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Chlorine Industry Review 2011-2012

Will Europe fuel our future?



This Chlorine Industry Review 2011 comes in the newly adopted Euro Chlor style and corporate identity. Its content is more compact than before, the layout sober, the pictures in crisp black and white.

It is part of the new Euro Chlor communications approach that will advance more clearly the benefits of chlorine derived chemistry for a sustainable future of the Planet.

Online copies are available on www.eurochlor.org. Paper copies can be easily ordered via the contact form on the same web site.

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Alistair Steel
Executive Director

Will Europe fuel our future?

It is customary in forewords like this to look back over the previous year and highlight changes compared to the previous one, both at the macro and industry specific level. On this occasion it is useful to bear in mind the question 'What should we be worrying about?' as this brief comparison is made.

For most, the first half of 2012 probably feels much like 2011 in that at the macro level the recession is still omnipresent (with no end in sight), the debt and banking crisis remains (despite some notable changes at the political level with new governments in Greece & France), and the pressure on margins in the chemical industry is as tough as ever. For our European chlor-alkali industry, capacity utilisation continues at historical lows as we wait for the construction industry to spark into life again.

So what are we worrying about and can we do anything to change things?

Energy pricing is of course the traditional subject close to our hearts. It seems an age since we started to discuss the effects of the Emissions Trading System (ETS), the cost of carbon and the effect on power prices. The anticipated carbon cost of €30 per tonne has of course never materialised but as 2013 approaches, phase 3 of ETS will commence, requiring all emission allowances to be auctioned. The exceptions will be those who have won recognition for a free allocation, but as this does not include the electricity generators (Poland excluded) member companies need to be alert to the future pricing policies of electricity suppliers. More to the point, we should perhaps be worrying about what will happen to the price of carbon if the Commission decides to put in place an action to intervene in the market and drive up the price in order to provide incentives to invest in 'green technology'.

For our industry who as 'indirect emitters' pay for carbon through the purchase price of electricity, we have won a certain reprieve through the publication of the 'State Aid Guidelines', in the context of ETS, whereby governments are permitted to make compensation payments to the chlor-alkali industry up to a prescribed limit. This compensation is based on regional CO₂ intensity factors reflecting actual fuel sources and a benchmark for the industry. At the time of writing, Euro Chlor is in discussion with the authorities on the benchmark value but we know that this will be challenging, reflecting the electricity consumption of the 'best' operating units in an effort by the legislators to put in place incentives to reduce power usage.

Whatever the final value, there will at least be the possibility of members being able to claim some financial compensation from their governments to mitigate the costs of CO₂ – of course expect governments to claim poverty and pay only minimal amounts!

However, in terms of the worry factor, this is only half the story (or somewhat less than that) as the fundamental cost of power in Europe is many times more than other parts of the world, which will threaten our ability to compete in international markets. This has much to do with the availability of shale gas in the USA and the enviable governmental support for its commercial exploitation. Gas is already being substituted for oil and coal in electricity generation bringing an immediate cost benefit to chlor-alkali producers. The availability of low cost ethylene will, in addition, bring benefit to the PVC sector.

European producers will have a tough fight on their hands in the coming years, and as an industry we will have to switch our advocacy efforts to this battleground.

On a brighter note, welcome to the new look Euro Chlor!

Our communications programme now takes on a fresher, less technical and more appealing style, designed to support our Sustainability Initiative by promoting the benefits that chlorine chemistry brings to our lives. This reflects a general feeling that our industry has moved on from the days when we were the subject of irrational attacks from pressure groups, and we can now take the opportunity to talk about how the daily lives of all of us are made safe and comfortable because of the products made using chlorine and caustic soda.

I hope you are impressed and join me in looking forward to the day when our audiences say 'Chlorine – that's the stuff that helps make my life enjoyable!'



Alistair J. Steel

1/ Chlor-alkali industry issues

ETS Directive: call for balancing the incentive to operate at the lowest energy consumption without compromising maximal production output.

Emission Trading System (ETS) Directive implementation

Euro Chlor welcomed the adoption by the Commission on 24 May 2012 of the State Aid Guidelines. These rules are necessary in order to implement the financial compensation that Member States may provide to industries exposed to carbon leakage identified in the revised ETS Directive. Euro Chlor has contributed to the various consultations organised by DG Competition in order to achieve the best possible deal for our industry. The outcome is largely acceptable with the rules clearly identifying the chlor-alkali industry as an exposed sector (under NACE 2143) and thus eligible for State aid. The maximum compensation that Member States can provide will be based on the following parameters:

- ▶ Aid intensity: 85% (2013-15), 80% (2016-18), 75% (2019-20)
- ▶ Regional CO₂ emission factor based on marginal fuel of production (gas, coal and oil) and on geographical areas
- ▶ Historic production 2005-2011 with the possibility to omit 1 year
- ▶ Sector specific benchmark

Euro Chlor then concentrated its efforts on the chlor-alkali benchmark which was subsequently adopted through a Commission decision. (At the time of writing this value had not been determined). The ETS Directive states that the benchmark should be set according to the 'most energy efficient technology'. In the case of the chlor-alkali industry this means membrane technology. The discussions focussed on identifying a benchmark value that on one hand satisfies the objectives of the directive and on the other hand balances the incentive to operate at the lowest electricity consumption without compromising the incentive to maximise production output. Euro Chlor called for a benchmark that takes these considerations into account.

WORKERS' EXPOSURE TO ELECTROMAGNETIC FIELDS (EMF)

The Commission's proposal (adopted in June 2011) was generally acceptable to Euro Chlor, who actively participated in the technical committee advising the Commission on the stakeholder views. The Directive had to be adopted by the Council and European Parliament by April 2012 at the latest. However, end of 2011, it was clear that the Council was unable to reach an agreement, and thus the application of the directive was again postponed until October 2013 in order to find a solution.

The Council has now reached a preliminary agreement on the technical annexes. The limits are stricter than the Commission's proposal but nevertheless still acceptable to our industry. Euro Chlor will closely monitor the developments in the European Parliament and Council leading up to the final adoption in 2013.

“A major challenge: gather the necessary information and find a balance between details and essential information describing BAT.”

Chlor-alkali BREF update

The Industrial Emissions Directive came into force in March 2011, triggering the revision of the BREF - Best Available Techniques (BAT) Reference Document for the chlor-alkali industry. Euro Chlor, with the help of member companies, is intensively involved in the process of updating the BREF, the first draft of which was published in December 2011.

It has proven to be a major challenge to gather the necessary information and find a balance between details and essential information describing BAT. The scope of the BREF revision was set by a Technical Working Group (TWG) with Member State representatives and stakeholders, including industry. It is a continuing challenge to keep the BREF drafting within the agreed scope. Euro Chlor will continue to help develop a workable BREF by providing the required technical information in combination with advocacy at EU level and, in particular, through the national contacts network.

A key issue for Euro Chlor members is to ensure identified technologies are industrially available, correctly assessed and not overly prescriptive. Furthermore, the BREF should allow realistic conditions for transitional arrangements for the use of asbestos diaphragm and for mercury technologies. The asbestos diaphragm and mercury technologies are not considered BAT, and will thus not be included in the BAT conclusions (i.e. chapter 5 of the BREF) that will become legally mandatory. Subsequently, local authorities

will have to align existing permits with the BAT requirements and deviations will have to be justified.

The BREF drafting process is expected to be finished by the end of 2012 or early 2013. The BAT conclusions from the published BREF document will be formally adopted and published in the course of 2013. Permitting authorities are required to review and adapt local permits according to these BAT conclusions within 4 years of their publication.

Chlorinated alkanes

Chlorinated paraffins (CPs) - more correctly called chlorinated alkanes (CAs) - face global challenges with developments in Europe, Canada, USA and globally under the UNEP Stockholm Convention. In Europe, short-chain chlorinated paraffins or alkanes (SCCPs) were added to the EU POPs Regulation in June 2012, based on the decision made by UNECE's Protocol on Persistent Organic Pollutants. This addition implies that SCCPs will no longer be allowed on the EU market as of January 2013, except for two specific uses (conveyor belts in mining, dam sealants). Other substances should contain less than 1% of SCCP. SCCPs are still being evaluated in the Stockholm Convention process, and have been for several

years in a row. During the first half of 2012 the risk profile was adapted again, this time mainly by considering possible impacts of 'joint action' (i.e. toxic effects of mixtures) of different commercial chlorinated alkanes.

In the EU, MCCPs (mid-chain) have been put on the so-called CoRAP (Commission Rolling Action Plan) list. This means the substance data in the REACH dossier will be revisited. This discussion will centre on the possible PBT properties (persistent, bioaccumulative or toxic). The Chemical Safety Report as submitted provides evidence that MCCPs do not meet these criteria, but this has been challenged by some Member States in the past. The revision was started in the first half of 2012 and should be finalised by the end of 2012, unless significant further work is agreed. In Canada, chlorinated alkanes are still under scrutiny, but the focus has shifted somewhat from the assessment of environmental impact properties to possible risk management options for various uses.

Meanwhile, the scientific assessment of the environmental impact of MCCP is focusing on its biodegradability, the analytical determination of the substance and possible breakdown products in the environment. Chlorinated alkanes are a complex mixture and therefore a challenge for the scientific work, but good progress is being made.

International cooperation on chlorinated alkanes initiated by Euro Chlor

The CPSG (Chlorinated Paraffins Sector Group) of Euro Chlor has initiated international cooperation among CP producers worldwide. After a presentation on these products, its uses and regulatory threats worldwide and a plea for global cooperation at the WCC meeting in Shanghai in October 2011, the initiative has been followed up by initiating an ICAIA Newsletter: International Chlorinated Paraffins Industry Association. The Newsletter aims to generate a stronger cooperation and information sharing from European, North and South American, Chinese, Indian, Japanese, African and Russian producers. A global meeting has been organised for the end of September 2012.



SWIMMING POOL AND SPA HEALTH

The potential relation between chlorination by-products and asthma is being followed up closely together with US colleagues and other international experts under the umbrella of the World Chlorine Council (WCC). WCC commissioned an extensive reality check on the potential health effects from swimming in chlorinated pools in adults and children from the University of Utrecht (The Netherlands), and the results will be available in the course of 2012.

Euro Chlor established a first positive contact with the European Union of Swimming Pool and Spa Associations. The aim is to contribute to adequate handling procedures for chlorine and to improve swimmers' hygiene in pools, as this will increase the safety of swimmers and pool workers.

2013

THE NEW BIOCIDES LEGISLATION WILL ENTER INTO FORCE IN SEPTEMBER 2013, INTRODUCING SOME CHANGES AROUND PRODUCT AUTHORIZATION WHICH WILL BE RELEVANT FOR OUR SUBSTANCES.

Biocidal Products Directive

The Biocidal Products Directive active substance registration projects continue for chlorine, sodium hypochlorite and calcium hypochlorite. The substances have been discussed at two EU Technical Meetings, with some changes being required in the dossiers submitted. It is expected that at least one more Technical Meeting will be required, and this discussion will likely take place in December 2012. Given the current timing and movements, we expect a decision on Annex I listing of these substances mid-2014. A new aspect currently being discussed is the assessment of disinfection by-products, which remain of concern.

The new Biocidal Products Directive has been agreed at the European Council, and published in the Official Journal. The new legislation will enter into force in September 2013, which will introduce some changes around product authorization being relevant for our substances.

Chlor-alkali metallic mercury reporting to the Commission

The EU Regulation on export ban and storage obligation (1102/2008) requires that quantities of metallic mercury on chlor-alkali sites be reported yearly to the Commission, starting December 2009.

The Euro Chlor proposal to collate data from the member companies utilising mercury cell technology has been recognised by a Commission recommendation. All member companies contributed and we successfully provided the following data successively for each reporting year:

- ▶ Best estimate of total amount of mercury still in use
- ▶ Total amount of metallic mercury stored at the facility.

These data are publicly available on DG Environment's website <http://ec.europa.eu/environment/chemicals/mercury> and can also be consulted on the Euro Chlor website. The global trend shows a continuous decrease due to progressive conversions of chlor-alkali plants using the mercury technology, although none took place in 2011 owing to the postponement of several projects because of last year's crisis.

The export ban with storage obligation has been in force since March 15, 2011, and the excess metallic mercury from one shut down site was sent for stabilisation as sulphide and disposal in salt mine.

UNEP GLOBAL CONVENTION ON MERCURY

An International Convention dealing with mercury pollution is being negotiated and is currently well advanced. The Convention should include both legally binding as well as voluntary measures. The World Chlorine Council (WCC) has been contributing actively to both activities, i.e. the International Negotiating Committee (INC) and the voluntary Chlor-alkali Partnership. In the past reporting year, WCC attended two important meetings: one in the UNEP headquarters in Nairobi end of October 2011 (INC3), and the INC4 meeting in Uruguay from 27 June until 3 July. The negotiations are nearing their final stages, with a final INC5 planned for January 2013 in Geneva and a closing diplomatic meeting in the last quarter of 2013 in Japan.

WCC is closely following the development of requirements on chlor-alkali processes using the mercury technology to define reasonable transition times and modalities for exemption and implementation. The Chlor-alkali Partnership achieved an important result by publishing a report on the costs of conversion away from the mercury technology. The key message in this report is that conversion is entirely a financial issue with no other barriers. Other key messages advocated by WCC are centered around reasonable time-frames and conditions for conversion, while WCC is offering technical guidance and sharing of good practices through the Chlor-alkali Partnership.

Occupational Health

The Euro Chlor data collection on exposure of workers to mercury in plants using mercury cell technology had a good response rate again this year. The decreasing trend is not as evident as in previous years, but some sites have shown good progress while others could be improved further. A slight change in the questionnaire has resulted from discussions over how the testing frequency might affect performance, and additional data was collected from sites that test more than quarterly.

The updated chlorine adverse exposure questionnaire has been fully implemented, and members continue to provide information when an exposure occurs. This information needs to be collected industry-wide, due to the low number of exposure events at single sites, and is valuable for future assessment of treatment techniques.

HCBD being investigated for POP properties

The Stockholm Convention has identified hexachlorobutadiene (HCBD) as a potential POP (Persistent Organic Pollutant) and is currently investigating the environmental properties and potential risks in a so-called risk profile (Stockholm Convention Annex E evaluation). Although several legislations have identified HCBD as a POP, the dossier does not actually provide very convincing data, in particular on its persistency and bioaccumulation potential. Euro Chlor and WCC are therefore critically commenting on the profile and also the intended conclusion that global action is warranted, due to its significant adverse effects. HCBD has not been produced commercially for a long time and is only emitted as an unwanted by-product, in very low quantities. This is actually demonstrated in very low measured environmental concentrations and decreasing trends over time. So WCC is not convinced that the evidence supports a conclusion to consider HCBD as a POP. The risk profile of HCBD will be discussed at the POP Review Committee meeting early October 2012, but unfortunately the interest of Parties in defending the case for this non-commercial substance is very low.



REACH REGISTRATIONS

After the REACH registration deadlines of 2010, we have scaled back the amount of work on these projects. However, some specific issues continue to have a high profile and require considerable input. The 1,2-dichloroethane registration is under increased regulatory scrutiny due to addition on the candidate list, and possible listing on Annex XIV for Authorisation or Restriction. The non-intermediate producing members of the consortium have devoted significant time to this issue. In addition, work continues on the classification and labelling of sodium hypochlorite, due to the changes made in the implementation of the new classification and labelling regulation (1272/2008).

Sébastien Gallet takes over the ECSA responsibilities of Wolfgang Marquardt, who has been working in the Euro Chlor secretariat for five years.



Sébastien Gallet
New ECSA Manager



Wolfgang Marquardt
Former ECSA Manager

Chlorinated Solvents Sales

Sales of the chlorinated solvents dichloromethane and perchloroethylene totalled 145,000 tonnes last year, an average decrease of 8% compared with the previous year (157,000 tonnes). 2011 sales figures came close to the all-time low sales figures of 2009 at the peak of the economic crisis (144,000 tonnes).

Dichloromethane sales dropped in 2011 to 104,000 tonnes compared to 113,000 tonnes in 2010. EU-wide restrictions on the marketing and use of dichloromethane in paint stripping for consumer use became effective as of 6 December 2010. This deadline and further deadlines in 2011 and 2012 affect professional use as well, with derogations allowed in EU Member States under certain conditions. Industrial use is not concerned by these restrictions. Dichloromethane is the most widely-used of the chlorinated solvents, especially in the pharmaceutical industry, in adhesives, in paint stripping and as a process agent.

European sales figures of perchloroethylene by ECSA member companies last year decreased to 41,000 tonnes. Perchloroethylene sales stabilised at 44,000 tonnes over the previous three years (2008-2010). Perchloroethylene remains the solvent of choice for dry-cleaning despite recent national developments and continues to gain market share as a substitute for trichloroethylene in metal degreasing. With only one producer in Western Europe, the absolute sales of trichloroethylene can no longer be reported.

Safe use of dichloromethane in professional paint stripping

ECSCA supports the preparation of a web-based training tool for the safe use of dichloromethane in professional paint stripping. Paint strippers containing dichloromethane in a concentration equal to or greater than 0,1% by weight are not to be used by professionals after 6 June 2012 unless derogations are in place (EU 276/2010).

By way of derogation, Member States may allow their use, by specially trained professionals, on their territories and for certain activities. These professionals must demonstrate proper training and competence to safely use paint strippers containing dichloromethane. The training must cover:

- (a) awareness, evaluation and management of risks to health, including information on existing substitutes or processes, which under their conditions of use are less hazardous to the health and safety of workers;
- (b) use of adequate ventilation;
- (c) use of appropriate personal protective equipment that complies with Directive 89/686/EEC.

ECSCA actively supports the initiative to prepare a web-based training tool for the safe use of dichloromethane in professional paint stripping to guarantee European-wide safety standards for professionals in Member States that allow derogations.

Chlorinated Solvents and REACH

- ▶ **Registration:** all chlorinated solvents were registered under REACH in 2010.
- ▶ **Evaluation:** several chlorinated hydrocarbons are currently or will be evaluated under REACH. The rapporteur for carbon tetrachloride is France (2012) and Italy is evaluating methyl chloride (2012). In 2013, perchloroethylene will be evaluated by Latvia.
- ▶ **Authorisation:** trichloroethylene is prioritised for authorisation under REACH.
- ▶ **Harmonised Classification:** the ECHA Risk Assessment Committee (RAC) concluded in 2011 on a harmonised classification for chloroform. The RAC decided on a non-classification on the endpoint mutagenicity.

Proposed restrictions on new perchloroethylene machines in dry-cleaning in France

A French draft law was put to public consultation in May which aims to restrict new dry-cleaning machines using perchloroethylene (PER) from being located too close to neighbouring residents but would allow them in industrial areas. It is proposed that existing machines not bearing the French NF quality certificate be removed after 15 years of use. The proposed law would restrict the implementation of modern machine technology using PER and force French dry-cleaners to close down or search for any alternative.

ECSCA supports part of the initiative of the French Ministries to enforce improvements towards modern machine technology to provide lower solvent emissions and exposure in dry-cleaning shops where standards are still low. However, examples from other EU Member States such as Germany and The Netherlands demonstrate that these technology improvements are sufficient to achieve strict exposure limits with proper handling. Any restriction of PER in French dry-cleaning would disproportionately restrict access to modern PER machine technology, ignore the principle of the harmonised EU internal market and contradict the planned evaluation of perchloroethylene under REACH in 2013.



ABOUT ECSA

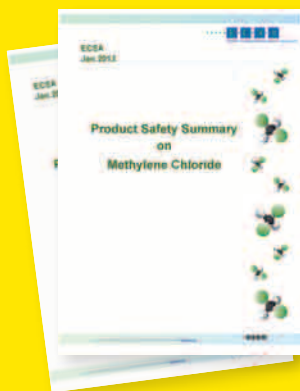
The interests of European chlorinated solvent producers and consumers are represented by ECSA (European Chlorinated Solvent Association), part of Euro Chlor. ECSA was formed over 35 years ago.

ECSA works to support the long-term sustainability of the chlorinated solvent industry. The association defines and promotes safe practice, as well as commissioning toxicological studies to further increase our knowledge of the products.

ECSA's goals are:

- ▶ To ensure that hazards are identified and that proper risk management is applied by users of chlorinated solvents
- ▶ To provide expertise on chlorinated solvents
- ▶ To act as contact for regulators
- ▶ To ensure communication to customers

ECSA represents six companies that manufacture methylene chloride (dichloromethane), perchloroethylene and trichloroethylene. In addition, ECSA addresses issues affecting other chlorinated hydrocarbons on an *ad hoc* basis.



ECSA publications are available at www.chlorinated-solvents.eu



International agreement reached on hazard assessment of first two REACH substances

ECSA welcomes the international agreement reached by the OECD Cooperative Chemicals Assessment Programme on the hazard assessment of dichloromethane and carbon tetrachloride. The Organisation for Economic Co-operation and Development (OECD) works with member countries and other stakeholders to cooperatively assess the hazards of industrial chemicals. The focus of the OECD Cooperative Chemicals Assessment Programme is to derive OECD-wide agreed hazard assessments of chemicals. These are available to the public and can be used for risk assessment and other activities within national or regional programmes. Furthermore, this cooperative work allows member countries and the chemical industry to share the burden of evaluating chemicals and avoid duplication, which in turn increases efficiencies, decreases costs and minimises the need for animal testing.

The substances dichloromethane and carbon tetrachloride were registered under REACH by the end of 2010. The chlorinated solvents producers, in collaboration with Switzerland, have re-used the work done for REACH and attained international agreement by the OECD Cooperative Chemicals Assessment Programme. The conclusions are now publicly available from the eChemPortal (www.oecd.org).

WORLD CHLORINE COUNCIL WELCOMES CHINA AND INDIA

In a special ceremony held mid-October 2011 in Shanghai during the World Chlorine Council's annual meeting, the China Chlor-Alkali Industry Association officially joined the WCC as associate member. The event enjoyed a very wide global participation including representatives from North and South America, Russia, India, Japan, Korea and of course Europe. It is indeed a key World Chlorine Council (WCC) objective to bring aboard all chlorine manufacturers from around the world.

The inclusion of CCAIA into WCC's activities is of tremendous importance given the significant increase in capacity and production of the blossoming Chinese chlor-alkali industry. The signing by CCAIA of the relevant documents to become associate member is testament to the importance the Chinese industry attaches to expressing its opinions through WCC.

"As the Executive Director of the WCC secretariat, it has been a great honour for me to have the process successfully completed under my watch", Alistair Steel (Executive Director Euro Chlor) stated.

The Alkali Manufacturers' Association of India (AMAI) has officially joined the World Chlorine Council. The special signing ceremony took place in New Delhi on February 16. This means the WCC membership now covers more than 90 per cent of the world's installed chlorine production capacity.

With about three million tonnes of capacity, India is an important addition to WCC. Although Indian chlorine consumption per capita is only about 1.85 kg (China 13 kg, Brazil 7.8 kg), the growth potential is substantial. Chlorinated (disinfected) drinking water is still not mandatory in India so with projected economic growth levels, together with increased living standard aspirations, expansion of the Indian chlor-alkali sector is expected.

An emergency response network for the Indian industry is to be launched, which will represent a valuable improvement, given the local road network. The Indian Association also has a Customer Education and Stewardship Programme in place as well as a programme based on Corporate Social Responsibility. The Indian chlor-alkali industry will have completed the conversion of all mercury based production by the end of 2012, according to a voluntary commitment made in 2003.

Further regions to address for WCC membership are the Middle-East, Africa, South-East Asia and Australia.

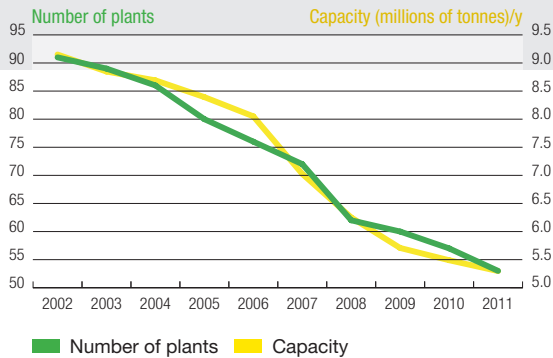
As the Executive Director of the WCC secretariat, it has been a great honour for me to have the process successfully completed under my watch.

Alistair Steel



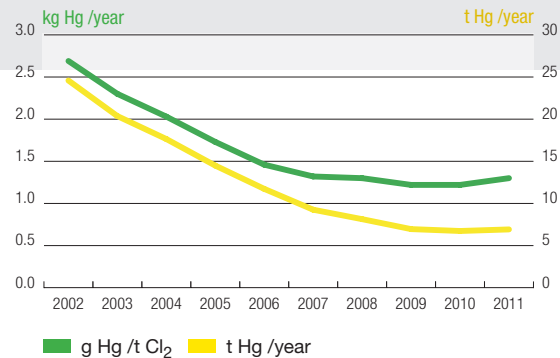
WCC - Chlor-alkali industry / Number of plants and capacity of mercury electrolysis units

(in USA/Canada/Mexico, Europe, Russia, India and Brazil/Argentina/Uruguay)



WCC - Chlor-alkali industry / Total mercury emissions (air + water + products)

(in USA/Canada/Mexico, Europe, Russia, India and Brazil/Argentina/Uruguay)



UNEP - Mercury reporting

In accordance with its commitment, the World Chlorine Council (WCC) continues to gather mercury emissions data from its members and report them yearly to UNEP.

- ▶ The number of plants and the mercury cell-based production capacity continue to show a worldwide decrease: the number of plants went down from 91 to 53 over the period 2002-2011 (-42%) and the mercury cell-based capacity from 9.1 million tonnes to 5.3 million tonnes (-42%).
- ▶ Global mercury emissions have been substantially reduced in the period 2002-2011, although there was some stabilisation during the last years. They went down from 24.6 tonnes per year to about 6.9 tonnes, or 72 % decrease over the ten years of reporting by WCC. The emissions expressed in g mercury/tonne annual chlorine capacity show a similar trend.



The World Chlorine Council reported updated figures to the United Nations Global Mercury Programme on the progress made in the chlor-alkali industry in reducing the use and the emissions of mercury.

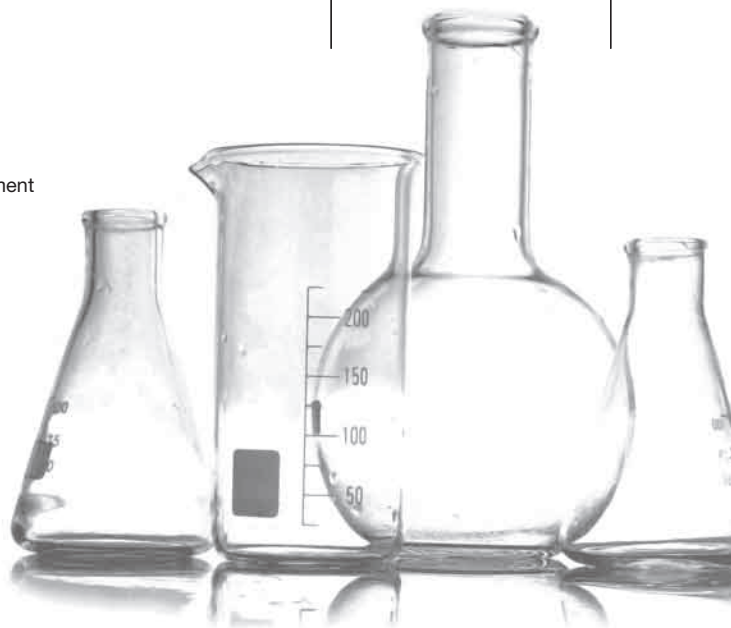
www.unep.org/hazardoussubstances/Mercury/GlobalMercuryPartnership/tabid/1253/language/en-US/Default.aspx

2/ Sustainability

We look forward to reporting, over the next 10 years, how the chlorine industry has continued to deliver more for society, from less.



Michael Träger
Chairman of the Management
Committee



The 21st century needs a sustainable chlorine industry

In the past chlorine chemistry was often regarded as unsustainable, because of problems that arose with certain chlorine derivatives, now no longer produced or emitted. In addition to that, chlorine production remains energy-intensive which might seem to sit uncomfortably with the quest to reduce energy use wherever possible. But most of the energy used is not lost but retained in the high-energy chlorine molecule and is released (in exothermic reactions) when it is reacted to make downstream products.

The 21st century needs a sustainable chlorine industry. Already, our first sustainability programme has delivered major improvements across a broad range of our key impacts, and it has focused companies throughout the sector on the areas where further improvements can most beneficially be made.

The new programme will strengthen the emphasis on training as the foundation of safe and sustainable operation. Our work to encourage and track training and accreditation to environmental management standards such as EMAS and ISO14001 will be extended by a new indicator which reports our investment in training in terms of 'hours per employee'.

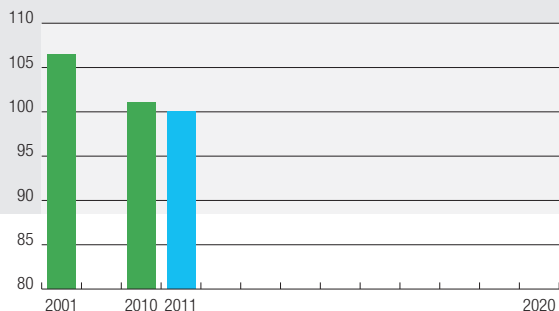
In summary, our programme just concluded has not only shown the industry's collective commitment to sustainable development. It has shown the ability to lead and deliver major improvements, bringing all in the industry towards the standards of the best. In parallel, our communications initiatives based on transparency and science have started to show the essential benefits that chlorine chemistry brings to society weighed in a truer and more realistic balance against the environmental impacts of our operations.

The route towards further improving this balance to create a yet more sustainable chlorine industry is charted and the second stage of the journey has begun. We look forward to reporting, over the next 10 years, how the chlorine industry has continued to deliver more for society, from less.

Michael Träger
Chairman of the Management Committee

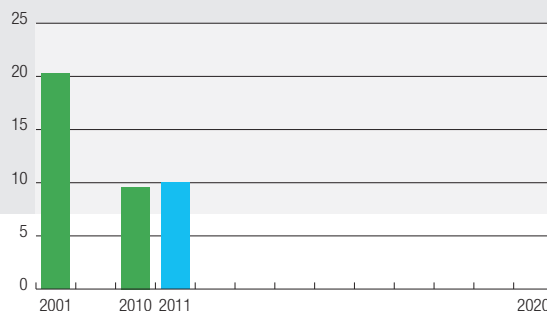
Primary fuel energy consumption

(% with respect to 2011)



Hydrogen not used

(% of production)



First year of the new programme

Based on the results and interest in the first sustainability programme, the industry decided to keep most of the previous quantitative indicators in the second programme. It was also agreed to modify the presentation of the indicators to better illustrate their evolution.

In a first approach, no targets have been fixed but the trend will be yearly reported and linked to the results of the previous programme. In this section, we summarise the results of the first year of this new programme. The coherence and representativeness of the indicators need to be verified (did each company report exactly according to the defined rules?). If necessary, this will be adjusted for the following reporting.

To have a link with the previous programme, we have reported in green the corresponding values of the first (2001) and the last year (2010) of this programme. We have recalculated the values according to the new rules where necessary.

Unfortunately, we were still expecting the contribution of a couple of companies, with limited chlorine production capacity, at the time when the review was finalised.

Hydrogen use

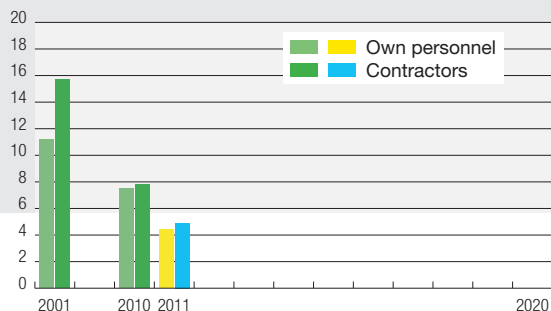
The fraction of hydrogen used from the production is quite high, and the indicator now shows the fraction “not used”. The 2011 situation is quite similar to the last year of the previous programme (the highest reached), with only about 10% of the produced hydrogen not valorised. Some companies are still having difficulties finding a way to use the by-produced hydrogen even if new technologies under development, like fuel cells or electrolysers with depolarised cathodes, are tried in several places.

Energy use

Energy is now expressed in percentage of primary fuel consumption with respect to the 2011 value that is considered as reference (100%). This energy includes not only the electricity consumed in the electrolysis cells and for the utilities (motors, pumps and illumination) but also the steam used for heating fluids and particularly for the concentration of the caustic to 50% (diaphragm and membrane processes). The coefficients to calculate the primary fuels use for generating electricity and steam are based on European average figures for electricity generators and steam boilers.

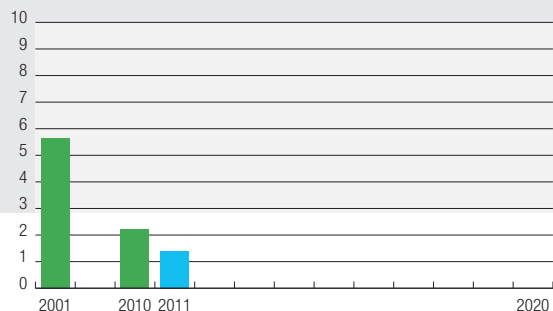
Chlor-alkali Lost Time Injuries frequency rate

(number of LTI incidents per million working hours)



Process incidents and losses

(Number per million tonne chlorine capacity)



To illustrate the concept, the corresponding figure for 2001, first year of the first programme, and 2010, last year of the first programme, would correspond respectively to about 107% and 101% of the 2011 consumption.

Process incidents and losses

This indicator is exactly the same as for the first programme. The actual value is 1.40 million tonne process incidents in 2011, showing a further good improvement that needs to be confirmed and continued in the future.

Lost-time injuries

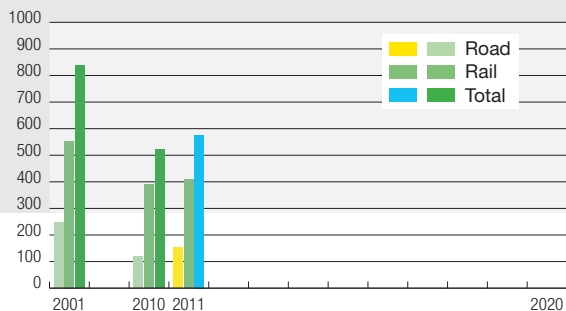
This indicator was modified with respect to the first programme as we asked the companies to report only the accidents specific to the chlorine industry, i.e. directly related to electric current/voltage, chlorine, caustic, hydrogen (explosion), mercury, hypochlorite, sulphuric/hydrochloric acids and other reagents used in the perimeter of the electrolysis unit. The frequency rate figures (number per million working hours) for own employees (4.4) and contractors (4.9) are considerably lower than the previous year, except for some companies. This could mean that in some cases **all** accidents were reported, like it was the case in the first programme. This will be clarified, but efforts are required anyway for some sites to reduce the number of accidents.

Time dedicated to HSE training

This new indicator should monitor the proportion of the working time spent to formal training of the operators in the fields of health, safety and environmental protection (HSE). The average value in 2011 was about 1.7% of working time but the huge spread of individual values could indicate differences in understanding the data to report. This needs further analysis.

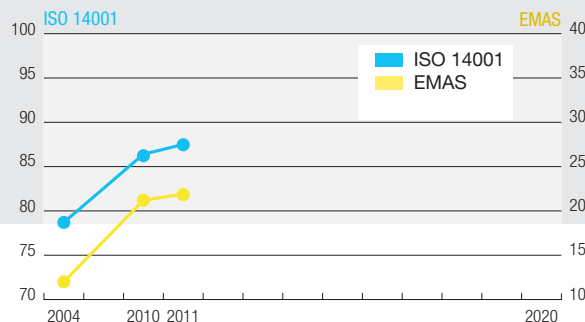
Chlorine transported outside industrial sites

(Thousands of tonnes)



Environmental certifications

(% of total sites)



Transportation

The quantities of chlorine transported increased slightly in 2011, after the crisis dip of the last years, to reach about 5.9% of the production (pipelines excluded), with a bit more than 2/3 by rail and the rest by road. There were no transport incidents to deplore in 2011.

Economic development

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.

Environmental accreditation

Environmental accreditations recognise the fact that organisations have and practise an environmental management system, and Euro Chlor advises its members to demonstrate via these accreditations, that their production units care for the environment. 56 of 64 chlorine production units are ISO 14001 certified and the number of EMAS certifications, still at 14 because they are more demanding, should progressively increase.

Product knowledge

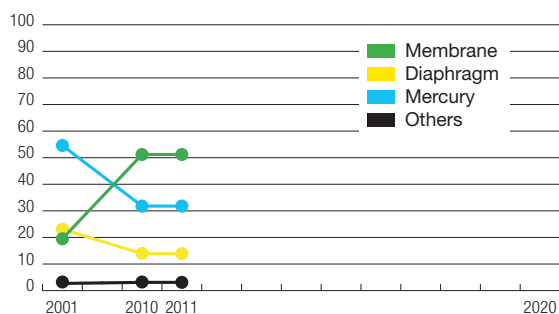
The industry agreed to provide full eco-toxicological and environmental data on 29 chlorinated substances under the International Council of Chemical Associations/ OECD initiative on high production volume (HPV) chemicals. These data have been published except for four HPV chemicals which were either no longer relevant (not commercially available anymore) or are covered under Key substance property data of substances registered under REACH that have been made publicly available.

1.7%

THE AVERAGE HSE TRAINING TIME IN 2011 WAS ABOUT 1.7% OF WORKING TIME BUT THE HUGE SPREAD OF INDIVIDUAL VALUES COULD INDICATE DIFFERENCES IN UNDERSTANDING THE DATA TO REPORT.

Chlorine manufacturing technologies

(% of total installed capacity)



Manufacturing technology

Following the economic crisis of the previous years, several conversion projects were postponed and not concluded in 2011 as initially foreseen. As a consequence, the distribution of the production capacity between the different technologies among the Euro Chlor members did not change with respect to 2010, with about 51% based on the membrane process and 32% based on the mercury process.

Nevertheless, several conversions will be finalised in 2012, and the trend for total phase out of the mercury process in the chlor-alkali industry will then confirm the target of 2020 is in view.

Mercury emissions

With the members' commitment to phase out the mercury (Hg) technology for the chlor-alkali industry by 2020, Euro Chlor continues to monitor the performances of the production units still using it.

Overall European emissions in 2011 amounted to 0.81 g Hg/tonne chlorine capacity, confirming the continuous improvement with respect to the previous years (0.88 g Hg/t in 2010). The plant average reduction of the emissions is due to the improvement shown by the less efficient plants, and there is still margin for reduction... Unfortunately, there are still three plants above the 2007 target of 1.5 g Hg/tonne chlorine capacity for the total emissions, even if two of them are quite close to this value.

Responsible Care®

Euro Chlor does not require its members to sign up to the 'Responsible Care®' initiative but encourages them strongly to do so. In 2011, 1 company on 33 participating to the survey was not yet convinced of the desirability of a formal commitment and will be approached to inform and persuade them to sign the programme.



PVC INDUSTRY REPORTS PROGRESS ON TEN YEARS SUSTAINABILITY

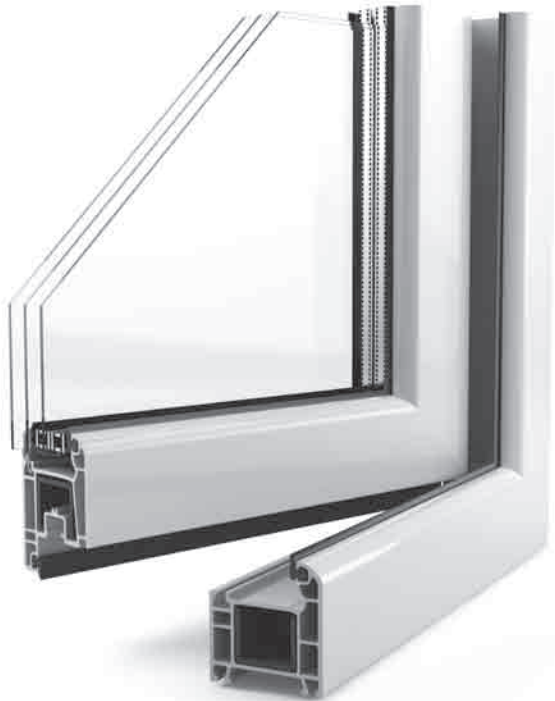
The first year results of the new ten year PVC sustainability initiative – VinylPlus – were presented at the close of the European PVC Value Chain's 2012 annual meeting. Despite significant challenges caused by the economic crisis, results indicate that the industry is on track to achieve the VinylPlus sustainability goals for 2020 set last year following the successful completion of its predecessor Vinyl 2010. Under VinylPlus, the industry has set ambitious targets of recycling per year 800,000 tonnes of PVC in Europe by 2020. Thanks to the consolidation of collection and recycling schemes for PVC, 257,084 tonnes were recycled in 2011. This is despite continuing adverse market conditions and the decrease in volumes of PVC waste in construction.

Progress has also been made towards ensuring the sustainable use of additives. By 2011, the consumption of lead stabilisers decreased by 71.4 per cent in the EU-27 compared to 2007 and remains on track for complete substitution by 2015. This trend has been supported by the corresponding growth in calcium organic stabilisers, used as an alternative to lead-based stabilisers.

However, industry leaders warned that meeting VinylPlus' ambitious objectives will continue to depend on different stakeholders working together to stimulate the market for PVC recycling in Europe. "The industry remains fully committed to the targets we have set and we are encouraged by progress made in the first year of the new programme in a very difficult economic climate. The need for cooperation is more important than ever in these times of austerity. Reaching our goals requires active support down the PVC value chain and a policy environment across Europe which continues to incentivise the diversion of waste from landfill and demand for recycled goods", said Stefan Eingaertner, General Manager of VinylPlus.

257,084

THANKS TO THE CONSOLIDATION OF COLLECTION AND RECYCLING SCHEMES FOR PVC 257,084 TONNES WERE RECYCLED IN 2011.





“In summary, our Sustainability Programme just concluded, shows the ability to bring all in the industry towards the standards of the best.”

Michael Träger



3/ Communication & education

Raising a positive awareness of the benefits of chlorine

The Chlorine Benefits communications plan

Over the past 23 years, Euro Chlor and its partners have established the organisation as the credible and responsible voice of the chlor-alkali chemicals industry. Our joint efforts have given us influence and leverage.

We are a respected communications partner and a source of information for governments, decision makers, scientists and journalists. While continuing this role, we feel it is time to increase the awareness of the benefits of chlorine and the chlorine industry. We will demonstrate chlorine's key role as a chemical building block to make a wide range of products for everyday life, increasing our safety and comfort. We want our stakeholders to understand that chlorine is essential for their cars, laptops and smart-phones, their energy-saving construction materials, medicines, their sports equipment and many more everyday products.

Our three-year communication plan will focus on chlorine, especially in the first and second year. In the third year, the focus will shift and add other aspects like the chlorine co-product caustic soda.

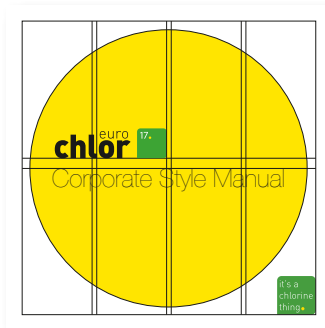


RAISING A POSITIVE AWARENESS OF THE BENEFITS OF CHLORINE

Our focus for the next three years will be on creating a positive image of chlorine and getting the message across that chlorine is indeed a positive, beneficial and necessary element for the modern world. We want people – and especially the audiences in 'the Brussels Bubble' – to see that chlorine is not something that we need to use because there is no alternative, but that it is actually a life-enhancing natural chemical element. An element that is needed for life itself and that improves the quality of life of billions of people around the globe every day.

All communications prepared for this plan will be comprehensible, inclusive, informative, non-defensive and reliable.

“The goal is to make chlorine an accepted, natural and almost mundane part of everyday life”



New Logo

We have designed a new look to match our goals and ambitions. The look includes a new logo, new colours and new visual guidelines. It will ensure that our communications remain fresh, intriguing, friendly, recognisable and educational. The different elements of this new look and feel will be easily associated with Euro Chlor, enhance each other and help to generate a positive impression of chlorine. The elements of the new identity will help to make chlorine and the chlorine industry accessible to a wider audience.

The goal is to make chlorine an accepted, natural and almost mundane part of everyday life. The new Euro Chlor logo presents an evolution rather than a revolution. We have retained the green and yellow of the old logo and incorporated those colours in a fresh, new way. We have also included the number 17 in the logo, reflecting chlorine's position in the periodic table of elements.

For those who are aware of the association with 17, the visualisation of the number will help link the Euro Chlor brand to the logo. Those who are blissfully unaware of the meaning of the 17 will be intrigued. They will be inclined to ask the question – What does the 17 stand for? – raising their awareness of both chlorine and Euro Chlor.

New baseline

Euro Chlor's former baseline was: 'Representing the Chlor-Alkali Industry'. While it has accurately reflected the role of Euro Chlor since its establishment, the baseline focuses on the lobbying role of the organisation. It does not necessarily contribute to a positive image of the element.

As Euro Chlor's identity and personality are now well established, we feel it is the right time to move to a different, catchy baseline.

We need a statement that breathes positivity and makes people smile. It needs to raise awareness and to answer a number of questions. Although the Euro Chlor baseline is not needed for any commercial purposes, what we are looking for is the sort of relevant and credible positivism that is reflected by an iconic baseline.

These ideas have been distilled to create a new, friendly and smile-evoking baseline for Euro Chlor: It's a chlorine thing. In addition to its inherent advantages in terms of likeability, this baseline also shows great versatility. It can be used as a signature as well as a headline. It can be used as a sign-off in letters, advertisements, research results or official documents. The apparent light-heartedness of this baseline should not compromise the intention, credibility or purpose of our new communication plan. Quite the contrary. It will simply enhance and reinforce the identity of Euro Chlor's messages.

it's a
chlorine
thing.



“One of the most important ingredients of upcoming Euro Chlor communication is likeability. To raise positive awareness, people must be receptive to the benefits of chlorine.”

The Chlorinethings.eu website

One of the most important ingredients of upcoming Euro Chlor communication is likeability. To raise positive awareness, people must be receptive to the benefits of chlorine. That requires a tone of voice that is welcoming and comprehensible, rather than scientific.

An additional website – www.chlorinethings.eu – will be created to explain chlorine-related issues using everyday language. The new website is solely intended as a platform to raise awareness of the benefits of chlorine. It will be inclusive and it will educate and inform.

It will not assume that visitors already have a lot of knowledge about chlorine and related topics. The website will also be predominantly linked to everyday chlorine-based products that people recognise.

The site will be linked to a quarterly electronic newsletter “The Chlorine Journal”, which will be distributed to our main audiences and via the membership.

The site will also offer the opportunity to spread little ‘viral’ videos about chlorine chemistry’s benefits.





2,500

THE MODERN AND COLOURFUL
EURO CHLOR SITE HAS AN
AVERAGE OF 2,500 VISITORS
PER MONTH

Euro Chlor website highly successful

The revamped Euro Chlor website, launched at the September 2011 Annual General Meeting, shows very good figures on the number of pages visited, the duration of the visits and the number of Euro Chlor publications ordered. The modern and colourful Euro Chlor site has an average of 2,500 visitors per month.

An analysis via the Google Analytics software shows that several visit parameters have considerably improved compared to the former Euro Chlor site:

- ▶ The average visit time is now 4'40" vs. 2'02" (old site)
- ▶ The bouncing rate (percentage of people leaving the site after having viewed one page) has gone down from 70 per cent to less than 44 per cent
- ▶ Consequently, the average number of pages viewed per visit now is 3.8, vs. 2.4 (old site)

The top five visiting countries are (in this order) United Kingdom, the United States, Belgium, Germany and The Netherlands. The top traffic sources are, by far, Google and direct hits: combined, they generate 78% of all visits.

With 43% returning visitors, the loyalty rate is quite high. Interactivity with visitors is also very good: between 40 and 50 visitors per month order Euro Chlor technical documents, with an absolute record of 150 orders in October 2011, just after the new site's launch. Its ergonomics and the simplicity of navigation are probably the main reasons for that phenomenon. Also, Euro Chlor communications receives between 20 and 40 written questions per mail every month via the Euro Chlor Contact Form.

783 million

TODAY, 783 MILLION PEOPLE
DO NOT HAVE ACCESS
TO SAFE WATER



New Information Sheets published

Communications has published two new Information Sheets in 2011. The first one reports on the progress made in the phasing out of mercury-based chlor-alkali production. The adopted timetable (phase-out by the end of 2020) ensures environmental protection without unnecessary damage to the competitiveness of the European industry and the many downstream industries depending on it. The timetable also allows for the environmentally sound management of the pure mercury that will become available upon closure or conversion of existing mercury cell rooms. Conversion can only be financed if there is good economic justification, and it should be emphasised that the economics of a technology switch are highly site-specific.

The second Information Sheet was issued on the occasion of the 2012 European Green Week, dedicated to water issues. Chlorine was first used in drinking water in the late 19th century to control the spread of water-borne diseases such as typhoid, cholera, dysentery and gastro-enteritis, which have killed more people than all the wars in history. Fighting these diseases remains a vital and ongoing process today. The World Health Organisation estimates that each year, more than three million people still die as a direct result of drinking unsafe water, of which 1.7 million from diarrheal diseases. Today, 783 million people do not have access to safe water sources (joint Report UNICEF/United Nations, April 2012).

Big media focus on chlorinated swimming pools

"Babies (0-12 months): discouraged; swimming above 1 year: encouraged". This was the clear message of the Belgian Superior Health Council in its latest report (March 2012) on health risks related to swimming in chlorinated pools. The Council considers that below the age of 1 year, the risks of infection might not weigh up against the potential benefits of swimming exercise for that particular age group. Above the age of 1 year, swimming in chlorinated pools is certainly recommended.

Amid the huge press activity following the press conference, Euro Chlor communicated that high hygiene standards are crucial in order to minimise the negative effect of disinfection by-products. This message was widely spread in dozens of electronic and print media all over Europe. Euro Chlor welcomes the Superior Health Council's report, and shares its views on the issue. The Federation actively contributes to developing the science on possible impacts and best practices of disinfection by-products.

New Science Publications

In early 2012, Euro Chlor published a new FOCS (Focus On Chlorine Science) document, which is designed to give a quick introduction to a scientific topic. The document focusses on electromagnetic fields in the chlor-alkali industry.

It is hoped later this year to prepare a science dossier on the human health effects of disinfection by-products from the use of chlorine. Additionally a risk assessment for hexachlorobenzene is being finalized for publication by the Environmental Working Group.

EURO CHLOR AT THE SCIENTIFIC SETAC CONGRESS IN BERLIN

The 2012 World SETAC congress in Berlin was attended by over 2,500 environmental scientists, chemists and ecotoxicologists from around the globe. The congress consisted of 4 days of presentations and daily poster sessions.

Again this year mercury did not feature as prominently, but legacy PCBs and HCB remained important topics. In addition there were several interesting posters and presentations on the assessment of PBT/POP substances. There was a lot of interest in the Euro Chlor booth, with a selection of FOCS and science dossiers available (www.eurochlor.org/download-centre/science-dossiers.aspx). This year we provided the whole Euro Chlor Science Library on CD and memory sticks, which was popular with the attendees.

4/ The European Chlorine Industry

European chlor-alkali optimism shaken by uncertain economic indicators

28k

WITH 28K TONNES OF AVERAGE DAILY CHLORINE PRODUCTION IN EARLY 2011, THERE WAS A SENSE OF OPTIMISM IN THE STATISTICS.

European chlor-alkali optimism shaken by uncertain economic indicators

After several months of optimism in the statistics, growth in European chlor-alkali industry output in 2011 was eventually weaker than expected because of increased business uncertainty and reduction in inventories. Caustic soda stocks position was low and relatively static. Chlorinated solvents market went down in 2011, after a recovery in 2010.

Having climbed back over the course of 2010 and in the first half of 2011 to achieving several months with 28k tonnes of average daily chlorine production, there was a sense of optimism in the statistics. This optimism was somewhat shaken in the final quarter of the year by continuing dismal economic indicators such as the Eurozone banking and debt crisis, the high US Government debt level and fierce global competition from fast-growing economies like China and India. With 9,939k tonnes, the 2011 European chlorine production was just 0.6% below the 2010 level, and the 2011 average capacity utilisation rate stood at 78.7% compared to 79.0% in the previous year.

Germany, Belgium/The Netherlands and France remained the top three regions accounting together for nearly 70% of the total European chlorine production in 2011 (Germany: 43.8%; Belgium/The Netherlands: 15.0%; France: 11.0%).



Similarly to 2010, demand for caustic soda – an essential co-product in chlorine make – remained low and relatively static in 2011 with an average monthly stock level just above the 255k tonnes mark.

Because of the uncertain business climate of recent years, several conversion projects had to be delayed. Therefore, the share of total European installed chlorine capacity between the three types of electrolysis (diaphragm: 14%; mercury: 32%; membrane: 51%) did not evolve much in 2011 compared to the previous year.

After a slow recovery in 2010, the chlorinated solvents market went down again in 2011, coming close to the all-time low sales figures of 2009 at the peak of the economic crisis (144k tonnes).

2,000,000

ALMOST 2,000,000 JOBS ARE DIRECTLY OR INDIRECTLY RELATED TO CHLORINE AND ITS CO-PRODUCT CAUSTIC SODA



Euro Chlor

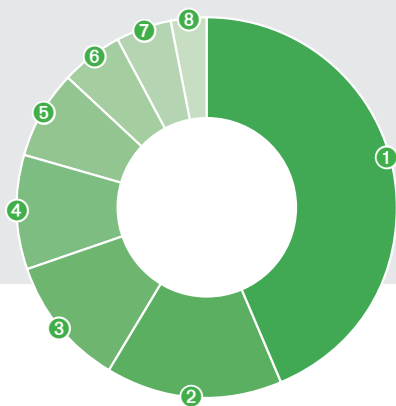
In Europe, 43 Members of Euro Chlor produce chlorine on 71 manufacturing locations in 19 countries. However, almost 2,000,000 jobs are directly or indirectly related to chlorine and its co-product caustic soda when the numerous downstream activities are taken into account.

Apart from producers, Euro Chlor also has 44 Associate Members and 47 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 also provides the Secretariat for the World Chlorine Council, a global network of national or regional organizations in nearly 30 countries. WCC represents producers accounting for more than 90% of worldwide chlor-alkali production.

Euro Chlor was founded nearly 60 years ago as a production-oriented technical organization 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.

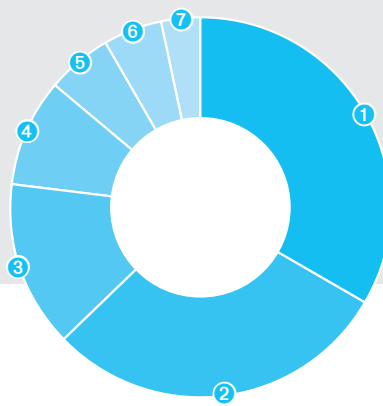
At the occasion of the 20th anniversary of Euro Chlor in 2009, the Federation underlined that one of its major objectives has always been the full recognition by Europe and the rest of the world of the benefits of chlorine chemistry to society. A new Communications Plan has been designed in the course of 2012 to underline this core message.



European Chlorine production

9,937 kilotonnes

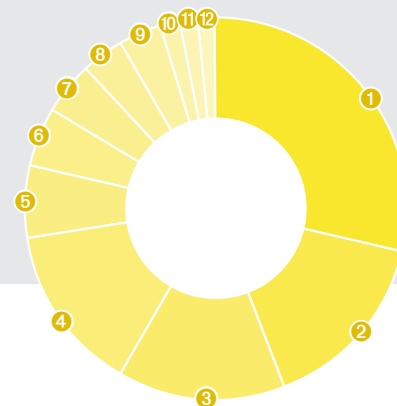
2011	Ktonnes	%
1 Germany	4,349	43.8
2 Belgium + Netherlands	1,494	15.0
3 PT+CH+GR+RO+UK	965	9.7
4 France	1,096	11.0
5 FI+NO+SE+PL	755	7.6
6 Spain	531	5.3
7 CZ+SK+HU+AT	468	4.7
8 Italy	279	2.8
TOTAL EURO CHLOR	9,937	100.0



European chlorine applications

9,992 kilotonnes

2011	Ktonnes	%
1 PVC	3,362	33.6
2 Isocyanates & oxygenates	2,938	29.4
3 Inorganics	1,404	14.1
4 Other organics	920	9.2
5 Chloromethanes	536	5.4
6 Epichlorohydrin	521	5.2
7 Solvents	311	3.1
TOTAL	9,992	100.0



European caustic soda applications

9,678 kilotonnes

2011	Ktonnes	%
1 Organics	2,798	28.9
2 Miscellaneous	1,492	15.4
3 Other inorganics	1,380	14.3
4 Pulp Paper cellulose	1,372	14.2
5 Aluminium and metals	578	6.0
6 Food industries	480	5.0
7 Water treatment	435	4.5
8 Bleach	367	3.8
9 Soaps	367	3.8
10 Phosphates	157	1.6
11 Rayon	151	1.6
12 Mineral oils	131	1.4
TOTAL	9,678,496	100.0

Chlorine production plants January 2012

North-East Atlantic

North Sea

Baltic

Mediterranean

COUNTRY	NUMBER ON MAP	COMPANY	SITE	PROCESS	CAPACITY (000 tonnes chlorine)
AUSTRIA	1	Donau Chemie	Brückl	M	70
BELGIUM	3	SolVin	Antwerp	Hg	290
				M	144
	4	SolVin	Jemeppe	M	174
	5	INEOS ChlorVinyls	Tessenderlo*	Hg	205
				M	270
CZECH REPUBLIC	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	VENCOREX France	Pont de Claix	D	170
	12	Arkema	Fos	D	150
				M	150
	13	Arkema	Jarrie	Hg	163
	14	Arkema	Lavera	Hg	166
				D	175
	15	Arkema	Saint-Auban	M	20
	16	Métaux Spéciaux	Pomblière	Na	42
	17	Prod. Chim. d'Harbonnières	Harbonnières	Hg	23
	18	Solvay	Tavaux	Hg	240
				M	120
	19	Produits Chimiques de Loos	Loos	Hg	18
GERMANY	20	BASF	Ludwigshafen	Hg	170
				M	215
	21	Bayer	Dormagen	M	400
				HCl	80
	22	Bayer	Leverkusen	M	330
	23	Bayer	Uerdingen	Hg	130
				M	130
	24	Bayer	Brunsbüttel	HCl	210
	25	Dow	Schkopau	M	250

* 400 kt Cl₂/year as total combined production capacity permitted

COUNTRY	NUMBER ON MAP	COMPANY	SITE	PROCESS	CAPACITY (000 tonnes chlorine)
GERMANY	26	Vinnolit	Knapsack	M	250
	27	CABB GmbH	Gersthofen	M	45
	28	Dow	Stade	D	1030
				M	555
	29	AkzoNobel	Ibberbüren	Hg	125
	30	AkzoNobel	Bitterfeld	M	93
	31	Evonik Industries	Lülsdorf	Hg	137
	32	INEOS ChlorVinyls	Wilhelmshaven	Hg	149
	33	AkzoNobel	Frankfurt	Hg	167
	34	Solvay	Rheinberg	D	110
				M	85
	35	VESTOLIT	Marl	M	260
	36	Vinnolit	Gendorf	M	180
	37	Wacker Chemie	Burghausen	M	50
GREECE	38	Hellenic Petroleum	Thessaloniki	Hg	40
		Kapachim	Inofita Viotias	M	4
		Unilever Knorr	Marousi	M	20
HUNGARY	39	BorsodChem	Kazincbarcika	Hg	131
				M	160
IRELAND	40	MicroBio	Fermoy	M	9
ITALY	41	Altair Chimica	Volterra	M	27
	93	Procter and Gamble	Campochiaro	M	20
	42	Solvay	Bussi	M	25
	44	Syndial	Assemini/Cagliari	M	150
	49	Solvay	Rosignano	M	120
	50	Tessenderlo Chemie	Pieve Vergonte	Hg	42
THE NETHERLANDS	51	AkzoNobel	Botlek	M	637
	52	AkzoNobel	Delfzijl	M	118
	54	SABIC	Bergen op Zoom	M	89
NORWAY	55	Borregaard	Sarpsborg	M	45
	56	Elkem	Bremanger	M	10
	57	INEOS ChlorVinyls	Rafnes	M	260

COUNTRY	NUMBER ON MAP	COMPANY	SITE	PROCESS	CAPACITY (000 tonnes chlorine)	
POLAND	58	Rokita	Brzeg Dolny	Hg	78	
				M	48	
	59	Zachem	Bydgoszcz	D	72	
				60	Anwil	Wloclawek
PORTUGAL	61	Solvay	Povoa	M	26	
	62	CUF Químicos Industriais	Estarreja	M	72	
				HCl	44	
ROMANIA	91	Oltchim	Ramnicu Valcea	Hg	186	
				M	105	
	92	ChimComplex	Borzesti	M	107	
SLOVAK REPUBLIC	63	<i>Novacke Chemicke</i>	<i>Novaky</i>	<i>Hg</i>	76	
SLOVENIA	88	<i>TKI Hrastnik</i>	<i>Hrastnik</i>	<i>M</i>	16	
SPAIN	64	Ercros	Huelva/Palos	Hg	48	
	65	Ercros	Sabinanigo	M	30	
	66	Ercros	Vilaseca	Hg	135	
				M	55	
	67	EHERSA	Hernani	M	15	
	68	ELNOSA	Pontevedra/Lourizan	Hg	34	
	69	Ercros	Flix	Hg	115	
	70	Química del Cinca	Monzon	Hg	31	
	71	Hispavic	Martorell	Hg	218	
	72	Solvay	Torrelavega	Hg	63	
SWEDEN	75	INEOS ChlorVinyls	Stenungsund	Hg	120	
SWITZERLAND	77	CABB AG	Pratteln	Hg	27	
UK	82	INEOS ChlorVinyls	Runcorn	Hg	277	
				M	430	
	85	Brenntag	Thetford	M	7	
TOTAL					12,605	
					<i>Non members</i>	241
					Members	12,364

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

Management Committee

(1st June 2012)

- ▶ **Chairman: Träger, Michael**
VESTOLIT
- ▶ **Amling, Andreas**
Bayer MaterialScience
- ▶ **Berges, José**
Evonik Industries
- ▶ **García Brú, Francisco**
Ercros
- ▶ **Garrigue, Fabrice**
VENCOREX France
- ▶ **Korte, Hans-Jürgen**
Solvay
- ▶ **Kwaśny, Janusz**
PCC Rokita
- ▶ **Metcalf, Keith**
INEOS ChlorVinyls
- ▶ **Procházka, Martin**
Spolchemie
- ▶ **Schwalenberg, Knut**
Akzo Nobel Industrial Chemicals
- ▶ **Takken, Otto**
ARKEMA
- ▶ **Thomas, Arnd**
Dow Deutschland
- ▶ **Wehlage, Thomas**
BASF
- ▶ **Winhold, Michael**
Vinnolit

Committees and working groups

MANAGEMENT

- ▶ Management Committee
- ▶ Statistics Committee

ADVOCACY & COMMUNICATIONS

- ▶ Regulatory Affairs Committee
- ▶ Ad hoc Energy WG
- ▶ Communications Committee

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
- ▶ Human Health WG
- ▶ Environmental WG
- ▶ Biocides Strategy Group
- ▶ Biocides Registration Groups
- ▶ REACH Project Team

TECHNICAL & SAFETY

- ▶ General Technical Committee (GTC)
- ▶ Environmental Protection WG
- ▶ GEST (Safety) WG
- ▶ Equipment WG
- ▶ Instruments WG
- ▶ Transport WG
- ▶ Health WG
- ▶ Electromagnetic Fields WG
- ▶ Analytical WG
- ▶ Ad hoc Group Chlor-Alkali BREF Update

WORLD CHLORINE COUNCIL

- ▶ WCC Governing Council
- ▶ WCC Management Committee
- ▶ WCC Joint Global Advocacy & Science Team
- ▶ WCC Global Safety Team
- ▶ WCC Global Sustainability Team
- ▶ WCC GAST Ad hoc Mercury WG

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Euro Chlor provides a focal point for the chlor-alkali industry's drive to achieve a sustainable future through economically and environmentally sound manufacture and use of its products. Based in Brussels, at the heart of the European Union, the federation works with national, European and international authorities to ensure that legislation affecting the industry is workable, efficient and effective.

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