

Progress Report 2015

REPORTING ON 2014 ACTIVITIES

GHELAMCO ARENA

This Report summarises VinylPlus' progress and achievements in 2014 in each of the five sustainable development challenges identified for PVC in the Voluntary Commitment of the European PVC industry.

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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PVC pool floorings form a part of PVC pool vessels that are virtually impervious to rust and corrosion

2014 Year Highlights

VinylPlus is the renewed 10-year Voluntary Commitment to sustainable development by the European PVC industry. Developed through open dialogue with stakeholders, the VinylPlus programme is addressing five key sustainability challenges identified on the basis of The Natural Step (TNS) System Conditions for a Sustainable Society. The regional scope of the programme is the EU plus Norway and Switzerland.

Five key challenges have been identified based on The Natural Step System Conditions for a Sustainable Society.



CONTROLLED-LOOP MANAGEMENT

With 481,018 tonnes of PVC waste recycled in 2014, VinylPlus continues to progress toward its 2020 recycling targets. Taking into account the VinylPlus mid-term target review in 2015, the Controlled-Loop Committee is collecting updated best estimates of volumes to be recycled by 2020.

The most recent developments in waste regulation and their impact on 'legacy additives' are of major concern for the European PVC industry, as they might jeopardise the future of PVC recycling. In 2014, VinylPlus further strengthened its cooperation with the competent authorities, aiming to ensure that recycling can continue to grow and contribute more and more to the circular economy.

ORGANOCHLORINE EMISSIONS

The Task Force of experts continued its work assessing the risk of transporting major raw materials.

Certification systems were identified for ship, road and rail transport.

No transport accidents leading to vinyl chloride monomer (VCM) release were recorded in 2014.



SUSTAINABLE USE OF ADDITIVES

The use of lead-based stabilisers decreased by 86% in the EU-28 compared to 2007, progressing towards the target of completing their substitution by the end of 2015. European plasticiser producers continued to adapt their products to legislation and to the evolving demands of the market.

The Additives Task Force developed a new methodology to evaluate the use of substances utilised as additives in PVC products. This integrates the current standard Environmental Product Declarations (EPDs) with TNS criteria for sustainability. The new 'EPD^{plus}' approach was reviewed and discussed with external stakeholders at the '*Stakeholders Dialogue on Additives*' meeting hosted by VinylPlus in Austria in autumn 2014.



SUSTAINABLE USE OF ENERGY AND RAW MATERIALS

In 2014, the Energy Efficiency Task Force analysed ECVM member companies' energy consumption data for 2012-2013. This showed a decrease in the energy used to produce a tonne of PVC compared to the 2007-2008 baseline, which is well in line with the target of a 20% reduction by 2020.

The Sustainable Footprint Task Force continued monitoring the European Commission's Product Environmental Footprint (PEF) scheme, which is in its pilot phase.

The Renewable Materials Task Force's analysis of alternative, renewable resources for the production of PVC – including potential scenarios for the future – has been summarised in a detailed report.



SUSTAINABILITY AWARENESS

The second Vinyl Sustainability Forum – held in Rome, Italy, in May 2014 – explored the keys to successful collaboration between regional, national, European and international partners, in both the public and private sectors, as a way to best achieve long-term sustainable development goals.

European industry sector federations and national PVC associations also continued joint communications projects supported by VinylPlus in order to raise sustainability awareness.

The VinylPlus Product Label scheme, developed in close cooperation with BRE Global and TNS, was officially launched in May 2014.



Management and Monitoring

MANAGEMENT BOARD

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

VinylPlus Board

Mr Bernhard Borgardt – EuPC^{1(a)}

Mr Dirk Breitbach – EuPC (Compounding sector)

Mr Filipe Constant – ECVN 2010²

Mr Alexandre Dangis – EuPC

Dr Brigitte Dero – General Manager (ECVN 2010)

Mr Joachim Eckstein – Vice Chairman (EuPC)

Mr Stefan Eingärtner – Deputy General Manager

Dr Josef Ertl – ECVN 2010

Mr Rainer Grasmück – Treasurer (ESPA³)

Mr Andreas Hartleif – EuPC (Rigid PVC sector)

Mr Roberto Jacono – EuPC (Flexible PVC sector)^(b)

Mr Michael Kundel – EuPC^(c)

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)^(d)

Mr Geoffroy Tillieux – Controller (EuPC)

Dr Michael Träger – Chairman (ECVN 2010)

Mr Joachim Tremmel – PlasticisersPlus

Mr Christian Vergeylen – EuPC (Flexible PVC sector)^(e)

(a) Until July 2014

(b) Until September 2014

(c) Until April 2014 (permanent guest since July 2014)

(d) Since September 2014

(e) Since April 2014

MONITORING COMMITTEE

The Monitoring Committee is an independent body guaranteeing VinylPlus' transparency, participation and accountability. The Committee is open to external stakeholders and currently includes representatives from the European Commission, the European Parliament, trade unions and consumer associations, as well as representatives of the European PVC industry.

Chaired by Professor Alfons Buekens, the Monitoring Committee acts as an interface between VinylPlus and civil society, evaluating progress towards sustainable development and stimulating dialogue and interaction with third parties.

Members

Prof. Alfons Buekens – VUB⁵, Chairman of the Monitoring Committee

Mr Gwenole Cozigou – Directorate-General Enterprise and Industry, European Commission

Mr Alexandre Dangis – VinylPlus Board Member

Dr Brigitte Dero – General Manager of VinylPlus

Mr Joachim Eckstein – Vice Chairman of VinylPlus

Mr Rainer Grasmück – Treasurer of VinylPlus

Mr Sajjad Karim – Member of the European Parliament

Dr Godelieve Quisthoudt-Rowohl – Member of the European Parliament

Mr Jorma Rusanen – Senior Policy Officer, 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

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

² ECVN 2010: the formal legal entity of ECVN (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 formal legal entity of ECPI (The European Council for Plasticisers and Intermediates – www.plasticisers.org), based in Brussels, Belgium

⁵ VUB: Vrije Universiteit Brussel (Free University of Brussels – www.vub.ac.be)

⁶ IndustriAll: European Trade Union (www.industrial-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)

Foreword from the Chairman of VinylPlus

If I had to pick one theme that stood out in 2014, it would be cooperation and partnerships. Our industry awareness and capability to cooperate, dialogue and work in partnership with all interested stakeholders continued to grow, enhancing progress in all our sustainability challenges.

We strongly believe in partnerships as a way to achieve new perspectives, skills and knowledge, and to address issues and barriers. Indeed, the theme of our Vinyl Sustainability Forum 2014 was *'Enhancing the value of Partnerships'*. We were very pleased at the increased participation of stakeholders from outside the industry, as they contributed new experiences and ideas to the discussion, stimulating the PVC industry delegates in the dialogue on sustainability.

In our daily work for VinylPlus, we have confirmation that partnerships bring mutual benefits to all parties involved and that collaboration drives changes and innovation. We see this in the different projects by industry sectors and national networks. Involving a wide range of actors – from industry, research, government and beyond, they are developing new applications for recycled PVC, helping to collect greater quantities of waste, and finding ways to recycle PVC products that are difficult to treat.

Stakeholder consultation was fundamental in 2014 to progress on a methodology for evaluating the sustainable use of additives. The Additives Task Force last year released the new *'EPDplus'* approach, which integrates current standard Environmental Product Declarations with The Natural Step sustainability criteria. This approach was then reviewed and discussed at the *'Stakeholders Dialogue on Additives'*, and is expected to be finalised in 2015.

The VinylPlus Product Label scheme, developed in collaboration with TNS and BRE Global, was also finalised in 2014, and the first pioneering companies have already applied for label audits.

Our progress in 2014 was – as every year – possible only thanks to the dedication and hard work of people in the industry: the VinylPlus organisation, our partner and member companies, PVC Network, sectoral associations, task forces and working groups. During the year, I had the pleasure of meeting many of you, and I was always impressed by your steadfast commitment to our goals. Our Voluntary Commitment is not a side-job. It is an integral part of what our industry is. Combining these efforts with those of our stakeholders, we are steadily moving towards a true model of the circular economy.

While external recognition is growing for our industry's efforts, one area of continuing concern is regulation. The PVC industry is on track to achieve its recycling targets, but a restrictive interpretation of the end-of-waste policies could seriously impede recycling. In particular, the modifications of the hazardous waste regulations entering into force in June 2015 are a major concern. However, we are carrying out rigorous scientific work on this with the competent authorities, and we hope for a more balanced regulation, combining maximum safety with an increased potential for recycling.

2015 will be a busy and important year for VinylPlus. We will undertake the mid-term critical review of our targets, measuring and evaluating our initiatives up to now. This review process will give us the opportunity to place our sustainability programme in the context of ongoing socio-economic developments, for example the above-mentioned changes in waste legislations and economic developments along the value chain. The Advocacy Task Force set up in 2014 will help us in this demanding task.

Finally, I would like to welcome the 10 new VinylPlus partners who joined in 2014. Greater numbers will lead to greater achievements.



MICHAEL TRÄGER,
Chairman of VinylPlus

A. Träger



PHOTO: COURTESY OF POLYFLOR

CHALLENGE 1

Controlled-Loop Management:

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

TARGETS

1

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

2

Exact definitions and reporting concept to be available by end 2011.

> **achieved**

3

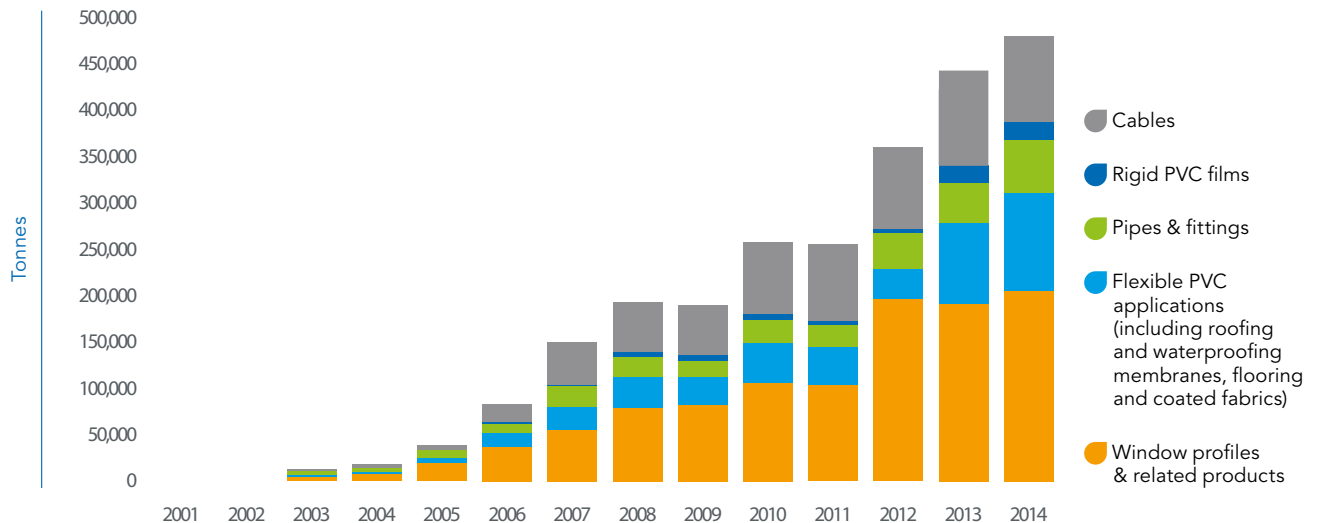
Develop and exploit innovative technology to recycle 100,000 tonnes/ year of difficult-to-recycle PVC material (within the overall 800,000 tonnes/ year recycling target) by 2020.

4

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

> **ongoing**

PVC RECYCLED WITHIN THE VINYL 2010 AND VINYLPLUS FRAMEWORKS



RECYCLING TARGET

With 481,018 tonnes of PVC waste recycled in 2014, VinylPlus continues to progress toward its recycling targets. Although nearly all European countries have improved their performance, the increase in volume was due in particular to the consolidation of the PVC profile recycling schemes in France and Poland, as well as to significant growth in flooring recycling in France.

Nevertheless, growing concerns have been expressed by recyclers and converters over uncertainties in the interpretation of relevant EU regulations (REACH⁹, CLP¹⁰ and Hazardous Waste), as these might jeopardise recycling activities and demand for recyclates in Europe.

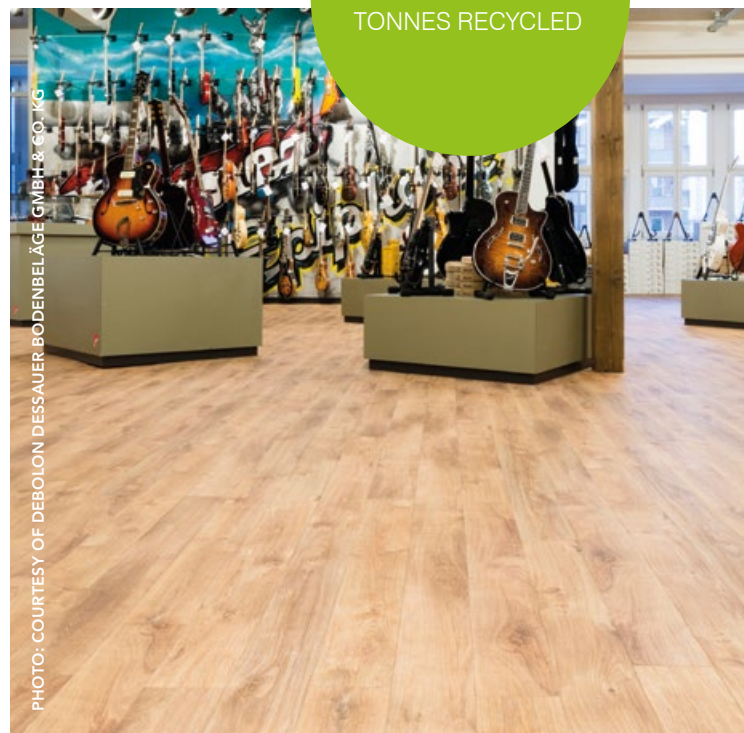
Recovinyl

Recovinyl's mission (www.recovinyl.com) is to stimulate and encourage the use of recycled PVC, by facilitating PVC waste collection and recycling in the framework of the Voluntary Commitment.

In 2014, Recovinyl further consolidated its network, which currently comprises 156 companies. It registered and certified 473,576 tonnes of recycled PVC.

Concerning rigid PVC, positive highlights of the year were new recyclers from France and Poland

481,018
TONNES RECYCLED



PVC floors offer improved living standards through better design and functionality

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>)



PHOTO: COURTESY OF PROFINE GMBH

PVC wall cladding is easy to install, makes ecological sense and is highly recyclable

joining the network, and a new project to collect pipes at specific distribution points. This was promoted by PUM Plastiques (www.pumplastiques.fr) in France, and could be replicated in other countries.

Nevertheless, despite the increase in total volumes, the market was negatively affected by the low price of incineration and higher logistics costs.

For flexible PVC, 2014 saw a significant increase in post-industrial flooring recycling. Unfortunately, uncertainties posed by regulations on the presence of legacy additives (DEHP) in recycled products, resulted in around 10,000 tonnes of flexible PVC lost for recycling. (For further information see www.vinylplus.eu)

Industry-Sector Projects for PVC Waste Management

Recycling volumes of windows and profiles continued to grow in 2014 and were in line with EPPA's¹¹ estimated sector target for 2020. A major contribution came from Rewindo¹², which recycled around 97,000 tonnes (reported as part of Recovinyl volumes) in Germany. Here also, the main challenge is the interpretation of incoming EU legislation on hazardous waste. If an exemption

for recycling is not granted, this could seriously compromise the prospects of achieving VinylPlus' recycling targets. Meanwhile, profiles recycling was promoted and supported through advocacy activities both at European level and at national level in Belgium and in Germany. (For further information see www.vinylplus.eu and www.eppa-profiles.eu).

In the framework of VinylPlus, TEPPFA¹³ members are committed to utilising 60,000 tonnes of recycled PVC in new pipe products and to trying to use a further 60,000 tonnes by 2020. The 2014 annual report by VITO¹⁴ stated that TEPPFA members used close to 81,000 tonnes of PVC recyclates in 2013, a 4.6% increase over 2012.

TEPPFA is continuing to work on the legacy additives issue together with VinylPlus and EuPC. The association carried out advocacy and communications activities in 2014, to promote quality PVC pipes and the use of recyclates in quality, long-life products.

EPDs have been finalised for all TEPPFA's most important product groups based on a life cycle assessment (LCA) study carried out by VITO, and validated by Denkstatt Austria¹⁵. (For further information see www.vinylplus.eu and www.teppfa.eu)

¹¹ EPPA: European PVC Window Profile and Related Building Products Association, an EuPC sectoral association (www.eppa-profiles.eu)

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

¹³ TEPPFA: European Plastic Pipes and Fittings Association, an EuPC sectoral association (www.teppfa.eu)

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

¹⁵ Denkstatt: sustainability consultancy (www.denkstatt-group.com)

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

ESWA¹⁶ recycled 4,045 tonnes of roofing and waterproofing membranes in 2014 through its project Roofcollect®. This represented around 72% of the sector's PVC waste available for collection in Europe and nearly 100% of such waste in Germany. (For further information see www.vinylplus.eu, www.roofcollect.com and www.eswa.be)

EPFLOOR¹⁷ collected 3,580 tonnes of flooring waste for recycling in 2014, a slight decrease¹⁸ from the previous year. Post-consumer flooring recycling is currently under pressure from hazardous waste legislation, as well as financial constraints.

In the framework of the Turquoise project, aimed at developing a value chain for PVC flooring recycling in France, several converters successfully undertook tests on the use of PVC flooring recyclates in manufactured products, such as tiles and road cones. Tile converter Novafloor (www.novaplak.com) plans to launch tiles containing recycled PVC flooring on the market in 2015. The Turquoise project will continue in 2015 in order to further develop the converters network in France and to increase the scale of Novafloor products.

EPFLOOR also participated in one of the VinylPlus ReMapPlus projects for PVC waste that is difficult to recycle. The solvent-based recovery process selected in 2013 by the joint ERFMI¹⁹/EPFLOOR Task Force on new technologies for flooring recycling is being further investigated. Tests are ongoing in partnership with the National Technical University of Athens (www.ntua.gr) and the Fraunhofer Institute (www.fraunhofer.de).



There is a particularly high energy saving potential when using PVC window frames in the passive house standard

In January 2014, the Recofloor Design Competition was launched, with the aim of developing new applications for PVC flooring recyclates. The competition was organised in partnership with the University of Hertfordshire (www.herts.ac.uk) and Loughborough University (www.lboro.ac.uk), and included technical workshops and briefing sessions for students. (For further information see www.vinylplus.eu)

EPCoat (IVK Europe²⁰ PVC Coated Fabrics Sector Project) recycled 3,588 tonnes of PVC coated fabrics during 2014 (reported as part of Recovinyl volumes) through its collection and recycling scheme. Coated fabrics consist of a polyester fibre web whose surface is coated with soft PVC. (For further information see www.vinylplus.eu)

ERPA²¹ member CIFRA²² recycled 2,124 tonnes of food packaging in 2014. The recycled thick rigid films produced were subsequently thermoformed into profiles by HAMON Thermal Europe (www.hamon.com) and used for the construction of ultra-lightweight water-bearing modules (GEOlight™). In total, 20,214 tonnes of PVC rigid films were recycled in 2014 within the VinylPlus framework. (For further information see www.vinylplus.eu)



The smooth, tough surface of PVC floors prevents dust and dirt from building up and stops microbes from breeding, helping to reduce disease and infections in buildings that need to be kept sterile, such as hospitals and clinics

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

¹⁸ Overall, VinylPlus registered an increase in PVC flooring recycling thanks to a big French flooring recycler joining the Recovinyl network

¹⁹ ERFMI: European Resilient Flooring Manufacturers' Institute (www.erfmi.com)

²⁰ IVK Europe: Industrierverband Kunststoffbahnen e.V. (Association of Coated Fabrics and Films – www.ivk-europe.com)

²¹ ERPA: European Rigid PVC Film Association, an EuPC sectoral association (www.pvc-films.org)

²² CIFRA: Calandrage Industriel Français, a French calendering company (www.cifra.fr)



The VinylPlus Controlled-Loop Committee

Other Recycling Projects

In 2013, VinylPlus launched a joint project with the European Automotive Trim Suppliers Association (EATS²³), with the objective of establishing how EATS members were dealing with post-industrial PVC waste. In 2014, the project focused on developing more sustainable end-of-life solutions for the EATS PVC waste still going to incineration (7%) and landfill (30%). In the UK, EATS members are exploring the use of PVC waste for traffic calming devices. In Spain, EATS agreed to conduct trials with Tecni-Plasper²⁴ to verify whether a collaboration would be possible for PVC waste. In Portugal, EATS and Recovinyl are liaising with a cement company and national authorities to explore the possibility of recovering energy from automotive PVC waste in cement kilns. Meetings were also held with the European Automobile Manufacturers' Association (ACEA²⁵), and the project's findings will be presented at ACEA's Environmental Committee meeting in early 2015. Findings and results of the project are currently being collected in a final report that will be available in 2015.

In France, the possibility of extending selective collection to all kinds of plastic household packaging (including blister packs and trays, instead of just bottles) has been under evaluation since 2012. It has been estimated that this could potentially yield a stream of 25-30,000 tonnes/year of rigid PVC packaging. The recycling route identified in 2013 for this stream was further investigated in 2014. In addition, tests on a semi-industrial scale were conducted by Chaize Environnement (www.chaizesa.com) to improve the initial phase of the process, aiming at purifying the stream of rigid PVC waste coming from sorting facilities. On the basis of positive preliminary results, Chaize Environnement confirmed the possibility to implement the process on an

industrial scale, at a capacity of 1,000 tonnes/year of waste.

The Ebene project on end-of-life professional furniture was initiated in France in 2014, with the objectives of defining the flow of PVC furniture waste in both qualitative and quantitative terms; 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). The project confirmed that the chlorine content of furniture waste is between 1% and 2.5%, which is the upper limit for energy recovery in cement facilities. The recycling test done on rigid PVC furniture produced excellent results. But the amount of soft PVC collected was insufficient to carry out a test. The sorting and collection



PHOTO: COURTESY OF VMB RECYCLING

Vinyl floor mats come with a dissipative top layer, have excellent grounding properties, are easy to clean and are superbly durable

²³ EATS: European Automotive Trim Suppliers Association, an EuPC sectoral association (www.trimsuppliers.eu)

²⁴ Tecni-Plasper: a Spanish PVC converter and recycler, located in Barcelona (www.plasper.com)

²⁵ ACEA: European Automobile Manufacturers' Association, representing 15 Europe-based car, van, truck and bus makers (www.acea.be)

PVC finds uses in all aspects of daily living: floors, walls, ceilings, furniture, cladding, ...the list is endless



of PVC furniture waste will continue in 2015 in order to develop appropriate recycling solutions.

In the UK, RecoMed – a partnership project between the British Plastics Federation (BPF²⁶) and Axion Consulting²⁷ (the UK agent of Recovinyl) – was launched in 2014. The project aimed to verify the feasibility of recycling PVC medical products from UK hospitals, thus diverting waste that currently ends up in landfills and incineration. To ensure that the collection and recycling of PVC medical waste complies with environmental legislation, a close working relationship with the UK Environment Agency was also developed. In addition, a recycling route was identified: the collected material is granulated by Fabrico Recycling in Hull and then used by Rainbow Professionals (www.rainbow.eu.com) to make tree ties for the horticultural industry. Two hospitals were selected for the initial trial. After the preparation phase, which included training presentations for hospital staff, collection started in the second half of 2014. Based on data provided by the participating hospitals, Axion Consulting estimated the potential amount of collectable waste in the UK at approximately 3,430 tonnes/year. RecoMed will roll out the trial to at least five other hospitals in 2015. RecoMed wants next to establish long-term funding and potentially promote itself as a flagship scheme for the European PVC sector.

The U-P-U²⁸ project was launched in Italy by PVC Forum Italia²⁹ in collaboration with Università del Piemonte Orientale³⁰ in the framework of the VinylPlus technical projects. The project aimed to test the performance of a multilayer sewage pipe, with an intermediate layer made from recycled P-PVC (plasticised PVC). The expected benefits include higher annular deformation due to the

plasticised layer; greater capacity to absorb shocks during installation; greater flexibility, allowing the pipe to diverge some degrees from its usual linear trajectory; and a greener product, utilising recycled P-PVC. Results from sample testing conducted on multilayer PVC strips during the feasibility study were promising. In particular, trials showed significant absorption of vibrations, which improves the acoustic performance of the U-P-U pipe. The specimens also showed better resistance than traditional pipes to breakage and comparable resistance to tensile stress.

In Denmark, VinylPlus continued to support the WUPPI³¹ project (www.wuppi.dk) in 2014. As the recycler partner was suffering financial difficulties, new contracts were signed with a Danish collection/sorting company and a Dutch recycler.



PVC decking is water resistant and ideal for pool decks, spa surrounds, high-humidity and marine environments. Since it does not absorb moisture, the deck will not crack, split, decay or splinter

VinylLoop®

VinylLoop® is a physical, solvent-based technology that can recycle difficult-to-treat, end-of-life PVC waste and produces high-quality R-PVC (recycled PVC) compounds. Now that the technology has been perfected, the VinylLoop® process is available for licensing worldwide.

In 2014, the VinylLoop Ferrara plant produced 5,215 tonnes of R-PVC (+7% compared to 2013). In addition, 917 tonnes of tarpaulin waste (a 9% rise from 2013) were recycled through the TaxyLoop® process, which was developed for the treatment of scraps containing fibres. (For further information see www.vinylplus.eu and www.vinylloop.com).

²⁶ BPF: British Plastics Federation, the leading trade association for the UK Plastic Industry (www.bpf.co.uk)

²⁷ Axion Consulting: resource recovery expert, a division of Axion Recycling Limited (www.axionconsulting.co.uk)

²⁸ U-P-U: Unplasticised-plasticised-unplasticised

²⁹ PVC Forum Italia: the Italian association of the PVC value chain (www.pvcforum.it)

³⁰ Università del Piemonte Orientale: University of Eastern Piedmont (www.uniupo.it)

³¹ WUPPI: Danish company set up to collect and recycle rigid PVC (www.wuppi.dk)

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.

The most recent developments in waste regulation are of major concern for the European PVC industry, as they might jeopardise the future of PVC recycling.

In October 2014, the Joint Research Centre (JRC³²) published its Technical Proposal for developing end-of-waste criteria for waste plastics. The proposal also specified that end-of-waste (EoW) plastics should not be classified as hazardous according to the definitions in Article 3 and Annex I

assessment and classification of hazardous waste.

The study will be based on a thorough analysis of the legislative framework; relevant literature and – if needed – field research; and contributions from experts. It should include an assessment of the possibility of granting derogations to specific types of plastics and rubber waste.

VinylPlus is contributing to the study, by providing technical data and scientific information on plastics waste and legacy additives.

The BiPRO study will be finalised by mid 2015.

In August 2014, VinylPlus commissioned a migration study from the German institute FABES (www.fabes-online.de), aimed at establishing reliable values for the physical parameters required to carry out modelling (i.e. the diffusion and partition coefficients) for cadmium, lead, tin and zinc in rigid and flexible PVC (including DEHP for the latter). These parameters should help to evaluate model situations expected to be of concern to regulators. The study should be completed in early 2015.

RoHS 2 Directive

Following a 2013 public consultation on the assessment of DEHP, BBP and DBP as restricted substances in electrical and electronic equipment (EEE), in February 2014 the European Commission published a study by the Austrian Environment Agency (UBA³⁵), which included annex dossiers on DEHP, BBP and DBP.

In 2014, the European Commission appointed the consultancy Öko Institut (www.oeko.de) to produce a report on 21 substances that could be prioritised in the RoHS 2 Directive³⁶ for restriction in EEE.

Based on the methodology proposed by UBA, PVC was included in the Öko Institut's prioritisation list for possible future restrictions.

The PVC industry pointed out that this prioritisation list was inconsistent with existing legislation, such as REACH. The European Commission will publish its final methodology paper in Q1 2015.

SDS-R Project

EuPC and PRE³⁷ have developed an online database of polymers and applications, where recyclers can enter basic information (either statistical or analytical) and obtain Safety Data Sheets for Recyclates (SDS-R).

All SDSs have been adapted to the Globally Harmonised System (GHS), and can be modified and updated on the basis of the REACH regulation.



PVC for kitchen cabinets are an excellent choice for their fire retardant qualities. They're also waterproof, maintenance free, economical and easy to install

of Regulation EC/1272/2008 (CLP). It is now important to see how the European Commission will handle the JRC's proposal.

Meanwhile, Commission Regulation n° 1357/2014³⁴, which will enter into force on 1 June 2015, specifies concentration limits for some categories of hazardous substances. Above these limits, the waste will automatically be considered hazardous. If no derogation or exemptions are considered, this regulation would negatively affect the recycling of some PVC applications.

In relation to the assessment and classification of waste, the EU Commission initiated a study with the German consultancy BiPRO (www.bipro.de) in December 2014. The objective of the study is to assist the Commission in the development of a comprehensive guidance document on the

³² JRC: Joint Research Centre, the European Commission's in-house science service (<https://ec.europa.eu/jrc/>)

³³ <http://publications.jrc.ec.europa.eu/repository/bitstream/11111111/33010/1/2014-jrc91637%20.pdf>

³⁴ <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R1357&from=EN>

³⁵ UBA: Umweltbundesamt, Environment Agency Austria (www.umweltbundesamt.at)

³⁶ 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



PHOTO: COURTESY OF RENOLIT ONDEX SAS

Vinyl roofs provide an energy-efficient roofing option, including due to their inherently light colouring

CONTROLLED-LOOP COMMITTEE

The Controlled-Loop Committee is carefully monitoring the development and implementation of the complex EU regulatory framework, both at national and European level, and proactively contributing to ongoing discussions.

In 2014, the Committee continued to investigate innovative recycling technologies and sorting solutions that are available for difficult-to-recycle PVC waste. For feedstock recycling technologies, several sub-group meetings were held with EcoLoop management in Germany (www.ecoloop.eu). Large-scale trials could not be carried out in 2014, since the plant was not fully ready, but they were rescheduled for Q3-Q4 2015. Selected samples will include flooring, wall covering, shredder residue and PVDC packaging.

PVC decking offers the most significant fade, stain, and mold resistance among decking products



PHOTO: COURTESY OF F BOARD LTD

In October 2014, a Committee sub-group visited the DOW/BSL (www.dow.com) plant in Schkopau, Germany, where trials with PVC waste had been successfully conducted in the past. The Committee then updated the evaluation of this option's benefits, so that it could submit recommendations to the VinylPlus Board.

To gather information on sorting techniques, a Committee sub-group visited the German company Boltersdorf (www.repaboltersdorf.de) in June 2014. The company is developing a multi-stage sorting process for PVC and fibres, which is still at an experimental stage. Galloo Plastics (www.gallooplastics.eu) in France treats mainly shredder residue from electrical, electronic and automotive waste. The company intends further to focus its efforts on the separation and treatment of chlorine-rich content. Caretta (www.caretta-folie.de) is a German foil company working on difficult-to-recycle PVC. Its technology is based on the separation of materials such as synthetic leather and swimming pool foils, and this appears to work.

Two ReMapPlus Workshops had been held in 2013, with research and technology institutes and academics, focused on difficult-to-recycle waste. Promising research routes for private funding and EU projects (Horizon 2020) were identified. Further focusing work in 2014 resulted in scheduling a new workshop in January 2015.

Taking into account the VinylPlus mid-term review of targets in 2015, the Controlled-Loop Committee is updating the best estimates of the volumes of PVC to be recycled by 2020.

³⁷ PRE: Plastics Recyclers Europe (www.plasticsrecyclers.eu)



PHOTO: COURTESY OF PROTAN AS

CHALLENGE 2

Organochlorine Emissions:

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

TARGETS

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.

➤ **partially achieved**

5

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

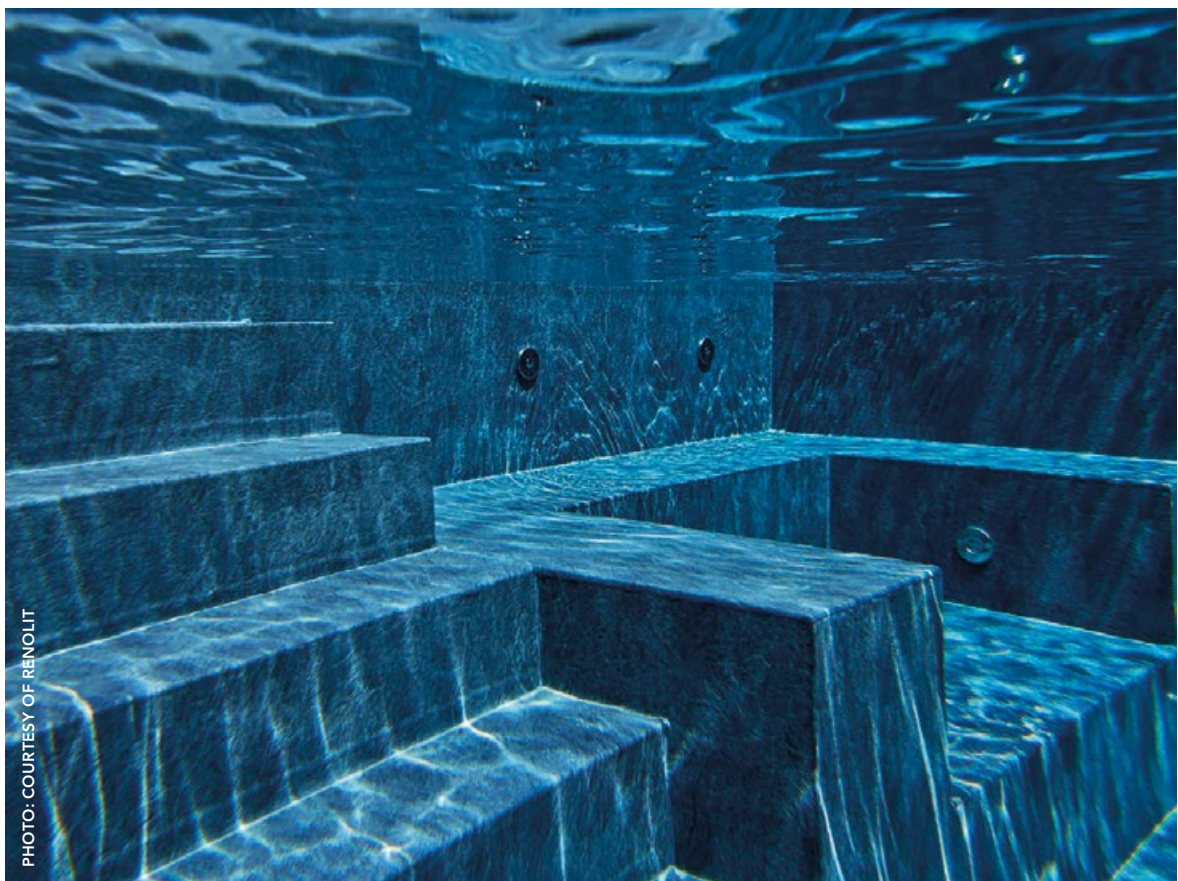
SAFE TRANSPORT

There were no transport accidents with VCM release in 2014.

The Task Force of experts set up to assess the risk of transporting major raw materials continued its work on the analysis and inventory of procedures and practices. Certification systems are in place for ships (Chemical Distribution Institute, CDI – www.cdi.org.uk) and for road and rail transport (Safety and Quality Assessment Systems, SQAS – www.sqas.org). The relevant companies confirmed that thorough checks are also performed on railcars and trucks upon arrival and prior to departure. Risk assessments for loading and unloading operations had already been carried out in the past as part of the risk assessments of manufacturing operations.

Several risk assessment tools exist for transport, but they tend to yield different results. Moreover, experience shows that different teams evaluating the same risk and using the same method usually obtain different results. These results therefore only have relative value, such as demonstrating that one route is safer than another. Since rail and shipping companies are responsible for choosing rail and sea routes, risk assessment might only be relevant for choosing options in road transport.

PVC decking provides significant fade and stain resistance and lower maintenance requirements compared to other products



Vinyl liners makes all surfaces of a pool smooth and offers unlimited design options, sizes and shapes. A vinyl pool is also less expensive than a fiberglass pool or concrete pool



PHOTO: COURTESY OF TARKETT

CHALLENGE 3

Sustainable Use of Additives:

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

TARGETS

1

Lead replacement in the EU-27 by end 2015.

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**

Flexible PVC flooring is inexpensive and used in a variety of buildings covering the home, hospitals, offices, schools, etc. Complex and 3D designs are possible due to the prints that can be created. The smooth, tough surface of the upper wear layer prevents the build-up of dirt

LEAD REPLACEMENT

In 2014, ESPA's and EuPC's commitment to replacing lead-based stabilisers by the end of 2015 across the EU-27 was extended to the EU-28. Substitution of lead-based stabilisers is progressing further, and ESPA is on track to complete replacement by the end of 2015.

In the 2007-2014 period, use of lead-based stabilisers decreased by 86,228 tonnes (-86%) in the EU-28, while use of calcium-based stabilisers, which are used as an alternative, increased by 29,472 tonnes. (For further information see www.vinylplus.eu and www.stabilisers.eu).

ESPA members are working very closely with converters to resolve any remaining issues that might prevent them from completing the switch and to help reformulate remaining applications that still rely on lead-based stabilisers.

PLASTICISERS

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

Restrictions Re-evaluation on DINP and DIDP

On 15 January 2014, the European Commission published its conclusions on the re-evaluation of restrictions on DINP and DIDP in toys and childcare articles that children can put in their mouths.

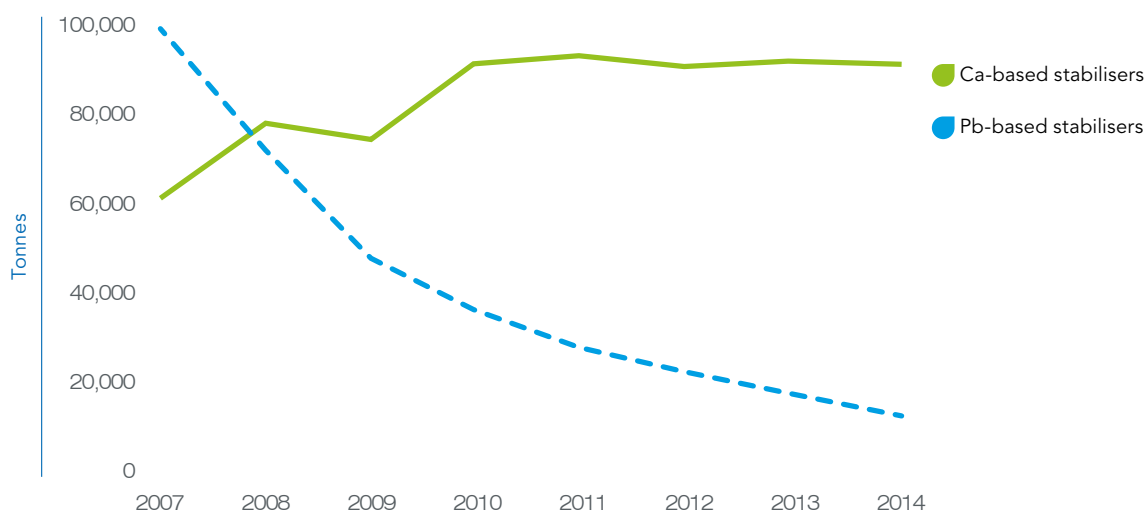
The Commission is fully aligned with the main

conclusions presented in August 2013 by the European Chemicals Agency (ECHA³⁸). Based on ECHA's assessment, the Commission concluded that "no unacceptable risk has been characterised for the uses of DINP and DIDP in articles other than toys and childcare articles which can be placed in the mouth". "The existing restrictions should be maintained", the Commission said. It further concluded that "in the light of the absence of any further risks from the uses of DINP and DIDP, the evaluation of potential substitutes has been less pertinent". DINP and DIDP are therefore considered safe for use in all current consumer applications. Regarding children, ECHA concluded that "no further risk management measures are needed to reduce the exposure of children to DINP and DIDP". For adults, biomonitoring data reviewed by ECHA confirmed that "exposure from food



PVC is used extensively in sewage pipes due to its low cost, chemical resistance and ease of jointing

STABILISERS CONSUMPTION IN THE EU-28



³⁸ ECHA: European Chemicals Agency (<http://echa.europa.eu>)

EU TREND: SHIFTING TO HMW PHTHALATES & OTHER PLASTICISERS



Source: ECPI estimate based on IHS published data

and the indoor environment are not very significant” and that dermal exposure to DINP and DIDP is “not expected to result in a risk for adults or the developing foetus in pregnant women”.

REACH Authorisation

In September 2014, ECHA’s Committees for Risk Assessment (RAC) and Socio-economic Analysis (SEAC) expressed their support for authorising companies which applied for Authorisation to continue to use DEHP in both virgin and recycled PVC and DBP in certain specific applications³⁹.

REACH Classification

Following a proposal from Denmark, ECHA’s Member State Committee (MSC) concluded in December 2014 that DEHP is an endocrine disruptor in the wider environment, as well as in humans. This conclusion may lead to a second listing of DEHP on the REACH Candidate list, with the potential for a second Authorisation process. However, ECPI considers that the science on DEHP does not support this conclusion, as the weight of evidence shows that DEHP does not cause adverse endocrine effects in fish or other aquatic organisms. Moreover, DEHP does not bio-accumulate and cannot therefore pose an environmental hazard to higher mammals. ECPI does not agree with the Member State Committee, which said that the WHO/IPCS⁴⁰ definition of adverse environmental effects consequent to an endocrine mode of action has been met and demonstrated in the dossiers

submitted. DEHP is already stringently regulated as a reproductive agent under Category 1B. The double regulation via the Candidate List is now creating significant uncertainty for the company seeking Authorisation.

Studies and Research

An epidemiology review study is being carried out by Maastricht University (www.maastrichtuniversity.nl) to ascertain the reliability of scientific papers that report an association between phthalate exposure and health effects



PHOTO: COURTESY OF RESYSTA INTERNATIONAL GMBH

Rigid PVC is extensively used in the building industry as a low-maintenance material

³⁹ <http://echa.europa.eu/addressing-chemicals-of-concern/authorisation/applications-for-authorisation-previous-consultations>

⁴⁰ WHO/IPCS: World Health Organisation’s International Programme on Chemical Safety (www.who.int/ipcs)



PHOTO: COURTESY OF POLYFLOR

such as obesity, asthma and reduced fertility. Results publication is expected in 2015.

An LCA study on DINP was finalised by the consultancy PE INTERNATIONAL⁴¹ in 2014 and was then submitted to Denkstatt for validation. The final report will be published by early 2015.

National Regulatory Updates

In France, ECPI responded to requests during 2014 from the French National Health and Environmental Agency (ANSES) and the Ministry of Ecology with regard to the National Endocrine Strategy. As a result, REACH-registered plasticisers and their regulatory evaluation statuses were reviewed. This led France to identify a citrate plasticiser for further evaluation in view of its use in toys. Evaluation and Risk Management Option Analysis (RMOA) reports on DINCH and DOTP are expected in 2015, following a decision in 2014 to evaluate them in view of their use as replacements for classified LMW phthalates.

In Denmark, the Danish Environment Ministry decided to withdraw its proposed ban on DEHP, DBP, DIBP and BBP, which would have entered into force in December 2015. The European Commission had already stressed that national bans on specific chemicals might not be compatible with EU chemicals legislation.

Criteria for the 'Sustainable Use of Additives'

The VinylPlus Additives Task Force includes representatives from ECPI, ESPA and related sectors such as pigments and fillers, as well as NGOs and major PVC converting industries. In 2014 it further widened its membership.

The Task Force worked with The Natural Step (TNS) to integrate the current standard EPDs with TNS

sustainability criteria. This work resulted in a joint document in June 2014, presenting the 'EPD_{plus}' concept, in which a new integrated approach and methodology were proposed for evaluating the use of substances utilised as additives in PVC products from the perspective of sustainable development.

As a second step, the proposed approach and evaluation methodology were presented to and discussed by external stakeholders at the 'Stakeholders Dialogue on Additives' meeting hosted by VinylPlus in Vienna, Austria, in September 2014. Participants included representatives from international institutions, national and local authorities, environment agencies, research institutes, consumer organisations and environmental NGOs. The EPD_{plus} concept was analysed in an open and constructive dialogue, and was generally welcomed. Input and comments received by stakeholders helped and encouraged VinylPlus' progress in this approach.

In November, it was decided to start working on EPD_{plus} for flooring and multilayer pipes. The first EPD_{plus} will be finalised in Q1 2015 and presented at the 2015 Vinyl Sustainability Forum in Cannes, France.

Most contamination in a cleanroom ends up being on the floor. Used in hospitals and medical centres they provide easy maintenance and very importantly hygiene can be readily maintained



PHOTO: COURTESY OF POLYFLOR

⁴¹ PE INTERNATIONAL: sustainability consultancy (www.pe-international.com)



PHOTO: COURTESY OF RENOLIT ONDEX SAS

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.”

TARGETS

- 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.

In 2012, the Energy Efficiency Task Force agreed with the ECVM Production Committee to adopt as a baseline the data collected by IFEU⁴² for the 2009 energy benchmarking (for energy consumption in 2007-2008). In 2014, IFEU collected ECVM members' energy consumption data for 2012-2013 on behalf of VinylPlus.

The intermediate results of this first verification showed that the energy needed to produce a tonne of PVC had decreased by an average of 10.2%. This improvement came from a combination of factors, such as improvements in eco-efficiency, operations and equipment.

Converters, too, are striving to increase their energy efficiency. However, due to the complexity and variety of operations in the converting sectors, an overall target would be meaningless, as would targets for subsectors. It was therefore decided to take a step-by-step approach.

Tests were conducted on some converter companies in 2014, in order to evaluate their energy consumption. But the calculations were very complicated, because energy consumption can vary significantly depending on the product being manufactured, as well as for individual production runs.

SUSTAINABLE FOOTPRINT

In 2012, VinylPlus established an ad hoc Task Force to assess the available methods to measure environmental and sustainability footprints and to recommend suitable footprint measurements. The Task Force is currently monitoring the pilot phase of the European Commission's Product Environmental Footprint (PEF) scheme, with the aim of recommending footprint



PHOTO: COURTESY OF WAVIN

Used PVC pipes are collected for recycling, including through take-back guarantee systems provided by some manufacturing companies

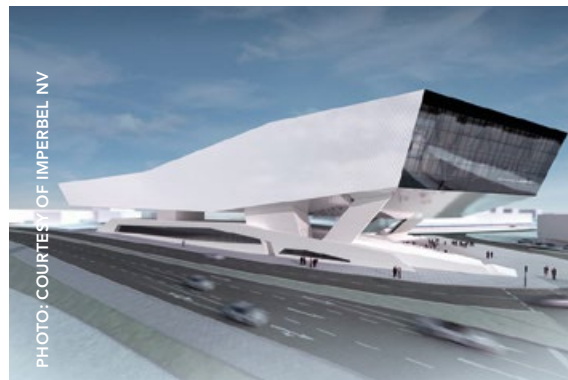


PHOTO: COURTESY OF IMPERBEL NV

PVC can facilitate innovative and sustainable solutions for roofs and buildings

measurements that are aligned with the EU PEF. TEPPFA is directly participating in the PEF pilot phase for the product group 'hot and cold water supply pipes'.

RENEWABLE RAW MATERIALS

Established in December 2011, the Renewable Materials Task Force has been investigating renewable alternative resources for the production of PVC. Information was collected and analysed from 2012 to 2014, and TNS contributed some general views early in 2014. A detailed report on the work, including potential scenarios for the future, is available on the VinylPlus website. An Executive Summary is included in Appendix 1 of this Progress Report.



-10.2%

ENERGY CONSUMPTION
BY PVC RESIN PRODUCERS

PHOTO: COURTESY OF IMPERBEL NV

PVC can help save energy and costs, produce renewable energy, increase sustainability as well as decrease the carbon footprint of buildings

⁴² IFEU: Institut für Energie- und Umweltforschung Heidelberg GmbH (German Institute for Energy and Environmental Research – www.ifeu.de)



PHOTO: VINYLPLUS

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.”

TARGETS

1

VinylPlus web portal to go online in summer 2011.

➤ **achieved**

2

VinylPlus Monitoring Committee, which will meet a minimum of twice a year, will be established by end 2011.

➤ **achieved**

3

A VinylPlus Membership Certificate will be launched end 2011.

➤ **achieved**

4

A public, and independently audited, VinylPlus Progress Report will be published annually and proactively promoted to key stakeholders.

With the first edition being published in 2012.

➤ **achieved**

5

Annual external stakeholder meetings will be organised, commencing in 2012.

➤ **achieved**

6

A VinylPlus product label will be launched by end 2012.

➤ **achieved in 2014**

7

ECVM will take an active role in promoting VinylPlus within international PVC industry organisations worldwide.

➤ **ongoing**

8

ESPA stabiliser producers will actively promote VinylPlus outside the EU-27.

➤ **ongoing**

9

VinylPlus will increase the number of programme participants by 20% compared to 2010 by end 2013

➤ **not achieved**

10

VinylPlus will engage with five global brand holders by end 2013.

➤ **partially achieved**

11

A review of progress towards the globalisation of the approach will be undertaken by end 2015.

INDEPENDENT MONITORING

The VinylPlus Monitoring Committee (see p. 6) met formally twice in 2014, in April and in November.

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

ANNUAL REPORTING

As part of the Voluntary Commitment, progress, developments and achievements are published annually in a Progress Report.

The Progress Report 2015 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. It is also committed to frank and open dialogue with all stakeholders, third parties, institutions and organisations in technical, political and social communities. Dialogue and cooperation continued to be enhanced in 2014, including through the joint projects approach. To share best practice, develop synergies and improve communications effectiveness, the first VinylPlus 'Joining Forces for Communication' workshop was organised in March in Liege, Belgium, involving representatives from the sectoral associations and the PVC Network. Supported by VinylPlus, eight joint communications projects were implemented by four European industry sector federations and three national PVC associations in 2014. (For further information see www.vinylplus.eu/community/communications-projects/2013-4).

In 2014, two new VinylPlus brochures were published. 'Recycling Technologies'⁴³ outlines the context and opportunities for recycling in Europe, as well as some of the challenges and solutions for increasing the recycling of PVC waste. It places particular emphasis on emerging technologies that can access waste streams that are difficult to recycle. 'Closing the Loop with PVC'⁴⁴ showcases a selection of examples of best practice developed within the framework of the VinylPlus programme.

Advocacy Task Force

A new Advocacy Task Force was set up in 2014 to support the development of the Voluntary Commitment in the context of the complex EU regulatory framework and the EU policy roadmap. The Task Force will also contribute to the mid-term review of the Voluntary Commitment in 2015 and will work to maximise the perceived value and image of VinylPlus for its stakeholders.

Engaging Globally

As part of the commitment to promote its approach across the PVC industry worldwide, VinylPlus actively shares knowledge and best practices with the other regional PVC associations in the GVC (Global Vinyl Council). In 2014, one of the GVC's bi-annual meetings took place in Africa for the first time: this was hosted by SAVA (Southern African Vinyl Association), in conjunction with the Vinyl South Africa 2014 Conference. The event took place in October in Johannesburg, and was attended by more than 150 delegates from around the world.

United Nations

As 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) – VinylPlus continued to proactively dialogue with the UN in 2014.

In May 2014, Barbara Kreissler, Head of the Business Partnerships Group at UNIDO, participated as keynote speaker in the second Vinyl Sustainability



PVC has a myriad uses: industrial construction, agriculture or just decoration

⁴³ http://www.vinylplus.eu/uploads/Modules/Documents/ok_brochure_pvc_14-03-2014.pdf

⁴⁴ http://www.vinylplus.eu/uploads/Modules/Documents/camb01_4002_vinylplus_brochure_en.pdf



PVC windows and doors provide a perfect balance between energy efficiency and comfortable living

Forum, which was held in Rome, Italy. Opening the session 'Partnerships as a Driving Force: Co-operation towards Sustainability Goals', she said: "UNIDO is particularly proud to have an industry-wide partnership such as VinylPlus on the Green Industry Platform. The recent milestones they have achieved demonstrate how the private sector can be transformative in nature and can take the lead in achieving an important step towards sustainability objectives and realizing a more inclusive and sustainable model of industrial development. This partnership model is therefore of great relevance not only in the European context,

A great example of the decorative use of PVC



but also for developing and transition economies that are just beginning their journey of sustainable economic growth."

In May 2014, in response to a UNEP request to submit information in relation to paragraph 4 of UNEP Governing Council Decision 27/12 Section II. Lead and Cadmium⁴⁵, VinylPlus contributed a paper on 'The European PVC industry's experience in replacing lead and cadmium-based stabilisers'⁴⁶.

Stakeholders Events, Conferences and Exhibitions

The international conference on 'Alternatives to Classified Phthalates in PVC Medical Devices' was held in Copenhagen, Denmark, in March 2014, with the aim of contributing to the debate around the use of PVC plasticisers in medical applications. VinylPlus presented its approach and progress towards sustainability to the conference, which was organised by the Danish Environmental Protection Agency, the Danish Health and Medicines Authority and the PVC Information Council Denmark (a PVCMed Alliance partner – www.pvcmed.org).

In April 2014, VinylPlus participated in PVC 2014, a triennial conference in Brighton, UK, covering all aspects of PVC, from formulation through to recovery and recycling. VinylPlus' renewed commitment to sustainability and its achievements were presented and discussed at the conference, which was attended by 490 delegates from 36 countries.

The second Vinyl Sustainability Forum, co-organised by ECVI and VinylPlus, took place in Rome, Italy, in May 2014, and was attended by more than 100 experts from all over the world. With the theme 'Enhancing the value of Partnerships', the 2014 forum explored the keys to successful collaboration between regional, national, European and international partners, in both the public and private sectors. Participants learnt about new ways of working together towards goals in sustainability and resource-efficiency. They also networked with other business leaders and got the latest insights from key companies and associations.

VinylPlus exhibited at the European Commission's Green Week 2014 conference in Brussels, Belgium, from 3 to 5 June 2014, which focused on the 'Circular Economy, Resource Efficiency and Waste'. Visiting the VinylPlus booth, EU policy-makers and other European stakeholders learned about examples of best practice in consumer and industrial applications using recycled PVC. VinylPlus had already contributed to the Green Week 2014 conference theme as a panel speaker in a dedicated workshop at the TEPPFA Forum 2014 – a Green

⁴⁵<http://www.unep.org/chemicalsandwaste/LeadCadmium/Publications/DevelopmentofTechniquesforEmissions/tabid/838787/Default.aspx>

⁴⁶http://www.unep.org/chemicalsandwaste/Portals/9/Lead_Cadmium/docs/GC27%20Followup%202013/VinylPlus_Contribution%20Cefic_Eu%20Industry.pdf



PHOTO: COURTESY OF WAVIN

Roughly half of the world's polyvinyl chloride resin manufactured annually is used for producing pipes for municipal and industrial applications

Week satellite event organised by TEPPFA and EPPA in April 2014.

To increase South-East European recyclers' awareness of VinylPlus' Voluntary Commitment and the potential uses and applications of recycled PVC, a workshop on PVC recycling was held in Nicosia, Cyprus, in September 2014. The event was co-organised by the Cypriot Ministry of Environment and VinylPlus.

In October 2014, ECPI and VinylPlus jointly organised a media field trip in Ravenna and Ferrara, Italy, for eight journalists from four different countries, who visited VinylPlus partners Vulcaflex (www.vulcaflex.eu) and VinyLoop®.

Around 120 delegates representing over 50 European companies involved in the production of PVC insulated cables gathered in Bologna, Italy, in November at PVC CABLES 2014. The event, jointly organised by ECVI and PVC Forum Italia, was the first European workshop dedicated to the sustainable development of PVC cables, and featured a presentation of VinylPlus' Voluntary Commitment and its approach to cable manufacturers.

In December, VinylPlus' contribution to the Plasticisers Conference 2014, organised by ECPI and European Plastics News in Brussels, Belgium, focussed on the sustainable use of plasticisers in flexible PVC.

Online Communications

Online communications are an integral part of the VinylPlus communications programme. In 2014, VinylPlus launched a new webinar format for its internal communications, which took up different themes related to PVC. The first webinar,

'Vinyl it!', was organised in April 2014, and more than 40 participants registered for an interactive session to learn more about the VinylPlus programme, receive first-hand insights and ask questions. The second webinar, 'Recycle it!' took place in October 2014 and focused on PVC recycling, in particular methodologies, techniques and management in the framework of the VinylPlus programme.

VINYLPLUS PARTNER CERTIFICATE AND PRODUCT LABEL

Partner Certificates are awarded each year to companies that support the VinylPlus Voluntary Commitment. The Certificate is increasingly used by partner companies to demonstrate to customers and employees their commitment to and engagement in the VinylPlus programme.

The Product Label scheme was developed in close cooperation with BRE Global (UK-based certification experts on responsible sourcing for building and construction products – www.bre.co.uk) and TNS. After completion of the legal verifications to ensure that the Product Label complies fully with all existing regulations and competition law, it was officially launched at the Vinyl Sustainability Forum in Rome in May 2014. In the second half of 2014, work concentrated on building up the required infrastructure, defining work processes and negotiating BRE's contract. Aiming to be the first in their sectors to demonstrate the advanced sustainability performance of their products, several companies from the pipe, window and flooring sectors have officially applied for the Product Label and are now preparing for their audits.

VinylPlus Partners

IN 2014, CONTRIBUTORS WERE:

A. Kolckmann GmbH (Germany)
Alfatherm SpA (Italy)
Aliaxis Group (Belgium)
Altro (UK)
aluplast Austria GmbH (Austria)
aluplast GmbH (Germany)
alwitra GmbH & Co (Germany)
AMS Kunststofftechnik GmbH & Co. KG (Germany)
Amtico International (UK)
Armstrong DLW AG (Germany)
Bilcare Research (Germany)
BM S.L. (Spain)
BT Bautechnik Impex GmbH & Co. KG (Germany)
BTH Fitting Kft. (Hungary)
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)
Döllken Kunststoffverarbeitung GmbH (Germany)
Dyka BV (Netherlands)
Dyka Plastics NV (Belgium)
Dyka Polska Sp. z o.o. (Poland)
Elbtal Plastics GmbH & Co. KG (Germany)
Epwin Window Systems (UK)
Ergis SA (Poland)
FDT FlachdachTechnologie GmbH & Co. KG (Germany)
Finstral AG (Italy)
FIP (Italy)
Flag SpA (Italy)
Fucine Film Solutions Srl (Italy)*
Gallazzi SpA (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)
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)
Imperbel NV (Belgium)*
Inoutic/Deceuninck GmbH (Germany)
Inoutic/Deceuninck Sp. z o.o. (Poland)
Internorm Baulemente GmbH (Austria)*
Jimten (Spain)
Klößner Pentaplast GmbH & Co. KG (Germany)
Konrad Hornschuch AG (Germany)
KWH Pipe Oy AB (Finland)
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)
Nicol (France)
Nicol Italy (Italy)
Nordisk Wavin A/S (Denmark)
Norsk Wavin A/S (Norway)
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)*
Riuvet (Spain)
Roehling Engineering Plastics KG (Germany)
S.I.D.I.A.C. (France)
Salamander Industrie Produkte GmbH (Germany)
Sattler (Austria)
Schüco PWS GmbH & Co. KG (Germany)
Serge Ferrari SAS (France)
Sika Services AG (Switzerland)
Sika Trocal GmbH (Germany)
SIMONA AG (Germany)*
Sioen Industries (Belgium)*
SKZ-TeConA 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)
Upofloor Oy (Finland)
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 2014

Ineos Vinyls (Belgium, France, Germany, UK, Netherlands, Norway, Sweden)
Shin-Etsu PVC (Netherlands, Portugal)
SolVin (Belgium, France, Germany, Spain)
VESTOLIT GmbH (Germany)
Vinnolit GmbH & Co. KG (Germany, UK)

Stabiliser producers contributing to VinylPlus in 2014

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 2014

BASF SE
DEZA a.s.
Evonik Industries AG (Germany)
ExxonMobil Chemical Europe Inc.
Grupa Azoty Zakłady Azotowe Kędzierzyn S.A.
Perstorp Oxo AB (Sweden)

* Companies that joined VinylPlus in 2014

Financial Report

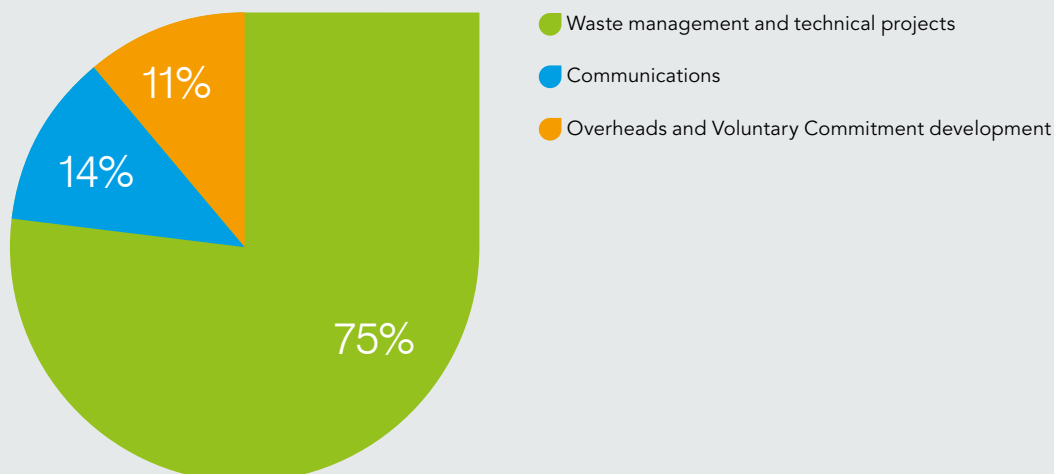
In 2014, further savings were made through reorganisation and gains in efficiency. Funds were freed to increase research in new recycling processes, applications or collection schemes, including pilots on furniture and medical waste.

WASTE MANAGEMENT AND TECHNICAL PROJECTS FIGURES IN €1,000S	TOTAL EXPENDITURE INCLUDING EUPC AND ITS MEMBERS	
	2013	2014
EPCoat	183	198
EPFLOOR	815	570
EPPA	507	413
ERPA – Pack upgrade	-19*	-42**
PlasticsEurope France Blister	44	11
ESWA/Roofcollect®	147	139
Recovinyl	2,353	2,100
Studies, start-up & pull concept	221	75
TEPPFA	552	807
EATS (Automotive trimmings recovery)	38	14
Ebene (Furniture recycling)	–	15
RecoMed (Medical applications recycling)	–	20
TOTAL PROJECTS	4,842	4,319

* Reversal of accrual made in 2012

** Reversal of accrual made in 2013

VINYLPUS TOTAL EXPENDITURE IN 2014: €5.75 MILLION



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 2014 to December 31st 2014 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-recognised 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 2014 and verify of the mathematical accuracy of this.

The total expenses amount to KEUR 5,752.

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

- b. Verify that these costs are recorded in the financial statements 2014 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 2014 and December 31st 2014.

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 2014.

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

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

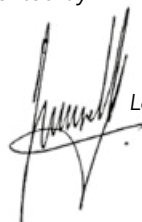
We found no exceptions as a result of applying this procedure, which represents 16.25% of total expenses.

Note that financial statements of VinylPlus AISBL, TEPPFA AISBL, Recoviny AISBL and EuPC AISBL 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 Bedrijfsrevisoren – Réviseurs d'Entreprises,
a Belgian civil CVBA/SCRL
Represented by



DOMINIC ROUSSELLE,

Réviseur d'Entreprises
Louvain-la-Neuve, March 25th 2015

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 Recovinyl Inpa during the period January 1st 2014 to December 31st 2014.

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 2014.

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

PROJECT	TYPE OF PVC	TONNAGE RECYCLED IN 2013	TONNAGE RECYCLED IN 2014
IVK/EPCoat (incl. Recovinyl)	Coated fabrics	7,663*	8,941*
EPFLOOR	Flooring	3,618*	3,314*
EPPA (incl. Recovinyl)	Window profiles & profile related PVC	192,419	203,962**
ESWA – ROOFCOLLECT and Recovinyl	Flexible PVC	77,319 tons which consist of:	96,536 tons which consist of:
ESWA – ROOFCOLLECT	Flexible PVC	4,271*	4,045*
Recovinyl	Flexible PVC applications	73,048	92,491**
TEPPFA (incl. Recovinyl)	Pipes & fittings	40,887	55,225
ERPA via Recovinyl (incl. CIFRA and Pack-Upgrade Project)	Rigid PVC film	19,431	20,214**
Recovinyl (incl. Vinyloop Ferrara)	Cables	103,131	92,826
TOTAL		444,468	481,018

* 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 Bedrijfsrevisoren – Réviseurs d'Entreprises,
a Belgian civil CVBA/SCRL
Represented by

DOMINIC ROUSSELLE,

Réviseur d'Entreprises
Louvain-la-Neuve, March 25th 2015



Verification Statements

SGS INDEPENDENT VERIFICATION STATEMENT ABOUT THIS VINYLPLUS PROGRESS REPORT 2015

Established in 1878, SGS is the world's leading inspection, verification, testing and certification company. We are recognised 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 2015". This report presents the commitments and achievements made by the VinylPlus project in 2014.

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 2015" represents VinylPlus' performance in 2014 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
S&SC Certification Manager
23 March 2015



TNS Commentary on VinylPlus Progress Report for 2014

The Natural Step has been a partner of VinylPlus from the beginning, acting as mentor, critical friend and capacity builder. We support the initiative in helping the European industry increase the sustainable development potential of a material widely used in all parts of society. The 5 Sustainability Challenges of the VinylPlus programme were derived from The Natural Step System Conditions for a Sustainable Society⁴⁷ – the parameters within which PVC needs to be developed to contribute to sustainable development. The past year has involved much hard work to address these challenges. Here we comment on the important, but also difficult, work that VinylPlus is doing to guide its industry towards sustainability.

COLLABORATION AND STAKEHOLDER ENGAGEMENT

Many of the activities showing in this 2014 Progress Report have been influenced by talking with and listening to various stakeholders, as we have advocated. Year by year VinylPlus is helping the industry reach out and include more stakeholders in various conversations. For example, there has been a focus and much hard work applied to the often emotive issue of additives in PVC (Challenge 3). During the year The Natural Step facilitated a dialogue with stakeholders on this topic and the feedback is now helping the Additives Task Force further refine its work. At the Vinyl Sustainability Forum we were given the opportunity to speak about the need for true and effective dialogue, particularly on questions which are genuinely complex and perhaps heavy with emotional history. We believe that through various activities VinylPlus is helping both shift attitudes and foster improved dialogue within the industry. It is becoming more open to outside perspectives and the whole programme is becoming stronger and more credible as a result of this way of engagement.

THE TRANSITION TO A CIRCULAR ECONOMY MODEL

In 2014 the circular economy concept received widespread attention. Policymakers are grappling with how to implement it and ensure that it truly contributes to sustainable development. VinylPlus is a living case demonstrating the practicalities

of implementing circular economy thinking using science-based sustainability criteria as a compass. Multiple strategies have been developed to achieve an overall vision, addressing often difficult questions and trade-offs on the journey. For example, the past year has seen continued scaling up of recycling infrastructure and volumes towards controlled-loop management of PVC (Challenge 1), while work is underway to identify ways to handle difficult to recycle materials, optimize additive formulations (Challenge 3), explore the potential for bio-based feedstocks and ensure that emissions are reduced (Challenge 4). The current debate on legacy additives in waste streams needs to be taken in this context and it is to be hoped that a new regulatory solution recognizes such effort and does not become an impediment to the development of infrastructure for circular resource flows.

LEARNING AND BUILDING CAPACITY

We welcome the detailed work of the VinylPlus Task Forces and note that many recent activities have been technical in nature, investigating specific solutions that will help the industry map out pathways toward the VinylPlus vision. In recent times we have seen a great increase in the application of novel solutions, including bio-based materials and processes, as well as a major focus upon climate change and its implications for energy in industry. We expect the knowledge gained will help VinylPlus promote more innovative ways to deliver end-use applications

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

TNS Commentary on VinylPlus Progress Report for 2014

with a lower footprint. For example, looking for alternative raw materials from fossil hydrocarbons. The other main component of PVC, chlorine, is also an area where we hope to see VinylPlus talking with the chlorine industry, to see how both can deal with specific sustainability challenges that are shared.

MEASURING AND DIFFERENTIATING PERFORMANCE

In 2014 there were two achievements that are important platforms for defining and evaluating sustainability performance within the VinylPlus programme. The first is the continued development of a methodology for evaluating additives. We can dream of a consistent, reliable and globally-applied methodology for judging chemical compilations. It is one of the most serious gaps in society today that we do not have such an agreed and publicly trusted system. The VinylPlus Task force is pioneering in its efforts to find such a methodology for additives in PVC. Some fundamental questions and puzzles remain but the journey has begun and we hope to see the EPD_{plus} idea in pilot phase over the coming year. That is an impressive effort on a topic that looked quite unapproachable earlier, at least in any collective sense. The second milestone is the launch of a labelling scheme for PVC products. Whilst it is still early days, we expect that these tools will help stimulate and guide progress in the coming years, rewarding those who lead.

LOOKING AHEAD

In the year ahead we would like to see VinylPlus capitalize on foundations already laid, including piloting the EPD_{plus} idea for evaluating additives and the VinylPlus label for construction materials. Consultation on VinylPlus' approach to closed-loop resource use is also foreseen. The mid-term review of targets scheduled in 2015 is an opportunity to reflect on progress in light of the higher expectations of stakeholders and an accelerating pace of sustainability-driven activity in downstream industries, international policy-making and society at large. As in our last commentary we emphasize

the need for member companies to promote and demonstrate progress toward the goals of VinylPlus. Finally, we call for greater outreach, collaboration and internationalization. VinylPlus cannot achieve its vision without more effort in the rest of the world and the longer it takes for others to join this journey the more vulnerable become the individual efforts. Unacceptable practices in one part of the world condemns PVC everywhere. Progress together on a global scale is the only ultimate answer. We need consistent and reliable standards world-wide to ensure competitiveness. The whole global industry should be seeking higher fundamental standards for all.

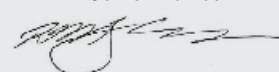
DAVID COOK,

Executive Ambassador



RICHARD BLUME,

Senior Advisor



KRISTOFFER LUNDHOLM,

Senior Advisor



The Natural Step, Stockholm

© The Natural Step

Appendix 1 – Report on Renewable Raw Materials: Executive Summary

PVC products are made of PVC resin and additives. Regarding the possible move to renewables, the focus should be put on PVC resin and plasticisers, for volumes and carbon content reasons.

Chlorine content of PVC resin is 57%. Its source (common salt), although not renewable in the strict sense, is almost inexhaustible, which positions PVC already rather well as part of the debate on renewables.

Technically, the production of PVC resin from biomass is not an issue, whatever the biomass type. Ethylene produced from biomass via ethanol has exactly the same characteristics as ethylene produced from oil or gas, and there is absolutely no difference for the quality of the produced resin.

The problem linked to the move to renewables is economic, environmental, and social.

The problem is economic because the attractiveness of the bio-based raw materials is directly connected to the respective prices of biomass, oil and gas, including shale gas. And so far the cost of ethylene based on biomass production (including depreciation of new specific investments) has not been low enough to give the possibility to sell the resin at the price of the traditional raw material based resin. The consequence is that producers have not significantly invested in that route and that customers have never been fighting for buying bio-based resin and pay a green 'premium' which is difficult for them to pass on to their markets.

Over the last few years, oil price has been high but not high enough to economically justify a significant move to biomass. In addition, the development of shale gas production, especially in the US, has been a serious competitor for bio-based raw materials producers, to such an extent that the ones who were committed to move to renewables have decided to freeze their green plastics plans.

Seeing the rather low current traditional raw material prices, it is clear that no company will move to renewables in the current circumstances, and put its financial sustainability at serious risk.

In practice, only political measures would help move to renewables:

- developing legislation that removes duties on imports of biomass based feedstock;
- financing R&D and demo plants;
- supporting market development in order to ensure the concept is proven but stop at the pre-competitive level in order to let the free market mechanism find the appropriate balance;
- defining methodology for comparative sustainability assessments;
- encouraging green public procurement for bio-based products while avoiding discrimination of products based on traditional feedstock having an equivalent ecological performance on the basis of Life Cycle Analysis.

Appendix 1 – Report on Renewable Raw Materials: Executive Summary

Regarding environmental aspects, there is some evidence that the use of biomass from plants helps to reduce CO₂ emissions (because of the capture of CO₂ by the plants), but on the other hand the environmental assessments results will very much depend on the transport needs (location of the fields and of the facilities for ethanol and ethylene production), the impact on nature (potential deforestation, agricultural land use), and the location of the PVC resin production facilities.

As regards the plasticisers, there are already many bio-based plasticisers available on the market. There are therefore technical possibilities to substitute traditional plasticisers, but appropriate performance must be ensured, and market prices of bio-based plasticisers must be reasonable and competitive.

Finally, recycling potential should not be underestimated as part of the debate on the use of renewables. With regard to the depletion of the non-renewable raw materials, recycling achieves the same objective as moving to renewables, and even saving renewable raw materials. In addition recycling helps to reduce energy consumption, and reduces use of traditional waste management processes (incineration, landfilling). Because of its huge recycling potential and its technical characteristics, PVC is definitely well positioned.

Appendix 2 – Glossary

ACEA	European Automobile Manufacturers' Association (www.acea.be)	EuPC	European Plastics Converters (www.plasticsconverters.eu)
BBP	Butyl benzyl phthalate	GHS	Globally Harmonized System of Classification and Labelling of Chemicals
BPF	British Plastics Federation (www.bpf.co.uk)	GIP	Green Industry Platform (www.greenindustryplatform.org)
Ca	Calcium	HMW phthalates	High Molecular Weight phthalates
CARACAL	Competent Authorities for REACH and CLP. CARACAL is an expert group which advises the European Commission and ECHA on questions related to REACH and CLP. It was founded as the 'European Commission Working Group on the Practical Preparations for REACH' in May 2004. In September 2007, it was re-named 'REACH Competent Authorities (REACH CA)' and, in March 2009, 'Competent Authorities for REACH and CLP (CARACAL)'	IFEU	Institut für Energie- und Umweltforschung Heidelberg GmbH (German Institute for Energy and Environmental Research – www.ifeu.de)
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)	Industry Charters	ECVM Industry Charters for the Production of VCM and S-PVC (1995) and for the Production of E-PVC (1998)
DBP	Di-n-butyl phthalate	IVK Europe	Industrieverband Kunststoffbahnen e.V. (Association of Coated Fabrics and Films – www.ivkeurope.com)
DEHP	Di(2-ethylhexyl) phthalate	KPMG	KPMG is a global network of professional firms providing audit, tax and advisory services (www.kpmg.com)
DIBP	Di-isobutyl phthalate	LCA	Life Cycle Assessment
DIDP	Di-isodecyl phthalate	LMW phthalates	Low Molecular Weight phthalates
DINCH	Di-isononyl cyclohexane dicarboxylate	Pb	Lead
DINP	Di-isononyl phthalate	PE	Polyethylene
DNEL	Derived no-effect level	PEF	Product Environmental Footprint
DOTP	Di-octyl terephthalate	PlasticisersPlus	The ECPI's formal legal entity, based in Brussels, Belgium
DPHP	Di(2-propyl heptyl) phthalate	PRE	Plastics Recyclers Europe (www.plasticsrecyclers.eu)
EATS	European Automotive Trim Suppliers Association (www.trimsuppliers.eu)	PVC	Polyvinyl chloride
EC	European Commission	PVDC	Polyvinylidene chloride
ECHA	European Chemicals Agency (http://echa.europa.eu)	P-PVC	Plasticised PVC
ECPI	The European Council for Plasticisers and Intermediates (www.plasticisers.org)	RAC	Risk Assessment Committee
ECVM	The European Council of Vinyl Manufacturers (www.pvc.org)	REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
ECVM 2010	The ECVM's formal legal entity, registered in Belgium	RoHS	EU legislation restricting the use of hazardous substances in electrical and electronic equipment (RoHS Directive 2002/95/EC)
EDC	Ethylene dichloride or 1,2-dichlorethane	RoHS 2	The recast RoHS Directive 2011/65/EU (RoHS 2) entered into force on 21 July 2011
EPA	Environmental Protection Agency	R-PVC	Recycled PVC
EPCoat	IVK Europe PVC Coated Fabrics Sector Project	SDS	Safety Data Sheet
EPD	Environmental Product Declaration	SDS-R	Safety Data Sheet for Recyclates
EPFLOOR	European PVC Floor Manufacturers, an EuPC sector group (www.epfloor.eu)	SGS	Société Générale de Surveillance, the world's leading testing and verification organisation (www.sgs.com)
EPPA	European PVC Window Profile and Related Building Products Association, an EuPC sectoral association (www.eppa-profiles.eu)	S-PVC	Suspension polyvinyl chloride
E-PVC	Emulsion polyvinyl chloride	SVHC	Substances of Very High Concern
ERPA	European Rigid PVC Film Association, an EuPC sectoral association (www.pvc-films.org)	TEPPFA	The European Plastic Pipes and Fittings Association, an EuPC sectoral association (www.teppfa.eu)
ERFMI	European Resilient Flooring Manufacturers' Institute (www.erfmi.com)	TNS	The Natural Step (www.naturalstep.org)
ESPA	The European Stabiliser Producers Association (www.stabilisers.eu)	UN	United Nations
ESWA	European Single Ply Waterproofing Association, an EuPC sectoral association (www.eswa.be)	UNEP	United Nations Environment Programme
EU	European Union	UNIDO	United Nations Industrial Development Organization
		U-P-U	Unplasticised-plasticised-unplasticised
		VCM	Vinyl chloride monomer
		Vinyl 2010	The first 10-year Voluntary Commitment of the European PVC industry, signed in 2000
		WUPPI	Danish company set up to collect and recycle rigid PVC (www.wuppi.dk)

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.

Made from salt (57%) and oil (43%), PVC uses less oil in its manufacture than any other major thermoplastic. 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 both of 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 which produce more than 98% of the stabilisers sold in Europe. They employ approximately 5,000 people.

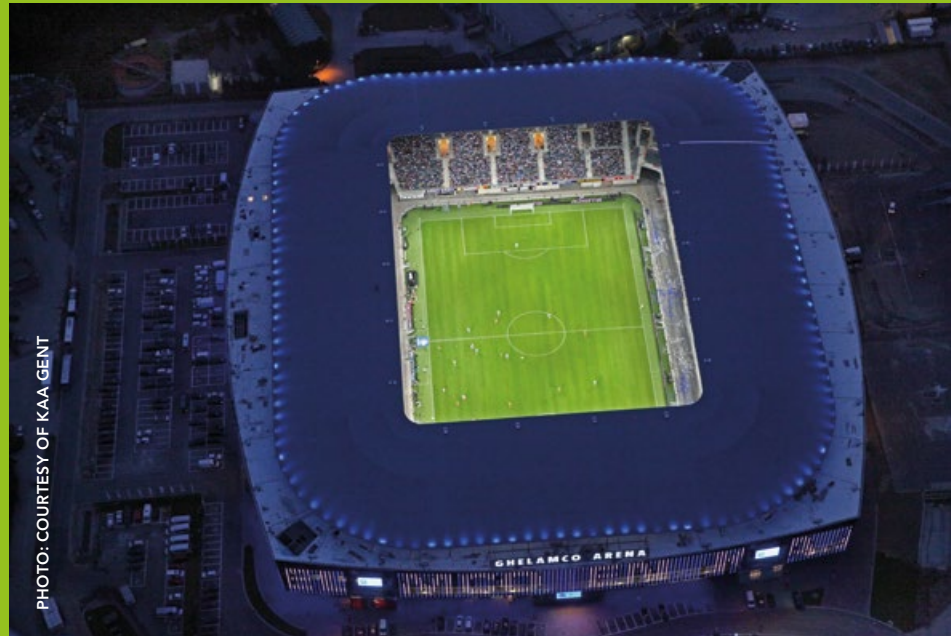
www.stabilisers.eu



THE EUROPEAN COUNCIL FOR PLASTICISERS AND INTERMEDIATES

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

www.plasticisers.org



The Ghelamco football stadium in Ghent, Belgium, is a real eye-catcher: impressive, fashionable in design and an architectural beauty. The stadium, however, is more than just about design; it is above all environmentally friendly.

The undulating roof was made waterproof by means of reflective PVC membranes, produced by VinylPlus partner RENOLIT. A special protective coating on the roofing membranes ensures a high reflection of sunlight, which in summertime has a positive impact on the interior of the building.

On this large project no less than 13,000 sqm of PVC roofing membranes were installed. At a later stage, solar panels will be mounted on the roof, again a special energy-saving effort. Quite important, as well ecologically speaking, is the collection and re-use of rainwater at this stadium: three large buffer reservoirs and two water storage tanks have been installed. 5,200 sqm of PVC membranes were used to make the basins waterproof.

An aerial night photograph of a large stadium with a curved, illuminated roof. The stadium is filled with spectators, and the green pitch is visible. To the left of the stadium is a large parking lot filled with cars and trucks. The scene is lit by the stadium's lights and streetlights.

VinylPlus

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