



**YEARS OF SUPPORTING
A SAFE, SUSTAINABLE
AND SUCCESSFUL
INDUSTRY FOR EUROPE**

30 YEARS OF EURO CHLOR FROM JUST SALT, WATER AND ELECTRICITY



Having just experienced eight exciting years at Euro Chlor, I tend to forget that it was originally set up as the “Bureau International du Chlore”, assembling the chlorine producers of the Benelux, France, Germany, Italy and the UK. We are talking about the 1950s, just 60 years after industrial production of chlor-alkali began.

It is reassuring to note that safety has always been the key topic for our organisation, even long before we expanded into the current EU-wide ‘Euro Chlor’ in 1989. This was the era when environmental groups attacked our industry for producing ‘the Devil’s element’, chlorine. I am so grateful that my predecessors were able to assist the membership in restoring the rightful positive reputation that chlorine chemistry deserves. We can now easily highlight the benefits of chlor-alkali through our ‘chlorine things’ and ‘17 Successes’ programmes.

I strongly believe that the key to Euro Chlor’s success has been two-fold. In the first instance, it lies in its original goal to provide balanced, science-based information, developed by active members and a skilled Secretariat. Secondly, the membership is brave enough to work proactively and with great ambition. For example, in 2001 Euro Chlor launched its first 10-year sustainability programme with challenging, but realistic goals and a commitment to measuring data on health, safety and environment, production levels and product applications, as well as a voluntary commitment to phase out mercury.

This was complemented by the publication of the chlor-alkali industry Ecoprofile and concrete sustainability targets in 2004 – a first for Europe’s chemical industries. The second 10-year sustainability programme (2011–2020) followed smoothly thereafter. On many occasions, Euro Chlor was praised by authorities for being a transparent and trusted partner.

With all the above as my inheritance, I am honoured to take the lead of the Euro Chlor Secretariat and enthusiastically take up the challenge to keep standards high.

Following the chlor-alkali industry with a chemist’s eye, I remain fascinated that all of this is possible from just salt, water and electricity!



MARLEEN PAUWELS
Executive Director

The full version of this report is available from:
<https://chlorineindustryreview.com>



AND THE NEXT 30 YEARS? WE LOOK FORWARD WITH OPTIMISM FOR OUR INDUSTRY

In addition to being an essential building block for numerous products that we rely on every day, chlor-alkali can play a key role in Europe's more sustainable future. For example, our chemistry can contribute to building lightweight, safe and efficient cars and renewable energy technologies. It can treat waste water for re-use in water-deprived areas, create new medicines to fight cancer and help us improve energy efficiency in our homes. These and countless other innovations are anticipated in the next three decades, with chlor-alkali contributing to many of the United Nation's global Sustainable Development Goals (SDGs).

For European chlor-alkali to provide raw materials for these solutions, we need a responsible but competitive sector. To achieve this, Euro Chlor plans to deliver its third sustainability programme in 2021 and further improve safety performance via its safety initiative.



Overview of themes to be covered by Euro Chlor strategy

We will investigate how to add value to hydrogen streams, contribute to a 'carbon-neutral' future and advocate for a level playing field for energy, as well as how we can play a bigger role in the circular economy. More than ever, we will engage in educating and communicating transparently with objective technical and scientific data and continue to highlight the benefits of our industry – building on our recent 17 Successes programme – to encourage people to work in our sector.

Inspired by the Cefic Mid-Century Vision, we will crystallise this in our own strategy to define what our industry should look like in the coming years, and the concrete steps needed to get there. This will strengthen our commitment to creating a better world.

Our industry has a promising future. I am confident that we can work together, as we have in the past, to get there, continuing to support a safe, sustainable and successful chlor-alkali industry for Europe.



JÜRGEN BAUNE

Chairman of the Management Committee

Read more on the following page about the **2018/2019 highlights** for Euro Chlor's key topics.

SUSTAINABILITY*

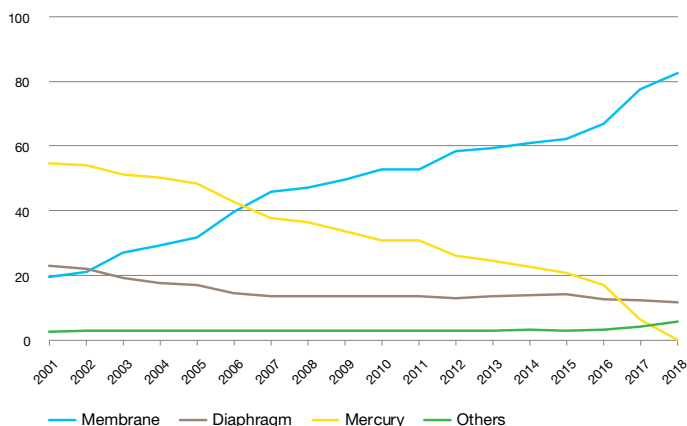
* For this review, 98.5% of Euro Chlor member's capacity is covered from 32 companies at 53 sites.

MANUFACTURING TECHNOLOGY

Despite mercury technology being phased-out by the end of 2017, a few installations required more time for conversion, which was accomplished during 2018.

Chlorine manufacturing process

(% of total installed capacity end of year)



The conversion of mercury to membrane (and closure of some mercury installations) is clearly visible in the graph over the last three years. The 'Other' technologies cover, for example, HCl electrolysis and oxidation, alcoholates, metal production but also production of chlorine and caustic without hydrogen production.

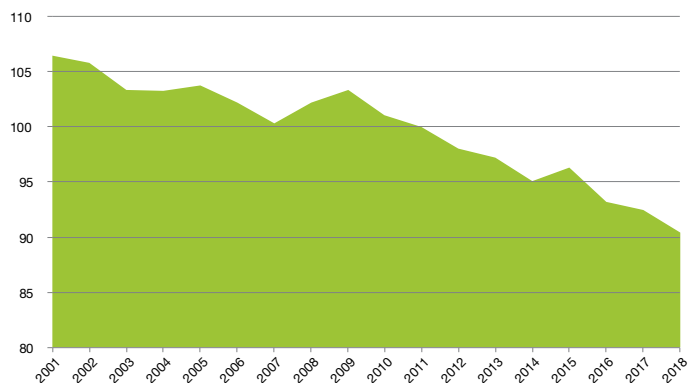
ENERGY CONSUMPTION

90.5%

Energy consumption in 2018 was at 90.5% versus the 2011 reference with a decrease of 2% compared to the 2017 level (92.5% to 90.5%).

Primary fuel energy consumption

(% with respect to 2011)



The decrease mostly results from the conversion of mercury to membrane technology, and the closure of some mercury plants. A small drop is still expected for 2019 as the final conversion to mercury becomes effective during 2018. After that, energy improvement is expected to be limited.

“Over the last 30 years, we have seen significant improvements in the parameters that we measure as part of our sustainability programme. By continuing to further improve these, we can ensure our license to operate for the next 30 years and beyond.”

TON MANDERS
Technical & Safety Director



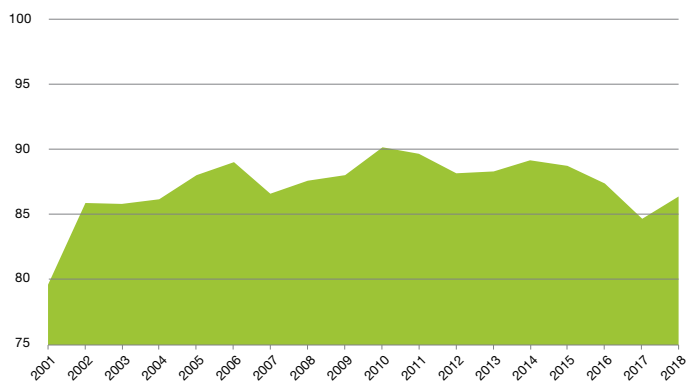
HYDROGEN USE

86.6%

The use of hydrogen has increased slightly, hopefully reversing the declining trend observed in recent years. In 2018, the utilisation rate reached 86.6%, a 1.8% increase compared to the previous year.

Hydrogen used

(% of production)



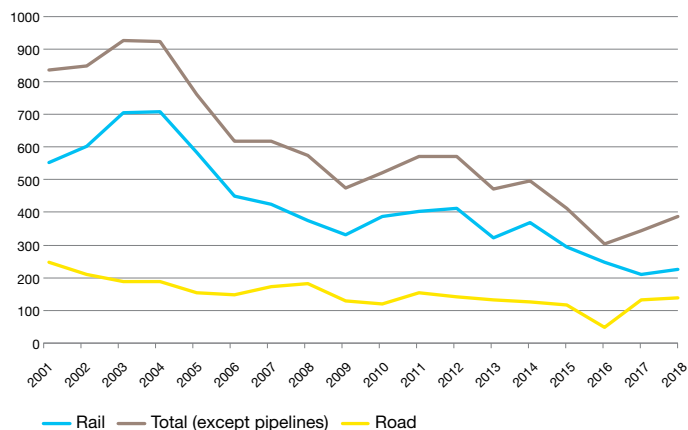
Although hydrogen is an important chemical for the low carbon economy, the utilisation rate from chlor-alkali production is relatively low. The main reason for this is that some sites may lack an economically viable ‘user’ nearby (or at least one who can utilise 100% of the produced hydrogen). This may change over time as demand for hydrogen increases, and more solutions (e.g. blending into the gas grid) become available.

TRANSPORTATION

The amount of chlorine transported from production sites increased slightly compared to 2017. This may be explained by the complete closure of some mercury production locations.

Chlorine transported outside industrial sites

(Transported amount in 1000 tonnes of Cl₂)



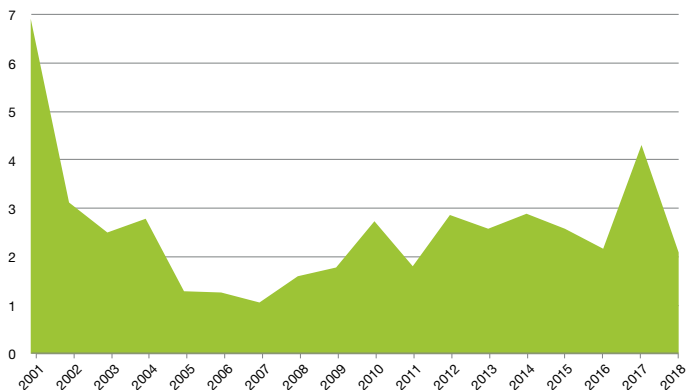
SAFETY

PROCESS INCIDENTS

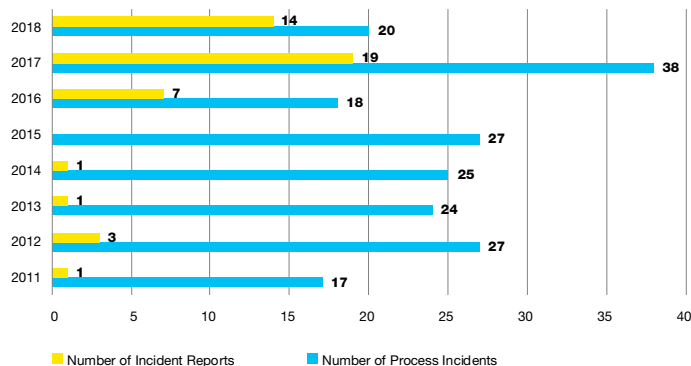
Process incidents and losses decreased in 2018 towards the 2016 level. In 2018, this was 2.30 incidents per million tonnes of chlorine produced.

Process incidents and losses

(Number per million tonnes chlorine produced)



Incident reporting



Whilst the Euro Chlor technical Working Groups continue to investigate the 2017 'incident spike', they welcome the 2018 decrease and the increasing reporting efforts of our membership. Now that Euro Chlor receives information on some 70% of the incidents, the relevant Working Groups can have even more detailed discussions, compiling lessons learnt, updating and even developing new guidelines.

“Over the past 30 years, our ongoing safety initiative has gone from strength to strength and is now using modern techniques and training tools to ensure that everyone returns home healthy every day.”

TON MANDERS
Technical & Safety Director

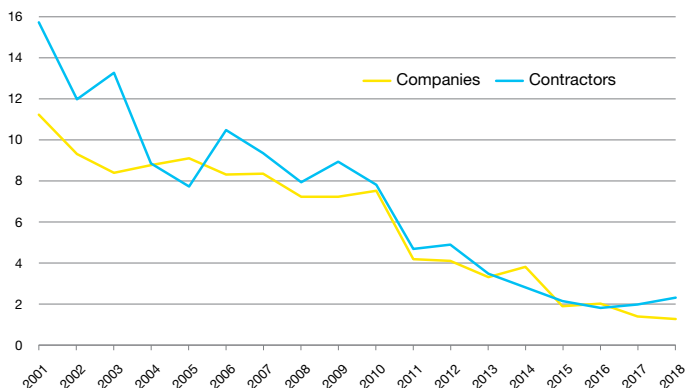


OCCUPATIONAL SAFETY

In 2018, Lost Time Injuries (LTIs) for member company personnel improved compared to 2017, from 1.39 to 1.26 per million working hours.

Chlor-alkali LTI frequency rate

(Number of LTI incidents per million working hours)



It is notable that, since 2011, this LTI rate per million working hours only includes incidents directly related to chlor-alkali industry specific items.

Whilst the frequency rate for member company personnel continues to move in the right direction, member companies still struggle to achieve a similar performance improvement for contractors. Indeed, the LTI figure for contractor staff worsened (from 1.99 to 2.33). With a sustained ‘aiming for zero’ mentality for ALL employees (own and contractors), Euro Chlor members continue their efforts in training and supporting contractors to further increase awareness and to improve on working safely.

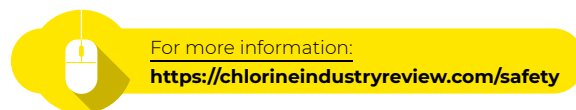
WORKERS' HEALTH

Euro Chlor's Health Working Group has delivered several new guidance documents:

- Brief summaries of existing health documents for workers and site managers;
- An informative training presentation on electromagnetic fields, to be made available in local languages.

In addition, the group is compiling:

- A short briefing for emergency departments on how to optimally treat patients that are accidentally exposed to chlorine;
- A training presentation on the causes and protection against stress and burnout.





European Chlorinated Solvents Association (ECSA)'s regulatory challenges

According to the German UBA (Federal Environment Agency) criteria, perchloroethylene is considered to be persistent, mobile and toxic. This may have consequences in relation to REACH and the Stockholm Convention on Persistent Organic Pollutants. ECSA is reaching out to other stakeholders and closely following the scientific and regulatory discussions.

The German UBA also held a workshop concerning the revision of the German Federal Emission Protection Ordinance. The latter describes detailed technical installations, monitoring and permit requirements of halogenated solvents in dry-cleaning, metal cleaning and extraction installations, implementing the Industrial Emissions Directive (IED). ECSA advocates against listing new solvents or removing current ones.

Some chlorinated solvents (methylene chloride and chloroform) are also claimed to have a negative impact on ozone layer recovery. ECSA has provided extensive data and scientific arguments proving that current produced volumes of chlorinated solvents are no harm to the ozone layer and do not need to be regulated under ozone depleting substances regimes.



Chloro Alkanes Product Groups (CAPG) highlights

The CAPG has been involved in two major international conferences over the past 12 months:

- In New Delhi, speakers from the CAPG and MCCP REACH consortia presented the results of the Community rolling action plan (CoRAP) test programme and urged the international audience towards greater inter-continental collaboration to promote the benefits of chloro alkanes.
- During a technical event at the VU Amsterdam, academics, regulators and European officials discussed the potential and limitations of methods and technologies to detect chloro alkanes.

Finally, the CAPG is following up the Restriction of Hazardous Substances in Electronics and Electronic Equipment Directive. MCCP is included as part of an exercise to 'test' an adapted methodology. In close collaboration with Cefic, members are ensuring that any nomination is scientifically and legally correct.

ECSA produces new flyer

ECSA has released a new informative flyer that describes the benefits of chlorinated solvents. The ECSA website (<http://www.chlorinated-solvents.eu>) is also in the process of being modernised.

As part of this, their Product & Application Toolbox is being updated according to the revised REACH dossiers and regulations, giving users simple guidance on safe and sustainable use.

“Since the formation of Euro Chlor, we have contributed valuable content to many of the regulations related to our sector. This will not change as we focus even more on the key European regulatory topic of energy.”



KRISTOF MAY
Regulatory Affairs Manager

Energy: input on two consultation rounds to EU Emission Trading Scheme (ETS)

The Energy Task Force work focused on the EU Emission Trading Scheme (ETS), more specifically on the associated State Aid Guidelines for indirect costs compensation.

The EU ETS rules result in higher electricity costs for some electro-intensive undertakings. To compensate these higher costs, industry can count on the European State Aid guidelines. With the ETS Directive just being revised for its phase 4 (2021-2030), the 2012 State Aid Guidelines are now also in the process of being updated.

The EC Directorate-General for Competition (DG COMP) already organised two consultation rounds for this. In both rounds (public and sector-targeted), Euro Chlor and Cefic demonstrated the importance and value of this compensation for our sector given the strong indirect effects of the ETS system on the chlor-alkali industry. In close collaboration, Euro Chlor and Cefic will make sure all DG COMP's questions are answered.

In addition to our own Energy Task Force, the Euro Chlor Regulatory Department actively works together with Cefic to have our sector heard in the larger European energy debate.

Mercury phase out: deadline passed but Euro Chlor remains vigilant

Despite the phase-out of the mercury technology by the end of 2017, mercury is still in the picture. This is because a lot of liquid mercury still needs to be removed from both the cells and no longer used equipment.

According to EU legislation, liquid mercury must be converted into mercury sulphide by the end of 2022, before being safely stored in salt-mines. At the end of 2018, Euro Chlor members reported 2,947 tonnes of liquid mercury on site, with 1,146 tonnes being converted in 2018. Based on these results, the total conversion of available liquid mercury could be finalised before the end of 2022.

Biocides news

At the start of 2019, disinfectant products related to chlorine, sodium hypochlorite and calcium hypochlorite were registered under the EU Biocidal Product Regulation.

To better serve Euro Chlor members, further registration activities have meanwhile been passed to an external provider (SCC GmbH). As such, Euro Chlor will enhance our advocacy efforts for these biocides by setting up a dedicated task force to support the safe, but essential, use of these important chlor-alkali products.



For more information:
<https://chlorineindustryreview.com/regulatory>

COMMUNICATIONS

17 SUCCESSES CAMPAIGN NOW COMPLETE!

Take a look at <http://17successes.com> to see all 17 of the '17 Successes' which have now been published! Taking '17' as our inspiration (from chlorine's position on the chemical Periodic Table of elements), this programme presents real Europeans, whose success at work is partially thanks to chlor-alkali chemistry. Rollups and postcards are available for download from each individual success on the website. To mark the completion of the programme, an innovative compilation video and infographic is also available there for onward dissemination.

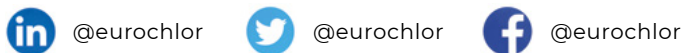


NEW EURO CHLOR WEBSITE ONLINE

This year we unveiled our new website at <https://www.eurochlor.org>. The new online portal has been designed to promote the benefits of chlor-alkali and its products and the many jobs which rely on them. It also spreads information on best practices in safety, health and environmental protection.

FOLLOW US ON SOCIAL MEDIA

We actively update our social media and encourage people to follow us on Twitter, Facebook and LinkedIn.



OUR NEW YOUTUBE VIDEOS



- Jürgen Baune, Euro Chlor Chairman, details his opinion on where our industry is headed in the coming years and how one possible co-product, hydrogen, may play a role in a sustainable future for our industry.
- A new 'chlorine things' video shows the role of chlor-alkali chemistry in keeping people safe in our communities. It covers the role of advanced polymers in protecting policemen and firefighters, fire-retardants and advanced materials that keep children and adults safe on their bikes.
- New videos are planned with our little chlorine character so watch this space!



For more information:
<https://chlorineindustryreview.com/communications>

MANUFACTURING & APPLICATIONS

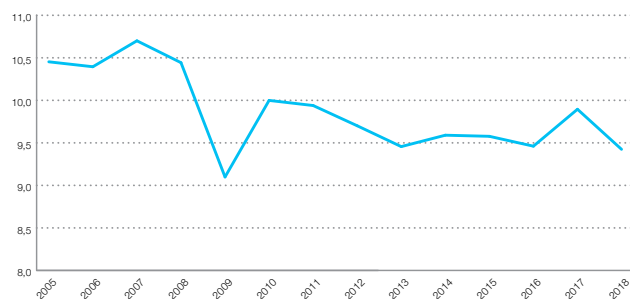
CHLORINE PRODUCTION 2018

2018 chlorine production was reported at 9,424 kilotonnes, 4.8% below the 2017 level, the lowest production level since 2009. This can be partly explained by the loss of installed capacity due to the mercury phase-out. The utilisation rate was 82.3% compared to 81.4% in 2017.

Production in the EU chemicals sector declined by 0.9% in 2018 (compared to 2017) according to Cefic figures. This means that chlorine production performed worse than the average production of the chemical industry in 2018.

Chlorine production level 2018

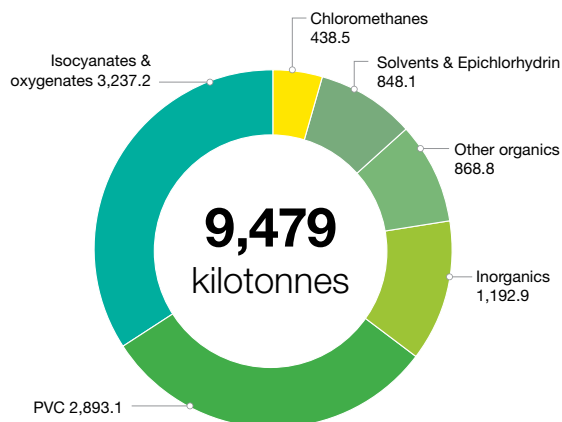
(in kilotonnes/year)



CHLORINE AND CAUSTIC SODA APPLICATIONS 2018

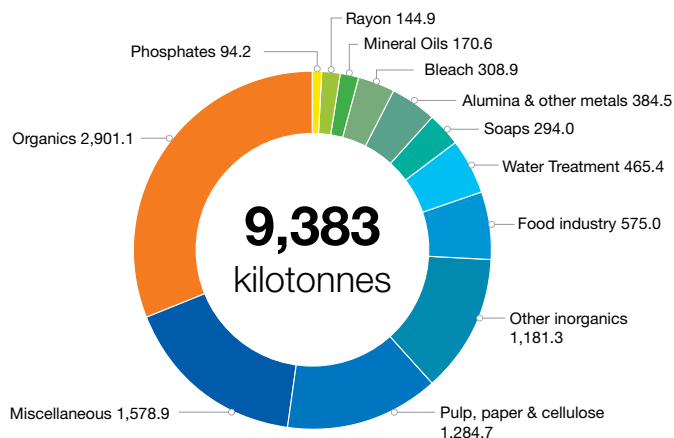
European chlorine applications 2018

(in kilotonnes)



European caustic soda applications 2018

(in kilotonnes)



CHLORINE PRODUCTION PLANTS

January 2018 Capacities

Process

Hg = mercury

M = membrane

D = diaphragm

"Others" include HCl electrolysis, ODC, molten salt electrolysis, alcoholates

Non Euro Chlor members are indicated in italic

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



Country	Company	Site	Total (000 tonnes chlorine)	Hg	D	M	Others
01 Austria	Donau Chemie	Brückl	75			75	
<i>Austria Total</i>			75	0	0	75	0
03 Belgium	INOYIN	Lillo	500			500	
04 Belgium	INOYIN	Jemeppe	174			174	
05 Belgium	Vynova	Tessenderlo*	400			425	
<i>Belgium Total</i>			1,074	0	0	1,099	0
07 Czech Republic	Spolchemie	Usti	82			82	
<i>Czech Republic Total</i>			82	0	0	82	0
09 Finland	Kemira	Joutseno	75			75	
<i>Finland Total</i>			75	0	0	75	0

	Country	Company	Site	Total (000 tonnes chlorine)	Hg	D	M	Others
10	France	Vynova	Thann	42			42	
11	France	VENCOREX	Pont de Claix	114			114	
12	France	Kem One	Fos	333		178	155	
13	France	Arkema	Jarrie	72			72	
14	France	Kem One	Lavera	341			341	
15	France	Arkema	St Auban	20			20	
16	France	MSSA	Pomblière	42				42
18	France	INOVYN	Tavaux	370			370	
19	France	PC Loos	Loos	35			35	
France Total				1,370	0	178	1,150	42
20	Germany	BASF	Ludwigshafen	485				
21	Germany	Covestro	Dormagen	480			400	80
22	Germany	Covestro	Leverkusen	390			390	
23	Germany	Covestro	Uerdingen	260			234	26
24	Germany	Covestro	Brunsbüttel	210				210
25	Germany	Dow	Schkopau	261			261	
26	Germany	Vinnolit	Knapsack	250			250	
27	Germany	CABB GmbH	Gersthofen	52			52	
28	Germany	Dow	Stade	1,615		1,007	608	
29	Germany	Neolyse Ibbenbüren GmbH	Ibbenbüren	70			70	
30	Germany	Nouryon	Bitterfeld	99			99	
31	Germany	Evonik Industries	Lülsdorf	77				77
33	Germany	Nouryon	Frankfurt	250			250	
34	Germany	INOVYN	Rheinberg	220		110	110	
35	Germany	VESTOLIT	Marl	260			260	
36	Germany	Vinnolit	Gendorf	180			180	
37	Germany	Wacker Chemie	Burghausen	55			55	
96	Germany	LEUNA	Leuna	15			15	
Germany Total				5,229	0	1,117	3,235	393
94	Greece	Kapachim	Inofita Viotias	10			10	
Greece Total				10	0	0	10	0
39	Hungary	Borsodchem	Kazincbarcika	480			384	96
Hungary Total				480	0	0	384	96
40	Ireland	MicroBio	Fermoy	11			11	
Ireland Total				11	0	0	11	0

	Country	Company	Site	Total (000 tonnes chlorine)	Hg	D	M	Others
41	Italy	Altair Chimica	Volterra	60			60	
42	Italy	Società Chimica Bussi S.p.A.	Bussi	18			18	
44	Italy	Ing. Luigi Conti Vecchi	Assemini	25			25	
49	Italy	INOVYN	Rosignano	150			150	
99	Italy	Halo Industry Spa	Torviscosa	24			24	
93	Italy	Fater	Campochiaro	20			20	
Italy Total				297	0	0	297	0
51	The Netherlands	Nouryon	Botlek	637			637	
52	The Netherlands	Nouryon	Delfzijl	121			121	
54	The Netherlands	Sabir	Bergen op Zoom	89			89	
The Netherlands Total				847	0	0	847	0
55	Norway	Borregaard	Sarpsborg	41			41	
56	Norway	Elkem	Bremanger	11			11	
57	Norway	INOVYN	Rafnes	280			280	
Norway Total				332	0	0	332	0
58	Poland	PCC Rokita	Brzeg Dolny	210			210	
60	Poland	Anwil	Wloclawek	195			195	
Poland Total				405	0	0	405	0
62	Portugal	Bondalti	Estarreja	142			94	48
Portugal Total				142	0	0	94	48
91	Romania	Oltchim	Rimnicu Valcea	105			105	
92	Romania	Chimcomplex	Borzesti	102			102	
Romania Total				207	0	0	207	0
63	Slovak Republic	Fortischem	Novaky	76			76	
Slovak Republic Total				76	0	0	76	0
88	Slovenia	TKI Hrastnik	Hrastnik	16			16	
Slovenia Total				16	0	0	16	0
64	Spain	Electroquimica Onubense	Huelva/Palos	44			44	
65	Spain	Ercros	Sabinanigo	45			45	
66	Spain	Ercros	Vilaseca	149			149	
67	Spain	Electroquimica de Hernani	Hernani	30			30	
100	Spain	Biomca Química	Santa Cruz de Tenerife	3			3	
70	Spain	Química del Cinca	Monzon	45			45	
Spain Total				316	0	0	316	0
75	Sweden	INOVYN	Stenungsund	123			123	
Sweden Total				123	0	0	123	0
77	Switzerland	CABB AG	Pratteln	47			47	
Switzerland Total				47	0	0	47	0
98	UK	Runcorn MCP	Runcorn	430			430	
85	UK	Brenntag	Thetford	7			7	
97	UK	Industrial Chemicals Ltd	West Thurrock	44			44	
UK Total				481	0	0	481	0
Grand Total				11,693	0	1,295	9,360	579
Per process					0.0%	11.5%	83.3%	5.2%

MEMBERS

Altair Chimica SpA

<http://www.altairchimica.com>

Anwil SA

<http://www.anwil.pl>

Arkema S.A.

<https://www.arkema.com/en>

BASF SE

<http://www.BASF.com>

Biomca Quimica SL

<http://www.biomcaquimica.com>

Bondalti Chemicals SA

<http://www.bondalti.com>

Borregaard AS

<http://www.borregaard.com>

BorsodChem Zrt.

<http://www.borsodchem-group.com>

Brenntag UK Ltd

<http://www.brenntag.co.uk>

CABB AG

<http://www.cabb-chemicals.com>

CABB GmbH

<http://www.cabb-chemicals.com>

Covestro Deutschland AG

<http://www.covestro.com>

Donau Chemie AG

<http://www.donau-chemie.com>

Dow Deutschland Anlagengesellschaft mbH

<http://www.dow.de>

Electroquímica de Hernani**Electroquímica del Noroeste, S.A.U. (ELNOSA)**

<https://www.bondalti.com>

Electroquímica Onubense, S.L.

<http://www.electroquimicaonubense.es>

Ercros SA

<http://www.ercros.es>

Evonik Performance Materials GmbH

<http://www.evonik.com>

Fater S.p.A.

<http://www.fater.it>

Industrial Chemicals Limited

<http://www.icgl.co.uk>

Ing. Luigi Conti Vecchi S.p.A.

https://www.eniday.com/it/human_it/valorizzazione-saline-conti-vecchi

Inovyn

<http://www.inovyn.com>

Kapachim SA

<http://www.kapachim.com>

Kemira AB

<http://www.kemira.com>

KEM ONE

<http://www.kemone.com>

Micro Bio (Irl.) Ltd.

<http://www.microbio.ie>

MSSA SAS

<http://www.metauxspeciaux.fr>

Nouryon

<http://www.nouryon.com>

PCC Rokita SA

<https://www.pcc.rokita.pl>

Produits Chimiques de Loos (Tessenderlo Group)

<http://www.tessenderlo.com>

Química del Cinca SLU

<http://www.qcinca.es>

SC Chimcomplex SA Borzesti

<http://www.chimcomplex.ro>

Società Chimica Bussi S.p.A.

<http://www.chimicabussi.it>

Spolek pro chemickou a hutni výrobu, a.s.

<http://www.spolchemie.cz>

Vencorex Chemicals

<http://www.vencorex.com>

VESTOLIT GmbH

<http://www.vestolit.de>

Vinnolit GmbH & Co. KG

<http://www.vinnolit.com>

VYNOVA Group

<https://www.vynova-group.com>

PARTNERS

Adama Makhtshim Ltd

<http://www.adama.com>

AGC Chemicals Europe Ltd.

<http://www.agcce.com>

Alchemist International Ltd

AMEC FOSTER WHEELER ITALIANA SRL

<https://www.amecfw.com>

ANE (Asociación Nacional de Electroquímica)

<http://www.cloro.info>

Angelini A.C.R.A.F. S.p.A.

<http://www.angelini.it>

Applitek NV/SA

<http://www.applitek.com>

AQUAGROUP AG

<http://www.aquagroup.com>

Arch Chemicals S.A.S.

<http://www.lonza.com>

Armstrong Chemtec Group

<https://www.armstrong-chemtec.com>

Asahi Kasei Europe GmbH

<https://www.asahi-kasei.co.jp/asahi/en>

Atana Limited

<http://www.atana.co.uk>

Axiall, LLC

<http://www.axiall.com>

Banner Chemicals Limited

<http://www.bannerchemicals.com>

BARCHEMICALS SRL

<http://www.barchemicals.it>

BATREC INDUSTRIE AG

<http://www.batrec.ch/en>

BC Switzerland GmbH

<https://www.olin.com>

BELL-O-SEAL VALVES P. LIMITED

<http://bellowseal.com>

Blackhall Engineering Limited

<http://www.shawvalves.co.uk>

Bluestar (Beijing) Chemical Machinery Co., Ltd.

<http://www.chemchina.com.cn>

BOCHEMIE a.s.

<https://www.bochemie.cz/en>

BWT AG

<http://www.bwt-group.com>

Caffaro Brescia S.r.l.

<http://www.caffarobrescia.com>

CARBUROS METALICOS SA

<http://www.carburos.com>

CBee Europe Ltd

<https://www.clorox.com>

Chemieanlagenbau Chemnitz GmbH

<http://www.cac-chem.de>

Chemofarm AG

<http://www.chemofarm.com>

Chloran Chemical Production Co. (CCPC)

<http://www.ccpc.ir/en/home>

CIA - Chemicals Industries Association Ltd

<http://www.cia.org.uk>

Coogee Chlor Alkali Pty Ltd

<http://www.coogee.com.au>

De Nora Deutschland GmbH

<http://www.denora.com>

Descote

<http://www.descote.com>

DSD Chemtech Projects & Services GmbH

<http://www.dsd-chemtech.com>

DUPONT ASTURIAS, S.L.

<http://www.dupont.com>

Econ Industries Services GmbH

<http://www.econindustries.com>

ERAMET SANDOUILLE SAS

<http://www.eramet.fr>

Essencia ASBL

<https://www.essencia.be>

Eu Salt aisbl (European Salt Producers' Association)

<https://eusalt.com>

Eynard Robin

<http://www.groupe.eynardrobin.com>

Fariman Petrochemical Industries

<https://farimanpetrochemical.en.ec21.com>

FEDERCHIMICA - Federazione Nazionale dell' Industria Chimica

<http://www.federchimica.it>

FIKE Europe bvba

<http://www.fike.com>

Garlock Sealing Technologies

<https://www.garlock.com>

Gazechim

<http://www.gazechim.com>

GHC Gerling, Holz & Co Handels GmbH

<http://www.ghc.com>

Haixing Eno Chemical Co., Ltd.

<http://www.enochem.com.cn>

HELM AG

<http://www.helmag.com>

Hunt & Mitton Valve Company

<http://www.huntandmitton.net>

Huntsman Belgium BVBA

<http://www.huntsman.com>

IKEM - Innovation and Chemical Industries in Sweden

<http://www.ikem.se>

INQUIDE S.A.

<https://www.fluidra.com>

IXOM (formerly Orica Chemicals)

<http://www.ixom.com>

Jiangsu Ancan Technology Co., Ltd.

<http://www.ancan-cn.com>

Jordan Bromine Company

<http://www.jordanbromine.com>

K+S Entsorgung GmbH

<http://www.ks-entsorgung.com>

Kronos Worldwide Inc

<http://www.kronostio2.com>

KUROTEC-KTS KUNSTSTOFFTECHNIK STADE GMBH

<http://www.kurotec-kts.de>

Leuna Tenside GmbH

<http://www.leuna-tenside.de>

LOMBARDA H Srl

<http://www.lombardah.com>

Lonza AG

<http://www.lonza.com>

Lubrizol Deutschland GmbH

<http://www.lubrizol.com>

MAVESZ - Magyar Vegyipari Szovetseg

<https://mavesz.hu/en>

Mersen Pgy SAS

<https://www.mersen.com/markets/corrosive-chemicals/chlor-alkali>

Nankai Chemical Industry Co., Ltd.

<http://www.nankai-chem.co.jp>

Nantong Xingqiu Graphite Equipment Co., Ltd

<http://en.ntxingqiu.com>

NEELTRAN, INC.

<http://www.neeltran.com>

Nippon Soda

<http://www.nippon-soda.co.jp>

Nirou Chlor co.

<http://www.nirouchlor.com>

Nuberg Engineering Limited

<http://www.nubergepc.com>

Olin (Blue Cube Operations, LLC)

<http://www.olin.com>

Permascand AB

<http://www.permascand.com>

Pfeiffer Chemie-Armaturenbau GmbH

<http://www.pfeiffer-armaturen.com>

Phoenix Armaturen-Werke Bregel GmbH

<https://www.cw-valvegroup.com>

Powell Fabrication & Manufacturing LLC.

<http://www.powellfab.com>

PRINCE RUBBER & PLASTICS CO., INC;

<http://www.princecp.com>

Recherche 2000 Inc.

<http://www.r2000.com>

Richter-Chemie-Technik GmbH

<http://www.richter-ct.com>

SALCO PRODUCTS INC.

<https://www.salcoproducts.com>

Sasol Chemicals a division of Sasol South Africa (Pty) Ltd

<http://www.sasol.com>

SAVINO BARBERA SRL

<http://www.savinobarbera.com>

SCHP - Association of Chemical Industry of the Czech Republic

<http://www.schp.cz>

Scienceindustries

<http://www.scienceindustries.ch>

Senior Aerospace Ermeto

<http://www.senior-aerospace-ermeto.com>

PARTNERS

SEQENS Acid & Derivatives

<https://www.seqens.com/en>

SGL Carbon GmbH

<http://www.sglprocesstechnology.com>

SIEM Supranite

<http://www.siem.fr>

Sinopec Jiangnan Salt & Chemical Complex

<http://www.sinopecgroup.com/group/en>

Sojitz Europe plc

<http://www.sojitz.com>

Spolana s.r.o

<http://www.spolana.cz>

Steuler-KCH GmbH

<http://www.steuler-kch.de>

Syngenta Crop Protection Monthey SA

<https://www.syngenta.com>

TechnipFMC France

<http://www.technipfmc.com>

Teijin Aramid BV

<http://www.teijinaramid.com>

ThyssenKrupp Uhde Chlorine Engineers GmbH

<http://www.thyssenkrupp-uhde-chlorine-engineers.com>

Tosoh Corporation

<http://www.tosoh.com>

Tronox Pigments (Holland) B.V.

<http://www.tronox.com>

UNILEVER-KNORR S.A.

<http://www.unilever.com>

VAN DEN HEUVEL WATERTechnologie BV

<http://www.vdhwater.com>

VCI - Verband der Chemischen Industrie e. V.

<http://www.vci.de>

VELTEK ASSOCIATES INC.

<http://www.sterile.com>

Vinyl Vegyipari KFT

<http://www.vinyl.hu>

VNCI - Vereniging van de Nederlandse Chemische Industrie

<https://www.vnci.nl>

W.L. Gore & Associates GmbH

<http://www.gore.com>

Xomox International GmbH & Co. OHG - Crane ChemPharma & Energy

<http://www.cranecpe.com>

OUR DOWNSTREAM STAKEHOLDERS

Euro Chlor is strengthening links with other key industry associations, including the European Council of Vinyl Manufacturers (ECVM) and the European Diisocyanate & Polyol Producers Association (ISOPA).

See more information about VinylPlus®, the voluntary commitment to sustainable development of the European PVC industry which features ECVM as a key partner at <https://chlorineindustryreview.com/about-us>.



ABOUT US | THE SECRETARIAT

CHANGES AT THE SECRETARIAT

This past year the Euro Chlor Secretariat has undergone many changes – a new Executive Director and three new colleagues, the move to a brand new Cefic office on the 10th floor of rue Belliard 40 in the heart of the EU district, new Management Committee members, updated membership categories and new IT systems and tools.

Marleen Pauwels, previously Science & Regulatory Affairs Director, succeeded Dolf van Wijk as Executive Director at the beginning of 2019 when he retired. Marleen joined Euro Chlor as Science Manager in 2011 and had been Science & Regulatory Affairs Director since September 2016.

Early in 2019, Angelica Candido joined Euro Chlor as Sector Group Manager for the European Chlorinated Solvents Association (ECSA) Sector Group, Kristof May as Regulatory Affairs Manager and Assumpta Tabaro as Management Assistant.



MARLEEN PAUWELS
Executive Director



ANGELICA CANDIDO
ECSA Manager



KRISTOF MAY
Regulatory Affairs Manager



ASSUMPTA TABARO
Management Assistant

Euro Chlor assumes Secretariat of World Chlorine Council

Euro Chlor has taken over the Secretariat of the World Chlorine Council (WCC) as of 1 January 2019 and will lead the operations of this global network representing the chlorine and chlorinated products industries for the coming two years.

WORLD chlorine council®



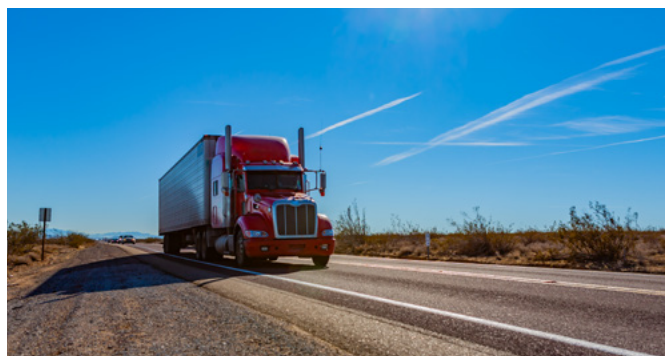
For more information:
<https://chlorineindustryreview.com/about-us>



LOADING AND UNLOADING UPDATE

(FEATURED ON PAGE 6)

Euro Chlor members are seeing an increasing number of safety issues related to the loading and unloading of chlor-alkali related products. As such, a new GEST recommendation has been prepared entitled [“Safe Loading and Unloading of Chlor-Alkali related Chemicals”](#). In addition, an initiative has begun to prepare a Euro Chlor commitment that will implement safe rules for loading and unloading of our chemicals, not only at member sites but also amongst customer and transport companies.



INTERACTIVE GAME

To further support its Safety Initiative, Euro Chlor began a project with the University of Delft in June 2019 to develop an interactive ‘game’ for use as a process safety learning tool by our members. This will help create more awareness and understanding of the hazards associated with chlor-alkali production. A prototype is expected by the summer of 2020, which several members will evaluate to see if it can be used to train people in the plant. If this ‘beta-test’ goes well, the tool will be expanded to cover all the important learnings on process safety in our sector.





HEALTH WORKING GROUP UPDATE

(FEATURED ON PAGE 7)

Euro Chlor's [Health Working Group](#) has delivered several guidance documents to help further improve the health of Europe's chlor-alkali workforce. Over the past year, the group has been developing a series of tools to ensure that the information in these documents gets to the people who need it. These tools include:

- Brief summaries on the chemical risks of chlor-alkali products for workers and site managers;
- An informative poster and training presentation to raise worker

awareness on electromagnetic fields that can be found on production sites. These will be made available in local languages;

- Emergency information sheets for hospitals on what to do in case of accidental chlorine release;

In addition, the group is compiling expert advice and authority information on the causes and protection against stress and burnout. From this a training presentation will be prepared to help protect everyone in our industry against this rising issue.





REGULATORY

Clean energy for all Europeans

To facilitate the transition towards a climate-neutral Europe by 2050 and deliver on the EU's Paris Agreement commitments for reducing greenhouse gas (GHG) emissions, the EU has agreed a comprehensive update to its energy policy framework. This update resulted in the completion of a new energy rulebook – [the Clean Energy for all Europeans' package](#). The package consists of eight legislative acts in total and the EU Council of Ministers formally adopted the final four pieces on 22 May 2019 and published them on 19 June 2019.

The EU is aiming high, not only by striving for an energy mix consisting of 32% renewable energy sources by 2030, but also in counting on an increase in energy efficiency of 32.5% by that same date. Agreed during June 2018 trilogue meetings between the European Commission (EC), Parliament and Member States, these targets set the EU as an energy and climate action leader in the world. They will now need to be taken up in the Member States'

National Climate and Energy Plans for the upcoming years (up to 2050).

The 'Clean Energy Package' aims to place the consumer at the heart of the energy transition. There will be support for small installations so that households are also able to participate in the market and self-generate, consume and store any energy they produce. In addition, families will be better informed about energy prices and potential efficiency improvements. This may in turn help to combat 'energy poverty'.

In the package, industry is not seen as a specific separate player but merely as a large consumer. One of the key points of the package is to improve the functioning of Europe's energy markets. This would result in lower energy prices and in keeping industries competitive, particularly electricity-intensive industries like the chlor-alkali sector. It is Euro Chlor's challenge and goal to safeguard a reliable and affordable electricity supply.

[Click here](#) to find out more information about energy.





REGULATORY

Input on two consultation rounds to EU Emission Trading Scheme (ETS)

The Energy Task Force work focused on the [EU Emission Trading Scheme \(ETS\)](#), more specifically on the associated State Aid Guidelines for indirect costs compensation.

The EU ETS rules result in higher electricity costs for some electrointensive undertakings. To compensate these higher costs, industry can count on the European State Aid guidelines. With the ETS Directive just being revised for its phase 4 (2021–2030), the 2012 State Aid Guidelines are now also in the process of being updated.

[The EC Directorate-General for Competition \(DG COMP\)](#) already organised two consultation rounds for this. In both rounds (public and sector-targeted), Euro Chlor and Cefic demonstrated the importance and value of this compensation for our sector given the strong indirect effects of the ETS system on the chlor-alkali industry. In close collaboration, Euro Chlor and Cefic will make sure all DG COMP's questions are answered.

In addition to our own Energy Task Force, the Euro Chlor Regulatory Department actively works together with Cefic to have our sector heard in the larger European energy debate.

[Click here](#) to find out more information about energy.

Mercury phase out: deadline passed but Euro Chlor remains vigilant

Despite the phase-out of the mercury technology by the end of 2017, a lot of work remained to remove the mercury from both the cells and any equipment that is no longer used.

According to the EU legislation, liquid mercury must be converted within a five-year period, (i.e. before the end of 2022), to mercury sulphide before being safely stored in a salt-mine. This requires effort on our part as there is limited capacity available to convert any mercury. At the end of 2018, Euro Chlor members reported that they have 2,947 tonnes of liquid mercury on site with 1,146 tonnes of liquid mercury being converted during 2018. Based on the results of 2018, we might expect that the total conversion of the available liquid mercury to be finalised before the end of 2022.

[Click here](#) to find out more information about mercury.

ECSA'S REGULATORY CHALLENGES

(FEATURED ON PAGE 8)

UBA PMT approach

Perchloroethylene (PER) is considered to be persistent, mobile and toxic (PMT) under criteria set by Germany's UBA^[1]. The PMT criteria could be used to identify substances of very high concern (SVHC) for inclusion in the candidate list for authorisation and the Stockholm convention on Persistent Organic Pollutants. An EU science committee identified PMT substances as one of 14 emerging issues that could impact human health or the environment in the future. ECSA has shared its position with Cefic, national industry associations and EU and national authorities and is closely following the scientific and regulatory discussions.

[1] UBA: Umweltbundesamt (the German Federal Environment Agency)

Revision of 2.BImSchV in Germany

The German UBA also initiated a workshop concerning the revision of the 2. BImSchV (German Federal Emission Protection Ordinance). The 2. BImSchV, established in 1990 and revised in 2013, describes detailed technical installations, monitoring and permit requirements of halogenated solvents in dry-cleaning, metal cleaning and extraction installations, implementing the Industrial Emissions Directive (IED) in Germany. ECSA responded to the survey and attended the UBA workshop on 16 April 2019 with solvent users and recyclers. ECSA and its stakeholders told UBA that this unique ordinance should be left as is without listing new solvents or removing current ones as it ensures the safe use of chlorinated solvents at a very high standard in Germany.

Montreal Protocol and the EU ODS regulation

Discussions on very short-lived substances (VSLs) continue, which include chlorinated solvents (methylene chloride and chloroform) and their predicted negative impact on ozone layer recovery. This impact has been overestimated due to incorrect global volume growth and emission projections. ECSA is a recognised stakeholder in the revision of the Montreal Protocol and the EU Regulation on Ozone Depleting Substances (ODS), which implements the Montreal Protocol into EU law, and has provided extensive data and scientific arguments proving that current produced volumes of chlorinated solvents are no harm to the ozone layer and do not need to be regulated under the ODS regimes. Adaptations of the Protocol and the EU ODS regulation are expected in late 2019 or early 2020.



ECSA REFRESHES ITS COMMUNICATIONS

ECSA, the [European Chlorinated Solvents Association](http://www.chlorinated-solvents.eu), is evaluating and refreshing all its communications and has released a new, informative flyer that describes the benefits of chlorinated solvents. The ECSA website (www.chlorinated-solvents.eu) is also in the process of being modernised in line with the Euro Chlor corporate design and improved functionalities. As part of this, the Product & Application Toolbox is being updated according to the revised REACH dossiers and regulations, giving users of chlorinated solvents and related co-products guidance at a glance on safe and sustainable use, simplifying the highly formal exposure scenarios in the extended safety datasheets (eSDSs).





OTHER PRODUCT GROUP NEWS



Chloro Alkane Product Groups (CAPG) highlights

The Chloro Alkane Product Group (CAPG) has been involved in two major international conferences over the past 12 months. The first took place in New Delhi, India in December 2018. At this event, speakers from the CAPG and MCCP REACH consortia presented the results of the Community rolling action plan (CoRAP) test programme and urged the international audience towards greater inter-continental collaboration to promote the benefits of chloro alkanes.

The second more technical event took place at the VU Amsterdam, Netherlands and focused on the challenges associated with chloro alkane detection. Organised by the CAPG, the audience of

academics, regulators and European officials identified the methods and technologies needed to ensure the correct detection of this material.

Closer to home, the group is involved as part of the Restriction of Hazardous Substances in Electronics and Electronic Equipment Directive ('RoHS'; 2011/65/EU). Here, the EC is adapting the methodology by which substances are nominated for restriction under the RoHS directive. MCCP is included as part of an exercise to 'test' the methodology so CAPG are working closely with Cefic to ensure that any nomination is scientifically and legally correct.



OTHER PRODUCT GROUP NEWS

Biocide News

At the start of 2019, disinfectant products related to chlorine, sodium hypochlorite and calcium hypochlorite were registered under the [EU Biocidal Product Regulation \(EU 528/2012\)](#). This came at a time when focus was on these essential biocides from other regulations such as the [Drinking Water Directive \(98/83/EC\)](#) and the [Pesticide Residue Regulation \(EC 396/2005\)](#). Activities are also underway to change the EN standards related to the use of sodium hypochlorite as a drinking water treatment chemical.

To better serve Euro Chlor members, all registration activities have been passed to another provider (SCC GmbH) who will continue to manage the registration groups through the 'preservative' applications (PT11 and 12). Meanwhile, Euro Chlor will enhance the advocacy efforts for these biocides by setting up a dedicated task force that will support the safe, but essential, use of these important chlor-alkali products.

Sodium Chlorate Product Group (SCPG) update

Euro Chlor's newest product group has been following the recent review of the [Explosive Precursors regulation \(98/2013\)](#). The regulation harmonises rules across Europe on the marketing and use of such precursors and originally included sodium chlorate. The SCPG have a code of conduct on how to deal with the requirements imposed as part of this regulation.

As sodium chlorate is no longer available to the general public, recommendations have been made by authorities that licensing requirements for sodium chlorate are discontinued. The group is also supporting efforts to remove the H412 (Harmful to aquatic life with long lasting effects) environmental toxicity classification from sodium chlorate, sponsored by the Swedish Chemicals Agency, KemI.



COMMUNICATIONS



Two new videos released over past year on Youtube

The first is a message from our chairman, Jürgen Baune, that details his opinion on where our industry is headed in the coming years. Jürgen also talks about how one possible co-product, hydrogen, may play a role in a sustainable future for our industry.



The other video is part of the 'chlorine things' family. This latest video shows the role of chlor-alkali chemistry in keeping us safe in our communities. From the role of advanced polymers in protecting our police and fire services to fire-retardants and advanced materials that keep us safe on our bikes, safety is a chlorine thing! See the videos and much more on our [YouTube channel](#).

Social Media update

Euro Chlor social media activities continue to encourage people to visit our new website. In addition, a private group has been set up on LinkedIn to support Euro Chlor Partners and provide them with the most up-to-date news and content.

With [Twitter](#) providing news content and commentary, [LinkedIn](#) being more business oriented and [Facebook](#) being a platform for highlighting the benefits of chlor-alkali, our three social media platforms continue to grow and we urge people to follow them to ensure they are also kept informed.



COMMUNICATIONS

Partners and Members together form communications network

During 2018, Euro Chlor clarified its status within the new Cefic organisation and updated its Operating Rules accordingly, which included a move from three to two membership categories, namely 'members' and 'partners'.

As of 2019, Associate Members and Technical Correspondents both became 'partners'. Such companies can attend the General Assembly, enjoy a reduced fee to the Euro Chlor Technical Conference held every three years and benefit from:

- Attendance at a new information session on the Working Group/ Committees prior to the General Assembly
- Participation in the Euro Chlor Communications Network (and receiving chlor-alkali related information such as member news, Safety Newsletters and the Euro Chlor Management Brief)
- Updates and information on European policies affecting our sector
- Selected key working documentation on issues related to our sector

As a result, the Euro Chlor Communications Committee has been expanded to include partners and become the new Communications Network. This Network is in the process of defining its chair, terms of reference, frequency of meetings and remit.



INVESTMENTS

Member investments demonstrate confidence and create career opportunities in Europe. In the past year, Euro Chlor members have continued to finalise and invest in new technologies and facilities for chlor-alkali and its related downstream products. These include:



PCC expansion of monochloroacetic acid production planned in Poland.



Nouryon increasing capacity of chloromethanes in Germany



BorsodChem beginning chlor-alkali production in Hungary.



INOVYN started chlor-alkali production at new membrane chlorine cellroom at Stenungsund facility in Sweden. INOVYN to expand PVC production at Jemeppe site in Belgium.



Ercros starts up newest chlor-alkali plant in Vila-seca I, Tarragona.



ANWIL increases output at Włocławek facility in Poland.



Covestro to invest EUR 300 million to boost Antwerp aniline production.



Vynova opens potassium hydroxide plant in Belgium. PPC SAS joins Vynova Group.



OUR DOWNSTREAM STAKEHOLDERS

VinylPlus® confirms leadership in the Circular Economy. During this year of hugely increased public, political and regulatory pressure on plastics, VinylPlus has successfully illustrated what can be achieved by voluntary actions with concrete targets, supported by the full commitment of an entire value chain.

Read the highlights under the three headings below:

Following the publication of the [EU action plan for the Circular Economy](#) in December 2015 and the European Commission (EC) [Communications on the Plastics Strategy](#) and the [Chemical, Product and Waste Interface](#) early in 2018, the policy focus moved to the actions and measures required to make these strategic visions work. The most relevant ones for VinylPlus were the public consultation on the interface between product and waste legislation, and the EC's request for voluntary recycling pledges by industry.

VinylPlus of course responded to the interface consultation, but also made strenuous efforts to explain its views to other industry sectors less involved or experienced in recycling. More generally,

in this year of great uncertainty for the plastic industry, companies and organisations outside the PVC sector, even outside the plastic industry, repeatedly asked VinylPlus to share knowledge and give advice on possible actions and success factors.

The EC's request for voluntary pledges is in many ways a recognition of the VinylPlus value chain approach and of trailblazing efforts and achievements. In 2018, VinylPlus increased the volume of recycled PVC to nearly 740,000 tonnes – up by 15.6% from 2017. Cumulatively, almost 5 million tonnes of PVC have been recycled since 2000. Obviously VinylPlus could not afford to disappoint and responded early on with commitments to ensure the use of a minimum of 900,000 tonnes of recyclate in new products by 2025, and a minimum of one million tonnes by 2030.

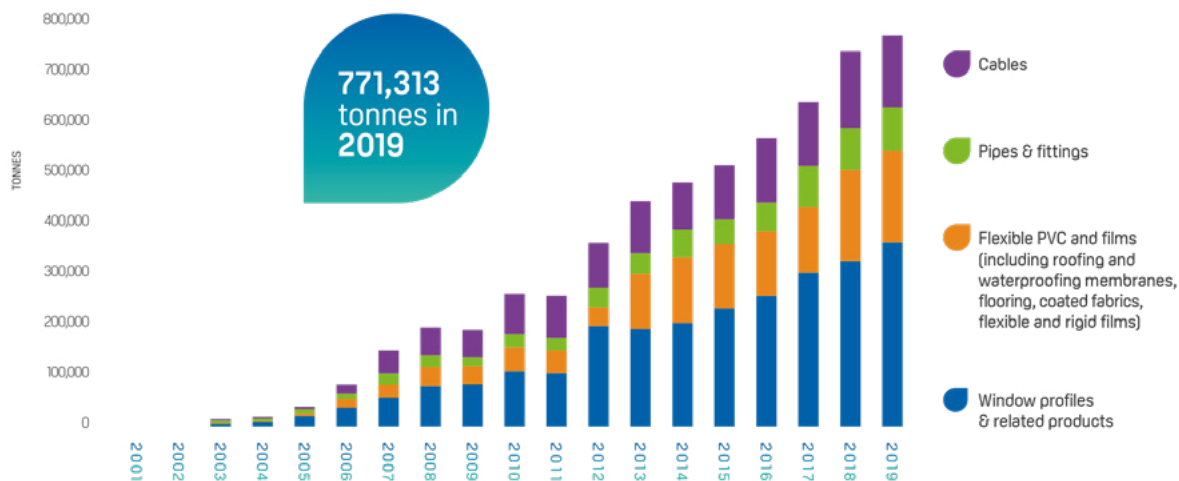
These commitments represented 10% of the amount expected by the EC and were very well received. They also constituted a first step in the post-2020 strategy of the PVC industry, which will be further fleshed out in 2019.

PRODUCT LABEL

Another major achievement in 2018 was the official launch of the [VinylPlus® Product Label](#), a sustainability certification scheme for PVC building and construction products, making it simpler for customers, specifiers and markets to identify products delivering the highest sustainability performance and contribution to the

circular economy. To date, eight profile manufacturers have been awarded this Product Label for 43 profile systems manufactured in 13 European sites across 11 countries and this was celebrated during an award ceremony at the [VinylPlus Sustainability Forum 2019](#) in May.

PVC RECYCLED WITHIN THE VINYLPLUS FRAMEWORK





EVENTS AND REPORT

This year's Sustainability Forum featured the theme of 'Accelerating Innovation' and examined the challenges and opportunities presented by innovation in shaping the PVC industry's future in the context of the circular economy.

The event attracted more than 170 stakeholders from 32 countries, representing the EC, European Parliament, United Nations, NGOs, academia, specifiers, designers, recyclers and the PVC value chain. The [2019 Progress Report](#) summarises VinylPlus achievements in 2018.



Also contact:

- info@vinylplus.eu
- vinylplus.eu
- [@VinylPlus_EU](https://www.linkedin.com/company/vinylplus/)
- [LinkedIn Vinylplus](https://www.linkedin.com/company/vinylplus/)

The full version of this report is available from
<https://chlorineindustryreview.com>



Euro Chlor supports a safe, sustainable and successful chlor-alkali industry for Europe.

Chlor-alkali is an essential building block for the manufacture of numerous products that we rely on every day. Across Europe, millions of jobs are dependent on the availability of competitively priced chlor-alkali supplies.

Chlor-alkali chemistry is also vital for the development of the innovative materials we will need in the future.

Euro Chlor's 39 producing members operate 58 manufacturing locations in 19 European countries, representing 97% of all European production capacity.

Euro Chlor represents the interests of chlor-alkali producers in Europe; encourages best practices in safety, health and environmental protection and promotes the economic and social benefits of chlor-alkali and the many industries that rely on them.

Based in Brussels, Belgium, Euro Chlor is a sector group of Cefic (European Chemical Industry Council), which represents chemical companies across Europe, directly providing 1.2 million jobs and accounting for 14.7% of world chemical production.

Euro Chlor is a member of the World Chlorine Council, a global network of regional organisations that represents producers accounting for more than 80% of worldwide chlor-alkali production capacity.



Euro Chlor

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<http://www.chlorinethings.eu>

A sector group of Cefic 

European Chemical Industry Council - Cefic aisbl

EU Transparency Register n° 64879142323-90



<https://linkedin.com/company/eurochlor>



<https://twitter.com/eurochlor>



<https://facebook.com/eurochlor>

The photos on the cover page highlight key products and innovations from the past 30 years that have relied on chlor-alkali chemistry.

