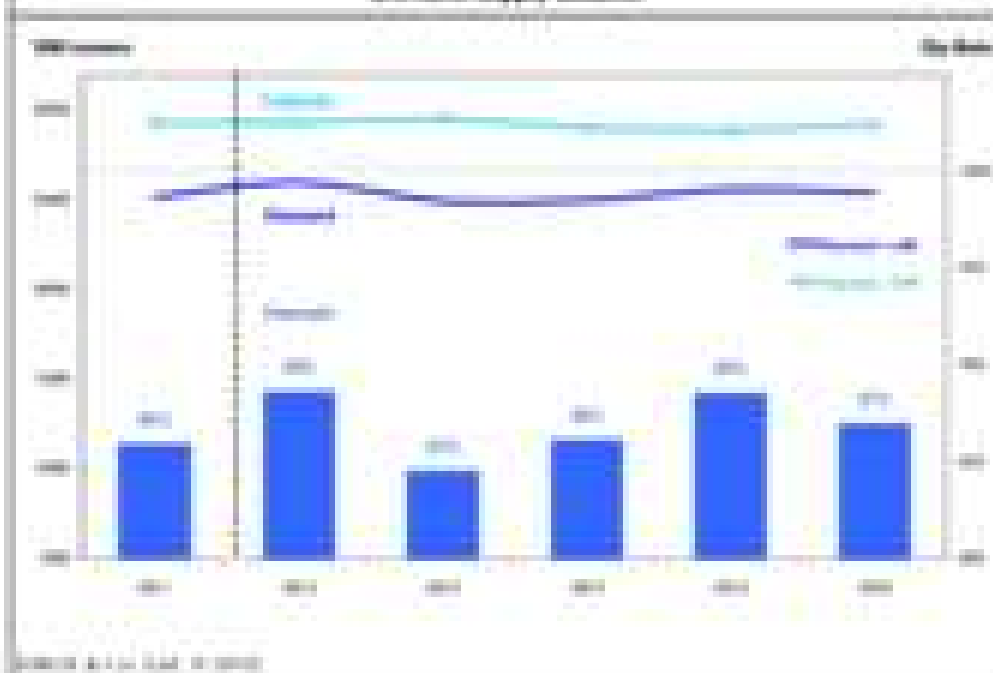
TABLE 10: OUTPUT GROWTH, WORLD BY REGION, COATED WOODPULP

		growth % p.a.				
Output Growth		2013	2014	2015	2016	2017
World		1.0%	0.9%	1.0%	1.0%	0.9%
Asia Pacific		1.0%	1.1%	1.0%	1.0%	0.9%
Europe		0.9%	1.0%	0.9%	0.9%	1.0%
Latin America		0.9%	0.7%	0.7%	0.7%	0.7%
Middle East		0.9%	0.7%	0.8%	0.9%	0.7%
North America		1.0%	1.0%	0.9%	0.9%	1.0%
Other		0.7%	0.9%	0.9%	0.9%	0.9%
Other Markets/Rest of World		0.7%	0.9%	0.9%	0.9%	0.9%
Supply		0.9%	0.9%	0.9%	0.9%	0.9%
Feed		0.9%	0.8%	0.7%	0.8%	0.8%
Output Feed		1.0%	1.0%	1.0%	1.0%	0.9%
Input Feed		0.9%	0.9%	1.0%	0.9%	1.0%

EMGH & Co. Ltd. © 2019

TABLE 11: WORLD DEMAND SUPPLY, COATED WOODPULP

Demand Supply Balance



EMGH & Co. Ltd. © 2019



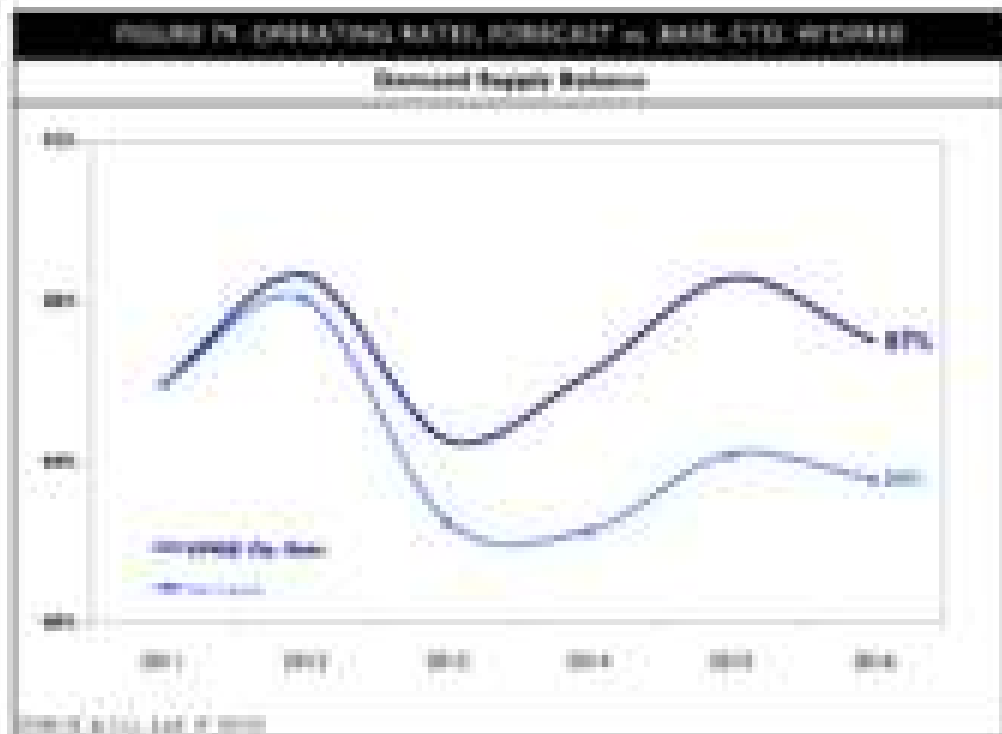
## 2.4. Capacity Assumptions - Global Headline

**TABLE 16 - Global CAPACITY assumptions, Global Headline**

**Assumed capacity**

Capacity (MM t/a)	2011	2012	2013	2014	2015	2016	2017-20
Aluminum				100	100		100
Other Energy							
Aluminum			100	100	100		100
Coal Mining							
Steel			100	100			100
Other		100	100	100	100		100
Other (oil)			75	75	100	100	75
Other (gas)							
Other (oil)							
<b>Total</b>		100	100	100	100	100	100

Source: EIC, IHS, EIA, etc.



## 2.3. Capacity and Operating Rates - Coated Woodfree

### 2.3.1. Run Rate

FIGURE 23: RUN CAPACITY, BY REGION, COATED WOODFREE							
(Excluding unspecified capacity)							
Capacity (MM mt)	2021	2022	2023	2024	2025	2026	2027-28
Midwest	1,000	1,100	1,100	1,100	1,100	1,100	1,100
Other Europe	100	100	100	100	100	100	100
Mid-America	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Asia America	100	100	100	100	100	100	100
Japan	1,000	1,000	1,000	1,000	1,000	1,000	1,000
China	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Other Asia & Rest	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Unspecified	100	100	100	100	100	100	100
<b>Total</b>	<b>6,200</b>	<b>6,300</b>	<b>6,300</b>	<b>6,300</b>	<b>6,300</b>	<b>6,300</b>	<b>6,300</b>
Europe	1,100	1,100	1,100	1,100	1,100	1,100	1,100
Asia	1,000	1,000	1,000	1,000	1,000	1,000	1,000

Source: Company Reports

FIGURE 24: RUN OPERATING RATE, BY REGION, COATED WOODFREE						
% Production of Capacity						
Operating Rate	2021	2022	2023	2024	2025	2026
Midwest	87%	87%	87%	87%	87%	87%
Other Europe	87%	87%	87%	87%	87%	87%
Mid-America	87%	87%	87%	87%	87%	87%
Asia America	87%	87%	87%	87%	87%	87%
Japan	87%	87%	87%	87%	87%	87%
China	87%	87%	87%	87%	87%	87%
Other Asia & Rest	87%	87%	87%	87%	87%	87%
Unspecified	87%	87%	87%	87%	87%	87%
<b>Total</b>	<b>87%</b>	<b>87%</b>	<b>87%</b>	<b>87%</b>	<b>87%</b>	<b>87%</b>
Europe Total	87%	87%	87%	87%	87%	87%
Asia Total	87%	87%	87%	87%	87%	87%

Source: Company Reports

## 2.3.2. Forecast Data

TABLE 11. FORECAST CAPACITY BY REGION, CTD WOODPILE

Forecasting unapportioned capacity							
Capacity, MB m <sup>3</sup>	2011	2012	2013	2014	2015	2016	2017-18
Western	140	140	140	140	140	140	140
Other Europe	10	10	10	10	10	10	10
Australia	100	100	100	100	100	100	100
Latin America	10	10	10	10	10	10	0
Asia	100	100	100	100	100	100	100
Other Africa, Middle East	10	10	10	10	10	10	10
Adjusted	10	10	10	10	10	10	0
<b>Total</b>	<b>270</b>	<b>270</b>	<b>270</b>	<b>270</b>	<b>270</b>	<b>270</b>	<b>270</b>
Range Total	140	140	140	140	140	140	140
Max Total	140	140	140	140	140	140	140

Source: CTD, Ltd. © 2012

TABLE 12. FORECAST OPERATING RATES BY REGION, CTD WOODPILE

% Production of Capacity							
Operating Rate	2011	2012	2013	2014	2015	2016	
Western	52%	52%	52%	52%	52%	52%	
Other Europe	4%	4%	4%	4%	4%	4%	
Australia	37%	37%	37%	37%	37%	37%	
Latin America	4%	4%	4%	4%	4%	4%	
Asia	37%	37%	37%	37%	37%	37%	
Other Africa, Middle East	4%	4%	4%	4%	4%	4%	
Adjusted	4%	4%	4%	4%	4%	4%	
<b>Total</b>	<b>37%</b>	<b>37%</b>	<b>37%</b>	<b>37%</b>	<b>37%</b>	<b>37%</b>	
Range Total	37%	37%	37%	37%	37%	37%	
Max Total	37%	37%	37%	37%	37%	37%	

Source: CTD, Ltd. © 2012

## 3. Uncoated Woodfree – Forecasts

### 3.1. Demand – Forecast Highlights

FIGURE 24: DEMAND FORECAST, WORLD BY REGION, UNCO. WOODFREE							
TMM tonnes							
Demand	2021	2022	2023	2024	2025	2026	2027-2030
Europe	150	162	170	177	183	188	+0.7%
Other Europe	140	150	158	165	170	174	+0.7%
Asia Pacific	470	500	520	535	550	560	+0.7%
Latin America	300	310	315	320	325	330	+0.6%
MENA	100	100	100	100	100	100	+0.0%
Central	40	40	40	40	40	40	+0.0%
Other Non-Euro Area	100	100	100	100	100	100	+0.0%
World	1160	1242	1265	1282	1308	1328	+0.7%
Total	4160	4370	4480	4580	4680	4780	+0.7%
Europe Total	150	162	170	177	183	188	+0.7%
Asia Total	1160	1242	1265	1282	1308	1328	+0.7%
Source: ENR, based on ENR							
growth %/yr							
Growth	2022	2023	2024	2025	2026		
Europe	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%		
Other Europe	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%		
Asia Pacific	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%		
Latin America	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%		
MENA	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%		
Other	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%		
Other Non-Euro Area	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%		
World	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%		
Total	+0.7%	+0.7%	+0.7%	+0.7%	+0.7%		
Europe Total	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%		
Asia Total	+1.0%	+1.0%	+1.0%	+1.0%	+1.0%		
Source: ENR, based on ENR							

### 3.2 Trade Flow - Forecasted Waiver

FIGURE 20. TRADE FORECAST, WORLD BY REGION, USD, M USD

		1000 tonnes						
Trade	2017	2018	2019	2020	2021	2022	2023-24	
W Europe	100	100	100	100	100	100	100	
Other Europe	-10	-10	-10	0	0	0	0	
NA America	-100	-100	-100	-100	-100	-100	-100	
Latin America	100	100	100	100	100	100	100	
Asia	100	100	100	100	100	100	100	
Oceania	-10	-10	100	100	100	100	100	
Other Africa, ME, CIS	-100	-100	-100	-100	-100	-100	-100	
MyWorld	-100	-100	-100	-100	-100	-100	-100	
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
Europe Total	100	100	100	100	100	100	100	
Asia Total	100	100	100	100	100	100	100	

Source: IHS Markit, Ltd. © 2019

### 3.3 Output - Forecasted Waiver

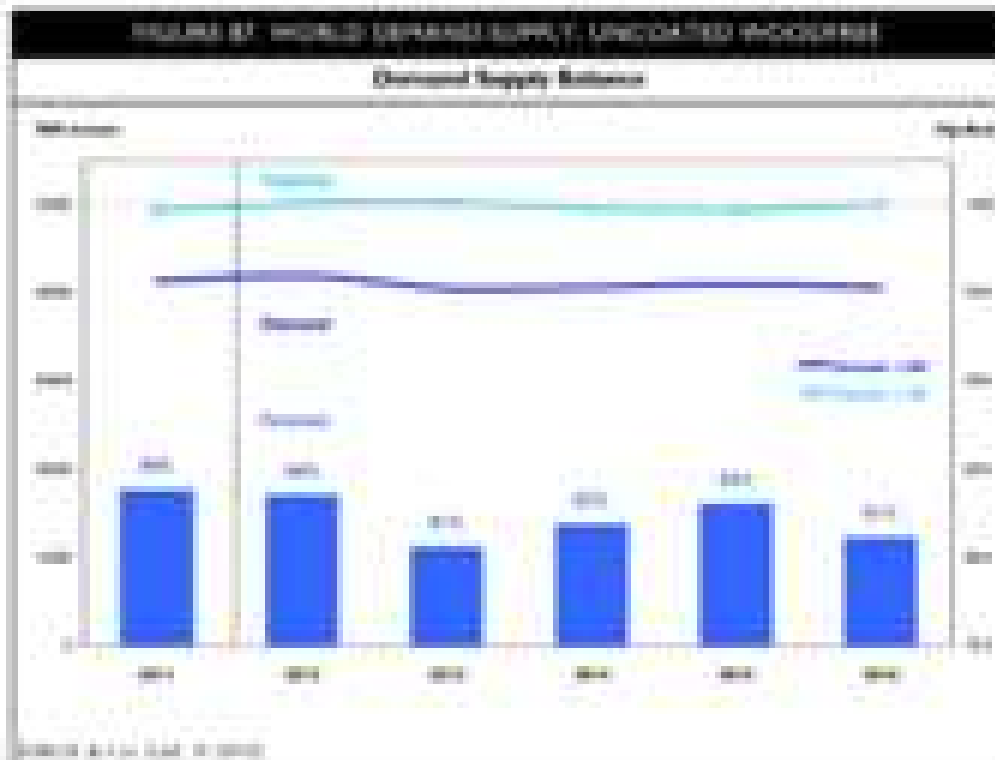
FIGURE 21. OUTPUT FORECAST, WORLD BY REGION, USD, M USD

		1000 tonnes						
Region	2017	2018	2019	2020	2021	2022	2023-24	
W Europe	1000	1000	1000	1000	1000	1000	1000	
Other Europe	1000	1000	1000	1000	1000	1000	1000	
NA America	1000	1000	1000	1000	1000	1000	1000	
Latin America	1000	1000	1000	1000	1000	1000	1000	
Asia	1000	1000	1000	1000	1000	1000	1000	
Oceania	1000	1000	1000	1000	1000	1000	1000	
Other Africa, ME, CIS	1000	1000	1000	1000	1000	1000	1000	
MyWorld	1000	1000	1000	1000	1000	1000	1000	
<b>Total</b>	<b>7000</b>	<b>7000</b>	<b>7000</b>	<b>7000</b>	<b>7000</b>	<b>7000</b>	<b>7000</b>	
Europe Total	2000	2000	2000	2000	2000	2000	2000	
Asia Total	1000	1000	1000	1000	1000	1000	1000	

Source: IHS Markit, Ltd. © 2019

OUTPUT GROWTH WORLD BY REGION, LINE, INPERCENT					
Growth % p.a.					
Region Growth	2013	2014	2015	2016	2017
Western	1.0%	0.7%	0.8%	0.8%	0.7%
Asia Pacific	4.0%	3.9%	3.9%	3.8%	3.7%
Western	-0.7%	-0.9%	-0.7%	-0.7%	-0.9%
Latin America	1.7%	0.6%	0.5%	1.0%	1.0%
Other	1.0%	1.7%	0.8%	1.7%	1.7%
Other Middle East	1.0%	0.5%	0.7%	0.7%	1.2%
World	0.9%	0.7%	0.8%	0.8%	0.7%
Energy	1.0%	0.8%	0.8%	0.8%	0.8%
Chemical	1.7%	1.1%	1.2%	1.0%	1.0%

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### 3.4. Capacity Assumptions - Global Wind

FIGURE 16. Global Capacity Assumptions (MW) by Year (2011-2015)

Assumed capacity							
Capacity (MW a.c.)	2011	2012	2013	2014	2015	2016	2017-20
Europe			100	100	100		100
Asia Europe							100
Americas			100	100	100		100
China (a.c.)							100
Japan				100			100
Other		100	100	100	100		100
China (d.c.)				100	100	100	100
Other (a.c.)			100	100	100		100
Other (d.c.)				100	100	100	100
Global			400	400	400	300	600

Source: IHS Global Energy

FIGURE 17. Operating Rate Forecast - 2013-2015 (MW) - Wind



Source: IHS Global Energy

### 1.3. Capacity and Operating Rates - Unexcused Windfalls

#### 1.3.1. Run Rate

TABLE 10. BASE CAPACITY BY REGION, QNC, WY2022							
Excluding suspended capacity							
Capacity, MW net	2021	2022	2023	2024	2025	2026	2027
Midwest	600	600	600	600	600	600	600
Old South	200	200	200	200	200	200	200
Midwest	600	600	600	600	600	600	600
Old South	200	200	200	200	200	200	200
gas	200	200	200	200	200	200	200
Coal	200	200	200	200	200	200	200
Old South, Gas	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Renewable	100	100	100	100	100	100	100
<b>Total</b>	<b>2,000</b>	<b>2,000</b>	<b>2,000</b>	<b>2,000</b>	<b>2,000</b>	<b>2,000</b>	<b>2,000</b>
Renew	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Gas	1,000	1,000	1,000	1,000	1,000	1,000	1,000

(MW) & (MW) net

TABLE 11. BASE OPERATING RATES BY REGION, QNC, WY2022							
% Production of Capacity							
Operating Rate	2021	2022	2023	2024	2025	2026	2027
Midwest	67%	67%	67%	67%	67%	67%	67%
Old South	67%	67%	67%	67%	67%	67%	67%
Midwest	67%	67%	67%	67%	67%	67%	67%
Old South	67%	67%	67%	67%	67%	67%	67%
gas	67%	67%	67%	67%	67%	67%	67%
Coal	67%	67%	67%	67%	67%	67%	67%
Old South, Gas	67%	67%	67%	67%	67%	67%	67%
Renewable	67%	67%	67%	67%	67%	67%	67%
<b>Total</b>	<b>67%</b>	<b>67%</b>	<b>67%</b>	<b>67%</b>	<b>67%</b>	<b>67%</b>	<b>67%</b>
Renew Total	67%	67%	67%	67%	67%	67%	67%
Gas Total	67%	67%	67%	67%	67%	67%	67%

(MW) & (MW) net



### 1.3.2. Forecast Data

**TABLE 11. FORECAST EXPENSES BY REGION, QNC, W 2019**

[including unapportioned expenses]							
Category, \$M U.S.	2011	2012	2013	2014	2015	2016	2017-18
Wages	1,500	1,500	1,500	1,500	1,500	1,500	1,500
Other Salaries	200	200	200	200	200	200	200
Materials	1,625	1,625	1,625	1,625	1,625	1,625	1,625
Other Expenses	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Other	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Other Region, Total	1,125	1,125	1,125	1,125	1,125	1,125	1,125
Adjusted	100	100	100	100	100	100	100
Total	2,925	2,925	2,925	2,925	2,925	2,925	2,925
Group Total	1,400	1,400	1,400	1,400	1,400	1,400	1,400
Net Total	1,000	1,000	1,000	1,000	1,000	1,000	1,000

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**TABLE 12. FORECAST OPERATING MARGIN BY REGION, QNC, W 2019**

% Production of Capacity						
Operating Rate	2011	2012	2013	2014	2015	2016
Wages	57%	56%	56%	57%	56%	57%
Other Salaries	57%	57%	56%	57%	57%	56%
Materials	60%	60%	60%	60%	60%	60%
Other Expenses	60%	60%	60%	60%	60%	60%
Other	60%	60%	60%	60%	60%	60%
Other Region, Total	60%	60%	60%	60%	60%	60%
Adjusted	77%	77%	77%	77%	77%	77%
Total	64%	64%	64%	64%	64%	64%
Group Total	60%	60%	60%	60%	60%	60%
Net Total	60%	60%	60%	60%	60%	60%

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## 4. Coated Mechanical - Forecasts

### 4.1. Demand - Coated Mechanical

TABLE 16. DEMAND FORECAST, WORLD BY REGION, COATED MECHANICAL							
(\$Bn tonnes)							
Demand	2017	2018	2019	2020	2021	2022	2017-2022
Western	490	502	514	527	540	553	+1.7%
Other Europe	100	100	100	100	100	100	+0%
Western	270	270	270	270	270	270	+0%
Latin America	100	100	100	100	100	100	+0%
Asia	100	100	100	100	100	100	+0%
Oceania	100	100	100	100	100	100	+0%
Other Middle East	100	100	100	100	100	100	+0%
Africa	100	100	100	100	100	100	+0%
<b>Total</b>	<b>1000</b>	<b>1002</b>	<b>1004</b>	<b>1007</b>	<b>1010</b>	<b>1013</b>	<b>+0%</b>
Europe Total	590	602	614	627	640	653	+1.7%
Asia Total	100	100	100	100	100	100	+0%
2017 & 2018: actual, 2019-2022: forecast							
growth %/pt							
Region	2017	2018	2019	2020	2021	2022	
Western	+1%	+1%	+1%	+1%	+1%	+1%	
Other Europe	+0%	+0%	+0%	+0%	+0%	+0%	
Western	+0%	+0%	+0%	+0%	+0%	+0%	
Latin America	+0%	+0%	+0%	+0%	+0%	+0%	
Asia	+0%	+0%	+0%	+0%	+0%	+0%	
Oceania	+0%	+0%	+0%	+0%	+0%	+0%	
Other Middle East	+0%	+0%	+0%	+0%	+0%	+0%	
Africa	+0%	+0%	+0%	+0%	+0%	+0%	
<b>Total</b>	<b>+0%</b>	<b>+0%</b>	<b>+0%</b>	<b>+0%</b>	<b>+0%</b>	<b>+0%</b>	
Europe Total	+1%	+1%	+1%	+1%	+1%	+1%	
Asia Total	+0%	+0%	+0%	+0%	+0%	+0%	
2017 & 2018: actual, 2019-2022: forecast							

### 4.2. Trade Flow - Global Mechanical

FIGURE 15. TRADE FORECAST, WORLD BY REGION, CITE MECHANICAL

1000 tonnes							
Trade	2011	2012	2013	2014	2015	2016	2017-18
Imports	2000	2000	2000	2000	2100	2010	190
Other Imports	100	100	100	100	100	100	100
Re-Exports	100	100	100	100	100	100	100
Local Production	100	100	100	100	100	100	100
Other	100	100	100	100	100	100	100
Exports	100	100	100	100	100	100	100
Other Exports	100	100	100	100	100	100	100
Re-Exports	100	100	100	100	100	100	100
Total	0	0	0	0	0	0	0
Change Total	1000	1000	1000	1000	1000	1000	1000
Net Total	1000	1000	1000	1000	1000	1000	1000

Source: CITE, Ltd. Ltd. 2015

### 4.3. Output - Global Mechanical

FIGURE 16. OUTPUT FORECAST, WORLD BY REGION, CITE MECHANICAL

1000 tonnes							
Output	2011	2012	2013	2014	2015	2016	2017-18
Imports	2000	2000	2000	2000	2100	2010	190
Other Imports	100	100	100	100	100	100	100
Re-Exports	100	100	100	100	100	100	100
Local Production	100	100	100	100	100	100	100
Other	100	100	100	100	100	100	100
Exports	100	100	100	100	100	100	100
Other Exports	100	100	100	100	100	100	100
Re-Exports	100	100	100	100	100	100	100
Total	1000	1000	1000	1000	1000	1000	1000
Change Total	1000	1000	1000	1000	1000	1000	1000
Net Total	1000	1000	1000	1000	1000	1000	1000

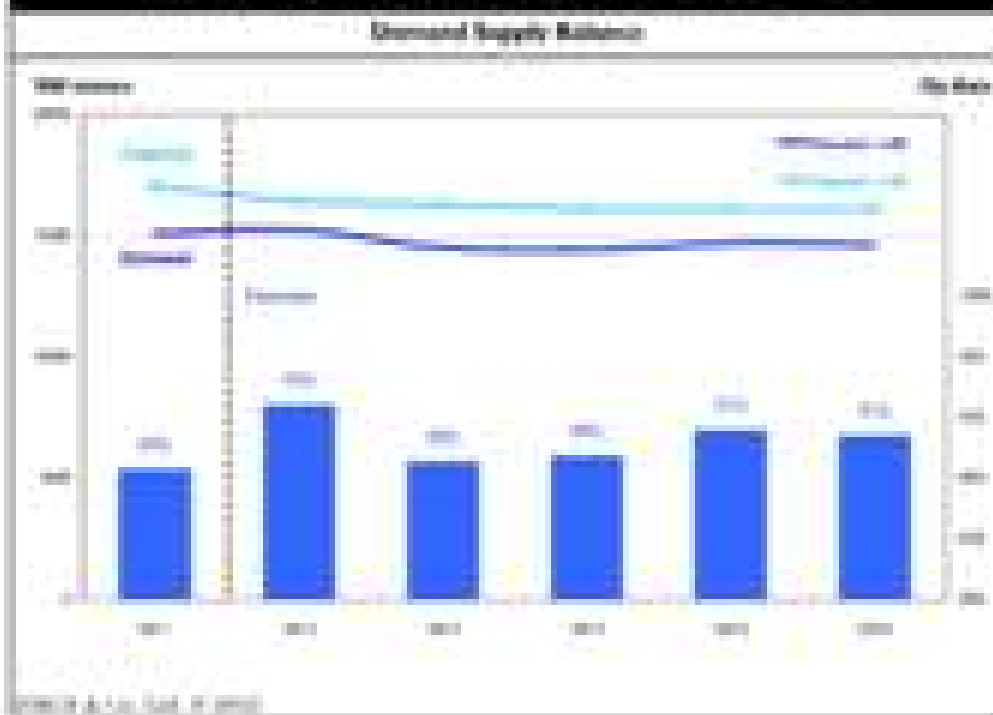
Source: CITE, Ltd. Ltd. 2015

OUTPUT GROWTH BY WORLD BY REGION, CTR. PROJECTION

Region Growth	Growth Rate				
	2013	2014	2015	2016	2017
Western	0.0%	0.0%	0.0%	0.0%	0.0%
Asia Pacific	0.0%	0.0%	0.0%	0.0%	0.0%
Latin America	0.0%	0.0%	0.0%	0.0%	0.0%
Europe	0.0%	0.0%	0.0%	0.0%	0.0%
Other	0.0%	0.0%	0.0%	0.0%	0.0%
Other than in. Area	0.0%	0.0%	0.0%	0.0%	0.0%
World	0.0%	0.0%	0.0%	0.0%	0.0%
Europe Total	0.0%	0.0%	0.0%	0.0%	0.0%
Asia Total	0.0%	0.0%	0.0%	0.0%	0.0%

EMC&E & Co. Ltd. © 2014

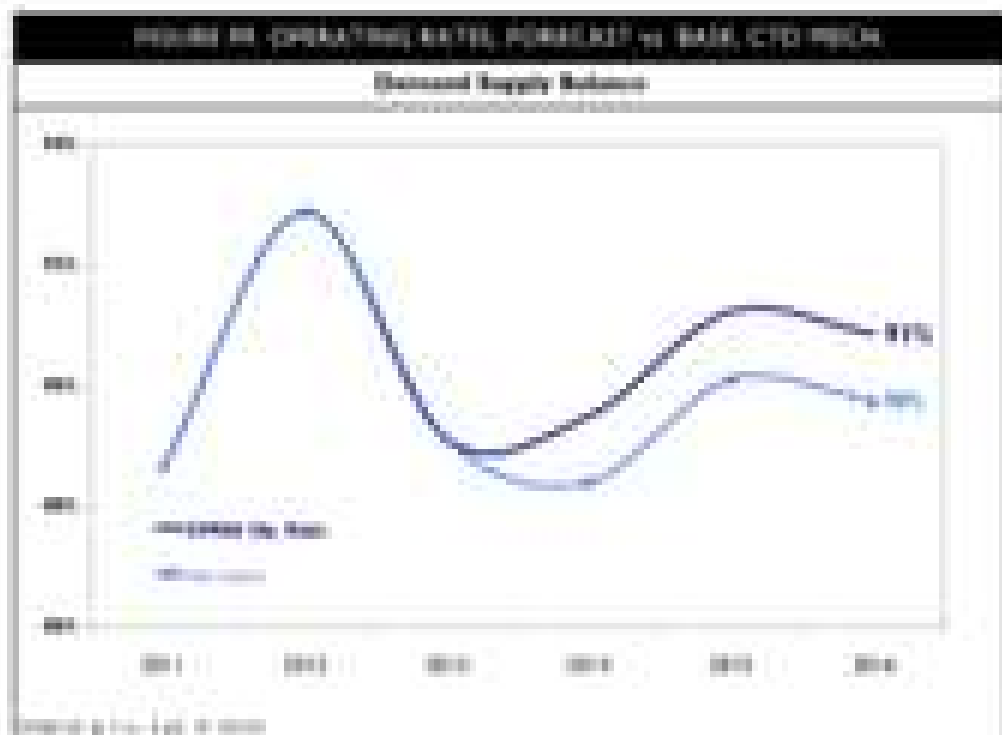
FIGURE 10. WORLD DEMAND-SUPPLY COATED PAPER/BOARD



### 4.4. Capacity Assumptions - Global Mechanical

TABLE 4.4.1: 2019 CAPACITY ASSUMPTIONS, GLOBAL MECHANICAL							
Simplified capacity							
Capacity (Mn u.s.)	2019	2020	2021	2022	2023	2024	2025-26
Wound							
Other Surgical							
Orthopedic					1,000		1,000
Cardiovascular							
IV							
Other							
Other Med							
Overall					1,000		1,000

Source: IHS, Ltd. © 2019



### 4.3. Capacity and Operating Rates - Capital Mechanical

#### 4.3.1. Base Data

TABLE 100. BASE CAPACITY BY REGION, CTR MECHANICAL							
(Excluding unspecified capacity)							
Capacity (MW net)	2021	2022	2023	2024	2025	2026	2027-28
Midwest	800	800	800	800	800	800	800
Other Region	0	0	0	0	0	0	0
<b>Midwest</b>	<b>800</b>	<b>800</b>	<b>800</b>	<b>800</b>	<b>800</b>	<b>800</b>	<b>800</b>
Low Income	0	0	0	0	0	0	0
Joint	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Other Non-Base	0	0	0	0	0	0	0
<b>Total</b>	<b>800</b>	<b>800</b>	<b>800</b>	<b>800</b>	<b>800</b>	<b>800</b>	<b>800</b>
Design	800	800	800	800	800	800	800
As-Built	800	800	800	800	800	800	800

TABLE 101. BASE OPERATING RATES BY REGION, CTR MECHANICAL							
% Production of Capacity							
Operating Rate	2021	2022	2023	2024	2025	2026	2027-28
Midwest	95%	95%	95%	95%	95%	95%	95%
Other Region	95%	95%	95%	95%	95%	95%	95%
<b>Midwest</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>
Low Income	95%	95%	95%	95%	95%	95%	95%
Joint	95%	95%	95%	95%	95%	95%	95%
Other	95%	95%	95%	95%	95%	95%	95%
Other Non-Base	95%	95%	95%	95%	95%	95%	95%
<b>Total</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>	<b>95%</b>
Design Rate	95%	95%	95%	95%	95%	95%	95%
As-Built	95%	95%	95%	95%	95%	95%	95%

### 2.3.2. Forecast Data

TABLE 146. FORECAST CAPACITY, BY REGION, CTR FROM							
(including unspecified capacity)							
Capacity, 000 t/a	2011	2012	2013	2014	2015	2016	2017-18
Western	360	360	370	440	460	460	460
Other Europe	0	0	0	0	0	0	0
Asia Pacific	200	200	200	200	200	200	200
Latin America	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
Total	560	560	570	640	660	660	660
Europe Total	360	360	370	440	460	460	460
Asia Total	200	200	200	200	200	200	200

EMERGENCE, LLC, 2018, P. 10

TABLE 147. FORECAST OPERATING RATE, BY REGION, CTR FROM						
% Production of Capacity						
Operating Rate	2011	2012	2013	2014	2015	2016
Western	87%	87%	88%	91%	92%	92%
Other Europe	0%	0%	0%	0%	0%	0%
Asia Pacific	88%	87%	87%	87%	87%	87%
Latin America	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	0%	0%	0%
Total	87%	87%	88%	91%	92%	92%
Europe Total	87%	87%	88%	91%	92%	92%
Asia Total	88%	87%	87%	87%	87%	87%

EMERGENCE, LLC, 2018, P. 10

## 5. Unc. Mechanical – Forecasts

### 5.1. Demand – Forecast Mechanical

Include the Demand Forecast, month by month, 2018, 2019							
2018 forecast							
Demand	2018	2019	2020	2021	2022	2023	2024
Wholesale	1000	1000	1075	1175	1200	1275	1300
Other Supply	500	500	500	500	500	500	500
Wholesale	1000	1075	1075	1000	1000	1075	1100
Other Supply	500	500	500	500	500	500	500
Peak	500	500	500	500	500	500	500
Off-peak	500	500	500	500	500	500	500
Other Supply from	100	100	100	100	100	100	100
Wholesale	175	175	175	175	175	175	175
Total	2800	2800	2800	2800	2800	2800	2800
Supply Total	1775	1800	1775	1775	1775	1775	1775
Net Total	1025	1000	1025	1025	1025	1025	1025
2019 & 2020, Sept. 2019							
growth %/pt							
Demand	2019	2020	2021	2022	2023	2024	
Wholesale	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Other Supply	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Wholesale	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Other Supply	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Peak	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Off-peak	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Other Supply from	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Wholesale	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Total	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Supply Total	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Net Total	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
2019 & 2020, Sept. 2019							



### 5.2. Trade Flow - Financial Mechanical

FIGURE 10. TRADE FLOW, ALL, MONTH BY REGION, USD, MFCM							
USD amount							
Trade	2011	2012	2013	2014	2011	2012	2013-14
W Europe	170	180	180	180	170	160	0
Other Europe	10	10	10	10	10	10	0
W America	10	10	10	10	10	10	0
Latin America	10	10	10	10	10	10	0
Asia	10	10	10	10	10	10	0
Oceania	10	10	10	10	10	10	0
Other Africa, ME, CIS	10	10	10	10	10	10	0
EMEA	10	10	10	10	10	10	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
Target Year	0	0	0	0	0	0	0
Act. Year	0	0	0	0	0	0	0

Source: GlobalVest, Ltd. © 2014

### 5.3. Output - Financial Mechanical

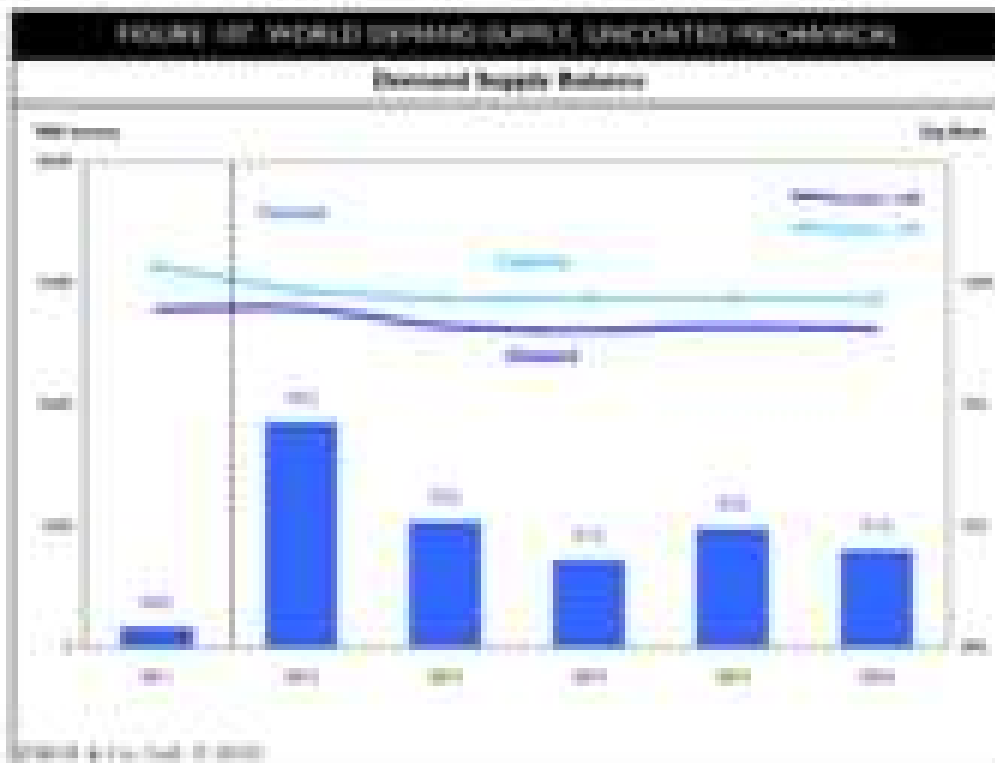
FIGURE 11. Output Financial Mechanical, Month by Region, USD, MFCM							
USD amount							
Output	2011	2012	2013	2014	2011	2012	2013-14
W Europe	100	100	110	100	110	100	0
Other Europe	10	10	10	10	10	10	0
W America	100	100	100	100	100	100	0
Latin America	10	10	10	10	10	10	0
Asia	10	10	10	10	10	10	0
Oceania	10	10	10	10	10	10	0
Other Africa, ME, CIS	10	10	10	10	10	10	0
EMEA	10	10	10	10	10	10	0
<b>Total</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>	<b>0</b>
Target Year	1000	1000	1000	1000	1000	1000	0
Act. Year	1000	1000	1000	1000	1000	1000	0

Source: GlobalVest, Ltd. © 2014

**Figure 10: Output Growth, World by Region, 1960-2020**

Region Growth	Growth Rate				
	1961	1970	1980	1990	2000
World	3.0%	4.0%	3.0%	3.0%	2.0%
Asia Pacific	5.0%	6.0%	4.0%	4.0%	5.0%
Europe	2.0%	2.0%	2.0%	2.0%	2.0%
Latin America	3.0%	3.0%	3.0%	3.0%	3.0%
Middle East	1.0%	1.0%	1.0%	1.0%	1.0%
Other Middle East	1.0%	1.0%	1.0%	1.0%	1.0%
Australia	3.0%	3.0%	3.0%	3.0%	3.0%
USA	4.0%	4.0%	4.0%	4.0%	4.0%
Other North America	1.0%	1.0%	1.0%	1.0%	1.0%
South Africa	3.0%	3.0%	3.0%	3.0%	3.0%
Other Africa	1.0%	1.0%	1.0%	1.0%	1.0%
Other Asia	1.0%	1.0%	1.0%	1.0%	1.0%
Other Europe	1.0%	1.0%	1.0%	1.0%	1.0%
Other Latin America	1.0%	1.0%	1.0%	1.0%	1.0%
Other Middle East	1.0%	1.0%	1.0%	1.0%	1.0%
Other Oceania	1.0%	1.0%	1.0%	1.0%	1.0%
Other USA	1.0%	1.0%	1.0%	1.0%	1.0%

Source: EIA, World Energy Outlook 2023



## 3.6. Capacity and Operating Rates - Electrical Mechanical

### 3.6.1. Base Data

FIGURE 186: BASE CAPACITY, BY REGION, LINE FEED							
(\$/hourly uncommitted capacity)							
Capacity MW net	2011	2012	2013	2014	2015	2016	2017-18
Western	4,100	3,900	3,900	3,900	3,900	3,900	4,000
Other Europe	100	100	100	100	100	100	100
Asia Pacific	4,000	4,000	4,000	4,000	4,000	4,000	4,000
Latin America	100	100	100	100	100	100	100
Other	100	100	100	100	100	100	100
Other	100	100	100	100	100	100	100
Other Africa/Asia	100	100	100	100	100	100	100
Grand Total	8,500	8,300	8,300	8,300	8,300	8,300	8,500
Total	4,800	4,600	4,600	4,600	4,600	4,600	4,800
Europe	500	500	500	500	500	500	500
Asia	3,800	3,800	3,800	3,800	3,800	3,800	3,800

Source: IHS, Ltd. © 2013

FIGURE 187: BASE OPERATING RATES, BY REGION, LINE FEED						
% Production of Capacity						
Operating Rate	2011	2012	2013	2014	2015	2016
Western	80%	80%	80%	80%	80%	80%
Other Europe	80%	80%	80%	80%	80%	80%
Asia Pacific	80%	80%	80%	80%	80%	80%
Latin America	80%	80%	80%	80%	80%	80%
Other	80%	80%	80%	80%	80%	80%
Other	80%	80%	80%	80%	80%	80%
Other Africa/Asia	80%	80%	80%	80%	80%	80%
Grand Total	80%	80%	80%	80%	80%	80%
Total	80%	80%	80%	80%	80%	80%
Europe Total	80%	80%	80%	80%	80%	80%
Asia Total	80%	80%	80%	80%	80%	80%

Source: IHS, Ltd. © 2013

3.4.2. Forecast Data

**FIGURE 10. FORECAST CAPACITY BY REGION, 1960-1970**  
(including unpermitted capacity)

Capacity, MW on 1	1971	1972	1973	1974	1975	1976	1977-78
Western	240	190	190	190	190	190	190
Other Europe	100	100	100	100	100	100	0
Mediterranean	200	200	200	200	200	200	200
Latin America	100	100	100	100	100	100	100
Japan	100	100	100	100	100	100	100
Other	100	100	100	100	100	100	0
Other North America	100	100	100	100	100	100	0
Unpermitted	0	0	0	0	0	0	0
<b>Total</b>	<b>1040</b>	<b>1080</b>	<b>1090</b>	<b>1090</b>	<b>1090</b>	<b>1090</b>	<b>1090</b>
Europe Total	340	290	290	290	290	290	190
Asia Total	100	100	100	100	100	100	100

Source: E.ON Grid, 2019

**FIGURE 11. FORECAST OPERATING RATES BY REGION, 1960-1970**  
% Production of Capacity

Operating Rate	1971	1972	1973	1974	1975	1976
Western	60%	60%	60%	60%	60%	60%
Other Europe	60%	60%	60%	60%	60%	60%
Mediterranean	60%	60%	60%	60%	60%	60%
Latin America	60%	60%	60%	60%	60%	60%
Japan	60%	60%	60%	60%	60%	60%
Other	60%	60%	60%	60%	60%	60%
Other North America	60%	60%	60%	60%	60%	60%
Unpermitted	60%	60%	60%	60%	60%	60%
<b>Total</b>	<b>60%</b>	<b>60%</b>	<b>60%</b>	<b>60%</b>	<b>60%</b>	<b>60%</b>
Europe Total	60%	60%	60%	60%	60%	60%
Asia Total	60%	60%	60%	60%	60%	60%

Source: E.ON Grid, 2019

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## 6. Newsprint - Forecasts

### World Newsprint Markets (WNM) – SPRING 2012

In order to focus more on the specific issues of the important Newsprint market, we are pleased to announce the upcoming publication of an update to our associated report "World Newsprint Markets" (WNM).

The WNM report is published in two parts:

- 1) Supply-Demand Outlook, 2011 to 2016 (including capacities and leading supplier tables)
- 2) Price Forecasts – quarterly and 4-year outlook for Newsprint and Publication Paper prices around the world.

In the next issue of WNM, the report will examine the key developments that are likely to impact the future market, including price forecasts, demand-supply, outlook etc.

For more information on the World Newsprint Markets report, please contact:

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Truro, TR1 1FN,  
United Kingdom

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## 7. Country Data World-wide

### 7.1 Country Data World-wide, Central Electricity

TABLE 11. DEMAND, TRADE, OUTPUT & CAPACITY BY COUNTRY, CWT					
Europe - 2011a					
Year, MW	Demand	Trade	Output	Capacity	Operating
	Capacity				Rate %
2000	100	100	100	100	100
2001	100	100	100	100	100
2002	100	100	100	100	100
2003	100	100	100	100	100
2004	100	100	100	100	100
2005	100	100	100	100	100
2006	100	100	100	100	100
2007	100	100	100	100	100
2008	100	100	100	100	100
2009	100	100	100	100	100
2010	100	100	100	100	100
2011	100	100	100	100	100
2012	100	100	100	100	100
2013	100	100	100	100	100
2014	100	100	100	100	100
2015	100	100	100	100	100
2016	100	100	100	100	100
2017	100	100	100	100	100
2018	100	100	100	100	100
2019	100	100	100	100	100
2020	100	100	100	100	100
2021	100	100	100	100	100
2022	100	100	100	100	100
2023	100	100	100	100	100
2024	100	100	100	100	100
2025	100	100	100	100	100
2026	100	100	100	100	100
2027	100	100	100	100	100
2028	100	100	100	100	100
2029	100	100	100	100	100
2030	100	100	100	100	100
2031	100	100	100	100	100
2032	100	100	100	100	100
2033	100	100	100	100	100
2034	100	100	100	100	100
2035	100	100	100	100	100
2036	100	100	100	100	100
2037	100	100	100	100	100
2038	100	100	100	100	100
2039	100	100	100	100	100
2040	100	100	100	100	100
2041	100	100	100	100	100
2042	100	100	100	100	100
2043	100	100	100	100	100
2044	100	100	100	100	100
2045	100	100	100	100	100
2046	100	100	100	100	100
2047	100	100	100	100	100
2048	100	100	100	100	100
2049	100	100	100	100	100
2050	100	100	100	100	100
2051	100	100	100	100	100
2052	100	100	100	100	100
2053	100	100	100	100	100
2054	100	100	100	100	100
2055	100	100	100	100	100
2056	100	100	100	100	100
2057	100	100	100	100	100
2058	100	100	100	100	100
2059	100	100	100	100	100
2060	100	100	100	100	100
2061	100	100	100	100	100
2062	100	100	100	100	100
2063	100	100	100	100	100
2064	100	100	100	100	100
2065	100	100	100	100	100
2066	100	100	100	100	100
2067	100	100	100	100	100
2068	100	100	100	100	100
2069	100	100	100	100	100
2070	100	100	100	100	100
2071	100	100	100	100	100
2072	100	100	100	100	100
2073	100	100	100	100	100
2074	100	100	100	100	100
2075	100	100	100	100	100
2076	100	100	100	100	100
2077	100	100	100	100	100
2078	100	100	100	100	100
2079	100	100	100	100	100
2080	100	100	100	100	100
2081	100	100	100	100	100
2082	100	100	100	100	100
2083	100	100	100	100	100
2084	100	100	100	100	100
2085	100	100	100	100	100
2086	100	100	100	100	100
2087	100	100	100	100	100
2088	100	100	100	100	100
2089	100	100	100	100	100
2090	100	100	100	100	100
2091	100	100	100	100	100
2092	100	100	100	100	100
2093	100	100	100	100	100
2094	100	100	100	100	100
2095	100	100	100	100	100
2096	100	100	100	100	100
2097	100	100	100	100	100
2098	100	100	100	100	100
2099	100	100	100	100	100
2100	100	100	100	100	100





**DEMAND, TRADE, OUTPUT & CAPACITY OF DOMESTIC STEEL WORKS COMPANIES**

Annual & Periodic Steel - 2017a					
Year/Year	Consumption	Trade	Output	Capacity	Use Rate %
2017	478	478	478	478	
2016	478	478	478	478	
2015	478	478	478	478	
2014	478	478	478	478	
2013	478	478	478	478	72%
2012	478	478	478	478	
2011	478	478	478	478	
2010	478	478	478	478	
2009	478	478	478	478	
2008	478	478	478	478	
2007	478	478	478	478	82%
2006	478	478	478	478	
2005	478	478	478	478	
2004	478	478	478	478	
2003	478	478	478	478	
2002	478	478	478	478	
2001	478	478	478	478	
2000	478	478	478	478	
1999	478	478	478	478	
1998	478	478	478	478	
1997	478	478	478	478	
1996	478	478	478	478	
1995	478	478	478	478	
1994	478	478	478	478	
1993	478	478	478	478	
1992	478	478	478	478	
1991	478	478	478	478	
1990	478	478	478	478	
1989	478	478	478	478	
1988	478	478	478	478	
1987	478	478	478	478	
1986	478	478	478	478	
1985	478	478	478	478	
1984	478	478	478	478	
1983	478	478	478	478	
1982	478	478	478	478	
1981	478	478	478	478	
1980	478	478	478	478	
1979	478	478	478	478	
1978	478	478	478	478	
1977	478	478	478	478	
1976	478	478	478	478	
1975	478	478	478	478	
1974	478	478	478	478	
1973	478	478	478	478	
1972	478	478	478	478	
1971	478	478	478	478	
1970	478	478	478	478	
1969	478	478	478	478	
1968	478	478	478	478	
1967	478	478	478	478	
1966	478	478	478	478	
1965	478	478	478	478	
1964	478	478	478	478	
1963	478	478	478	478	
1962	478	478	478	478	
1961	478	478	478	478	
1960	478	478	478	478	
1959	478	478	478	478	
1958	478	478	478	478	
1957	478	478	478	478	
1956	478	478	478	478	
1955	478	478	478	478	
1954	478	478	478	478	
1953	478	478	478	478	
1952	478	478	478	478	
1951	478	478	478	478	
1950	478	478	478	478	
1949	478	478	478	478	
1948	478	478	478	478	
1947	478	478	478	478	
1946	478	478	478	478	
1945	478	478	478	478	
1944	478	478	478	478	
1943	478	478	478	478	
1942	478	478	478	478	
1941	478	478	478	478	
1940	478	478	478	478	
1939	478	478	478	478	
1938	478	478	478	478	
1937	478	478	478	478	
1936	478	478	478	478	
1935	478	478	478	478	
1934	478	478	478	478	
1933	478	478	478	478	
1932	478	478	478	478	
1931	478	478	478	478	
1930	478	478	478	478	
1929	478	478	478	478	
1928	478	478	478	478	
1927	478	478	478	478	
1926	478	478	478	478	
1925	478	478	478	478	
1924	478	478	478	478	
1923	478	478	478	478	
1922	478	478	478	478	
1921	478	478	478	478	
1920	478	478	478	478	
1919	478	478	478	478	
1918	478	478	478	478	
1917	478	478	478	478	
1916	478	478	478	478	
1915	478	478	478	478	
1914	478	478	478	478	
1913	478	478	478	478	
1912	478	478	478	478	
1911	478	478	478	478	
1910	478	478	478	478	
1909	478	478	478	478	
1908	478	478	478	478	
1907	478	478	478	478	
1906	478	478	478	478	
1905	478	478	478	478	
1904	478	478	478	478	
1903	478	478	478	478	
1902	478	478	478	478	
1901	478	478	478	478	
1900	478	478	478	478	
1899	478	478	478	478	
1898	478	478	478	478	
1897	478	478	478	478	
1896	478	478	478	478	
1895	478	478	478	478	
1894	478	478	478	478	
1893	478	478	478	478	
1892	478	478	478	478	
1891	478	478	478	478	
1890	478	478	478	478	

## DEMAND, TRADE, OUTPUT &amp; CAPACITY BY COUNTRY, CUMULATIVE 2010

Sub Totals, 2010					
2010 Total	Consumption	Trade	Output	Capacity	Use Rate %
China	100	100	100	100	100
China Group	100	100	100	100	100
EU Group	100	100	100	100	100
EU	100	100	100	100	100
EU Group	100	100	100	100	100
Japan	100	100	100	100	100
Japan Group	100	100	100	100	100
Latin America	100	100	100	100	100
Latin America Group	100	100	100	100	100
Latin America	100	100	100	100	100
Middle East	100	100	100	100	100
Middle East Group	100	100	100	100	100
Middle East	100	100	100	100	100
Other	100	100	100	100	100
Other Group	100	100	100	100	100
Other	100	100	100	100	100
Sub Total	1000	1000	1000	1000	100
Group Total	1000	1000	1000	1000	100
Total	1000	1000	1000	1000	100

Source: U.S. Census Bureau, BEA

### 2.2 Country Data Worldwide, Forecasted Halfyear

Europe - 2019					
Year	Max. capacity	Peak	Output	Capacity	Capacity Rev. %
2015	100	100	100	100	100
2016	100	100	100	100	100
2017	100	100	100	100	100
2018	100	100	100	100	100
2019	100	100	100	100	100
2020	100	100	100	100	100
2021	100	100	100	100	100
2022	100	100	100	100	100
2023	100	100	100	100	100
2024	100	100	100	100	100
2025	100	100	100	100	100
2026	100	100	100	100	100
2027	100	100	100	100	100
2028	100	100	100	100	100
2029	100	100	100	100	100
2030	100	100	100	100	100
2031	100	100	100	100	100
2032	100	100	100	100	100
2033	100	100	100	100	100
2034	100	100	100	100	100
2035	100	100	100	100	100
2036	100	100	100	100	100
2037	100	100	100	100	100
2038	100	100	100	100	100
2039	100	100	100	100	100
2040	100	100	100	100	100
2041	100	100	100	100	100
2042	100	100	100	100	100
2043	100	100	100	100	100
2044	100	100	100	100	100
2045	100	100	100	100	100
2046	100	100	100	100	100
2047	100	100	100	100	100
2048	100	100	100	100	100
2049	100	100	100	100	100
2050	100	100	100	100	100



**DETAILED TRADE, OUTPUT & CAPACITY LINE WOODPANELS PAPER JOINTS**
**America & Asia - 2019**

Site Code	Consumption	Trade	Output	Capacity	Op. Rate %
01	100	0	100	100	100
02	100	0	100	100	100
03	100	0	100	100	100
04	100	0	100	100	100
05	100	0	100	100	100
06	100	0	100	100	100
07	100	0	100	100	100
08	100	0	100	100	100
09	100	0	100	100	100
10	100	0	100	100	100
11	100	0	100	100	100
12	100	0	100	100	100
13	100	0	100	100	100
14	100	0	100	100	100
15	100	0	100	100	100
16	100	0	100	100	100
17	100	0	100	100	100
18	100	0	100	100	100
19	100	0	100	100	100
20	100	0	100	100	100
21	100	0	100	100	100
22	100	0	100	100	100
23	100	0	100	100	100
24	100	0	100	100	100
25	100	0	100	100	100
26	100	0	100	100	100
27	100	0	100	100	100
28	100	0	100	100	100
29	100	0	100	100	100
30	100	0	100	100	100
31	100	0	100	100	100
32	100	0	100	100	100
33	100	0	100	100	100
34	100	0	100	100	100
35	100	0	100	100	100
36	100	0	100	100	100
37	100	0	100	100	100
38	100	0	100	100	100
39	100	0	100	100	100
40	100	0	100	100	100
41	100	0	100	100	100
42	100	0	100	100	100
43	100	0	100	100	100
44	100	0	100	100	100
45	100	0	100	100	100
46	100	0	100	100	100
47	100	0	100	100	100
48	100	0	100	100	100
49	100	0	100	100	100
50	100	0	100	100	100
51	100	0	100	100	100
52	100	0	100	100	100
53	100	0	100	100	100
54	100	0	100	100	100
55	100	0	100	100	100
56	100	0	100	100	100
57	100	0	100	100	100
58	100	0	100	100	100
59	100	0	100	100	100
60	100	0	100	100	100
61	100	0	100	100	100
62	100	0	100	100	100
63	100	0	100	100	100
64	100	0	100	100	100
65	100	0	100	100	100
66	100	0	100	100	100
67	100	0	100	100	100
68	100	0	100	100	100
69	100	0	100	100	100
70	100	0	100	100	100
71	100	0	100	100	100
72	100	0	100	100	100
73	100	0	100	100	100
74	100	0	100	100	100
75	100	0	100	100	100
76	100	0	100	100	100
77	100	0	100	100	100
78	100	0	100	100	100
79	100	0	100	100	100
80	100	0	100	100	100
81	100	0	100	100	100
82	100	0	100	100	100
83	100	0	100	100	100
84	100	0	100	100	100
85	100	0	100	100	100
86	100	0	100	100	100
87	100	0	100	100	100
88	100	0	100	100	100
89	100	0	100	100	100
90	100	0	100	100	100
91	100	0	100	100	100
92	100	0	100	100	100
93	100	0	100	100	100
94	100	0	100	100	100
95	100	0	100	100	100
96	100	0	100	100	100
97	100	0	100	100	100
98	100	0	100	100	100
99	100	0	100	100	100
100	100	0	100	100	100

2019 &amp; 2020 are in million

REVENUE, TRADE, OUPPE & EXPENSES, INC. WOODRIDGE PARKS CENTER					
April 1 - 2014th Quarter - 2014					
Date	Description	Trade	Budget	Expense	Exp. Apr 30
04/01		00	00	0	0
04/02		100	100	100	100
04/03		100	100	100	100
04/04		100	100	0	0
04/05		100	100	100	100
04/06		100	100	0	0
04/07		100	100	100	100
04/08		100	100	100	100
04/09		100	100	100	100
04/10		100	100	100	100
04/11		100	100	100	100
04/12		100	100	100	100
04/13		100	100	100	100
04/14		100	100	100	100
04/15		100	100	100	100
04/16		100	100	100	100
04/17		100	100	100	100
04/18		100	100	100	100
04/19		100	100	100	100
04/20		100	100	100	100
04/21		100	100	100	100
04/22		100	100	100	100
04/23		100	100	100	100
04/24		100	100	100	100
04/25		100	100	100	100
04/26		100	100	100	100
04/27		100	100	100	100
04/28		100	100	100	100
04/29		100	100	100	100
04/30		100	100	100	100
<b>Total</b>		<b>3000</b>	<b>0</b>	<b>3000</b>	<b>3000</b>
05/01		100	100	100	100
05/02		100	100	100	100
05/03		100	100	100	100
05/04		100	100	100	100
05/05		100	100	100	100
05/06		100	100	100	100
05/07		100	100	100	100
05/08		100	100	100	100
05/09		100	100	100	100
05/10		100	100	100	100
05/11		100	100	100	100
05/12		100	100	100	100
05/13		100	100	100	100
05/14		100	100	100	100
05/15		100	100	100	100
05/16		100	100	100	100
05/17		100	100	100	100
05/18		100	100	100	100
05/19		100	100	100	100
05/20		100	100	100	100
05/21		100	100	100	100
05/22		100	100	100	100
05/23		100	100	100	100
05/24		100	100	100	100
05/25		100	100	100	100
05/26		100	100	100	100
05/27		100	100	100	100
05/28		100	100	100	100
05/29		100	100	100	100
05/30		100	100	100	100
<b>Total</b>		<b>3000</b>	<b>0</b>	<b>3000</b>	<b>3000</b>
<b>Grand Total</b>		<b>6000</b>	<b>0</b>	<b>6000</b>	<b>6000</b>
<b>Net Total</b>		<b>6000</b>	<b>0</b>	<b>6000</b>	<b>6000</b>



**PERMANENT TRAILS, OUTPAT & CLINICAL, LLC - HOSPITAL PLANS (CONT'D)**
**Self Funded, 2011a**

Plan Type	Consumption	Funds	Revenue	Capacity	Cap. Rate %
Basic	100	100	100	100	100
Basic Outpatient	100	100	100	100	100
Basic Inpatient	100	100	100	100	100
Specialty Outpatient	100	100	100	100	100
<b>Total</b>	400	400	400	400	100
General	100	100	100	100	100
Basic	100	100	100	100	100
Outpatient	100	100	100	100	100
<b>Total</b>	300	300	300	300	100
General	100	100	100	100	100
Outpatient	100	100	100	100	100
Specialty Outpatient	100	100	100	100	100
Basic	100	100	100	100	100
Outpatient	100	100	100	100	100
Specialty Outpatient	100	100	100	100	100
Basic	100	100	100	100	100
Outpatient	100	100	100	100	100
Specialty Outpatient	100	100	100	100	100
Basic	100	100	100	100	100
Outpatient	100	100	100	100	100
Specialty Outpatient	100	100	100	100	100
<b>Total</b>	1200	1200	1200	1200	100
<b>Total</b>	2200	2200	2200	2200	100
Group Total	2200	2200	2200	2200	100
Net Total	2200	2200	2200	2200	100

2011a is for FY 2011

### 2.3 Country Data Worldwide, Control Mechanical

TABLE 14: Global, Trade, Output & Capacity, Control Mech					
Market = Global					
Year	Consumption	Trade	Output	Capacity	Cap. Rate %
2020	100	0	100	0	0%
2021	100	0	100	0	0%
2022	100	0	0	0	0%
2023	100	0	0	0	0%
2024	100	0	0	0	0%
2025	100	0	0	0	0%
2026	100	0	0	0	0%
2027	100	0	0	0	0%
2028	100	0	0	0	0%
2029	100	0	0	0	0%
2030	100	0	0	0	0%
2031	100	0	0	0	0%
2032	100	0	0	0	0%
2033	100	0	0	0	0%
2034	100	0	0	0	0%
2035	100	0	0	0	0%
2036	100	0	0	0	0%
2037	100	0	0	0	0%
2038	100	0	0	0	0%
2039	100	0	0	0	0%
2040	100	0	0	0	0%
2041	100	0	0	0	0%
2042	100	0	0	0	0%
2043	100	0	0	0	0%
2044	100	0	0	0	0%
2045	100	0	0	0	0%
2046	100	0	0	0	0%
2047	100	0	0	0	0%
2048	100	0	0	0	0%
2049	100	0	0	0	0%
2050	100	0	0	0	0%
2051	100	0	0	0	0%
2052	100	0	0	0	0%
2053	100	0	0	0	0%
2054	100	0	0	0	0%
2055	100	0	0	0	0%
2056	100	0	0	0	0%
2057	100	0	0	0	0%
2058	100	0	0	0	0%
2059	100	0	0	0	0%
2060	100	0	0	0	0%
2061	100	0	0	0	0%
2062	100	0	0	0	0%
2063	100	0	0	0	0%
2064	100	0	0	0	0%
2065	100	0	0	0	0%
2066	100	0	0	0	0%
2067	100	0	0	0	0%
2068	100	0	0	0	0%
2069	100	0	0	0	0%
2070	100	0	0	0	0%
2071	100	0	0	0	0%
2072	100	0	0	0	0%
2073	100	0	0	0	0%
2074	100	0	0	0	0%
2075	100	0	0	0	0%
2076	100	0	0	0	0%
2077	100	0	0	0	0%
2078	100	0	0	0	0%
2079	100	0	0	0	0%
2080	100	0	0	0	0%
2081	100	0	0	0	0%
2082	100	0	0	0	0%
2083	100	0	0	0	0%
2084	100	0	0	0	0%
2085	100	0	0	0	0%
2086	100	0	0	0	0%
2087	100	0	0	0	0%
2088	100	0	0	0	0%
2089	100	0	0	0	0%
2090	100	0	0	0	0%
2091	100	0	0	0	0%
2092	100	0	0	0	0%
2093	100	0	0	0	0%
2094	100	0	0	0	0%
2095	100	0	0	0	0%
2096	100	0	0	0	0%
2097	100	0	0	0	0%
2098	100	0	0	0	0%
2099	100	0	0	0	0%
2100	100	0	0	0	0%



Earnings, Trade, Output & Capacity, CUMULATED FROM JOINT USE					
Available to Joint Use - 2013					
By Use	Commodity	Trade	Output	Capacity	By Rate B
Gas	100	100	70	45	100
Oil	200	200	200	200	100
Electricity	0	0	0	0	
Water	0	0	0	0	100
Heat	0	0	0	0	
Steam	0	0	0	0	
Power	0	0	0	0	
Other	0	0	0	0	
Gas	0	0	0	0	
Oil	0	0	0	0	
Electricity	0	0	0	0	
Water	0	0	0	0	
Heat	0	0	0	0	
Steam	0	0	0	0	
Power	0	0	0	0	
Other	0	0	0	0	
Gas	0	0	0	0	
Oil	0	0	0	0	
Electricity	0	0	0	0	
Water	0	0	0	0	
Heat	0	0	0	0	
Steam	0	0	0	0	
Power	0	0	0	0	
Other	0	0	0	0	
Gas	0	0	0	0	
Oil	0	0	0	0	
Electricity	0	0	0	0	
Water	0	0	0	0	
Heat	0	0	0	0	
Steam	0	0	0	0	
Power	0	0	0	0	
Other	0	0	0	0	
Gas	0	0	0	0	
Oil	0	0	0	0	
Electricity	0	0	0	0	
Water	0	0	0	0	
Heat	0	0	0	0	
Steam	0	0	0	0	
Power	0	0	0	0	
Other	0	0	0	0	
Gas	0	0	0	0	
Oil	0	0	0	0	
Electricity	0	0	0	0	
Water	0	0	0	0	
Heat	0	0	0	0	
Steam	0	0	0	0	
Power	0	0	0	0	
Other	0	0	0	0	
Gas	0	0	0	0	
Oil	0	0	0	0	
Electricity	0	0	0	0	
Water	0	0	0	0	
Heat	0	0	0	0	
Steam	0	0	0	0	
Power	0	0	0	0	
Other	0	0	0	0	

2013 Annual Report

## EXPANSION, TRADE, INFRASTRUCTURE &amp; CAPITAL, CDBG PROGRAM BUDGET

Active &amp; Pending Start - 2019

Line Item	Commencement	Funds	Budget	Expense	Exp. Rate %
01	0	0	0	0	
02	0	0	0	0	
03	0	0	0	0	
04	0	0	0	0	
05	0	0	0	0	
06	0	0	0	0	
07	0	0	0	0	
08	0	0	0	0	
09	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	
31	0	0	0	0	
32	0	0	0	0	
33	0	0	0	0	
34	0	0	0	0	
35	0	0	0	0	
36	0	0	0	0	
37	0	0	0	0	
38	0	0	0	0	
39	0	0	0	0	
40	0	0	0	0	
41	0	0	0	0	
42	0	0	0	0	
43	0	0	0	0	
44	0	0	0	0	
45	0	0	0	0	
46	0	0	0	0	
47	0	0	0	0	
48	0	0	0	0	
49	0	0	0	0	
50	0	0	0	0	
51	0	0	0	0	
52	0	0	0	0	
53	0	0	0	0	
54	0	0	0	0	
55	0	0	0	0	
56	0	0	0	0	
57	0	0	0	0	
58	0	0	0	0	
59	0	0	0	0	
60	0	0	0	0	
61	0	0	0	0	
62	0	0	0	0	
63	0	0	0	0	
64	0	0	0	0	
65	0	0	0	0	
66	0	0	0	0	
67	0	0	0	0	
68	0	0	0	0	
69	0	0	0	0	
70	0	0	0	0	
71	0	0	0	0	
72	0	0	0	0	
73	0	0	0	0	
74	0	0	0	0	
75	0	0	0	0	
76	0	0	0	0	
77	0	0	0	0	
78	0	0	0	0	
79	0	0	0	0	
80	0	0	0	0	
81	0	0	0	0	
82	0	0	0	0	
83	0	0	0	0	
84	0	0	0	0	
85	0	0	0	0	
86	0	0	0	0	
87	0	0	0	0	
88	0	0	0	0	
89	0	0	0	0	
90	0	0	0	0	
91	0	0	0	0	
92	0	0	0	0	
93	0	0	0	0	
94	0	0	0	0	
95	0	0	0	0	
96	0	0	0	0	
97	0	0	0	0	
98	0	0	0	0	
99	0	0	0	0	
100	0	0	0	0	
101	0	0	0	0	
102	0	0	0	0	
103	0	0	0	0	
104	0	0	0	0	
105	0	0	0	0	
106	0	0	0	0	
107	0	0	0	0	
108	0	0	0	0	
109	0	0	0	0	
110	0	0	0	0	
111	0	0	0	0	
112	0	0	0	0	
113	0	0	0	0	
114	0	0	0	0	
115	0	0	0	0	
116	0	0	0	0	
117	0	0	0	0	
118	0	0	0	0	
119	0	0	0	0	
120	0	0	0	0	
121	0	0	0	0	
122	0	0	0	0	
123	0	0	0	0	
124	0	0	0	0	
125	0	0	0	0	
126	0	0	0	0	
127	0	0	0	0	
128	0	0	0	0	
129	0	0	0	0	
130	0	0	0	0	
131	0	0	0	0	
132	0	0	0	0	
133	0	0	0	0	
134	0	0	0	0	
135	0	0	0	0	
136	0	0	0	0	
137	0	0	0	0	
138	0	0	0	0	
139	0	0	0	0	
140	0	0	0	0	
141	0	0	0	0	
142	0	0	0	0	
143	0	0	0	0	
144	0	0	0	0	
145	0	0	0	0	
146	0	0	0	0	
147	0	0	0	0	
148	0	0	0	0	
149	0	0	0	0	
150	0	0	0	0	
151	0	0	0	0	
152	0	0	0	0	
153	0	0	0	0	
154	0	0	0	0	
155	0	0	0	0	
156	0	0	0	0	
157	0	0	0	0	
158	0	0	0	0	
159	0	0	0	0	
160	0	0	0	0	
161	0	0	0	0	
162	0	0	0	0	
163	0	0	0	0	
164	0	0	0	0	
165	0	0	0	0	
166	0	0	0	0	
167	0	0	0	0	
168	0	0	0	0	
169	0	0	0	0	
170	0	0	0	0	
171	0	0	0	0	
172	0	0	0	0	
173	0	0	0	0	
174	0	0	0	0	
175	0	0	0	0	
176	0	0	0	0	
177	0	0	0	0	
178	0	0	0	0	
179	0	0	0	0	
180	0	0	0	0	
181	0	0	0	0	
182	0	0	0	0	
183	0	0	0	0	
184	0	0	0	0	
185	0	0	0	0	
186	0	0	0	0	
187	0	0	0	0	
188	0	0	0	0	
189	0	0	0	0	
190	0	0	0	0	
191	0	0	0	0	
192	0	0	0	0	
193	0	0	0	0	
194	0	0	0	0	
195	0	0	0	0	
196	0	0	0	0	
197	0	0	0	0	
198	0	0	0	0	
199	0	0	0	0	
200	0	0	0	0	
201	0	0	0	0	
202	0	0	0	0	
203	0	0	0	0	
204	0	0	0	0	
205	0	0	0	0	
206	0	0	0	0	
207	0	0	0	0	
208	0	0	0	0	
209	0	0	0	0	
210	0	0	0	0	
211	0	0	0	0	
212	0	0	0	0	
213	0	0	0	0	
214	0	0	0	0	
215	0	0	0	0	
216	0	0	0	0	
217	0	0	0	0	
218	0	0	0	0	
219	0	0	0	0	
220	0	0	0	0	
221	0	0	0	0	
222	0	0	0	0	
223	0	0	0	0	
224	0	0	0	0	
225	0	0	0	0	
226	0	0	0	0	
227	0	0	0	0	
228	0	0	0	0	
229	0	0	0	0	
230	0	0	0	0	
231	0	0	0	0	
232	0	0	0	0	
233	0	0	0	0	
234	0	0	0	0	
235	0	0	0	0	
236	0	0	0	0	
237	0	0	0	0	
238	0	0	0	0	
239	0	0	0	0	
240	0	0	0	0	
241	0	0	0	0	
242	0	0	0	0	
243	0	0	0	0	
244	0	0	0	0	
245	0	0	0	0	
246	0	0	0	0	
247	0	0	0	0	
248	0	0	0	0	
249	0	0	0	0	
250	0	0	0	0	
251	0	0	0	0	
252	0	0	0	0	
253	0	0	0	0	
254	0	0	0	0	
255	0	0	0	0	
256	0	0	0	0	
257	0	0	0	0	
258	0	0	0	0	
259	0	0	0	0	
260	0	0	0	0	
261	0	0	0	0	
262	0	0	0	0	
263	0	0	0	0	
264	0	0	0	0	
265	0	0	0	0	
266	0	0	0	0	
267	0	0	0	0	
268	0	0	0	0	
269	0	0	0	0	
270	0	0	0	0	
271	0	0	0	0	
272	0	0	0	0	
273	0	0	0	0	
274	0	0	0	0	
275	0	0	0	0	
276	0	0	0	0	
277	0	0	0	0	
278	0	0	0	0	
279	0	0	0	0	
280	0	0	0	0	
281	0	0	0	0	
282	0	0	0	0	
283	0	0	0	0	
284	0	0	0	0	
285	0	0	0	0	
286	0	0	0	0	
287	0	0	0	0	
288	0	0	0	0	
289	0	0	0	0	
290	0	0	0	0	
291	0	0	0	0	
292	0	0	0	0	
293	0	0	0	0	
294	0	0	0	0	
295	0	0	0	0	
296	0	0	0	0	
297	0	0	0	0	
298	0	0	0	0	

<b>SEWER, TRAIL, OUTPUT &amp; CAPACITY, COATED IRON CONDUIT</b>					
<b>Sub-System: 2011a</b>					
<b>2011a Item</b>	<b>Consumption</b>	<b>Trade</b>	<b>Revenue</b>	<b>Capacity</b>	<b>By Rate 5</b>
Water	100	200	1000	1000	100
Water Wastage	100	200	1000	1000	100
Water to Sewer	100	100	0	0	100
Replenish Sewer	100	100	0	0	
<b>Total</b>	<b>300</b>	<b>500</b>	<b>1000</b>	<b>1000</b>	<b>100</b>
Gas	100	100	100	100	100
Gas Wastage	100	100	0	0	100
<b>Total</b>	<b>200</b>	<b>200</b>	<b>100</b>	<b>100</b>	<b>200</b>
Trunk	1000	100	1000	1000	100
Trunk Wastage	100	100	1000	1100	100
Trunk to Sewer	100	200	0	0	100
Trunk	100	100	0	0	
Trunk to Gas	100	100	0	0	
Replenish Gas	100	100	0	0	
Trunk Wastage	100	100	0	0	
<b>Total</b>	<b>2000</b>	<b>600</b>	<b>1000</b>	<b>2000</b>	<b>100</b>
Water Sewer	100	100	0	0	100
Water Wastage	1000	100	1000	1000	100
Water Wastage	100	100	100	100	100
Gas	1000	100	1000	1000	100
Trunk Wastage	100	100	1000	1100	100
Trunk Sewer Wastage	100	100	0	0	100
Revenue	100	100	0	0	
<b>Total</b>	<b>2000</b>	<b>0</b>	<b>1000</b>	<b>1000</b>	<b>100</b>
Output Total	1000	100	1000	1000	100
Cost Total	1000	1100	1000	1000	100

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### 2.4 Country Data Worldwide, Forecasted Mechanical

**FIGURE 1.9. DEMAND, TRAIL, OUTPUT & CAPACITY UNCOMMITTED FROM**

**Europe - MW-h**

Year	Demand	Trail	Output	Capacity	By 2030
2023	100	100	100	100	100
2024	100	100	100	100	100
2025	100	100	100	100	100
2026	100	100	100	100	100
2027	100	100	100	100	100
2028	100	100	100	100	100
2029	100	100	100	100	100
2030	100	100	100	100	100
2031	100	100	100	100	100
2032	100	100	100	100	100
2033	100	100	100	100	100
2034	100	100	100	100	100
2035	100	100	100	100	100
2036	100	100	100	100	100
2037	100	100	100	100	100
2038	100	100	100	100	100
2039	100	100	100	100	100
2040	100	100	100	100	100
2041	100	100	100	100	100
2042	100	100	100	100	100
2043	100	100	100	100	100
2044	100	100	100	100	100
2045	100	100	100	100	100
2046	100	100	100	100	100
2047	100	100	100	100	100
2048	100	100	100	100	100
2049	100	100	100	100	100
2050	100	100	100	100	100





GENERAL TRADE DUTY & CAPACITY PROVISION FROM 2010/11					
April 2016 - 2016/17 Budget - 2017/18					
Item Name	Commenced	Trade	Budget	Capacity	Req. April 2017
11	10	10	0	0	
12	10	10	10	10	100%
13	10	10	0	0	
14	10	10	0	0	
15	10	10	10	10	100%
16	10	10	0	0	
17	10	10	10	10	100%
18	10	10	0	0	
19	10	10	0	0	
20	10	10	0	0	
21	10	10	0	0	
22	10	10	10	10	100%
23	10	10	0	0	
24	10	10	10	10	100%
25	10	10	0	0	
26	10	10	10	10	100%
27	10	10	0	0	
28	10	10	10	10	100%
29	10	10	0	0	
30	10	10	0	0	
31	10	10	0	0	
32	10	10	0	0	
33	10	10	0	0	
34	10	10	0	0	
35	10	10	0	0	
36	10	10	0	0	
37	10	10	0	0	
38	10	10	0	0	
39	10	10	0	0	
40	10	10	0	0	
41	10	10	0	0	
42	10	10	0	0	
43	10	10	0	0	
44	10	10	0	0	
45	10	10	0	0	
46	10	10	0	0	
47	10	10	0	0	
48	10	10	0	0	
49	10	10	0	0	
50	10	10	0	0	
51	10	10	0	0	
52	10	10	0	0	
53	10	10	0	0	
54	10	10	0	0	
55	10	10	0	0	
56	10	10	0	0	
57	10	10	0	0	
58	10	10	0	0	
59	10	10	0	0	
60	10	10	0	0	
61	10	10	0	0	
62	10	10	0	0	
63	10	10	0	0	
64	10	10	0	0	
65	10	10	0	0	
66	10	10	0	0	
67	10	10	0	0	
68	10	10	0	0	
69	10	10	0	0	
70	10	10	0	0	
71	10	10	0	0	
72	10	10	0	0	
73	10	10	0	0	
74	10	10	0	0	
75	10	10	0	0	
76	10	10	0	0	
77	10	10	0	0	
78	10	10	0	0	
79	10	10	0	0	
80	10	10	0	0	
81	10	10	0	0	
82	10	10	0	0	
83	10	10	0	0	
84	10	10	0	0	
85	10	10	0	0	
86	10	10	0	0	
87	10	10	0	0	
88	10	10	0	0	
89	10	10	0	0	
90	10	10	0	0	
91	10	10	0	0	
92	10	10	0	0	
93	10	10	0	0	
94	10	10	0	0	
95	10	10	0	0	
96	10	10	0	0	
97	10	10	0	0	
98	10	10	0	0	
99	10	10	0	0	
100	10	10	0	0	
101	10	10	0	0	
102	10	10	0	0	
103	10	10	0	0	
104	10	10	0	0	
105	10	10	0	0	
106	10	10	0	0	
107	10	10	0	0	
108	10	10	0	0	
109	10	10	0	0	
110	10	10	0	0	
111	10	10	0	0	
112	10	10	0	0	
113	10	10	0	0	
114	10	10	0	0	
115	10	10	0	0	
116	10	10	0	0	
117	10	10	0	0	
118	10	10	0	0	
119	10	10	0	0	
120	10	10	0	0	
121	10	10	0	0	
122	10	10	0	0	
123	10	10	0	0	
124	10	10	0	0	
125	10	10	0	0	
126	10	10	0	0	
127	10	10	0	0	
128	10	10	0	0	
129	10	10	0	0	
130	10	10	0	0	
131	10	10	0	0	
132	10	10	0	0	
133	10	10	0	0	
134	10	10	0	0	
135	10	10	0	0	
136	10	10	0	0	
137	10	10	0	0	
138	10	10	0	0	
139	10	10	0	0	
140	10	10	0	0	
141	10	10	0	0	
142	10	10	0	0	
143	10	10	0	0	
144	10	10	0	0	
145	10	10	0	0	
146	10	10	0	0	
147	10	10	0	0	
148	10	10	0	0	
149	10	10	0	0	
150	10	10	0	0	
151	10	10	0	0	
152	10	10	0	0	
153	10	10	0	0	
154	10	10	0	0	
155	10	10	0	0	
156	10	10	0	0	
157	10	10	0	0	
158	10	10	0	0	
159	10	10	0	0	
160	10	10	0	0	
161	10	10	0	0	
162	10	10	0	0	
163	10	10	0	0	
164	10	10	0	0	
165	10	10	0	0	
166	10	10	0	0	
167	10	10	0	0	
168	10	10	0	0	
169	10	10	0	0	
170	10	10	0	0	
171	10	10	0	0	
172	10	10	0	0	
173	10	10	0	0	
174	10	10	0	0	
175	10	10	0	0	
176	10	10	0	0	
177	10	10	0	0	
178	10	10	0	0	
179	10	10	0	0	
180	10	10	0	0	
181	10	10	0	0	
182	10	10	0	0	
183	10	10	0	0	
184	10	10	0	0	
185	10	10	0	0	
186	10	10	0	0	
187	10	10	0	0	
188	10	10	0	0	
189	10	10	0	0	
190	10	10	0	0	
191	10	10	0	0	
192	10	10	0	0	
193	10	10	0	0	
194	10	10	0	0	
195	10	10	0	0	
196	10	10	0	0	
197	10	10	0	0	
198	10	10	0	0	
199	10	10	0	0	
200	10	10	0	0	
201	10	10	0	0	
202	10	10	0	0	
203	10	10	0	0	
204	10	10	0	0	
205	10	10	0	0	
206	10	10	0	0	
207	10	10	0	0	
208	10	10	0	0	
209	10	10	0	0	
210	10	10	0	0	
211	10	10	0	0	
212	10	10	0	0	
213	10	10	0	0	
214	10	10	0	0	
215	10	10	0	0	
216	10	10	0	0	
217	10	10	0	0	
218	10	10	0	0	
219	10	10	0	0	
220	10	10	0	0	
221	10	10	0	0	
222	10	10	0	0	
223	10	10	0	0	
224	10	10	0	0	
225	10	10	0	0	
226	10	10	0	0	
227	10	10	0	0	
228	10	10	0	0	
229	10	10	0	0	
230	10	10	0	0	
231	10	10	0	0	
232	10	10	0	0	
233	10	10	0	0	
234	10	10	0	0	
235	10	10	0	0	
236	10	10	0	0	
237	10	10	0	0	
238	10	10	0	0	
239	10	10	0	0	
240	10	10	0	0	
241	10	10	0	0	
242	10	10	0	0	
243	10	10	0	0	
244	10	10	0	0	
245	10	10	0	0	
246	10	10	0	0	
247	10	10	0	0	
248	10	10	0	0	
249	10				

## DEMAND, FUEL OUTPUT &amp; CAPACITY UNCOVERED FROM JOINTS

Sub Total, 2013

2013 Use	Consumption	Fuel	Output	Capacity	Use Rate %
Heat	100	200	400	200	100
Hot Water	100	200	400	200	100
Hot Oil Heat	100	100	10	10	100
Hot Water Storage	100	100	10	100	100
CHP	100	200	100	100	100
Chiller	100	100	200	200	100
Boiler	100	100	10	10	100
Hot Storage	100	100	100	100	100
CHP	100	100	100	100	100
Chiller	100	100	100	100	100
Hot Oil Heat	100	100	100	100	100
Boiler	100	100	100	100	100
Hot Oil	100	100	10	10	100
Hot Water Storage	100	100	10	10	100
Hot Oil	100	100	10	10	100
<b>Total</b>					
Hot Water	1000	1000	1000	1000	100
Hot Storage	100	100	100	100	100
CHP	1000	1000	1000	1000	100
Hot Storage	100	100	100	100	100
CHP	100	100	100	100	100
Chiller	100	100	100	100	100
Hot Oil Heat	100	100	100	100	100
Boiler	100	100	10	10	100
<b>Total</b>	1000	1000	1000	1000	100
Group Total	1000	1000	1000	1000	100
Net Total	1000	1000	1000	1000	100

2013.03.13.13.13.13

## 8. Supply Outlook

### **Detailed information on our capacity calculations**

This report includes detailed capacity information, to enable our clients to understand exactly how we arrive at the figures in our overall capacity forecasts.

**Plant capacity.** This section shows the capacity figures we use that are based on known projects, including new machines and major upgrades that have been approved, ordered and financed, as well as firm contract plans.



The following table shows the base capacity changes by country worldwide:

*U.S. & Canada Worldwide*

EMG&E (INCORPORATED) BY COUNTRY, COUNTRY INCORPORATED PARTS							
U.S. America, W. Europe & Asia							
Year	2011	2012	2013	2014	2015	2016	2017-18
USA	100	100	100	100	100	100	0
Canada	0	0	0	0	0	0	0
UK	0	0	0	0	0	0	0
France	100	100	100	100	100	100	0
Germany	100	100	100	100	100	100	100
Italy	100	100	100	100	100	100	0
Spain	0	0	0	0	0	0	0
Japan	0	0	0	0	0	0	0
China	0	0	0	0	0	0	0
India	0	0	0	0	0	0	0
South Korea	0	0	0	0	0	0	0
Australia	0	0	0	0	0	0	0
South Africa	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0
<b>Total</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>300</b>	<b>100</b>

EMG&E (INCORPORATED)

Summary of Assets by Counterparty Credit Risk							
Asset	Currency						Total
	USD	EUR	GBP	JPY	CHF	Other	
Accounts receivable	100	100	100	100	100	100	600
Loans	200	200	200	200	200	200	1,200
Investments	300	300	300	300	300	300	1,800
Other	50	50	50	50	50	50	300
Total	650	650	650	650	650	650	3,900
Accounts payable	100	100	100	100	100	100	600
Loans payable	200	200	200	200	200	200	1,200
Investments	300	300	300	300	300	300	1,800
Other	50	50	50	50	50	50	300
Total	650	650	650	650	650	650	3,900
Net assets	0	0	0	0	0	0	0

Amounts in US\$ million



Capacity Capacity by Country, LAC, MOSCOW PANEL (CONT'D)							
Country	Capacity						
	2011	2012	2013	2014	2015	2016	2017-18
Algeria	100	100	100	100	100	100	0
Angola	100	100	100	100	100	100	100
Argentina	100	100	100	100	100	100	100
Australia	100	100	100	100	100	100	100
Austria	100	100	100	100	100	100	100
Bahrain	100	100	100	100	100	100	100
Bangladesh	100	100	100	100	100	100	100
Barbados	100	100	100	100	100	100	100
Belgium	100	100	100	100	100	100	100
Belize	100	100	100	100	100	100	100
Bhutan	100	100	100	100	100	100	100
Bolivia	100	100	100	100	100	100	100
Brazil	100	100	100	100	100	100	100
Bulgaria	100	100	100	100	100	100	100
Canada	100	100	100	100	100	100	100
Chad	100	100	100	100	100	100	100
Chile	100	100	100	100	100	100	100
China	100	100	100	100	100	100	100
Colombia	100	100	100	100	100	100	100
Costa Rica	100	100	100	100	100	100	100
Cuba	100	100	100	100	100	100	100
Cyprus	100	100	100	100	100	100	100
Czechia	100	100	100	100	100	100	100
Dominican Republic	100	100	100	100	100	100	100
Dominica	100	100	100	100	100	100	100
Ecuador	100	100	100	100	100	100	100
Egypt	100	100	100	100	100	100	100
El Salvador	100	100	100	100	100	100	100
Equatorial Guinea	100	100	100	100	100	100	100
Ethiopia	100	100	100	100	100	100	100
France	100	100	100	100	100	100	100
Ghana	100	100	100	100	100	100	100
Guatemala	100	100	100	100	100	100	100
Honduras	100	100	100	100	100	100	100
India	100	100	100	100	100	100	100
Indonesia	100	100	100	100	100	100	100
Italy	100	100	100	100	100	100	100
Jamaica	100	100	100	100	100	100	100
Japan	100	100	100	100	100	100	100
Jordan	100	100	100	100	100	100	100
Kazakhstan	100	100	100	100	100	100	100
Kenya	100	100	100	100	100	100	100
Korea	100	100	100	100	100	100	100
Kuwait	100	100	100	100	100	100	100
Latvia	100	100	100	100	100	100	100
Lebanon	100	100	100	100	100	100	100
Lesotho	100	100	100	100	100	100	100
Lithuania	100	100	100	100	100	100	100
Luxembourg	100	100	100	100	100	100	100
Macao	100	100	100	100	100	100	100
Madagascar	100	100	100	100	100	100	100
Mali	100	100	100	100	100	100	100
Mexico	100	100	100	100	100	100	100
Moldova	100	100	100	100	100	100	100
Morocco	100	100	100	100	100	100	100
Mozambique	100	100	100	100	100	100	100
Netherlands	100	100	100	100	100	100	100
Nigeria	100	100	100	100	100	100	100
North Macedonia	100	100	100	100	100	100	100
Oman	100	100	100	100	100	100	100
Pakistan	100	100	100	100	100	100	100
Panama	100	100	100	100	100	100	100
Papua New Guinea	100	100	100	100	100	100	100
Paraguay	100	100	100	100	100	100	100
Peru	100	100	100	100	100	100	100
Philippines	100	100	100	100	100	100	100
Poland	100	100	100	100	100	100	100
Portugal	100	100	100	100	100	100	100
Romania	100	100	100	100	100	100	100
Russia	100	100	100	100	100	100	100
Rwanda	100	100	100	100	100	100	100
Saudi Arabia	100	100	100	100	100	100	100
Senegal	100	100	100	100	100	100	100
Seychelles	100	100	100	100	100	100	100
Singapore	100	100	100	100	100	100	100
Slovakia	100	100	100	100	100	100	100
Slovenia	100	100	100	100	100	100	100
South Africa	100	100	100	100	100	100	100
South Korea	100	100	100	100	100	100	100
Spain	100	100	100	100	100	100	100
Sweden	100	100	100	100	100	100	100
Switzerland	100	100	100	100	100	100	100
Taiwan	100	100	100	100	100	100	100
Tanzania	100	100	100	100	100	100	100
Togo	100	100	100	100	100	100	100
Turkey	100	100	100	100	100	100	100
Uganda	100	100	100	100	100	100	100
Ukraine	100	100	100	100	100	100	100
United Kingdom	100	100	100	100	100	100	100
United States	100	100	100	100	100	100	100
Uruguay	100	100	100	100	100	100	100
Uzbekistan	100	100	100	100	100	100	100
Venezuela	100	100	100	100	100	100	100
Zambia	100	100	100	100	100	100	100
Zimbabwe	100	100	100	100	100	100	100

### A.2.3 Global Mechanical

FIGURE 18: CAPACITY CHANGE BY COUNTRY, COATED IRON

Year	Thousands						2011-10
	2011	2012	2013	2014	2015	2016	
China	200	200	200	200	200	200	
India	100	100	100	100	100	100	
Japan	500	500	500	500	500	500	0
U.S.	100	100	100	100	100	100	0
U.K.	100	100	100	100	100	100	0
Germany	100	100	100	100	100	100	0
France	100	100	100	100	100	100	0
Italy	100	100	100	100	100	100	0
Spain	100	100	100	100	100	100	0
Other	100	100	100	100	100	100	0
U.S. Excl.	100	100	100	100	100	100	0
Europe	100	100	100	100	100	100	0
Asia	100	100	100	100	100	100	0
Latin Am.	100	100	100	100	100	100	0
Other	100	100	100	100	100	100	0
World	100	100	100	100	100	100	0

SOURCE: ENR, ENR.COM, ENR.COM

8.2.2 Forecast Methodology

FIGURE 19. CAPACITY CHANGES BY COUNTRY, 1992-2004

E.America, W.Europe & Asia							
Year	2001	2002	2003	2004	2005	2006	2007-08
USA	100	100	100	100	100	100	
Canada	100	100	100	100	100	100	
UK	100	100	100	100	100	100	
Germany	100	100	100	100	100	100	
France	100	100	100	100	100	100	
Italy	100	100	100	100	100	100	
Spain	100	100	100	100	100	100	
Japan	100	100	100	100	100	100	
China	100	100	100	100	100	100	
India	100	100	100	100	100	100	
South Africa	100	100	100	100	100	100	
Other	100	100	100	100	100	100	
EMEA	100	100	100	100	100	100	
Asia	100	100	100	100	100	100	
W.Europe	100	100	100	100	100	100	
E.America	100	100	100	100	100	100	
Global	100	100	100	100	100	100	

Source: EMG-E, 2016

CAPACITY DEMAND BY COUNTRY AND YEAR (2011-13)							
Others							
Year	2011	2012	2013	2014	2015	2016	2017-18
Algeria	25	25	25	25	25	25	
Armenia	25	25	25	25	25	25	
Azerbaijan	25	25	25	25	25	25	
Bahrain	25	25	25	25	25	25	
Bangladesh	25	25	25	25	25	25	
Brazil	25	25	25	25	25	25	
Bulgaria	25	25	25	25	25	25	
Canada	25	25	25	25	25	25	
China	25	25	25	25	25	25	
Colombia	25	25	25	25	25	25	
Cuba	25	25	25	25	25	25	
Czech Republic	25	25	25	25	25	25	
Dominican Republic	25	25	25	25	25	25	
Egypt	25	25	25	25	25	25	
France	25	25	25	25	25	25	
Germany	25	25	25	25	25	25	
Greece	25	25	25	25	25	25	
India	25	25	25	25	25	25	
Indonesia	25	25	25	25	25	25	
Italy	25	25	25	25	25	25	
Japan	25	25	25	25	25	25	
Korea	25	25	25	25	25	25	
Malaysia	25	25	25	25	25	25	
Mexico	25	25	25	25	25	25	
Netherlands	25	25	25	25	25	25	
Nigeria	25	25	25	25	25	25	
Poland	25	25	25	25	25	25	
Romania	25	25	25	25	25	25	
Russia	25	25	25	25	25	25	
Saudi Arabia	25	25	25	25	25	25	
Spain	25	25	25	25	25	25	
Sweden	25	25	25	25	25	25	
Switzerland	25	25	25	25	25	25	
Taiwan	25	25	25	25	25	25	
Thailand	25	25	25	25	25	25	
Turkey	25	25	25	25	25	25	
USA	25	25	25	25	25	25	
Ukraine	25	25	25	25	25	25	
UK	25	25	25	25	25	25	
Uzbekistan	25	25	25	25	25	25	
Vietnam	25	25	25	25	25	25	
Yemen	25	25	25	25	25	25	
Zimbabwe	25	25	25	25	25	25	

Source: Company Data & Market

## 9. Investments & New Machines

### 9.1 Machine Closures

FIGURE 10: GLOBAL NEW PAPER MACHINES CLOSED	
Machines closing down 2023	
GRADE	Tonnage
COATED WOODFREE	1,000
UNCOATED WOODFREE	1,000
COATED MECHANICAL	1,000
UNCOATED MECHANICAL	1,000
<b>TOTAL NEW PAPER CLOSURE</b>	<b>4,000</b>
Including EMGE Unreported Capacity Closures	
EMGE & Co. Ltd. © 2023	

### 9.2 Machine Investments

FIGURE 11: GLOBAL NEW PAPER MACHINE INVESTMENTS	
Announced & Planned Machine Investments	
GRADE	Tonnage
COATED WOODFREE	1,000
UNCOATED WOODFREE	1,000
COATED MECHANICAL	1,000
UNCOATED MECHANICAL	1,000
<b>NEW PAPER MACHINE INVESTMENTS</b>	<b>4,000</b>
EMGE & Co. Ltd. © 2023	



### 9.3 Individual Market Assessment Plans

#### Detailed, Individual Investment plan listings

In this section we provide detailed investment plan listings. In these tables we show all announced capacity plans, including those not classified as definite, decided and financed.

Individual machine details are shown in the tables following: where a **D** indicates the item is included as decided, while a **X** indicates that the item is undecided and hence excluded from our capacity analysis.

The complete listings follow:

**P.L.J. Machine Investment Plans, Coated Hessian Paper**

GROUP 101 INVESTMENT LISTING - COATED WOODFREE, BUNDFE & WILSON				
Groups & Remarks				
Grouping	MS	Item	Description	Qty. (Units)
<b>Rolls</b>				
Roll	Rolls	201124	Remains stock of the roll (201) inches of the roll	100
<b>Press</b>				
Press	Press	201125	Remains inventory due to poor condition of MS press	1
<b>Delivery</b>				
Delivery	Delivery		201126 (MS) roll stock used by Paper Machine in office of MS	1
Roll	Roll	201111	Remains a roll of paper in the roll stock in inventory	100
Roll	Roll	201122	Remains a roll of paper in the roll stock in inventory	10
<b>Rolls</b>				
Roll	Roll	2011	201123 (MS) roll stock in the roll stock in inventory	1
<b>Inventory</b>				
Roll	Roll	201124	Remains a roll of paper in the roll stock in inventory	100
<b>MSI (MSI)</b>				
<b>Roll</b>				
Roll	Roll	201124	Remains a roll of paper in the roll stock in inventory	10
Roll	Roll	201111	Remains a roll of paper in the roll stock in inventory	100
<b>Rolls</b>				
Roll	Roll	201122	MS roll of paper in the roll stock in inventory	10
<b>Rolls (MSI)</b>				
<b>Roll</b>				
Roll	Roll	201124	Remains a roll of paper in the roll stock in inventory	10
Roll	Roll	201122	Remains a roll of paper in the roll stock in inventory	10

### TABLE 11: INVESTMENT LISTING - CTD WORKS, AUSTRALIA

Australia (Japan, China & Other Asia)					
Category	MS	Date	Description	Cap. (M\$)	Cap. (B\$)
<b>India</b>					
Hydro Power	HydroPower	2011-12	Share of 100% of HydroPower and investment in this PPA	100	10
<b>China</b>					
PP	China	2011-12	Sharing of 100% equity in the PPA with company PPA	100	10
Oil Power	Sheng	2011-12	Sharing of 100% for equity PPA	100	10
Sheng Power	Sheng	2011-12	Sharing of 100% used for equity PPA	100	10
Sheng	Sheng	2011-12	Sharing of 100% used for PPA	100	10
Oil Power	Sheng	2011-12	Sharing of the 100% used equity PPA for the oil PPA	100	10
Sheng power	Sheng	2011-12	Share in 100% equity equity of PPA capacity in the oil PPA	100	10
Oil Power	Sheng	2011-12	Share in 100% equity equity for equity PPA in the oil PPA	100	10
PPA	China	2011-12	Share of 100% (100%) equity in the oil	100	10
PPA	Sheng	100	Share plan for the use of the gas PPA	100	10
PPA	Sheng	100	Share plan for the use of the gas PPA	100	10
<b>Other</b>					
PPA	Sheng/China/2011-12	100	Share of 100% equity equity of 100% equity in the oil PPA	100	10
<b>Other</b>					
Hydro Power	China	2011-12	Sharing of 100% for equity equity in the oil	100	10
Hydro Power	China	2011-12	Share of 100% for equity PPA in the oil	100	10
<b>Other</b>					
Hydro Power	China/China/2011-12	100	Share of 100% equity equity in the oil	100	10
Hydro Power	China/China/2011-12	100	Share of 100% equity equity PPA in the oil	100	10

Source: CTD works Ltd. (2017)

### 9.3.2 Multiple Investment Plans, Classified Sharefile

**TABLE 13: INVESTMENT LISTING - UNCOMPLIANCE WORKSHEET, EUROPE**

Europe					
Company	MR	Rate	Comments	Cap. Value	
<b>Denmark</b>					
State Aps	State	20192	Share of 200 MR in the cap	100	✓
<b>France</b>					
Amor	Europe	20192	MR received after various paper trading updates	50	✓
Cheminex	State	2019	Capex received at the end of May	10	✓
Orange	MR in the	20192	Cap of MR in the cap after various conditions - Capex received		✓
Orsted	Real Estate	20192	Investment in real estate for various projects		✓
Orsted	Europe	20192	Capex received after various updates	10	✓
Orange	MR	2019	Share of the company received - MR in the cap	10	✓
Orsted	MR	2019	Investment in real estate for various projects - MR in the cap		✓
<b>Germany</b>					
Orsted	Real Estate	20192	Investment in real estate for various projects - MR in the cap		✓
Orsted	State	2019	Investment in real estate for various projects - MR in the cap		✓
Orsted	Investment	20192	Investment in real estate for various projects - MR in the cap	100	✓
<b>Italy</b>					
Orsted	Investment	20192	Investment in real estate for various projects - MR in the cap		✓
Orsted	Europe	20192	Share of the cap in the cap	5	✓
<b>Spain</b>					
Orsted	Europe	20192	Capex received after various updates		✓
Orsted	Real Estate	20192	MR received after various updates - MR in the cap		✓
Orsted	Europe	20192	Capex received after various updates - MR in the cap		✓
<b>Switzerland</b>					
Orsted	State	20192	Share of the cap in the cap after various updates - MR in the cap	40	✓
<b>UK</b>					
Orsted	Real Estate	20192	Investment in real estate for various projects - MR in the cap		✓
<b>USA &amp; Canada</b>					
<b>USA</b>					
Orsted	Europe	20192	Investment in real estate for various projects - MR in the cap	5	✓
Orsted	Europe	20192	Share of the cap in the cap after various updates - MR in the cap	100	✓
<b>USA/Canada</b>					
Orsted	State	20192	Investment in real estate for various projects - MR in the cap	10	✓

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FIGURE 12B. INVESTMENT LISTING - USA, WESTERN AMERICA &amp; OCEANIA

M. & L. America & Oceania					
Company	ADR	Date	Description	Cap	Index
<b>USA</b>					
Archer	Archer	2012Q4	Acquisition of 100% of Archer (off market) of the cell	100	✓
Archer Paper	Archer	2011 Q3	Acquisition of 100% of Archer (off market) of the cell	100	✓
Archer Paper	Archer	2012Q4	Acquisition of 100% of Archer (off market) of the cell	100	✓
Archer Paper	Archer	2012Q4	Acquisition of 100% of Archer (off market) of the cell	100	✓
Archer	Archer	2012Q4	Acquisition of 100% of Archer (off market) of the cell	100	✓
Archer Paper	Archer	2012Q4	Acquisition of 100% of Archer (off market) of the cell	100	✓
<b>Canada</b>					
Archer Paper	Archer	2011	Acquisition of 100% of Archer (off market) of the cell	100	✓
<b>Argentina</b>					
Archer Paper	Archer	100	Acquisition of 100% of Archer (off market) of the cell	100	✓
<b>Other</b>					
Archer		100	Acquisition of 100% of Archer (off market) of the cell	100	✓
<b>Other</b>					
Archer	Archer	2012Q4	Acquisition of 100% of Archer (off market) of the cell	100	✓
Archer	Archer	2012Q4	Acquisition of 100% of Archer (off market) of the cell	100	✓
Archer Paper	Archer Paper	2011 Q3	Acquisition of 100% of Archer Paper (off market) of the cell	100	✓
Archer Paper	Archer	2012Q4	Acquisition of 100% of Archer Paper (off market) of the cell	100	✓
Archer	Archer Paper	2011 Q3	Acquisition of 100% of Archer Paper (off market) of the cell	100	✓
Archer Paper	Archer Paper	100	Acquisition of 100% of Archer Paper (off market) of the cell	100	✓
<b>Other</b>					
Archer	Archer	100	Acquisition of 100% of Archer (off market) of the cell	100	✓
<b>Other</b>					
Archer	Archer Paper	2011 Q3	Acquisition of 100% of Archer Paper (off market) of the cell	100	✓
<b>Other</b>					
Archer	Archer Paper	2011 Q3	Acquisition of 100% of Archer Paper (off market) of the cell	100	✓
<b>Other</b>					
Archer	Archer	2012Q4	Acquisition of 100% of Archer (off market) of the cell	100	✓
<b>Other</b>					
Archer Paper	Archer	2011	Acquisition of 100% of Archer Paper (off market) of the cell	100	✓

EMGE ANALYTICAL CORP. (FORMERLY - FORMER) (2017)



## TABLE 17. INVESTMENT LISTING – UNCLASSIFIED WOODPANELS, 2022

Info					
Category	MR	Year	Description	Cap. Invest.	Cap. Invest.
Investment	Wooden	2022-1	Renovation investment (costs) of 140,000 EUR on	0	0
Investment Paper	Wooden	2022Q2	Renovation up to 140,000 EUR on the production line	0	0
Renov. Paper	Wooden	2022-	Renovation to 120,000 euros investment/PP paper roll	0	0
Investment	Steel	2022-	Renovation to new 23,000 EUR roll in the year	0	0
Investment MR	Wooden	2022-1	Renov. and investment of 100 to 1000 EUR	0	0
Investing Paper	Wooden	2022Q2	Renov. of the roll by Schwaninger Paper 3. Board roll		
Investment	Wooden/Investing Paper	Q2	Renov. of roll paper (investment) 10,000 EUR on the roll	0	0
MR	Autoc. Production	Q2	Investment of 170 euros in MR		
Company MR	Autoc.	2022Q2	Investment of the roll in autoc. investment/PP paper	100	0
MR Paper	MR	2022-1	Renov. of investment 10,000 euros/roll paper rolls	0	0
MR Paper	Paper	2022Q2	Renov. of new 1000 EUR on capital MR (1 & 2)	100	0
Renov. Invest.	Steel	2022-1	Renov. of new 10,000 euros investment in the roll	0	0
Autoc. Paper	Paper	2022-	Renov. of production MR roll on 2 new 1000 EUR MR	100	0
Renov. Paper	Autoc. roll	2022Q2	Renov. investment of new investment 1000 roll	100	0
MR	Autoc. Production	Q2	MR capacity upgrade of 10,000 euros in the roll	0	0
Investment Paper	Paper	2022-	Renov. of investment using Autoc. for investment	0	0
MR Paper	MR	2022-	Renov. to roll on new MR capacity plant	100	0
Autoc. Paper MR	Autoc. Paper	MR	Renov. to roll on new MR MR in the roll	100	0
MR	Autoc. Production		Renov. to roll on new MR roll on the roll	100	0
Investment Paper	Autoc.	MR	Renov. of new MR paper roll on production line	100	0
Investment Paper	Autoc.	MR	Renov. investment for production line paper roll	100	0

MR: 1 & 2, Jan. 2022

**FIGURE 28. INVESTMENT LISTING - UNCORRECTED INFORMATION, OTHER ASIA**

Other Asia					
Company	NA	NA	Description	Cap. (million)	
<b>Indonesia</b>					
Bank Rakyat Indonesia	Banking	2019	Renewal of the call which has been closed since 2018	100	✓
PT Bank	Banking	2019	Renewal of two cancelled PP securities on the call	100	✓
Banka B	Banking	2019	Renewal of two cancelled PP securities on the call	100	✓
<b>Malaysia</b>					
MS	Banking	2019	Renewal of two cancelled paper securities 1 and 2 on the call	100	✓
MS	Banking	2019	Renewal of two cancelled paper securities 3 and 4 on the call	100	✓
MS	Banking	2019	Renewal of two cancelled paper securities 5 and 6 on the call	100	✓
<b>Philippines</b>					
Maple	Infrastructure	2019	Change call on the 2019 issue, 2019 and 2019	100	✓
<b>Singapore</b>					
Bank of China	Banking	2019	Renewal of two cancelled paper securities on the call	100	✓
<b>Thailand</b>					
Bank of China	Banking	2019	Renewal of two cancelled paper securities on the call	100	✓
<b>Vietnam</b>					
Bank of China	Banking	2019	Renewal of two cancelled paper securities on the call	100	✓
Bank of China	Banking	2019	Renewal of two cancelled paper securities on the call	100	✓
Bank of China	Banking	2019	Renewal of two cancelled paper securities on the call	100	✓

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INVESTMENT POLICY - SPECIALISED INVESTING OPERATIONS (CONTINUED)					
Other Assets/Equities					
Category	YTD	QoQ	Comment	Cap. %/YTD	
<b>Insurance pool</b>					
<b>Invest</b>					
Invest	YTD	QTD	Not at all. Focus on insurance pool - Invest in 2011	100	✓
<b>Assets &amp; Equities</b>					
<b>Equity</b>					
Invest in	YTD	QTD	Review and usage of vehicles that will be required from 2011		✓
<b>Equities</b>					
Other (Investing Asset)	YTD		Portfolio plan for investment for the short term		✓
<b>Reservations</b>					
Invest (Invest)	Investment/Investment/Investment	Investment plan for new 2011 and to the company		100	✓
Invest	YTD	YTD	Portfolio plan for investment and equity	100	✓
<b>Investing</b>					
Invest	YTD	QTD	Invest in 2011 and to the company	100	✓
<b>Investing</b>					
Invest	YTD	QTD	Review of 2011 (Investing reserves of 2011)	100	✓

Investing in 2011 and to the company

## B.1.1 Machine Assessment Plans, Control Mechanisms

FIGURE 124. MACHINERY ASSESSMENT PLANS - COATED PAPER, EUROPE

Europe				
Category	MS	Plan	Comment	Exp. (months)
<b>General</b>				
Exp.	Europe	EMG-E	Check if correct assessment papers EMG-E on the wall	
Exp. Exp.	Exp.	EMG-E	Presence of the wall in Questionnaire	
Exp.	Europe	EMG-E	Presence of the wall in the assessment plan	120
<b>General</b>				
Exp.	Europe	EMG-E	Presence of the wall in the assessment plan	120
<b>General</b>				
Exp.	Europe	EMG-E	Presence of the wall in the assessment plan	120
<b>Exp.</b>				
Exp.	Europe	EMG-E	Check if EMG-E assessment papers EMG-E on the wall	120
<b>Exp.</b>				
Exp. Exp.	Exp.	EMG-E	Presence of the wall in the assessment plan	120
<b>Exp.</b>				
Exp.	Europe	EMG-E	Check if correct wall (EMG-E) on the wall for a questionnaire EMG-E	120
<b>Exp. Exp. Exp.</b>				
Exp.	Exp.	EMG-E	Presence of the wall in the assessment plan	120
Exp.	Exp.	EMG-E	Presence of the wall in the assessment plan	120

EMG-E (2014) (2014)

## EMGE (a) INVESTMENT CONTROL – CONTROL PANEL OTHER

## Health Services &amp; Care

Company	MR	Date	Comments	Copy/Dir
<b>Health Services</b>				
<b>EMH</b>				
Health	Health	2/11/12	Check of EMH MR through control panel not	OK ✓
Health	Health	2/11/12	Review of EMH MR at the end	OK ✓
<b>EMH</b>				
<b>Health</b>				
Health	Health	2/11/12	Check of additional EMH MR in past control panel	OK ✓
Health	Health	2/11/12	Review of EMH MR in past control panel	OK ✓
<b>EMH</b>				
EMH	EMH	2/11/12	Check of EMH MR through control panel not	OK ✓
EMH	EMH	2/11/12	Review of EMH MR at the end	OK ✓
EMH	EMH	2/11/12	Check of additional EMH MR at the end	OK ✓
EMH	EMH	2/11/12	Review of EMH MR at the end	OK ✓

EMGE (a) Invest. Cont. - 3/1/12

8.3.4 Machine Adjustment Plans, Classified Mechanical

FIGURE 11. ADJUSTMENT LISTING - UNCOATED MECHANICAL

All Regions					
Component	Part	Size	Comment	Qty (each)	
<b>Pinion</b>					
110	Pinion	20/12	Removal check of the 20/12 pinion set	120	✓
<b>Shaft</b>					
110/120	Shaftpin	20/12	Verify position in hole between the 2 high speed shafts	✓	✓
<b>Roller/Shaft</b>					
110/120	Roller	20/12	Removal check to ensure check of 20/12 roller set	✓	✓
<b>Washer</b>					
110/120	Washer	20/12	Removal check of the 20/12 washer/roller set	120	✓
<b>Ball</b>					
110/120	Ballbearing	20/12	Check of condition of 20/12 ball to responsibility	120	✓
<b>Coupler</b>					
110/120	Check the 20/12/12/12 check of the 12/12 with setting in water			120	✓
110/120	Shaftpin	20/12	Removal check of 20/12 at the end	120	✓
110/120	Washer	20/12	Check of the end due to high speed and this case	120	✓
110/120	Roller/Shaft	20/12	Check of the end	120	✓
110/120	Roller	20/12	Check of the end of pressure propagation between the end	✓	✓
<b>USA</b>					
110/120	Roller/Shaft	20/12	Removal check of 20/12 roller/roller set		
110/120	Roller/Shaft	20/12	Check of 20/12 roller/roller/roller set for roller/roller set		
110/120	Roller	20/12	Removal check of 20/12 roller set at the end	120	✓
<b>Washer</b>					
110/120	Washer	20/12	Check of the 20/12 roller/roller set at the end	120	✓
<b>Ball</b>					
110/120	Ballbearing	20/12	Removal check of 20/12 roller/roller set at the end	120	✓

EMG-E (MAGNETIC) PARTS

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## Appendices – Grouping Totals

### App.1 Coated Printing Papers

The following tables show data for Total Coated (Coil Wreathline + Coil Wreathline)

#### A1.1 Demand, Trade, Output and Capacity Forecasts, Total Coated

FIGURE 13: DEMAND FORECAST, WORLD BY REGION, TOTAL COATED							
TMR tonnes							
Demand	2011	2012	2013	2014	2015	2016	2011-2016
Western	4220	4200	4160	4220	4160	4160	-0.7%
Other Europe	200	200	200	200	200	200	0.0%
Western	6140	6000	5920	5920	5790	5790	-6.2%
Latin America	2000	2000	2000	2000	2000	2000	0.0%
Asia	2000	2000	2000	2000	2000	2000	0.0%
China	4000	4000	4000	4000	4000	4000	0.0%
Other Asia-Pacific	1000	1000	1000	1000	1000	1000	0.0%
Africa/ME	1000	1000	1000	1000	1000	1000	0.0%
<b>Total</b>	<b>14270</b>	<b>14100</b>	<b>13920</b>	<b>13920</b>	<b>13790</b>	<b>13790</b>	<b>-4.7%</b>
Output Total	14270	14100	13920	13920	13790	13790	-4.7%
App Total	14270	14100	13920	13920	13790	13790	-4.7%
Source: EMGE, Ltd. © 2012							
growth % per							
Demand	2012	2013	2014	2015	2016		
Western	-0.5%	-0.9%	-0.5%	-0.5%	-0.5%		
Other Europe	0.0%	0.0%	0.0%	0.0%	0.0%		
Western	-2.3%	-2.0%	-1.3%	-2.2%	-2.2%		
Latin America	0.0%	0.0%	0.0%	0.0%	0.0%		
Asia	0.0%	0.0%	0.0%	0.0%	0.0%		
China	0.0%	0.0%	0.0%	0.0%	0.0%		
Other Asia-Pacific	0.0%	0.0%	0.0%	0.0%	0.0%		
Africa/ME	0.0%	0.0%	0.0%	0.0%	0.0%		
<b>Total</b>	<b>-1.4%</b>	<b>-1.2%</b>	<b>-1.2%</b>	<b>-1.2%</b>	<b>-1.2%</b>		
Output Total	-1.4%	-1.2%	-1.2%	-1.2%	-1.2%		
App Total	-1.4%	-1.2%	-1.2%	-1.2%	-1.2%		
Source: EMGE, Ltd. © 2012							

FIGURE 113. TRADE FORECAST, WORLD BY REGION, TOTAL COATED

1000 tonnes							
Region	2011	2012	2013	2014	2015	2016	2017-18
Western	400	450	500	570	640	700	800
Other Europe	100	100	100	100	100	100	100
NAmerica	200	200	200	200	200	200	200
Latin America	100	100	100	100	100	100	100
Asia	200	200	200	200	200	200	200
Oceania	100	100	100	100	100	100	100
Other Africa, Middle East	50	50	50	50	50	50	50
Global	1150	1250	1350	1500	1600	1700	2000
Total	0	0	0	0	0	0	0
Europe Total	500	550	600	670	740	800	900
Asia Total	200	200	200	200	200	200	200

EMERGENCE OF CHINA'S FUTURE

FIGURE 114. OUTPUT FORECAST, WORLD BY REGION, TOTAL COATED

1000 tonnes							
Region	2011	2012	2013	2014	2015	2016	2017-18
Western	1000	1000	1000	1000	1000	1000	1000
Other Europe	20	20	20	20	20	20	20
NAmerica	100	100	100	100	100	100	100
Latin America	50	50	50	50	50	50	50
Asia	500	500	500	500	500	500	500
Oceania	200	200	200	200	200	200	200
Other Africa, Middle East	100	100	100	100	100	100	100
Global	1900	1900	1900	1900	1900	1900	1900
Total	6000	6000	6000	6000	6000	6000	6000
Europe Total	1020	1020	1020	1020	1020	1020	1020
Asia Total	500	500	500	500	500	500	500

EMERGENCE OF CHINA'S FUTURE

**FIGURE 12. CARGOY CARBON FOOTPRINT, WORLD BY REGION, TOTAL CO<sub>2</sub>e**

1000 tonnes							
Category	2021	2022	2023	2024	2025	2026	2027-28
Europe	1740	1762	1784	1806	1828	1850	1872
Other Europe	20	20	20	20	20	20	20
Americas	1600	1620	1640	1660	1680	1700	1720
Latin America	70	70	70	70	70	70	70
Asia	2120	2170	2220	2270	2320	2370	2420
Oceania	700	690	680	670	660	650	640
Other Markets Area	400	400	400	400	400	400	400
Global	100	100	100	100	100	100	100
<b>Total</b>	<b>6020</b>	<b>6072</b>	<b>6124</b>	<b>6176</b>	<b>6228</b>	<b>6280</b>	<b>6332</b>
Scope 1 and 2	1700	1710	1720	1730	1740	1750	1760
Scope 3	4320	4362	4404	4446	4488	4530	4572

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**FIGURE 13. OPERATIONAL SAFETY FORECAST, WORLD BY REGION, TOTAL OTR**

% Proportion of Capacity						
Operating Area	2021	2022	2023	2024	2025	2026
Europe	27%	27%	27%	27%	27%	27%
Other Europe	0%	0%	0%	0%	0%	0%
Americas	27%	27%	27%	27%	27%	27%
Latin America	0%	0%	0%	0%	0%	0%
Asia	27%	27%	27%	27%	27%	27%
Oceania	1%	1%	1%	1%	1%	1%
Other Markets Area	1%	1%	1%	1%	1%	1%
Global	0%	0%	0%	0%	0%	0%
<b>Total</b>	<b>83%</b>	<b>83%</b>	<b>83%</b>	<b>83%</b>	<b>83%</b>	<b>83%</b>
Scope 1 and 2	83%	83%	83%	83%	83%	83%
Scope 3	0%	0%	0%	0%	0%	0%

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DEMAND, TRADE OUTPUT & CAPACITY BY COUNTRY, TOTAL COUNTRY (Cont.)					
Revenue, \$, Data = 2011a					
Country	Consumption	Trade	Output	Capacity	Exp. Rev. \$
Canada	400	400	200	200	400
USA	1100	1000	2000	1000	4000
Alaska	100	100	50	50	100
Arizona	300	300	150	150	300
Arkansas	100	100	50	50	100
California	100	100	50	50	100
Colorado	100	100	50	50	100
Connecticut	100	100	50	50	100
Delaware	100	100	50	50	100
Florida	100	100	50	50	100
Georgia	100	100	50	50	100
Hawaii	100	100	50	50	100
Illinois	100	100	50	50	100
Indiana	100	100	50	50	100
Iowa	100	100	50	50	100
Kansas	100	100	50	50	100
Kentucky	100	100	50	50	100
Louisiana	100	100	50	50	100
Maine	100	100	50	50	100
Maryland	100	100	50	50	100
Massachusetts	100	100	50	50	100
Michigan	100	100	50	50	100
Minnesota	100	100	50	50	100
Mississippi	100	100	50	50	100
Missouri	100	100	50	50	100
Montana	100	100	50	50	100
Nebraska	100	100	50	50	100
Nevada	100	100	50	50	100
New Hampshire	100	100	50	50	100
New Jersey	100	100	50	50	100
New Mexico	100	100	50	50	100
New York	100	100	50	50	100
North Carolina	100	100	50	50	100
North Dakota	100	100	50	50	100
Ohio	100	100	50	50	100
Oklahoma	100	100	50	50	100
Oregon	100	100	50	50	100
Pennsylvania	100	100	50	50	100
Rhode Island	100	100	50	50	100
South Carolina	100	100	50	50	100
South Dakota	100	100	50	50	100
Tennessee	100	100	50	50	100
Texas	100	100	50	50	100
Utah	100	100	50	50	100
Vermont	100	100	50	50	100
Virginia	100	100	50	50	100
Washington	100	100	50	50	100
West Virginia	100	100	50	50	100
Wisconsin	100	100	50	50	100
Wyoming	100	100	50	50	100
Foreign	100	100	50	50	100
Total	1000	1000	500	500	1000

## DEMAND, TRADE, OUTPUT &amp; CAPACITY BY COUNTRY, 2014 (CONSTANT 2000 \$)

Africa & Middle East - 2014					
2014, 1000	Consumption	Trade	Output	Capacity	Op. Rate %
Algeria	10	10	0	0	
Angola	100	100	0	0	
Botswana	10	10	0	0	
Burkina Faso	10	10	0	0	
Burundi	100	100	0	0	100
Cameroon	100	100	0	0	
Chad	10	10	0	0	
Cote d'Ivoire	10	10	0	0	
Egypt	10	10	0	0	
Ethiopia	10	10	0	0	
Ghana	10	10	0	0	
Guinea	10	10	0	0	
Guinea-Bissau	10	10	0	0	
Kenya	10	10	0	0	
Madagascar	10	10	0	0	
Mali	10	10	0	0	
Morocco	10	10	0	0	
Mozambique	10	10	0	0	
Niger	10	10	0	0	
Nigeria	10	10	0	0	
Rwanda	10	10	0	0	
Tanzania	10	10	0	0	
Togo	10	10	0	0	
Tunisia	10	10	0	0	
Zambia	10	10	0	0	
Zimbabwe	10	10	0	0	
<b>Total</b>	<b>1000</b>	<b>0</b>	<b>1000</b>	<b>1000</b>	<b>100%</b>

2014 is based on 2000 \$

**[EMC2 - TRADE SUPPLY & CARRY ON COOPER, TOPIC COATED (cont.)]**

<b>Sub Totals, \$M</b>					
<b>Sub Totals</b>	<b>Expenditure</b>	<b>Trade</b>	<b>Output</b>	<b>Capacity</b>	<b>Cap. Rev. %</b>
None	442	452	229	442	100%
Other 40 Supply	1712	16	1742	1742	100%
Other 20 Supply	124	124	124	124	100%
Production Supply	100	102	0	10	100%
<b>Sub</b>	<b>2118</b>	<b>194</b>	<b>2175</b>	<b>2175</b>	<b>100%</b>
Other	400	400	400	400	100%
Other	400	400	400	400	100%
Other Supply	1100	140	1240	1175	100%
<b>Sub</b>	<b>1900</b>	<b>940</b>	<b>2040</b>	<b>2040</b>	<b>100%</b>
Other	1000	1000	1000	1000	100%
Other	900	900	0	0	100%
Other	0	0	0	0	100%
Other Supply	0	0	0	0	100%
Other	0	0	0	0	100%
<b>Sub</b>	<b>1900</b>	<b>940</b>	<b>2040</b>	<b>2040</b>	<b>100%</b>
Other Supply	1000	1000	1000	1000	100%
Other Supply	900	900	900	900	100%
Other Supply	0	0	0	0	100%
Other Supply	0	0	0	0	100%
Other	0	0	0	0	100%
Other	0	0	0	0	100%
Other Supply	0	0	0	0	100%
Other	0	0	0	0	100%
Other Supply	0	0	0	0	100%
<b>Total</b>	<b>4018</b>	<b>0</b>	<b>4018</b>	<b>4018</b>	<b>100%</b>
Other Total	1712	16	1742	1742	100%
Other Total	1900	94	1994	1994	100%

EMC2 - 2015-16 (2014/15)

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## App.2 Woodfree Pr/Wr Papers

The following tables show data for Woodfree Printing & Writing (DWT + LWV) Papers:

### 12.1 Demand, Trade, Output & Capacity Forecasts W/Wr Paper

TABLE 12.1 DEMAND FORECAST, 2011-2014 BY REGION, WOODFREE PAPER							
1000 tonnes							
Region	2011	2012	2013	2014	2015	2016	2016 output
Western	1000	1000	1000	1000	1000	1000	1000
Other Europe	200	200	200	200	200	200	200
Western	1000	1000	1000	1000	1000	1000	1000
Latin America	200	200	200	200	200	200	200
Japan	400	400	400	400	400	400	400
China	400	400	400	400	400	400	400
Other Markets/Rest	1100	1100	1100	1100	1100	1100	1100
Output	3000	3000	3000	3000	3000	3000	3000
Total	4000	4000	4000	4000	4000	4000	4000
Output Total	100%	100%	100%	100%	100%	100%	100%
Net Total	2400	2400	2400	2400	2400	2400	2400
Source: EMGE Ltd. 2012							
growth % p.a.							
Region	2012	2013	2014	2015	2016		
Western	0%	0%	0%	0%	0%		
Other Europe	0%	0%	0%	0%	0%		
Western	0%	0%	0%	0%	0%		
Latin America	0%	0%	0%	0%	0%		
Japan	0%	0%	0%	0%	0%		
China	0%	0%	0%	0%	0%		
Other Markets/Rest	0%	0%	0%	0%	0%		
Output	0%	0%	0%	0%	0%		
Total	0%	0%	0%	0%	0%		
Output Total	0%	0%	0%	0%	0%		
Net Total	0%	0%	0%	0%	0%		
Source: EMGE Ltd. 2012							

TABLE 17. TRADE FORECAST, WORLD BY REGION, WORSE CASE

1000 tonnes							
Trade	2011	2012	2013	2014	2015	2016	2017-18
W Europe	270	270	260	250	240	230	220
Other Europe	100	100	100	100	100	100	100
W America	100	100	100	100	100	100	100
Latin America	100	100	100	100	100	100	100
Asia	100	100	100	100	100	100	100
Oceania	100	100	100	100	100	100	100
Other Africa, Middle East	100	100	100	100	100	100	100
AGGREGATE	1000	1000	1000	1000	1000	1000	1000
Total	0	0	0	0	0	0	0
Supply Total	1000	1000	1000	1000	1000	1000	1000
Demand Total	1000	1000	1000	1000	1000	1000	1000

Source: EAC, Ltd. Ltd. © 2011

TABLE 18. OUTPUT FORECAST, WORLD BY REGION, WORSE CASE

1000 tonnes							
Output	2011	2012	2013	2014	2015	2016	2017-18
W Europe	1000	1000	1000	1000	1000	1000	1000
Other Europe	1000	1000	1000	1000	1000	1000	1000
W America	1000	1000	1000	1000	1000	1000	1000
Latin America	1000	1000	1000	1000	1000	1000	1000
Asia	1000	1000	1000	1000	1000	1000	1000
Oceania	1000	1000	1000	1000	1000	1000	1000
Other Africa, Middle East	1000	1000	1000	1000	1000	1000	1000
AGGREGATE	1000	1000	1000	1000	1000	1000	1000
Total	10000	10000	10000	10000	10000	10000	10000
Supply Total	10000	10000	10000	10000	10000	10000	10000
Demand Total	10000	10000	10000	10000	10000	10000	10000

Source: EAC, Ltd. Ltd. © 2011

**FIGURE 14. CAPACITY FORECAST, WORLD BY REGION, WY PAPER**

1000 tonnes							
Capacity	2011	2012	2013	2014	2015	2016	2017-18
Western	4270	4760	4760	4760	4800	4870	4880
Other Europe	3300	3300	3300	3300	3300	3300	3300
Middle East	1200	1200	1200	1200	1200	1200	1200
Latin America	4700	4700	4700	4700	4700	4700	4700
Japan	3000	3000	3000	3000	3000	3000	3000
China	12000	12000	12000	12000	12000	12000	12000
Other World Region	1000	1000	1000	1000	1000	1000	1000
Uncertain	1000	1000	1000	1000	1000	1000	1000
<b>Total</b>	<b>28470</b>	<b>28470</b>	<b>28470</b>	<b>28470</b>	<b>28470</b>	<b>28470</b>	<b>28470</b>
Design Total	27400	27400	27400	27400	27400	27400	27400
Real Power	26000	26000	26000	26000	26000	26000	26000

Source: EMC&E, 2013

**FIGURE 15. OPERATING RATES FORECAST, WORLD BY REGION, WY PAPER**

% Production of Capacity						
Operating Rates	2011	2012	2013	2014	2015	2016
Western	87%	87%	87%	88%	87%	87%
Other Europe	87%	87%	87%	87%	87%	87%
Middle East	87%	87%	87%	87%	88%	87%
Latin America	87%	87%	87%	87%	87%	87%
Japan	87%	87%	87%	88%	87%	87%
China	87%	87%	86%	87%	88%	87%
Other World Region	87%	87%	87%	88%	88%	87%
Uncertain	87%	87%	87%	87%	87%	87%
<b>Total</b>	<b>87%</b>	<b>87%</b>	<b>87%</b>	<b>87%</b>	<b>87%</b>	<b>87%</b>
Design Total	87%	87%	87%	87%	87%	87%
Real Power	87%	87%	86%	87%	88%	87%

Source: EMC&E, 2013



### 12.2 Country Data World-wide, Total Heatflow Figures

TABLE 10: DEMAND, TRADE, OUTPUT & CAPACITY BY COUNTRY, 2010 (MWh)					
Europe + Africa					
2010 Year	Demand	Trade	Output	Capacity	Op. Rate %
Algeria	100	100	100	100	100
Austria	100	100	100	100	100
Bahrain	10	10	10	10	100
Belgium	1000	100	1000	1000	100
Brazil	1000	100	1000	1000	100
Canada	1000	100	1000	1000	100
China	100	100	100	100	100
Denmark	100	100	100	100	100
France	1000	100	1000	1000	100
Germany	1000	100	1000	1000	100
Greece	100	100	100	100	100
India	1000	100	1000	1000	100
Italy	100	100	100	100	100
Japan	1000	100	1000	1000	100
Kenya	100	100	100	100	100
Libya	100	100	100	100	100
Malaysia	100	100	100	100	100
Mexico	100	100	100	100	100
Nigeria	100	100	100	100	100
Poland	1000	100	1000	1000	100
Russia	1000	100	1000	1000	100
Saudi Arabia	100	100	100	100	100
Spain	1000	100	1000	1000	100
Sweden	100	100	100	100	100
Switzerland	100	100	100	100	100
Taiwan	100	100	100	100	100
Tanzania	100	100	100	100	100
Thailand	100	100	100	100	100
USA	1000	100	1000	1000	100
UK	1000	100	1000	1000	100
Ukraine	100	100	100	100	100
Uzbekistan	100	100	100	100	100
Yemen	100	100	100	100	100
Zimbabwe	100	100	100	100	100
World	10000	1000	10000	10000	100

Source: ENBR, ENBR 2010



**DEMAND, TRADE, SUPPLY & CARRY OF COMMODITY TOTAL HOLDING PAPERS**

Ammia B. Wealth Fund - 2011 to

2011 to 2010	Consumption	Trade	Output	Carrying	Op. Ratio %
Oil	100	100	0	0	100
Oil	100	100	100	100	100
Oil	100	10	100	100	100
Oil	10	100	0	0	100
Oil	100	100	100	100	100
Oil	100	100	0	0	100
Oil	0	10	10	10	100
Oil	100	100	100	100	100
Oil	0	10	10	0	100
Oil	0	10	10	10	100
Oil	0	10	0	0	100
Oil	0	100	0	0	100
Oil	100	10	100	100	100
Oil	10	10	10	10	100
Oil	100	100	0	10	100
Total	1000	0	1000	1000	100

All data in US\$ million

EXPENSE, TRADE, OUTPUT & CAPACITY BY COUNTRY, TOTAL WORKER PAYERS					
Units: Dollars, \$B/yr					
Est. No. Payers	Compensation	Trade	Output	Capacity	Cap. Rate %
<b>Asia</b>	480	22.7	2607	6600	80%
China & Hong Kong	123.4	10.2	1260	1410	80%
India & Singapore	100	0	12.7	170	80%
Remainder of Asia	257	12.5	1435	5090	80%
<b>EU</b>	127.0	3.6	1200	1700	70%
Germany	120	3.7	90	400	80%
France	100	0	200	250	80%
Other Europe	7.0	-0.1	110	350	80%
<b>NA</b>	40.0	0	200	250	80%
Canada	20.0	0	100	100	70%
Other N. Am.	20.0	0	100	150	80%
<b>Lat. Am.</b>	10	0.1	10	10	80%
Other Lat. Am.	10	0.1	10	10	80%
<b>Other</b>	100	0.7	100	100	70%
Other Asia	100	0.7	100	100	70%
<b>World</b>	740	27.1	4417	9400	80%
Other World	100	0.7	100	100	80%
<b>Trade</b>					
EU Trade	120	3.7	100	400	80%
Other Europe Trade	100	0	10	100	80%
NA Trade	20	0	100	100	80%
Other N. Am. Trade	20	0	10	100	80%
Lat. Am. Trade	10	0.1	10	10	80%
Other Lat. Am. Trade	10	0.1	10	10	80%
<b>Output</b>					
EU Output	120	3.7	100	400	80%
Other Europe Output	100	0	10	100	80%
NA Output	20	0	100	100	80%
Other N. Am. Output	20	0	10	100	80%
Lat. Am. Output	10	0.1	10	10	80%
Other Lat. Am. Output	10	0.1	10	10	80%
<b>Capacity</b>					
EU Capacity	120	3.7	100	400	80%
Other Europe Capacity	100	0	10	100	80%
NA Capacity	20	0	100	100	80%
Other N. Am. Capacity	20	0	10	100	80%
Lat. Am. Capacity	10	0.1	10	10	80%
Other Lat. Am. Capacity	10	0.1	10	10	80%
<b>Total</b>	440	0	4400	5600	80%
Other Total	100	0.7	100	100	80%
Final Total	200	0.7	200	200	80%

Source: EMG&E, 2014

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## App.3 Printing & Writing Papers

The following tables show data for Total Printing & Writing (Coated Woodfree + Coated Mechanical + Uncoated Mechanical + Uncoated Woodfree) in, excluding Hangers.

### A.1 Demand, Trade, Output and Capacity Forecasts, PzP/Wt

FIGURE 144 DEMAND FORECAST, WORLD BY REGION, TOTAL PzP/Wt							
1000 tonnes							
Region	2011	2012	2013	2014	2015	2016	2017 (PzP/Wt)
Europe	2200	2164	2130	2097	2065	2033	-1.7%
Asia Pacific	2200	2200	2200	2190	2180	2170	-1.0%
Americas	2100	2100	2100	2090	2080	2070	-1.0%
Latin America	900	890	870	850	840	830	-1.2%
Japan	800	790	780	770	760	750	-1.3%
Oceania	700	690	680	670	660	650	-1.5%
Other Non-As. Areas	1200	1190	1180	1170	1160	1150	-1.0%
World	10000	9900	9800	9700	9600	9500	-1.0%
Trade	8000	7900	7800	7700	7600	7500	-1.3%
Output	2000	2000	2000	1990	1980	1970	-1.0%
Capacity	2000	2000	2000	1990	1980	1970	-1.0%
Source: A. C. Nielsen, © 2012							
growth %/pt							
Region	2011	2012	2013	2014	2015	2016	2017
Europe	-1.7%	-1.7%	-1.6%	-1.6%	-1.6%	-1.6%	-1.7%
Asia Pacific	0.0%	0.0%	0.0%	-0.5%	-0.5%	-0.5%	-1.0%
Americas	0.0%	0.0%	0.0%	-0.5%	-0.5%	-0.5%	-1.0%
Latin America	-1.1%	-1.1%	-1.1%	-1.1%	-1.1%	-1.1%	-1.2%
Japan	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%	-1.2%	-1.3%
Oceania	-1.4%	-1.4%	-1.4%	-1.4%	-1.4%	-1.4%	-1.6%
Other Non-As. Areas	-0.8%	-0.8%	-0.8%	-0.8%	-0.8%	-0.8%	-1.0%
World	-1.0%	-1.0%	-1.0%	-1.0%	-1.0%	-1.0%	-1.0%
Trade	-1.3%	-1.3%	-1.3%	-1.3%	-1.3%	-1.3%	-1.3%
Output	0.0%	0.0%	0.0%	-0.5%	-0.5%	-0.5%	-1.0%
Capacity	0.0%	0.0%	0.0%	-0.5%	-0.5%	-0.5%	-1.0%
Source: A. C. Nielsen, © 2012							

FIGURE 14. TRADE FORECAST, WORLD BY REGION, TOTAL TRADE

1000 \$mm							
Trade	2011	2012	2013	2014	2015	2016	2017-18
W Europe	2470	2520	2580	2630	2670	2700	270
Other Europe	1200	1250	1300	1350	1400	1450	150
NA America	1440	1500	1550	1600	1650	1700	160
Latin America	1400	1500	1600	1700	1800	1900	200
Asia	1000	1100	1200	1300	1400	1500	170
Oceania	1000	1050	1100	1150	1200	1250	110
Other Africa, Middle	1000	1000	1000	1000	1000	1000	100
AGGREGATE	10700	11200	11700	12200	12700	13200	1300
Total	0	0	0	0	0	0	0
Range Total	2000	2500	3000	3500	4000	4500	500
Capex Total	1200	1300	1400	1500	1600	1700	1800

Source: IEA, IFC, EIU, etc. 2012

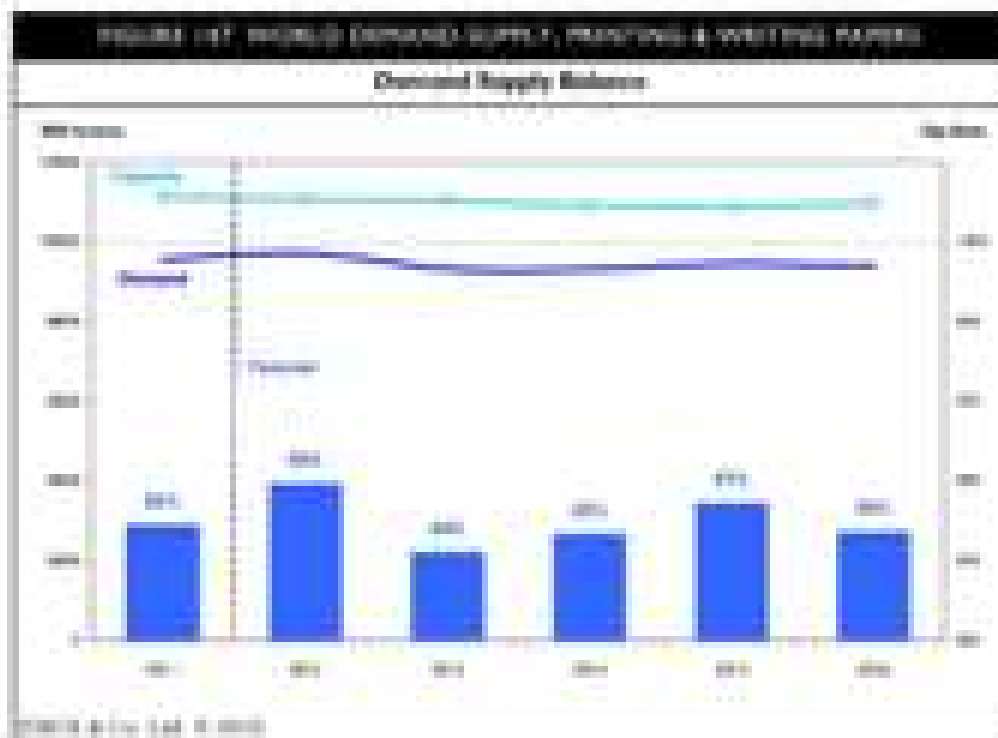
FIGURE 15. OUTPUT FORECAST, WORLD BY REGION, TOTAL OUTPUT

1000 \$mm							
Output	2011	2012	2013	2014	2015	2016	2017-18
W Europe	20000	20000	20000	20000	20000	20000	2000
Other Europe	12700	13000	13300	13600	13900	14200	1500
NA America	20000	20000	20000	20000	20000	20000	2000
Latin America	12000	13000	14000	15000	16000	17000	1800
Asia	27000	28000	29000	30000	31000	32000	3000
Oceania	11000	11000	11000	11000	11000	11000	1000
Other Africa, Middle	10000	10000	10000	10000	10000	10000	1000
AGGREGATE	100000	100000	100000	100000	100000	100000	10000
Total	00000	00000	00000	00000	00000	00000	0000
Range Total	20000	20000	20000	20000	20000	20000	2000
Capex Total	20000	20000	20000	20000	20000	20000	2000

Source: IEA, IFC, EIU, etc. 2012

OUTPUT GROWTH, WORLD BY REGION, TOTAL MARKET					
	growth %/pt				
Region/Market	2013	2014	2015	2016	2017
Western	1.0%	-1.0%	-0.5%	1.0%	0.5%
Other Europe	0.5%	-1.5%	0.5%	0.0%	1.0%
Western	-0.5%	-0.5%	-0.5%	-0.5%	-0.5%
Latin America	0.5%	-0.5%	1.0%	2.0%	1.0%
Asia	1.0%	-0.5%	-0.5%	0.0%	-0.5%
China	0.0%	0.0%	0.5%	0.0%	0.0%
Other Asian/Rest	1.0%	-1.0%	-1.0%	1.0%	1.0%
Emerging	0.0%	-1.0%	0.0%	0.0%	1.0%
<b>Total</b>	<b>0.5%</b>	<b>-0.5%</b>	<b>-0.2%</b>	<b>1.0%</b>	<b>-0.5%</b>
Output Total	1.0%	-0.5%	-1.0%	1.0%	-1.0%
App Total	0.0%	1.0%	0.0%	0.0%	1.0%

EMERSON ENERGY (NYSE: EMI)

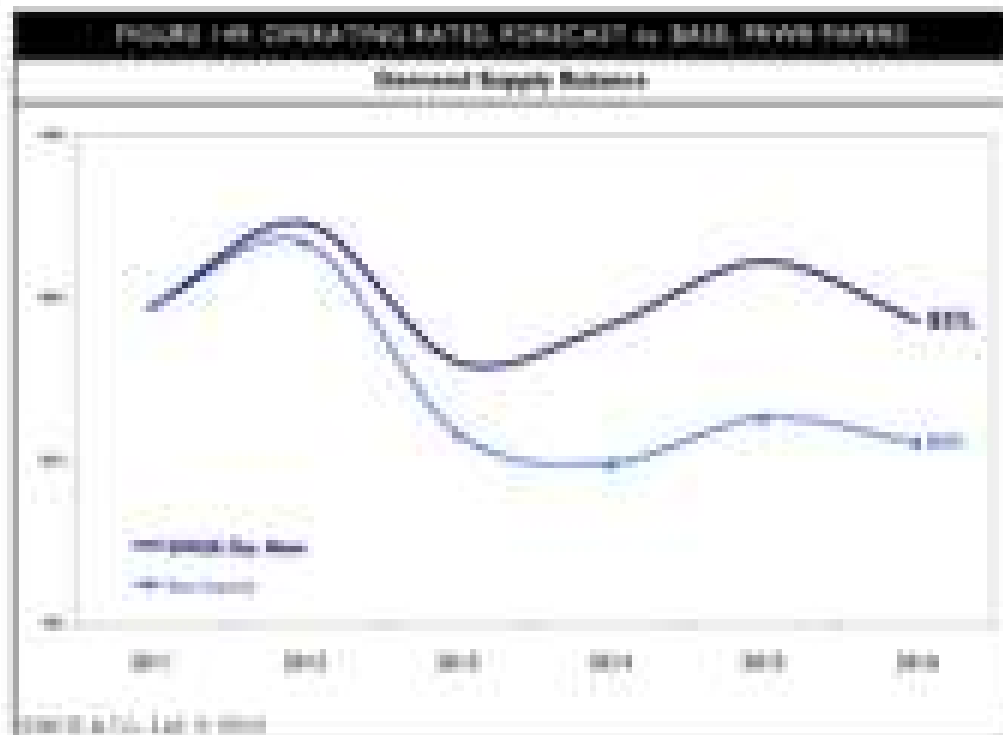




### Capacity Assumptions – PPIs Report

FIGURE 14B: 2018-2022 CAPACITY ASSUMPTIONS, PPIs REPORT							
[assumed capacity]							
Capacity (000 sq. ft.)	2017	2018	2019	2020	2021	2022	2023-24
Outpatient			100	100	100		100
Other Outpatient							
Inpatient			100	100	100		100
Other Inpatient							
Total			200	200			200
Other		100	100	100	100		100
Other Outpatient				100	100	100	100
Other Inpatient			100	100	100		100
Other Outpatient				100	100	100	100
Other Inpatient							
Other							
Total		100	200	400	400	300	400

Source: AECOM, LLC © 2017



Source: AECOM, LLC © 2017

## Capacity and Operating Rates - Printing & Writing Papers

### Area Data

FIGURE 10. BASE CAPACITY, BY REGION, IN 6-WR PAPERS							
(Excluding unspecified capacity)							
Capacity, 100 mt	2011	2012	2013	2014	2015	2016	2011-16
Western	2700	2700	2600	2600	2400	2400	2170
Other Europe	240	240	240	240	240	240	240
Midwest	2000	2000	2100	2100	2100	2100	2100
Asia Pacific	100	100	100	100	100	100	100
Japan	1000	1000	1000	1000	1000	1000	1000
China	1000	1000	1000	1000	1000	1000	1000
Other Asia & Austral	1000	1000	1000	1000	1000	1000	1000
South	100	100	100	100	100	100	100
<b>Total</b>	<b>11400</b>	<b>11400</b>	<b>11800</b>	<b>11800</b>	<b>11200</b>	<b>11200</b>	<b>1000</b>
Target Total	11400	11400	11710	11710	11100	11100	1000
Gap Total	0000	0000	0000	0000	0000	0000	000

(2016 & 2017 Est. in 2015)

FIGURE 11. BASE OPERATING RATE, BY REGION, IN 6-WR PAPERS							
% Production of Capacity							
Operating Rate	2011	2012	2013	2014	2015	2016	
Western	87%	86%	87%	87%	89%	87%	
Other Europe	87%	87%	87%	87%	87%	86%	
Midwest	87%	87%	86%	87%	86%	87%	
Asia Pacific	87%	87%	87%	87%	84%	86%	
Japan	87%	87%	87%	87%	87%	87%	
China	87%	87%	87%	87%	87%	87%	
Other Asia & Austral	87%	87%	87%	87%	87%	87%	
South	87%	87%	87%	87%	87%	86%	
<b>Total</b>	<b>87%</b>	<b>87%</b>	<b>86%</b>	<b>87%</b>	<b>86%</b>	<b>87%</b>	
Target Total	87%	86%	86%	86%	86%	87%	
Gap Total	00%	00%	00%	00%	00%	00%	

(2016 & 2017 Est. in 2015)

## Financial Data

FIGURE 115. FORECAST CAPACITY, BY REGION, FUTURE YEARS							
(Including unspecified capacity)							
Capacity, MB m.c.	2011	2012	2013	2014	2015	2016	2017-18
Midrange	2700	2600	2500	2400	2300	2200	2100
Other Range	100	100	100	100	100	100	100
Midrange	2000	1900	1800	1700	1600	1500	1400
Low Range	100	100	100	100	100	100	100
Other	2000	1900	1800	1700	1600	1500	1400
Other Range, Spec	1000	1000	1000	1000	1000	1000	1000
Unspec'd	100	100	100	100	100	100	100
<b>Total</b>	<b>11,200</b>	<b>10,800</b>	<b>10,400</b>	<b>10,000</b>	<b>9,600</b>	<b>9,200</b>	<b>8,800</b>
Range Total	2800	2700	2600	2500	2400	2300	2200
Spec Total	1000	1000	1000	1000	1000	1000	1000

Source: E.C.P. (2011-2012)

FIGURE 116. FORECAST OPERATING RATE, BY REGION, FUTURE YEARS						
% Production of Capacity						
Operating Rate	2011	2012	2013	2014	2015	2016
Midrange	80%	80%	80%	80%	80%	80%
Other Range	80%	80%	80%	80%	80%	80%
Midrange	80%	80%	80%	80%	80%	80%
Low Range	80%	80%	80%	80%	80%	80%
Other	80%	80%	80%	80%	80%	80%
Other Range, Spec	80%	80%	80%	80%	80%	80%
Unspec'd	80%	80%	80%	80%	80%	80%
<b>Total</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>	<b>80%</b>
Range Total	80%	80%	80%	80%	80%	80%
Spec Total	80%	80%	80%	80%	80%	80%

Source: E.C.P. (2011-2012)

### 13.2 Country Data Worldwide, Total P:50

Energy in 2022					
Wto, kWh	Consumption	Trade	Output	Capacity	Op. Hours
AFR	106	129	226	230	220
AMR	188	20	64	130	270
ASA	25	80	30	20	80
EMEA	120	20	20	20	20
EU	75	20	30	30	30
Latin Am	25	20	20	20	20
ME	20	20	20	20	20
NA	20	20	20	20	20
OECD	20	20	20	20	20
SA	20	20	20	20	20
SE	20	20	20	20	20
Sub-Saharan Africa	20	20	20	20	20
Western Europe	20	20	20	20	20
Asia Pacific	20	20	20	20	20
Latin America	20	20	20	20	20
Europe	20	20	20	20	20
Other	20	20	20	20	20
World	20	20	20	20	20

INTERNAL TRADE: OUTPUT & CAPACITY, TOTAL PLANTS (Cont.)					
Reserve & Acre = 28176					
2012, 2011	Consumption	Trade	Output	Capacity	Op. Rate %
Coal	2027	1029	1044	1070	77%
Nat	1002	471	1002	1070	84%
Gas	57	14	57	58	87%
Oil	200	55	200	205	89%
NUC	100	100	100	100	100%
Hydro	100	10	100	100	100%
Wind	1075	100	100	1000	77%
Other	10	10	0	0	10%
Other	0	1	0	0	0%
Other	100	100	0	0	100%
Other	100	100	100	1000	84%
Other	100	100	1000	1000	77%
Other	100	100	0	0	100%
Other	1000	1000	1000	1000	100%
Other	100	100	100	100	100%
Other	100	100	100	100	100%
Other	100	100	0	0	100%
Other	100	100	1000	1000	77%
Other	100	100	100	100	100%
Other	100	100	100	100	100%
Other	100	100	1000	1000	77%
Other	100	100	100	100	100%
Other	100	100	100	100	100%

Source: EIA, DOE, and BEA

**DEMAND, TRADE, OUTPUT & EMPLOY BY COUNTRY, TOTAL, TRADE (Cont.)**

<b>Asia &amp; Pacific Excl. (A1) Ex</b>					
<b>Country</b>	<b>Consumption</b>	<b>Trade</b>	<b>Output</b>	<b>Capacity</b>	<b>Emp. Rate %</b>
China	200	200	0	0	
India	200	200	100	200	50%
Japan	200	100	100	100	50%
South Korea	200	200	0	0	
Taiwan	200	200	200	200	70%
Thailand	200	100	0	0	50%
Vietnam	200	0	10	20	15%
Philippines	200	100	100	100	50%
Singapore	200	0	0	0	0%
Malaysia	200	0	0	0	0%
Indonesia	200	0	0	0	0%
Other Asia	200	100	100	100	50%
Other Pacific	200	0	0	0	0%
<b>Total</b>	<b>2000</b>	<b>0</b>	<b>600</b>	<b>1000</b>	<b>60%</b>

Source: Emerge, 2012, P. 20122

DEMAND, TRADE, OUTPUT & CAPACITY BY COUNTRY, TOTAL TRADER (2000)					
Sub-Total, 2014a					
Sub-Total	Consumption	Trade	Output	Capacity	Sp. Rate %
<b>Asia</b>	1100	1600	1100	1000	90%
China	700	1000	700	600	85%
India	200	300	200	180	90%
Japan	100	150	100	100	100%
Other Asia	100	150	100	120	120%
<b>Europe</b>	1700	2700	1700	1600	94%
Germany	300	450	300	300	100%
UK	250	400	250	250	100%
EU (excl. UK)	1150	1800	1150	1100	95%
Other Europe	100	150	100	100	100%
<b>North America</b>	2000	3000	2000	1900	95%
USA	1300	2000	1300	1200	92%
Canada	700	1000	700	700	100%
<b>South America</b>	300	450	300	300	100%
Other South America	100	150	100	100	100%
<b>Africa</b>	100	150	100	100	100%
Other Africa	100	150	100	100	100%
<b>Oceania</b>	100	150	100	100	100%
<b>Total</b>	3000	4500	3000	2800	93%
Europe	1700	2700	1700	1600	94%
North America	2000	3000	2000	1900	95%
Asia	1100	1600	1100	1000	90%
Other	100	150	100	100	100%
<b>Total</b>	3000	4500	3000	2800	93%
<b>Total</b>	3000	4	3000	2800	93%
Europe	1700	400	1700	1600	94%
North America	2000	100	2000	1900	95%

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