

# **The Magnesia Industry and the Economic Crunch of 2008-?**

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## Contents

1. The crisis
2. The world magnesia industry
3. How the crisis affects the world magnesia industry
4. What next?
5. Summary. Conclusion

Appendix

References

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## **1. The crisis**

This section will present a brief analysis of the causes and effects of the on-going crisis

### **1.1 The world economy until 2007/2008**

Seven new factors eased globalisation in the 21<sup>st</sup> century [1]. First, there are international institutions, like the EU that now has 27 members plus four candidate countries. Second, the information revolution by itself fosters globalisation. Third, the developments in the energy field are also bringing people closer and setting common rules. Fourth, environmental globalisation in the form of greenhouse emissions [the global warming phenomenon] is linking energy with the environment in a manner that everybody immediately understands. Fifth, there are new finance tools and mechanisms that facilitate worldwide financial communications and transfers of funds. Sixth, there is an increasing role of the so-called BRIC ie Brazil, Russia, India and China, not only as suppliers but also as consumers, causing a shift in the global economy's centre of gravity. Lastly, as a response to globalisation, but also a force that contributes and feeds back to the phenomenon, are international lobbying groups

and environmental NGOs, both becoming more powerful in a world that is coming to grips with all the new realities discussed above.

The world has gone through some excellent years [1], with strong world demand nearly everywhere, rising middle classes in many developing countries, low interest rates, easy credit, and ‘affordable’ energy prices, ie almost everybody benefiting from globalisation.

## **1.2 What started in 2007/08?**

Our IM 19 presentation [1] ended as follows: ‘Lastly , we should all be prepared for a market downturn, as good times do not last forever, and we are already seeing strong signs of a slowdown in the US and the EU economies, admittedly without a significant impact on our sector - at least up to the moment of writing this paper.’ This was the period when the economic crisis had started but the industrial minerals industry, including magnesia, had not yet felt the pinch.

So what went wrong? On the face of it, everything started with the subprime crisis in the US housing market, which affected banks and other financial institutions, including outside the US, and then came a credit crunch when banks stopped trusting each other. A stock market crash ensued, causing businesses and households to reduce consumption and to postpone or cancel investments. All these phenomena created a downward spiral and also a major psychological problem [which was aggravated by the media], also causing acute political problems in many countries.

But in reality, in our personal opinion, the world was living beyond its’ means; we were all worried about ecological sustainability but neglected economic and financial sustainability. In other words, individuals, households, businesses and countries were living on borrowed money – ie borrowed time. Tremendous liquidity, too much debt piled by individuals and companies alike due to low interest rates [cheap money] and to the underpricing of risk - a very high risk attitude, exacerbated the problem.

Another major phenomenon was what can be called the ‘Financial Gulf Stream’, ie China lending the American consumers to buy Chinese goods and so on. A more cynical description talks about the supply of toxic financial products in return for toxic food and toys!

In parallel to all this, the interrelated factors of energy and the environment were playing a key role: Energy went up to 145\$, on the back of high demand as well as speculation, and is now back to 50\$. Similar phenomena, related to high demand, rising energy costs, and speculation, occurred in shipping. The environment has become a major issue - but not in balanced manner: the EU has enforced all kinds of programs such as a CO2 emissions cap-and-trade system, the REACH legislation, BATs etc and is discussing a SOx/NOx emissions cap-and-trade system, while other countries have not even ratified the Kyoto Protocol.

## **1.3 What is presently going on?**

Most western economies in a rather deep recession: notably the US and Europe. The international financial system in dire straights. The G20 has not come up with

immediate solutions. Three of the four BRICs still growing, but Russia's economy is problematic. Other countries also have in deep problems, for example in E.Europe. There are two economic theories: Keynesian [in the US!] and orthodox [in Europe!]. However, according to some analysts this is, in reality, a battle for supremacy between the US and Europe.

Energy is at modest prices. The environment is still at the top of the agenda in Europe, while President Obama is fighting in Congress for CO2 emissions trading, with the Copenhagen summit coming soon. Shipping rates are quite low.

As this is a Conference in Europe, let us discuss the European economies in some more detail.

### Eurozone

[28] Sharp falls in eurozone industrial production gathered pace at the start of this year, adding to evidence that continental Europe's recession is still gaining intensity. Industrial production in the 16-country region fell by 3.5 per cent in January compared with the previous month and was 17.3 per cent lower than a year before, according to Eurostat, the European Union's statistical office. Both the monthly and year-on-year falls were the biggest since the series began in 1990.

The latest gloomy data came as European Union leaders met in Brussels and could intensify pressure for additional economic stimulus measures. The precipitous fall in industrial production suggested first quarter eurozone gross domestic product contracted at an even faster pace than the record 1.5 per cent contraction seen in the final three months of last year, economists said. That would reinforce fears that the recession, already the worst in continental Europe since the second world war, still had a long way to run.

The eurozone's recession had initially resulted from a collapse demand for its exports but the effects were now broadening. The weakness could be domestically generated, through rising unemployment.

Germany continues to fare worst among the eurozone's biggest economies, reflecting its heavy reliance on exports. German industrial production fell by 7.5 per cent in January alone. In contrast, Spain reported a fall of just 0.5 per cent in January, perhaps indicating some stabilisation. But Spanish industrial production was still more than 20 per cent lower than in January 2008.

The contraction in French industrial production France, which fell 3.1 per cent on the month and 14.6 per cent year-on-year, was less sharp – but still amounted to a significant blow to the eurozone's second largest economy.

### Eastern Europe

This area does not offer a brighter picture [29]: 'Banks Reel On Eastern Europe's Bad News' - Fears of a full-blown economic crash in Eastern Europe shook the region's currencies and the share prices of Western banks doing big business there, helping to spur a new shock to financial confidence around the globe. Some market analysts

warned of a regional economic collapse on the scale of the Asian crisis in the late 1990s. The cost of insuring government debt from Poland to Russia rose further, while currencies fell.

Bad news among ex-communist nations came from as far afield as oil-rich Kazakhstan. Ukraine posted a 34% drop in industrial output for January compared with a year earlier, and a 16% drop from December. After years in which E. Europe attracted investment for its fast growth and increasing financial ties with Western counterparts, the region's fortunes have abruptly reversed -- largely the result of oversized dependence on foreign-currency loans that now are leading to rising defaults, and fast-dwindling demand by its Western neighbors for its exports amid the global slowdown. The volume of capital flowing into emerging European economies is expected to fall to just \$30 billion in 2009, from \$254 billion in 2008. The swing is unprecedented in scale.

Deep slides in currencies raise the prospect of widespread defaults on foreign-currency loans marketed by a growing roster of foreign-owned banks and taken out by businesses and individuals, who were attracted by better interest rates offered in euros and Swiss francs. A "special comment" published Tuesday by Moody's Investors Service Inc. warned that euro-zone banks -- notably in Austria, France, Italy, Belgium, Germany and Sweden -- with significant exposure to E. European economies may be downgraded. The Moody's report said economies across Central and Eastern Europe, the Balkans and the ex-Soviet bloc "have now entered a deep and long economic downturn." The economic distress and currency tumbles in Eastern Europe could trigger a write-down into the Western European banking system.

#### Russia

[30] Russia's industrial production plunged 20 per cent in January, a fall that could herald a much larger than expected drop in GDP this year, economists fear. The decline was its largest month-on-month drop since records began seven years ago. 'The horrendous industrial production data in January have left no doubt that the economy has come to a screeching halt,' said Ivan Tchakarov, chief Russia economist for Nomura, the investment bank.

#### Japan

Japan growth plunged to a 35-year low [38] and the government faced pressure for another stimulus package after plunging exports pushed the country, the world's second largest economy, into its worst slump in 35 years. Economists see little prospect for a quick rebound after a quarter-on-quarter fall of 3.3 per cent in gross domestic product in the last three months of 2008. The decline was worse than economists had forecast and equivalent to an annualised fall of 12.7 per cent -- the steepest drop since 1974 when import-dependent Japan suffered because of soaring oil prices.

## 2. The world magnesia industry

### 2.1 Description of the industry

This chapter presents statistical and other data on the location of magnesite-producing enterprises, whether from a natural or a synthetic route. Information is presented by country and by company.

The British Geological Survey [31] gives the following data for world production of natural magnesite in the period 2002-2006, by country of origin. The total amounts to around 24 mi mt.

Table 1  
Natural Magnesia Producers, Production by country

Production of magnesite						tonnes
Country	2002	2003	2004	2005	2006	
Austria	728 235	768 525	715 459	693 754	769 188	
Greece	553 700	542 800	552 300	471 000	463 277	
Netherlands (c)	226 000	261 194	245 495	285 336	293 006	
Poland	22 100	27 200	57 900	55 300	*56 000	
Russia	2 600 000	2 600 000	*2 600 000	*2 600 000	*2 600 000	
Serbia and Montenegro	25 247	17 488	—	—	—	
Slovakia	929 630	1 640 900	965 900	920 100	941 100	
Spain	637 024	517 030	567 504	556 129	*550 000	
Turkey	3 044 440	3 224 278	3 732 952	2 372 206	2 088 033	
South Africa	87 200	86 100	65 900	54 800	*55 000	
Zimbabwe	2 546	822	749	864	939	
Canada (b)	*165 000	*180 000	*180 000	*180 000	*180 000	
Argentina	29 956	—	—	—	—	
Brazil	302 230	306 444	366 174	386 759	323 902	
Colombia	*10 500	*10 500	*10 500	*10 500	*10 500	
China	11 000 000	12 000 000	13 310 000	15 440 000	13 640 000	
India (e)	278 267	323 977	383 953	351 495	243 264	
Iran (a)	69 683	87 795	88 194	94 850	*95 000	
Korea, Dem. P.R. of	*1 200 000	*1 200 000	*1 000 000	*1 000 000	*1 000 000	
Pakistan (d)	5 936	3 435	6 074	3 029	1 151	
Philippines	3 604	3 799	3 201	2 413	...	
Saudi Arabia	...	...	—	45 000	...	
Australia	483 838	472 668	586 393	*627 000	*492 000	
World Total	22 400 000	24 300 000	25 400 000	26 200 000	23 800 000	

Note(s):-  
(1) In addition to the countries listed, Bulgaria is believed to produce magnesite

(a) Years ended 20 March following that stated  
(b) Officially described as magnesitic dolomite and brucite  
(c) Chloride produced from solution mining  
(d) Years ended 30 June of that stated  
(e) Years ended 31 March following that stated

The U.S. Geological Survey 'Mineral Commodity Summaries, January 2008, Magnesia compounds', gives the following Table for world natural magnesite mine production, in 000 mtpy, totaling around 4.1 mi mt in 2006 and 4.6 mi mt in 2007.

Table 2  
 Natural Magnesia Producers, by country Production  
 in tpy. Reserves and reserve base in 000 t.  
 W=Withheld. t=metric tons

Countries	Production 2006	Production 2007	Reserves	Reserve Base
United States	W	W	10,000	15,000
Australia	137	140	100,000	120,000
Austria	202	200	15,000	20,000
Brazil	111	110	45,000	65,000
China	1,370	1,870	380,000	860,000
Greece	144	150	30,000	30,000
India	107	105	14,000	55,000
N. Korea	345	350	450,000	750,000
Russia	346	350	650,000	730,000
Slovakia	115	115	45,000	320,000
Spain	144	150	10,000	30,000
Turkey	922	930	65,000	160,000
Other	117	120	390,000	440,000
Word total (rounded)	4,060	4,600	2,200,000	3,600,000

Our opinion is that the USGS table presents the production of magnesia , not magnesite. Even so, when comparing with the BGS above after ‘converting’ magnesite to magnesia, very large discrepancies can be easily detected. We think these are mostly due to the following countries: China, where the USGS figures are too low; Russia; N.Korea, where both sources overestimate the country’s production, as total magnesia production does not presently exceed 150 000 mt/yr; Slovakia, where both sources underestimate the country’s production ; US, where data is withheld in the USGS table.

As for synthetic magnesia, the following Table shows the production capacity of synthetic magnesia producers worldwide. It should be noted that there have since been changes: Jormag shut down, Dead Sea quit deadburned but announced expansion in ccm, etc.

Table 3  
 Synthetic Magnesia Producers, by company and country  
 Source: [32]

COMPANY	COUNTRY	CAPACITY (tonnes / year)
Manchurian Seawater Works	China	10k dead – burnt
Jiaozhou Guhe Magnesium Salt Factory	China	3k caustic calcined
Scora	France	< 10k caustic calcined

Premier Periclase	Ireland	90k dead - burnt
Dead Sea Periclase	Israel	10k caustic calcined,60kdbm
Jordan Magnesia Company Ltd.	Jordan	50k dead - burnt, 10k cc/hy
Sam Hwa Chemical Co., Ltd	South Korea	50k dead – burnt
UBE Material Industries co., Ltd	Japan	250k dead - burnt, 50k cc
Shin Nihon Salt Co., Ltd	Japan	40k 35-40% Mg(OH) <sub>2</sub>
Naikai Salt Ind. Co., Ltd	Japan	20k Mg(OH) <sub>2</sub> , 2k powder
Ako Kasei Co.,Ltd	Japan	hydrox/ox
Tateho Chemical Ind. Co., Ltd	Japan	Fused
Konoshima Chemical Co.	Japan	12-15k Mg(OH) <sub>2</sub>
TMG Corp.	Japan	10k Mg(OH) <sub>2</sub>
Nihon Kaisui Kako	Japan	8k Mg(OH) <sub>2</sub> sl., 24kMgO/OH
Premier Chemicals, LLC	US	50k Mg(OH) <sub>2</sub> /ccm MgO
Martin Marietta	US	80k caustic calcined
Rohm & Haas	US	10k caustic calcined
SPI-Pharma	US	Pharma-hydrox
Buschle & Lepper	Brazil	Ox/hydrox
Penoles, S.A. de C.V.	Mexico	40k ccm,efm,hydrox,dbm

Below is an attempt to present all ccm magnesia producers, whether natural [N] or synthetic [S] or chemical [C] . Table 4, is a partial one, based partly on published sources such as a series of articles in ‘Industrial Minerals’ magazine and their 2008 Directory, partly on our own ‘Natural Resources GP’ data bases, and lastly on responses to a questionnaire.

Table 4  
World CCM Producers, by company and country [see also App.]  
Annual Production Estimates  
Source: ‘Natural Resources GP’

Note : CCM used for internal consumption, eg to make double-burned dbm, is not included. In some cases, noted with #, there is increased uncertainty on the figures

PRODUCER	N,S,C	COUNTRY	PRODUCTION, kmt/y
Akdeniz	N	Turkey	8
Baymag	N	Canada	50 [+50 project]
Bommag	N	Turkey	13
Buschle & Lepper	S	Brazil	7
Causmag	N	Australia	5
Chamotte Holdings	N	RS Africa	10
Dashiqiao Guaantun	N	China	30
Dongxin Ind. Corp	N	China	25
Dr Paul Lohmann	C	Germany	2
Fanglin Minerals	N	China	40
Grecian Magnesite	N	Greece	77
Haicheng City Qunli Mining	N	China	
IBAR	N	Brazil	40

ICL-IP [ex-DSP]	S	Israel	30 [+30 project]
Iran Refractories	N	Iran	10
Jiaozhou Guhe Magn. Salt	S	China	2 #
Kisuma BV	S	Nedmag	3 #
Kyowa Chemical Industry	C	Japan	
Liaoning Yinglian Co	N	China	10
Magnesita	N	Brazil	60 [excl. ccm to dbm]
Magnesitas de Rubian	N	Spain	75
Magnesitas Navarras	N	Spain	70
Magnezit Group	N	Russia	80 [+80 project]
Magnifin	C	Austria	9
Martin Marietta, incl.Morton	S	US	Σ cap.250 cc,hydrox,db
Nedmag	S	Nedmag	10
Nikochem	S	Russia	15 [project]
North Korean Magnesite	N	North Korea	25
Other Chinese: see App. A	N	China	
Penoles / Quimica del Rey	S	Mexico	10
Phulad	N	India	5
Premier Chemicals	N,S	US	110
Premier Periclase	S	Ireland	8
QMAG	N	Australia	62 [+100 project]
RHI	N	Austria	60
Scora	C	France	3
Shandong Magnesite	N	China	30
SMA	S	Norway	10
SMZ	N	Slovakia	5
Soc. Gen.Ind.Magnesia	C	Italy	2
Styromag	N	Austria	22
Syferfontein Magnesite	N	RS Africa	
Tamil Nadu	N	India	8
Ube	S	Japan	200 [incl hydrox.]
Xiuyan North	N	China	100
Xiuyan South	N	China	80
Yingkou Qinghua Gp	N	China	100
Zarghat	N	Saudi Arabia	[35 project]
Zhongxing Group Co	N	China	5

The Appendix presents additional Chinese enterprises involved in magnesia, only mentioned in Table 4 as ‘Other Chinese’. A number of these companies could be manufacturers of magnesia products other than ccm [such as dbm, electrofused, refractories] or magnesium metal, even though we have made an effort to eliminate obvious ones from the list. In any case, Tables 6 and 6a clearly indicate the very large amount of ccm magnesia producers in China. Detailed and current production figures, by Chinese company, are not readily available and will in fact require specifically-targeted on-the-spot research.

## **2.2 Present status/ recent events**

Some magnesia producers are declining, some are mature, a number of them are stable and few can be considered as growing. The ones with natural advantages are those that have good deposits, a strong home market, operate in a stable macroeconomic and political background, have favorable energy costs and utilise advanced technology.

Environmental factors should be added to the equation. In the EU [and Norway], an emission trading scheme for CO<sub>2</sub> with or without benchmarking; the SO<sub>x</sub>/NO<sub>x</sub> proposal [already in place, at national level, in the Netherlands and in Slovakia]; the IPPC Directive the BREF note and BAT that might become obligatory; all affect the magnesia industry.

## **3. How the crisis affects the world magnesia industry**

### **3.1 Performance of sectors of interest to magnesia**

Overall, there is a big drop in refractories and fertilisers, a smaller one in animal feed and industrial applications, and possibly a milder one in environmental uses, as can be seen in the following indicative articles.

Steel

[20] Global crude steel production tumbled 22 percent year-on-year in February to 84 million tonnes as steelmakers cut output sharply due to falling demand. In the first two months of the year, global production was down nearly 23 percent at 170 million tonnes, according to figures from the 66 countries reporting to the World Steel Association. The biggest casualties were North America, where output plunged 53 percent, and the European Union with a 43 percent fall. The Middle East looked fairly resilient, with output down 2.5 percent in Jan-Feb 2009.

A Reuters poll in early February showed that analysts were expecting global crude steel output to fall 9 percent to 1.210 billion tonnes this year, which will be the first drop in output since 1998. Since then, analysts have further downgraded their forecasts of supply and demand, and now predict double digit falls as the outlook worsens.

China was among the few countries in February and in the first two months of the year to post a rise in production. Chinese mills began to ramp up production in December, despite the country's steel association warning against overcapacity. Output in the world's top steel consumer and producer rose 4.9 percent in February to 40.4 million tonnes and 2.4 percent to over 81 million tonnes in the first two months of the year.

The Middle East was the only region to post an increase in output, thanks to a rise of nearly 16 percent in Iranian crude steel output.

Japan crude steel output dove by record 44 [42] from a year earlier to its lowest since 1968, as a global slump hits key customers in the auto sector, and no upturn is seen soon.

## Fertilisers

[19] Fertiliser minerals reached an unprecedented high last year with potash prices rocketing to around \$1,000/tonne, and nitrates, sulphur and phosphate rock exhibiting a spike in demand.

As discussed at CRU Group's Fertilizer Latino Americano event in Panama at the end of January, the world economy began a severe downturn from September 2008 and fertiliser and mineral producers have been hit hard, with many countries realising that the short-term need for fertiliser products is not as necessary as once thought.

In addition, S. E. Asian palm oil prices have collapsed as farmers could no longer afford the fertiliser, which also contributed heavily to the downturn of fertiliser fortunes.

## Cement

[23] CIS cement capacity to increase but actual output and consumption in region to drop. Despite cement capacity increases of 10m. tpa coming on stream in 2009 and 20m. tpa in 2010, actual production in the CIS region is set to fall in the next two years, with collective consumption in 10 of the 12 CIS countries set to stagnate.

Cement production in Russia, Ukraine, Belarus, Uzbekistan, Azerbaijan, Moldova, Turkmenistan, Georgia, and Armenia, peaked at 97.2m. tpa in 2007, but experienced a 6% drop in 2008 to 91.1m. tpa.

Meanwhile, consumption also peaked in 2007 at 99.7m. tpa with levels remaining roughly the same in 2008 at 99.5m. tpa., with demand met by Turkish and Chinese imports.

## Pulp and paper

[22] Paper demand in mature markets has fallen as web-based communication supplants newspapers. Finnish paper companies have been closing mills such as Summa – Google's new server centre – while the country has refashioned itself as an electronics hub around Nokia, the mobile handset market leader. On top of this structural shift, the European paper industry has suffered a prolonged cyclical downturn over the past decade. This year threatens to be gruelling, due to falling demand coupled with the twin challenges of continuing over-capacity and weak prices.

For Finland, the problems are particularly worrying. The paper industry is the country's second-biggest export earner and Stora Enso and UPM rank among its largest companies. The industry also has great symbolism because it grew out of the country's vast forests – its "green gold" – that are key to Finns' identity. In the 1990s, Finnish companies boosted capacity and expanded out of their remote corner of

Europe into other markets, notably through unsuccessful, expensive North American acquisitions. But this left them heavily exposed in this decade when the cycle turned and industry overcapacity pushed prices down. They – together with the rest of the European paper industry – compounded this mistake by being slow to restructure. Amid the gloom the only positive news recently has been the fall in energy and wood prices because of the economic slowdown, easing cost worries. Russia also postponed plans to hike tariffs on exported wood until at least October. Finnish industry will also increasingly be at a disadvantage as demand and supply shifts to emerging markets.

## Chemicals

[24] Two of Europe's biggest, LyondellBasell and Ineos, have got a Bunsen burner to their feet, thanks to huge debts. Meanwhile, Dow Chemical, the biggest US chemicals group, just had a \$17.4bn Middle East joint venture scuppered by the Kuwaiti authorities.

Chemicals makers face a horrible chain reaction. The first step is a collapse in demand for the materials used to make the plastics that go into all the products that nobody is now buying - cars and houses. Just look at the price of naphtha, which is widely used in the manufacture of plastics. For much of the autumn, naphtha sold for less than the cost of the components used to make it - evidence of a collapse in orders, especially from Asian factories.

The second problem is structural. Hydrocarbons are the industry's main raw material, so it makes sense for factories to be near where they are most abundant. Indeed, factories in the Gulf have already brought on new capacity, which is undercutting western producers. Making specialty chemicals, such as fancy polymers and protective coatings, offers some refuge. They can still be produced cost-effectively in the US or Europe, which is also where their customers are. But this segment offers only so much protection. That is why Dow hoped to set up a low-cost joint venture in Kuwait, producing more generic chemicals for Asian markets.

The final problem is leverage. Germany's BASF has little. But Dow's leverage ratios look high after the collapse of the Kuwaiti deal. James Ratcliffe, who founded Ineos in 1998, and Len Blavatnik, the Russian-born billionaire who owns LyondellBasell, built their empires by rolling up chemical producers cast off from other firms in a series of highly-leveraged deals. For a time, the strategy worked. Then the financial crisis hit. Ineos, with debts of €7.3bn (\$10bn), last month bought time from lenders with temporary waivers on its debt covenants. But LyondellBasell, in hock for \$26bn, just put certain subsidiaries into bankruptcy. Plastic might be forever; not the companies that help make it.

## Paint and glass

[25] US coating & glass maker cuts 2,500 jobs and closes several paint operations globally. USA-based coating and glass manufacture, PPG Industries Corp., has announced the closure of several paint plants, including operations in Saultain, north France, as part of restructuring. The plan is expected to save \$140m. annually and reduce the work force by around 2,500 staff around the world. Part of the plans

includes closing PPG's paint manufacturing in addition to several other smaller production plants. The largest cuts are expected to be in the automotive and industrial coatings units, as they have been hardest hit by the global downturn.

The end use markets could experience significant weakness, with the sharpest downturn in Europe, hitting PPG's coating, glass, and silica business the hardest. Last September, PPG already announced plans to close several coating plants, including those in Ontario, Canada and Geldermalsen, Netherlands; as well as its glass plants in Ontario, Canada and idling Mt. Zion in Illinois, USA. Other large glass manufactures have also cut production, owing to the downturn in the global car market, including Nippon Sheet Glass Co. which reduced staff numbers by 5,800 earlier this year.

### **3.2 Magnesita in the crisis framework**

After a number of bad years, which lead to consolidation/rationalization, the [remaining] world magnesita industry was doing extremely well: many good years: strong demand, manageable costs [except for some producers with inherent problems], easy financing

The Chinese situation was marked by a high internal demand [500 mi mt steel/yr], higher costs of magnesite and magnesita production, a fall in magnesite quality, and limits to their [legal and illegal] mag exports.

In the first nine months of 2008, demand was still strong but energy and freight were hurting most producers.

### **3.3 Individual magnesita producers and their markets**

In the EU, the sinter market is rather weak. The EU market for hydroxide is still in an acceptable shape. The EU fertilizer market is down by as much as 75%, while feed market is only slightly down. For producers that thought being in many market sectors would insulate them from the crisis, with sectors smoothing each other out, the first two to three months of 2009 show a general drop of over 20%. In refractory grades, Russian competition is increasing in the EU, with an increase of imports from N.Korea as well. According to one producer, ccm for construction is performing well, but this opinion is not shared by other EU producers. Energy costs are way down, contributing to a cost reduction. Unit costs are contained, due to slowdown in world inflation; an exception would be companies that face an increase in costs due to declining deposits or because of increased environmental costs, eg ETS.

In the EU market, Magnezit, Russia's magnesite large producer, partly due to the rouble devaluation and the large drop in Russian demand, plans to export magnesita, breaks into export market in deal with Hargreaves to supply Europe with Chinese export drought anticipated by mid-2009. North Korean MgO from Switzerland-based Quintermina, with recent RHI participation, is announcing it exports "competitive quality" caustic calcined and dead burned magnesita from North Korea

Turning to China, 'In a nutshell, while China, as host to a wealth of magnesite resources in Liaoning province, remains a huge producer of magnesita, its supply

dominance on the global magnesia market has been considerably weakened. In future, it will mainly aim to supply domestic, and to some extent east Asian markets.' [8]. Also, 'Chinese magnesia export smuggling via the South Korean port of Kunsan, which emerged again this year en route to Rotterdam, has supposedly run its course, ie. this "source" has apparently been stopped by government authorities' [8]. Recently, there is information that export licences for 2009 will diminish.

Outside the EU and China, some characteristic recent developments have been the following [10], [36]:

RHI announced a cut refractory output, with 1,000 jobs to go, but no plants to close, [IM web 08 April 2009]

In the US, Resco, the refractory maker, revives its' magnesite case and files an amended price fixing complaint against Chinese producers [IM web 01 April 2009]. As for Minteq, they mention that 'In October the U.S. steel industry was still running at an annualized rate of more than 100 million tons a pace that it had been on from more than a year, which had our refractories business tracking the record earnings through the third quarter and into October. Field production in the U.S. our largest market for refractories, dropped like a rock in November and December.'

Penoles sales volume slightly up in 2008. Magnesita, the Brazilian magnesite & refractories producer, reports losses for 2008, increases revenue but has overall net loss [3 April 2009]. QMag: operating at 30% capacity, mines only treating stockpiles, investment plan 100 000 ccm going on. The "mag" operations of Ube in Japan are listed under "Magnesia MagHydioxide, quicklime, slaked lime and others", for which sales in the 6 months April 1,2008-Sept 30,2008 were 23.4 billion yen, or +10.9%, compared with the same period of 2007. Operating income of these "mag" operations in that period of 2008 was up +0.4% compared with the same period of 2007.

Elsewhere, the dbm magnesia market is also weak, as the steel industries plunged into the economic crisis from last August and is expected to worsen in the first half of this year. Though the Indian government has taken steps to protect its steel industries, the steel market is going downhill. The Indian demand for magnesia in the first quarter of this year has been cut down by 40% at least, and most end-users are consuming their inventories[35].

Worldwide, capital for internal investments and/or M&A is becoming quite scarce, benefiting only the most cash-rich of the magnesia companies. Also, the share value of those magnesia enterprises has fallen dramatically in the last fifteen months, with a recent increase in these last weeks. Examples are RHI, Magnesita, Minteq, Martin Marietta, Penoles and Ube. Furthermore, due to the continuing credit crunch, cash flow remains a problem for some magnesia producers.

### **3.4 Current magnesia prices**

According to [39], the prices of magnesite products are as follows.

- Calcined magnesite, 90-92% MgO, \$250-350

- Calcined, agricultural, CIF Europe, €205-215
- Chinese, dead-burned
  - 90% MgO, lump, FOB China \$390-430
  - 92% MgO, lump, FOB China \$435-450
  - 94-95% MgO, lump, FOB China \$450-480
  - 97.5% MgO, lump, FOB China \$490-520
- Greek, raw, max 3.5% SiO<sub>2</sub>, FOB East Mediterranean €65-75

Recent information [43], dated April 20, 2009, indicates that European magnesia prices keep falling. ‘As the steel industry runs slow in Europe, magnesia demand remains weak, and price falls slowly. Offers received in Europe for 97.5% min fused magnesia were around USD600/mt CIF European port from Chinese suppliers, while the price for the same material was USD650/mt CIF European port two months ago. For 97% min dead burned magnesia, the price is around USD420/mt CIF European port. The current orders for this consumer decreased to only around one quarter compared to last year. Apparently, a lot of raw material was bought in the end of last year, so no magnesia was magnesia for the last several months. It was reported that offers received from Chinese suppliers are in the range of USD400-450/mt CIF Rotterdam for 97% min dead burned magnesia, and the price is slowly drifting downwards. Compared to the mainstream price last month, the price dropped by around USD10/t, but demand remains slow. There is slow demand of magnesia and also the European steel industry reduced production by half in the first quarter, while many consumers still have enough stock of raw material. Last year, when price increased fast in the beginning, many European consumers bought a lot of material, and now they can just consume the old stock, with demand expected to pick up in the third quarter of this year.’

## **4. What next?**

### **4.1 Whither the world economy?**

Official predictions

The most up-to-date predictions are by the International Monetary Fund [37] and the Federal Reserve Board [15].

The IMF recently estimated ‘the crisis duration at three years, with only a gradual rebound’.

The Fed’s Open Market Committee that met in January, indicated that ‘the economy continues to contract. Job losses, declining equity and housing wealth, and tight credit conditions have weighed on consumer sentiment and spending. Weaker sales prospects and difficulties in obtaining credit have led businesses to cut back on inventories and fixed investment. U.S. exports have slumped as a number of major trading partners have also fallen into recession. Although the near-term economic outlook is weak, the Committee anticipates that policy actions to stabilize financial markets and institutions, together with fiscal and monetary stimulus, will contribute to

a gradual resumption of sustainable economic growth. In light of increasing economic slack here and abroad, the Committee expects that inflation will remain subdued. Moreover, the Committee sees some risk that inflation could persist for a time below rates that best foster economic growth and price stability in the longer term.’

On the brighter side, Chinese March trade figures point to yearly gain. They would have been bad figures half a year go, but they are now regarded as light at the end of the tunnel. Analysts say that China's latest import and export statistics, though still in negative territory, point the way toward gains later in the year. The trade surplus stood at \$18.56 billion, up 41.2 percent on a yearly basis, and up as much as 287 percent compared with the previous month.

Dong Xian'an, an economist from Southwest Securities, a major Chinese securities brokerage, said the change in March was largely due to the US economy. The analyst cited US Department of the Commerce figures showing that the sales volume of residential properties in the US rose 4.7 percent from a month earlier, the highest in the past 10 months, and orders for durable consumer goods surged 3.4 percent, the first monthly growth since last August and the highest since December 2007. Dong remarked that, as the US economy starts to become more stable this should be reflected in China's trade figures.

Indeed, as shown by the March figures, China's trade with its three largest partners, the European Union, the US and Japan, all increased from a month earlier. Trade with the EU increased 21.2 percent to \$26.45 billion, with the US, 25.8 percent to \$22.65 billion, and with Japan, 19.1 percent to \$17.52 billion. Commenting on the significance of the March trade figures, Su Chang, an economist with China Economic Business Monitor, predicted that China's foreign trade would begin to see positive growth around the last quarter of the year. Dong said the first half will see a drop in foreign trade ranging from 10 to 15 percent, "but for the second half, there will be growth up to 10 percent". As for the trade surplus, Dong said the yearly record would be no less than last year, and will be around \$300 billion.

#### Our own prediction

What the Americans call the ‘alphabet soup’ offers a good description of the likely scenarios for the world economy. The letter ‘I’ implies a continuing fall, with an unknown end in site. The letter ‘U’ indicates a somewhat smooth rebound, while ‘V’ a sharper one. ‘W’ describes a rebound followed by another fall and a second rebound.

Our own prediction is better illustrated by the letter ‘L’. This means that first, there will be a continuation of the fall, and second, there will be no rebound to previous heights, but a dragging-along-at-the-bottom for a few years {see also [7]}.

#### **4.2 Whither magnesia?**

In the economic environment predicted above, the magnesia industry is likely to perform in a similar manner, unless major new applications are discovered and commercially established.

Another, more immediate, positive outcome for magnesia could be that, as the international fiscal stimulus packages are starting to take effect and to boost demand, they will carry along magnesia utilisation. For example the US and EU measures to boost infrastructure projects and automobile production, will boost demand for refractories. The question, in the longer-term is whether these measures will create huge government deficits, high inflation and a return to a new vicious cycle in a few years.

China will remain an extremely important factor in magnesia supply and demand. The country's internal growth, the stimulus package it is implementing, the licence regime and, finally, the extent of smuggling, will all play crucial roles in world magnesia.

Also, the steep drop in energy costs will be an advantage for energy-intensive processes eg synthetic magnesia. The question is 'will energy stay cheap', even if world energy demand falls?. Our personal estimate is negative, due to the increasing difficulty in accessing traditional energy sources and because of the higher cost of renewables.

Capital will become more accessible, but more selectively and with more risk-aversion by the lenders compared to before.

The drop in freights will be mostly to the advantage of magnesia producers that are far away from their markets.

#### New magnesia capacity

Producers' plans for new capacity are always a useful tool for looking into the future of a sector. The last such list for magnesia, to our knowledge, was published in September 2008 [8] and is presented in Table 5 below.

Table 5  
Magnesia capacity developments summary (outside China)  
Source: [8]

Company (parent)	Plant location	Development (metric tpy)
Baymag (Refratechnik, Germany)	Exshaw, Alberta	New 50k CCM MHF, start up H2 '09; considering FM plant restart & high purity DBM production
Magnesita Refrátarios (GPI, 47%; Gavea, 12.5%, others 40.5%)	Brumado, Bahia, Brazil, Contagem, Minas Gerais	Plans to triple DBM production by '10 (and double refractories production, currently 590k tpa).
Martin Marietta Magnesia Specialties (Martin Marietta Materials)	Manistee, Michigan, USA	Hydration system capacity expansion planned to come on stream early '09

Premier Chemicals	Gabbs, NV and Pt St. Joe, Fla, USA	Gabbs CCM plant recently started up 3 <sup>rd</sup> Herreshoff furnace
Quimica del Rey (Industrias Peñoles)	Coahuila, Mexico	26k CCM expansion for early '09; New 1.75k tpa FM fusion furnace in '08.
Liaoning RHI Jinding Magnesia (RHI, 80%, Jinding Magnesite, 20%)	Dashiqiao, Liaoning, China	100k tpa DBM
Queensland Magnesia (Resource Capital Fund)	Rockhampton, Queensland, Australia	Additional 15k w/ de-bottlenecking by '10; brownfield expansion to 325k total by end '09, incl. 135k DBM, 30k FM, 160k CCM
Bommag (formerly Calmag; Bomex Holding, Serbia)	Tavsanli, Turkey	35k DBM shaft kiln on stream spring '09; assessing 7.5-15k FM plant
Kumaş	Kutahya, Turkey	New DBM kiln; assessing FM production
Magnesia Products SBU – DSP	Mishor Rotem, Israel	35k expansion under construction,

To this list, we should add other expansion plans in countries like Russia [ccm, hydrox.], S.Arabia [ccm, dbm, efm] and Turkey [dbm]. Conversely, it is not clear whether all projects in Table 5 are still valid in April / May 2009.

The future of steel

Nearing the end of this presentation, we feel we should focus on some positive signs and predictions. The article 'Steel's slight return may herald recovery's arrival' [21] is of such nature.



'Green shoots or fool's gold? The signs are there if you look for them. Last week [end March 2009] light long product prices continued to rise in some regions as mills took advantage of a slight resurgence in demand to push through increases and pass on rises in scrap and billet costs. Even stainless steelmakers seemed to benefit, pushing through an 11% increase on base prices in Europe.

The performance of some key indicators was encouraging. UK-based trading house

Stemcor, the world's largest steel trader, reported the second-most successful year in its history in 2008, saying that it - unlike most steelmakers - had largely avoided significant losses last year when the markets turned. At the same time European distribution firm Klöckner & Co posted improved full-year figures for 2008, although it did warn that earnings would drop significantly in 2009. And London money-broker Moneycorp predicted that the global economy is set for a period of stability because toxic debts have been worked through the system, the evidence for which is greater M&A activity.

Equity markets also reacted positively to news that G20 nations had agreed to provide an additional \$500 billion to the International Monetary Fund (IMF), as part of a \$850 billion plan to provide capital to developing countries. All in all, the investments are part of what the G20 characterised as "an additional \$1.1 trillion programme of support to restore credit, growth and jobs in the world economy". "Together with the measures we have each taken nationally, this constitutes a global plan for recovery on an unprecedented scale," the G20 said in a combined statement.

At first glance, Iron and Steel Statistics Bureau [ISSB] statistics that reveal China recorded its first trade deficit in steel mill products since November 2009 are also encouraging. But negative indicators are still painfully noticeable. Considering that inventories in China remain at historically high levels, these statistics could indicate that the world's largest steel-producing nation no longer has a low enough cost base to be competitive on the international market. Spot market iron ore bookings cfr China posted small declines in the first week of April to \$63-64 per tonne for fines, but steel mills will need to get annual contract prices down to prices in the mid- to high-\$20 per tonne mark to enable them to be truly competitive.

Changes to export tax rebates will only make Chinese offers more competitive, something many other nations are more than aware of, with some continuing to embrace protectionism.

#### The future of cement

Another recent report [23] by PMR Ltd., titled "Cement market in the CIS countries 2009 – Development forecasts for 2009-2011", expects cement production and consumption to fall owing to the global financial crisis, and for the CIS region to reverse from being a cement importer to exporter until 2011.

#### The future of refractories

According to [27], dated April, 2009, 'World demand for refractories is expected to rise 3.5% annually through 2012 to 45.2 million metric tons (mmt). Market value will rise 4.5% (including price increases), reaching \$28.5 billion.

In the short term, refractory demand will be negatively impacted by the effects of the global economic downturn that began in the latter half of 2008, with declining manufacturing activity and global trade pushing demand below 2007 levels in most countries. However, recovery is expected by 2012, restoring gains for the refractory industry. Longer-term growth will be supported by the increasing use of better performing, more expensive refractories.

China is the dominant consumer of refractories, with over 50% of the world market in 2007, due to the nation's strong rise in industrial production. In 2007, the country manufactured 36% of the world's steel, 49% of the world's cement and 44% of world flat glass. In addition, China utilizes a higher rate of refractories per ton of steel than developed nations, due to its less efficient manufacturing processes. Over 80% of new demand in 2012 will be attributable to China.

Due primarily to China, Asia will continue to be the fastest-growing region in the world through 2012. While China will account for much of the region's gains, India will exhibit advances above the world average as well. Eastern Europe will have solid growth prospects due to its rising steel production. Multinational manufacturers have shifted production of steel-consuming goods such as household appliances and motor vehicles to Eastern Europe, creating demand for steel. Opportunities will also exist in Latin America and the Africa/Mideast region.

Iron and steel production is by far the largest market for refractories. Advances in this market have benefited from increased production in recent years compared to the late 1990s. However, the rate of refractory usage per ton of steel has continued to decline, holding back gains. This trend is expected to continue, adversely affecting the outlook for refractory suppliers.'

## **5. Summary. Conclusion**

The following points could be worth retaining from this presentation

1. There is a major financial, economic, commercial, psychological and political crisis in most parts of the world
2. China and India remain bright spots
3. The phenomenon of debt-generated consumption and investment seems to have run its' course...
4. ...unless government stimulus packages will re-generate it
5. The economic future in the next few years could best be illustrated by the letter 'L', ie a continuation of the current fall, not followed by a rebound but by a period of stagnation or anaemic growth
6. Countries like China will continue to play a key role in the world economy
7. Magnesia will remain a very significant resource and might even find major new applications
8. Environmental applications for calcined magnesia are bound to grow, but the same might not be true of the use in abrasives, electrical heating elements and flooring
9. The economic stimulus packages will favour the utilisation of magnesia, eg in refractories for steel and concrete...
10. ...but with most of the new growth in refractories will be in China and other Asian countries
11. As demand will not grow as expected and finance will remain scarce, major investment projects in magnesia capacity expansion will be either looking for strong partners or get moth-balled,
12. Recent magnesia acquisitions will pay off with more difficulty

13. Prices of energy will not fall much, due to the limited available new resources as well as environmental considerations
  14. Environmental and health-related problems will become more important in magnesia production and consumption, eventually in developing countries, too
  15. As in any crisis, there will be players in the magnesia field [production, trading, consumption] that will suffer, even fatally. On the other hand, strong and clever enterprises will survive and even profit. The magnesia world five years from now will be considerably different from the one of May 2009.
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## Appendix

Other Chinese Natural Magnesia Enterprises [in conjunction with Table 4]  
Source: [34]

1. Dashiqiao Kun Qiao Chemical Material Co.,Ltd
2. HaiCheng Zhen Bo Mining Co.,Ltd
3. HaiCheng MinZheng Magnesium Sand Factory
4. Yingkou Peace Harvest Magnesia Industry Co.,Ltd
5. Guangda High-purity Magnesium Limited Liability Company
6. Dashiqiao Shifo Minzheng Fused-Magnesia Plant
7. Liaodong Meida (Group) Company
8. ShengHua Fire-resistant Material Enterprise of DingGang City
9. Xiuyan Wancheng Magnesium Industry Group of Liaoning
10. XiuYan WanNing Mineral Co.,Ltd
11. Liaoning JiaYi XiuYan Magnesite Co.,Ltd
12. Xiuyan Yi Mg (Magnesium) Co.,Ltd
13. DanDong Zhi Ke Mineral Products Co.,Ltd
14. Xiuyan Ying-xiu Combined Magnesium Deposit
15. Xiuyan Gaosheng Magnesium Products Co., Ltd
16. Xinyan Xinyuan Magnesium Mineral
17. Hai An Magnesia Mine
18. Anshan Xinfu Magnesia Products Co.,Ltd
19. Jiachen Ltd. of Corp.
20. Liaoning benefit Corp. (Liaoning camp unites magnesium material Ltd.)
21. Hai Cheng City Hua Yin Conglomerate.

22. Hai Cheng City Hua Yu mineral product Ltd.
23. Xiu Yan Gold Mountain Magnesite Product Factory
24. Xiuyan Magnesium Powder Plant
25. Zhongan Magnesium Co.,Ltd
26. Fushun Zhaofeng Metallurgy Material Co.,Ltd,
27. Dandong Jinggang Mine Industry Co.,Ltd
28. HuaiRen Eastern Magnesia Company
29. Causmag International / Orind Australia Pty.Ltd
30. Yingkou Guangda Fire-resistant Chemical Co.,Ltd
31. Qinghai KunLun Magnesium Salt Co.,Ltd
32. Qinghai Western Magnesium Technology Co.,Ltd
33. Yulong Magnesium Industry Co., Ltd
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IM=Industrial Minerals

FT=Financial Times

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