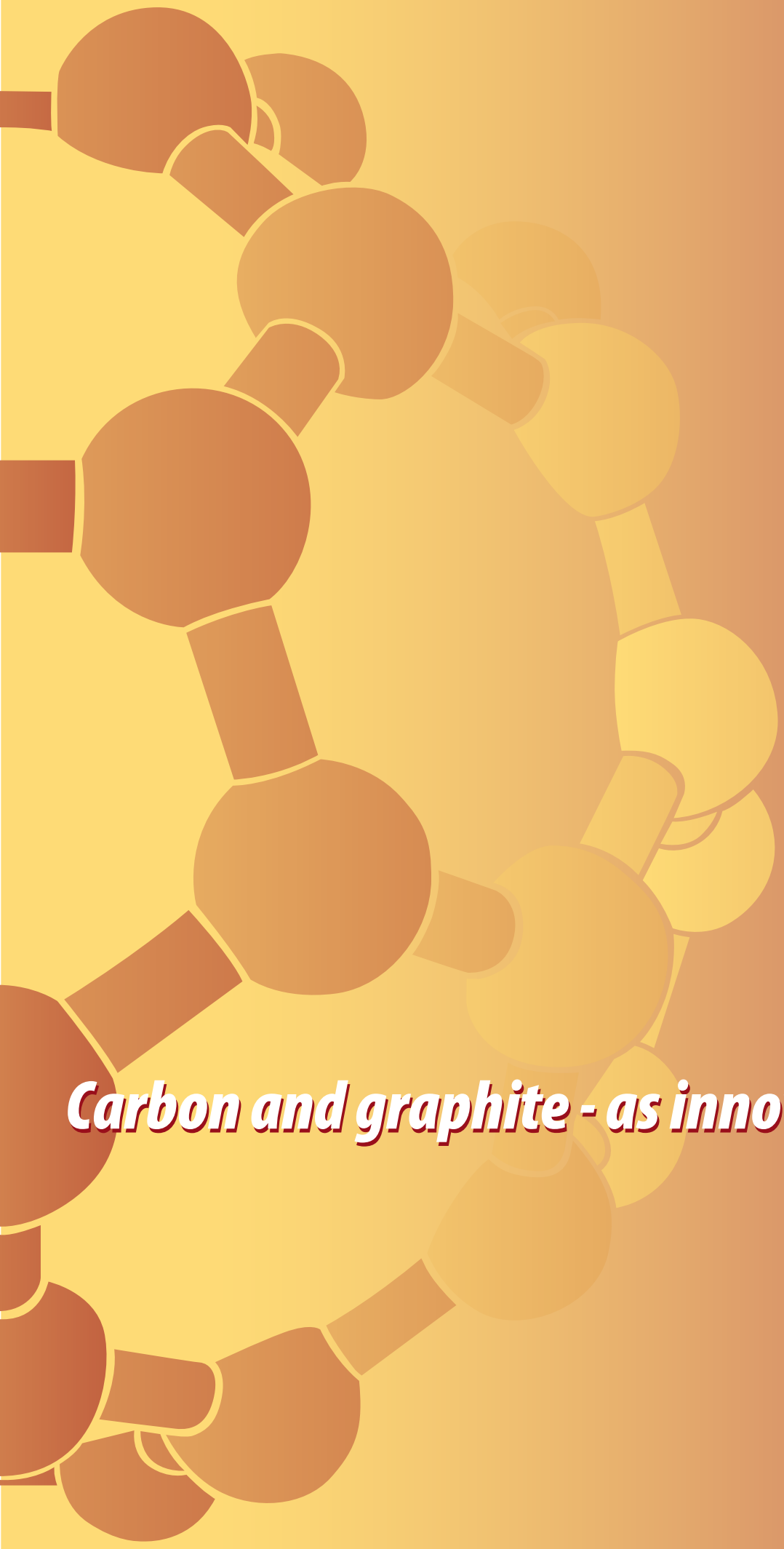
ECGA

EUROPEAN CARBON AND GRAPHITE ASSOCIATION

ANNUAL REPORT

2007



Carbon and graphite - as innovative as ever

"FOREWORD BY THE PRESIDENT" – YEAR 2007

The world is changing. Throughout 2007, the emerging economies of Asia continued to show a strong growth in their economic output, with China and India achieving a year-on-year growth of respectively 11.4% and 8.8%. This impressive development benefited the customer industries of our Members, with a positive impact in the demand of steel, aluminium and other metallurgical products. On the other hand and as a consequence of the growth in these economies, the price of the barrel of oil continued to increase sharply reaching levels of around 120 dollars in the spring of 2008 (with all the consequences including higher energy and transportation costs), while we are witnessing a more recent surge in the prices of staple food items such as rice and wheat.

In fact another major trend of change is represented by the increase in population and the impact of economic affluence and growth on the environment.

To make the picture even more complicated, the U.S. dollar went into a free fall with a parallel strengthening of the Euro, the financial crisis connected to the use of derivatives and sub-prime loans hit a large proportion of the major financial institutions and caused important interventions from the Central Banks.

*The European carbon and graphite industries represented by our Association faced substantial increases in their basic raw materials during 2007 and were forced to adjust the prices of their products to their customers, while continuing in their own rationalization and continuous improvement efforts. At the same time, the European Union has been pushing forward with more regulations such as **REACH** ("Registration, Evaluation and Authorisation of Chemicals") and initiatives aiming at reducing the output of pollutants in the atmosphere, so that the pressure on the Carbon and Graphite industries is increasing and makes competing on all markets more difficult and expensive.*

Our Association is playing a central role by giving the necessary information to the European Commission while issuing new rules involving our industry. Moreover, the Association is active in the complicated interpretations and procedures involved in EU regulations such as REACH (started in 2007) and other programs relating to the environment.

Particular emphasis continues to be given to safety at work by all Members of our Association by continuing to improve working conditions and focusing the attention of all managers and employees on working safety standards.

I would like to express my sincere thanks to our Secretary General, Dr Corina Hebestreit, for her unrelenting work and at the same time welcome her new Assistant Mr Peter Schallert who replaces Ms Marleen Bellen.
Finally, my best thanks to all Members and all those involved in the work of our Committees for their dedication.

Dr B Toniolo, President

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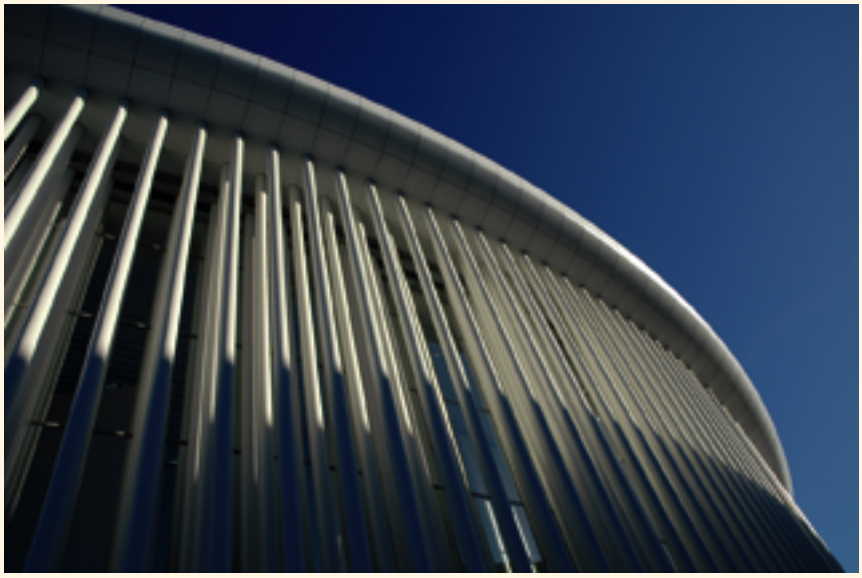
I-a. Carbon and Graphite in the Aluminium Industry

One of the major global markets for carbon and graphite products is the primary aluminium industry.

Providing the basic elements for the aluminium reduction cells

The carbon and graphite industry supplies furnace linings for the primary aluminium industry in the form of cathode blocks with which the floor of the electrolytic reduction cells are lined as well as pieces for the surrounding sidewalls. Both types of blocks are manufactured in a number of different fired qualities. Carbon ramming pastes are used to seal the joints between the fired blocks.



Higher metal consumption driving new smetter project

The total demand for aluminium has continued to grow in 2007 on a worldwide basis, as was widely predicted. This follows growth at 7.0% to 7.5% in previous years. However, the percentage shares of consumption by region have shifted considerably in the past 12 years.
Consumption in China continues to grow especially strongly. Worldwide growth is expected to continue and production will rise to meet the increased demand for the metal.
The strength of demand has been reflected in both the aluminium metal price and the alumina price.

Demand for carbon and gaphite products is created by the relining of cells when they fail and by projects for the start-up of new smelters or the extension of existing plants.
Developments in the aluminium industry indicate that the maintenance demand will be stable over the next five years. Meanwhile the demand created by new projects is expected to increase worldwide, with a major increase in China and the Near East.

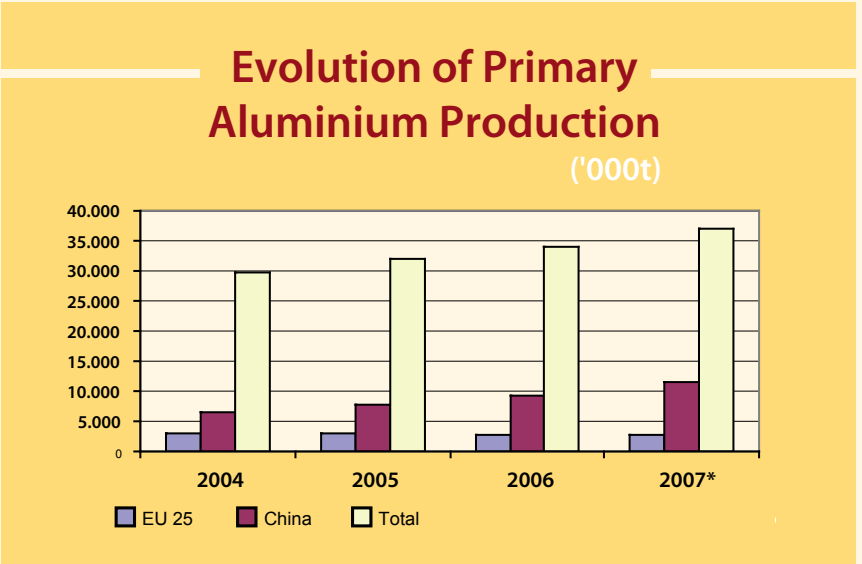
An increase in aluminium production has always also had a major impact on the second type of

product the industry provides for the furnaces of the aluminium industry: the anodes. Due to increased consumption worldwide anode production has increased at almost the same rate. The ever-increasing efficiency of anode consumption in the smelters due to improving quality and better process control has contributed to increasingly sustainable production in this area.

Whilst the reduction cell has been in use for over 120 years and has seen developments that have provided greater production levels and higher efficiency, there is still no effective and economically viable alternative available on an industrial scale. The ECGA's aluminium committee monitored the development of new technologies and reported that there had been no significant developments in the last year.

It is widely appreciated that primary aluminium is an energy intensive industry. Smelters require a constant supply of electricity at low and stable prices in order to remain competitive. Increased power tariffs are evident in several parts of the world, including Europe and North America, and a number of primary smelters have either closed or face the prospect of doing so, hence the importance of the new European ETS and its potential impact on costs for energy and process emissions.

The ECGA's aluminium committee maintains an industry database that has been updated with details of metal production and capacity, consumption and stocks, green-field and brown-field project activity plus shut down, idled and restarted capacity to monitor the development of the downstream industry.

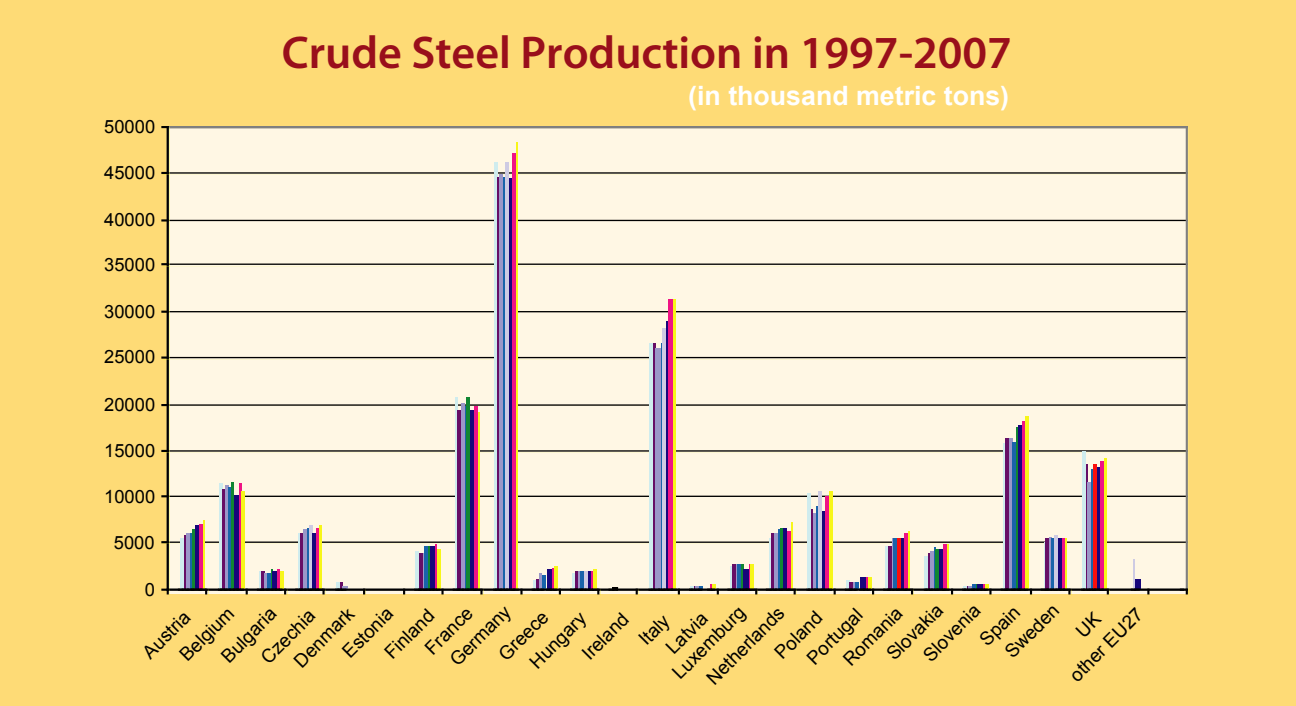


I-b. Carbon and Graphite in the Steel industry

In terms of tonnes produced steel is still the number two in man-made goods. Following the very low point of the steel industry in early 2002 the European industry had experienced a dramatic turn-around and with it the European carbon and graphite industry supplying important parts for the steel production, the graphite electrodes.
Nowadays the five biggest steel makers in the world are responsible for 19% of the output, compared to only 14% in 2000. This of course also has an impact on the supply industry such as the graphite industry.

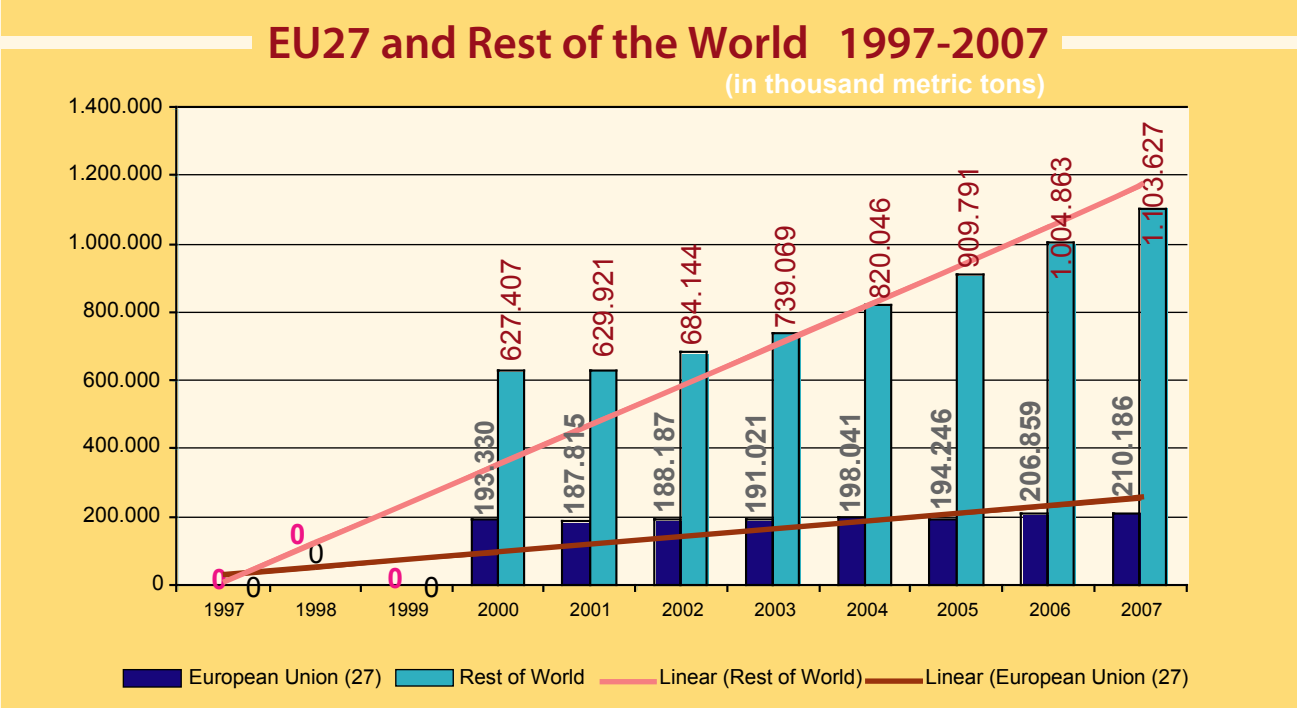
The largest factor for this is the influence of China, its share of the world steel consumption has risen to about 30% in 2006 and continued to grow in 2007.
The output of the world's steel industry reached new heights in recent years. Each production figure of the last years was a new world record and as predicted goes further upwards.

In the European union the strongest steel producing country is still Germany, followed by Italy, France, Sweden and UK.



The main reasons for these positive prognoses are expectations for a further rise in per capita steel consumptions in China (currently 250 kg) and especially India (currently a meagre 30 kg and

this is the second most populous country in the world). The per-person consumptions of steel in the EU and the USA are at 400 kg, top of the list is Singapore with 600 kg.



The extraordinary growth rates in Asia (especially China) helped the steel industry worldwide to achieve good turnovers and to increase the price of steel in general over the last years. On top of that the industry was even able to elevate the profit margins to healthy regions – the significant increase in prices of raw materials such as iron ore, coke and scrap additionally pushed steel makers towards efficiency increases. It appears that all this made the industry in Europe and North America much more optimistic about their chances of survival in the face of a stronger Asian market presence. "Paradigm change" may be too grand a word but a partial shift towards higher-value products of more use to customers is visible. That in return may lessen the reliance on mass production commodity steel grades and focus more on complex, end-user oriented grades that will have their place in the future, providing profits.

The growth rates of global EAF steel production for the recent years were not as steep as the increase in crude steel production.

The main reason is China's focus on the blast furnace route to produce steel, so most of the new capacities there were not EAFs and in order to focus more on modern steel plants they shut-down some obsolete EAF capacity. Additionally the above mentioned reduced output of some larger groups in the face of market weaknesses – if given the choice, it is easier to cut down production on an EAF compared to slow down a blast furnace. This does not seem to be an ongoing trend, so a moderate but steady increase of steel production in EAFs is expected.

The steel demand outlook is solid and even improving and we're bullish on a further global cyclical recovery, but a threat of excess capacity is building in China. Sustained demand in Europe is necessary for prices to hold or producers could be asked to adjust more production. Steel demand growth will reduce availability of raw materials and keep the industry cost-curve high in the near-term. Steel scrap steel availability is of particular concern in medium-term, but more consolidated producers should sustain profitability in an industry where asset growth is low and turnover high.

II. Contributing to sustainable resource management

The products

At the same time the carbon and graphite industry's products for example in the steel recycling industry contributes to creating that cycle economy that makes optimal use of the resource iron and steel.

By having increased its efficiency in the specific graphite electrode consumption continuously, the industry has actively contributed to a saving in resources and energy consumption.

The product quality improvement in the area of cathodes and anodes used for the aluminium industry have seen similar improvements and therefore - also here - contribute to resource and energy savings.

In other areas new developments in the fuel cell technology for example, graphite contributes to the generation of new and cleaner energy generation which will in the long term save fossil fuels and reduce emissions.

Energy savings are also achieved when applying carbon fibres in transportation since its light weight factor reduces fuel consumption whilst at the same time providing strength and performance.

The operations

But not only the carbon and graphite products are contributing to resource and energy savings, the operations itself have also made a continuous strive to improve their EHS and energy management in order to become more sustainable and more competitive in an international context.

In fact, the carbon and graphite industry has for years been actively contributing to the efficient resource management by making for example best possible use of wastes and by-products from the coal and oil industry and turning them into valuable carbon and graphite products, some of them substituting the use of natural graphite.

Since ECGA members operate manufacturing sites across Europe and outside of Europe their performance improvement is based on a global approach and very often international standards whilst respecting the local legislative requirements.
Amongst the performance highlights are:

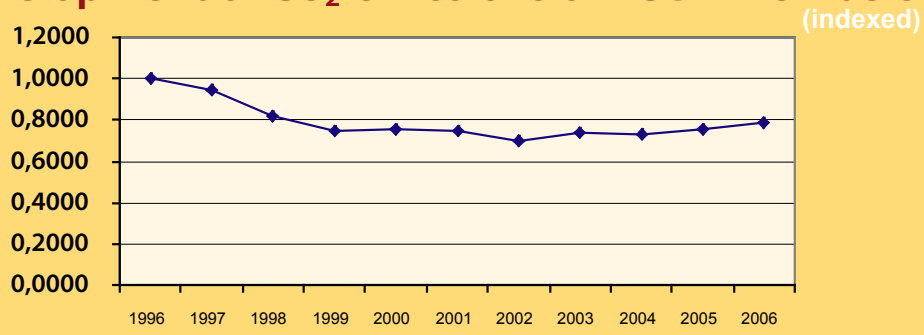
- ECGA members have reduced CO2 emissions per produced tonne of material from their factories by 20% since 1996;
- the emission of non-hazardous wastes was reduced by 20% over a ten-year period;

- the reduction of cooling water consumption per tonne of produced material over ten years amounted to 45%;

- dust emissions were reduced by 50% over the same period of ten years.

To protect the environment and meet future legal requirements based on EU directives, the carbon and graphite industry will have to invest significantly in environmental protection installations to prevent air pollution in the coming years.

Development of CO_2 emissions of ECGA members



The capital expenditure of ECGA members for environmental protection and improvement of the working and safety conditions will amount to more than 50 million € within the next few years, the first projects have almost been started.
In 2007 the EHSA Committee has continuously monitored the development of further EU and national EHS legislation, such as REACH, the EU's chemicals regulation.
According to this regulation all chemical substances and their different applications have to be registered, evaluated and finally authorised.
In this particular area the carbon and graphite industry was actively involved in the currently conducted risk assessment on coal tar pitch as a downstream user.

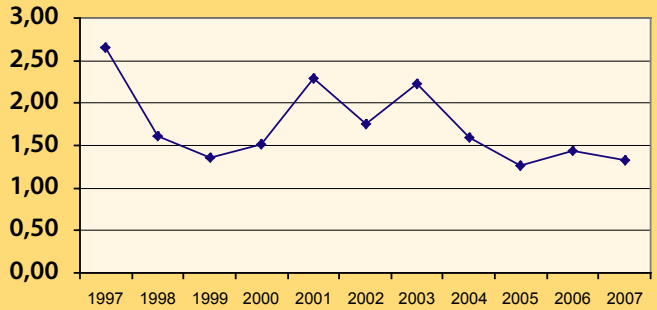
For the upcoming REACH regulation the ECGA members were informed extensively about the requirements for them as downstream users and for them as producers. A proposal of a change in the regulation at the beginning of 2008 suggested for the time being that certain carbon and graphite products would have to undergo registration.

Safety Performance

Thanks to the continuous and sustainable application of highly developed Health and Safety practices by the ECGA members in the last years a successful improvement of the Safety Performance Index and a significant regression of the key accident indicators could be attained.

Frequency Rate Index for ECGA Members

(Number of lost time accidents related to 200.000 hours worked)



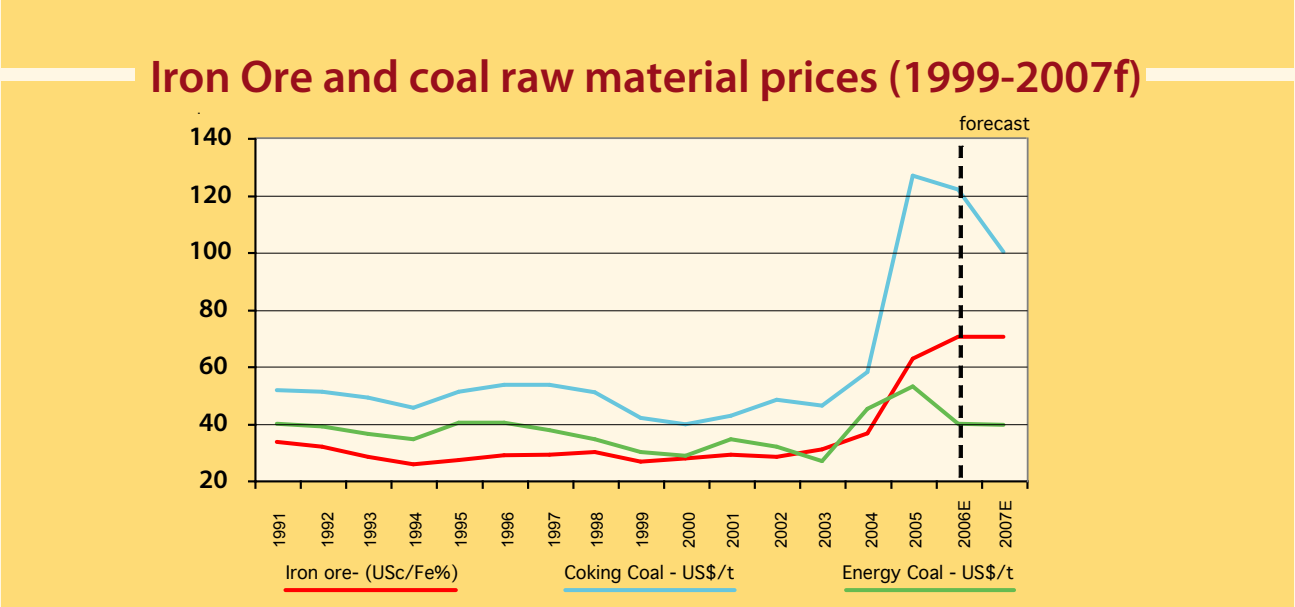
By the means of plant modernisation and streamlining, specific process instructions, consistent internal auditing and detailed accident and incident investigations this improvement could be made possible. As it can be seen in the presented charts not only the number of accidents (frequency rate) declined but also the absence of the job - time (severity rate) caused by accidents.
Although the efforts and measures of the ECGA members to establish and maintain high-levelled environmental standards during the last years as a result of stringent legislative requirements the future requirements might hamper the industrial activities and the global competition.

III. Raw materials and energy

The European Carbon and Graphite industry full heartedly support Commissioner Verheugen's initiative on the sustainable access to resources which was launched in 2007 and which will address five basic pillars:

- *increasing access to resources from European sources;*
- *improving the transparency and level playing field with regard to resource inputs from outside of Europe;*
- *improving the efficiency of resource use in the EU;*
- *improving the capacity in and outside of Europe in order to deal with resource management in a sustainable manner; and*
- *increasing the knowledge base about our resources.*

The expectation is that this will give a boost to the development of raw materials and will for example also address the shortage of coke worldwide.
Raw material prices have increased substantially in the past years and have an impact on the competitiveness of the carbon and graphite, but also the downstream user industries.

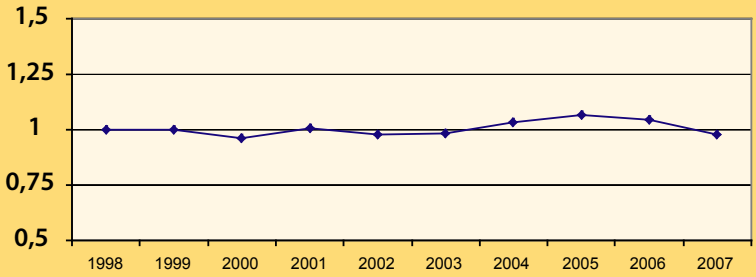


Energy issues

In this context in particular the sector was looking forward to the outcome of the first working groups on energy and related issues since the carbon and graphite industry itself is also user of substantial amounts of energy and the rising costs in the past years have threatened the

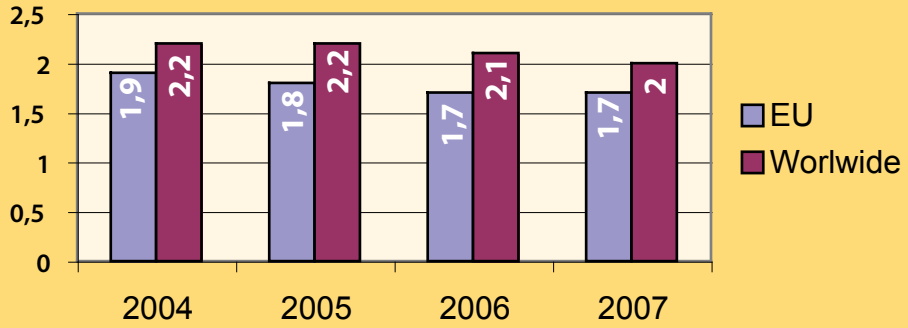
competitiveness of the EU industry in comparison to its global competitors. Parts of the carbon and graphite industry can be considered energy intensive due to the fact that for example the graphite electrode which is an integral part of all types of steel making requires substantial amounts of energy in order to achieve higher longevity of the electrode in the steel furnace.

Energy consumption Index of ECGA members 1996-2007



Hence, whilst the specific consumption of electrodes in furnaces per ton of steel has decreased over the past decades and continues to decrease the improved quality of the graphite electrode and the abatement techniques for the environmental protection overall have increased the energy consumption per tonne of product, only partly offsetting process efficiency.

Evolution of the average graphite electrodes consumption in the steel industry



The sector welcomes the recommendations that were formulated by the High Level Group and its various energy related working groups with regard to the competitive pricing, the unbundling of the supply structures and the creation of a truly free market in energy supply in Europe.

However, the new proposal for the European Emission trading scheme post 2013 will be another constraint on the competitiveness of the European graphite industry by imposing further costs on the enterprises which competing producers worldwide do not have to reckon with.
It is therefore crucial that energy intensive industries which face fierce competition are given special allowances in this new scheme.

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Graphic Design V.D.H.O. +32 475 60 30 74 Brussels - Belgium
Printed by Breuerdruck Dusseldorf - Germany