

Five Energy

Industry Review 2015-2016

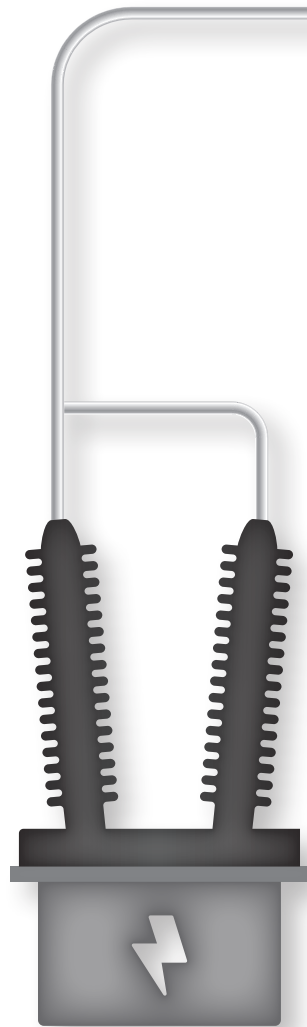
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The central theme of this issue is electrical energy, which along with salt and water, is the third essential raw ‘material’ for chlorine production (see diagram page 21). Energy is a high priority issue for the chlor-alkali industry as every industrial electrolysis is, by definition, **an electricity-intensive process**. The European chlor-alkali industry calls for a European energy regulation package that safeguards its international competitiveness and ensures regulatory certainty.

Read more about the Euro Chlor position here:





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Moving forward in turbulent times



Dolf van Wijk
Executive Director

Turbulent times were already evident well before the 23rd of June when the ‘Brexit’ vote added to the uncertainty by delivering an outcome unexpected by many. The British desire to leave the European Union continues to attract media attention but, in fact, just adds to the many other challenges that the European Union is facing. The euro crisis in Greece continues and is spreading to other Member States, the refugee

crisis continues to divide Europe and serious geopolitical risks in surrounding countries keeps the EU in a perpetual state of crisis management. Meanwhile, the badly needed ‘growth and jobs’ and a supportive policy framework for manufacturing in Europe seems to have moved well down the list of priorities.

Paradoxically, the desire for an ‘ever closer union’ has been counterproductive and is increasing division. For the future of the European Union, it is essential that leaders take the increasing skepticism seriously, becoming transparent and factual about policy results and restoring public confidence by delivering on agreements and policies. Frequent failure to enforce its own rules has seriously undermined the Union’s credibility and led to the logical reprioritization by Member States, based on more ‘local’ interests.

Perhaps the Brexit (which is critical of the Union, *not* about Europe as a whole) will encourage the EU to develop an effective, cooperative model on key areas of common interest that takes national priorities more into account.

Europe’s competitiveness at risk

More specifically to the chemicals sector, including chlor-alkali manufacturing, the past year has emphasized that our competitiveness continues to suffer. Investment leakage is a reality, energy policy has increased electricity costs without achieving the intended goals and the regulatory burden in Europe is high. Addressing these specific concerns will remain a priority on both the Euro Chlor and Cefic agendas.

The ‘Cumulative Cost Assessment’, based on industry input, showed how the regulatory burden has doubled in just one decade. Compared to Gross Operational Surplus (an economic measure of profit), the additional regulatory cost has reached 30% – a substantial part of the profitability of companies and a significant factor in our industry’s competitiveness.

Despite our high level of process safety and the major increase in understanding on the health impact of our products through significant investments in REACH dossiers, it is irrational that Europe has become even more precautionary. There is still a lack of evidence-based policy in Europe which undermines the Union’s desire to lead on environmental issues. It is not uncommon for facts to be ignored in policy-making.

Affordable and reliable energy essential to economic success

EU climate policy has initiated energy policies intended to foster the internal energy market and lower CO₂ emissions. In reality this has not been achieved and energy costs remain uncompetitive. Subsidized renewable energy production has increased energy costs and undermined the reliability of supply. This is contrary to what is needed to nurture prosperous economic framework conditions.

For the short-term, the chlor-alkali industry needs a level playing field through full compensation of indirect carbon costs up to the benchmark. For the longer term, we support the building of a truly liberalised European energy market based on full and open competition, designed to lead to uninterrupted, competitively priced, secure energy for all consumers. This is a fundamental necessity for EU energy-intensive industries, such as chlor-alkali manufacturing, to be able to compete in an international competitive market. Today we still do not see this in practice in the energy market.

Mercury deadline approaching quickly

The deadline of mercury technology phase-out is rapidly approaching and the past year saw several announcements on conversion plans. Less than one and a half years away from the phase-out deadline, we are entering a critical phase with challenges in terms of investment, decommissioning commitment and maintaining the environmental safety performance at the desired standards. A successful workshop organized by Euro Chlor in June demonstrated the key role of our association in sharing good practices amongst members.

Moving forward through innovative value chains

Whilst overall positive signs are lacking for chemicals in Europe – both economically and politically, our sector is indispensable for society's future challenges. Chlor-alkali chemistry has a number of strengths that will flourish in a setting with more positive framework conditions for innovation. Developing innovative breakthroughs and turning new ideas into products and solutions is the task of companies; but a supportive environment of modern evidence-based policy is also essential.

Factual and evidence-based innovation principles and policies should return to law-making, helping Europe to go back to its fundamental core values. Top level science, the quest for knowledge, evidence, and new solutions has always been the basis of European prosperity. Investments in R&D are slowly increasing again, young people are increasingly choosing to study chemistry or engineering and Europe's chemistry is world-class in terms of energy efficiency. Europe can and should rely on its capacity to innovate, a feature which has been its critical strength for centuries.

SUSTAINABILITY



The Conversion Years



Chairman
Thomas Wehlage

For the chlorine Industry in Europe, the next one and a half years will be a period of mercury technology phase-out, leading to a fundamental reshaping of the market landscape. By 1999, the European Chlorine Industry had already made a voluntary agreement for the phase-out of mercury technology by 2020.

In 2013, under the Industrial Emissions Directive, the BAT conclusions (Best Available Techniques) for the chlor alkali

industry became legally binding. This means that before the end of 2017, mercury-based production technology will cease.

At this moment, approximately 20% of the capacity in Europe is still based on mercury technology. For those companies involved in conversion, this means hard work in order to maintain the environmental and safety performance of these plants up to the required standards during the conversion. These challenges, in addition to an energy market in transition with increasing pressure to apply renewable energy sources, increase economic uncertainty and pressure on our member companies.

After the conversion or shut-down of these mercury plants, there will still be a period of dismantling of those installations containing mercury. Diligence is therefore required due to the need for safe removal and transformation of mercury into permanent storage.

During this process, *Euro Chlor has a major role in assisting members with guidance documents and in sharing best practices for decommissioning and the safe and environmentally responsible treatment of any waste and excess mercury.* This was a clear observation from the recent, well-received, Euro Chlor June 2016 workshop on mercury plant decommissioning and occupational health.

In addition, Euro Chlor continues to collect information on mercury emissions as part of the sustainability programme to monitor the shift away from mercury-based technologies. However, continued vigilance is required to keep our Industry focused on all sustainability indicators and to ensure improvement. Special attention is still needed in some areas where trends are not improving such as energy and process incidents.

Together with the member companies, Euro Chlor will develop strategies to restore declining parameters into 'positive' trends. Whilst Euro Chlor will take a leading role in this, the support and active participation of the member companies is essential to ensure success.

I know I can count on your commitment in this matter to safeguard our industry's license to operate.

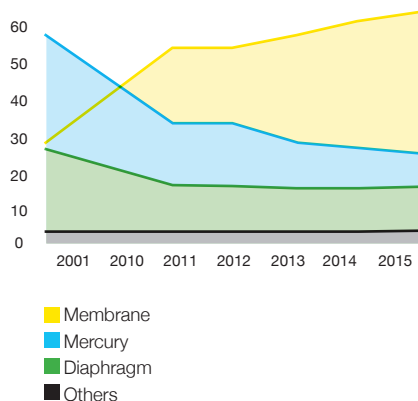
A handwritten signature in blue ink, which appears to read 'Wehlage', written in a cursive style.

Manufacturing technology

Three mercury based units were shut down and/or converted to membrane technology during 2015. By the end of 2015, membrane technology represented about 64% of the chlorine production capacity in Europe. In contrast, the mercury process now accounts for approximately 20% of production capacity.

During 2016 and 2017 conversions to the membrane process will increase further due to the implementation of the chlor-alkali BAT conclusions under the Industrial Emissions Directive. **The Directive requires implementation of the chlor-alkali BAT by member states by the end of 2017.**

Chlorine manufacturing process
(% of total installed capacity end of year)

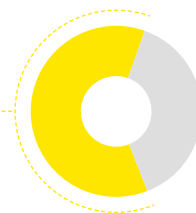


THE MEMBRANE PROCESS



64%

of the chlorine
production capacity
IN EUROPE

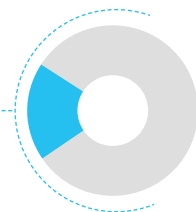


THE MERCURY PROCESS



20%

of the chlorine
production capacity
IN EUROPE



Economic development

Within the Sustainability Programme, Euro Chlor has decided to report monthly, quarterly and annual data on European production of chlorine and caustic soda. This includes utilization rates, caustic stocks, capacity and technology by plants and applications. **The aim of this openness is to enhance transparency of the chlor-alkali sector.**

In 2015 and 2016, Euro Chlor continued to publish these figures. Every year this Industry Review includes a map of Europe showing the location of all plants and a table indicating the location ownership, technologies and capacity of each plant (see Chapter 3, Competitiveness).

Mercury emissions

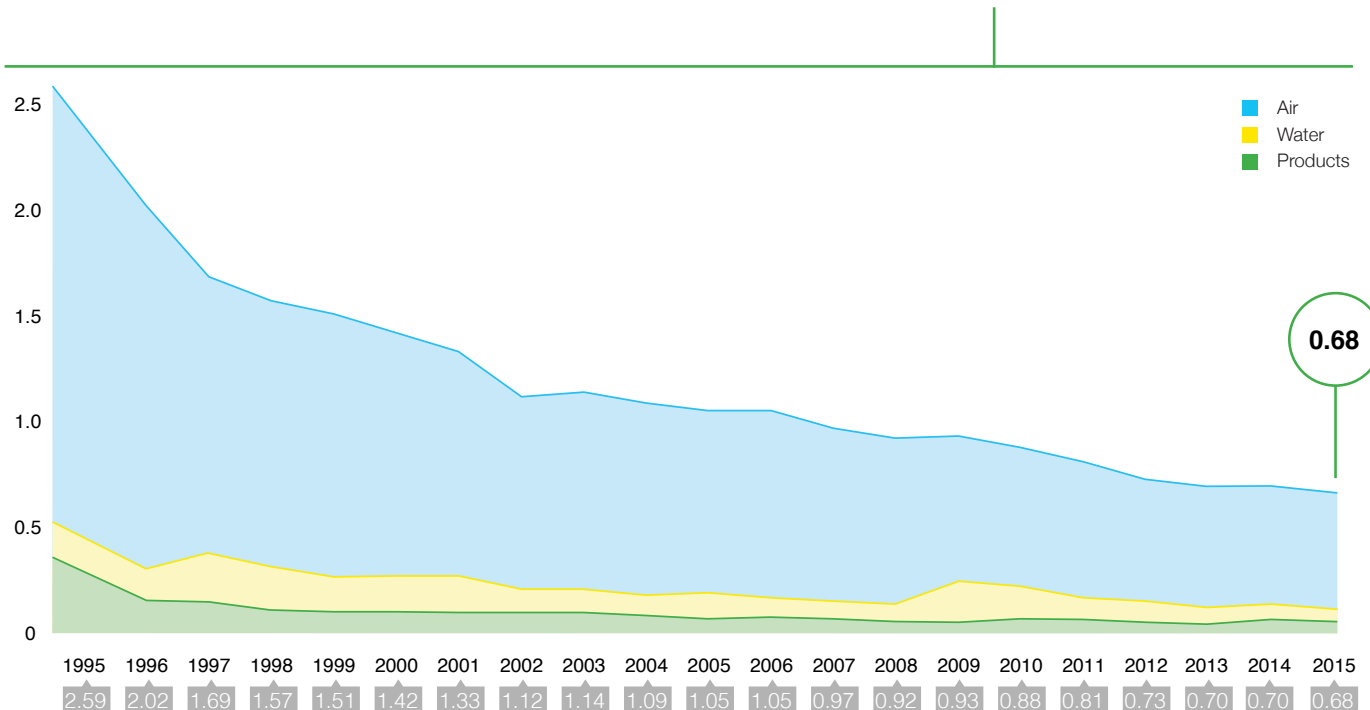
The phase-out of the mercury process for chlor-alkali production is in full swing. In the meantime though, Euro Chlor continues to find it important to monitor and reduce the mercury emissions of those production sites that still use the mercury technology.

The absolute level of mercury emissions declined to approx. 1.7 tonne in 2015, mainly due to closures but also due to a reduction in the emissions from the remaining production sites.

The specific mercury emission per tonne of chlorine reduced to 0.68 g Hg/t in 2015.



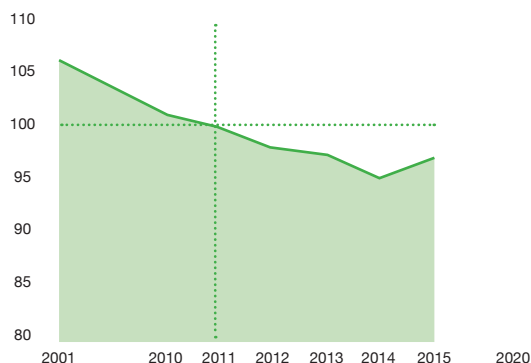
Trend of mercury emissions
(g Hg/tonne chlorine capacity)



Energy consumption

Energy Consumption

(% with respect to 2011)



In 2015, the declining trend in energy consumption apparently reversed. The energy consumption in 2015 was 96.3% compared to the 2011 reference level, but compared to 2014 there was an increase of 1.2% (from 95.1% to 96.3%)

This increase may be partially explained by the fact that in 2014, fewer production sites participated in the sustainability review. In 2015 there was a higher participation rate (95% of the nameplate capacity), so when the 2014 figure for the missing companies is corrected for this, the percentage in 2014 is actually 96.3%. As such, **there has not been an overall decline in energy consumption since 2013.**

This static trend may be explained by the fact that membrane plants were being operated at a higher production level, whilst the mercury installations in the last phase of their lifecycle began to perform slightly worse. The effect of the transition from mercury to membrane is still rather small and the positive effect of this is completely overridden by the negative effect of the increasing energy consumption of the remaining mercury production units.

Hydrogen use

The use of hydrogen is stable over the period 2010-2015; around 89%.

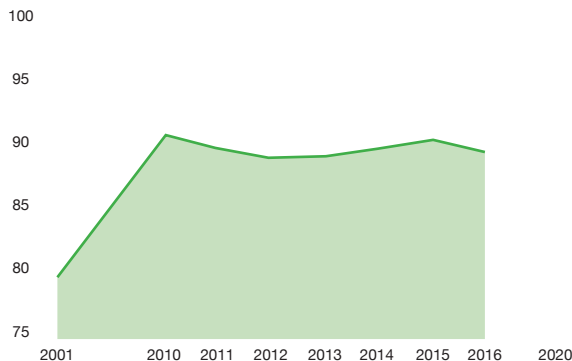
The electrolysis by-product hydrogen (H_2) can be used as a **chemical reagent** in integrated production sites, for **energy generation** (steam) or in some cases **into electricity** (fuel cells).

Moreover, in some cases hydrogen production in the electrolyzers is avoided via the use of depolarised cathodes.



Hydrogen used

(% of production)



Occupational Safety

After slightly poorer safety performance for company workforce data in 2014, **the figures recovered in 2015 and the declining trend continues.**

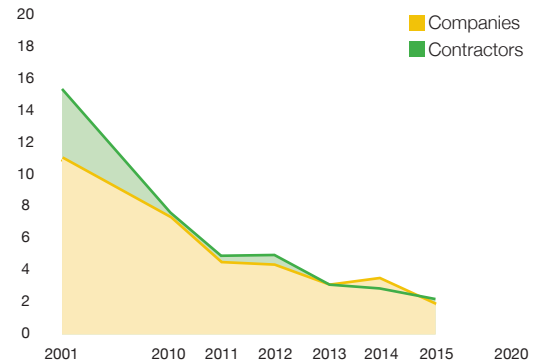
The declining trend is encouraging but the effort to further reduce 'lost time injuries' and improve the safety performance of the Industry remains a key priority for the membership and Euro Chlor. This also forms a central component of the Euro Chlor Safety Initiative.

Occupational safety is measured as lost time injuries per million working hours (LTI rate). Since 2011, only those accidents specific to the chlorine industry are accounted for (i.e. injuries directly related to electric current/voltage, chlorine, caustic, hydrogen (explosion), mercury, hypochlorite, sulphuric/hydrochloric acid and other reactants used in the electrolysis unit).



Occupational Safety

(number of LTI incidents per million working hours)



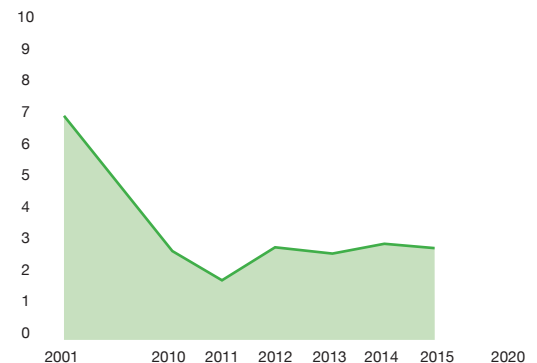
Process incidents and losses

Process incidents and losses remain stable over recent years (2012-2015); however, unfortunately the excellent level of 2011 has not been reached since.

The Safety Initiative will focus more on incidents and near misses in order to increase awareness, lessons learned and bring about improvement of Euro Chlor recommendations. With this, Euro Chlor will assist member companies in improving their performance in this area.

Process incidents and losses

(Number per million tonne chlorine produced)



Time dedicated to HSE training

This indicator, introduced as part of the new programme, monitors the proportion of working time spent on the formal training of company operators in the fields of health, safety and environmental protection (HSE).

During recent years, this figure was rather stable at 1.5%, however this year, a decline to 1.3% has been observed. Besides this, there is a wide spread of values between the different companies, with approximately 60% of the companies having a value below this average.

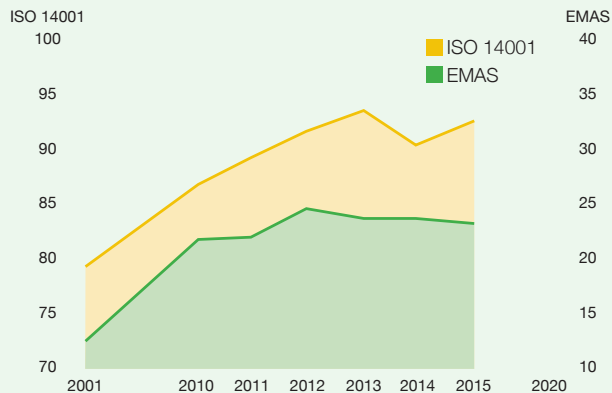
As there can be a relation between safety performance and the amount of training, the declining trend in the amount of hours spent on training may be of concern. As such, **there is a need to increase and improve the dedicated HSE training of the operators amongst the majority of member companies.**



ISO 14001

Environmental accreditation

(% of total sites)



Environmental accreditation

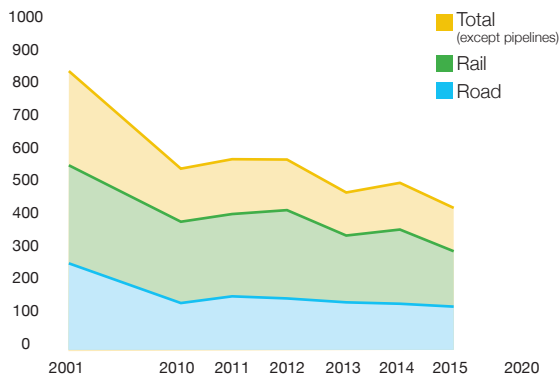
Overall, the proportion of sites with ISO 14001 (environmental) accreditation status actually increased compared to 2014, staying more or less constant with 2013 data. The decrease in 2014 may be explained by one company not reporting in 2014. So, **this KPI stays more or less stable over the last 3 years.** The same applies for the more demanding EMAS (Eco-Management & Audit Scheme) status.

Transportation

The amount of chlorine that is transported from production sites decreased further in 2015. In 2015, 4.5% of produced chlorine was transported, with the majority being transported by rail (71% of the total). The amount of the total that was transported by ship was approximately 1%, whilst the amount being transported by road was around 28%.

Chlorine transported outside industrial sites

(Thousands of tonnes)



Safety initiative organizes successful workshop

In 2014, Euro Chlor launched a new safety initiative. As part of this, a dedicated Task Force was set-up under the Technical Committee who organized a Leadership Safety Workshop in September 2015. The successful event encouraged strong engagement between the 21 participants, highlighting a clear, universal desire to improve. **The main conclusions of the Workshop were the need to improve incident reporting and increase the sharing of best practices through incorporation of the lessons learned via our guidelines.** In order to enhance such lesson sharing, a quarterly Safety Newsletter was introduced as a new initiative from the Workshop.

The positive engagement of the participants has inspired the Euro Chlor team to work on additional steps to improve the safety performance of our members. In the course of 2016 and 2017 more initiatives will be developed by the Task Force before being presented to the members.

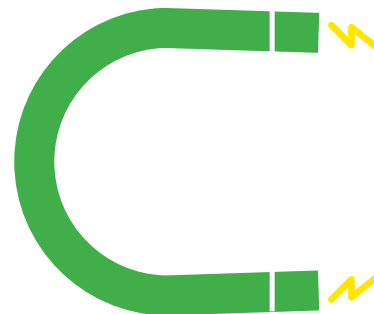
Full compensation of indirect carbon costs is needed for a level playing field in Europe

Responsible Care

The Responsible Care® initiative is *the* international programme of the chemical industry.

It comprises a commitment through a charter for continuous improvement in the areas of environmental protection, safety and workers' health. Member companies report periodically about progress.

Euro Chlor, through the support of the corresponding national associations, works with its members to meet the principles and criteria of Responsible Care® and collectively reports on the results.



A new chapter for the Health Working Group

With the 2017 deadline for mercury plant decommissioning activities in sight, the Euro Chlor Health Working Group (HWG) will gradually reduce its activities on mercury topics in the upcoming years. **This means that the Group will have the opportunity to focus on new issues relevant to the industry.** Before designing a detailed roadmap for the future, the HWG commissioned a survey amongst a subset of the Euro Chlor membership to obtain their opinions on the future value of the group's activities, to ask for suggestions for continuous improvement and to identify topics in the post-mercury age.

It was concluded that the HWG adds value to Euro Chlor and should continue producing documentation and training material, sharing experience on accidents, gathering knowledge on substances of concern, and collecting data on health performance of the members. **The HWG will closely cooperate with the Safety Initiative and will endeavour to enlarge the group with a wider variety of health and safety personnel as part of its 2016-2017 action plan.**

Are electromagnetic fields an issue in occupational safety?

The HWG recently published an advisory document informing company health practitioners on the complicated medical (non-)issues surrounding electromagnetic fields (EMFs). Designed to distill the essential information from the weighty EU guidance on EMFs, the document aims to answer the essential questions ‘What are EMFs?’, ‘What is their potential effect on workers?’ and ‘Which measures should the occupational physician take?’.

The basic message is that the strengths of EMFs in electrolysis units are limited and that the fields are only relevant in specific areas of the plant. No long-term adverse health effects caused by EMFs have been encountered in the chlor-alkali industry. Nevertheless, **special attention should be given to people wearing implanted medical devices that could be affected by electromagnetic waves.** The newest generation of active devices is much more resistant to external disturbances. However, the HWG strongly recommends that occupational health providers perform a risk assessment prior to allowing workers wearing medical devices to enter the plant.



Treatment of caustic soda burns: water, water, water or... Diphoterine®?

Contact of human skin with caustic soda may lead to severe and painful burns and should therefore by all means be prevented. Unfortunately, accidents still occur and the treatment during the first moments after the chemical burn is essential in determining the resulting damage to eyes or skin. Solutions of Diphoterine®, a neutralizing agent, are commercialized and advertised as an excellent treatment for caustic skin and eye burns. The accompanying documentation describes a rinsing procedure of just a couple of minutes. Based upon a literature search, own experience and a discussion with the Belgian Antipoison Center, the Euro Chlor HWG issued a document on the use and the limitations of Diphoterine®. **The document highlights the importance and benefits of immediate and prolonged rinsing of the affected area with fresh water.** Diphoterine® is considered useful in sites far from safety showers, but its use should not replace the water rinsing procedure.



VinylPlus makes ongoing progress with PVC sustainability

Since its launch in June 2011, VinylPlus continues to build on the accomplishments of its predecessor Vinyl 2010, the European PVC industry's voluntary commitment, with the aim of making PVC truly sustainable. Currently just over halfway through its 10-year programme, progress is being made on all the Five Sustainability Challenges derived from The Natural Step System Conditions for a Sustainable Society.

Continued investment in recycling infrastructure and technologies is driving the controlled-loop management of PVC. With 514,913 tonnes of PVC waste being recycled in 2015, VinylPlus is on track towards its 2020 target of recycling 800,000 tonnes of PVC per year.

A significant milestone was reached at the end of 2015 with the announcement by European Stabiliser Producers Association (ESPA) members that they had completed the replacement of lead-based stabilisers in all their formulations sold in the EU-28 market. Hence, products made from virgin PVC resin by European converters do not longer contain lead as of 2016.

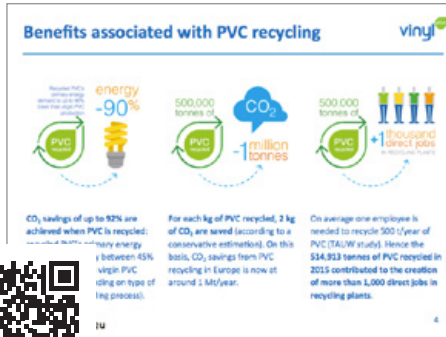
VinylPlus reaffirmed its commitment to addressing the issue of 'legacy additives' in recycled PVC in cooperation with regulatory authorities and **is calling to propose realistic solutions for the continuation and development of PVC recycling, taking into account its resource efficiency benefits.**

European plasticiser producers are reacting to the evolving demands of the market by adapting their products to address the new regulatory constraints, including REACH, and investing in R&D to provide solutions for the PVC chain.

As the Circular Economy concept becomes more deeply ingrained, its policies are increasingly reshaping the environmental debate in which VinylPlus and its members are playing a vital role. Raising sustainability awareness of PVC and its place in the 21st century, both throughout Europe and globally, is a key priority. VinylPlus will continue to build sustainability awareness across the value chain – including stakeholders inside and outside the industry – to accelerate resolving its sustainability challenges.

VinylPlus General Manager Brigitte Dero said: "In just under 16 years, we have come a long way and achieved much, but to achieve its vision VinylPlus will continue to further strengthen collaboration and engagement globally. **The voluntary approach of VinylPlus and its scope, encompassing the entire value chain, constitute an interesting and motivating example of what a committed and united industry can achieve.** Its relevance extends well beyond the boundaries of the European PVC industry. Progressing together in one united global aim, while seeking higher fundamental standards for PVC sustainability, is the ultimate answer."





PVC facts and figures

“ As the Circular Economy concept becomes more deeply ingrained, its policies are increasingly reshaping the environmental debate in which VinylPlus and its members are playing a vital role. ”

2020
TARGET



recycling
800,000 t
of PVC per year.



The Progress Report 2016 summarizes VinylPlus achievements in 2015



Also check the new VinylPlus fact sheet on Showing the Path for a Circular Economy

REGULATION



Biocidal Products Regulation activities accelerate

After a quiet few years, the Biocidal Products Regulation (BPR) process on the active substance dossiers for **chlorine, sodium hypochlorite and calcium hypochlorite**, managed by Euro Chlor, has been re-energised. In a very busy first-half of 2016, the Italian evaluating Competent Authority, assisted by Euro Chlor registration group members, presented its proposal for the final dossiers to the other member states. These proposals included items related to the identity of the substances, their environmental and human health impact and their efficacy, all of which will help companies to conduct subsequent product authorisations. It is still expected that the dossiers will be fully accepted by early 2017, with an estimated final active substance approval date of early 2019.

As more companies become aware of their responsibilities under the BPR (e.g. those involved in producing in-situ devices that locally 'chlorinate' water distribution systems), Euro Chlor continues to support the process by providing letters of access to such businesses, whilst providing members with troubleshooting advice and information on next steps.

ECHA remains the lead administrative body for the BPR and **is looking to publish at least 50 biocidal active/product opinions per year; a very ambitious target.**

Further, as part of the biocides process, Euro Chlor followed discussions on a Dutch member state harmonized classification and labeling proposal to classify sodium hypochlorite as being more environmentally toxic at lower concentrations. As this proposal was based on old, incomplete data and would have had major SEVESO implications, an industry task force was arranged to address this issue. Working with a group of members and downstream users, Euro Chlor encouraged the ECHA Risk Assessment Committee (RAC) to **apply a correct, scientific, weight-of-evidence approach** and use more recent studies for the assessment. These more recent studies, some of which had been asked for by the authorities and funded by Euro Chlor, did not support the Dutch position and as such, RAC decisions concluded in favour of the industry position. In the decision, the M factors were concluded as 1 (chronic) and 10 (acute) for sodium hypochlorite.

Emission Trading System reform post-2020

Since the establishment of the Emission Trading System (ETS) Directive, **Euro Chlor has advocated that an EU-wide compensation scheme for electricity-intensive industries should be put into place.** Whilst we consider the Commission's proposal for the post-2020 trading period a step in the right direction, it still needs improvement in order to address Euro Chlor's major concerns. The ETS needs to ensure that indirect emitters producing up to the benchmark of energy efficiency do not face any carbon costs. Any discrepancy in implementation across the EU will disturb the internal market.

The political discussions in the European Parliament and the Council have started and are expected to continue well into 2017. Euro Chlor, in cooperation with Cefic, continues to relay its position on indirect emitters to the European institutions.

Read the **Euro Chlor position paper** here:





Chlorinated Alkanes Sector Group (CASG)

After the 2014 ECHA request to the MCCP REACH Consortium for **additional bioaccumulation (B) and persistence (P) tests**, an ECHA Board of Appeal case was raised in order to propose an alternative testing plan. Unfortunately, the Board of Appeal upheld the test requirement and, as such, testing must take place before early 2018 in order to assess the B and P properties of the substance. Whilst testing is underway, it is disappointing that such tests are required in that it goes against the regulatory requirements for reduced animal testing and does not adequately consider available B data indicating that MCCP is not likely to bioaccumulate in the environment and is far better degradable than previously assumed.

MCCP is further challenged by a KEMI proposal to prepare a RoHS Annex II dossier before guidance on Annex II dossier preparation is available from the European Commission. Such guidance would help to determine what those criteria are for inclusion of a substance on Annex II, as being currently worked on by the Commission and Industry. Efforts are therefore underway to encourage regulators to investigate the process and **ensure that substances are assessed in a harmonised, scientifically robust and impartial manner.**

The CASG has also initiated a programme to promote the benefits of chlorinated alkanes in a manner similar to other specialty chemicals. Interesting case studies are being obtained from downstream users on their application of chlorinated alkanes in order to show that such substances have important, life-saving functions and display versatile chemistry.

Mercury phase-out deadline approaching

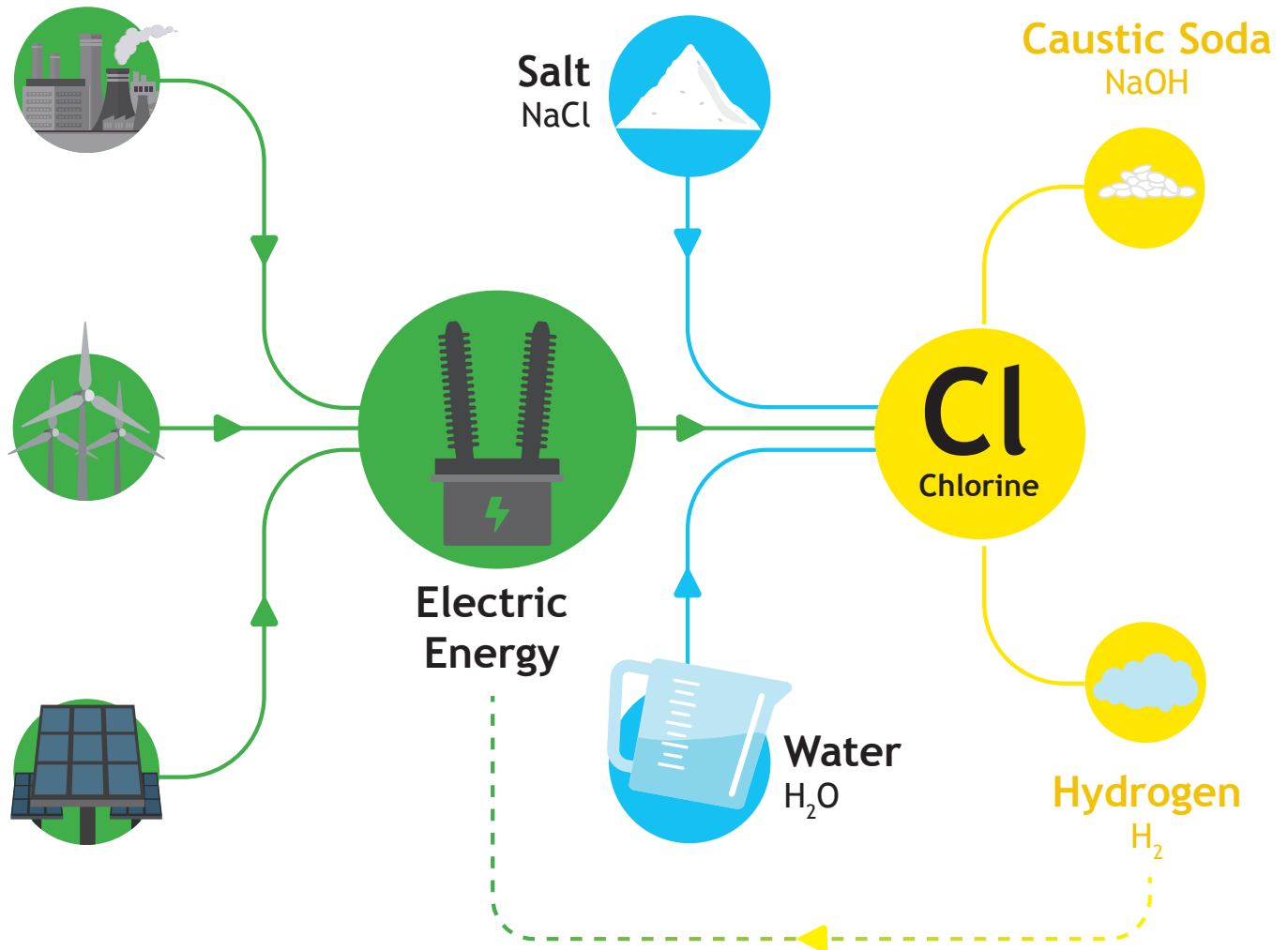
By the end of 2017 (at the latest), all chlor-alkali production sites must have updated their local permits under the IED (Industrial Emissions Directive). These permits should comply with the requirements of the new chlor-alkali BREF and BAT conclusions, as published in the EU OJ of 11th December 2013.

During the past year, there have been several announcements of capacity conversion and closure. In order to **inform our stakeholders on the latest developments, the Euro Chlor website has a dedicated page where all such announcements are published.** For the latest, publicly available information, we recommend consulting this web page:



How to make chlorine?

It only takes three raw materials to make chlorine. Yes, three: **salt, water and energy** in the form of **electricity**. Depending on the installed technology, the cost of electricity can constitute up to 50% of the total chlorine production cost.



Commission proposal for mercury regulation published

A new regulation on mercury, repealing all other mercury related regulations, has been published by the Commission as of 2nd February 2016. This new Regulation includes all other regulatory requirements concerning mercury use and control, whilst simultaneously serving as the EU ratification package for the UNEP Minamata Convention, the global legally-binding instrument on Mercury.

The EU is a strong promotor of this global treaty and therefore **global expectations for the EU to ratify the Convention are high**. Once the EU has ratified, it is expected that many Member States will also quickly ratify the treaty, bringing the total above 50. Entry into force is expected to happen in the first half of 2017 at the latest with the first COP (Conference of the Parties) for the Minamata Convention possibly in the second half of 2017 in Geneva.

For European chlor-alkali companies the main challenge of the new Regulation is the availability of multiple safe and affordable permanent storage (disposal) options, which currently remain limited. The Commission proposal foresees permanent storage of liquid mercury as an option, but criteria for storage and monitoring have not yet been established.

The alternative is to ‘stabilize’ mercury by reacting it to mercury sulfide forming an ‘industrial’ waste rather than a ‘hazardous’ one. For the moment, there is at least one operational provider for this solution, although some other developments may be on the horizon. The capacity of the stabilization option will be challenging though, given the total amount of expected ‘excess’ mercury (almost 6000 tons) and the timelines predicted. This challenge will be closely followed up with the Commission.

o 13	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922
h 106	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.711	51 Sb Antimony 121.757
r 117	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980
it 81	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium unknown	114 Fl Flerovium [289]	115 Uu Ununpentium unknown

80	2
Hg	8
Mercury	8
200.59	32
	18
	2

Occupational Health and Safety Workshop on Mercury Exposure, 2016 Edition

Euro Chlor organised its third well-attended workshop on mercury plant decommissioning. 23 Participants from 15 member companies exchanged experiences on the many challenges they face 30 months before mercury related activities need to reach completion. Topics of discussion included the efficient cleaning of contaminated materials, waste disposal, limiting worker and environmental exposure during dismantling, dealing with external contractors and keeping stakeholders adequately informed.

The presentations and lively discussions that followed allowed important questions to be answered. However, **the workshop also revealed that this type of experience exchange fora should be organised on a more regular basis**, something which the Euro Chlor team will investigate further.



Stockholm Convention progresses HCBd and SCCP

After the evaluation of the risk management report for hexachlorobutadiene (HCBd; Annex F at the 2015 Conference of the Parties (COP7)), HCBd was listed on Annex A (no production). However, whilst it was also deemed to be a minor and unintentional by-product in the manufacturing of chlorinated solvents, there was a lack of clarity identified by the COP on measures required to prevent such production (and justify an Annex C inclusion; cessation of unintentional production). The new document, which is receiving further input from the World Chlorine Council (WCC), **will be discussed at the POP Review Committee meeting in late-September 2016** for presentation at the next COP in May 2017.

SCCPs passed through the Annex E stage of the convention after a very controversial evaluation in Q3 2015. Several external, non-industry commentators noted the highly political nature of the evaluation process and WCC led the way in highlighting a lack of scientific rigour in the assessments under the Convention. Such issues are *still* noted in the current inter-sessional process on the risk management evaluation (Annex F), with concerns over the poorly defined assessment of alternatives and an incorrect understanding of the presence of SCCP impurities in other substances.

WCC is engaging with the scientific community, wider chemical industry experts and members of the POPRC and UNEP secretariat in order to encourage open discussion on the scientific rigour of the entire review process.

ECSA membership

ECSA membership faced some big changes in 2015. As of 1st July 2015, the joint venture (called INOVYN) between INEOS and Solvay began. In addition, the chlorinated solvents business of Dow was divested to Olin Corporation, which became effective on 1st October 2015.

As the **ECSA membership** is now comprised of 4 companies, as per Cefic rules and EU regulation, most of the data collection and statistical analysis has ceased due to an insufficient sample size. In turn, this prevents ECSA in communicating statistical data to national and European authorities, as has been extensively requested in the past.

This year also saw changes in the management of the group as from 1st January 2016, **Andy Story, Organic Chlorine Derivatives Marketing Manager of INOVYN, accepted the position of ECSA Chairman.**



REACH

The substance evaluation for **carbon tetrachloride** being listed on the CoRAP list in 2012, led to a request for an extended one generation reprotoxicity study (EOGRTS) via inhalation by the French rapporteur. As carbon tetrachloride is, with a small exception, exclusively used as an intermediate under strictly controlled conditions, the Chlorsolv REACH Consortium did not regard this request as relevant information to lower the risk of use and decided to approach ECHA's Board of Appeal to petition against this decision. In the final decision, published on 23rd September 2015, the Board of Appeal agreed with consortium argumentation, effectively annulling the decision and remitting the case to the Agency for further action. The appellants updated the dossier in the end of May 2016, and France/ECHA have 1 year to react.

For **chloroform**, the consortium decided to conduct a new nitrification inhibition test to derive a NOEC/EC10, which will bring improvements to the industrial users of chloroform as it will confirm that the usual, unavoidable discharges into Sewage Treatment Plants are safe.

Methylene chloride was put on the CoRAP list for substance evaluation in 2016, despite the REACH dossier being of high quality due to earlier, thorough revisions in 2014. The consortium has already contacted the eMSCA (Italy) to offer their cooperation should further information be needed. An outcome of the evaluation is expected within 12 months of publication.

Data sharing for **Korean chemical registration** ('K-REACH') is another topic that registrants have been involved with. A number of ECSA studies are cited in the REACH dossiers and all chlorinated solvents are listed on the 1st K-REACH priority list. Again, chlorinated solvents are pioneering this complicated process, supported by ReachCentrum, to facilitate scientifically sound REACH data finding their way into K-REACH dossiers, thus avoiding the need for new tests with potentially diverging substance data.

New documents available on ECSA website

The revamped ECSA website, launched in 2014, is now accessible via www.chlorinated-solvents.eu, and is being kept up-to-date. Recently, **numerous documents in the publications section have been updated** with new information such as the Product Safety Summaries for the GPS initiative, and the Information for Dry-Cleaners (available in several EU languages). The Health Profiles for perchloroethylene and methylene chloride have also been updated with the latest scientific information. These Health Profiles are comprehensive, state-of-the-art summaries of the toxicological and ecotoxicological findings and their related classification.

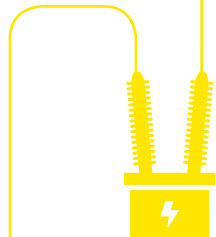
By the end of 2016, the **Product & Applications Toolbox** that gives safety information for the 5 solvents covered by ECSA and 360 applications will be **updated**. The storage and handling guideline is also under revision and will be 're-versioned' within the same timeline.

German guideline on safe use of PER in dry-cleaning

The State Office for Work Safety (Landesamt für Arbeitsschutz, LAS) in Germany has published a guide on safe working conditions for perchloroethylene usage in dry-cleaning. The report describes, in detail, the equipment and handling that should be applied in dry-cleaning premises to prevent or minimize exposure and be compliant with strict German regulations. It is based on a recent exposure assessment study in German dry-cleaning shops which confirmed that, under these conditions, the average exposure will be far under the 20 ppm exposure limit. **ECSA has worked with the German authorities to translate this document into English, thus enabling its use as a good example of risk management for other educational and advocacy purposes.** The German market represents ca. 3800 shops, of which 70 % are working with PER as a dry-cleaning solvent.

Genotoxicity study commissioned for methylene chloride

Together with our US sister organisation (HSIA), ECSA funded a study to clarify the mode of action of cancer formation by methylene chloride and a publication on this is expected in a peer-reviewed scientific journal soon. The outcome of this study shows that, **below a threshold, there is no methylene chloride related risk of cancer formation.** This will help to defend the product against allegations from regulatory bodies and NGOs regarding cancer classification and the setting of unjustified occupational exposure levels.



Continued support for UNEP Mercury Global Partnership

The UNEP Mercury Chlor-alkali Partnership underwent a change during the past year when UNIDO (the UN Industrial Development Organisation) gained the co-chairmanship of the Partnership alongside the US EPA, who has fulfilled this role for many years. Euro Chlor, working within the WCC (World Chlorine Council®), will continue to actively support Partnership activities. Such collaboration has made WCC a well-respected partner, enabling the Chlor-alkali Partnership to become the most active of those Partnerships supporting the Minamata Convention.

UNIDO joined the partnership to help explore those options that give financial support to developing countries, helping them to safely convert from mercury technologies. In a meeting at the UNIDO headquarters in Vienna in June 2016, it became clear that the UN has different funding and support mechanisms, but these are thinly spread over many activity areas.

In general, it is expected that industry will be the major investor in joint projects (such as the conversion from mercury cell to membrane technology) but some additional funding may become available to support specific elements of the entire operation. These elements might include the monitoring of exposure during decommissioning activities or other studies related to the safe handling of mercury.

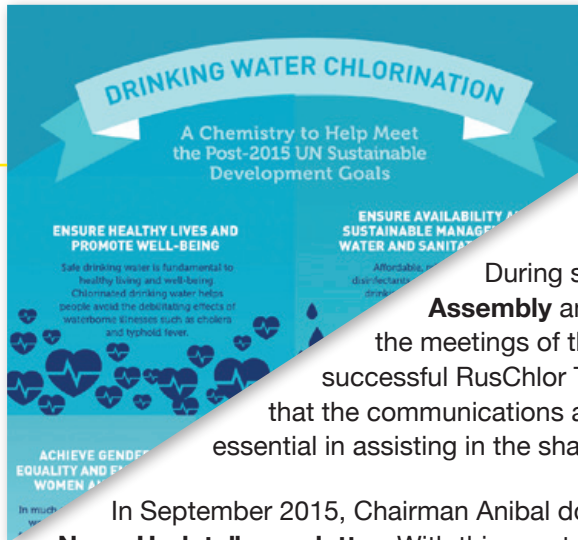
Financing of conversion projects is the major challenge for our industry, but solutions for permanent disposal are also still critical. Whilst workable and affordable safe solutions are essential for the industry, maintaining the credibility of our sector in ensuring that excess mercury does not enter other (perhaps illegal) markets is also important. Currently only few disposal solution providers exist, with a very limited capacity.

The Chlor-alkali Partnership will follow these developments closely and will list all potential solution providers on the UNEP section of the WCC website in order to promote transparency and awareness to all stakeholders.

 **ORLD chlorine council®**



World Chlorine Council® intensifies communications efforts



With a representation of more than 90% of global chlor-alkali production capacity (with the participation of China, India and Russia in recent years), the World Chlorine Council® (WCC) is a **truly global organisation**. As such, WCC attention has shifted towards efforts in better sharing of best practices in advocacy, science, communication and, most importantly, safety.

During several recent WCC meetings, including the New Delhi **General Assembly** and AMAI Workshop on drinking water chlorination (October 2015), the meetings of the Global Safety Team and in regional activities such as the successful RusChlor Technology Conference (Moscow, April 2016), it became apparent that the communications activities of the World Chlorine Council (and its regions) are essential in assisting in the sharing of information.

In September 2015, Chairman Anibal do Vale proudly presented the first edition of the “**WCC Global News Update**” newsletter. With this quarterly leaflet, Mr. do Vale hopes WCC can be more pro-active in sharing experiences, knowledge and perspectives, including sustainability and safety, between members. The leaflet also contains news on WCC developments including how, in spring 2016, **Mr. John McIntosh**, Executive Vice President, Olin and President, Chemicals & Ammunition, became the **WCC Governing Council Vice-Chairman**. He will assume the Governing Council Chairman position for 2017 and 2018 when the Secretariat responsibilities will be administered by the American Chemistry Council’s Chlorine Chemistry Division.

In other communications news, the **WCC website** is being continually updated to keep it a modern and vital source of information. In addition to the site being a document library, it is the organisation’s key public communications tool. The organisation wishes to develop the website further though, enhancing its functionality and content. ‘Blogs’ will keep the WCC web-content dynamic and relevant. In order to advertise the site, all WCC member regions have been asked to adapt their websites in order to facilitate access to the it.

Some important documents have been made available via the website including the **WCC outreach materials** on the post-2015 UN Sustainable Development Goals (SDGs), which have been finalized and may be accessed via the links below (QR codes).



Double-sided infographic



Trifold brochure

COMPETITIVENESS



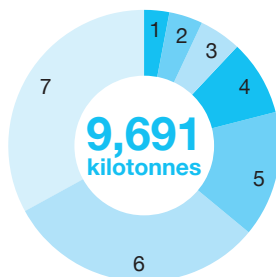
EUR. CHLORINE PRODUCTION 2015	KTONNES	%
GROUP 1 - SOUTHERN EUROPE	1,881.33	19.6%
GROUP 2 - NORTHERN EUROPE	6,773.60	70.7%
GROUP 3 - CENTRAL/EASTERN EUROPE	921.85	9.6%
TOTAL EURO CHLOR	9,578	100.0%



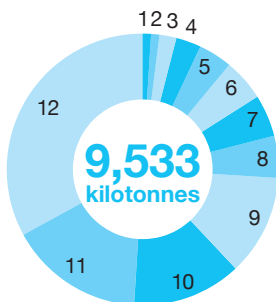
Due to new Cefic statistics rules, the European chlorine production is now divided into three zones:

GROUP 1 SOUTHERN EUROPE	GROUP 2 NORTHERN EUROPE	GROUP 3 CENTRAL & EASTERN EUROPE
France	Belgium & Luxembourg	Austria
Italy	Netherlands	Liechtenstein
Greece	Germany	Switzerland
Portugal	United Kingdom	Poland
Spain	Ireland	Czech Republic
Faroe Islands	Denmark	Slovakia
Andorra	Sweden	Hungary
Gibraltar	Finland	Romania
Vatican City	Iceland	Croatia
Malta	Norway	
San Marino		
Svalbard Archipelago		

EUR. CHLORINE APPLICATIONS 2015	KTONNES	%
1 SOLVENTS	258	2.7%
2 CHLOROMETHANES	359	3.7%
3 EPICHLOROHYDRIN	486	5.0%
4 OTHER ORGANICS	896	9.2%
5 INORGANICS	1,441	14.9%
6 PVC	3,060	31.6%
7 ISOCYANATES & OXYGENATES	3,191	32.9%



EUR. CAUSTIC SODA APPLICATIONS 2015	KTONNES	%
1 PHOSPHATES	104	1.1%
2 RAYON	108	1.1%
3 MINERAL OILS	156	1.6%
4 SOAPS	316	3.3%
5 BLEACH	331	3.5%
6 WATER TREATMENT	447	4.7%
7 ALUMINIUM & OTHER METALS	499	5.2%
8 FOOD INDUSTRIES	510	5.4%
9 OTHER INORGANICS	1,149	12.1%
10 PULP, PAPER, CELLULOSE	1,267	13.3%
11 MISCELLANEOUS	1,523	16.0%
12 ORGANICS	3,123	32.8%



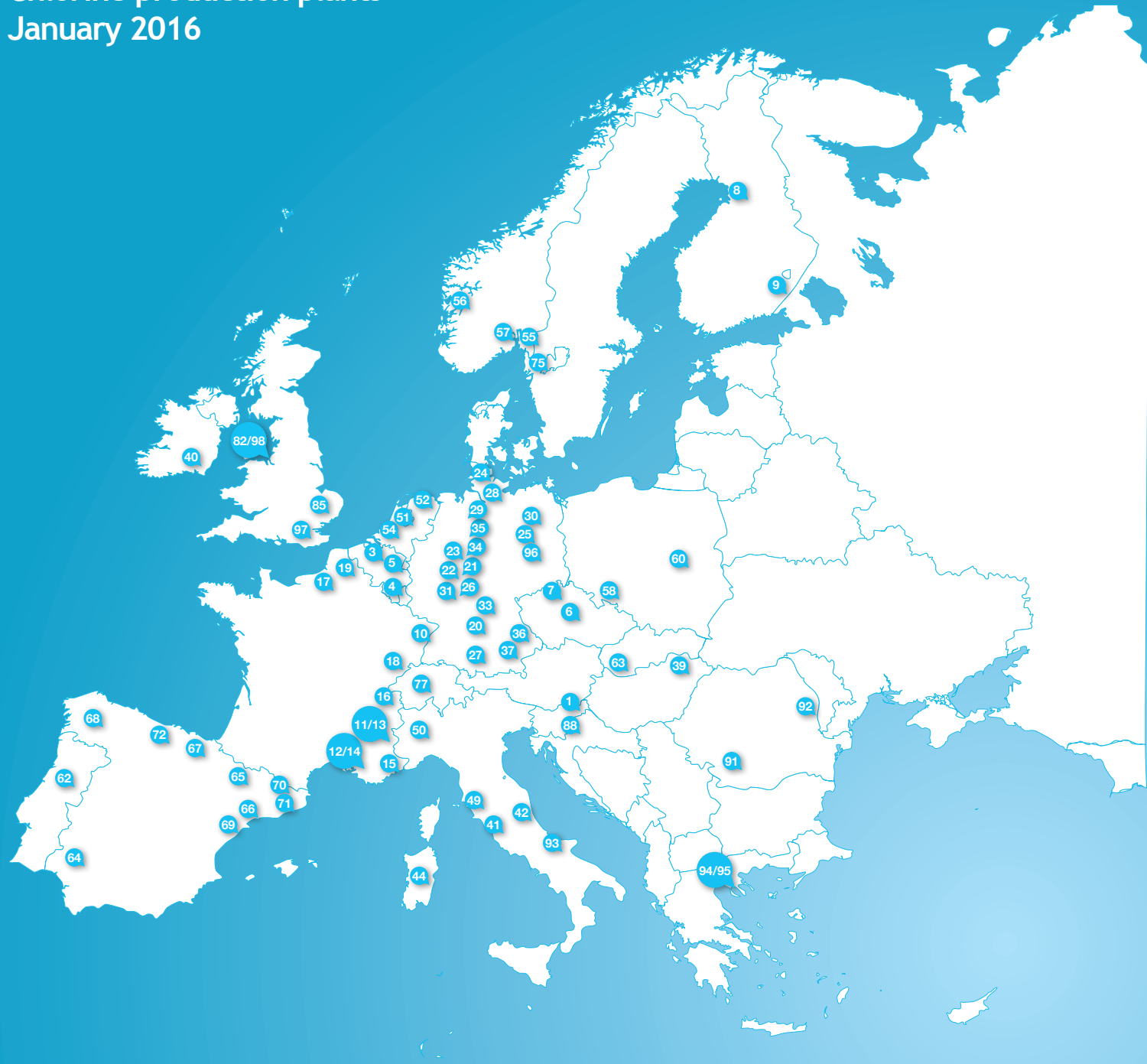
Chlorine production remains flat in 2015

European chlorine production in 2015 was reported at 9,578 kt which is 0.3% below the level of 2014 and still 9.7% below the peak level registered in pre-crisis 2007. **This means there is no real sign of recovery from pre-crisis levels, despite the hope provided from the small uplift of 1.7% on last year.** The average capacity utilization rate in 2015 was 79.7% which was slightly higher than in 2014 (77.3%).

For the overall chemical industry in Europe, Cefic reported a sluggish growth rate of 0.5% for 2015. The environment for the chemical business in 2015 continues to prove challenging with construction growth slower than expected in the current, low-interest rate environment. Only the automotive industry over-performed in 2015, impacting demand for certain chemical products.

For 2016, the world economy is expected to grow only moderately and Cefic expects the growth of gross domestic production in the European Union will remain stable with some regional differences. With the developments in the competing regions outside Europe, there is a continued **need for EU policymakers to support the competitiveness and innovative capacity of the European chemical industry.**

Chlorine production plants January 2016



COUNTRY	NUMBER ON MAP	COMPANY	SITE	NAMEPLATE CAPACITY (000 TONNES CHLORINE)	Hg	D	M	OTHERS
Austria	1	Donau Chemie	Brückl	74			74	
AUSTRIA TOTAL				74	0	0	74	0
Belgium	3	INOVYN	Antwerp	460	110		350	
Belgium	4	INOVYN	Jemeppe	174			174	
Belgium	5	Vynova	Tessengerlo*	400	205		270	
BELGIUM TOTAL				1,034	315	0	794	0
Czech Republic	6	Spolana	Neratovice	135	135			
Czech Republic	7	Spolchemie	Usti	61	61			
CZECH REPUBLIC TOTAL				196	196	0	0	0
Finland	8	AkzoNobel	Oulu	40	40			
Finland	9	Kemira	Joutseno	75			75	
FINLAND TOTAL				115	40	0	75	0
France	10	PPChemicals	Thann	43			43	
France	11	VENCOREX	Pont de Claix	170		170		
France	12	Kem One	Fos	340		179	161	
France	13	Arkema	Jarrie	72			72	
France	14	Kem One	Lavera	363	164	199		
France	15	Arkema	St Auban	20			20	
France	16	MSSA	Pomblière	42				42
France	17	PC Harbonnières	Harbonnières	23	23			
France	18	INOVYN	Tavaux	360			360	
France	19	PC Loos	Loos	18	18			
FRANCE TOTAL				1,451	205	548	656	42
Germany	20	BASF	Ludwigshafen	385	170		215	
Germany	21	Covestro	Dormagen	480			400	80
Germany	22	Covestro	Leverkusen	390			390	
Germany	23	Covestro	Uerdingen	260			240	20
Germany	24	Covestro	Brunsbüttel	210				210
Germany	25	Dow	Schkopau	250			250	
Germany	26	Vinnolit	Knapsack	250			250	
Germany	27	CABB GmbH	Gersthofen	55			55	
Germany	28	Dow	Stade	1,585		1,030	555	

COUNTRY	NUMBER ON MAP	COMPANY	SITE	NAMEPLATE CAPACITY (000 TONNES CHLORINE)	Hg	D	M	OTHERS
Germany	29	AkzoNobel	Ibbsbüren	125	125			
Germany	30	AkzoNobel	Bitterfeld	99			99	
Germany	31	Evonik Industries	Lülsdorf	137	137			
Germany	33	AkzoNobel	Frankfurt	283			283	
Germany	34	INOVYN	Rheinberg	220		110	110	
Germany	35	VESTOLIT	Marl	260			260	
Germany	36	Vinnolit	Gendorf	180			180	
Germany	37	Wacker Chemie	Burghausen	50			50	
Germany	96	LEUNA-TENSIDE	Leuna	15			15	
GERMANY TOTAL				5,234	432	1,140	3,352	310
Greece	94	Kapachim	Inofita Viotias	4			4	
Greece	95	Unilever Knorr	Marousi	20			20	
GREECE TOTAL				24	0	0	24	0
Hungary	39	Borsodchem	Kazincbarcika	323	131		192	
HUNGARY TOTAL				323	131	0	192	0
Ireland	40	MicroBio	Fermoy	9			9	
IRELAND TOTAL				9	0	0	9	0
Italy	41	Altair Chimica	Volterra	55			55	
Italy	42	Solvay	Bussi	25			25	
Italy	44	Ing. Luigi Conti Vecchi	Assemini	25			25	
Italy	49	INOVYN	Rosignano	150			150	
Italy	50	HydroChem Italia	Pieve Vergonte	42	42			
Italy	93	Fater	Campochiaro	20			20	
ITALY TOTAL				301	42	0	259	0
The Netherlands	51	AkzoNobel	Botlek	637			637	
The Netherlands	52	AkzoNobel	Delfzijl	121			121	
The Netherlands	54	Sabir	Bergen op Zoom	89			89	
THE NETHERLANDS TOTAL				847	0	0	847	0
Norway	55	Borregaard	Sarpsborg	46			46	
Norway	56	Elkem	Bremanger	10			10	
Norway	57	INOVYN	Rafnes	280			280	
NORWAY TOTAL				336	0	0	336	0
Poland	58	PCC Rokita	Brzeg Dolny	155			155	

COUNTRY	NUMBER ON MAP	COMPANY	SITE	NAMEPLATE CAPACITY (000 TONNES CHLORINE)	Hg	D	M	OTHERS
Poland	60	Anwil	Wloclawek	214			214	
POLAND TOTAL				369	0	0	369	0
Portugal	62	CUF	Estarreja	122			78	44
PORTUGAL TOTAL				122	0	0	78	44
<i>Romania</i>	91	<i>Oltchim</i>	<i>Rimnicu Valcea</i>	105			105	
Romania	92	Chimcomplex	Borzesti	96			96	
ROMANIA TOTAL				201	0	0	201	0
<i>Slovak Republic</i>	63	<i>Fortischem</i>	<i>Novaky</i>	76	76			
SLOVAK REPUBLIC TOTAL				76	76	0	0	0
<i>Slovenia</i>	88	<i>TKI Hrastnik</i>	<i>Hrastnik</i>	16			16	
SLOVENIA TOTAL				16	0	0	16	0
Spain	64	Electroquimica Onubense	Huelva/Palos	48	48			
Spain	65	Ercros	Sabinanigo	30			30	
Spain	66	Ercros	Vilaseca	190	135		55	
Spain	67	Electroquimica de Hernani	Hernani	15			15	
Spain	68	ELNOSA	Pontevedra/Lourizan	34	34			
Spain	69	Ercros	Flix	78	78			
Spain	70	Quimica del Cinca	Monzon	31			31	
Spain	71	INOVYN	Martorell	218	218			
Spain	72	Solvay	Torrelavega	63	63			
SPAIN TOTAL				707	576	0	131	0
Sweden	75	INOVYN	Stenungsund	120	120			
SWEDEN TOTAL				120	120	0	0	0
Switzerland	77	CABB AG	Pratteln	27	27			
SWITZERLAND TOTAL				27	27	0	0	0
UK	82	INOVYN	Runcorn	277	277			
UK	98	Runcorn MCP	Runcorn	430			430	
UK	85	Brenntag	Thetford	7			7	
UK	97	Industrial Chemicals Ltd	West Thurrock	15			15	
UK TOTAL				729	277	0	452	0
GRAND TOTAL				12,311	2,437	1,688	7,865	396
PER PROCESS					19.7%	13.6%	63.5%	3.2%

Process: Hg = mercury M = membrane D = diaphragm Others = electrolysis of HCl to Cl₂ or molten salt electrolysis
Euro Chlor members are indicated in non-italic

* Total combined production capacity of the Tessenderlo site Permit = 400 kt Cl₂/yr

COMMUNICATION & EDUCATION



Home Page

Home Page
Technical Documents
Membership Documents

Click on the blocks below or use the top menu bar to navigate through the site.
Your access to the different sections of this site depends on your membership level and on your involvement as a regular member in a committee or working group.

EDIT LINKS



Management

Technical

Technical Documents

Regulatory Affairs

Science

Communications

ECSA

Chloro alkanes

Potassium

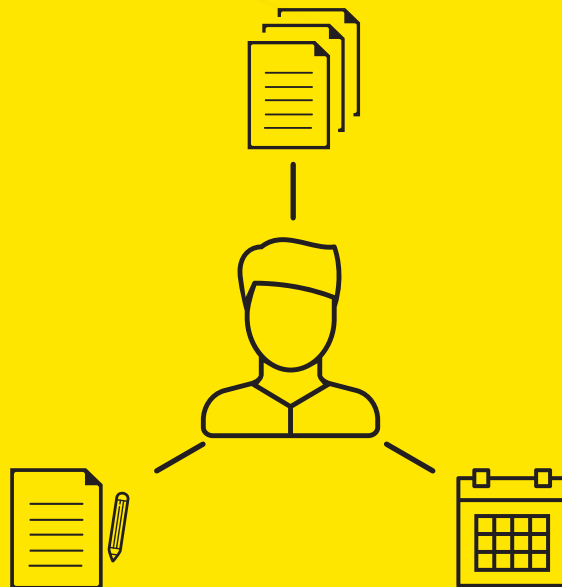
Lost? Refer to the following **Site Plan** to find your way through the site

Site Plan.pdf

New Euro Chlor SharePoint site live!

In order to facilitate information sharing with its membership, Euro Chlor has released a new, improved SharePoint site. Acting as a **document library (including minutes and agenda), work space for technical document editing, calendar of events and meeting/event registration platform**, the new site will allow Euro Chlor members to increase interaction with the secretariat and with each other in order to share best practices on health, safety and sustainability.

All members can receive a personalised login for the platform with tailored access to areas of the site which are of interest. Troubleshooting and advice is available from the Euro Chlor team and more will be presented during meetings on how best to use this new service at www.chlorine.eurochlor.org.



Chlorine Chemistry: Contributing to a sustainable future

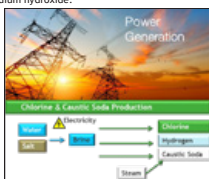
Each year, over 9500 kilo tonnes of chlorine are produced in Europe and are used in nearly every branch of the chemical industry as well as in base chemicals for many products we use on a daily basis. Given it's importance in such a diversity of applications, we recognise our social, environmental and economic responsibility in maintaining the planet for future generations.

From basic soap production...

The chlorine industry stands as one of the first examples of a truly 'circular economy'. In the 19th century, alkali (or lye) was being produced in large quantities for 'novel' chemicals like soap. Interestingly, the word 'lye' actually comes from an ancient Indo-European word meaning 'to wash'.

...chlorine was a waste...

Originally, lye was produced by treating sodium carbonate with calcium hydroxide but this was then replaced by the Solvay Process, whereby sodium chloride solutions (or brine) were mixed with calcium carbonate (from limestone), however both of these required a lot of mineral raw material. The Solvay process developed into the more efficient, modern chlor-alkali process whereby an electric current is passed through brine leading to sodium hydroxide.



An overview of the production of chlorine, caustic soda and hydrogen

During this early manufacture of lye, 'wastes' such as hydrogen and chlorine were also produced. These wastes were of obvious economic value and as such industries developed in order to use these wastes. This resulted in the industry as we know it today and also led to the enhancement of our modern lifestyles.

...now used in sophisticated PVC materials

Chlorine in particular is used in products from cards to computers, from dyestuffs to detergents, from paints to pharmaceuticals (whereby 85% of pharmaceuticals used today are manufactured using chlorine) and PVC (which is used in window frames, flooring and cables). PVC itself is actually very easy to recycle. Indeed, one firm is currently recycling 800,000T per year, cutting down on the waste disposal requirements.

Some chlorinated additives which produce 0.8kg CO₂ per kg of product beat other additives which can have as much as 2.8kg CO₂ per kg. In Europe, virtually all PVC cable waste is now recycled (around 100,000 tonnes). Some of these 'wastes' also contain plasticisers which do not impede the recycling but actually impart vital flame retardancy features.

What about water?

One of the best-known uses of chlorine is in the provision of safe, clean drinking water. One of the post-2015 UN Sustainable Development Goals (SDG2015) is the provision of clean water and sanitation. Chlorinated water helps people to avoid

EURO
chlor 17.

Science communication

Several new scientific documents have been made available by Euro Chlor over the past year covering a diverse range of chlor-alkali related topics.

The first is an **information sheet**, designed to educate on an interesting feature of our industries activities. Entitled 'Chlorine Chemistry: Contributing to a sustainable future', it tells the story of how, in the 19th century, chlorine was originally a waste product from lye manufacture which is now harnessed into many applications such as modern PVC plastics (with their own sustainability cycles), drinking water (part of UN Sustainability Goals) and in solvents. It is fair to say that chlorine chemistry stands as one of the first real examples of what is now called 'circular economy'.

A **Focus on Chlorine Science (FOCS)** leaflet has also been published on 'Passive Sampling'. The Euro Chlor Environmental Working Group has sponsored projects in this area given the possibilities for using this method to support water-based monitoring of chemical discharges.

Another FOCS has been published on Scientific Integrity, which accompanied Dr. van Wijk's presentation at this year's SETAC 2016 conference. 'The challenge of science-based decision making' aims to show how, as academic research makes its way through the regulatory process, it becomes vulnerable to external influence. It is important to understand this process, to ensure that chemical regulation remains based on 'sound' science.

These documents and more available at:
<http://www.eurochlor.org/download-centre>

“Chlorine chemistry stands as one of the first real examples of what is now called 'circular economy'”



Euro Chlor input in major environmental science conference

Building on the successful participation of previous years, Euro Chlor again represented our industry at SETAC, an international environmental congress bringing together academics, regulators and industry to discuss the latest scientific findings. The 2016 edition took place in Nantes, France, attracting nearly 2000 participants to a variety of presentations, several of which **highlighted the need for an improved weight-of-evidence approach to regulatory decision making, as well as the drive to incorporate more, current academic research into such judgments.**

Euro Chlor was represented, not only at their dedicated booth, but also in a very well-attended session where Executive Director, Dolf van Wijk, along with academics, NGOs, journal editors and the SETAC Global president gave a presentation on the issue of science integrity. Dr. van Wijk discussed the Cefic-LRI project (which Euro Chlor helps coordinate) to create a matrix that shows how vulnerable science is to external influence and misinterpretation during its journey from the lab into policy. He also drew attention to the accompanying FOCS publication which was readily collected by SETAC participants from our booth, alongside other Euro Chlor publications.

The last year has emphasized that our competitiveness continues to suffer



Euro Chlor Executive Director van Wijk discussed how vulnerable science is to external influence and misinterpretation during its journey from the lab into policy.

Advertisements in selected media

As an integrated part of the **Chlorine Benefits Communications scheme**, new advertisements have been created. They show objects and activities in which chlorine-based chemistry is prominently involved, but this fact is mostly unknown by the policy makers. Good examples are the high-tech and high-speed trains but also the simple but very appreciated act of paying by means of PVC credit cards. These advertisements are **published in selected European print and electronic media** like Politico and viEUws.

Chlorine Chemistry moves High Speed Trains



These trains use chlorine chemistry based body panels, interiors, electrical equipment and sophisticated electronics for enhanced safety.

it's a
chlorine
thing.

euro
chlor 17.

| www.chlorinethings.eu | www.eurochlor.org |

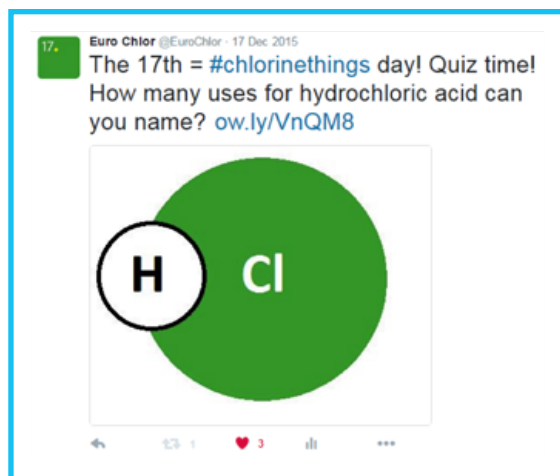
Twitter activities: more than just 'playing' on the internet?

Based on efforts from last year, Euro Chlor's Social Media strategy has developed further into a low-effort, high-return programme. Using the Twitter platform, messages (or 140 character 'Tweets') have been published twice a week, covering six main topics: International Earth Days related to chlor-alkali products (like "World Water Day"), Member News/Member Website promotion, promotion for the Euro Chlor/ChlorineThings website content, tweets on relevant scientific news/content linking to the corresponding publications/websites, statements on Euro Chlor positions and of course a monthly tweet (every 17th day) on an interesting point related to the industry.

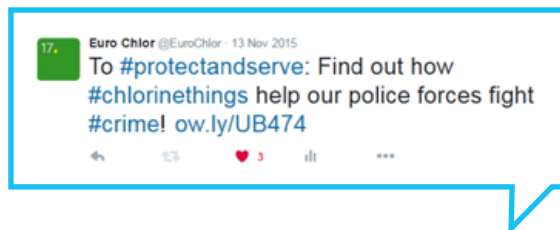
Since last year, Euro Chlor has seen an 80% increase in the number of people who actively subscribe to our messages. This in turn has led to **over 60,000 'impressions' (occasions where our content appears in someone else's message board)**, which is particularly impressive given the nature of our work and the small time expenditure on this activity. Euro Chlor also has the capacity to characterise this audience (who are mostly interested in technology, business and science news) helping us to further refine our messages.

Twitter audiences can have very diverse backgrounds and include new Cefic Director General (Marco Mensink, who is an avid 'tweeter'), member companies (several of whom regularly engage with our content and 're-tweet' our messages), members of the European Institutions (including Mr Juncker), world leaders and the general public.

Follow us [@eurochlor](https://twitter.com/eurochlor).



A typical "17th of the month" tweet



An interview with Marco Mensink, Cefic's new Director General



Marco Mensink

Mr. Marco Mensink began his new role as Director General in May 2016. Mr. Mensink is a Dutch national with extensive working experience in Brussels who arrived in 2006 to work for the pulp and paper sector. Here he shares his views on several areas of interest to Euro Chlor.

As you know, Euro Chlor advocates for full

compensation of indirect carbon costs up to the benchmark. How can Cefic help us to achieve this?

“The biggest challenge to EU industry competitiveness is the high energy cost, with the EU Emissions Trading System (ETS) having a major impact on this. EU ETS itself has both direct and indirect ‘costs’, which must be addressed. In order not to lose even more investment to regions outside Europe, energy-intensive sectors should be compensated for their higher energy costs (as advocated strongly for by Cefic), which have arisen due to policy making.

There are two key features of the compensation of indirect carbon costs. Many representatives within the Member States, the Parliament and the Commission agree on the need to compensate. The question therefore becomes whether the system should be an EU harmonised system or a structure in which Member States can choose how to compensate. The current situation, with only a few countries compensating indirect carbon costs, is a clear, unacceptable, distortion of the internal market. A level-playing field is essential!

One must acknowledge the difficulties as well though. What we want, is limited by the fact that Member States do not have the funds to achieve full compensation. Most opposition to compensation comes from finance ministers and purists that state that the EU can design a system in which member states give state aid, but cannot force member states to subsidise. It is a very difficult battle, but Cefic will keep applying pressure.”

Substitution of ‘Substances of Very High Concern’ (SVHC) is a hot topic in current regulatory developments in Europe. In our chlorine industry, the SVHC trichloroethylene is a good example of where advanced risk management (RM) technologies allowed continued use of this high-performance substance in metal cleaning, whilst strictly controlling its exposure. This RM approach gave Europe a competitive advantage over other regions.

Given the EU drive to assess substances based on their hazard rather than their risk, what can Cefic do to safeguard substances with SVHC properties where Europe has superior risk control processes?

“Where individual chemical risks have been assessed, managed and their specific properties are crucial to society, there is a good case for continued use. Highlighting the competitive advantage to regulators is, however, not enough to sway opinion. Despite the view of hazard-based decisions becoming more prominent in policy-making, we must hold the Commission and Member States accountable, not to ban chemicals, but manage the risk of use of certain chemical substances.

Our concern in this issue does not lie with the Commission, but more with Member States positions, where a group of countries has actively worked against this principle in a number of recent cases.

Coming from another sector, I am amazed how the outcome of thorough processes and existing legislation can be overturned by political arguments without looking at the impact on markets and industry. Industry engagement in these Member States and Cefic cooperation with national associations will be crucial in achieving our goals in the future.”

Moving on to wider Cefic programmes, how does your Chemicals 2021 initiative address increasing regulatory pressure on the chemicals industry and how do you see this programme developing?

“In order to properly understand and influence policy making we need to look ahead. We can already identify the long-term targets of a number of key actors, as well as activities to prepare the agenda of the next European Commission.

Starting its mandate in 2019, by 2021 the next Commission will launch its first legislative proposals. It is crucial that our industry be that forward thinking, allowing us to prepare and act during discussions with policymakers to ‘sense’ the direction of their thinking.

More than taking the pressure off specific chemicals, it is about being at the table. In the current, endless chemical-by-chemical discussions, authorities present their concerns about safety and we defend our practices in a series of consultations, expert committee hearings, and even court cases. We need to change this and anticipate better.

We have opportunities here. There is the EU “better regulation” initiative, which aims to make the whole area of chemicals regulation more effective and less burdensome. Then there are new initiatives, such as the 7th Environmental Action Programme with its Non-Toxic Environment, and the Circular Economy and Waste Directive package currently putting a

greater emphasis on “prevention of risk” versus “risk management”.

Cefic’s advocacy on future chemicals policy is often based on logical arguments and experience. However, it is often not explicitly based on examples that bring our messages to life, an area in which Euro Chlor can help. We need to show what we can do right when given the chance and how well-intended but poorly constructed regulatory measures can lead to unacceptable consequences, not just for industrial operations but also for society as a whole.”

You have been with Cefic for nearly half a year now, what are your early impressions about the community here and what are your expectations for the future?

“Cefic is a force in town, considered to be a trustworthy partner by the EU institutions. Our technical competence (which will remain crucial) in combination with more agile public affairs work can help to boost this reputation.

With the size of the industry, our expertise and great companies in the sector we should and shall be able to convey our messages better. I want to lead Cefic in a more pro-active approach making it the best advocacy organization in town, closely working with national associations and our member companies.

The chemical industry is not only the industry of industries, it is the sector that will provide for and be present in every future solution to societal challenges, be it climate change, energy, resource efficiency, growth, jobs, etc.

A coordinated approach across Cefic’s horizontal and sector groups, such as Euro Chlor, is the basis for a crucial ‘one voice policy’, enabling success in advocacy and policy making.”

Solar Impulse 2 flies into the history books!

Made of carbon fibre, with a wingspan of 72 meters, propelled by four electric motors fed from 600 kg of lithium batteries, Solar Impulse 2 has completed its remarkable round-the-world journey without using a single drop of fuel. Pilots Bertrand Piccard and André Borschberg flew this innovative, lightweight plane, equipped with 17,000 solar cells that power its propellers whilst charging the batteries so that, at night, the plane flies completely on stored electricity.

The project was officially launched in November 2003 and with innovative research inputs from Euro Chlor members Covestro and Solvay, Solar Impulse 2 was presented to the public in April 2014. In March 2015, this revolutionary aircraft took off from Abu Dhabi in the United Arab Emirates (UAE), from where it started its journey around the world.

First stops were made in Oman, India, Myanmar and China with unplanned stops occurring in Japan due to heavy winds and in Hawaii due to overheating batteries.

After a quick repair, it took off again on 21st April 2016 and headed for mainland USA where it made six stops before crossing the Atlantic from New York on 20th June 2016 heading towards Seville, Spain.

After flying over the pyramids for one last stop in Cairo, it finished its historic circumnavigation, landing back in the UAE on 25th July 2016.

Solar Impulse 2 stands as a great example of collaborative efforts to produce clean, futuristic, chlorine-based technologies!

72 meters
wingspan



4
electric motors



600kg
lithium batteries



17,000
solar cells



Solar Impulse pilots Bertrand Piccard and André Borschberg: “We made it around the world! 40,000 km without fuel, a first for energy!”

Euro Chlor corporate website major ‘trump-card’ for online communication

With 235,000 page views in 96,000 visits per year, the Euro Chlor corporate website confirms itself as the major external communication tool for Euro Chlor. On average, visitors stay on the site for 2.4 minutes, consulting 2.9 pages. As the corporate website can now also be easily accessed via mobile phone and tablet computers, its popularity will only improve.

No less than 77% of all **visitors** are newcomers, meaning that the site ranks very highly in online searches for “chlorine” and related key words. The majority of visitors are Americans, followed by inhabitants of the United Kingdom, India, Germany, Australia and Belgium. Of these visitors, 50.3% are younger than 34.

The most **popular pages** are found in “The chlorine universe” chapter (with 113,000 page views/year) which are of particular interest to teachers, looking for the animations of the three production process technologies. As a result of this popularity, we have also linked these **videos** to the ChlorineThings website. The communications corner is the second most consulted (14,000 views/year), followed by the chlorine issues (13,000 views) and the safety/technology pages (12,000 page views/year).

More than 7,400 **documents** and publications are taken up every year via the Download Centre. Every month, nearly 100 visitors want to know how they can produce small quantities of chlorine in their home kitchen. They can do this by watching the **instructive animations** on the dedicated page which also comes in French and Russian due to the continued interest in North-Africa and Russian-speaking countries.

Visitors also want to know more about Euro Chlor itself; 9,500 views of these information pages confirm this. Finally, the “**contact us**” form was viewed more than 2,000 times; luckily though not all of these views resulted in an e-mail sent to the Communications manager...!

50.4%

Younger than 34 y.o.



100

visitors

view the animation
showing how to produce
chlorine in their kitchen

PER MONTH

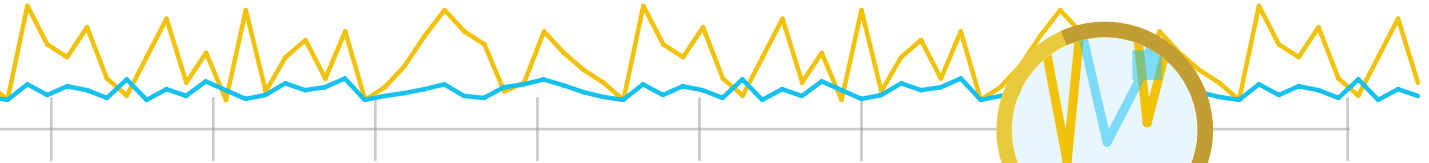
235,000

Page views

77%

Newcomers

000 VISITS



5 DAYS



7,400

Euro Chlor Publications downloaded per year

2.9

Pages

2,4

Minutes

PER VISIT



New feature on website to promote Euro Chlor member news

Member News:
Vestolit achieves Social Responsibility Certification

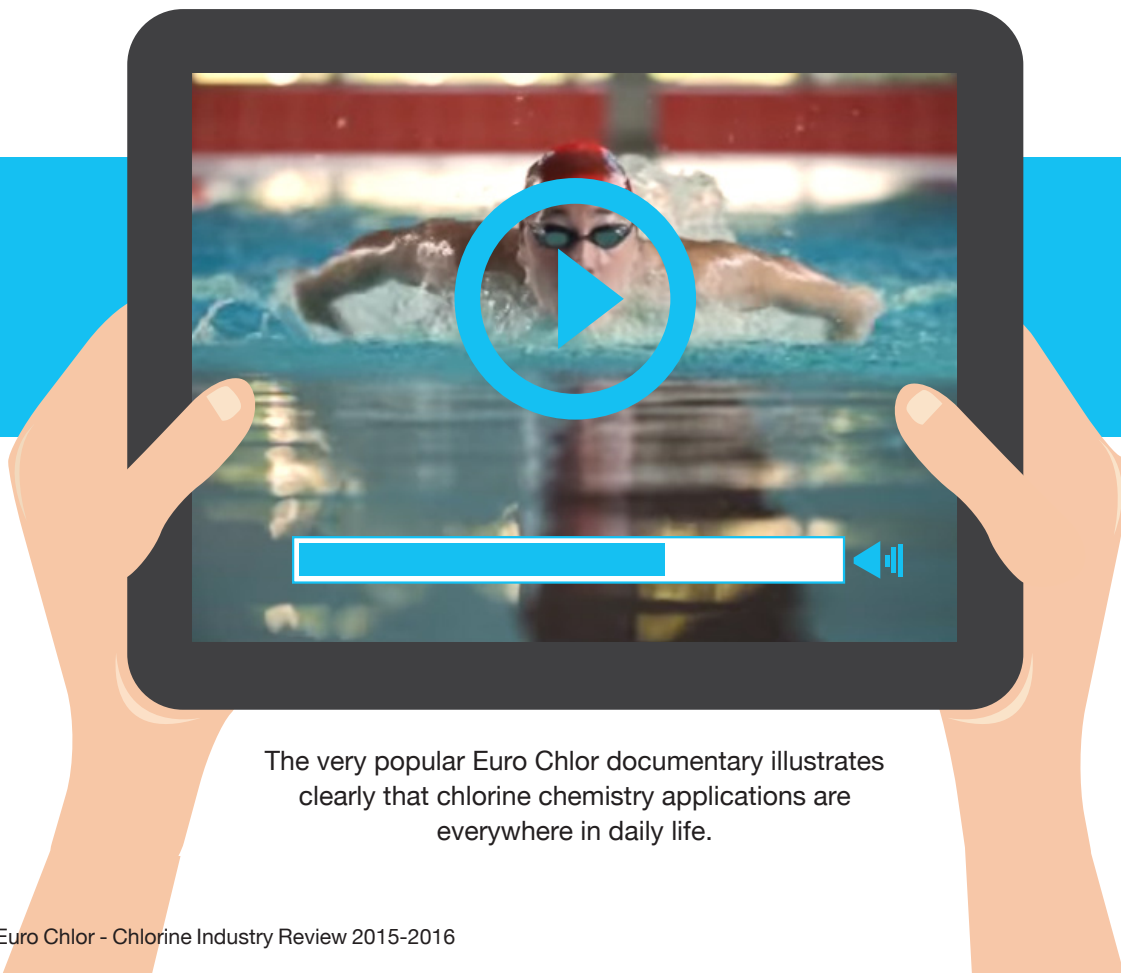
Euro Chlor member one of the first to be awarded with new German social responsibility standard....

Given the variety of news channels, Euro Chlor has added a new feature to the main website in order to better highlight the activities of our members. Available via the news section on the landing page of the eurochlor.org website, it will be regularly updated with interesting new content. **Should any members have any news that they would like to share, they should feel free to send it to Euro Chlor Communications for inclusion.**

Chlorine Documentary “A world of opportunities” remains very popular

In parallel to the www.ChlorineThings.eu website, the film “A world of opportunities” documents areas of daily life in which chlorine-based chemistry plays a crucial role. This video continues to be very popular on the internet, which is rather unexpected for a ten minute video. With over 3,000 views to date, it is even more popular than some of the shorter videos that we also have on YouTube. Even more positive, is that the curve showing the number of views is a steadily increasing trend.

The audience for this video varies from politicians to teachers, from member company colleagues to young people visiting YouTube. **Member companies are invited and encouraged to use it actively in their communication efforts.**



The very popular Euro Chlor documentary illustrates clearly that chlorine chemistry applications are everywhere in daily life.

The Euro Chlor Federation

In Europe, 34 Members of Euro Chlor produce chlorine at 66 manufacturing locations in 21 countries. **About 7,500 jobs are directly related to European production sites of chlorine and its co-product caustic soda.**

When the numerous downstream activities are also taken into consideration, like the PVC sector, polyurethane production, pulp and paper, the aluminium sector, construction etc., the sum of direct and indirect employment is of course several times higher.

In addition to the chlor-alkali producers, Euro Chlor also has 46 Associate Members and 51 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.

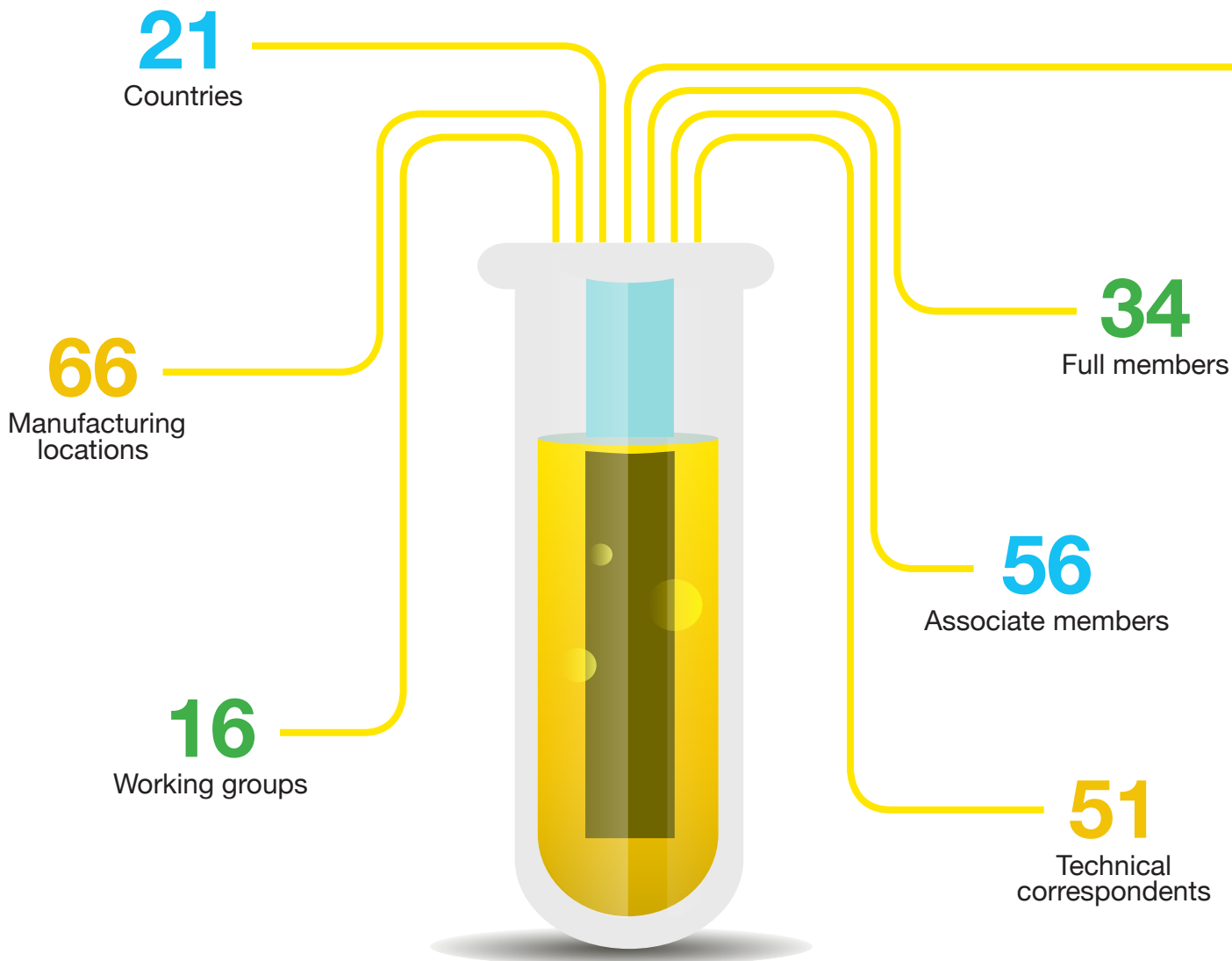
Euro Chlor was founded 63 years ago (1953) as a production-oriented, technical organization. The association was restructured and officially named “Euro Chlor” in 1989 in order to provide the sector with strengthened scientific, advocacy and communications capabilities. Since then, a strong focus has been placed on sound science coupled with continual health, safety and environmental improvements, which are complemented by open and transparent communications with all stakeholders.

One of Euro Chlor’s major objectives is to obtain the full recognition of European citizens as well as the global community of the benefits of chlorine chemistry.



Europe’s chemistry is
world-class in terms of
energy efficiency

365 days working for you



Management Committee

15

Management
Committee members

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- Damien Baes
- Jürgen Baune
- Stuart Collings
- Brigitte Dero
- Ralf Echterhoff
- Agustín Franco Blasco
- Jaroslav Pancek
- Stefan Plaß
- Hans-Christoph Porth
- Dieter Schnepel
- Daniel Tamchyna
- Johan Van Den Broeck
- Dolf van Wijk
- Michael Winhold

BASF

VENCOREX France
Akzo Nobel Industrial Chemicals BV
INOVYN ChlorVinyls Limited
PlasticsEurope
Covestro AG
Ercros SA
PCC Rokita SA
Evonik Performance Materials GmbH
VESTOLIT GmbH
Dow Deutschland Anlagengesellschaft mbH
Spolek pro chemickou a hutni výrobu, a.s.
VYNOVA International
Euro Chlor
Vinnolit GmbH

Ton Manders new Technical & Safety Director



Ton Manders

As of June 2016, Ton Manders became the new Technical & Safety Director of Euro Chlor. Ton has a record of 30 years of industrial experience at AkzoNobel. Until now, he was Technology Manager Chlor-Alkali and Chloromethanes at AkzoNobel Industrial Chemicals, Amsterdam. There he has been part of the business management team Chlor-Alkali & Chloromethanes, responsible for Technology and RD&I (Research, Development and Innovation). In a matrix organization linked to the production organization (2 plants in the Netherlands and 4 plants in Germany) he was responsible for technology and process safety and the RD&I leadership team that coordinates and executes the Business unit related RD&I program.

Recently, Ton also had technological responsibility for larger investment projects, e.g. the conversion project of the mercury plant in Ibbenbüren in cooperation with the joint venture partner Evonik. He also has a long tradition of sharing expertise with Euro Chlor in various roles, including the chairmanship of the GEST WG. As Technical & Safety Director of Euro Chlor, some of Ton's key responsibilities will be the management of the different technical task forces, the sharing of best practices, the projects within the Safety Initiative, the sustainability programme and the organization of the Technology Conference & Exhibition in May 2017. See <http://eurochlor2017.org/>.

We warmly welcome Ton to the Euro Chlor team.

Euro Chlor full members

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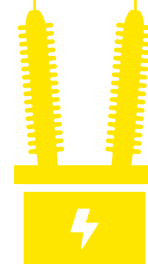
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- CIA - Chemical Industries Association Ltd
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- essencia ASBL
- EuSalt aisbl – European Salt Producers' Association
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- Novacid
- Olin (Blue Cube Operations, LLC)
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- Sinopec Jiangnan Salt & Chemical Complex
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- Syngenta Crop Protection Monthey SA
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- VCI - Verband der Chemischen Industrie e.V.
- Veltek Associates, inc.
- Vinyl Vegyipari KFT
- VNCI - Vereniging van de Nederlandse Chemische Industrie

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- Applitek NV/SA
www.applitek.com
- BATREC INDUSTRIE AG
www.batrec.ch
- BELL-O-SEAL VALVES P. LIMITED
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- Blackhall Engineering Limited
www.shawvalves.co.uk
- Bluestar (Beijing) Chemical Machinery Co Ltd.
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- Chemtec UK Limited
www.rmarmstrong.com
- CHLORAN CHEMICAL PRODUCTION CO. (CCPC)
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- Cristal Global
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- Phönix Armaturen-Werke
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www.remondis-qr.de
- Richter Chemie-Technik GmbH
www.richter-ct.com
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www.rivm.nl
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- W.L. Gore & Associates GmbH
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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. Euro Chlor communicates in a transparent way with all stakeholders and systematically highlights chlorine chemistry benefits as well as the economic importance of the chlor-alkali sector.

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