

09

Chlorine Industry Review

2009-2010

The spectre of substitution
calls for vigilance



Euro Chlor
representing the chlor-alkali industry

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Cover: Clean, healthy water has been associated for more than a century with chlorination. However, few people are aware of the fact that chlorine and its co-product caustic soda are building blocks for many high-tech product lines that are – among many other applications – essential for more efficient energy management on Planet Earth.



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01 Introduction



The spectre of substitution calls for vigilance

Has our industry become the object of media attention again? And if it has, in what way, what are the implications and should we be concerned?

The answer is yes, but not directly and yes, we should be concerned. For some time now the Regulation on Hazardous Substances (RoHS) has been under review by the European Parliament with the environmental lobby calling for a ban on organochlorines, organobromides and PVC for use in electric appliances.

Now this may not immediately ring any alarm bells but it is not an isolated event. Earlier this year a restriction on the use of dichloromethane in paint strippers (except for industrial installations) was passed which signals that the full frontal attack on chlorine which occurred in the nineties may have diminished but chlorine containing substances are still the subject of attention today. What we should be most concerned about is the manner in which these decisions are taken. I refer to the extravagant and libertine use of the Precautionary Principle where the risk based decision-making process is pushed aside and replaced by the doom driven imaginations of activists. In the event, the Parliamentary Environmental Committee and the plenary vote in Parliament did not result in a ban but these chlorine containing substances are put in a 'candidate list' for future consideration so the threat has not gone away.

This may sound very benign but there are implications here which need to be kept in mind – and this is what we should be concerned about. It is the spectre of substitution.

Consider this – the Cefic Policy Centre sees substitution being implemented in two distinctly different ways. The first is the obvious one – by legislation. Under REACH, authorization will be given on condition of a legal obligation to substitute by a given date. The second one which I am addressing in this foreword is market driven substitution.





It is gratifying to report that investment in new membrane plants to replace mercury based ones continues even in the austere economic climate the chlor-alkali industry operates in

Market driven substitution can be more difficult to tackle because it is never obvious just who is driving it in any particular instance. Take PVC for example, the largest single consumer for chlorine, and the recent case of dichloromethane. It is all very well to say it's the environmentalists who are the activists trying to have it banned but downstream users and retailers play a role here too. This stakeholder group is driven by a desire to satisfy and attract consumers using a strategy based on consumer perceptions of environmental and health risks. The question of how we can influence such perceptions must remain rhetorical for the moment.

There is nothing new in this – what is new is the threat of self-destruction brought about through the opportunity to profit from deselection through the supply of substitute products by manipulating the regulatory process. There are increasing instances of companies encouraging legislators to resist defense strategies by offering substitutes whose testing provenance is often not complete. This is bad practice and will result in splintering our chemical industry as a whole. We will look foolish, and worse still our efforts to act from a position of unison and the strength which that brings will be seriously compromised.

On a more positive and less controversial note it is gratifying to report that investment in new membrane plants to replace mercury-based ones continues even in the austere economic climate in which we still operate. Membrane technology now accounts for 50% of our installed capacity which means we remain on

track in meeting our voluntary commitment to have converted all mercury based chlor alkali capacity by 2020. Considering the slow rate of recovery in our sector this is a major act of faith by our membership!

Meanwhile, within the climate change and energy arena the ETS debate continues. At the time of writing, a paper from DG Competition detailing guidelines enabling the Member States to offer state aid to electro-intensive industries is still awaited. This is many months overdue and probably reflects a change in thinking from the new Commissioner influenced no doubt by national governments and other stakeholders. In the aftermath of Copenhagen where no global agreements were achieved, calls to increase carbon emission targets from 20 to 30% have so far been successfully rebutted by manufacturing industry. Optimism remains high that we will succeed in achieving some measure of state aid compensation for carbon inflated electricity prices but the level is very much in question with the real effect of carbon leakage being challenged.

For the future we will remain vigilant in identifying the threats for our industry but are optimistic that we can deal with these through the collective efforts of our membership.


Alistair J. Steel
Executive Director

02 Sustainability

Continuous efforts for improvement

“Perhaps it is rational that progress towards our 2010 sustainability goals has diminished. In some areas achieving further improvement becomes much more difficult as we approach the targets. Still, those companies in the upper quartile of performers have been able to maintain their position. As a professional organisation we must ask ourselves what needs to be done in order to realise the improvement we aim at. If we don’t, we waste an opportunity to create value.”

Alistair J. Steel



Bayer CropScience



Bayer CropScience

Unified strategic approach

All of the Western European chlorine manufacturing members of Euro Chlor agreed in 2001 on an industry-wide strategy that focused on six voluntary commitments. These were first developed to ensure a united industry approach and commitment to address key sustainability concerns:

- Include environmental, social and economic factors in all strategic business decisions;
- Optimize energy efficiency in chlorine production;
- Reduce water usage through recycling;
- Continuously reduce polluting emissions to water, air and land;
- Use more hydrogen generated by the industry as a raw material or fuel;
- Give high priority to safe transportation of chlorine.

In parallel, data was collected for 2001-02 and with this information, 14 performance indicators and improvement goals were agreed among producers and announced by Euro Chlor in January 2003. Then the following year, a 15th indicator was added that required members to gain EMAS and/or ISO 14001 Environmental Accreditation for their plants.

These indicators come under the following main areas: economic aspects of production, environmental protection, safety and social progress and for some of them targets were fixed for 2010. Each year, producers are required to report their progress to Euro Chlor, which combines feedback to report to the association's Management Committee prior to an-

nual publication of the industry's performance. In this section, we report on performance indicators and progress in 2009. Whilst the programme continues to be a powerful force for change, not all the indicators show the same degree of progress.

Economic contribution

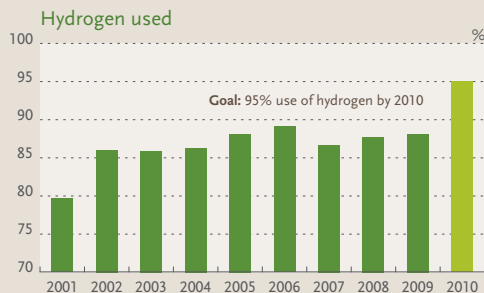
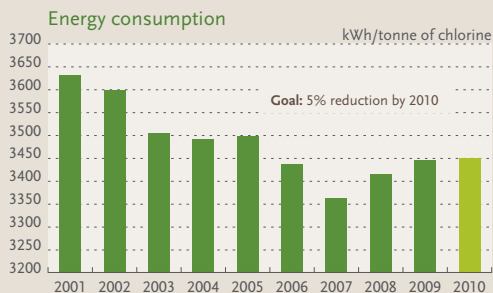
Energy use

Target: By 2010, reduce industry-wide energy consumption by 5% in terms of kWh/tonne of chlorine produced compared with the 2001 base year.

Update: As for the previous year, there was an increase in 2009, but the average energy consumption is still slightly below the target fixed for 2010, with a value of 3,445 kWh/t of chlorine produced. The global trend is related to the progressive conversion from mercury to membrane technology, with the last two years disruptions probably due to production rate fluctuations caused by the economic crisis.

Background: Since electricity is an indispensable raw material of the chlorine production process, the basic consumption – corresponding to the electrochemical reaction – cannot be significantly reduced. However, converting one technology into a more efficient one may save a certain amount of energy and, to a lesser degree, reduce ancillary energy use. The energy indicator is weight-averaged across all producers and based on steam and electricity. Energy is mainly used for electrolysis (transformers, rectifiers and cells) and also for illumination

Many effective and safe crop protection formulae rely on chlorinated substances



Energy consumption

Real ■
Objective ■

Hydrogen utilisation

Real ■
Objective ■

and motor power (pumps, compressors, centrifuges, etc.). Steam is used mainly for caustic soda concentration to 50% and for minor utility purposes.

Hydrogen use

Target: Increase use of hydrogen gas from 80% (2001) to 95% by 2010.

Update: In 2009, the percentage of hydrogen use again increased slightly to 88.1%, but the general trend has been roughly flat for several years, with a value quite low compared to the target of 95%. About one third of the companies are below 80%, with two not even reaching 50%.

Comment: The 2010 goal will be very difficult to achieve, but several hydrogen fuel cell projects have been announced!

Background: High-quality hydrogen is co-produced with chlorine and caustic soda during the electrolysis of brine. This can be used as a raw material for other processes or as fuel to produce steam; technologies are in development to allow for local electricity recovery via fuel cells.

Manufacturing technology

Target: The percentage of chlorine produced by mercury cells, diaphragm cells, membrane cells and other technologies will be communicated on a yearly basis.

Update: Membrane technology now represents almost half (49.8%) of the installed production capacity at Euro Chlor members. The mercury process accounts for 33.5% at the beginning of

2010, continuing the progressive phase out of this technology in line with the Chlor Alkali sector's voluntary agreement. The diaphragm process still accounts for about 14% of the total capacity.

Economic development

Target: Euro Chlor has decided to report monthly, quarterly and annually data on European production of chlorine and caustic soda. This includes utilization rates, caustic stocks, capacity and technology by plants and applications.

Update: In 2009, Euro Chlor continued to publish on its website and distribute to the media figures for monthly chlorine production and caustic soda stocks. The Industry Review includes every year a map of Europe showing the location of all plants and a table indicating the location, ownership, technologies and capacity of each plant (see p.43 for the situation at the end of 2009).

Safety & social progress

Lost-time injuries

Target: To reduce lost-time injuries (LTI) to 1.3 per million working hours for all workers - both company employees and contractors working in production units.

Update: The 2009 figures for employees did not really change (slight decrease of 0.1, giving a value of 7.2 which is the lowest level since 2001), but this is still much too high compared with the ambitious target of 1.3. Unfortunately, the rate for contractors increased to 8.9.



Freitag/PVC Plus/Bertina Koch

Even old truck sheeting protection is recycled into handsome and sustainable PVC handbags

Comment: All kinds of accidents are considered here, not only those specific to the chlor-alkali plant. Even if the long-term trends show a small reduction (mostly for contractors), the figures remain much too high compared with the target. For employees, the values have stayed roughly level for more than 5 years. There is a marked need for additional efforts by a number of companies in order to achieve significant improvement for both indicators.

Background: A lost time injury (LTI) results in at least one day of absence from work. It is reported as the number of LTI per million working hours. The figures from companies reporting on a three day period of absence are converted to a “one day” equivalent using a Cefic correlation.

Process incidents and losses

Target: A 75% reduction in the number of process incidents from 67 (2001) to 15.

Update: After having been at the level of the 2010 target for 3 years, the number of incidents increased in 2008 and again in 2009 to reach a value of 22.

Comment: The past results show that the 2010 target can still be achieved, but efforts are needed.

PVC sustainable development on track despite the global recession

As reported by Vinyl 2010 in its 2010 annual progress report, the European PVC industry recycled 194,950 tonnes of this chlorine-based plastic in 2009, continuing an exponential increase in the recycling of post-consumer PVC since 2004.

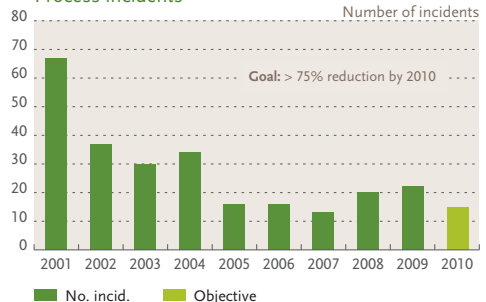
Vinyl 2010 is a voluntary commitment from industry groups representing the complete PVC value-chain: the European Council of Vinyl Manufacturers (ECVM), the European Plastics Converters (EuPC), the European Stabiliser Producers Association (ESPA) and the European Council for Plasticisers and Intermediates (ECPI).

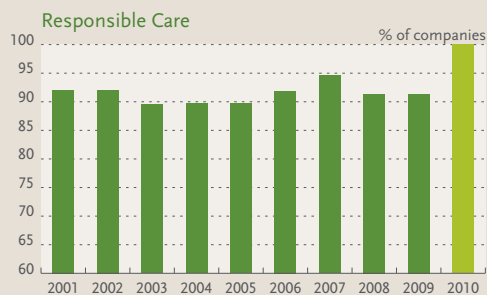
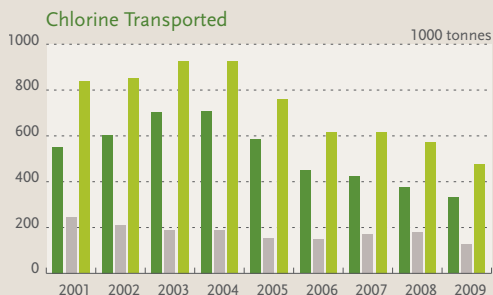
Vinyl 2010 says that progress towards targets set in 2000 shows that this particular approach to self-regulation is working and that the PVC industry’s sustainable development initiative is definitely on track to achieve its Voluntary Commitment 10-year targets despite the difficulties the entire industry has faced as a result of the global recession.

Lost Time Injuries - production units and contractors indicators (number of incidents for 1 million working hours) %



Process incidents





Chlorine Transported

- Bulk rail
- Bulk road
- Total without pipeline

Responsible Care

- Actual
- Objective

Background: Incidents are classified as events involving a fire, explosion or the release of chlorine, hydrochloric acid, sulphuric acid, sodium hypochlorite (bleach) or caustic soda, which cause a fatality, serious injury or property damage exceeding € 100,000. Losses include any of the above chemical spills in air, water or land, which impact human health or the environment, property or result in evacuation.

Transportation

Targets: Zero ‘transport incidents’ involving the bulk movement of chlorine by 2010. Additionally, the tonnage of chlorine transported as a percentage of the total chlorine produced will be reported annually as well as the mode of transport involved.

Update: Four transportation incidents were reported in 2009, while only one occurred in 2008. The quantity of chlorine transported in 2009 was reduced, compared to the previous years, probably mainly influenced by the economic crisis: chlorine producers in Europe transported 475,000 tonnes of chlorine, with almost 70% being shipped by rail and the remainder by road. The transport of chlorine (excluding pipelines) represented a bit more than 5% of the 2009 production. The average distance chlorine was transported by rail remained about 450 km and 170 km by road.

Background: A “chlorine transport incident” is one which either involves death or injury, a spill/leak of more than 5 kg, substantial property damage, public disruption of more than one hour or the intervention of emergency services or media coverage. The amount of

chlorine transported in Europe by rail and road has halved during the past decade. Chlorine movement is progressively decoupled from production through supplier/customer relocations, where possible, and more use of local pipe lines. Rail transport dominates; road transport for bulk supply is used only in the United Kingdom and, to a limited extent, in Spain, France and Portugal.

Responsible Care

Target: All chlorine-producing members of Euro Chlor to sign up to the ‘Responsible Care’ initiatives by 2010.

Update: Some companies are not convinced of the desirability of a formal commitment and have still not signed for the programme. As last year, the same 33 (out of 37) Euro Chlor full members are participating in national Responsible Care initiatives.

Background: Responsible Care is the chemical industry’s global voluntary initiative by which companies, through national associations, work together to continuously improve their health, safety and environmental performance and to communicate with stakeholders about their products and processes. Responsible Care was conceived in Canada and launched in 1985 to address public concerns about chemical manufacture, distribution and use. The number of national chemical industry associations embracing the Responsible Care ethic has grown considerably from 6 to 52 countries since 1992.



Responsible Care® is the global chemical industry initiative to continuously improve health, safety and environmental performance

Environmental protection

COC emissions

Target: Emissions of 22 chlorinated organic compounds (COCs) to be reduced in 2010 by 75% to water and by 50% to air against the 2001 base year.

Update: At end 2009, COC emissions from manufacturing plants confirmed globally the previous results for both water and air compartments, with even some further improvement; the consolidated values reached a level of 78% reduction for water, and more than 70% for the air performance.

Background: The COCs were selected from various international regulatory priority lists for emissions reductions and comprise the following substances: 1,1,1-trichloroethane; 1,1,2-trichloroethane; 1,2-dichlorobenzene; 1,2-dichloroethane; 1,4-dichlorobenzene; 2-chlorophenol; 3-chlorophenol; 4-chlorophenol; carbon tetrachloride; chlorine; chlorobenzene; chloroform; dichloromethane; dioxins & furans (as TEQ); hexachlorobenzene; hexachlorobutadiene; hexachlorocyclohexane; pentachlorophenol; tetrachloroethylene; trichlorobenzene; trichloroethylene and vinyl chloride. In 2005, pentachlorobenzene was added to the list of the substances to be monitored, in line with the requirements of the EU Water Framework Directive. To provide a longer-term perspective of the sector's commitment to reducing emissions, the data shown spans the period 1985-2009.



“We aim at pro-active communication with the stakeholders”

Wolfgang Marquardt
ECSA Manager

Wolfgang Marquardt studied chemistry at the Ludwig-Maximilians-University in Munich. Before joining Euro Chlor in 2007, he worked on his PhD thesis at the Walther-Straub-Institute of Pharmacology and Toxicology in Munich.

Wolfgang Marquardt started as science manager in the European Chlorinated Solvent Association (ECSA) and became the sector group manager of ECSA in 2009. He is responsible for the ECSA Management and the different working groups such as the General Technical, Occupational and Environmental Health, Product, Communication and Outreach, and Sustainability Groups.

REACH and sustainability: challenges for 2010

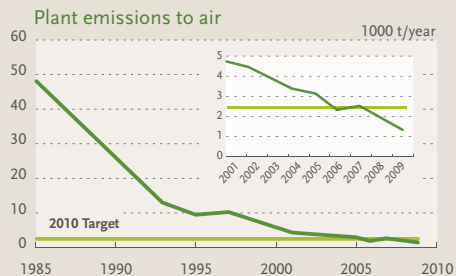
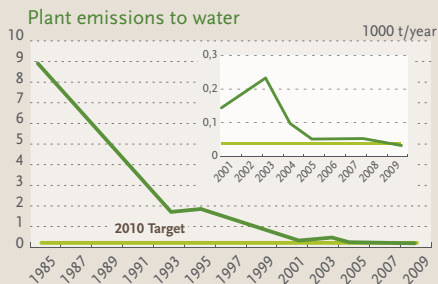
The main focus in 2010 is compliance with REACH. The REACH registration deadline end of 2010 is valid for five different chlorinated solvents; the preparation of the REACH dossiers is covered in a Chlorinated Solvent Consortium under ReachCentrum.

Besides regulatory compliance, ECSA has invested a lot of time in understanding how sustainability can be defined and further realised for chlorinated solvent products. Projects are ongoing, e.g. ECSA is a partner in an EU project to implement a training module for professional dry-cleaning shops - the Leonardo Da Vinci project with the European Commission.

A pro-active communication

ECSA will continue its efforts in scientific programs and on regulatory challenges and is aiming at pro-active communication towards stakeholders. The revamped website delivers comprehensive information about chlorinated solvents and adds tools for a further dialogue with the downstream users of chlorinated solvents in the future.

Chlorinated organic compounds



Plant emissions to water
Total
Target

Plant emissions to air
Total
Target

Mercury emissions

Target: Although all other programme deadlines are set for 2010, the industry decided to maintain an earlier 1998 commitment to achieve an emission target of 1 g Hg/t chlorine capacity on a national basis by end 2007, with no plant being above 1.5 g Hg/t chlorine capacity.

The industry opted for keeping the earlier date, since from October 2007 all EU chlor-alkali plants whether membrane, mercury or diaphragm require an operating permit under the Integrated Pollution Prevention and Control (IPPC) Directive.

Update: Overall European emissions in 2009 amounted to 0.93 g Hg/tonne chlorine capacity, practically identical to 2008 (0.92 g Hg/t).

Comment: The real evolution is more dramatic than what appears on the global trend; there was a clear reduction of the mercury emissions to air, but unfortunately we had to integrate a relatively high emission value in the liquid effluents of one plant.

Three plants are still above the 2007 target of 1.5 g Hg/tonne chlorine capacity for total emissions, even if 2 of them are very close to this value.

Product knowledge

Target: The industry agreed to provide full eco-toxicological and environmental data on 29 chlorinated substances under the International Council of Chemical Associations/ OECD initiative on high production volume (HPV) chemicals.

Update: These data have been published except for four HPV chemicals which were either no longer relevant (not commercially available anymore) or will be covered under REACH with a registration deadline of December 1st 2010). Key substance property data of substances registered under REACH will be made publicly available.

Environmental accreditation

Target: All full members to gain EMAS and/ or at least ISO 14001 Environmental Accreditation for their plants by 2010.

Update: there were no changes during 2009 and there are still 14 production sites with EMAS accreditation and 54 certified according to ISO 14001.

Background: EMAS (The Eco-Management and Audit Scheme) is the EU voluntary instrument which acknowledges organisations that improve their environmental performance on a continuous basis. EMAS registered organisations are legally compliant, run an environmental management system and report on their environmental performance through publication of an independently verified environmental statement. ISO 14001 is an international quality assurance standard to evaluate an organisation's environmental management systems and encourage continuous improvement. It helps organisations minimise negative environmental impacts (to air, water or land), comply with applicable laws/regulations and other environmentally-oriented requirements. It is often the case that ISO 14001 is used as a part of the EMAS registration process.



Jean-Pol Debelle
Technical Director

“We are working closely with member companies for continuous improvement in HSE fields”

Jean-Pol Debelle has a chemical engineering background and a long experience in chlorine production units within the Solvay Group. For more than five years now, he has been seconded to Euro Chlor to take charge of the technical aspects of health, safety and environmental protection issues (HSE).

Continuous improvement in HSE areas

Jean-Pol is managing several Working Groups exchanging experiences between member companies, leading to the publication of Guidance documents which continuously help improve performance in the health, safety and environmental protection areas. These documents are available to the whole membership via the Euro Chlor website.

On a global level (the World Chlorine Council), Euro Chlor is working with its international partner associations to enhance HSE aspects of chlor-alkali production.

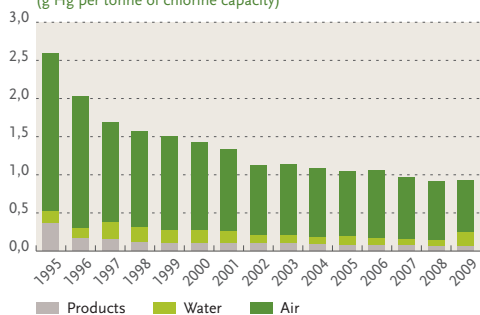
In support of regulatory work

The technical activities include support to the regulatory activities of Euro Chlor through the collection and analysis of technical data. In the health area, exposure to chlorine, mercury and electromagnetic fields are monitored and the appropriate protective measures proposed. Environmental protection covers the emissions of mercury to air, water and products, and the handling of waste; technological solutions for further reduction are discussed.

Euro Chlor is also working closely with the national authorities for the preparation of the new BAT reference document (BREF), which is of vital importance for the chlor-alkali units and their operating permits.

The Euro Chlor sustainability programme continues to monitor and publish a large number of sustainability parameters, thus contributing to the transparency of the sector towards all stakeholders.

European mercury emissions 1995-2009
(g Hg per tonne of chlorine capacity)



The World Chlorine Council® (WCC) is an ICCA committee representing the chlorine and chlorinated products industries. The WCC membership represents over 90 percent of global chlorine and caustic soda production. Overall, WCC is focused on engaging producers worldwide to achieve its 2007-2010 goals which focus on:

- Engaging the global chlorine and vinyl industries;
- Participating proactively in key international fora and coordinating advocacy on priority issues;
- Promoting continuous improvement in safety, environment and health performance;
- Demonstrating progress towards sustainability for chlorine chemistry; and
- Communicating the benefits of chlorine chemistry to society.

Outreach to the global chlor-alkali sector

In 2009 and 2010, WCC continued to strengthen relationships with the chlor-alkali associations of Russia, China, India and producers in the Asia-Pacific region. Outreach was also initiated in the Middle-East with a very productive meeting hosted by the Gulf Petrochemical and Chemical Association (GPCA) attended by companies from Qatar and Saudi Arabia which have expressed a strong wish to participate in future WCC activities.

Energy and Climate Change

During 2009 the WCC Management Committee followed the activities of the UN and G8 in order to provide the views of our industry. Attention was naturally focussed on the outcome of the UN organised climate change summit held in Copenhagen during December 2009 where attempts were planned to reach a global agreement on CO₂ reduction targets. Though not optimistic about achieving this there was some optimism about reaching agreement at the sectoral level. In the event no such agreement was reached with many regarding the summit a failure. Since then some regions, notably Europe and Japan, have further developed their own emission trading schemes based on emission reduction targets.

WCC continues to exchange intelligence on political activity across the globe in an attempt to influence decision making in a coherent and consistent way. However this is now a lower priority for some regions and a global approach is not foreseen in the short term.

Advocacy for Promoting Sound Implementation of International Conventions & Policies

WCC is currently engaged in more than 10 international treaties or intergovernmental programs that could impact chlorine-based processes or products. Advocacy efforts cover outreach to governments and industry contacts on issues relating to chlorine and its derivatives.



Huntsman

Optimal workers' safety through a combination of selected metals, natural and polymer materials

WCC advocacy efforts are focused on the following priority issues:

- Stockholm POPs Convention – The World Chlorine Council (WCC) has continued outreach to governments regarding the process and criteria for reviewing candidate chemicals. Industry's efforts have resulted in improvements in the assessment of candidate POPs and the use of such information for risk management.
- UNEP Global Mercury Programme – WCC continues to be an active participant to the UNEP Global Mercury Programme in providing its annual report on mercury use, consumption and emissions by mercury cell facilities. WCC is also a contributor to various Partnerships linked to the Programme (e.g. Chlor-Alkali Sector, Supply and Storage, Waste Management). The first Intergovernmental Negotiation Committee meeting for the preparation of a Global Convention was held in Stockholm in June 2010. WCC participated in the discussions and shared its updated leaflet on "Reduction of Mercury Emissions and Use from the Chlor-Alkali Sector Partnership". It is expected that the Convention would be ready by 2013.

Improving Chlorine Safety, Environment & Health Performance

The World Chlorine Council continues to organise stewardship workshops around the globe to promote best practices in environment, health, and safety. Through the WCC safety program, our industry sector is working

to achieve continuous improvements in safety performance at production facilities worldwide as well as during transportation and use of chlorine. Key developments in 2009-2010 include:

- The quarterly publication of the WCC Safety Newsletter to share best practices and to learn from past incidents is translated into Japanese, Portuguese, Spanish and Chinese.
- The preparation of new safety tools on specific topics that are made available to producers and packagers, including synthetic WCC Safety Posters.
- Presentations made by experts from WCC companies and associations on chlorine safety matters during a stewardship/safety workshop.
- Organisation of a stewardship/safety workshop in Brasil by end 2010.

As from the beginning of this year Euro Chlor is in charge of managing for 2 years the work of the Global Safety Team, and coordinate its related activities (publications, workshop ...).

Demonstrating Sustainability of the Chlor-Alkali Industry

Work continued on the sustainability programme as agreed the previous year. Though energy became a lower priority following the failure of Copenhagen to reach global agreements, other climate change issues including the use of chlorine derivatives in the field of insulation continue.

03 Regulatory Affairs

Balanced legislation for a sustainable future

A critical role for Euro Chlor is to provide advocacy leadership in order to positively influence regulations in the areas of energy, environment, climate change, health and competitiveness. The federation works with European and international authorities in order to achieve the common goals of having balanced and workable legislation.



Véronique Garny
Regulatory Affairs Director

Emission Trading Scheme (ETS) Directive implementation

Euro Chlor continues to take a great interest in the implementation of the revised Emission Trading Scheme (ETS) Directive which was adopted in December 2008. The main topic during 2009 was the identification by the European Commission of sectors or sub-sectors deemed to be exposed to a significant risk of carbon leakage. Euro Chlor provided input to the Commission in order to demonstrate that the chlor-alkali industry should be recognised as an exposed sector. After discussions in the Council and European Parliament the list of exposed sectors was adopted end of 2009. In total 164 industrial sectors qualify as exposed. The chlor-alkali industry, as part of the sector “basic inorganic chemicals” (according to the statistical classification of economic activities in the European Community), has been recognized as one of the exposed sectors. These sectors will be eligible for free carbon allowances or for financial measures under the state aid rules.

The setting up of the rules for the financial measures that Member States may give to compensate for additional costs of CO₂ passed through in the electricity prices falls under the competence of the Commission. These state aid rules will set the maximum compensation that Member States could provide to electro-intensive industries exposed to carbon leakage (so-called indirect emitters). Euro Chlor continues to be in contact with the Commission to provide the chlor-alkali industry views on the rules for financial compensation. A public stakeholder consultation on the

“Our areas of concern are of great importance for the sustainable future of the European chlor-alkali industry”

Veronique Garny is a pharmacist with a specialisation in toxicology. She joined Euro Chlor in 1996, started working on science issues and progressively took over the Fluorinated Sector Groups. She became Director for Regulatory Affairs in January 2010.

Issues of great importance

The main regulatory issues Euro Chlor is working on are Energy (the ETS Directive), mercury and the Industrial Emissions Directive. Other topics include the Water Framework Directive, POPs and PBTs and Electromagnetic Fields.

The regulatory work aims to cover all the regulatory issues affecting the European chlor-alkali industry. These areas of concern may be a bit less diverse than in the past, but are certainly of great importance for our industry and its sustainable operations in the future.

Global information exchange

Furthermore, coordination and alignment with our global counterparts is important and the necessary information exchange constitutes a major task of the World Chlorine Council (WCC). Certain subjects – like the mercury issue – are indeed discussed on a global level (e.g. at the level of the United Nations Environment Programme UNEP).



Sustainable heating of our homes is made possible by the use of high-performance polyurethane foam, produced with the help of chlorine chemistry

proposal will be organised by the Commission. However, this process has been delayed and it is uncertain if the State Aid Guidelines will be adopted by the end of 2010.

International negotiations

The EU has a firm commitment to reduce the overall greenhouse gas emissions of the Community by at least 20 % below 1990 levels by 2020, and by 30 % provided that other countries commit themselves to comparable emission reductions. The Commission is mandated to assess in the light of the outcome of the Copenhagen Conference, by end of June 2010, the impact of moving beyond this 20% reduction target and the situation of the carbon leakage sectors.

Euro Chlor has joined the Alliance of Energy Intensive Industries calling upon the Commission not to move beyond the current 20% emission reduction. The focus should instead be on international negotiations in order to reach a global agreement which would provide equal treatment and thus a level playing field for globally traded goods. Otherwise the EU industry risks losing out to competitors in countries with lesser or no carbon constraints. Euro Chlor continues to monitor the international developments.

Euro Chlor is also participating to a CEN (European Committee for Standardisation) working group aiming at defining the standards to determine the CO₂ emission (direct and indirect) from different industry sectors.

Mercury: export ban and storage criteria

The EU regulation on the export ban and storage of decommissioned mercury is now being implemented. Euro Chlor has volunteered to gather the data from the member companies utilising the mercury cell technology in order to facilitate the reporting to the Commission. All member companies contributed and Euro Chlor was successful in providing the following data for end 2008 and end 2009:

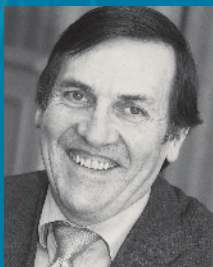
- Best estimate of the total amount of mercury still in use in the chlor-alkali cells and
- Total amount of metallic mercury stored in the facility.

The data are publicly available on DG Environment's website <http://ec.europa.eu/environment/chemicals/mercury> and <http://www.eurochlor.org/regulatory>.

When the storage obligation enters into force after 15 March 2011 metallic mercury that has been sent as waste to temporary or permanent storage facilities will also need to be reported (quantities and destinations).

The European Commission has released a study, completed by the consultancy firm BiPRO, concerning the storage criteria for liquid mercury. BiPRO also added an evaluation of all available information on the stabilisation and solidification of mercury as well as the opportunities to apply these processes in practice at EU level. Euro Chlor has contributed to the data collected for this study and provided additional information to the Commission to update the Landfill of Waste Directive, so that it can cover liquid mercury.





“My expectation has been that Europe and the world will fully recognize the benefits of chlorine chemistry to society”

Arseen Seys
Retired Deputy Executive Director of Euro Chlor

Arseen Seys, Deputy Executive Director of Euro Chlor, retired 31 December 2009, after having served the European chlor-alkali industry for nearly 25 years. During the full 20 years of his executive role in leading Euro Chlor Regulatory Affairs, he has been striving for the full recognition of the benefits of chlorine chemistry to society and for continuously improving the performance of the chlorine industry. He was also the Managing Director of the World Chlorine Council. Arseen Seys will now act as an adviser to the Euro Chlor organisation.

In the early years of Euro Chlor's existence, interest from European and national policy making bodies, scientific groups, press and environmental NGOs in chlorine chemistry industry issues grew rapidly. Euro

Chlor took this as a real opportunity for effective dialogue. Industry had to become familiar with doing advocacy in public events which were hostile towards representatives of the chlorine industry. But gradually our organisation became more and more recognised and appreciated.

In the last two decades, the chlor-alkali sector has seen several threats. In his executive role of leading the regulatory affairs of Euro Chlor for a period of more than 20 years, Arseen's expectation has been that Europe and the rest of the world will fully recognize the benefits of chlorine chemistry to society and that chlorine industry will continue to improve its performances.

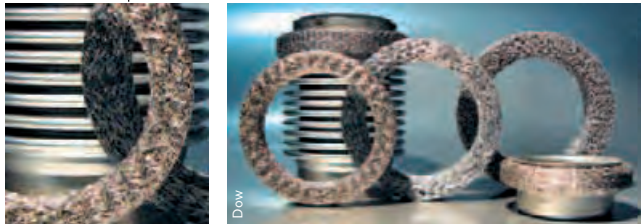
In parallel, Euro Chlor experts have issued a report detailing the knowledge on liquid mercury behaviour in underground salt mines. The report has been submitted to the German Ministry of the Environment, which will use it to prepare a safety assessment for salt mines where mercury could be stored. The Euro Chlor position paper and a Q&A document reflect and underline the need of the European chlor-alkali industry – before March 2011 – for a permanent solution for the storage of liquid mercury.

The final solution proposal for a safe underground storage in salt mines might not be available on time. That is why Euro Chlor has also asked to consider the storage of liquid mercury on site – under well defined conditions – as a temporary solution.

The stabilisation of mercury in the form of mercury sulphide may not offer a short-term alternative to storage of liquid mercury: the cost impact analysis should be evaluated. Furthermore, the appropriateness of the technique and the storage conditions must be investigated.

European Mercury Strategy under review

The European Strategy on Mercury – which covers all uses of mercury – is under review to analyse where progress can be made in order to reduce mercury use and emissions. The Commission has asked a consultant to make proposals to check all concerned regulations and to report on whether sufficient measures



One of the well-known applications of chlorinated solvents is metal degreasing



“Being on top of the issues, pro-active work and intensive contacts with all stakeholders are crucial elements of our work”

Caroline Andersson
Senior Counsellor Regulatory Affairs

Caroline Andersson has a Master of Science in Business Administration (MBA) and started at Euro Chlor Regulatory Affairs in 1997. She is closely monitoring legislative developments and initiates advocacy activities, in close consultation with the Membership. She has privileged contacts with the European Commission and Parliament in order to discuss and present the views of the European chlor-alkali industry.

Energy dominant

For several years now, the energy issue and particularly the European Emissions Trading Scheme (ETS) have been dominating the regulatory activities. The Euro Chlor advocacy in this dossier is not finished yet, but has achieved positive results for the sector: member states can

compensate for the CO₂ costs passed through in electricity prices and chlor-alkali is considered as a sector exposed to carbon leakage.

Mercury is also an ongoing issue. Euro Chlor is striving to have the criteria for underground storage of liquid mercury approved by the European authorities. Other dossiers, like Electromagnetic Fields and Energy Tax are likewise in the pipeline and Euro Chlor is preparing its positions on these matters.

Caroline makes sure that Euro Chlor does not miss important developments, and has the necessary timely contacts – internally and externally – to stay on top of the issues that matter for the member companies.





are in place or new measures need to be added. Euro Chlor has already contributed substantially to the process with the voluntary phase-out of mercury technology in the chlor-alkali process by the end of 2020. We also communicated with high transparency on all aspects of the mercury use and emissions in the chlor-alkali sector.

Industrial Emissions Directive

Euro Chlor welcomed the efforts of the European bodies to simplify and strengthen the Industrial Emissions Directive (IED) with the aim of sustainable environmental protection. This would also solve a major problem encountered in the application of the existing IPPC regulation (Integrated Pollution Prevention and Control): the uneven implementation in the Member States.

In a balanced approach, the IED should take into account the different local conditions and the different technical characteristics of the plants and processes. This means that “justified flexibility” and local adaptation have to be better secured. Euro Chlor has communicated three concrete examples where the implementation of the BAT as described in the BREF document is affected by the geographical location and the local environmental conditions, the technical characteristics of the installation or an obvious disparity between the economic costs and the environmental advantages. Euro Chlor supported the Council’s view that this could occur in specific cases (not exceptional cases).

Chlor-alkali BREF update

The chlor-alkali BREF document is more than 10 years old and its update, decided last year by the Commission, focuses more than previously on measurements and monitoring.

A Euro Chlor ad hoc task force was immediately created to define the industry position and gather the necessary information. Last September, the Commission held the official kick-off meeting in Seville and Euro Chlor, with industry delegates, participated as member of the technical working group. The wishes of the different stakeholders were examined together with new information proposed or needed. A questionnaire to gather this information was discussed in detail. Unlike the first BREF, mercury and asbestos technologies were no longer the subject of heavy discussion. Euro Chlor was clearly recognised as a strong organisation and a trustworthy source of information, and has been asked to organise the collection of data from the industry.

Besides managing and controlling the answers to the questionnaire prepared by the Bureau in Seville, the Euro Chlor secretariat prepared, with the help of active members, a substantial number of technical documents that have been uploaded on the Commission’s dedicated website. This information is also available to all members on the CVn website.

A first draft of the updated BREF is expected before the end of 2010.

Even sports stadiums can receive a beautiful and long-lasting finishing of polyurethane coated materials



In modern public transportation pre-coated PU-encapsulated rails provide high electrical insulation, vibration resistance, noise reduction, anti-skid and anti-corrosion properties

POPs/PBTs and substances of very high concern (SVHC)

Substances of Very High Concern (SVHC) keep attracting special attention from authorities, both in the EU and globally. SVHCs under REACH have to be authorised for specific uses which is time-limited and effectively puts pressure on substitution if a suitable alternative is available. Euro Chlor, the chlorinated paraffins and chlorinated solvents sector groups are following SVHC related developments closely.

Short-chain chlorinated paraffins (SCCP) will be added to the POPs Protocol of the LRTAP Convention (Long-Range Transport of Atmospheric Pollution) of UNECE (United Nations Economic Commission for Europe) as decided by the Executive Board at its meeting in December 2009.

Once this decision is included in the European Regulation on POPs (850/2004) and in national laws, the production and use of SCCPs in the UNECE region will no longer be allowed except for use in conveyor belts for mines and in dam sealants.

Other chlor-alkali related substances managed by various regulations are pentachlorobenzene (Stockholm Convention POPs and UNECE) and hexachlorobutadiene (UNECE).

In addition to the UNECE, SCCPs are also dealt with under the Stockholm Convention on POPs, the RoHS (Regulation on Hazardous Substances) and Annex XIV (Authorisation) of REACH.

Trichloroethylene has been put on the REACH candidate list for Authorisation. Euro Chlor will continue to follow these developments closely, both at the scientific and regulatory levels.

In the UNEP Global Mercury Partnership, Euro Chlor works with World Chlorine Council (WCC) members to update the information provided each year to UNEP on the reduction of mercury based capacity and emissions



UNEP Global Convention on Mercury

At the UNEP Governing Council/Ministerial Forum convened on February 16-20, 2009 a decision was reached to establish an international convention to deal with mercury pollution which should include both binding and voluntary measures. The details of the new convention will be negotiated over the next years and will be completed by 2013.

In the UNEP Global Mercury Partnership, Euro Chlor works with World Chlorine Council (WCC) members to update the information provided each year to UNEP on the shut down of mercury cell plants and thus on the reduction of mercury-based capacity. The leaflet WCC has issued on this matter has been updated and shows that year after year mercury based plants are closing down or being converted to membrane technology.

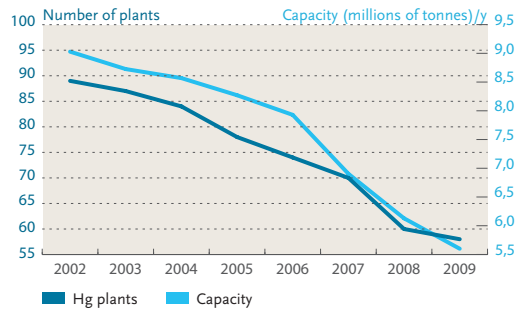
The number of plants and the mercury cell-based production capacity show a worldwide decrease: the number of plants went down from 89 to 58 over a seven year period (- 35 %) and the mercury cell-based capacity from 8.6 million tonnes to 5.6 million tonnes (- 35 %).

The information transmitted to UNEP also includes the emission trend: global mercury emissions were indeed further substantially reduced in the period 2002-2009. They did in fact go down from 23.3 tonnes/year to about 6.4 tonnes - a 72 % decrease over the seven years of reporting by WCC. The relative emissions, expressed in gram mercury/tonne annual chlorine capacity show the same trend.

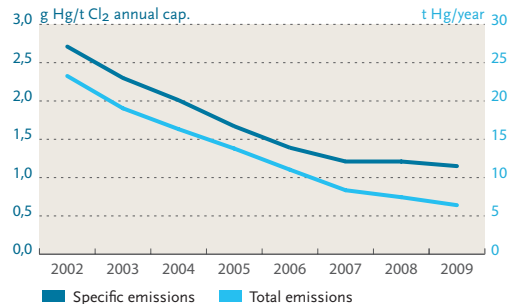
The Partnership (see above) also includes sharing experiences, documents and recommendations on best available techniques and good workplace practices.

Also see <http://www.chem.unep.ch/mercury/>

WCC-chlor-alkali Industry / Number of plants and capacity of mercury electrolysis units (in USA/Canada, Europe, Russia, India and Brazil/Argentina/Uruguay)



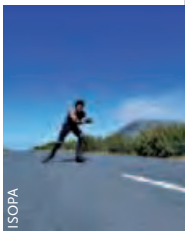
WCC-chlor-alkali Industry / Total mercury emissions (air + water + products) (for USA/Canada, Europe, India and Brazil/Argentina plus 1 Uruguayan and 3 Russian plants from 2005 onwards)



04 Science

Effective advocacy based on sound science

Advocating sound, science-based regulatory decision-making has been Euro Chlor core business for more than twenty years. In 2009-2010, the organisational and technical challenges posed by REACH, chlorine-based biocides, classification and labelling and chemicals of special concern constituted key issues in the science activities of the Federation.



High-performance materials are key factors in top performance and safety in many sports

REACH consortia well on track

It has been a busy year for the REACH Consortia. REACH poses many organisational and technical challenges. Many issues with pre-registered companies of the SIEF (Substance Information Exchange Forum) had to be settled, such as clarifying their intentions for registration, Consortium membership, finances, and organising Letters of Access. Technical issues included providing clarity on substance identity, recommending analytical methods and assessing the uses and related exposures. Substance specific information and property data are included in so-called IUCLID files which were completed for all substances. Studies had to be critically evaluated and robust summaries prepared. The IUCLID-hazard data together with the use and exposure data will form the basis of the CSR (Chemical Safety Report) which will specify the risk management measures needed to safely use the chemical in various applications.

Most of the Euro Chlor Consortia have made good progress and are very close to submitting dossiers for registration by the time this Review went to print. Substances covered are: caustic soda, chlorine, ethylene dichloride, hydrogen chloride, potassium carbonate, potassium hydroxide and sodium hypochlorite. The chlorinated solvents consortium covers the five substances tetrachloroethylene, trichloroethylene, chloroform, carbon tetrachloride and dichloromethane. All consortia are managed by Euro Chlor staff working under the umbrella of ReachCentrum.

For all consortia external consultants have been contracted to support the preparation of the dossier.

A REACH dossier for mercury is also being prepared by the Belgium-based consultant ARCHE which specialises in risk assessments of metals. The cooperation of the companies involved has been organised by DELA GmbH (a German recycling firm which deals with the recovery of mercury), with the assistance of Euro Chlor. Euro Chlor supports the work on the dossier with technical and scientific input on mercury as applied in the chlor-alkali industry. NaCl registration will not be actively organised by Euro Chlor because for most of the members there is no need to register.

The chlorinated paraffins (medium-chain, long-chain and sulpho-) REACH requirements are managed separately by a consultant. Short-chain chlorinated paraffins are listed on Annex XIV (Authorisation) and their registration under REACH is left to individual companies.

Biocides

The registration of chlorine, sodium hypochlorite and calcium hypochlorite as active substances under the Biocidal Products Directive (98/8/EC) is continuing, albeit a little behind schedule. The registrations for product types of Main Group 1 (disinfectants and general biocides) were submitted in mid-2007. The dossiers for the three substances have been evaluated, and the draft competent authority report was provided to us for review.



Dolf van Wijk
Science Director

“REACH will demonstrate safe use of chlorine products”

Dolf van Wijk came to Euro Chlor in 2001 and was appointed Euro Chlor Science Director on January 1st, 2010. Before joining Euro Chlor he was manager of AkzoNobel's Laboratory of Environmental Chemistry in Arnhem, The Netherlands, where he focused on ecotoxicology, environmental risk assessment and fate modelling.

Science delivers facts in Euro Chlor's activities

Euro Chlor has always integrated science in its advocacy. To convince regulators it is important to deliver facts and solutions. For example, Euro Chlor carried out marine risk assessments on a voluntary basis. The results have been used in OSPAR, the Water Framework Directive and in the EU Existing Chemicals risk assessment programme. Other science activities are benchmarking and improving our workers' health - dealing with mercury, chlorine etc. In external debates we are active in improving swimming pool chlorination practices to reduce by-products exposure. Significant progress has been achieved on assessment of PBTs and POPs and on communicating chlorine science.

Dominating REACH activities

As expected, in the past three years REACH activities have increasingly dominated Euro Chlor's science activities. In close cooperation with member companies, good progress of the REACH dossiers has been achieved. They will identify and support safe use of many applications of our products which we can communicate with confidence.

Over the years, delivering sound scientific facts and transparency on our industry and chlorine chemistry has positioned Euro Chlor as a recognised and reliable partner to regulators.

The disinfectant properties of hypochlorite are particularly appreciated in hospitals



AISE

In this report the view of the Rapporteur Member State (RMS) is that the three substances should be approved for use in biocidal products. The procedure following this is for the report to be provided to the other Member States for comments, and to be publicly published on the Commission's CIRCA platform. After this the report will be forwarded to the Technical Meetings for further discussion and finalization. If all goes well, we would expect a listing of the substances in Annex I of the BPD mid-2011. A second series of dossiers for Main Group 2 (preservatives) were submitted in October 2008 for the three active substances. These dossiers have been assessed as complete by the RMS, and have entered the evaluation procedure. This should be finished in 2011.

Classification and labelling

At the end of this year the notification of substances under the Regulation on Classification, Labelling and Packaging of Substances and Mixtures Regulation (EC 1272/2008) (CLP) must be completed. Substances that will be registered this year will have the classification notified in the REACH dossier. However, companies with lower tonnage bands not registering under REACH this year must still notify the substance to ECHA before the 3rd of January 2011. Euro Chlor is organising the notification of calcium hypochlorite, as no REACH consortium exists for this substance. Companies manufacturing substances for which a REACH consortium exists but are not planning to register this year should contact the relevant REACH consortium to find out what they recommend for the notification process.



ISOPA

With regard to the classification of sodium hypochlorite, some controversy exists. Late 2008 testing on *Daphnia magna* was performed as it had been decided that further testing was required to realistically assess the toxicity of sodium hypochlorite solutions to aquatic species. The result of this test, combined with other data, allows the classification of sodium hypochlorite as Dangerous to the Environment in solutions of $\geq 2.5\%$.

While industry is empowered by the CLP to self-classify where a classification is not harmonised, in this case approval by Member States and the Commission is still awaited.

Occupational health issues priority for Euro Chlor members

The Euro Chlor Occupational Health Working Group has focused during 2010 on communication and sharing experiences. In previous years the recommendations on best practices to limit mercury and chlorine exposure in the workplace and on electromagnetic fields were updated.

On 25 and 26 May 2010, 40 experts representing 15 Euro Chlor member companies met on the Solvay premises in Brussels for a one day workshop with the objective of sharing best practices on how to minimise mercury exposure in the workplace. Production managers, plant managers, occupational physicians and HSE experts attended.

After some introductory presentations on the dismantling of Hg cells, management of contractors, practical examples to reduce Hg exposure and Hg measurement, participants shared experiences in working groups. Good practices, communication with workers, atmospheric and biological monitoring, cell room cleaning and floor repair were some of the issues discussed. The workshop helped participants to create a network which is expected to facilitate future sharing of information. The outcome of the workshop will be reported by October 2010 and will be made available to all members.

The results of the mercury in urine questionnaire for 2008 had an excellent response rate, and showed a general decrease in exposure to mercury. However, there is still some room for improvement.

Disinfection by-products, chlorine and asthma

The European Union is investigating the health-related effects of disinfection by-products (DBPs), by financing the research project HIWATE of which Euro Chlor is a relevant stakeholder. The main findings were presented during a 3-day meeting early 2010. One of the most ambitious parts of the project is to measure exposure to DBPs. Sampling took place at 6 sites around Europe, with over 1000 samples taken. 20,000 analyses were carried out to identify various by-products. Once available, these data will be very useful for risk assessment of DBPs in the EU.

State-of-the-art synthetic foams contribute to a large extent to modern home comfort



Modern refrigerators are so well insulated that the European energy ratings lower than A will disappear from the market. We will soon only talk about A, A+, A++ etc.

Existing epidemiological studies suggested a positive association between total trihalomethanes and bladder cancer, but no significant association was seen with colon-rectal cancer and adverse reproductive outcomes. The benefits of water chlorination are recognised by the investigators, many of them saying that detailed studies on by-products from using alternative disinfectants are needed before changing the disinfection process.

In recent years, the media have reported on a possible link between chlorination of indoor pools and asthma in children and pool workers. Most of the research is focusing on epidemiological studies. A link with exposure data is missing, because of the difficulties in measuring chlorination by-products (in particular chloramines) in swimming pool air. For this reason, Euro Chlor is supporting a project with the University of Utrecht to fill this gap. The exposure data obtained will be compared to the results of questionnaires to children attending the swimming pools. The results of this project will be presented at a workshop of international experts in swimming pool operational practices, epidemiology, asthma and disinfection by-products exposure, which should take place in the USA in October 2010. This workshop will identify data gaps for future work.

Workers' exposure to electromagnetic fields

The update of the European Directive to protect workers against the effects of electromagnetic fields (EMF) has progressed with a report prepared by a consultant to help assessing the impact of possible legislative alternatives.

The first step of the social partners' consultation confirmed that a Directive was needed, but some improvements, update and practical flexibility were requested. In the meantime, IC-NIRP (the International Commission on Non-Ionising Radiation Protection) has presented a draft of its new guideline for low frequency EMF. The German authorities have published a study performed by several specialists to propose a practical solution for the new Directive. A workshop for all stakeholders – including Euro Chlor – was organised in Sweden to share ideas and proposals with the Commission.

The second step of the social partners' consultation was launched just before summer 2010 with more detailed proposals for the future Directive; Euro Chlor appreciated that they took into account the requirements for a practical and clear implementation and commented in line with other industrial associations. The Working Party assisting the Commission - in which Euro Chlor is actively participating - analysed these proposals and comments to help the Commission finalise its draft Directive by September 2010.

CENELEC (The European Committee for Electrotechnical Standardization), in collaboration with Euro Chlor, progressed in preparing a standard for EMF measurement methods applicable to the electrolysis industries.

The document will be finalised when more information is available on the precise content of the future Directive.



Thanks to their low energy consumption, long service life and high-quality light, organic light-emitting diodes (OLEDs), are a light source of the future. A polycarbonate based extraction layer just 100 µm thick increases the light yield by 40 to 60 percent



Valentina Bertato
Science manager

“We cover the human health subjects of interest to the Euro Chlor Member Companies ”

Valentina joined Euro Chlor in 2002. She has a degree in Environmental Sciences and is specialised in environmental chemistry, complemented by a master's year in environmental management.

Integrating science into technical matters

In the Science Group, Valentina covers the human health subjects of interest to the Euro Chlor Member Companies. The issues are prepared by the Health Working Group, composed of physicians and experts in occupational exposure.

An important example of this work is the monitoring of mercury in workers' urine. The Group also drafts recommendations on mercury and chlorine exposure, which are included in the technical documents of the Technical Working Groups within Euro Chlor.

Chlorination and human health

The issues of chlor-alkali industry and its products that could impact the public at large are also followed. The study of the public health aspects of disinfection by-products is a typical dossier in this area. Euro Chlor always relies upon independent laboratories analysing an issue; in this way, the study results obtain maximal credibility. The possible relationship between chlorination of swimming pool water and the occurrence of asthma in children was the subject of a recent study commissioned in the Netherlands to the University of Utrecht.

In addition to her Euro Chlor commitments, Valentina accompanies the work of the Fluorocarbons Group. These substances are used in refrigeration systems.

REACH consortium management

Last year's key activity for REACH was the consortium management for hydrochloric acid with 60 members and the preparation of the substance registration dossier by November 2010.



Shaun Presow
Science Counsellor

“Good data management is the basis for improving existing Guidelines and Best Practice documents. ”

The junior of the Euro Chlor Science team, New Zealander Shaun Presow, was awarded a PhD in Chemistry in Germany in 2008 before joining the Euro Chlor Federation in 2009.

REACH registration dossiers

Shaun is managing the dossiers for chlorine, sodium hypochlorite and ethylene dichloride. He is also responsible for the biocides dossiers, namely the active substance registration for chlorine, sodium hypochlorite and calcium hypochlorite.

Euro Chlor scientific communication

Since the beginning of this year Shaun has taken over the management of science communication, which covers for example the Science Dossiers (in-depth reviews on various chlorinated substances and topics addressing the scientific community) and the Focus on Chlorine Science (FOCS) leaflets aiming to help non-experts understand chlorine-related science issues.

Data management and sharing

Shaun is also involved in the management of data provided by Euro Chlor member companies. These data include mercury in workers' urine, the self-assessment audit in which companies assess their progress against Euro Chlor best practice guidelines in various areas, and reporting on chlorine inhalation incidents. The collated data is made available to the General Technical Committee and the Health Group for analysis, discussion, benchmarking and improving existing Guidelines and Best Practice documents.



in modern cars, polyurethanes contribute significantly to weight reduction, safety and comfort





SETAC Europe Congress in Seville very well attended

The 2010 SETAC Europe's Congress in Seville experienced a tremendous turn out of over 2300 participants, an all time high. Ecotoxicologists and environmental scientists from Europe, the US, South America, Asia, Russia and Africa met during 4 days in 8 parallel sessions of presentations and daily poster sessions. Remarkable was the revival of interest in mercury with a special poster session and also a lot of interest in the two Euro Chlor Science Dossiers on mercury available at Euro Chlor's booth (<http://www.eurochlor.org/sciencedossiers>).

Also the recently published Science Dossier (SD) on halogenated by-products was well appreciated by the audience.

We learned from booth visitors that Euro Chlor SDs are regularly used for teaching purposes at universities. Several chlorine-related issues were addressed in presentations given by eminent scientists from all over the world.

Climate change has been related to many things, so it was no real surprise to see a session on climate change and environmental effects. Really new was a special session on plastic waste in the environment. Some studies investigated the role of these marine plastic particles as a source and means of transport for POPs, but this seems to be of limited significance.

New Science Publications

Much of the science team's resources have been devoted over the last eighteen months towards the REACH registration of the chlor-alkali substances. In addition to this, several new publications have been released or are under development.

Euro Chlor was heavily involved in the SETAC Pellston Workshop on 'Science Based Guidance and Framework for the Evaluation and Identification of PBTs and POPs' held in 2008, the outcome of which was a series of publications in Integrated Environmental Assessment and Management which were published in October 2009.

In addition to editing a new Science Dossier, Euro Chlor was involved in a publication in Chemosphere (Vol. 75, published in September 2009) assessing sources of pentachlorobenzene and concentrations in the environment.

Two new FOCs documents ("Focus on Chlorine Science") are also under development, one on bioaccumulation and the other devoted to the health effects of long-term low exposure to metallic mercury. A summary of the science publications of last year was shared with a broad audience including scientists, regulators and industry contacts through the Annual Newsletter.

05 Communication & Education

Relevant, reliable and timely information

The European Chlor-Alkali industry has based its reputation management on providing relevant, reliable and timely information. The 20 year timeline brochure captures this communications strategy under the subtitle “About transparency, credibility, having a good story and getting it accepted”. This strategy remains unchanged. All stakeholders, including academia are systematically informed of the newest scientific findings connected to the sector’s activities and of Euro Chlor views on regulatory developments.

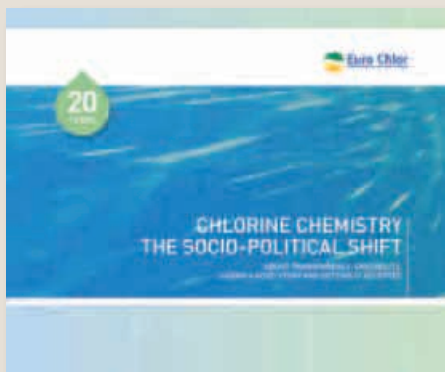
20
YEARS

Euro Chlor federation celebrated 20th anniversary

Under the heading “Healthy chlorine industry essential to a sustainable society”, Euro Chlor celebrated its 20th anniversary in Brussels on the occasion of its 2009 Annual General Meeting. The association was founded in 1989 (although it had been existing since 1953 as the “Bureau International Technique du Chlore”), in order to provide an adequate response to rising public concern about chlorine chemistry. It would turn out to be an important actor in the socio-political context determining the functioning of the chlor-alkali industry.

In the mid-1980s, the chlorine industry was under attack from a strong anti-chlorine movement led by environmentalist groups in Europe and the USA. Their slogans “Stop Chlorine” and “Chlorine Kills” were taken seriously by authority bodies in Europe who initiated steps to prohibit or substitute “unnecessary” organochlorines. The European chlorine industry took these threats very seriously and created a strong Euro Chlor with a vision and with the means to become the authoritative voice of the chlorine industry in Europe.

In the early years of Euro Chlor’s existence, interest from European and national policy making bodies, scientific groups, press and environmental NGOs in chlorine chemistry and industry issues grew rapidly. Euro Chlor took this as a real opportunity for effective dialogue. Executive Director Alistair steel says of the Euro Chlor strategy: “We at the secretariat from the very beginning set out to provide balanced,



The timeline brochure on 20 years of Euro Chlor documents how the Federation had to achieve high levels of credibility and acceptance amongst politicians, scientists and the media

science-based information for use in active dialogue with key influencers. The term Critical Success Factor was not in common usage in those days but this was our watchword! We had to achieve high levels of credibility and acceptance amongst politicians, scientists and the media.”

The breakthrough can probably be attributed to the development and application of the new concept of science-based risk assessments which enabled the implementation of risk management controls. This led to industry taking responsibility for this process and publicly reporting data on health, safety and environment even before the requirements under Responsible Care® became common practice. Reputation issues diminished and were replaced by rational questions on what our position is on chlorine-related issues of public and political interest.



“Preparing more intensive electronic communication, wrapped in a modern design jacket”

Dirk Clotman
Communications Manager

From his chemical background Dirk Clotman has been active all his career in defending, explaining and promoting chemistry and the chemical industry at large. For more than two years now, he has been developing and refreshing the Euro Chlor internal and external communications, including the Science Communication, and adapting the visual identity of Euro Chlor.

In the electronic field a brand new website is being prepared. Other types of electronic communication – such as social networks – are being studied. The daily

maintenance of the Euro Chlor and ECSA webpages as well as the management of the ChlorVinyl network document exchange site are also handled by Communications. Relevant information related to Euro Chlor and to Member companies' activities are shared in the electronic newsletter.

Communication is also increasing the visibility of the chlorine industry and working closely with Regulatory Affairs in order to enhance the readability of highly technical documents.

The new Science Dossier considers the quantities of halogenated by-products typically produced during the various uses of active chlorine solutions

It can be ordered free of cost on CD-rom or downloaded from the Euro Chlor website (www.eurochlor.org/science)

New Science Dossier on disinfection by-products

This dossier addresses both the main chemical families of the by-products and the many minor components including often uncharacterisable halogenated macromolecules that make up the balance of the effluent mixtures after the use of chlorine as water disinfectant.

The potential environmental risks arising from current uses of active chlorine have been formally assessed in the EU Risk Assessment of

sodium hypochlorite under the Existing Chemicals Regulation. The specific risks from halogenated organic by-products were assessed in detail using a combination of approaches and the conclusion reached for each use scenario is that with current risk management measures these by-products pose no significant risk to the environment.

Euro Chlor website

No less than 510 e-mail requests have reached the secretariat in 2009 via visits to the Euro Chlor website. Eighty-two per cent of those requests concern the technical, safety and health areas. They concern technical recommendations, codes of good practice, personal protective equipment, equipment specifications, etc. Ten per cent of the requests ask for general Euro Chlor paper publications. Finally, 8 per cent of the requests covered different areas such as REACH, the Biocide Regulation and so on.





“Turning the Tide on Climate Change” by Professor Kandel (LMD, Ecole Polytechnique Paris)

Turning the tide on climate change

The climate change phenomenon appeals to us to implement a low carbon economy. It is essential to foster innovation policies and the dissemination of more energy-friendly tools and to facilitate related behaviour. An effective energy efficiency policy must be related to a sound analysis of greenhouse gas emissions and savings mechanisms. It must also provide innovative concrete solutions that address everyday life consumer needs in areas like housing, food, mobility, use of energy, etc.

This is why Cefic, the European Chemical Industry Council asked Professor Kandel (LMD, Ecole Polytechnique Paris) to write a popular book, “Turning the Tide on Climate Change”, with a foreword by Rajendra Pachauri, chairman of the Intergovernmental Panel on Climate Change. Euro Chlor Communications contributed to the editorial preparation of this book that has been widely disseminated among stakeholders.

Chlorine-based construction materials like polyurethane insulation and PVC products help save energy and thus reduce CO₂ emissions. Light-weight materials reduce the weight of cars, like PVC and polycarbonate that replaces glass in headlights and other components. About half of crop protection chemicals used to boost yields and quality of food are based on chlorine chemistry. Chlorine is also indispensable in the production of ultra pure silicon, essential to the manufacturing of solar cells.

New ECSA web pages go live!

The European Chlorinated Solvent Association (ECSA) launched its renewed website which delivers comprehensive information about chlorinated solvents. The website was completely re-structured and the website content enriched with new information on current programmes run in ECSA.

ECSA was formed over 35 years ago by the leading chlorinated solvent manufacturers in Europe. This long-standing experience in ECSA is given in condensed form in the Facts&Figures section of the new web page as well as in the White Papers that focus on the environmental and human health studies on chlorinated solvents. Both sections – the Facts&Figures and the White Papers – are split into three sub-sections representing the major three chlorinated solvents, dichloromethane, perchloroethylene and trichloroethylene.

High importance has been given to the Sustainability section. It includes current sustainability programmes for the different chlorinated solvents as well as information about regulatory compliance, e.g. REACH, VOC, ODS. Additional tools have been included to increase the dialogue with other stakeholders towards a pro-active communication: SME support, News&Innovation and Ask an Expert.

The SME support is aimed at providing expertise and recommendations to small and medium enterprises. As part of its continuous effort to encourage responsible and safe handling of chlorinated solvents, ECSA has developed several information and guidance documents designed to help using chlorinated solvents not only in the most effective but also in the safest and most responsible manner by following best industry practices.

The News&Innovation section highlights some challenging innovations with chlorinated solvents which led e.g. to a Nobel Prize Award in Physics (see picture p.41).

The Ask an Expert tool will help to answer questions going beyond the information on the website. Further questions about chlorinated solvents and their multiple applications will be submitted to an expert in ECSA who will provide an adequate answer and share the knowledge with other visitors of this site.

Visit the ECSA website at the Euro Chlor pages:
www.eurochlor.org/ECSA

06 Industry overview

European chlor-alkali industry severely hit

Reflecting the overall depression in the European economy, production and demand for chlorine in the whole of Europe suffered a hard blow in 2009. Demand for caustic soda, an essential co-product in chlorine manufacture, dropped drastically. The chlorinated solvents market is slowly recovering from the economic recession.



Polyoles

Based on chlorine chemistry polyurethane is a modern hi-tech material with numerous uses in everyday life



The European chlor-alkali industry has been severely hit by the economic crisis. Although the recession was global, European producers were most affected because of their relative competitiveness on world markets due to higher energy and raw material prices. With 9.1 million tonnes in 2009, European chlorine production was 12.5% down on the 10.4 million tonnes produced in 2008. Capacity utilisation rates in 2009 averaged 71.1%, compared with 79.8% in 2008.

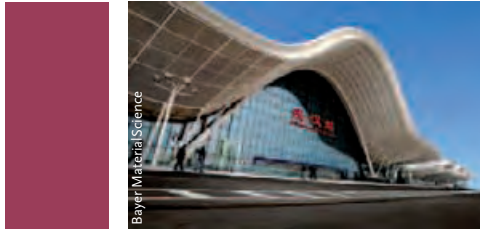
Germany remained Europe's largest chlorine producer in 2009, accounting for 43.5% of European production, followed by Belgium/The Netherlands with 14.9%. The UK/Austria/Switzerland/Finland/ Norway/Sweden group with 12.0% was the third highest, followed by France at 11.3%. These top four regions represented together 81.6% of the total European chlorine made in 2009.

Although chlorine is a key building block for the chemical industry, its essential co-product caustic soda is also important. After 3 consecutive years of stability and strength, demand for caustic soda dropped drastically, resulting in historically high average monthly stock levels close to the 300,000 tonnes mark.

After a substantial decrease in the second half of 2008, the chlorinated solvents market is slowly recovering from the morose economic climate, although the situation differs for the individual chlorinated solvents. European sales of dichloromethane – the most widely used of the chlorinated solvents – continued to go

down in 2009 due to the marketing and use restrictions in paint stripping. European sales of perchloroethylene stabilised in 2009, as it remains the solvent of choice for dry cleaning and still gains market share as a substitute for trichloroethylene in metal degreasing.

Chlorine is produced by electrolysis using 3 main technologies: mercury, diaphragm and membrane. Ten years ago, mercury technology accounted for about 60% of European chlorine capacity (including the non Euro Chlor members). The year 2009 continued to illustrate the trend of a gradual shift away from mercury cells to the more energy-efficient membrane technology (mercury: 31% - membrane: 52%). Three mercury cell rooms were converted to membrane technology during 2009, and another was definitively shut down.



Thanks to their outstanding properties, solid and multiwall polycarbonate sheets support a very diverse range of potential applications in architecture and construction

Turbulent year for chlorinated paraffins

New studies on chlorinated paraffins are shaking up settled views on their environmental properties. Earlier assessment of the persistence of mid-chain (MCCP) and even of short-chain chlorinated paraffins (SCCP) will have to be re-considered and concurrently also their categorisation as PBTs. These new scientific results have re-focussed ongoing discussions with European and Canadian authorities.

New science triggers regulatory changes

A surprising result of a so-called enhanced ready biodegradation test demonstrated that a chlorinated tetradecane was readily biodegradable. This implies that this MCCP component is not persistent in the environment, which contradicts earlier assumptions. Ongoing tests on several SCCPs and MCCPs suggest that biodegradability of chlorinated paraffins decreases with higher chlorination levels. This is being investigated in further detail.

The research plans and available results have been discussed with the UK rapporteur for the evaluation of PBT characteristics of MCCPs. The deadline of the UK to submit their report on MCCPs to the European Chemicals Agency (ECHA) in Helsinki is November 2010. These new data have also been submitted to the Canadian authorities who initially identified all chlorinated paraffins as potential PBTs. A renewed dialogue with Environment Canada was initiated.

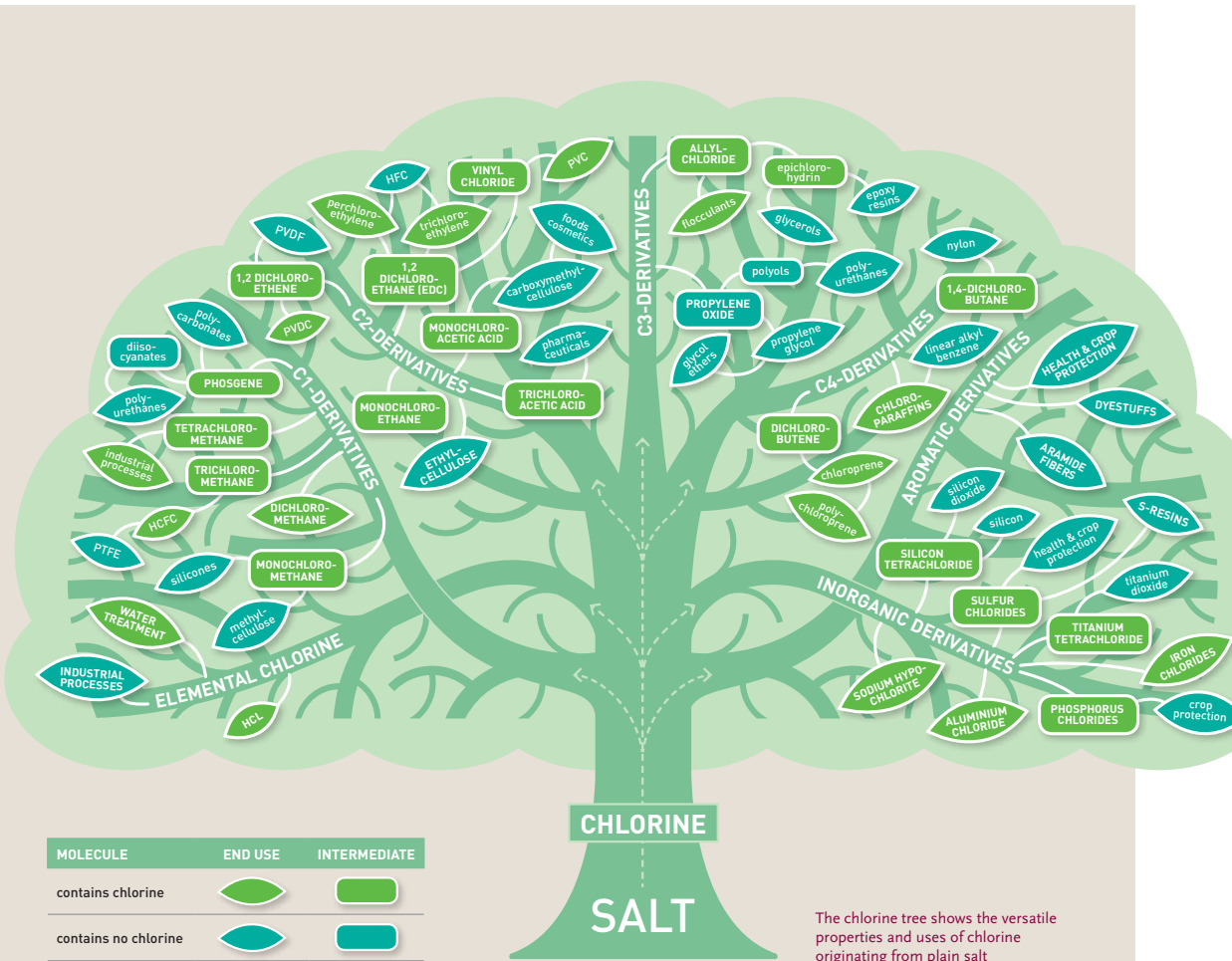
In addition, the new data also support the Sector's continued advocacy work in the context of the Stockholm Convention, where SCCPs' risk profile will be discussed for the fourth year in a row at a meeting in October 2010.

SCCPs on RoHS list

In addition, SCCPs have been proposed for inclusion on the priority list of the RoHS Directive (Regulation on Hazardous Substances). Although MCCPs are not specifically included on the proposed priority list there are two additional categories - organochlorines and chlorinated flame retardants - included that some may argue catches all chlorinated paraffins. Jointly with CEFIC, ECVI and PlasticsEurope the Sector Group is advocating that this inclusion is not justified based on sound science. The plenary vote in the European Parliament has been postponed to the third or fourth quarter of 2010 under the Belgian Presidency.

MCCP was one of 41 candidate substances evaluated for inclusion on the second priority list of the WFD. Based on the new data and ongoing work discussed at expert meetings in March and May 2010, it was decided not to include MCCPs in the proposal for the final list at this stage. The Sector Group is pleased with the present conclusion as recognition of the scientific work done.



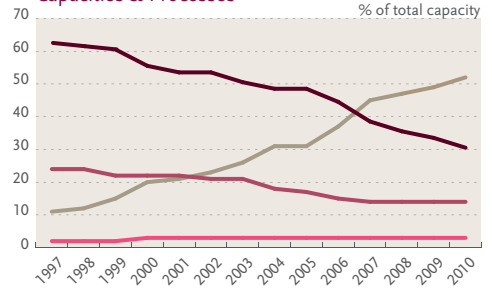


The chlorine tree shows the versatile properties and uses of chlorine originating from plain salt



- Mercury
- Membrane
- Diaphragm
- Other

Capacities & Processes



European Chlorine production in 2009

9,099 kilotonnes

Poland+Hungary+Czech Republic+Slovak Republic+Romania 835 kt (9.2%)

UK+Finland+Sweden+Austria+Norway+Switzerland 1,090 kt (12.0%)

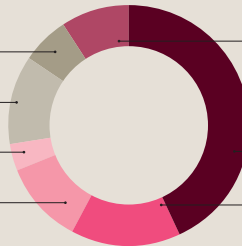
Italy 265 kt (2.9%)

France 1,025 kt (11.3%)

Spain+Portugal+Greece 577 kt (6.3%)

Germany 3,955 kt (43.5%)

Belgium+the Netherlands 1,352 kt (14.9%)



European chlorine applications in 2009

9,108 kilotonnes

Solvents 279 kt (3.1%)

Metal degreasing, adhesives, dry cleaning, plastics

Epichlorohydrin 510 kt (5.6%)

Pesticides, epoxy resins, printed circuits, sports boats, fishing rods

Isocyanates & Oxygenates 2,479 kt (27.2%)

Upholstery, insulation, footwear, plastics, pesticides, car paints

Inorganics 1,274 kt (14.0%)

Disinfectants, water treatment, paint pigments

Chloromethanes 520 kt (5.7%)

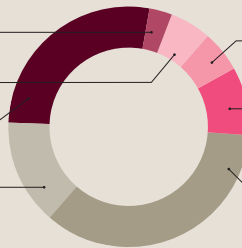
Silicon rubbers, decaffeinated, Teflon®, paint strippers, cosmetics

Other Organics 836 kt (9.2%)

Detergents, ship & bridge paints, lubricants, wallpaper adhesives, herbicides, insecticides

PVC 3,210 kt (35.2%)

Doors and window frames, pipes, flooring, medical supplies, clothing



European caustic soda applications in 2009

8,701 kilotonnes

Soaps 256 kt (2.9%)

Shampoos, cosmetics, cleaning agents

Miscellaneous 1,502 kt (17.3%)

Neutralisation of acids, gas scrubbing, pharmaceuticals, rubber recycling

Bleach 368 kt (4.2%)

Textiles, disinfectants

Food industries 412 kt (4.7%)

Fruit and vegetable peelings, ice cream, thickeners, wrappings

Pulp, paper, cellulose 1,207 kt (13.9%)

Adhesives, heat transfer printing, newspapers, books

Mineral oils 165 kt (1.9%)

Greases, fuel additives

Rayon 116 kt (1.3%)

Bedspreads, surgical dressings

Water treatment 398 kt (4.6%)

Flocculation of waste, acidity control

Phosphates 133 kt (1.5%)

Detergents

Other inorganics 1,168 kt (13.4%)

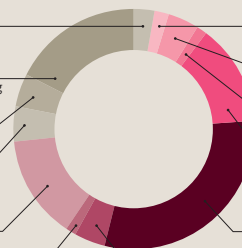
Paints, glass, ceramics, fuel cells, perfumes

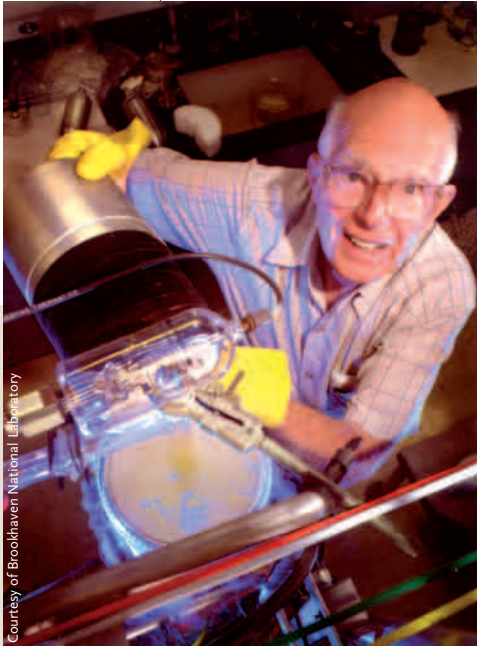
Organics 2,628 kt (30.2%)

Artificial arteries, parachutes, pen tips, telephones

Aluminium and metals 348 kt (4.0%)

Greenhouses, car and airplane panels, steel hardening





Courtesy of Brookhaven National Laboratory

American chemist Raymond Davis Jr. was one of three Physics Nobel Prize winners in 2002. He used many thousands of litres of the solvent PER to conduct for 24 years his radiochemical experiment in a tank installed down a South Dakota gold mine

Chlorinated solvents market not yet fully recovered from economic climate

Sales of the chlorinated solvents Perchloroethylene and Dichloromethane totalled 144,000 tonnes last year, an average drop of 7% compared with the previous year (154,000 tonnes). However, the market situation differs for the individual chlorinated solvents:

European sales figures of **Perchloroethylene** (PER) by ECSA member companies last year stabilised at 44,000 tonnes compared to the previous year (2008: 44,000 tonnes). Sales of PER dropped in 2008 compared to the previous year under the influence of the economic situation but the downward trend stopped in 2009.

Dichloromethane (DCM) sales dropped in 2009 to 100,000 tonnes compared to 110,000 tonnes in 2008. A decision of the European Parliament and the Council in 2009 restricted the marketing and use of DCM in paint stripping for consumer use, allowing derogations in professional use. However, the major uses of DCM still are in the pharmaceutical industry, in adhesives and as a process agent.

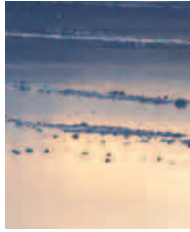
The absolute sales of **Trichloroethylene** (TRI) can no longer be reported according to Cefic statistics rules that at least 3 companies should participate in the reporting. Dow Europe is the only producer in Western Europe since 2009. The decline of trichloroethylene (TRI) sales continued after the more stringent carcinogenicity classification for TRI introduced in 2002. Dow Europe, the Romanian producer Chimcomplex Borzești and the British importer Banner Chemicals have taken further steps to ensure safe use in metal degreasing by stopping supplies of TRI to companies that are not equipped with closed systems after 2010.

07

Chlorine production plants

January 2010





Plain salt constitutes the natural raw material for the chlor-alkali production

COUNTRY	* COMPANY	SITE	PROCESS	CAPACITY (ooo tonnes)
Austria	1 Donau Chemie	Brückl	M	70
Belgium	3 SolVin	Antwerp	Hg, M	434
	4 SolVin	Jemeppe	M	174
	5 Tessenderlo Chemie	Tessenderlo	Hg, M	400
Bulgaria	90 <i>Polimeri</i>	<i>Devnya</i>	<i>D</i>	124
Czech Rep.	6 Spolana	Neratovice	Hg	135
	7 Spolchemie	Usti	Hg	61
Finland	8 AkzoNobel	Oulu	Hg	40
	9 Kemira	Joutseno	M	75
France	10 PPChemicals	Thann	Hg	72
	11 Perstorp	Pont de Claix	D	170
	12 Arkema	Fos	D, M	300
	13 Arkema	Jarrie	Hg	170
	14 Arkema	Lavera	Hg, D	341
	15 Arkema	Saint Auban	M	20
	16 Métaux Spéciaux	Pomblière	Na	42
	17 Prod. Chim. d'Harbonnières	Harbonnières	Hg	23
	18 Solvay	Tavaux	Hg, M	360
	19 Prod. Chim. Loos	Loos	Hg	18
Germany	20 BASF	Ludwigshafen	Hg, M	385
	21 Bayer	Dormagen	M, HCl	480
	22 Bayer	Leverkusen	M	330
	23 Bayer	Uerdingen	Hg, M	240
	24 Bayer	Brunsbüttel	HCl	210
	25 Dow	Schkopau	M	250
	26 Vinnolit	Knapsack	M	250
	27 CABB GmbH	Gersthofen	M	45
	28 Dow	Stade	D, M	1585
	29 AkzoNobel	Ibbenbüren	Hg	125
	30 AkzoNobel	Bitterfeld	M	88
	31 Evonik Degussa	Lülsdorf	Hg	137
	32 Ineos ChlorVinyls	Wilhelmshaven	Hg	149
	33 AkzoNobel	Frankfurt	Hg	167
	34 Solvay	Rheinberg	D, M	195
	35 Vestolit	Marl	M	260
	36 Vinnolit	Gendorf	M	180
	37 <i>Wacker Chemie</i>	<i>Burghausen</i>	<i>M</i>	50
Greece	38 Hellenic Petroleum	Thessaloniki	Hg	40
Hungary	39 BorsodChem	Kazincbarcika	Hg, M	291
Ireland	40 <i>MicroBio</i>	<i>Fermoy</i>	<i>M</i>	9
Italy	41 Altair Chimica	Volterra	M	27
	93 <i>Procter and Gamble</i>	<i>Campo Chiaro</i>	<i>M</i>	20

COUNTRY	* COMPANY	SITE	PROCESS	CAPACITY (ooo tonnes)	
	42 Solvay	Bussi	M	25	
	44 Syndial	Assemini/Cagliari	M	150	
	49 Solvay	Rosignano	M	120	
	50 Tessenderlo Chemie	Pieve Vergonte	Hg	42	
Netherlands	51 AkzoNobel	Botlek	M	633	
	52 AkzoNobel	Delfzijl	M	109	
	54 <i>SABIC GE Plastics</i>	<i>Bergen-op-Zoom</i>	<i>M</i>	89	
Norway	55 Borregaard	Sarpsborg	M	45	
	56 Elkem	Bremanger	M	10	
	57 Ineos ChlorVinyls	Rafnes	M	260	
Poland	58 Rokita	Brzeg Dolny	Hg	120	
	59 Zachem	Bydgoszcz	D	72	
	60 Anwil	Włocławek	M	214	
Portugal	61 Solvay	Povoa	M	26	
	62 CUF Quimicos Industriais	Estarreja	M, HCl	116	
Romania	91 Oltchim	Ramnicu Valcea	Hg, M	293	
	92 <i>ChimComplex</i>	<i>Borzesti</i>	<i>M</i>	107	
Slovak Rep.	63 Novácke Chemické Závody	Nováky	Hg	76	
Slovenia	88 <i>TKI Hrastnik</i>	<i>Hrastnik</i>	<i>M</i>	16	
Spain	64 Ercros	Huelva/Palos	Hg	101	
	65 Ercros	Sabinanigo	M	30	
	66 Ercros	Vilaseca	Hg, M	190	
	67 EHERSA	Hernani	M	15	
	68 ELNOSA	Lourizan	Hg	34	
	69 Ercros	Flix	Hg	150	
	70 Química del Cinca	Monzon	Hg	31	
	71 Hispavic	Martorell	Hg	218	
	72 Solvay	Torrelavega	Hg	63	
Sweden	74 AkzoNobel	Skoghall	M	95	
	75 Ineos ChlorVinyls	Stenungsund	Hg	120	
Switzerland	77 CABB AG	Pratteln	Hg	27	
	89 Borregaard	Solothurn	M	9	
UK	82 Ineos ChlorVinyls	Runcorn	Hg, M	677	
	85 Brenntag	Thetford	M	7	
TOTAL				12832	
				Non members	395
				Members	12437

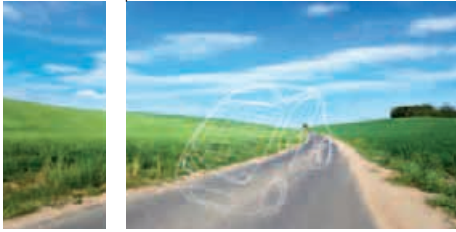
* Number on map

Process: Hg: Mercury M: Membrane D: Diaphragm HCl: Electrolysis of HCl to Cl₂ Na: molten salt electrolysis / Company names in italics are not Euro Chlor members

08 Euro Chlor

In the centre of chlor-alkali regulatory and HSE issues

Euro Chlor represents the interests of 97% of chlor-alkali producers in the EU-27 and the EFTA regions to the EU institutions and international authorities. It constitutes a central partner for member companies to share best practices on health, safety and environment matters. The Federation coordinates scientific and communications activities in order to improve understanding of chlorine chemistry and its great importance in providing basic building bricks for thousands of substances.



Lighter plastic parts, low friction tyres, fuels additives: many products from the chlorine value chain contribute to the energy efficient car of the future



In Europe, 37 producer members of Euro Chlor directly employ about 39,000 people at 76 manufacturing locations in 22 countries. However, almost 2,000,000 jobs are directly or indirectly related to chlorine and its co-product caustic soda when the numerous downstream activities are taken into consideration.

Apart from producers, Euro Chlor also has 42 Associate members and 40 Technical Correspondents. These include national chlorine associations and working groups, suppliers of equipment, materials and services as well as downstream users and producers outside Europe.

From its offices in Brussels, Euro Chlor will again provide – by the end of this year – the Secretariat for the World Chlorine Council, a global network of national or regional organizations in more than 27 countries. WCC represents producers accounting for more than 80% of worldwide chlor-alkali production.

Euro Chlor was founded nearly 60 years ago as a production-oriented technical organization (Bureau International Technique du Chlore, BITC) but was restructured in 1989 in order to provide the sector with strengthened scientific, advocacy and communications capabilities. Since then, a strong focus has been placed on sound science coupled with continual health, safety and environmental improvements complemented by open and transparent communications with key stakeholders.

On the occasion of the 20th anniversary of Euro Chlor in 2009, the Federation underlined that one of its major objectives has always been the full recognition by Europe and the rest of the world of the benefits of chlorine chemistry to society.

The 13 Secretariat staff employed at offices in Brussels represents eight nationalities (Belgian, English, Dutch, French, German, New Zealand, Italian and Swedish) and speak 9 languages.

Guidance and overall strategic direction is provided by the Management Committee and a few dozen committees and working groups provide specialist knowledge and support.

CHLORINE AND CAUSTIC SODA – KEY CHEMICAL BUILDING BLOCKS

Adhesives	Ceramics	Fiber-glass	Lubricants
Advanced composites	Computers	Flame-proofing	Paints
Air bags	Cosmetics	Footballs	Paper
Antibiotics	Credit cards	Fungicides	Perfumes
Antifreeze	Detergents	Gaskets	Pharmaceuticals
Bleach	Disinfectants	Golf bags	Plastics
Blood bags	Drilling fluids	Greenhouses	Refrigerants
Brake fluids	Drinking water	Hairdryers	Roller blades
Bullet-resistant glass	Dry cleaning	Herbicides	Roofing
Bumpers	Dyestuffs	Inks	Safety belts
Car seats	Electronics	Insulation	Vitamins
Carpets	Explosives	Intravenous drips	Window frames ...
CDs and DVDs	Fertilizers	Lighting	... and much more.



Management Committee (15 June 2010)

Chairman: Constant, F	Solvay
Amling, A	Bayer MaterialScience
Berges, J	Evonik Degussa
Fuhrmann, W	AkzoNobel Industrial Chemicals
García Brú, F	Ercros
Garrigue, F	Perstorp
Heroes, Y	Tessenderlo Chemie
Kwaśny, J	PCC Rokita
Procházka, M	Spolchemie
Rogghmann, R	Dow
Russo, G	Syndial
Tane, C	INEOS Chlor
Träger, M	VESTOLIT
Tual, D	Arkema
Wehlage, T	BASF
Winhold, M	Vinnolit

Secretariat staff

Steel Alistair	Executive Director
Minne Françoise	Senior Assistant
Garny Véronique	Regulatory Affairs Director
Andersson Caroline	Senior Counsellor Regulatory Affairs
Coppens Isabelle	Assistant
van Wijk Dolf	Science Director Chlorinated Paraffins Manager
Bertato Valentina	Science Manager
Presow Shaun	Science Counselor
Paturiaux Virginie	Assistant
Debelle Jean-Pol	Technical & Safety Director
Peeters Chantal	Assistant
Marquardt Wolfgang	ECSA Manager
Clotman Dirk	Communications Manager





The main applications of dichloromethane are in closed systems e.g. pharmaceuticals, fine chemicals, process chemicals

Committees and working groups

Management

- Management Committee
- Statistics Committee
- Sustainability ad hoc Task Force

Advocacy & communications

- Regulatory Affairs Committee
- National Chlorine Associations WG
- Chlorine Communicators' Network

Product groups

- Chlorinated Paraffins Sector Group
- Potassium Group

European Chlorinated Solvent Association

- Management Committee
- Communication & Outreach WG
- General Technical WG
- Occupational & Environmental Health WG
- Product WG
- Sustainability WGs

Science

- Steering Committee
- Environmental WG
- Toxicology WG
- Risk Assessment ad hoc WGs
- Biocides Strategy Group
- Biocides Registration Groups
- REACH Project Team

Technical & safety

- General Technical Committee (GTC)
- Environmental Protection WG
- GEST (Safety) WG
- Equipment WG
- Transport WG
- Health WG
- Electromagnetic Fields WG
- Analytical WG

Full Members

AkzoNobel Industrial Chemicals
Altair Chimica
Anwil
Arkema
BASF
Bayer MaterialScience
Borregaard
BorsodChem
CABB (Germany)
CABB (Switzerland)
CUF-Químicos Industriais
Donau Chemie
Dow Deutschland
Electroquímica de Hernani
Electroquímica del Noroeste
Ercros
Evonik Degussa
Hellenic Petroleum
INEOS ChlorVinyls
Kemira
MSSA
Novácke chemické závody
OLTCHIM
PCC Rokita
Perstorp France
PPC
Produits Chimiques d'Harbonnières
Química del Cinca
Solvay
SolVin
SPOLANA
Spolchemie - Spolek pro chemickou
a hutní výrobu
Syndial
Tessenderlo Chemie
VESTOLIT
Vinnolit
ZACHEM
Zakłady Chemiczne ZACHEM

Associate Members

Al Kout Industrial Projects Co.
Asociación Nacional de
Electroquímica (ANE)
Angelini A.C.R.A.F.
AQUAGROUP
Arch Chemicals
Asahi Kasei Chemicals Corporation
BOC
Bochemie
Brenntag UK Limited
Caffaro Chimica
Chemieanlagenbau Chemnitz
Chemoform
Chlorine Engineers Corp.
Chemical Industries Association (CIA)
essenscia
Federchimica Assobase
GHC Gerling, Holz & Co. Handels
Industrie De Nora
Inquide
K+S
Leuna Tenside
LOMBARDA H.
Lonza
Hungarian Chemical Industry
Association (MAVESZ)
Nankai Chemical Industry Co.
NCP Chlorchem (PTY)
Nippon Soda
NOVACID
Polish Chamber of the Chemical
Industry (PIPC)
Procter & Gamble Eurocor
Association of Chemical Industry
of the Czech Republic (SCHP)
SGCI Chemie Pharma Schweiz
Sojitz Europe
Syndicat des Halogènes & Dérivés
(SHD)
Syngenta
Teijin Aramid
The Swedish Plastics and Chemicals
Federation (Plast- &
Kemiföretagen)
Tosoh Corporation
Uhde
Unilever - Knorr
Verband der Chemischen Industrie (VCI)
Vereniging van de Nederlandse
Chemische Industrie (VNCI)

Technical Correspondents

AFC Energy
AGC Chemicals Europe
Aker Kvaerner Chemetics
Applitec
CAN-TECH
Chemtec
Conve & AVS
Coogee Chlor Alkali Pty
Crane Resistoflex
Cristal Global
Descote
Eramet
Eynard Robin
Flowstream International
Garlock
GEA Messo
Georg Fischer RLS
H2Scan Corporation
Health and Safety Executive
ISGEC
Koruma Klor Alkali
Kronos Europe
Lubrizol Advanced Materials Europe
NedStack Fuel Cell Technology
Nirou Chlor Co.
Occidental Chemical Belgium
Phoenix Armaturen-Werke
R2
Reliance Industries
Richter Chemie-Technik
RIVM – CEV
Sasol Polymers
Senior Aerospace Ermeto
SIEM - Supranite
Simon Carves
Taylorshaw Valves
Technip France
Tronox Pigments (Holland)
Vichem
WT Armatur



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