

# The Copper Industry's EU Newsletter

## JAN 08

from The European Copper Institute

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### EDITORIAL

## An exciting year ahead

*Luc Delagaye, ECI Chairman and Cumerio CEO*



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perceptions and expectations of policy-makers, regulators and other stakeholders regarding copper and its industry.

This newsletter comes as a direct result of this survey which identified the need expressed by EU officials for more information about copper, and, in particular, recycling and energy saving.

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This comprehensive assessment should pave the way for the confirmation that the production and use of copper products is safe both for Europe's environment and for the health of its citizens.

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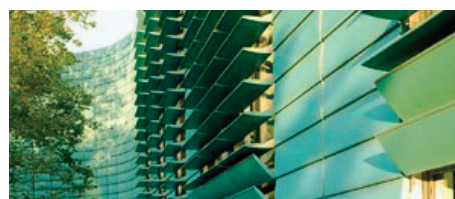
## The World in 2008

*Professor Philippe Chalmin, University of Paris Dauphine*

The first days of 2008 were filled with news of both records and troubling facts. Oil reached \$100 a barrel in New York, gold prices rose to \$900 an ounce and prices of commodities, ranging from soybeans and cobalt to corn and platinum, reached record levels. On the whole, commodity prices have reached their highest levels ever at current prices and, in constant dollar prices, are nearly as high as during the 1974 crisis.

In economic terms, the recent weeks have been filled by bad news. The so-called "sub prime crisis" is far from over. Housing markets in the US are still declining and everybody is frantically searching for the \$250 to \$400 billions lost by the world's financial industry.

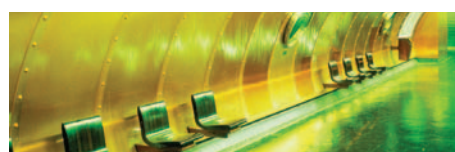
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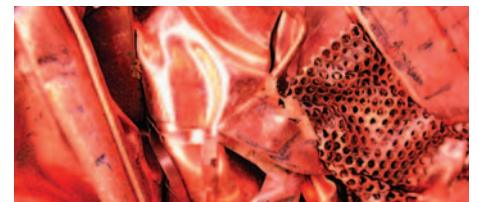
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## EDITORIAL

# An exciting year ahead

*By Luc Delagaye, ECI Chairman and Cumerio CEO*

2007 saw the completion of the European Copper Institute's opinion survey to help it better understand the perceptions and expectations of policy-makers, regulators and other stakeholders regarding copper and its industry.

In preparation for REACH, a Copper Consortium has just been formed. To maximise efficiency, Members will jointly fund the activities necessary for the registration of copper metal and the various by-products arising from the production process.

“This newsletter will offer readers information on copper in general, as well as the various activities undertaken by ECI.”



More generally, the results of the Risk Assessment will provide a solid scientific basis on which all future references to copper in EU environment and health legislation should be based. As a metal naturally present in the environment and used in a very wide range of applications, copper is affected by a range of EU policies and legislation.

Recognising the need to be able to make sound inputs into various EU policies on energy usage, emissions trading, sus-

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tainable development and life-cycle analysis, ECI has also developed a comprehensive database to track production and energy consumption data for the key industry sectors.

This newsletter, to be published three times a year, will offer readers information on copper in general, as well as the various activities undertaken by ECI. It will communicate how the copper industry is working to put into practice its commitment to the EU's goals, e.g. on recycling, energy efficiency, global warming, renewables and the promotion of sustainable development, as well as illustrating the contribution made by copper products to many aspects of EU citizens' daily lives. ■

## FEATURE

# The World in 2008

By Professor Philippe Chalmin, University of Paris Dauphine

The first days of 2008 were filled with news of both records and troubling facts. Oil reached \$100 a barrel in New York, gold prices rose to \$900 an ounce and prices of commodities, ranging from soybeans and cobalt to corn and platinum, reached record levels. On the whole, commodity prices have reached their highest levels ever at current prices and, in constant dollar prices, are nearly as high as during the 1974 crisis.

In economic terms, the recent weeks have been filled by bad news. The so-called "sub prime crisis" is far from over. Housing markets in the US are still declining and everybody is frantically searching for the \$250 to \$400 billions lost by the world's financial industry. The extent of this amount points to a true crisis in liquidity and a lack of confidence in even the best financial names. Economic activity is slowing throughout the US and Europe and the chances of a recession are growing daily.

Nevertheless, world economic forecasts remain at pretty high levels, with around 4% growth projected for 2008. This is, of course, not only due to the emerging economies of China and India, but also commodity-producing countries such as Russia and Brazil. The big question is whether the western economic turmoil will have much impact on those countries and especially on China? With the Olympic Games in Beijing in August 2008, any adjustment would need to be postponed at least to 2009 or later (after the World Expo in Shanghai in 2010!).

What does this mean for commodity prices in 2008? Under "normal" geopolitical and climatic conditions, we should see lower prices both for energy and for agricultural products. My forecast for the average Brent price is \$70 a barrel. For most non-ferrous



metals, peak prices seem something of the past, as shown by nickel, zinc and lead.

Copper will be probably one of the most interesting commodities to watch in 2008. With demand slowing in Europe and the U.S., everything will depend on the firmness of Asian - and especially Chinese - demand.

But one thing that is sure for copper, as well as for other commodities and the dollar itself, is that volatility will be very high in 2008 and anything can happen in a world where, from Pakistan to Congo, from Iran to Sudan, peace is definitely a scarce commodity. ■

**“Copper will be probably one of the most interesting commodities to watch in 2008.”**

## CONSTRUCTION

# Copper - the hidden key ingredient

It's hard to imagine a world without copper. Copper not only makes our homes, schools and businesses safe, functional, efficient, comfortable and decorative, but also gives years of reliable service. And - a further major plus - when it has reached the end of its useful life, it is 100% recyclable!

Although much of it is not visible, copper is everywhere in today's homes and workplaces. Copper is the vital - but often hidden - ingredient that ensures that our homes and workplaces function safely, efficiently and comfortably.

Among non-precious metals, copper is the most efficient conductor of electricity and heat. It delivers current and heat to our homes and workplaces, ensuring distribution to wherever we may wish to use it, and provides easy access to a broad array of entertainment and communications systems.

But, because much of it is hidden behind the walls of our homes and offices in the form of metres of telephone lines, data and electrical cabling, we are not always aware of copper's role in ensuring that the many appliances we now take for granted as everyday necessities actually work properly.

In addition, copper, due to its high resistance to corrosion and long-lasting properties, is also widely used for plumbing, heating, and air conditioning. This is also due, in part, to its anti-microbial properties, which can help inhibit the growth of harmful bacteria, such as legionella.

However, not all copper's uses in homes, offices or factories are hidden. Copper is a major constituent of taps, radiators and door handles, roofs and cladding, as well as facades, doors and window frames. It is used in its pure state or



alloyed with tin to create bronze or with zinc to create brass. Builders, architects and designers choose this metal because of its malleability, resistance to corrosion, durability, as well as aesthetic properties.

In addition to its more functional uses, copper and its alloys are popular in interior design applications. At the recent *Milan Triennial* (29 November - 30 December 2007), the latest creations from some of the world's most renowned designers, demonstrating the intrinsic and aesthetic potential of the 'red' metal, were showcased.

Once copper products have reached the end of what might be called their first lives, they can be recycled and used to make new products, making copper the 'red' metal that is 'green'. Copper is an important part of a global, environmentally friendly approach to sustainable construction. In 2005, according to the International Copper Study Group<sup>1</sup>, a substantial 41% of Europe's copper usage was met by recycling. Building construction products, for example, typically contain more than 70% recycled content. Moreover, products made from copper are highly durable, with lives ranging from several years to as long as several centuries, depending upon the application.

The European copper industry promotes sustainable construction and welcomes initiatives which provide incentives to industry to develop more sustainable products and solutions. In this context, the *Lead Markets Initiative*, announced by the European Commission on 7 January 2008, would appear to be a positive one.

Copper is one of the few materials that does not decompose or lose its chemical or physical properties during the recycling process. This means that there is no difference between recycled copper and that extracted from a mine. It is thus a sustainable material par excellence making a vital and major contribution to building a sustainable future.

In future issues of this newsletter, we will look at copper's role in the house of the future and architecture. ■

For more information, please visit [www.copperconcept.org](http://www.copperconcept.org)

1. The International Copper Study Group (ICSG) is an inter-governmental organisation, based in Lisbon, which publishes copper production and demand statistics. Website: [www.icsg.org](http://www.icsg.org)

## Links

### Milan Triennial

<http://www.eurocopper.org/doc/uploaded/File/catalogue.pdf>

### Lead Markets Initiative

<http://ec.europa.eu/enterprise/leadmarket/leadmarket.htm>

## ELECTRICITY &amp; ENERGY

# How copper can radically reduce CO<sub>2</sub> emissions

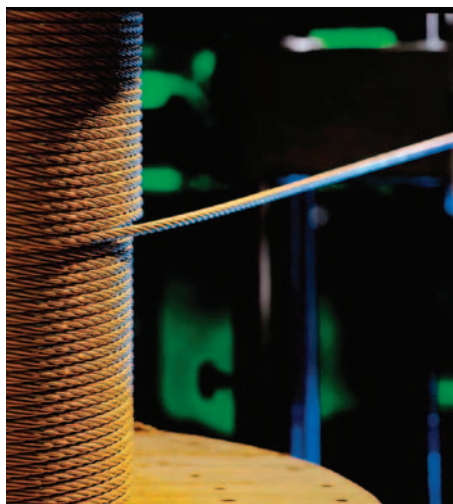
Copper has a key role in the generation and distribution of electricity to power our industries, businesses and homes. It also helps to save energy and, as a consequence, reduce CO<sub>2</sub> emissions and combat climate change. It has a key contribution to make in the attainment of the EU's target that 20% of Europe's energy will come from renewable sources by 2020 - the subject of Directive 2001/77/EC - both in terms of energy efficiency and the development of renewable resources.

Some of the European Union's main goals include the rational use of energy, the reduction of CO<sub>2</sub> emissions and an increase in the percentage of electricity generated from renewable energy sources.

Of all the non-precious metals, copper is the most efficient conductor of electricity, a substantial 65% higher than aluminium. Because of its efficiency in terms of conductivity, copper enables a significant reduction in energy losses. This essential property makes it critical to energy production and distribution, so that both conventional (e.g. fossil fuels and nuclear) and renewable (wind, tidal and solar) sources rely heavily on copper. Through its use in generators, motors and transformers, copper is the main provider of electrical energy efficiency, essential for energy savings and reductions in CO<sub>2</sub> emissions.

It is also interesting to note that, in Europe, according to the International Wrought Copper Council<sup>2</sup>, 58% of refined copper is used in the electricity and energy field - more than twice as much as the 26% used in the next sector - building and construction.

In 1997, signatories to the Kyoto Protocol agreed on an overall objective of a 5% reduction in greenhouse gas emissions by 2010, with an objective of 8% for the EU (compared with 1990 levels).



One of the most effective ways to attain these is to improve energy yields, both reducing operating expenses and decreasing CO<sub>2</sub> emissions.

In Europe, over a quarter of electricity is consumed by households. Energy consumption is continuing to rise by 1% per year and, in order to meet this increasing demand, the Rational Use of Energy (RUE) is being promoted. This means using the least possible amount of energy for the same level of comfort, notably by enhancing energy efficiency.

In fact, energy efficiency is a source of savings that, on its own, could meet all the European Union's Kyoto objectives (roughly 270 million tonne lower CO<sub>2</sub> emissions per year), according to Professor R. Belmans of the University of Leuven, in Belgium. It is estimated that each tonne of copper used efficiently in improving the yield from energy systems leads to a saving of 200 tonne of CO<sub>2</sub>. For instance, according to experts of the Leonardo initiative, a 22 kW motor, 50% loaded for 50% of the time, saves well over 3,000 kg of CO<sub>2</sub> per kg of copper used.

An April 2004 study, prepared in the context of the European Commission's Motor Challenge initiative, demonstrated that over 200 billion kWh per year could

be saved in Europe simply by increasing the use of high-efficient electrical motor driven systems. High-efficiency electric motors contain 30% more copper and their use, recommended within the Motor Challenge, reduces electricity losses by 30%.

Copper is essential for solar technologies and also plays an important role in wind energy. The generator in a 1.5 MW wind turbine contains no less than 3.4 tonne of copper to convert the wind energy into electricity.

Moving to the level of the individual energy consumer, products such as refrigerators, coffee machines, ovens, computers and chargers could not function without copper, which constitutes between 1% and 20% by weight of such equipment. Increasing the amount of copper used in these applications improves their performance and reduces energy losses during use.

The next issues of this newsletter will examine copper's role in power quality (PQ), as well as developments regarding electrical safety in homes. ■

For more information, please visit [www.eurocopper.org/copper/electricity-energy.html](http://www.eurocopper.org/copper/electricity-energy.html)

2. The International Wrought Copper Council (IWCC) is a trade association representing the copper fabricating industry. Website: [www.coppercouncil.org/](http://www.coppercouncil.org/)

## Links

**EU Directive 2001/77/EC**  
<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2001:283:0033:0040:EN:PDF>

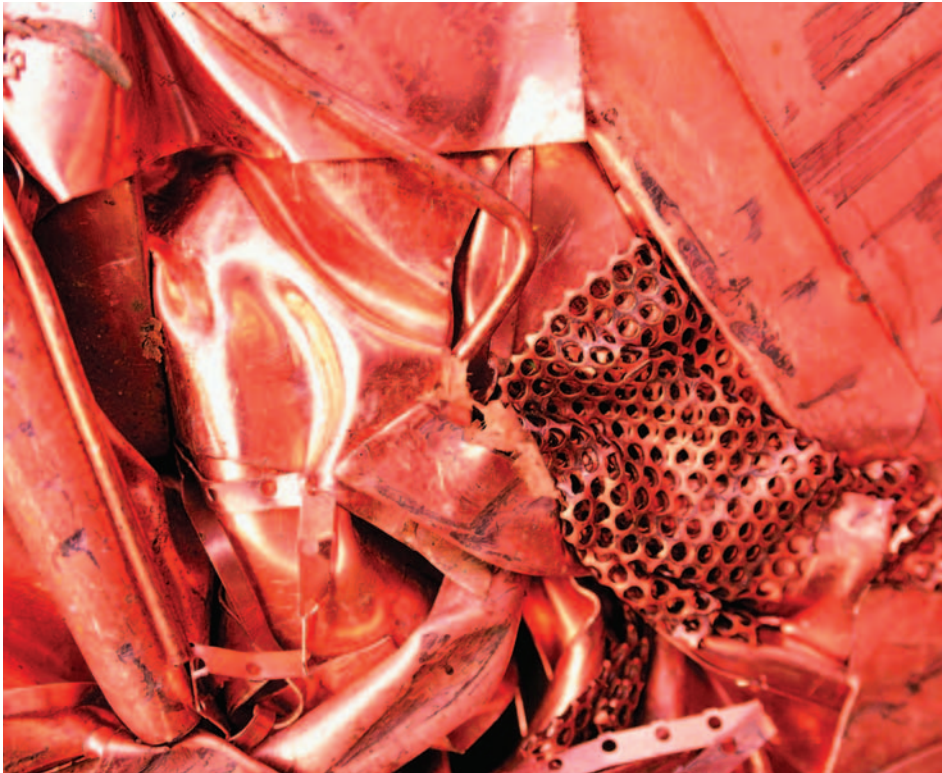
**Leonardo Initiative Eco-sheet**  
<http://www.leonardo-energy.org/drupal/files/Case1-22kW-50.pdf>

**April 2004 study**  
[http://www.eurocopper.org/doc/uploaded/File/HEM\\_lo.pdf](http://www.eurocopper.org/doc/uploaded/File/HEM_lo.pdf)

**EU Commission's Motor Challenge**  
<http://www.eurocopper.org/doc/uploaded/File/MOTOR-EN.pdf>

## ENVIRONMENT

# When red also means green



Copper is the oldest metal used by man and has served a wide range of purposes over more than ten thousand years, from the oldest coins to today's high technology in wind turbines. It is also 100% recyclable and this vital feature saves energy and helps to conserve natural resources. According to the International Copper Study Group<sup>3</sup>, 41% of the demand for copper in Europe each year is met through recycling.

Copper is a metal that is naturally present in the earth's crust and is essential to the development of all forms of life. It is the oldest metal used by man, with the first copper coins dating from 8,700 B.C. Alloyed with tin, copper made the Bronze Age possible. Along with its excellent electrical conductivity, it then went on to play a key role during the second industrial revolution and, indeed, continues to do so today, particularly in the fields of energy, transport and new information technologies.

Since the beginning of the 20<sup>th</sup> century, world demand for copper has increased from half a million tonne in 1900 to 17.2 million in 2006. In 2005, 34% of the world's copper usage was met by recycling and this figure was even higher - at 41% - in Europe. It is expected that, over time, the proportion of world copper usage derived from recycling will increase further.

Copper comes from three sources:

- the extraction and processing (refining) of mineral ores, called 'primary production';
- the direct recycling of 'new scrap' (resulting from the manufacturing process and downstream value chain operations) and
- the recycling of end-of-life products, together called 'secondary production'

The use of copper, which is extremely durable, helps to limit waste volumes. Ever since man first used copper, it has been recycled and turned into new

products. Recycling has the obvious advantage of reducing the need for natural resources. It also decreases energy consumption (up to 85% compared to mining copper) and reduces waste disposal problems.

An additional benefit is that copper loses none of its properties in the recycling process. The copper coins in your pocket today may contain metal that was once used by the Romans for their decorations, or by the Egyptians for their water pipes! It is estimated that 80% of the copper used since antiquity is still in circulation today.

The European Environment Agency (EEA) expects that Europeans will generate 45% more waste in 2020 than they did in 1995. A part of this waste contains copper, especially electrical and electronic equipment (computers, mobile phones, etc.), with up to 20% of their weight in copper. 'WEEE' (Waste Electrical and Electronic Equipment) is covered by a specific European Directive (Directive 2002/96/EC) which stipulates, for each EU member state, an average recovery objective of 4 kg/inhabitant/year.

In forthcoming issues of this newsletter, we will focus on the issue of the recycling of copper in the context of the revision of the WEEE Directive, on the place of copper in eco-design and on the reduced use of energy by Europe's copper industry. ■

For more information, please visit <http://www.eurocopper.org/copper/overview-health-environment.html>

3. The International Copper Study Group (ICSG) is an inter-governmental organisation, based in Lisbon, which publishes copper production and demand statistics. Website: [www.icsg.org](http://www.icsg.org)

## Links

EU Directive 2002/96/EC

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002L0096:EN:HTML>

## HEALTH

# Copper - essential for human health

Copper, zinc and iron make up a trio of minerals that are essential for our wellbeing. According to International Health Committees, we should ensure we have a daily intake of copper. This brief article looks at why copper is essential to human health, how much we need and points to the best sources of this vital trace element.

Naturally present in the body and in the environment, copper is a vital trace element, especially for a foetus or a child. Copper participates in the development of many physiological functions, including the nervous and cardiovascular systems, iron transport and bone growth, while also ensuring the proper functioning of the immune functions.

Throughout life, the body needs a regular supply of copper to stay in good health and there would appear to be greater risk of health effects from a deficiency of copper intake than from excess consumption<sup>4</sup>. International Health Committees, such as the IPCS (WHO), and the US National Academy of Science, recommend that healthy adults have an intake of 1.3 mg per day. Sensitive individuals, such as elderly people, may benefit from a slightly higher intake. A lack of copper may provoke anaemia, because copper helps to absorb iron into the system.

There may be a relationship between copper deficiency and the development of cardiovascular illnesses, as well as copper deficiency-related neurological syndromes. Copper has an impact on the normal metabolism of cholesterol: healthy adults whose diet contains low levels of copper have higher rates of LDL ("bad") cholesterol and lower rates of HDL ("good") cholesterol.

Copper also plays an important role in the health of the skeletal system.



Studies suggest the existence of possible correlations between copper deficiency and osteoporosis, because the element plays an active role in bone mineralisation.

So where can we find copper in our everyday foods? Chocolate, for example, is rich in copper. Other sources include seafood, offal (such as liver), whole grains, nuts, grapes and certain legumes (such as beans, peas and lentils).

In a future issue, we will describe a UK hospital trial investigating the potential for copper's special anti-microbial properties to combat harmful pathogens such as MRSA. ■

For more information, please visit [www.eurocopper.org/doc/uploaded/File/Chocolat%20PR%20EN.pdf](http://www.eurocopper.org/doc/uploaded/File/Chocolat%20PR%20EN.pdf)

4. According to the International Programme on Chemical Safety (WHO), "from available data on human exposures worldwide, but particularly in Europe and the Americas, there is greater risk of health effects from a deficiency in copper intake than from an excess in copper intake".

“Naturally present in the body and in the environment, copper is a vital trace element.”

## TRANSPORT

# Copper's electrical benefits on the road

Copper's electrical conductivity makes its role critical for transport. Over 100 years, the motor car has greatly benefited from technological innovations and become a 'smart' object ensuring its user's safety and comfort. Moreover, copper's 100% recyclability helps to meet the requirements of the EU's Directive 2000/53/EC on end-of-life vehicles which sets clear, quantified targets for the re-use, recycling and recovery of vehicles and their components.

Copper is a multi-purpose material, whose high-performance properties have made it a key component in vehicles since the dawn of the car industry. Ever in the forefront of technological innovation, the red metal has greatly improved vehicle efficiency, comfort, safety, energy consumption and environmental friendliness on a daily basis.

While copper was used, to a relatively small extent, in the famous 1916 Model T Ford, it now plays a critical role in modern cars, with even the most basic model containing some 2 km of wiring, mostly used to carry data, send control signals and supply electrical power. The average passenger car contains about 25 kg of copper and its use, a key player in electronics, is likely to grow in the most innovative vehicles.

In the 1960s, the first electronically controlled automatic transmission, followed a few years later by the fully electronic ignition, certainly seemed revolutionary. But now, almost 50 years on, modern vehicles, equipped as they are with electronic brains, every component of which makes use of copper, are commonplace.

Today's car is much more than just a means of transportation. It is designed to be comfortable and equipped with work and leisure spaces. Seats are able to remember and automatically adjust to the passenger because of



an array of small motors. Automatic warmth or cooling controls keep the interior at a comfortable temperature and telecommunications are accessible from behind the wheel of even relatively inexpensive vehicles (hands-free mobile phones, navigation assistance, security trackers, DVD players and even Internet connectivity).

From an environmental perspective, developing cleaner cars is one of the key challenges of this century. Copper is a major asset in combating the greenhouse gas effect in new processes designed to reduce fuel consumption and CO<sub>2</sub> emissions. Using direct injection systems that make use of copper's unique properties, the air/fuel ratio is more precise, thereby cutting both fuel consumption and gas emissions.

On average, we spend six years of our lives and 16% of our income travelling. Given that 20% of all energy consumption is used in transportation, and that non-renewable energy reserves are finite, researchers are actively looking at new propulsion systems. Firstly, hybrids, which combine conventional combustion engines with electric motors, can provide an interim solution where conventional fuels are used for long journeys and the electric motor for the urban environment. Secondly, work is being done to develop fuel cell

driven engines, a solution that creates almost no pollution! These two different systems, both with their powerful electric motors, can contain up to 12 kg of copper. All these contribute to the EU's goal of limiting CO<sub>2</sub> emissions in cars (proposal published on 19 December 2007).

Future editions of this newsletter will deal with aspects such as copper's role in the efficiency and safety of Europe's high speed trains and the development of the CuproBraz® radiator technology for both trains and trucks. ■

For more information, please visit [www.eurocopper.org/doc/uploaded/File/Copper%20Supplement.pdf](http://www.eurocopper.org/doc/uploaded/File/Copper%20Supplement.pdf)

## Links

EU Directive 2000/53/EC  
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Proposal  
[http://ec.europa.eu/environment/co2/co2\\_home.htm](http://ec.europa.eu/environment/co2/co2_home.htm)

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