



European Carbonate Resources & Markets

**Mike O'Driscoll,
Editor, Industrial Minerals**

Geology & Markets for Value-Added Carbonate Minerals
SME Dreyer Conference
8-11 October 2006, Atlanta

SA Reverte's Macael-Cobdar marble deposit, Spain

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Industrial Minerals

Who we are



Since 1967, the industry-recognised source for premium information on news and trends in global supply/demand of industrial minerals

“From mine to market: the world’s authority on non-metallic minerals”

Metals, Minerals, & Mining Division, Metal Bulletin, UK

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What we do

IM covers the entire mine to market supply chain



- supply sector

- logistics sector



- consuming market sector



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How we do it



• magazines



• newsletters

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Outline

- **Introduction**
- **Resources**
- **Production**
- **Market snapshot**
- **Summary & outlook**



Introduction



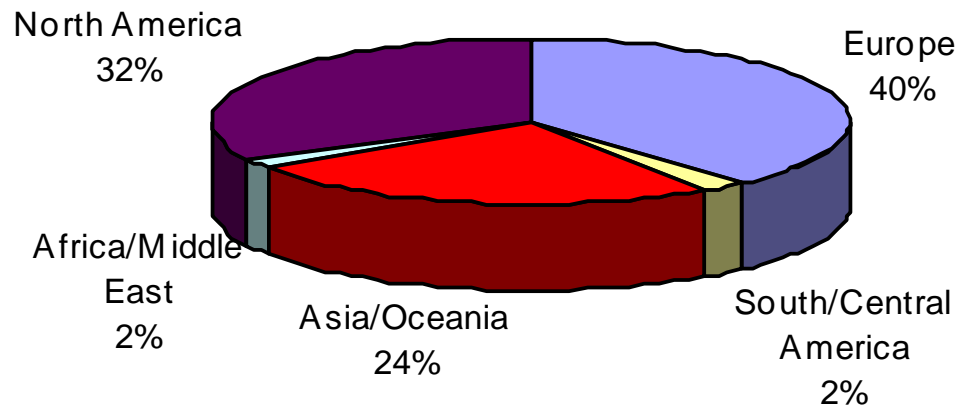
“Michaelangelo is the God of Carrara – with hands of a quarry worker, the eyes of an insane, and a yearning for the infinite”





Introduction

GCC WORLD PRODUCTION BY REGION FOR 2004 (57.4M t)

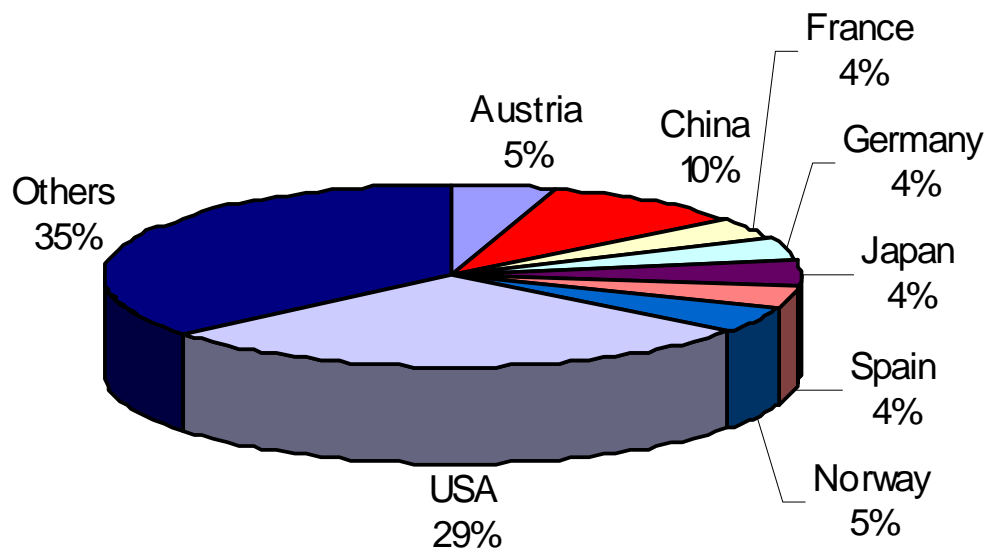




Introduction

GCC WORLD PRODUCTION BY COUNTRIES FOR 2004 (57.4M t)

(Eight countries account for 65% of the world's production)

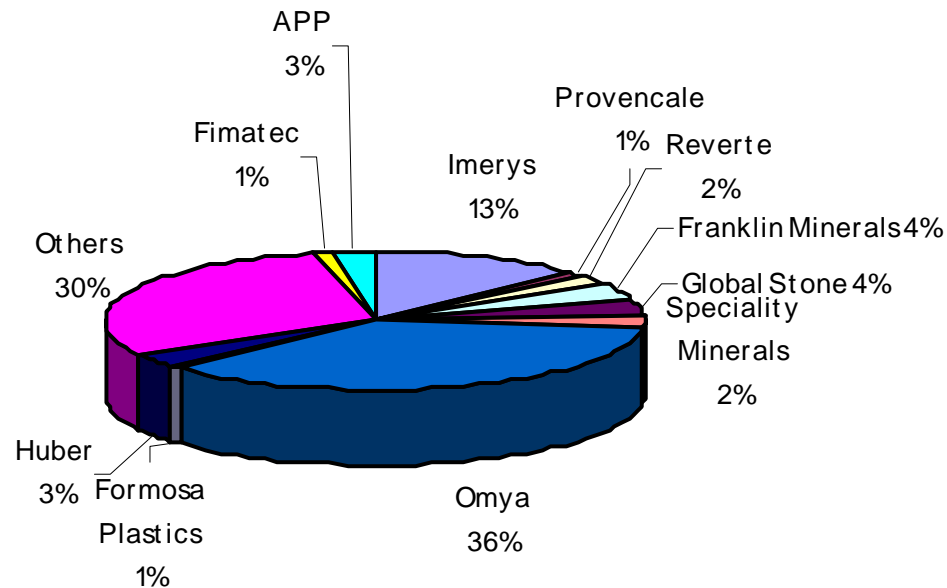




Introduction

LEADING GCC PRODUCING COMPANIES IN 2004 (TOTAL 57.4Mt)

(Top 11 Companies account for 70% of the production)



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Resources





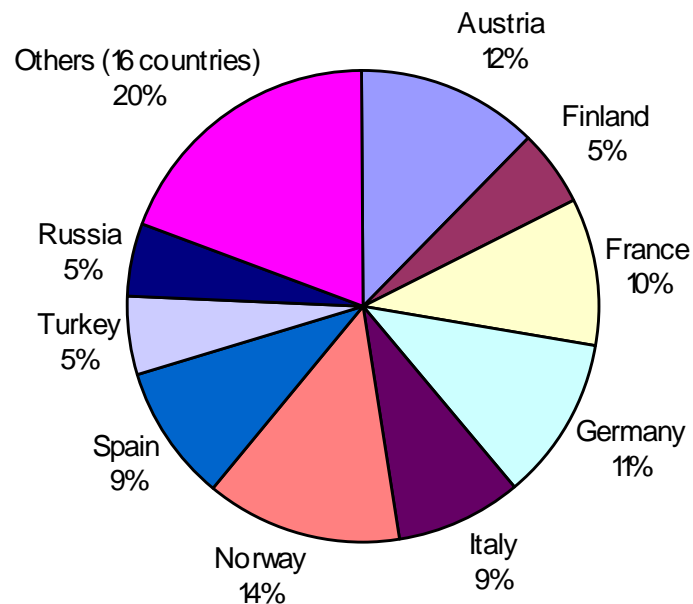
Resources

Some major European calcium carbonate deposits		
Type	Country	Location
MARBLE	Italy	Carrara – waste from block cutting used
	Norway	Various deposits in Molde region
	Turkey	Various deposits
LIMESTONE	Italy	Avezzano – high brightness limestone
	Germany	Bergberg
CHALK	France	Precy-sure-Oise, Paris Basin
	Germany	Northern Germany
	Russia	Belograd Region
	United Kingdom	Salisbury and Beverley



Production

EUROPEAN GCC PRODUCERS FOR 2004 (22.2Mt TOTAL)



Source: Ian Wilson (2006)

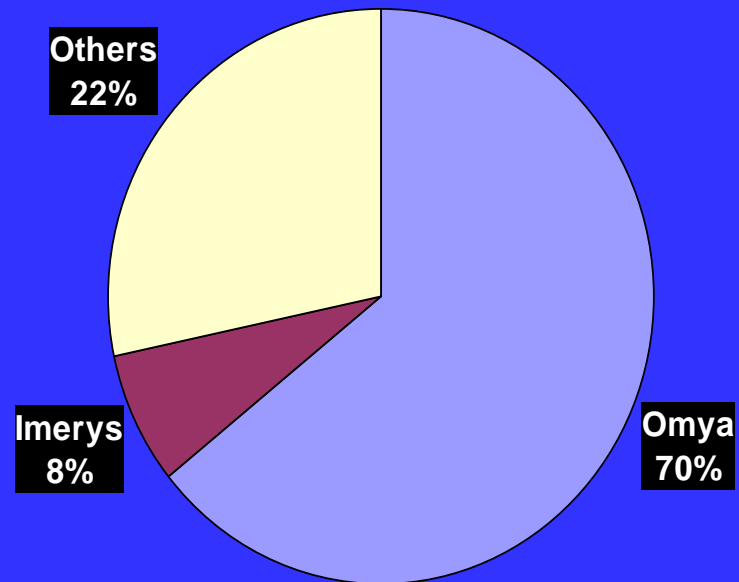
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Production



Source: Ian Wilson (2006)



Production



Austria

Omya Gummern, 2.5m. tpa marble u/g



Denmark

550,000 tpa; Faxe Kalk, Omya, Dankalk



Finland

>900,000 tpa; Sumomen Karbonaati, Lapp. (51% NK:49% OM); Omya (Forby, Molde). Increasing GCC use in paper, 1.4m. tonnes 2004, from 0.47m. tonnes in 1992.



Production



France

>2m. tpa;

Omya, Orgon
limestone, Salses
marble;

Imerys, Precy,
Mareuil;

Provencale SA,
Salses, marble.



Provencale's plant, S. France



Production



Germany

2.5m. tpa chalk & limestone; Omya 90% mkt share



Greece

>160,000 tpa marble & limestone; Microfill K. Zafranias, 120,000 tpa, mainly exports.



Microfill's GCC plant, Corinth, Greece



Production



Greece

Huntite $\text{CaMg}_3(\text{CO}_3)_4$

Hydromagnesite

$\text{Mg}_5(\text{CO}_3)_4(\text{OH})_2 \cdot 4(\text{H}_2\text{O})$

Kozani, N. Greece.

White Minerals

/Ankerpoort, Lefkara

Minelco Hellas SA,

Ultracarb – no mine

access



White Minerals' Lefkara mine, N. Greece



Production



Greece

WM: 500,000 t reserves;
95% products exported



White Minerals' Lefkara warehouse, N. Greece



Production



Italy >1.8m. tpa marble & limestone; Carrara marble, waste from sculptoring in 1980s; high brightness limestone at Avezzano, south Italy; Omya, Imerys slurry GCC.



Carmeuse's 300,000 tpa Sacile operation, N. Italy



Netherlands

2005: Omya 500,000 tpa plant Moerdijk, marble from Turkey.



Production



Norway

>3.m. tpa marble, limestone, dolomite;

Hustad Group –

Omya/local family

Hustadmarmor AS, Molde, 3m. tpa

Verdalskalk –

Franzefoss (55%), Faxe Kalk (35%),

Nordkalk (10%)

Norwegian Holding –

Hammerfall AS, (Omya, 20%), 400,000 tpa dolomite



Production



Verdalskalk:

v. pure low met. limestone at Verdal.

120-220,000 tpa lime Hylla for PCC; 50% exported for paper; 1m. tpa PCC-grade milling plant, Havna, 400,000 tpa.

New 200,000 tpa lime plant at Verdal; mining to rise by 0.5m.



Verdalskalk's Verdal 750,000 tpa mine, N. Tromsdalen, Norway



Production



Russia

small domestic supply industry – large market, 500,000 tpa; imports from Turkey, Cz.Rep, Finn. chalk-based producers in south-west Russia, marble in Urals, limestone and dolomite widespread.

only started using marble GCC recently, paper market undeveloped for GCC, uses imported kaolin and local chalk.

most producers Russian owned, 50-60,000 tpa; SA Reverte stake in JSC Ruslime, chalk, in Belgorod; Omya marble GCC plant in Urals



Production



Spain

>2.m tpa; GCC mainly in Barcelona and Almeira areas.

Clariancal SA (Omya): Arbos, Tarragona;
Purchena, Almeria

Marcael (Provencale): Arboleas, Almeria

SA Reverte, 1m. tpa: Castellet il La Gornal,; and
Albox, Almeria

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Production



SA Reverte, Castellet il La Gornal, near
Barcelona, Spain



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Production



SA Reverte, Albox, Almeria, Spain





Production



Sweden

>350,000 tpa; accounts for 90% mineral output;
50% supplied to cement, rest for paper/metal.

Nordkalk
SMA Group
Imerys
Omya



Production



Turkey

some of richest GCC reserves in world; perhaps 35% of Europe's high brightness marble deposits.

600,000-1.2m. tpa; significant exports of crude and finished GCC to Russia, Ukraine, Europe.

three main producing areas:

1. South & west of Marmara Sea
2. South central Turkey
3. Southwestern Turkey

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Production



three main producing areas:

- ★ 1. South & west of Marmara Sea
- ★ 2. South central Turkey
- ★ 3. Southwestern Turkey





Production



Turkey

main players, plus 20 further marble millers.

<i>Producer</i>	<i>Plant locations (with supplying mine locations where known)</i>	<i>Production capacities tpa</i>
Mikro Mineral (former Dolgu Madderleri)	Kocaeli, near Istanbul (mines in Bursa-Orhaneli-Yakuplar)	130,000
Esen Mikronize	Göztepe, Istanbul (mine in Yalova, Bursa area)	225,000
Omya AS – Gebze factory	Kocaeli, near Istanbul	120,000
Omya AS – Karabiga factory	Örtuluçe, Canakkale (adjacent mines plus supply from Manyas area)	300,000
Omya AS – Kemalpaşa factory	Near Izmir (mines in Yatagan)	250,000
Erciyes Mikron	Kayseri, central Anatolia (nearby mines)	75,000
Aydin Madencilik	Gemlik-Bursa, near Istanbul (adjacent mine)	70,000
Nigtas Mikronize	Nigde (nearby mines)	250,000
Hisar Maden	Aksaray and Aydin (mines in Nigde and Yatagan areas)	200,000

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DREYER

Production



Mikro Mineral, Bursa mine, Kocaeli plant



Production



Turkey

Huntite $\text{CaMg}_3(\text{CO}_3)_4$

Hydromagnesite $\text{Mg}_5(\text{CO}_3)_4(\text{OH})_2 \cdot 4(\text{H}_2\text{O})$

Tuz, Egidir, & Salda lakes, central Turkey

2005: Likya Minelco, Salda Lake – 50:50

Minelco:Likya

2006: Jeotek Mineral, mag/HT, Horan Golu, SW Turkey



UK

750,000; chalk and limestone deposits.

Imerys – Beverley, Humber, Salisbury, Wilts

Omya – Humber, Derbyshire

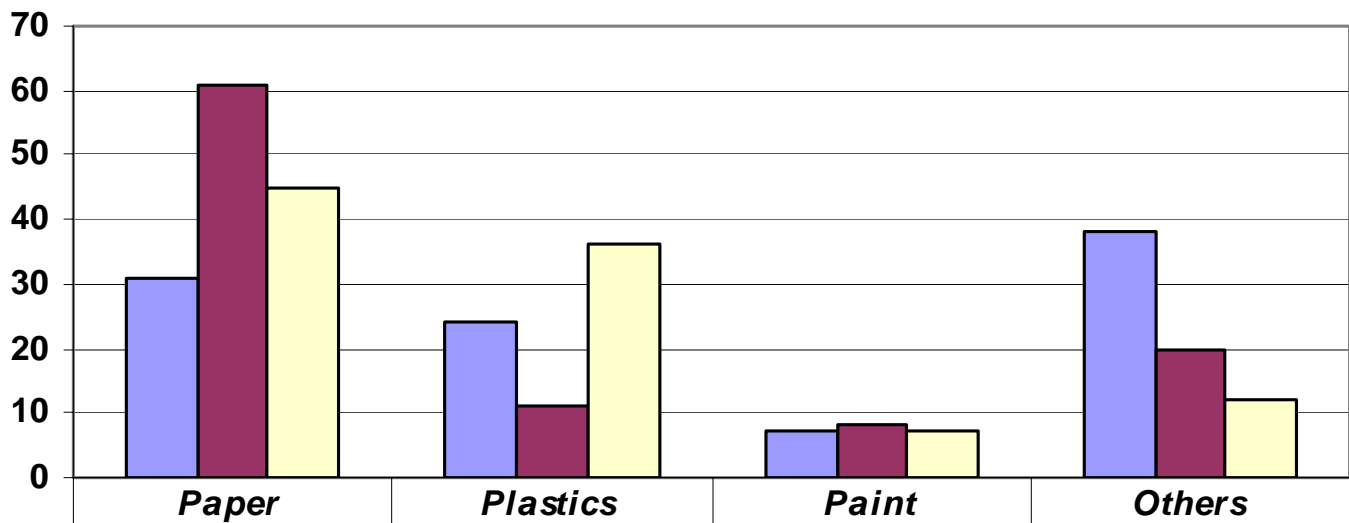
Minelco Specialities – Fordamin, Microfine



Markets

GCC MARKETS IN EUROPE, ASIA AND NORTH AMERICA

(BASED ON MARKET SPLIT (2004) FOR PAPER, PLASTICS, PAINT AND OTHERS)



■ North America	31	24	7	38
■ Europe	61	11	8	20
■ Asia	45	36	7	12



Markets

PAPER



GCC growth as pre-coat and coating pigment

Increasing use of blended formulations: GCC/PCC/Kaolin

Markku Pelto, global mkt. dir., Paper PCC, SMI, Finland:

“The whole value chain is suffering as a result of increased raw material and energy costs. The key...is total system cost. Pigment solutions are required which offer more flexibility and versatility. Rather than pitching one pigment against another...an important opportunity for intelligent and creative use of pigments” *PPI, May 2006*



Markets

PAPER



Top coat blend examples:

1. 80% GCC, 20% kaolin
2. 40% PCC, 40% GCC, 20% kaolin

Loading increasing:

Uncoated woodfree 50-100%

Uncoated SC converting from kaolin to carbonates or blends to improve brightness

Paper growth in Europe:

GCC consumption rose from 3.1m. tonnes 1998 to 4.8m. tonnes in 2004

25 new 50,000+ tpa paper plants scheduled for start-up 2006-07 – esp. in Russia, Poland, Estonia, Latvia, Czech Republic, and Spain



Markets

PAINT



Western Europe: nanomaterials in new paints – self-cleaning, scratch-resistant, UV protection, water repellent, antimicrobial; thin film and sophisticated paints driving demand for high-tech GCC

Turkey: centred on Gebze, nr Istanbul; 600,000 tpa paint demand; 11-12% p.a. growth.

Russia: 1.05m. t 2005; 7.1% growth 2005-2010; shortage of high quality raw materials

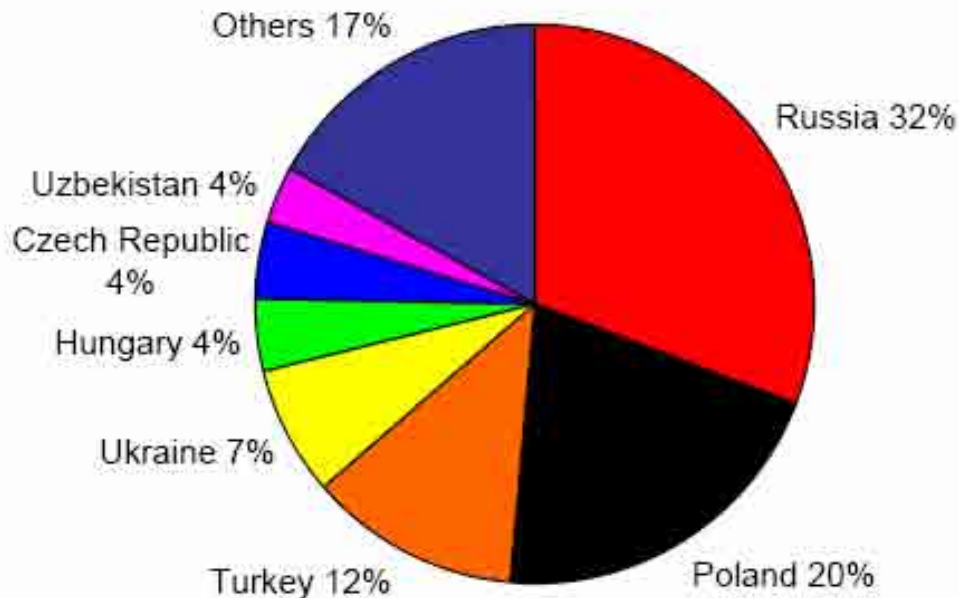


Markets

PAINT

Central & Eastern Europe: >3m. tpa paint demand;
7.4% p.a. avg. growth, 2009 = est. 4.3m. t paint

Paint Demand in Central and Eastern Europe, 2004 (%)



Growth rates p.a.:

Russia	7%
Poland	6%
Turkey	11%
Ukraine	10%
Hungary	5%
Cz. Rep.	4%
Uzbekistan	2%



Markets

PLASTICS



PVC

Breathable films/polyolefin

Turkey, Russia, eastern Europe.

Turkey: large plastics compounding industry for GCC; PVC pipes & profiles, booming domestic construction industry

Breathable film market: 150,000 tpa

U/F GCC, 1-2microns, surface treated

Hygiene, agricultural, and construction sectors



Markets

PLASTICS

Huntite/hydromagnesite/brucite/ $Mg(OH)_2$

Flame retardants in plastics eg. wire & cable, laptops, autoplastics

12,000 tpa est. Euro market; future growth as replacement in halogen-free FR.

Limited to high end market, still emerging

Dependent on new technology innovation in use



Auto mkt growth potential: 1-2km W&C/car = 4-6kg polymer compound;
2002 Europe 17m. cars = 68,000 t W&C @50% MHD loading = 34,000 t
2002 Asia 14m. Cars = 56,000 t W&C @50% MHD loading = 28,000 t

Est. 2010, global FR chemicals market = \$4,600m.



Summary & Outlook

- Europe will continue to be major area of GCC production
- Paper will remain dominant end market – trend to high brightness, fine grained GCC grades; trend to marble use.
- Emphasis on “solution package pigments/fillers” will drive GCC producers to mineral blends, and therefore expanded production portfolios, eg. GCC/PCC/kaolin; recent Huber PCC buy by Omya
- Turkey will emerge as significant supplier of marble GCC/HT/HYM
- Turkey/Russia/C&E Europe grow in importance as market growth areas in paint & plastics (poss. host new supply sources?)
- FR will remain “holy grail” of MHD suppliers; nanotechnology potential
- China/East Asia to seriously influence future as dominant supplier & market for GCC

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***Thank you
for listening***



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