

PROGRESS REPORT 2016

REPORTING ON 2015 ACTIVITIES

Launched in 2011, VinylPlus is the renewed 10-year Voluntary Commitment to sustainable development by the European PVC industry. The VinylPlus programme was developed through open dialogue with stakeholders, including industry, NGOs, regulators, civil society representatives and PVC users. The regional scope is the EU-28 plus Norway and Switzerland.

This Report summarises VinylPlus' progress and achievements in 2015 in each of the five key sustainability challenges identified for PVC on the basis of The Natural Step (TNS) System Conditions for a Sustainable Society.

All the information reported has been independently audited and verified by third parties.

A full glossary of abbreviations appears at the end of the Progress Report.

For detailed descriptions of the projects and activities please visit www.vinylplus.eu.

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FOREWORD

2015 was a crucial year for the sustainable future of our planet. Two high-level international meetings set the global agenda and charted the road ahead to 2030 and beyond.

In September, the United Nations' 193 Member States unanimously adopted the post-2015 development agenda at the Sustainable Development Summit 2015. Then, in December, the Paris Climate Summit (COP21) reached an historic agreement on climate change mitigation.

Faced with global challenges of this magnitude, VinylPlus is working ever harder to ensure that its Voluntary Commitment contributes to achieving the overriding environmental objectives. Issues such as the increasingly efficient use of resources, raw materials and energy, are already an integral part of the programme.

The Vinyl Sustainability Forum 2015 was a move in this direction. The theme – 'More Vinyl, Less Carbon' – summarised the challenges for PVC over the coming years, and also how the VinylPlus Voluntary Commitment is already contributing to addressing climate change, improving product sustainability and moving the European PVC industry towards a circular economy.

The Vinyl Sustainability Forum 2015 also confirmed the European PVC industry's strong commitment to collection and recycling by developing schemes that are increasingly efficient and economically viable. An important part of VinylPlus' work in 2015 focused precisely on how to recycle greater volumes of PVC, while at the same time ensuring the safety of recycled PVC.

The December 2015 Communication 'Closing the loop – An EU action plan for the Circular Economy' highlights the need to develop systems for ensuring the quality of recycled materials. The issue of 'chemicals of concern' in recycling streams features in the action plan. Indeed, uncertainty over the regulatory framework has major negative consequences for investment in the research and development of new products and markets for recycled PVC. We call therefore on the European Commission to propose pragmatic solutions allowing continuation and development of such PVC recycling, taking into account its resource efficiency benefits. VinylPlus is intensifying its dialogue with institutions and is fully committed to contribute to a solution ensuring concerns about health and the environment are addressed.

At the same time, our industry is engaged in major efforts to develop and use safer, more sustainable formulations. By the end of 2015, lead-based stabilisers had been replaced in the EU-28. This was undoubtedly the highlight of the year for VinylPlus, and it concluded a challenging journey that saw close cooperation along the value chain to solve technical constraints.

As planned from the outset, in 2015 we conducted a full review of the objectives and targets of the Voluntary Commitment to measure and evaluate our initiatives up to now, taking into account market and technical developments, as well as the evolution of the regulatory framework.

For the additional hard work and efforts that the mid-term review required, I would like to thank the VinylPlus organisation, the member and partner companies, the sectoral associations, the Task Forces and Working Groups, TNS and all the other stakeholders involved.

I would also like to welcome the nine new VinylPlus Partners who joined in 2015 to share with us the second part of our 10-year journey.



JOSEF ERTL
Chairman of VinylPlus

GOVERNANCE

MANAGEMENT BOARD

VinylPlus is managed by a comprehensive board representing all European PVC industry sectors.

VinylPlus Board

Mr Dirk Breitbach – Vice Chairman^(a) (EuPC¹ – Compounding sector)

Mr Filipe Constant – ECVN 2010²

Mr Alexandre Dangis – EuPC

Dr Brigitte Dero – General Manager (ECVN 2010)

Mr Joachim Eckstein – Vice Chairman^(b) (EuPC)

Mr Stefan Eingärtner – Deputy General Manager

Dr Josef Ertl – Chairman^(c) (ECVN 2010)

Mr Rainer Grasmück – Treasurer (ESPA³)

Mr Andreas Hartleif – EuPC (Rigid PVC sector)

Dr Ettore Nanni – ESPA

Mr Nigel Sarginson – PlasticisersPlus⁴

Mr Arjen Sevenster – Controller (ECVN 2010)

Mr Niels Rune Solgaard-Nielsen – EuPC (Rigid PVC sector)

Mr Chris Tane – ECVN 2010

Mr Remco Teulings – EuPC (Flexible PVC sector)

Mr Geoffroy Tillieux – Controller (EuPC)

Dr Michael Träger – Chairman^(d) (ECVN 2010)

Mr Joachim Tremmel – PlasticisersPlus

Mr Christian Vergeylen – EuPC (Flexible PVC sector)

^(a) Vice Chairman since April 2015, Acting Chairman from January 2016 until 14 April 2016

^(b) Until April 2015

^(c) From 15 April 2016

^(d) Until December 2015

Internal and external stakeholders engaged in open and constructive dialogue at the Vinyl Sustainability Forum 2015.



PHOTO: VINYLPLUS

*“VinylPlus can be considered
as a frontrunner for the circular economy”*

GWENOLE COZIGOU
Director, DG GROW, European Commission



MONITORING COMMITTEE

Open to all external stakeholders, the Monitoring Committee ensures an independent evaluation of the initiatives undertaken in the framework of the Voluntary Commitment, guaranteeing VinylPlus' transparency, participation and accountability.

*Gwenole Cozigou
speaking at the
Vinyl Sustainability Forum 2015.*

Members

Mr Dirk Breitbach – Vice Chairman of VinylPlus^(a)

Prof. Alfons Buekens⁵ – Chairman of the Monitoring Committee

Mr Gwenole Cozigou – Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW), European Commission

Mr Alexandre Dangis – VinylPlus Board Member

Dr Brigitte Dero – General Manager of VinylPlus

Mr Joachim Eckstein – Vice Chairman of VinylPlus^(b)

Dr Josef Ertl – Chairman^(c) (ECVM 2010)

Mr Rainer Grasmück – Treasurer of VinylPlus

Dr Godelieve Quisthoudt-Rowohl – Member of the European Parliament

Mr Sylvain Lefebvre – Deputy General Secretary, industriAll European Trade Union⁶

Mr Carlos Sánchez-Reyes de Palacio – President of OCU⁷, President of the Commission on Sectoral Policies and Environment, CES⁸

Dr Michael Träger – Chairman of VinylPlus^(d)

¹ EuPC: European Plastics Converters (www.plasticsconverters.eu)

² ECVM 2010: the formal legal entity of ECVM (The European Council of Vinyl Manufacturers – www.pvc.org), registered in Belgium

³ ESPA: The European Stabiliser Producers Association (www.stabilisers.eu)

⁴ PlasticisersPlus: the legal entity of ECPI (The European Council for Plasticisers and Intermediates – www.plasticisers.org; www.ecpi.org), based in Brussels, Belgium

⁵ Formerly Professor at the Vrije Universiteit Brussel (VUB, Free University of Brussels – www.vub.ac.be) and currently Invited Professor at Zhejiang University, China (www.zju.edu.cn)

⁶ IndustriAll: European Trade Union (www.industriall-europe.eu)

⁷ OCU: Organización de Consumidores y Usuarios (Spanish Consumers and Users Organisation – www.ocu.org)

⁸ CES: Consejo Económico y Social de España (Spanish Economic and Social Council – www.ces.es)

VINYLPLUS PARTNERS

IN 2015, THE CONTRIBUTORS WERE:

A. Kolckmann GmbH (Germany)
Alfatherm SpA (Italy)
Aliaxis Group (Belgium)
Alkor Draka B.V. (Netherlands)*
Alkor Draka S.A.S (France)*
Altro (UK)
aluplast Austria GmbH (Austria)
aluplast GmbH (Germany)
alwitra GmbH & Co (Germany)
AMS Kunststofftechnik GmbH & Co. KG (Germany)
Amtico International (UK)
Beaulieu International Group (Belgium)*
Bilcare Research (Germany)
BM S.L. (Spain)
BT Bautechnik Impex GmbH & Co. KG (Germany)
BTH Fitting Kft. (Hungary)
CF Kunststofprofielen (Netherlands)*
CIFRA (France)
Coveris Rigid Hungary Ltd (Hungary)
Debolon Dessauer Bodenbeläge GmbH & Co. KG (Germany)
Deceuninck Ltd (UK)
Deceuninck NV (Belgium)
Deceuninck SAS (France)
DHM (UK)
Dickson Saint Clair (France)
DLW Flooring GmbH (Germany)
Döllken Kunststoffverarbeitung GmbH (Germany)
Dyka BV (Netherlands)
Dyka Plastics NV (Belgium)
Dyka Polska Sp. z o.o. (Poland)
Eiblat Plastics GmbH & Co. KG (Germany)
Epwin Window System (UK)
Ergis SA (Poland)
FDT FlachdachTechnologie GmbH & Co. KG (Germany)
Finstral AG (Italy)
FIP (Italy)
Flag SpA (Italy)
Fucine Film Solutions Srl (Italy)
Gealan Fenster-Systeme GmbH (Germany)
Georg Fischer Deka GmbH (Germany)
Gerflor Mipolam GmbH (Germany)
Gerflor SAS (France)
Gerflor Tarare (France)
Gernord Ltd (Ireland)
Girpi (France)
Griffine Enduction (France)
Gruppo Fabbri (Svizzera) S.A. (Switzerland)*
Gruppo Fabbri Vignola SpA (Italy)*
H Producter AS (Norway)
Heytex Bramsche GmbH (Germany)
Heytex Neugersdorf GmbH (Germany)
Holland Colours NV (Netherlands)
Icopal Kunststoffverarbeitungs GmbH (Germany)
IGI – Global Wallcoverings Association (Belgium)
IKA Innovative Kunststoffaufbereitung GmbH & Co. KG (Germany)
Imerys (UK)*
Imperbel NV (Belgium)
Industrial Sedó SL (Spain)*
Inoutic/Deceuninck GmbH (Germany)
Inoutic/Deceuninck Sp. z o.o. (Poland)
Internorm Bauelemente GmbH (Austria)
Jimten (Spain)

Klößner Pentaplast GmbH & Co. KG (Germany)
Konrad Hornschuch AG (Germany)
Manufacturas JBA (Spain)
Marley Deutschland (Germany)
Marley Hungária (Hungary)
Mehler Technologies GmbH (Germany)
MKF-Ergis GmbH (Germany)
MKF-Ergis Sp. z o.o. (Poland)
Molecor (Spain)
Mondoplastico SpA (Italy)
Nicoll (France)
Nicoll Italy (Italy)
Nordisk Wavin A/S (Denmark)
Norsk Wavin A/S (Norway)
Novafloor (France)*
NYLOPLAST EUROPE B.V. (Netherlands)
Omya International AG (Switzerland)
Perlen Packaging (Switzerland)
Pipelife Austria (Austria)
Pipelife Belgium NV (Belgium)
Pipelife Czech s.r.o (Czech Republic)
Pipelife Deutschland GmbH (Germany)
Pipelife Eesti AS (Estonia)
Pipelife Finland Oy (Finland)
Pipelife France (France)
Pipelife Hellas S.A. (Greece)
Pipelife Hungária Kft. (Hungary)
Pipelife Nederland BV (Netherlands)
Pipelife Polska SA (Poland)
Pipelife Sverige AB (Sweden)
Poliplast (Poland)
Poloplast GmbH & Co. KG (Austria)
Polyflor (UK)
Polymer-Chemie GmbH (Germany)
Profine GmbH (Germany)
Protan AS (Norway)
PUM Plastiques SAS (France)
Redi (Italy)
REHAU AG & Co (Germany)
REHAU GmbH (Austria)
REHAU Ltd (UK)
REHAU SA (France)
REHAU Sp. z o.o. (Poland)
REHAU Industrias S.A. (Spain)
RENOLIT Belgium NV (Belgium)
RENOLIT Cramlington Ltd (UK)
RENOLIT Hispania SA (Spain)
RENOLIT Ibérica SA (Spain)
RENOLIT Milano Srl (Italy)
RENOLIT Nederland BV (Netherlands)
RENOLIT Ondex SAS (France)
RENOLIT SE (Germany)
Resysta International GmbH (Germany)
Riuvert (Spain)
Roehling Engineering Plastics KG (Germany)
Salamander Industrie Produkte GmbH (Germany)
Sattler PRO-TEX GmbH (Austria)
Schüco PWS Produktion GmbH & Co. KG (Germany)
Serge Ferrari SAS (France)
Sika Services AG (Switzerland)
Sika Trocal GmbH (Germany)
SIMONA AG (Germany)
Sioen Industries (Belgium)
SKZ-Testing GmbH (Germany)
SOTRA-SEPEREF SAS (France)

Stöckel GmbH (Germany)
Tarkett AB (Sweden)
Tarkett France (France)
Tarkett GDL SA (Luxembourg)
Tarkett Holding GmbH (Germany)
Tarkett Limited (UK)
TMG Automotive (Portugal)
Tönsmeier Kunststoffe GmbH & Co. KG (Germany)
Uponor Infra Oy (Finland)
Veka AG (Germany)
Veka Ibérica (Spain)
Veka Plc (UK)
Veka Polska (Poland)
Veka SAS (France)
Verseidag-Indutex GmbH (Germany)
Vescom BV (Netherlands)
Vulcaflex SpA (Italy)
Wardle Storeys (UK)
Wavin Baltic (Lithuania)
Wavin Belgium BV (Belgium)
Wavin BV (Netherlands)
Wavin France SAS (France)
Wavin GmbH (Germany)
Wavin Hungary (Hungary)
Wavin Ireland Ltd (Ireland)
Wavin Metalplast (Poland)
Wavin Nederland BV (Netherlands)
Wavin Plastics Ltd (UK)

PVC PRODUCERS CONTRIBUTING TO VINYLPLUS IN 2015

Inovyn (Belgium, Germany, Italy, Netherlands, Norway, Spain, Sweden, UK)
Shin-Etsu PVC (Netherlands, Portugal)
VESTOLIT GmbH (Germany)
VINNOLIT GmbH & Co. KG (Germany, UK)
Vynova Group (Belgium, France, Germany, Netherlands, UK)

STABILISER PRODUCERS CONTRIBUTING TO VINYLPLUS IN 2015

Akcros Chemicals
Akdeniz Kimya A.S.
Asua Products SA
Baerlocher GmbH
Chemson Polymer-Additive AG
Galata Chemicals
IKA GmbH & Co. KG
Lamberti SpA
PMC Group
Reagens SpA

PLASTICISER PRODUCERS CONTRIBUTING TO VINYLPLUS IN 2015

BASF SE
DEZA a.s.
Emerald Performance Materials
Evonik Performance Materials GmbH
ExxonMobil Chemical Europe Inc.
Perstorp Oxo AB

* Companies that joined VinylPlus in 2015

CHALLENGE 1

CONTROLLED-LOOP MANAGEMENT:

"We will work towards the more efficient use and control of PVC throughout its life cycle."

1. Recycle 800,000 tonnes/year of PVC by 2020.

2. Exact definitions and reporting concept to be available by end 2011.
➤ **achieved**

3. Develop and exploit innovative technology to recycle 100,000 tonnes/year of difficult-to-recycle PVC material (within the overall 800,000 tonnes/year recycling target) by 2020.

4. Address the issue of 'legacy additives' and deliver a status report within each annual VinylPlus Progress Report.
➤ **ongoing**

RECYCLING TARGET

In 2015, 514,913 tonnes of PVC waste were recycled within the VinylPlus framework. The windows and profiles sector continued to drive recycling volumes, accounting for around 45% of the total. A significant increase of recycled PVC was registered in Italy, thanks to reinforcement of the Recovinyl network.

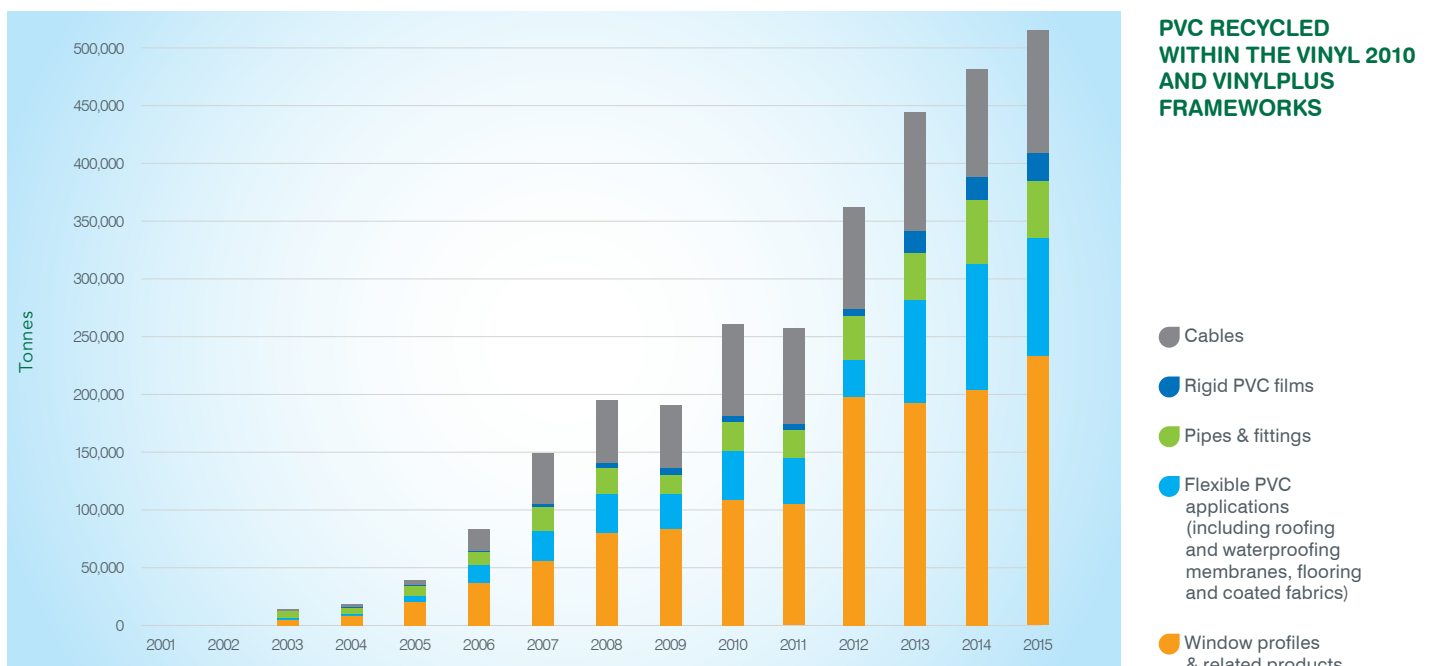
Recovinyl

Recovinyl's mission (www.recovinyl.com) is to facilitate PVC waste collection and recycling by acting as a mediator between recyclers and

converters. Recovinyl also registers and certifies volumes of PVC recycled, based on the EUCertPlast (www.eucertplast.eu) protocol.

In 2015, Recovinyl increased the number of companies in its network to 177. It registered and certified 508,154 tonnes of recycled PVC.

The collection of PVC was volatile, with better results in Q2 and Q4. Recyclers faced lower demand from pipe manufacturers. Recyclers and converters remained quite concerned over uncertainties in the implementation of relevant EU regulations such as REACH⁹, CLP¹⁰ and Waste¹¹.



⁹ REACH: Registration, Evaluation, Authorisation and Restriction of Chemicals (http://ec.europa.eu/growth/sectors/chemicals/reach/index_en.htm)

¹⁰ CLP: Classification, Labelling and Packaging of substances and mixtures (<http://echa.europa.eu/regulations/clp/legislation>)

¹¹ Waste Framework Directive and related legislation (<http://ec.europa.eu/environment/waste/legislation>)

Industry-Sector Projects for PVC Waste Management

The development and consolidation of collection and recycling schemes for window profiles continued in 2015, with a further increase in recycled volumes compared to the previous year. In Germany, Rewindo¹² recycled 100,000 tonnes of window profiles (reported as part of Recovinyl volumes). EPPA's¹³ activities focused on communications, with the aim of further stimulating recycling; and on advocacy related to legacy additives, which remains a priority for the short term. The projects included active participation in the development of a 'Practical Guidance for Plastics Recycling under REACH and Waste Legislation in Germany', in collaboration with the competent authorities and other industry associations; and the evaluation of the socio-economic impact of using recycled PVC from windows as a contribution to EU discussions on the circular economy.

Tiles containing recycled PVC flooring were launched on the market in 2015 by Novafloor (www.novaplak.com) in the framework of the Turquoise project. Contacts with retailers are ongoing for the commercialisation of the product. A contract has already been signed for more than 15 swimming pool areas.



PHOTO: COURTESY OF NOVAFLOOR

The 2015 annual report by VITO¹⁴ stated that TEPPFA¹⁵ members used close to 88,000 tonnes of PVC recyclates in 2014, a 10.6% increase over 2013, mainly thanks to the addition of new members.

TEPPFA is continuing to work on the legacy additives issue together with VinylPlus and EuPC. Uncertainties linked to the EU regulatory framework on the use of recycled PVC caused the piping industry to postpone investments in new products such as multi-layer pipes with recyclates. Advocacy and communications activities continued in 2015 to promote high-quality PVC pipes and the use of recyclates in high-quality, long-life products.

ESWA¹⁶ recycled 3,249 tonnes of roofing and waterproofing membranes in 2015 through its project Roofcollect® (www.roofcollect.com). The volumes recycled decreased compared to 2014, due to the lack of availability of waste for collection and organisational changes in some recycling companies. Still, ESWA remains in line with its commitment to recycle at least 50% of collectable, available used roofing membranes. Contact was made with an Italian company, which could lead to the collection and pre-treatment of roofing membranes in Italy.

EPFLOOR¹⁷ collected 4,101 tonnes of flooring waste and produced 3,938 tonnes of R-PVC in 2015, a 19% increase on the previous year.

The National Technical University of Athens (www.ntua.gr) and the Fraunhofer IVV Institute (www.fraunhofer.de) continued to investigate a solvent-based recovery process for difficult-to-recycle PVC waste, carrying out tests on the extraction of DEHP and the recovery of PVC on a laboratory scale. Further tests on a pilot scale are foreseen for 2016.

EPFLOOR was dissolved at the end of 2015, but the flooring industry remains committed to recycling and to the Voluntary Commitment, and a new organisational structure is under evaluation.

EPCoat (IVK Europe¹⁸ PVC Coated Fabrics Sector Project) recycled 4,263 tonnes of PVC-coated fabrics during 2015 (reported as part of Recovinyl volumes) through its collection and recycling scheme.

¹² Rewindo: Fenster-Recycling-Service (www.rewindo.de)

¹³ EPPA: European PVC Window Profile and Related Building Products Association, an EuPC sectoral association (www.eppa-profiles.eu)

¹⁴ VITO: Vlaamse Instelling voor Technologisch Onderzoek (Flemish Institute for Technological Research – www.vito.be)

¹⁵ TEPPFA: European Plastic Pipes and Fittings Association, an EuPC sectoral association (www.teppfa.eu)

¹⁶ ESWA: European Single Ply Waterproofing Association, an EuPC sectoral association (www.eswa.be)

¹⁷ EPFLOOR: European PVC Floor Manufacturers, an EuPC sectoral group (www.epfloor.eu)

¹⁸ IVK Europe: Industrierverband Kunststoffbahnen e.V. (Association of Coated Fabrics and Films – www.ivk-europe.com)

Nearly 50,000 tonnes of PVC pipes were recycled in 2015 in the framework of VinylPlus.



PHOTO: COURTESY OF MOLECOR

In 2015, ERPA¹⁹ started to cooperate with the recycling company Neidhardt (www.neidhardt-recycling.com) on the recycling of pharmaceutical blister packaging. Neidhardt can separate PVC and aluminium, and in 2015 it recycled 727 tonnes of PVC-aluminium blisters, producing 485 tonnes of R-PVC.

In addition, ERPA member CIFRA²⁰ recycled 440 tonnes of food packaging in 2015. In total, 24,371 tonnes of PVC rigid films were recycled in 2015 within the VinylPlus framework.

Other Recycling Projects

The Ebene project on end-of-life professional furniture was initiated in France in 2014 by SFEC²¹ with the objectives of assessing the flow of PVC furniture waste; identifying and testing logistical and recycling solutions for this type of waste; and consolidating knowledge about PVC incineration (as some furniture waste will still require incineration).

¹⁹ ERPA: European Rigid PVC Film Association, an EuPC sectoral association (www.pvc-films.org)

²⁰ CIFRA: Calandrage Industriel Français, a French calendering company (www.cifra.fr)

²¹ SFEC: Syndicat Français des Enducteurs Calandreurs, the French Association of Calenderers (www.sfec-services.org)



SFEC is cooperating with Valdelia, the French eco-agency dedicated to recycling professional furniture waste (www.valdelia.org/en/), providing it with information and developing recycling solutions for both rigid and flexible PVC. The information collected from the Ebene project was provided to the European Ecolabel Bureau. This helped allay concerns over PVC incineration, and none of the initial remarks on it were retained in the Ecolabel draft criteria on furniture of October 2015.

In 2015, VinylPlus started to support the recycling consortium Resysta® (www.resysta.com/en/), which produces a wood-like material based on rice husk and PVC, homogeneously connected in the polymer matrix, and recyclable after use. The consortium includes a number of VinylPlus partner companies across several industry sectors. During the year, collection and sorting technologies suitable for Resysta® products were examined,

The vast majority of pharmaceutical blister packs in Europe are made with rigid PVC and aluminium films. The PVC film is thermoformed to hold the tablets in cavities and welded to a cover film made of aluminium, which makes the recycling of pharmaceutical blister packs far from easy.



PHOTO: COURTESY OF ECPI

and other converters and recyclers in the VinylPlus/Recovynil network were contacted to exchange knowledge. From 2016, volumes of PVC recycled in Resysta® products (183 tonnes in 2015) will be included in VinylPlus statistics.

CHAIZE Environnement (www.chaizesa.com) – the French company conducting semi-industrial-scale tests on rigid PVC household packaging waste in the framework of the Blister project – was involved in the 3rd Media Field Trip organised by ECPI in October 2015.

RecoMed is a partnership project between the British Plastics Federation (BPF²²) and Axion Consulting²³ (the UK agent of Recovynil), launched in the UK in 2014. The RecoMed PVC take-back scheme provides the NHS (National Health Service) and private hospitals that register for the collection service with recycling containers and communications materials, and then carries out collections. After an initial trial with two hospitals, RecoMed involved six hospitals in 2015 and collected 719.5 kg of PVC. Since the potential for collection from hospitals is significant (in the UK there are around 1,500 hospitals), efforts are now being made to communicate the project and get other hospitals involved. New potential partners have already been identified.

In Denmark, the WUPPI²⁴ scheme focuses on the collection and recycling of rigid PVC. Set up in 2003, WUPPI now operates in more than 80% of the country's municipalities.

were both mainly due to uncertainties over the EU regulatory framework on the use of recycled PVC containing DEHP, which negatively affected demand for VinylLoop® R-PVC.

Legacy Additives

Legacy additives are substances whose use in PVC products has been discontinued but that are contained in recycled PVC. Since the use of legacy additives may be restricted by legislation, VinylPlus is committed to addressing the issue in cooperation with regulatory authorities.

In 2015, studies by BiPRO (www.bipro.de) and FABES (www.fabes-online.de) were completed. The BiPRO study had been commissioned by the European Commission to “*assess the possibility of granting a derogation to specific types of plastics and rubber waste in the EU waste list*”. The FABES study had been commissioned by VinylPlus in order to evaluate migration models for cadmium, lead, tin and zinc in rigid and flexible PVC (including DEHP for the latter).

According to the FABES study, the levels of migration of substances from recycled PVC are very low, and hence water used to wash recycled PVC meets the most stringent environmental standards. For this reason, the European PVC industry remains convinced that the recycling of PVC waste from

The aim of the RecoMed project is to recycle non-contaminated PVC medical products (such as IV solution bags, oxygen masks, oxygen tubing and anaesthetic masks) from UK hospitals.



VinylLoop®

In 2015, the VinylLoop Ferrara plant produced 4,511 tonnes of R-PVC (down 13.5% compared to 2014). In addition, 768 tonnes of waste (a 16.25% fall from 2014) were recycled with the TaxyLoop® process, which was developed for the treatment of scraps containing fibres. These significant decreases



PHOTO: COURTESY OF RRCOVINYL

²² BPF: British Plastics Federation, the leading trade association for the UK Plastic Industry (www.bpf.co.uk)

²³ Axion Consulting: resource recovery expert, a division of Axion Recycling Limited (www.axionrecycling.co.uk)

²⁴ WUPPI: Danish company set up to collect and recycle rigid PVC (www.wuppi.dk)

CO₂ savings from PVC recycling in Europe is now at around one million tonnes of CO₂ saved per year.



*VinylLoop®
(www.vinylloop.com)
is a physical, solvent-based
technology that can recycle
difficult-to-treat,
end-of-life PVC waste
and produces high-quality
R-PVC compounds.*

B&C (building and construction) products offers a manageable and cost-effective way to keep legacy additives in their safest place and represents the best option in terms of resource and energy efficiency, as well as waste treatment hierarchy.

In order to consolidate the results of the FABES study, additional measurements are currently being made.

RoHS 2 Directive

As reported in last year's VinylPlus Progress Report, in 2014 the European Commission appointed the consultancy Öko Institut (www.oeko.de) to produce a report on 21 substances that could be prioritised for restriction in electric and electronic equipment (EEE) under the RoHS 2 Directive²⁵. Based on the methodology proposed by UBA²⁶, PVC was included in the Öko Institut's prioritisation list for possible future restriction. No concrete intention to restrict PVC has been announced. The European Commission is now expected to publish a final methodology paper.

SDS-R Project

The tool developed by EuPC and PRE²⁷ to help recyclers prepare Safety Data Sheets for Recyclates (SDS-R) continued to be updated in line with the Globally Harmonised System (GHS), while taking into account the status of the REACH regulation. In 2015, the tool was translated into seven additional languages and is now available in 14 languages.

CONTROLLED-LOOP COMMITTEE

As part of the VinylPlus mid-term review, in 2015 the Controlled-Loop Committee carried out a detailed analysis of estimated volumes of PVC expected to be recycled by 2020, involving all the main PVC industry sectors. Key findings, also supported by a report from the consultancy firm Consultic (www.consultic.de/en/), include a best-case estimate as well as a worst-case scenario for the case of regulatory constraints on both DEHP in flexible and lead in rigid PVC.

²⁵ RoHS 2 Directive: EU legislation restricting the use of hazardous substances in electrical and electronic equipment.

The recast RoHS Directive 2011/65/EU (RoHS 2) entered into force on 21 July 2011

²⁶ UBA: Umweltbundesamt, Environment Agency Austria (www.umweltbundesamt.at)

²⁷ PRE: Plastics Recyclers Europe (www.plasticsrecyclers.eu)

CHALLENGE

1

Easy to clean, hygienic, and extremely versatile, PVC is used for many everyday-life products, thanks also to its unlimited printing and colour options.



PHOTO: COURTESY OF ERGIS

Since regulatory constraints related to the presence of legacy additives are still considered the major threat to recycling post-consumer waste, the Controlled-Loop Committee continued and will continue to give its technical support to ongoing discussions, including those at EU Member-State level.

Large-scale trials of EcoLoop feedstock recycling technology (www.ecoloop.eu) foreseen for 2015 were delayed by technical problems in the operation of the plant.

In the framework of the ReMapPlus initiative – in which VinylPlus closely cooperates with leading research and technology institutes and academics

– two promising projects were conceived, both led by the Belgian Textile Research Centre Centexbel (www.centexbel.be). The first project addresses chemical recycling solutions for difficult-to-recycle PVC waste. The second, CELFI, is investigating the inclusion of PVC waste in wood-plastic composites (www.centexbel.be/projects/celfi). An onsite visit to a flooring recycling plant near Cologne, Germany, was organised with a number of research partners to show them and discuss day-to-day recycling challenges.

In 2016, the Controlled-Loop Committee will continue to monitor the development and implementation of the EU regulatory framework in order to make technical contributions to ongoing discussions. The Committee will also focus on PVC energy recovery. Particular attention will be paid to those plants that recover energy from waste and recycle chlorinated components.

A new brochure – ‘Building the Future with Recycled PVC’ – is being developed, highlighting the variety of products by VinylPlus Partners already available on the market. Specifiers and end users will be able to focus their purchasing choices on the sustainability benefits derived from the use of recyclates, including reduced carbon emissions.

PVC film reels ready for recycling at VinylPlus Partner Alfatherm's plant.



PHOTO: COURTESY OF RECOVINYL

CHALLENGE 2

ORGANOCHLORINE EMISSIONS:

"We will help to ensure that persistent organic compounds do not accumulate in nature and that other emissions are reduced."

1. Engage with external stakeholders in the discussion of organochlorine emissions during 2012.
➤ achieved

2. Develop a plan to deal with stakeholder concerns on organochlorine emissions by end 2012.
➤ achieved

3. Compliance with the PVC resin Industry Charters by first Quarter 2012.
➤ partially achieved

4. Risk assessment for the transportation of major raw materials, in particular VCM, by end 2013.
➤ achieved in 2015

5. Target zero-accident rate with VCM release during transportation in the next 10 years.



SAFE TRANSPORT

There were no transport accidents in Europe with VCM release in 2015.

In September 2015, the ECVm Production Committee endorsed the memorandum 'Risk assessment of VCM transportation' by the Task Force on transport, which states in its conclusions:

"The risk of transporting VCM is essentially related to the hazard represented by bulk transport of flammable gas; the health hazard of VCM has no impact on the risk classification of such operations.

A qualitative risk analysis can be performed, and on the basis of the current scarce data would probably put VCM transportation in the second most acute

risk category. Belonging to such a category requires careful monitoring and control to ensure the risk remains as low as reasonably practicable.

A quantitative risk analysis would only make sense in some very specific cases to be appreciated at individual company level. It would be extremely difficult, and meaningless, to attempt such an analysis for the totality of VCM transportation in Europe.

Certification schemes exist, and are usually required, for all kinds of chemical transport. The risk analyses and mitigation procedures of loading and unloading are included in the plants' analyses and procedures and are thereby maintained up to date."

PVC roofing membranes contribute to buildings' insulation and energy-efficiency, and can help the development of urban agriculture and vertical gardening.

CHALLENGE 3

SUSTAINABLE USE OF ADDITIVES:

"We will review the use of PVC additives and move towards more sustainable additive systems."

1. Lead replacement in the EU-27 by end 2015 (extended to the EU-28 in 2014).

➤ **achieved**

2. Robust criteria for the 'sustainable use of additives' to be developed, with status report by end 2012.

➤ **achieved in 2014**

3. Validation of the robust criteria for the 'sustainable use of additives' in conjunction with the downstream value chain, with status report by end 2014.

➤ **partially achieved**

4. Other PVC additive producers and the downstream value chain will be invited to participate in the 'sustainable additives' initiative.

➤ **ongoing**

Pb (LEAD) REPLACEMENT

By the end of 2015, ESPA members had completed the replacement of lead-based stabilisers in all their formulations sold in the EU-28 market.

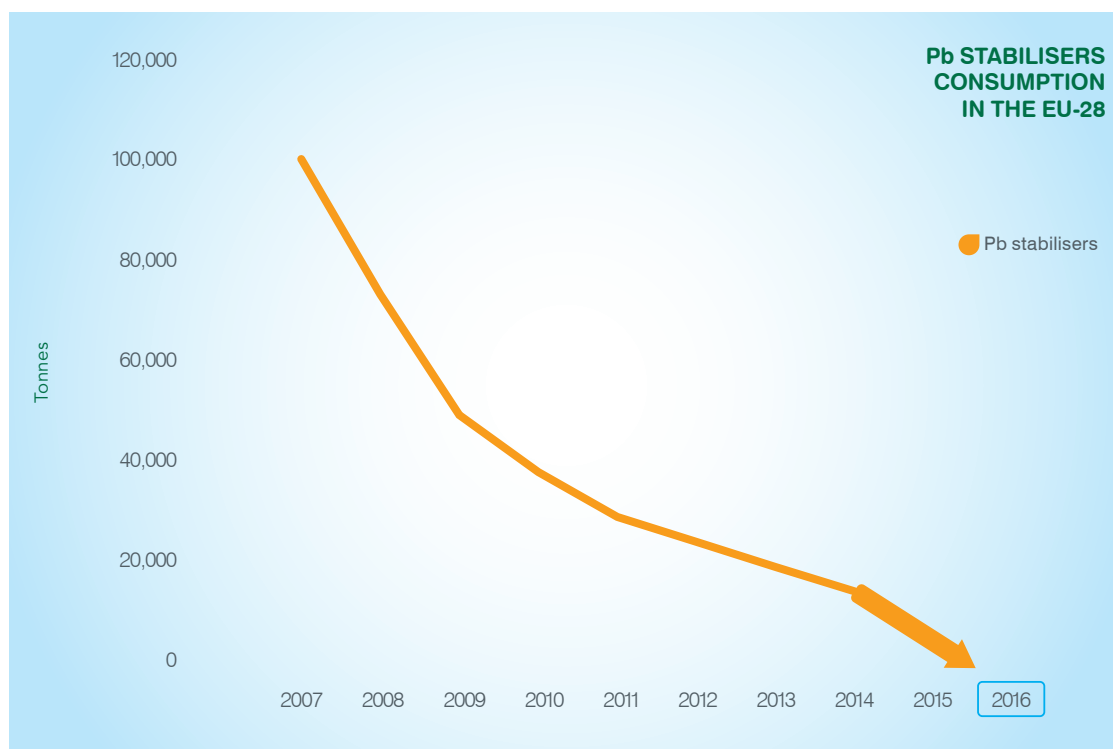
Hence, products made from virgin PVC resin by European converters will no longer contain lead as of 2016.

All ESPA members' CEOs have signed an official letter, confirming that their companies no longer place any lead-based stabiliser on the EU-28 market for use in PVC as of 31 December 2015. ESPA members are in the process of opening their books to an external auditor to document the effective completion of the substitution.

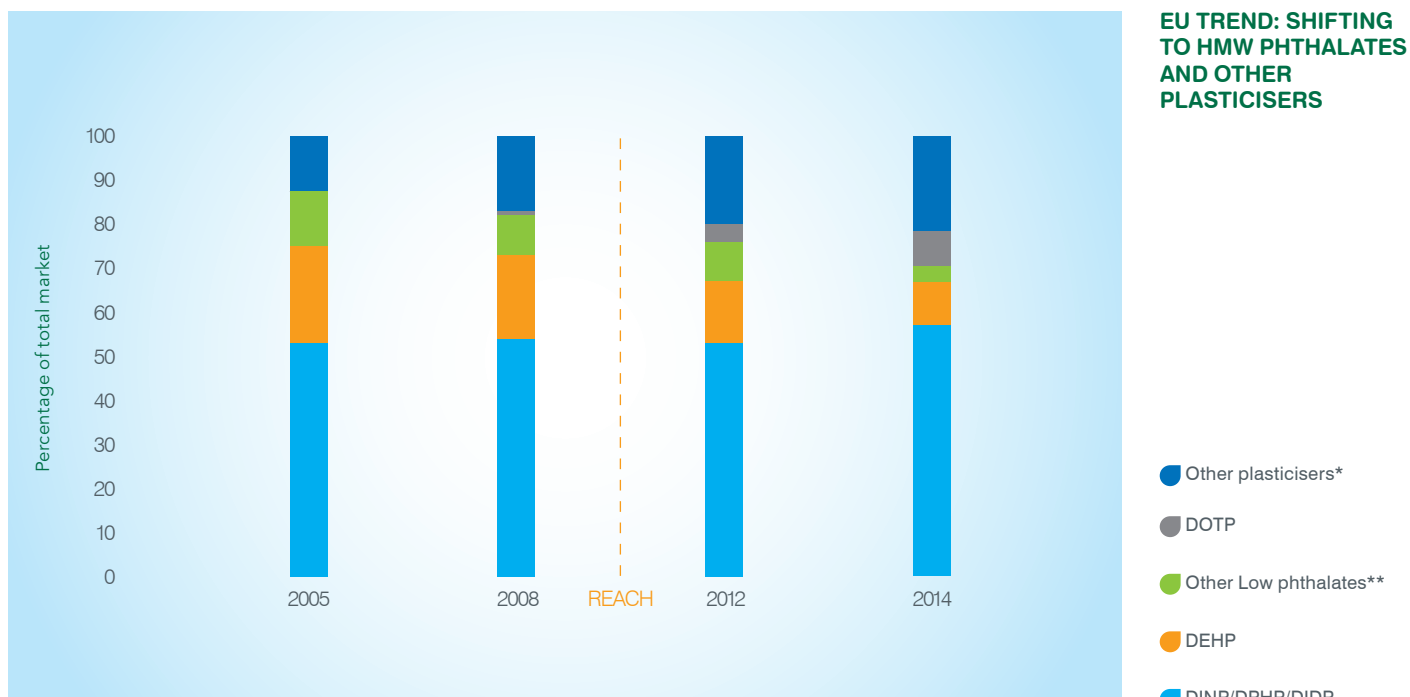


PHOTO: COURTESY OF PVC4PIPES

The replacement of lead stabilisers in PVC pipes by TEPPFA members was completed in 2012.



Source: ESPA



PLASTICISERS

The European plasticisers market continues to reflect regulatory changes. The market share of High Molecular Weight Ortho-phthalates and other plasticisers is growing rapidly as they replace DEHP.

Studies and Research

An epidemiology study, commissioned by ECPI and carried out by Maastricht University (www.maastrichtuniversity.nl), was completed and submitted for publication. The study examined the reliability of scientific papers that report an association between phthalate exposure and health effects such as obesity, asthma and reduced fertility. The LCA study on DINP, commissioned by ECPI and finalised by the consultancy PE INTERNATIONAL²⁸ in 2014, was validated by Denkstatt²⁹ in 2015. The LCA and the DINP eco-profile have been published and are available for use by the supply chain.

In 2015, ECPI worked with renowned independent consultants to develop a Weight of Evidence³⁰ methodology to assess the classification and labelling of DINP, DCHP and DnHP. Key conclusions show that DINP does not warrant any classification.

REACH Authorisation

In September 2014, ECHA's³¹ Committees for Risk Assessment (RAC) and Socio-economic Analysis (SEAC) expressed their support for authorising companies that applied for Authorisation to continue to use DEHP in both virgin and recycled PVC and DBP in specific applications³².

Despite a thorough evaluation and favourable opinions from the RAC and SEAC, in November 2015 the EU Parliament adopted a motion opposing the Commission's proposal to authorise recycling of soft PVC containing DEHP. A final decision should be taken by the European Commission.



Colourful, recyclable, easy to clean and hygienic, PVC is the ideal material for public buildings' flooring.

²⁸ PE INTERNATIONAL: sustainability consultancy (www.pe-international.com)

²⁹ Denkstatt: sustainability consultancy (www.denkstatt-group.com)

³⁰ Weight of Evidence (WoE): a quantitative method for combining evidence in support of a hypothesis

³¹ ECHA: European Chemicals Agency (<http://echa.europa.eu>)

³² <http://echa.europa.eu/addressing-chemicals-of-concern/authorisation/applications-for-authorisation-previous-consultations>

National Regulatory Updates

The evaluation and Risk Management Option Analysis (RMOA) conducted by the French authorities on DINCH and DOTP concluded that no danger or risk is identified under REACH; therefore, no additional risk management measures are needed.

In 2014, the European Commission and Member States endorsed a four-year re-evaluation showing no risk for DINP and DIDP in all current consumer applications³³. In spite of this, Denmark in 2015 communicated to ECHA its intention to submit a dossier proposing that DINP be classified as a reproductive agent under the CLP Regulation. The plasticisers industry will participate in a public consultation expected in 2016, bringing robust scientific evidence to support the conclusion that such classification is not justified.

Nearly 4,000 tonnes of PVC flooring were recycled in 2015 in the framework of VinylPlus, a 19% increase on the previous year.



PHOTO: COURTESY OF RENOLIT

CRITERIA FOR THE SUSTAINABLE USE OF ADDITIVES

EPD_{plus} is an approach and methodology developed by VinylPlus to evaluate the use of substances utilised as additives in PVC products from the perspective of sustainable development. It integrates the current standard Environmental Product Declarations (EPDs) with TNS criteria for sustainability. One EPD_{plus} for a building and construction PVC application was finalised in early 2015.

The EPD_{plus} evaluation methodology will be further developed by the dedicated Task Force with the close cooperation of all stakeholders, and will be aligned with the EU Product Environmental Footprint (PEF) concept when the latter is established, integrating it with the additional elements on which EPD_{plus} stands.

Additive producers continued to provide converter associations with the most recent data to help them update their LCAs and EPDs. In 2015, ESPA completed LCAs for two of its main family of calcium-based stabilisers, and it will continue to develop additional LCAs for the remaining families of stabilisers. ECPI published an LCA for DINP. An update of LCAs and EPDs is now foreseen for other families of additives, such as lubricants and flame retardants.



PHOTO: COURTESY OF TARKETT

In August 2015, the Swedish Chemicals Agency submitted a dossier proposing that DCHP be identified as a substance of very high concern (SVHC). The dossier was subsequently withdrawn, but is expected to be re-submitted in 2016.

³³ A restriction is maintained on toys and childcare articles that can be put in the mouth. For further information: 'Evaluation of new scientific evidence concerning DINP and DIDP' (<http://echa.europa.eu/documents/10162/31b4067e-de40-4044-93e8-9c9ff1960715>)

CHALLENGE 4

SUSTAINABLE USE OF ENERGY AND RAW MATERIALS:

"We will help to minimise climate impacts through reducing energy and raw material use, potentially endeavouring to switch to renewable sources and promoting sustainable innovation."

1. Establish Energy Efficiency Task Force by end 2011.
➤ **achieved**

2. PVC resin producers to reduce their specific energy consumption, targeting 20% by 2020.

3. Define targets for specific energy reduction for converters by end 2012.
➤ **partially achieved**

4. Energy Efficiency Task Force to recommend suitable environmental footprint measurement by end 2014.
➤ **delayed** (waiting for the EU PEF pilot phase results)

5. Establish Renewable Materials Task Force by end first Quarter 2012.
➤ **achieved**

6. Renewable Materials Task Force's status report by end 2012.
➤ **achieved**

ENERGY EFFICIENCY

PVC resin producers are committed to reducing their energy consumption for the production of EDC, VCM and PVC, targeting a 20% reduction by 2020. As reported in 2015, the results of the first verification showed that the energy needed to produce a tonne of PVC had decreased by an average of 10.2%. On this basis, the Energy Efficiency Task Force confirmed the target for PVC resin producers by 2020 as part of the VinylPlus mid-term review.

Tests to evaluate the energy consumption of some converter companies continued in 2015. Due to significant differences in the converters' plants and production processes, in several cases separate data could not be collected for PVC and other products. A first analysis and evaluation of the available data is foreseen in Q1 2016.

SUSTAINABLE FOOTPRINT

In November 2015, TEPPFA participated in the 'Mid-term Conference on the Environmental Footprint Pilot Phase'³⁴. The conference was organised by the European Commission's DG Environment, and TEPPFA shared and discussed feedback from the

pilot phase of the product group 'hot and cold water pipe systems'. The VinylPlus Task Force will continue to monitor the development of the European Commission's Product Environmental Footprint (PEF) scheme. Completion of the PEF pilot phase is expected in 2017.

RENEWABLE RAW MATERIALS

Following the publication of the 'VinylPlus Status Report on Renewables'³⁵ in May 2015, the Renewable Materials Task Force confirmed that no further actions were required on renewable raw materials, and that this target could be considered for now as complete but any new developments would be monitored, especially those outside Europe. Technical solutions exist to produce PVC and many additives from renewable resources. The barriers are economics and availability, both subject to market forces extending well beyond the PVC industry. It is also useful to remember that, even though PVC is based on a non-renewable resource, its long life and closed-loop management help to ensure resource efficiency and environmental gains.



PVC roofing membranes were used to insulate the 5,000 m² roof of the Rotterdam Markthal.

³⁴ http://ec.europa.eu/environment/eussd/smgp/conference_2015_en.htm

³⁵ http://www.vinylplus.eu/uploads/docs/Report_on_Renewable_Raw_Materials.pdf

CHALLENGE 5

SUSTAINABILITY AWARENESS:

"We will continue to build sustainability awareness across the value chain – including stakeholders inside and outside the industry – to accelerate resolving our sustainability challenges."

- | | | |
|---|--|--|
| <p>1. VinylPlus web portal to go online in summer 2011.
➤ achieved</p> | <p>2. VinylPlus Monitoring Committee, which will meet a minimum of twice a year, will be established by end 2011.
➤ achieved</p> | <p>3. A VinylPlus Membership Certificate will be launched end 2011.
➤ achieved</p> |
| <p>7. ECVN will take an active role in promoting VinylPlus within international PVC industry organisations worldwide.
➤ ongoing</p> | <p>8. ESPA stabiliser producers will actively promote VinylPlus outside the EU-28.
➤ ongoing</p> | <p>9. VinylPlus will increase the number of programme participants by 20% compared to 2010 by end 2013.
➤ not achieved</p> |
| | | <p>10. VinylPlus will engage with five global brand holders by end 2013.
➤ partially achieved</p> |
| | | <p>11. A review of progress towards the globalisation of the approach will be undertaken by end 2015.
➤ achieved</p> |



Anti-graffiti PVC films for facades facilitate buildings' maintenance.

INDEPENDENT MONITORING

The VinylPlus Monitoring Committee (see p. 5) is the independent body ensuring the programme's transparency, credibility and accountability. Chaired by Professor Alfons Buekens, it currently includes representatives from the European Commission, the European Parliament, trade unions and consumer associations, as well as representatives from the European PVC industry. The Committee met formally twice in 2015, in April and in November.

To ensure maximum transparency, the minutes of each Monitoring Committee meeting are published on the VinylPlus website (www.vinylplus.eu) after formal approval at the following meeting.

ANNUAL REPORTING

The Progress Report 2016 has been independently verified by SGS, while tonnages of PVC waste recycled and expenditures have been audited and certified by KPMG. The Natural Step made a commentary on the overall work and progress of VinylPlus.

EXTERNAL STAKEHOLDER DIALOGUE AND COMMUNICATIONS

VinylPlus is committed to building sustainability awareness along the value chain and among stakeholders both inside and outside the industry.



The 2nd Partnering for VinylPlus Communication Event was held in Brussels in March 2015 to share best practices and a common vision for VinylPlus communications. It was attended by 30 representatives of the VinylPlus Communications Committee, the PVC Network and Sector Groups linked to VinylPlus.

It is also committed to frank and open dialogue with all stakeholders, third parties, institutions and organisations in technical, political and social communities.

The 3rd stakeholder meeting organised by VinylPlus took place in Copenhagen, Denmark, in September 2015. The objective was to discuss in depth the role of PVC in the circular economy with influential Danish stakeholders. The main topic was controlled-loop management of PVC waste, including the key issue of legacy additives. The meeting, facilitated by TNS, was attended by about 20 representatives of the Danish EPA, the City of Copenhagen, environmental NGOs, academia, leading Scandinavian construction companies and the waste sector. It gave VinylPlus valuable input and greater insight into stakeholders' perspective on the circular economy.

In 2015, VinylPlus published three new brochures: 'On the Road to Sustainability: The ongoing Progress

of VinylPlus'³⁶, highlighting how the European PVC value chain managed to become a role model for achieving sustainable change in industry; 'How Regulation & Industry Innovation Have Eliminated Dioxins Emissions from PVC Production & Waste Incineration'³⁷, showing that PVC is not an issue in modern municipal solid waste incinerators; and 'How Acid Gases from PVC Energy Recovery are Neutralized'³⁸, outlining how hydrogen chloride is neutralised in modern incinerators.

A set of criteria for a VinylPlus product label certification scheme was finalised. The feasibility of its implementation is under review.

Engaging Globally

As part of the commitment to promote its approach to the worldwide PVC industry, in April VinylPlus contributed to Vinyl India® 2015, the 5th International PVC & Chlor-Alkali Conference in Mumbai. VinylPlus made a presentation on the European PVC industry

"The post-2015 Sustainable Development Goals (SDGs) and climate commitments will offer a new narrative for industry: sharing prosperity and respecting the environment. As a member of the Green Industry Platform, the Vinyl Industry can actively contribute to the global sustainability agenda through its continuous efforts to reduce its environmental and climate footprint and to develop new green products, services and jobs that will support a more sustainable world."

CHRISTOPHE YVETOT
UNIDO



³⁶ <http://www.vinylplus.eu/documents/39/57/The-Ongoing-Progress-of-VinylPlus>

³⁷ <http://www.vinylplus.eu/documents/37/57/How-Regulation-and-Industry-Innovation-Have-Eliminated-Dioxin-Emissions-from-PVC-Production-and-Waste-Incineration>

³⁸ <http://www.vinylplus.eu/documents/38/57/How-Acid-Gases-from-PVC-Energy-Recovery-are-Neutralised>



"UNEP welcomes all Sector initiatives such as VinylPlus, which recognize the challenges, set targets, engage stakeholders and demonstrate progress. 2015 will set the sustainability agenda through 2030 and beyond. No matter how you react, the trends that are driving the planet are driving the market. The private sector can see this as a new set of regulations, restrictions and red tape, or as a historic, immediate opportunity to innovate, grow new markets, and build new relationships with customers and other stakeholders to help society meet the challenge of change. UNEP stands ready to work with those visionaries."

ARAB HOBALLAH
UNEP

and its sustainability programme. The conference attracted more than 650 participants representing 335 companies from 15 countries.

VinylPlus also continued to actively share experience, knowledge and best practices with the other regional PVC associations in the GVC (Global Vinyl Council). In 2015 the GVC's bi-annual meetings were organised in Cannes, France in April and in Tokyo, Japan in October.

United Nations

The VinylPlus Voluntary Commitment was included in the Rio+20 Registry of Commitments³⁹ in 2012. Since November 2013, VinylPlus has been a member of the Green Industry Platform (GIP), the global high-level, multi-stakeholder partnership led by the United Nations Industrial Development Organization (UNIDO) and the United Nations Environment Programme (UNEP).

In 2015, Christophe Yvetot, UNIDO Representative to the EU, and Arab Hoballah, Chief of Sustainable Lifestyles, Cities and Industry of UNEP, participated as keynote speakers in the Vinyl Sustainability Forum.

Stakeholders Events, Conferences and Exhibitions

In March, VinylPlus contributed to the PVC Formulation 2015⁴⁰ conference in Cologne, Germany, with a speech

on 'The PVC industry in Europe and sustainable development'. The event showcased the latest innovations in PVC resins, vinyl compounds and additives, as well as market trends.

In March also, the Chairman of the Controlled-Loop Committee presented 'PVC cables – a clear demonstration of the circular economy' at the Cable 2015 conference, in Cologne, Germany.

With the theme 'More Vinyl, Less Carbon', the 3rd Vinyl Sustainability Forum in April 2015 in Cannes, France, brought together around 130 stakeholders from academia, government bodies, the UN, the European Commission, NGOs, retailers and all sectors of the PVC industry. Discussion focused on how the VinylPlus Voluntary Commitment is contributing to address climate change, by improving energy and resource efficiency and product sustainability, and moving the European PVC industry towards a circular economy; and how PVC products can contribute to reducing CO₂ emissions.

In October, VinylPlus participated in the Brussels Sustainable Development Summit 2015 organised by VITO. It contributed a poster and an oral presentation on 'Moving the European PVC industry towards a low-carbon circular economy' in a session dedicated to 'Innovative value chains for sustainable process industry'.

³⁹ <http://www.uncsd2012.org/index.php?page=view&type=1006&menu=153&nr=91>

⁴⁰ <http://www.amiplastics-na.com/Events/Resources/Programme/PVC%20Formulation%202015%20Programme.pdf>

VINYLPLUS JOINT COMMUNICATIONS PROJECTS

Each year VinylPlus co-funds a range of projects with the aim of expanding the scope of its communications activities. Ten projects⁴¹ were implemented in 2015 by four European industry sector federations and three national PVC associations.

PVC RECYCLERS MEET PVC CONVERTERS

Raise awareness of existing PVC recycling activities and create demand for further recycling, presenting VinylPlus recycling activities and national project partners such as AgPR⁴², EPCoat, KRV⁴³, Rewindo and Roofcollect®.

PHOTO: COURTESY OF AGPU

*Project led by AGPU⁴⁴
Geographic scope: Germany*



ENERGY- AND RESOURCE-EFFICIENT PRODUCTS FOR PUBLIC PROCUREMENT

Promotion of PVC products as sustainable solutions in public procurement by demonstrating their energy- and resource-efficiency and low whole-life cost.

PHOTO: VINYLPLUS

*Project led by AGPU
Geographic scope: Germany*



CREATING AWARENESS ALONG THE VALUE CHAIN

Support for PVC Forum Italia⁴⁵ member companies to communicate the progress made towards PVC sustainability and the importance of the Voluntary Commitment. This was carried out in a format integrated into member companies' communications, aiming to sensitise their employees and sales forces, as well as customers and installers.

PHOTO: COURTESY OF GUIDA FINESTRA

*Project led by PVC Forum Italia
Geographic scope: Italy*



MEDIA FIELD TRIP: LEARNING ABOUT THE BENEFITS OF FLEXIBLE PVC

Promotion of VinylPlus' and ECPI's commitment to sustainability through a media trip for European trade journalists. The project aims to give first-hand insights into the flexible PVC value chain. In 2015, ECPI visited Griffine's converting plant and CIFRA's and CHAIZE Environnement's recycling facilities, in France. Journalists could learn about the benefits that flexible PVC brings to everyday life with a variety of safe and high-performance applications having multiple lives. The event led to broad media coverage.

PHOTO: COURTESY OF ECPI

*Project led by ECPI
Geographic scope: EU*



BRAND HOLDERS: BUILDING A DIALOGUE WITH KEY STAKEHOLDERS

Promotion of the VinylPlus sustainability programme and the plasticisers industry's contribution through open dialogue with key European brand holders and retailers.

PHOTO: COURTESY OF ECPI

*Project led by ECPI
Geographic scope: EU*



⁴¹ <http://www.vinylplus.eu/community/communications-projects/2015-2>

⁴² AgPR: Association for the Recycling of PVC Floor-Coverings (www.agpr.de)

⁴³ KRV: the German plastic pipe industry association (www.krv.de)

⁴⁴ AGPU: Arbeitsgemeinschaft PVC und Umwelt – the German association of the PVC value chain (www.agpu.com)

⁴⁵ PVC Forum Italia: the Italian association of the PVC value chain (www.pvcforum.it)

CHALLENGE 5



TEPPFA ROAD SHOWS, EVENTS, E-MAGAZINE

Campaign to communicate the use of PVC recyclates in pipe systems to customers, governments and specifiers. Events included the TEPPFA Forum 2015 in April in Brussels, Belgium, where 200 delegates discussed the sustainability of PVC pipes.

PHOTO: COURTESY OF TEPPFA

*Project led by TEPPFA
Geographic scope: EU*



COMMUNICATING PVC BUILDING PRODUCTS' SUSTAINABILITY CREDENTIALS TO LOCAL AUTHORITIES & HOUSING ASSOCIATIONS

Promotion of PVC to procurement professionals and decision-makers at private sector housing associations, private sector construction companies and private sector DIY (do-it-yourself) retailers.

PHOTO: COURTESY OF BPF

*Project led by BPF
Geographic scope: UK*



INTERACTIVE ONLINE TOOL FOR INFORMATION ABOUT PVC PIPES

Launch of an interactive application on PVC pipes' green credentials: sustainability, long life, recyclability and energy efficiency.

*Project led by PVC4Pipes⁴⁶
Geographic scope: EU*



GREEN ACADEMY – ENJOY THE RAIN

An example of sustainable design with recycled PVC for water preservation and conservation.

A joint project of VinylPlus and PVC Forum Italia, in collaboration with the Domus Academy of Milan.

PHOTO: COURTESY OF DOMUS ACADEMY

*Project led by PVC Forum Italia
Geographic scope: Italy*



THE PVC STABILISER INDUSTRY'S JOURNEY TO LEAD SUBSTITUTION

Showcasing the PVC stabiliser industry's work in successfully replacing lead-based stabilisers and developing more sustainable alternatives in the EU-28 as part of the VinylPlus programme.

*Project led by ESPA
Geographic scope: EU*

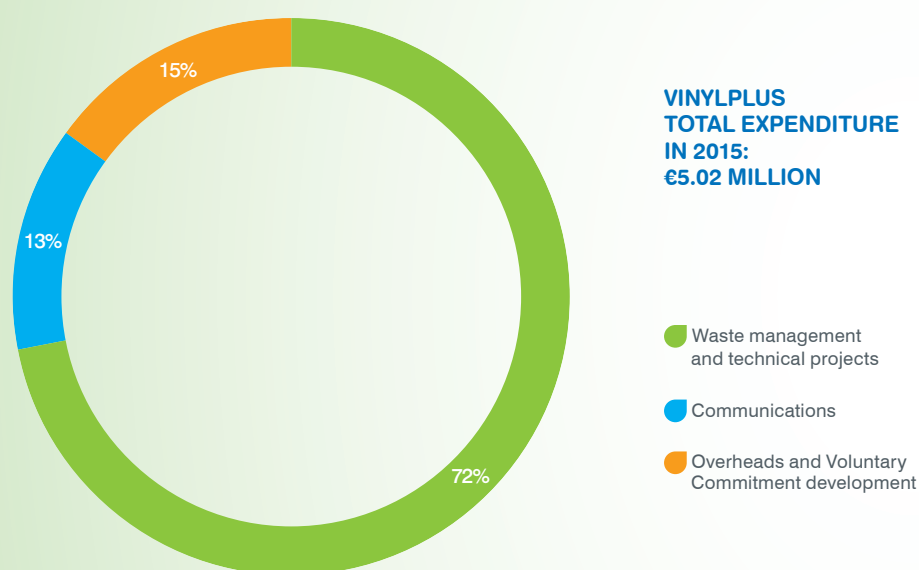


VinylPlus' Twitter account – @VinylPlus_EU – became more effective and increased its number of followers. It became a valuable tool for dialogue over the Voluntary Commitment and sustainable development in general.

FINANCIAL REPORT

In 2015, further savings were made through reorganisation and gains in efficiency, especially in the Recovinyl scheme, but also in sectoral initiatives.

Expenditure by VinylPlus for 2015, including EuPC and its members, amounted to €5.02 million.



WASTE MANAGEMENT AND TECHNICAL PROJECTS <small>FIGURES IN €1,000s</small>	TOTAL EXPENDITURE INCLUDING EUPC AND ITS MEMBERS	
	2014	2015
EPCoat	198	167
EPFLOOR & flooring projects	570	577
EPPA	413	339
ERPA – Pack upgrade	-42*	0
PlasticsEurope France Blister	11	0
ESWA/Roofcollect®	139	101
Recovinyl	2,100	1,761
Studies, start-up & pull concept	75	43
TEPPFA	807	578
EATS (Automotive trimmings recovery)	14	6
Ebene (Furniture recycling)	15	19
Medical applications recycling	20	46
Resysta® consortium	0	10
TOTAL PROJECTS	4,319	3,645

* Reversal of accrual made in 2013

VERIFICATION STATEMENTS

KPMG CERTIFICATION OF EXPENDITURE

Independent Accountants' Report on Applying Agreed-Upon Procedures

To the Management of VinylPlus

We have performed the procedures agreed with you and enumerated below with respect to the costs of the supported charges for the different projects of VinylPlus, as included in the VinylPlus Progress Report for the period from January 1st 2015 to December 31st 2015 prepared by the management of VinylPlus.

Scope of Work

Our engagement was carried out in accordance with:

- International Standard on Related Services ('ISRS') 4400 *Engagements to perform Agreed-upon Procedures regarding Financial Information* as promulgated by the International Federation of Accountants ('IFAC');
- the *Code of Ethics for Professional Accountants* issued by the IFAC. Although ISRS 4400 provides that independence is not a requirement for agreed-upon procedures engagements, you have asked that we also comply with the independence requirements of the *Code of Ethics for Professional Accountants*.

We confirm that we belong to an internationally-recognized supervisory body for statutory auditing.

VinylPlus' management is responsible for the overview, analytical accounting and supporting documents. The scope of these agreed upon procedures has been determined solely by the management of VinylPlus. We are not responsible for the suitability and appropriateness of these procedures.

Because the procedures performed do not constitute either an audit or a review made in accordance with International Standards on Auditing or International Standards on Review Engagements, we do not express any assurance on the cost statement.

Had we performed additional procedures or had we performed an audit or review of the financial statements in accordance with International Standards on Auditing or International Standards on Review Engagements other matters might have come to our attention that would have been reported to you.

Sources of Information

This report sets out information provided to us by the management of VinylPlus in response to specific questions or as obtained and extracted from VinylPlus information and accounting systems.

Procedures and Factual Findings

- a. Obtain the breakdown of costs declared in the table presenting the supported charges for the different projects of VinylPlus, as included in the VinylPlus Progress Report related to the activities of the year 2015 and verify the mathematical accuracy of this.

The total expenses amount to KEUR 5,021.

We found no exceptions as a result of applying this procedure.

- b. Verify that these costs are recorded in the financial statements 2015 of VinylPlus AISBL.

We found no exceptions as a result of applying this procedure.

- c. For projects EPFLOOR and ESWA, for all individual expenses greater than EUR 100, agree these expenses to the supporting document and verify that they were incurred between January 1st 2015 and December 31st 2015.

We found no exceptions as a result of applying this procedure.

- d. For projects EPFLOOR and ESWA, for all individual expenses greater than EUR 100, verify that these expenses are recorded in the accounts of the contractor no later than December 31st 2015.

We found no exceptions as a result of applying this procedure.

- e. For project Recovinyi, reconcile costs declared in the table presenting the supported charges for the different projects of VinylPlus with the income recognized in financial statements of Recovinyi AISBL.

We found no exceptions as a result of applying this procedure.

- f. For project not covered by the above procedures, obtain confirmation of costs from legal entity managing or contributing to the project.

We found no exceptions as a result of applying this procedure, which represents 16.21% of total expenses.

Note that financial statements of VinylPlus AISBL, TEPPFA AISBL, Recovinyi AISBL and EuPC AISLB of which EPFLOOR is a sector group are certified by KPMG.

Use of this Report

This report is intended solely for the information and use of the management of VinylPlus board, and is not intended to be and should not be used by anyone other than these specified parties.

KPMG Réviseurs d'Entreprises SCRL civile

Represented by



DOMINIC ROUSSELLE,

Réviseur d'Entreprises

.Mont-Saint-Guibert, March 18th 2016

KPMG LIMITED REVIEW OF TONNAGES

KPMG Bedrijfsrevisoren – Réviseurs d'Entreprises, a Belgian civil CVBA/SCRL

Report of the independent expert concerning the work performed with regard to the tonnages of recycled PVC by initiatives of the sector groups EPFLOOR and EPPA of the EuPC, by the sector associations ESWA and TEPPFA of the EuPC, by IVK/EPCoat and by Recovynyl Inpa during the period January 1st 2015 to December 31st 2015.

In accordance with the assignment, which was entrusted to us by VinylPlus, we give an overview of our work performed with regard to the following tonnages for the different projects of VinylPlus mentioned in the VinylPlus Progress Report related to the activities of the year 2015.

The conclusions of this work performed are summarized in the below-mentioned overview:

PROJECT	TYPE OF PVC	TONNAGE RECYCLED IN 2014	TONNAGE RECYCLED IN 2015
IVK/EPCoat (incl. Recovynyl)	Coated fabrics	8,941*	10,853*
EPFLOOR	Flooring	3,314*	3,938*
EPPA (incl. Recovynyl)	Window profiles & profile related PVC	203,962**	232,757**
ESWA – ROOFCOLLECT and Recovynyl	Flexible PVC	96,536 tons which consist of:	87,537 tons which consist of:
ESWA – ROOFCOLLECT	Flexible PVC	4,045*	3,249*
Recovynyl	Flexible PVC applications	92,491**	84,289**
TEPPFA (incl. Recovynyl)	Pipes & fittings	55,225	49,412**
ERPA via Recovynyl (incl. CIFRA and Pack-Upgrade Project)	Rigid PVC film	20,214**	24,371**
Recovynyl (incl. Vinyloop Ferrara)	Cables	92,826	106,044
TOTAL		481,018	514,913

* Tonnage including Norway and Switzerland

** Tonnage including Switzerland

The persons responsible for establishing the table presenting the supported tonnages for the different projects of VinylPlus have provided us with all explanations and information which we required for our assignment. Based on our work performed with regard to the provided information, we believe that

all PVC that was taken into account was recycled PVC, according to the VinylPlus Sector Definitions of Recycling and we have not recognized any elements which are of nature to influence significantly the presented information.

KPMG Réviseurs d'Entreprises SCRL civile

Represented by



DOMINIC ROUSSELLE,

Réviseur d'Entreprises

Mont-Saint-Guibert, March 18th 2016

SGS INDEPENDENT VERIFICATION STATEMENT ABOUT THIS VINYLPLUS PROGRESS REPORT 2016

Established in 1878, SGS is the world's leading inspection, verification, testing and certification company. We are recognized as the global benchmark for quality and integrity. With more than 80,000 employees, we operate a network of more than 1,650 offices and laboratories around the world.

SGS was commissioned by VinylPlus to provide an independent verification of the "Progress Report 2016". This report presents the commitments and achievements made by the VinylPlus project in 2015.

The purpose of the verification was to check the statements made in the report. SGS was not involved in the preparation of any part of this report or the collection of information on which it is based. This verification statement represents our independent opinion.

Verification Process

The verification consisted of checking whether the statements in this report give a true and fair representation of VinylPlus' performance and achievements. This included a critical review of the scope of the Progress Report and the balance and the unambiguity of the statements presented.

The verification process included the following activities:

- Desktop review of project-related material and documentation made available by VinylPlus such as plans, agreements, minutes of meetings, presentations, technical reports and more.
- Communication with VinylPlus personnel responsible for collecting data and writing various parts of the report, in order to discuss and substantiate selected statements.
- Communication with some members of the Monitoring Committee.

The verification did not cover the following:

- The underlying data and information on which the desk-top review documentation is based.
- The tonnage of PVC waste recycled (verified by KPMG).
- The chapter Financial Report (verified by KPMG).
- The chapter KPMG Certification of Expenditure.
- The chapter KPMG Limited Review of Tonnages.

Verification Results

Within the scope of our verification, VinylPlus has provided objective evidence of its performance in relation with its commitments in the VinylPlus programme.

It is our opinion that this "Progress Report 2016" represents VinylPlus' performance in 2015 in a reliable way; this report reflects the effort of VinylPlus to comply with its new Voluntary Commitments of June 2011.

IR PIETER WETERINGS

SGS Belgium NV
Certification Manager
Certification and Business Enhancement
18 March 2016



TNS COMMENTARY

ON VINYLPLUS PROGRESS REPORT FOR 2015

The Natural Step acts as an external advisor, stakeholder intermediary and capacity builder to VinylPlus, advocating for sustainability. We comment here upon the big picture context, progress and forward outlook at the mid-way point in the 10-year commitment.

A landmark year in a rapidly changing world

The year 2015 will be remembered as a breakthrough year for sustainable development. It was marked by some clear shifts in public awareness, calls for action from religious, political and business leaders and two global agreements – the COP21 Paris Climate Agreement and the launch of the UN Sustainable Development Goals (SDGs).

These signals point toward future markets that will be very different from those of today. The world is now starting to ask for more ambition and the opportunities for sustainable innovation are growing. At the same time, scientific evidence shows we need to move faster to avoid tipping points connected to “planetary boundaries”. We risk irreversibly pushing the world into a state dangerously unfavourable to civilization. Ills such as conflict, terrorism, inequality, corruption, mass migration and social discontent are all connected with each other, with ecological instability and with markets.

What does this mean for VinylPlus? Our hope is to put progress in context, offer encouragement on the roadmap and foster a renewed sense of urgency.

Step-wise progress to future-proof industry

All industries must work toward a common goal, aligned with the scientific requirements for sustainability, and track performance to close the gap. VinylPlus is a role model in this regard, as it seeks to align the PVC industry with the necessary system conditions for a sustainable society⁴⁷. This is about future-proofing business, a point that can easily be lost in the short-term perspective. It also offers a holistic model on how to become part of the circular economy.

By 2020, VinylPlus aims to have achieved targets related to the five key sustainability challenges of PVC. The vision should be kept in mind though, and the journey must continue. Economic conditions influence the progress but we can expect those who move faster will be better positioned for tomorrow's markets.

Our message is that VinylPlus is setting the frame for the industry of the future. We encourage all actors to use it to make coordinated step-wise progress together, to increase the pace, to ask for proactive governance, legislation and investment that supports the journey.

Reflections on progress after five years

During 2015 we provided input on VinylPlus' mid-term review of targets. We reflected upon the working principles, whether targets are being met, the expectations of stakeholders and the existing priorities. In our report to the VinylPlus Board we stated that despite some set-backs and delays, we believe VinylPlus is on track. It is living up to original promises overall, and remains a very effective leadership vehicle for an industry facing complex sustainability issues and a lingering trust deficit. Some really tough topics are now being dealt with (at least in Europe) in a much more open, honest and sensible manner e.g. dioxins. By being open about what is known and engaging others, VinylPlus managed to get beyond the rhetoric of this emotive issue and communicate clearly the limited extent of PVC's current contribution to this type of pollution and what can be done about it.

The review process also led to some deeper questions about the value of VinylPlus. Is this voluntary effort with all its costs and extra work really worthwhile? Is there enough enthusiasm for sustainability when industry faces tough economic challenges? Are companies using VinylPlus to deal with sustainability

⁴⁷<http://www.thenaturalstep.org/sustainability/the-system-conditions/>

questions, simply to avoid that responsibility themselves? Where is the business value for members? The conclusions remain very positive. Even if some parts of the industry and its various associations have been concerned it brings unnecessary attention to PVC, nonetheless VinylPlus is supported and seen by leaders in the industry as a serious contribution to their business strategy, values and ongoing success.

Highlights from 2015

This year's progress report reveals the extent of activity within VinylPlus, much of it at a technical level. In addition to the mid-term review we also wish to comment upon the following:

- new ground was covered during a consultation event with regulators, NGOs and academic stakeholders in Copenhagen concerning the Controlled-Loop Management of PVC and the potential for PVC in the circular economy. More such events are needed.
- the complete phase-out of lead from virgin PVC production in Europe is an historic achievement that deserves acknowledgement. It now needs to go global.
- the expansion of the PVC recycling scheme and growth in volumes show continued promise. Studies to understand waste projections and contextualize the targets added value. Questions remain about the economic impact of regulation of legacy additives on PVC recycling.

Looking ahead


We see some clear priorities that can help unlock further progress for industry via the VinylPlus programme:

Promoting innovation – More emphasis on exploring circular business models, rewarding materials innovation and stimulating design of solutions to minimize or avoid waste. Much effort has been on recycling existing waste streams but stakeholders also want to see a clear plan for the full controlled-loop management of PVC products in a circular economy (including guidance on appropriate applications).

EPDplus & measuring performance – Given the growing awareness of the effects of the use of chemicals in society, we repeat our call for “an industry-wide common process for evaluating additives (European but applicable globally) which is externally trusted”. The EPDplus concept holds promise but progress has been too slow and a credible and inclusive process is needed to take it forward.

VinylPlus Label & rewarding progress – The roll-out of the VinylPlus label for construction materials is important. Without systems to reward investment in improved performance it will not be possible for industry to credibly promote sustainable innovation.

Communication and outreach for industry sustainability – We would like to see more individual companies demonstrate progress and actively promote the goals of VinylPlus. Furthermore, we repeat our call for greater outreach, collaboration and internationalization.

 **LENA JOHANSSON,**
Project leader

 **RICHARD BLUME,**
Senior Advisor

 **DAVID COOK,**
Executive Ambassador

The Natural Step Stockholm
 The Natural Step

THE EUROPEAN PVC INDUSTRY

Polyvinyl chloride, or PVC, is one of the most widely used polymers in the world. Because it is so versatile, PVC is used extensively in a broad range of industrial, technical and everyday applications.

PVC is intrinsically a 'low carbon' plastic: 57% of its molecular weight is chlorine derived from common salt; 5% is hydrogen; and 38% is carbon. It consumes less primary energy in the manufacturing phase than other commonly used plastics. PVC is recyclable and is increasingly being recycled. The European PVC industry has been working hard to boost collection and improve recycling technologies.

Several recent eco-efficiency and LCA studies of major PVC applications have shown that in terms of energy use and GWP (Global Warming Potential), the performance of PVC is comparable to that of alternative products. In many cases, PVC applications showed advantages in terms of both lower total energy consumption and lower CO₂ emissions.

At the European level, the PVC value chain is represented by four associations:



THE EUROPEAN COUNCIL OF VINYL MANUFACTURERS

representing the five leading European producers of PVC resin, which account for around 70% of the EU-28 PVC resin production. These businesses operate around 40 different plants spread over 21 sites, and employ approximately 7,000 people.

www.pvc.org



EUROPEAN PLASTICS CONVERTERS

an association representing close to 50,000 companies in Europe, which produce over 45 million tonnes of plastic products of various types every year. They employ approximately 1.3 million people.

www.plasticsconverters.eu



THE EUROPEAN STABILISER PRODUCERS ASSOCIATION

representing 11 companies that produce more than 95% of the stabilisers sold in Europe. They employ directly more than 2,000 people in the EU.

www.stabilisers.eu



THE EUROPEAN COUNCIL FOR PLASTICISERS AND INTERMEDIATES

representing the five major European producers of plasticisers and intermediates. They employ approximately 1,200 people in plasticiser production.

www.plasticisers.org

GLOSSARY

ATBC	Acetyl tri-butyl citrate	EUPC	European Plastics Converters (www.plasticsconverters.eu)
BBP	Butyl benzyl phthalate	GHS	Globally Harmonised System of Classification and Labelling of Chemicals
B&C	Building and construction	GIP	Green Industry Platform (www.greenindustryplatform.org)
BPF	British Plastics Federation (www.bpf.co.uk)	HMW PHTHALATES	High Molecular Weight phthalates
CA	Calcium	INDUSTRY CHARTERS	ECVM Industry Charters for the Production of VCM and S-PVC (1995) and for the Production of E-PVC (1998)
CLP	European Regulation on Classification, Labelling and Packaging of chemical substances and mixtures. The legislation introduced throughout the EU a new system for classifying and labelling chemicals, based on the United Nations' Globally Harmonised System (UN GHS)	IVK EUROPE	Industrieverband Kunststoffbahnen e.V. (Association of Coated Fabrics and Films – www.ivk-europe.com)
DBP	Di-n-butyl phthalate	KPMG	KPMG is a global network of professional firms providing audit, tax and advisory services (www.kpmg.com)
DCHP	Di-cyclohexyl phthalate	LCA	Life Cycle Assessment
DEHP	Di(2-ethylhexyl) phthalate	LMW PHTHALATES	Low Molecular Weight phthalates
DIBP	Di-isobutyl phthalate	Pb	Lead
DIDP	Di-isodecyl phthalate	PEF	Product Environmental Footprint
DIOP	Di-isooctyl phthalate	PLASTICISERSPLUS	The ECPI's legal entity, based in Brussels, Belgium
DINCH	Di-isononyl cyclohexane dicarboxylate	PRE	Plastics Recyclers Europe (www.plasticsrecyclers.eu)
DINP	Di-isononyl phthalate	PVC	Polyvinyl chloride
DNEL	Derived no-effect level	P-PVC	Plasticised PVC
DnHP	Di-n-hexyl phthalate	RAC	Risk Assessment Committee
DOTP	Di-octyl terephthalate	REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
DPHP	Di(2-propyl heptyl) phthalate	RoHS	EU legislation restricting the use of hazardous substances in electrical and electronic equipment (RoHS Directive 2002/95/EC)
EC	European Commission	RoHS 2	The recast RoHS Directive 2011/65/EU (RoHS 2) entered into force on 21 July 2011
ECHA	European Chemicals Agency (http://echa.europa.eu)	R-PVC	Recycled PVC
ECPI	The European Council for Plasticisers and Intermediates (www.plasticisers.org ; www.ecpi.org)	SDS	Safety Data Sheet
ECVM	The European Council of Vinyl Manufacturers (www.pvc.org)	SDS-R	Safety Data Sheet for Recyclates
ECVM 2010	The ECVM's formal legal entity, registered in Belgium	SGS	Société Générale de Surveillance, the world's leading testing and verification organisation (www.sgs.com)
EDC	Ethylene dichloride or 1,2-dichloroethane	S-PVC	Suspension polyvinyl chloride
EPA	Environmental Protection Agency	SVHC	Substances of Very High Concern
EPCOAT	IVK Europe PVC Coated Fabrics Sector Project	TEPPFA	The European Plastic Pipes and Fittings Association, an EuPC sectoral association (www.teppfa.eu)
EPD	Environmental Product Declaration	TNS	The Natural Step (www.naturalstep.org)
EPFLOOR	European PVC Floor Manufacturers, an EuPC sector group (www.epffloor.eu)	UN	United Nations
EPPA	European PVC Window Profile and Related Building Products Association, an EuPC sectoral association (www.eppa-profiles.eu)	UNEP	United Nations Environment Programme
E-PVC	Emulsion polyvinyl chloride	UNIDO	United Nations Industrial Development Organization
ERPA	European Rigid PVC Film Association, an EuPC sectoral association (www.pvc-films.org)	VCM	Vinyl chloride monomer
ERFMI	European Resilient Flooring Manufacturers' Institute (www.erfmi.com)	VINYL 2010	the first 10-year Voluntary Commitment of the European PVC industry, signed in 2000
ESPA	The European Stabiliser Producers Association (www.stabilisers.eu)	WUPPI	Danish company set up to collect and recycle rigid PVC (www.wuppi.dk)
ESWA	European Single Ply Waterproofing Association, an EuPC sectoral association (www.eswa.be)		
EU	European Union		



Cover: Georges-Frêche School of Hotel Management, Montpellier, France

The new Georges-Frêche School of Hotel Management, in Montpellier, France, utilises particularly colourful examples of vinyl flooring, custom-developed by VinylPlus Partner Debolon Dessauer Bodenbeläge.

For their futuristic architectural concept, the Studio Fuksas architects wanted the 11,000 m² of vinyl floors to be in neon green, bright orange and magenta. The flowing visual appearance of the architecture made considerable demands on the façade, the supporting framework and the flooring.

Together with its functional characteristics of hygiene and safety, this is where vinyl flooring offered crucial advantages: it could be easily and flexibly adapted, both to the various spatial situations and to the specific wishes of the architects, in customised colour combinations.

Since the beginning of 2012, Debolon makes sustainable use of additives in its premium vinyl floors.

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