



# PROGRESS REPORT 2020

REPORTING ON 2019 ACTIVITIES



COMMITTED TO  
SUSTAINABLE DEVELOPMENT



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Wavin GmbH (Germany)  
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Wavin Ireland Ltd (Ireland)  
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Wavin Nederland BV (Netherlands)  
Wavin Plastics Ltd (UK)

### PVC RESIN PRODUCERS:

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

### PVC STABILISER PRODUCERS:

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

### PVC PLASTICISER PRODUCERS:

BASF SE  
DEZA a.s.  
Evonik Performance Materials GmbH  
ExxonMobil Chemical Europe Inc.  
Grupa Azoty ZAK SA  
LANXESS Deutschland GmbH  
Perstorp Oxo AB  
Provion

### ASSOCIATE MEMBERS:

AGPU – Arbeitsgemeinschaft PVC und Umwelt e.V. (Germany)  
British Plastics Federation (BPF) VinylPlus UK  
PVC Forum Italia (Italy)

\* Companies that joined VinylPlus in 2019

Launched in 2011, VinylPlus® is the renewed 10-year Voluntary Commitment to sustainable development of the European PVC industry. The VinylPlus programme was developed through open dialogue with stakeholders, including industry, NGOs, regulators, civil society representatives and PVC users. The regional scope is the EU-27 plus Norway, Switzerland and the UK.

This report summarises VinylPlus' progress and achievements in 2019 in each of the five key sustainability challenges identified for PVC on the basis of The Natural Step System Conditions for a Sustainable Society ([www.thenaturalstep.org/pvc](http://www.thenaturalstep.org/pvc)).

The Progress Report 2020 has been independently verified by SGS, while tonnages of recycled PVC waste and expenditures have been audited and certified by KPMG.

A full glossary of abbreviations appears at the end. For detailed descriptions of the projects and activities please visit [www.vinylplus.eu](http://www.vinylplus.eu).

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# GOVERNANCE

## VINYLPLUS MANAGEMENT BOARD

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

### MEMBERS

**Ms Karin Arz** – *EuPC<sup>1</sup> (Flexible PVC sector)*  
**Mr Fausto Bejarano** – *EuPC (Rigid PVC sector)*  
**Mr Dirk Breitbach** – *EuPC (Compounding sector)*  
**Mr Filipe Constant** – *ECVM 2010<sup>2</sup>*  
**Mr Alexandre Dangis** – *EuPC*  
**Dr Brigitte Dero** – *Managing Director (ECVM 2010)*  
**Mr Stefan Eingärtner** – *Technical Director*  
**Mr Rainer Grasmück** – *ESPA<sup>3</sup>*  
**Mr Andreas Hartleif** – *EuPC (Rigid PVC sector)*  
**Dr Zdenek Hruska** – *ECVM 2010*  
**Dr Ettore Nanni** – *Treasurer (ESPA)*  
**Mr Hans-Christoph Porth** – *ECVM 2010*  
**Mr Nigel Sarginson** – *European Plasticisers<sup>4</sup>*  
**Dr Arjen Sevenster** – *Controller (ECVM 2010)*  
**Dr Karl-Martin Schellerer** – *ECVM 2010*  
**Mr Stefan Sommer** – *Chairman (ECVM 2010)*  
**Mr Geoffroy Tillieux** – *Controller (EuPC)*  
**Mr Joachim Tremmel** – *European Plasticisers*  
**Ms Myriam Tryjefaczka** – *EuPC (Flexible PVC sector)*  
**Mr Christian Vergeylen** – *Vice Chairman (EuPC – Flexible PVC sector)*

## MONITORING COMMITTEE

The VinylPlus Monitoring Committee is the independent body supervising the implementation of the Voluntary Commitment. It thus plays a fundamental role in ensuring the transparency, participation and accountability of VinylPlus, as well as in providing guidance and advice. Open to all external stakeholders, it currently includes representatives of the European Commission, the European Parliament, academic institutions, trade unions and consumer organisations, as well as representatives of the European PVC industry. The Committee met formally twice in 2019, in April and in December.

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

### MEMBERS

**Ms Laure Baillargeon** – *Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW), European Commission*  
**Mr Werner Bosmans** – *Directorate-General Environment (DG ENV), European Commission*  
**Dr Alain Cavallero** – *Secretary General of ESPA<sup>(a)</sup>*  
**Mr Alexandre Dangis** – *VinylPlus Board Member*  
**Mr Armand De Wasch** – *Euroconsumers Group<sup>5</sup>*  
**Dr Brigitte Dero** – *Managing Director of VinylPlus*  
**Prof. Dr Ir. Jo Dewulf<sup>6</sup>** – *Chairman of the Monitoring Committee*  
**Ms Martina Dlabajová** – *Member of the European Parliament<sup>(a)</sup>*  
**Mr Ondřej Knotek** – *Member of the European Parliament<sup>(b)</sup>*  
**Mr Sylvain Lefebvre** – *Deputy General Secretary, industriAll European Trade Union<sup>7</sup>*  
**Mr Nuno Melo** – *Member of the European Parliament*  
**Dr Ettore Nanni** – *Treasurer of VinylPlus*  
**Mr Stefan Sommer** – *Chairman of VinylPlus*

**(a)** Until May 2019

**(b)** From December 2019

<sup>1</sup> EuPC: European Plastics Converters ([www.plasticsconverters.eu](http://www.plasticsconverters.eu))

<sup>2</sup> ECVM 2010: the formal legal entity of ECVM (The European Council of Vinyl Manufacturers – [www.pvc.org](http://www.pvc.org)), registered in Belgium

<sup>3</sup> ESPA: European Stabiliser Producers Association, is a sector group within Cefic, the European Chemical Industry Council. ESPA ([www.stabilisers.eu](http://www.stabilisers.eu)) is legally represented in VinylPlus by StabilisersPlus, the legal entity registered in Belgium

<sup>4</sup> European Plasticisers: formerly ECPI, is a sector group within Cefic. European Plasticisers ([www.europeanplasticisers.eu](http://www.europeanplasticisers.eu)) is legally represented in VinylPlus by PlasticisersPlus, the legal entity registered in Belgium

<sup>5</sup> European consumer organisation ([www.euroconsumers.org](http://www.euroconsumers.org))

<sup>6</sup> Department of Green Chemistry and Technology, Ghent University, Belgium ([www.ugent.be/en](http://www.ugent.be/en))

<sup>7</sup> industriAll: European Trade Union ([www.industriall-europe.eu](http://www.industriall-europe.eu))



# FOREWORD

***As the second decade of Voluntary Commitments for the Sustainable Development of the European PVC industry comes to a close, we are only a small step from achieving the objectives we set. Making PVC circular is now one of our fundamental values, and it confirms our desire to work with industry, civil society, government and regulators to make the circular economy a reality.***

*In 2019, 771,000 tonnes of PVC were recycled in the VinylPlus framework, very close to our 800,000-tonne target for 2020. We have worked hard for this result and, in recent years, further strengthened the operational and organisational structures of Recovinyl®. We have expanded the network of partners and improved collection, recycling and certification schemes.*

*However, legacy additives remain a thorny issue, and they represent the main threat to our recycling targets. This is in spite of the valuable work we have carried out to ensure the safe use of recycled PVC products containing such additives, using third-party, fact-based risk assessments.*

*In 2019, we have further implemented our Additive Sustainability Footprint and are now able to provide our partners with a working methodology that can proactively evaluate the use of current and new additives in PVC products from the perspective of sustainable development.*

*I would like to emphasise the value of the VinylPlus® Product Label, our sustainability certification scheme, which is increasingly known and*

*requested by both our partners manufacturing construction products and their customers. The Label has now been officially validated in Italy by Accredia and we are working to extend the validation throughout Europe and make it recognized in downstream sustainable construction schemes, such as BREEAM.*

*We have also made a great effort to raise sustainability awareness, which has strengthened our credibility with all stakeholders on the basis of the concrete results achieved so far. I am particularly proud of VinylPlus' recent engagement with the sporting community, such as the partnership with the International School Sport Federation (ISF) and the collaboration with the non-profit citizenship association Schuman Square (Brussels, Belgium). These initiatives have proved particularly successful both in designing sustainable sporting events and as vehicles to promote the understanding of sustainability and material circularity among young people.*

*In this last period of the current Voluntary Commitment, we have already started to work on our*

*programme for the next decade and beyond. We have made a commitment to the European Union that by 2025 we will recycle 900,000 tonnes of PVC per year into new products – and at least 1 million tonnes by 2030. In September 2019, VinylPlus officially joined the Circular Plastics Alliance (CPA), the high-level multi-stakeholder platform aimed at improving the economics and quality of plastics recycling in Europe. I am particularly proud that VinylPlus is chairing the CPA Construction Working Group, showing how much we engage the PVC value chain in the circular economy.*

*Months of hard work lie ahead of us on ongoing projects and to deliver on the 2020 targets, while also carrying out consultations with different stakeholders, inside and outside the industry, to gather input, suggestions and advice on the priorities for our next 10-year Voluntary Commitment towards 2030.*

**STEFAN SOMMER**  
Chairman of VinylPlus



# CHALLENGE 1

## CONTROLLED-LOOP MANAGEMENT:

“

*We will work towards the more efficient use and control of PVC throughout its life cycle.<sup>8</sup>*

VINYLPUS' **CHALLENGE 1** CONTRIBUTES TO THE FOLLOWING SUSTAINABLE DEVELOPMENT GOALS:<sup>9</sup>



TARGET 8.4



TARGET 9.5



TARGET 12.5



TARGET 13.1

## RECYCLING ACHIEVEMENT

In 2019, PVC waste recycling within the VinylPlus framework reached 771,313 tonnes, a 4.3% increase compared to the previous year.

Demand for recycled rigid PVC remained very high. At the same time, more PVC waste was available from cables – particularly in the Czech Republic, France, Germany, Poland and the UK – due to reduced exports to China.

Over the year, Recovinyl<sup>10</sup> further improved its monitoring and traceability systems throughout the recycling chain and carried out a survey to verify which applications PVC waste recycled in 2018 had been used in. (See chart at p. 8).

In 2019, 13 new recyclers joined the Recovinyl network.

### Industry-Sector Projects for PVC Waste Management

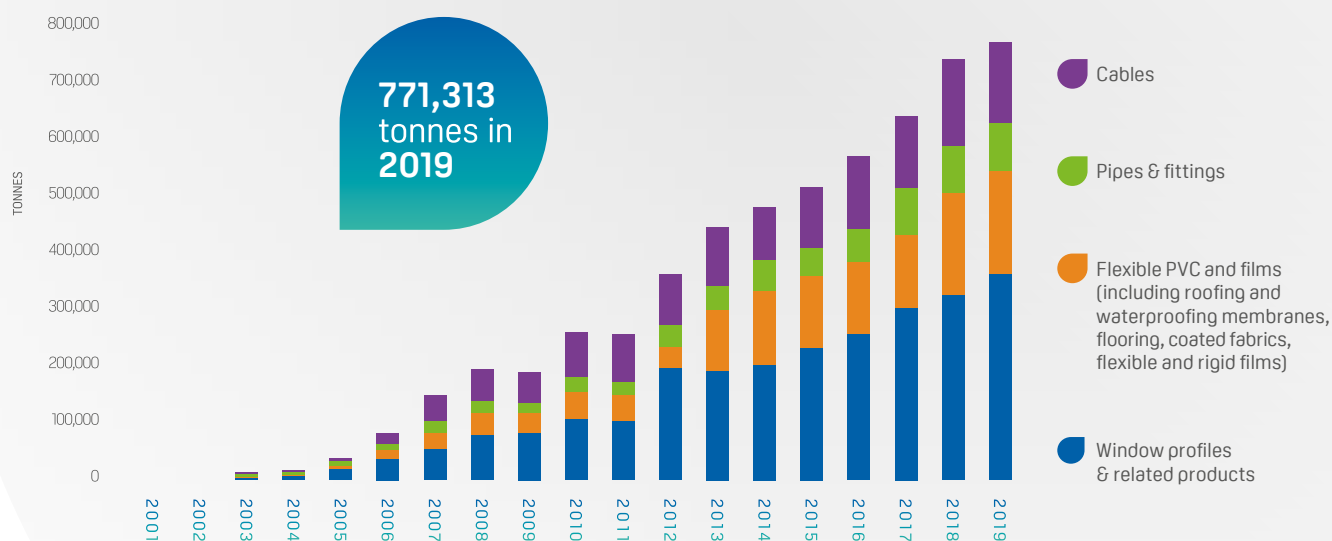
With 363,137 tonnes recycled in 2019, window profiles and related building products accounted for 47% of the total PVC recycled in the VinylPlus framework.

<sup>8</sup> Targets, deadlines and status of achievement are summarised in the Appendix, p. 36

<sup>9</sup> <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

<sup>10</sup> Set up in 2003, Recovinyl is the organisation aimed at facilitating PVC waste collection and recycling in the framework of the European PVC industry's Voluntary Commitments ([www.recovinyl.com](http://www.recovinyl.com))

## PVC RECYCLED WITHIN THE VINYLPLUS FRAMEWORK



A lightweight cycle lane separator made of recycled PVC: it has no sharp edges and is highly resistant to compression, impacts and bad weather.

In 2019, EPPA<sup>11</sup> started a technical project aimed at understanding the potential hazard classification under European waste legislation of rigid PVC containing legacy additives. Based on state-of-the-art scientific assessments, the study is investigating whether end-of-life PVC windows contain substances classified as HP 14 (Hazardous Properties ecotoxic).

In Germany, where the potential for post-consumer window recycling is high, Rewindo<sup>12</sup> set up a project aimed at further improving its collection and recycling schemes and enhancing partnerships and the number of partners along the value chain. Concrete actions also included increasing the number of local collection points for small and medium quantities of waste.

PVC membranes ensure excellent insulation for a wide range of applications in public and private buildings and constructions.



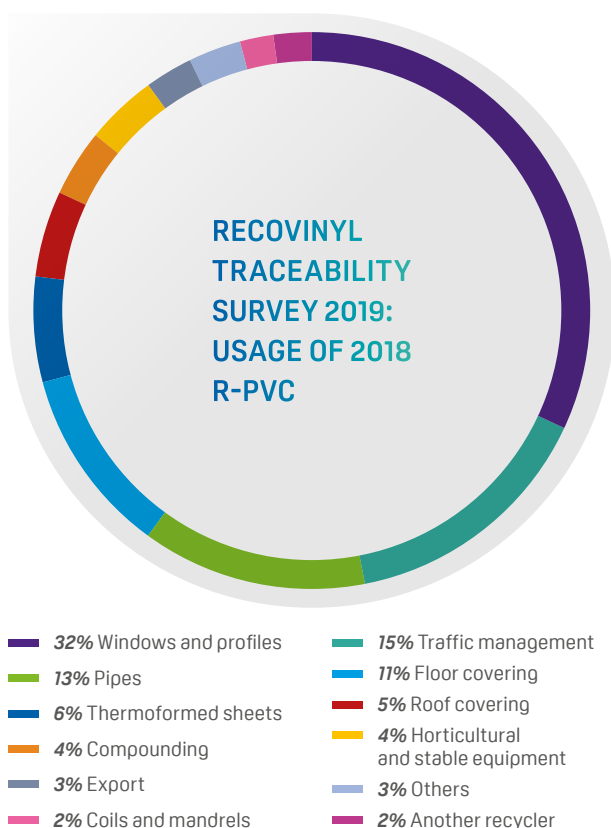
<sup>11</sup> EPPA: European PVC Window Profile and Related Building Products Association ([www.eppa-profiles.eu](http://www.eppa-profiles.eu))

<sup>12</sup> Rewindo: the German recycling initiative for PVC windows, roller shutters and related products ([www.rewindo.de](http://www.rewindo.de))



The structure, designed by the Dutch DoepelStrijkers team, creates a water management system with 2,400 pieces of recycled rainwater pipes. Perforated pipes collect rainwater to fill the pavilion's pool and provide water to the plants growing in the pipes.

During the past three years, the use of recycled PVC in pipe systems by TEPPFA<sup>13</sup> members has declined, and it has now settled at around 40,000 tonnes per year. Since the potential for recycling is much higher, TEPPFA initiated a project to test increased levels of recyclates in pipe systems and to demonstrate the performance of the final products. Co-extrusion is a consolidated technology and could, in theory, be suited to increasing the use of recyclates. However, the exploitation of this technology is currently limited by customer acceptance – for example, multi-layer pipe systems are not allowed in the Nordic countries, Austria and Belgium – and by a lack of material at the right price and of suitable quality. TEPPFA is therefore working on a new approach aimed at increasing the R-PVC uptake in solid-wall pipes, such as sewer pipes approved according to the EN 1401 standard.



A PVC circular economy platform, co-funded by VinylPlus and ReVinylFloor,<sup>14</sup> was set up within ERFMI<sup>15</sup> to promote a circular economy for the vinyl flooring sector in Europe and to support the objectives of the EU Circular Plastics Alliance (CPA – also see p. 11).

Recycling initiatives by IVK Europe<sup>16</sup> supported the collection and recycling of 41,300 tonnes of coated fabrics and soft and rigid PVC films in 2019. (These are reported as part of Recoviny volumes.)

Around 16,500 tonnes of roofing and waterproofing membranes were recycled through ESWA's<sup>17</sup> project Roofcollect® ([www.roofcollect.com](http://www.roofcollect.com)) and through the Recoviny scheme. The pilot trial for the treatment of roofing membranes at the Oreade plant was postponed until 2020. (See p. 9).

6,258 tonnes of flexible and rigid PVC films – reported as part of Recoviny volumes – were recycled by VFSE<sup>18</sup> Packaging and Automotive Working Groups' members. In total, 170,042 tonnes of flexible PVC and films were recycled in 2019 in the framework of VinylPlus.

<sup>13</sup> TEPPFA: The European Plastic Pipes and Fittings Association ([www.teppfa.eu](http://www.teppfa.eu))

<sup>14</sup> ReVinylFloor is the organisation set up to stimulate sustainable controlled-loop solutions for the recycling and recovery of post-consumer PVC flooring in Europe ([www.revinylfloor.org](http://www.revinylfloor.org))

<sup>15</sup> ERFMI: European Resilient Flooring Manufacturers' Institute ([www.erfmi.com](http://www.erfmi.com))

<sup>16</sup> IVK Europe: Industrieverband Kunststoffbahnen e.V. (Plastic Sheets and Films Association – [www.ivk-europe.com](http://www.ivk-europe.com))

<sup>17</sup> ESWA: European Single Ply Waterproofing Association, an EuPC sectoral association ([www.eswa.be](http://www.eswa.be))

<sup>18</sup> VFSE: Vinyl Films and Sheets Europe, the association representing the European suppliers of plastics sheets and foils ([www.vfse.org](http://www.vfse.org))



## Other Recycling Projects

The Oreade chemical recycling process, which is being studied at the Oreade-Suez<sup>19</sup> plant in France, combines energy and material recovery. Following the promising results of the 2017-2018 small-scale test trials, large-scale trials were planned for 2019 to test waste streams with different chlorine concentrations. Technical issues, such as a fire in the waste storage facility in Val'Estuaire in December 2018, caused some delays. But the project restarted at the end of 2019 with the delivery of the first 100 tonnes of PVC waste. In the meantime, the process was further optimised: a new concept for a more efficient neutralisation of HCl was developed; and new equipment was introduced that shreds PVC waste into smaller, homogeneous pieces.

In 2019, a life-cycle-assessment (LCA) study was conducted in agreement with the international standards ISO 14040-44 on the environmental footprint of flue gas treatment (FGT) during PVC incineration.

The study compared the Resolest<sup>20</sup> process used in the Oreade project with standard flue gas neutralisation technologies. Three different options were investigated: dry scrubber with sodium bicarbonate and with brine recovery (Resolest process); dry scrubber with bicarbonate without brine recovery; and dry scrubber with lime (the calcium-containing inorganic mineral). The results show that the sodium bicarbonate with brine recovery is the preferred option for flue gas neutralisation from the environmental point of view for all the environmental impact indicators.

### VINYLPLUS RECYCLING ACHIEVEMENTS



**770,000**  
tonnes of PVC waste  
recycled in 2019

**1.5 million**  
tonnes of CO<sub>2</sub>  
saved

The Buia lamps are an example of amazing recycling. Moulded from old PVC buoys, they exploit two different finishes: the outside surface is smooth and shiny, while the relief of the interior area creates interesting lightening effects.



PHOTO: COURTESY OF ALBA STUDIO

<sup>19</sup> [www.industriesduhavre.com/industries/oreade.html](http://www.industriesduhavre.com/industries/oreade.html)

<sup>20</sup> Resolest, a co-subsiary company of the Solvay Group and Sita Spécialités ([www.resolest.fr](http://www.resolest.fr)), is a leader in the recovery and recycling of residues from the purification of industrial fumes

In 2019, a new project called Thermovinyl was initiated by VinylPlus to assess the environmental characteristics of the PVC waste treatment processes in Swiss waste-to-energy plants. In Switzerland, some waste-to-energy plants recycle sodium residual chemicals (via Resolest, as in the Oreade project). Others use the recovered HCl from flue gas washing (by a wet-scrubbing process) to recycle metals from the bottom ashes. The study will compare the environmental benefits of both processes.

In June 2019, the REMADYL project<sup>21</sup> was launched. It is aimed at removing hazardous legacy substances from PVC and recycling 'old PVC' into high-purity PVC. The REMADYL project involves a consortium of 15 multidisciplinary European partners, including VinylPlus. The three-year project is funded by the Horizon 2020 Framework Programme for Research and Innovation and managed by the EASME (Executive Agency for Small and Medium-sized Enterprises) to contribute to the development of the EU Circular Economy Action Plan.



PVC wires and cables are the largest application sector for flexible PVC in Europe, absorbing 7% of PVC resins production.



The Resysta® recycling consortium ([www.resysta.com/en](http://www.resysta.com/en)) produces a recyclable wood-like material based on rice husks and PVC. In 2019, Resysta continued its communications and promotional activities for its applications, and improved its controlled-loop recycling system, which now has 20 collection points in Europe.

RecoMed is a partnership project between the British Plastics Federation (BPF)<sup>22</sup> and Axion<sup>23</sup> aimed at collecting and recycling non-contaminated used PVC medical devices from UK hospitals, including face masks and tubing. The project currently involves 36 hospitals, and another 100 are ready to enrol. Over 9,000 kg of medical devices were collected in 2019, equivalent to more than 746,000 mask-and-tube sets.

Since a tax on soft PVC is likely to be reintroduced in Denmark, the Danish manufacturers of flexible PVC decided to set up a new organisation to promote collection and recycling schemes for soft PVC along the lines of WUPPI.<sup>24</sup> The consultancy Ramboll<sup>25</sup> was commissioned to carry out a feasibility study. It will conduct a best-available-technique (BAT) analysis of existing collection and recycling schemes and assess the potential environmental benefits of Denmark joining the European recycling system. Ramboll's mandate also includes the development of concepts for the collection of soft PVC in Denmark.

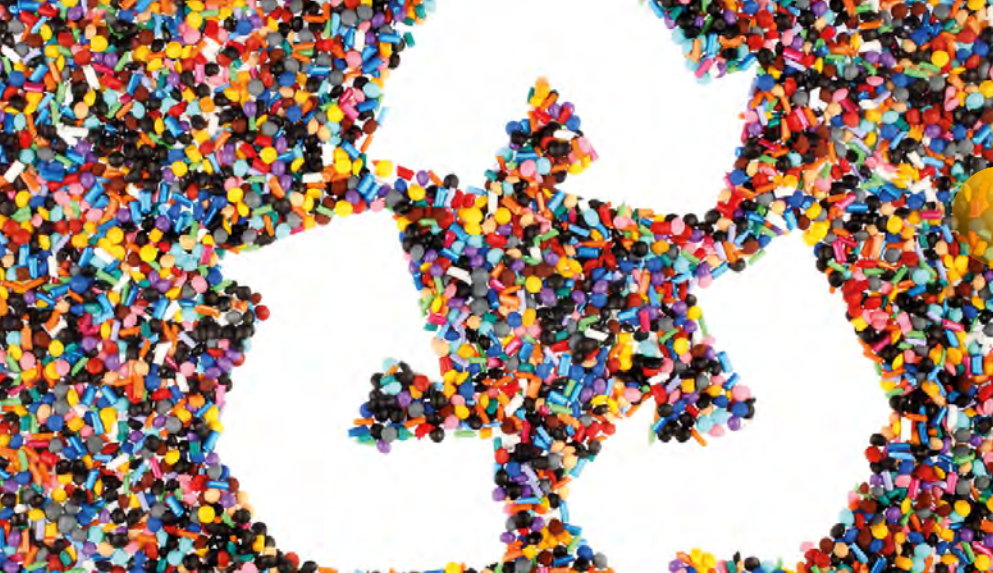
WREP (Waste Recycling Project) was launched in 2016 by PVC Forum Italia<sup>26</sup> to assess the improvement potential for PVC recycling in Italy and to promote the development of pilot PVC waste collection and recycling schemes. In the period 2018-2019, the project was developed

<sup>21</sup> <https://cordis.europa.eu/project/id/821136> and [www.remadyl.eu](http://www.remadyl.eu)

<sup>22</sup> BPF: British Plastics Federation, the leading trade association for the UK Plastic Industry ([www.bpf.co.uk](http://www.bpf.co.uk))

<sup>23</sup> Axion: circular economy specialists ([www.axiongroup.co.uk](http://www.axiongroup.co.uk))





Officially launched in September 2019 by the European Commission under the European Strategy for Plastics, the Circular Plastics Alliance (CPA) aims to boost the EU market for recycled plastics.

in partnership with Veritas, the utility operating in the Venice area ([www.gruppoveritas.it](http://www.gruppoveritas.it)); ARPAV, the Veneto Regional Environmental Prevention and Protection Agency; and DAE, the Recovinyl Regional Representative of Italy. The project focused on the recovery and recycling of PVC waste collected from urban waste at the municipal collection centres. Several new municipal utilities were contacted in 2019 to evaluate their interest in implementing the project in their collection centres and in other potential flows. ETRA SpA, the multi-utility operating in the Padua and Vicenza areas ([www.etraspa.it](http://www.etraspa.it)), signed an agreement in July 2019 with PVC Forum Italia in the framework of its participation in the CIRCE2020 project,<sup>27</sup> funded under the EU Interreg Central Europe programme. WREP is now part of CIRCE2020's initiatives in Italy. The WREP project will continue in 2020 and include a feasibility study for the design of a portable, economically viable NIR (near-infrared) detector to select PVC applications.

## CIRCULAR PLASTICS ALLIANCE

The EU Circular Plastics Alliance (CPA) is a collective endeavour aimed at taking actions to boost the EU market for recycled plastics to 10 million tonnes by 2025, a target set by the European Commission in its 2018 Plastics Strategy.

VinylPlus has committed to recycling 900,000 tonnes of PVC per year into new products by 2025 and at least one million tonnes by 2030. (Also see p. 12 of VinylPlus Progress Report 2019).

More than 215 organisations – representing industry, academia and public authorities and covering the whole plastics value chain and interested stakeholders – have to date signed the declaration of the Circular Plastics Alliance, which was officially launched in September 2019. These organisations included VinylPlus, several of its partners and PVC sectoral associations.

The Circular Plastics Alliance calls for a shift to zero plastic waste in nature and zero landfilling, and it builds on several concrete actions:

- The improvement of the design of plastic products to make them more recyclable
- The identification of solutions to further enhance plastic waste collection, sorting and recycling across the EU
- Setting a research-and-development agenda for circular plastics
- Establishing a transparent and reliable monitoring system.

The operational work is assured by six dedicated Working Groups – one for Monitoring and five for industry sectors: Packaging; Automotive; Construction; Electronic and Electrical Equipment; and Agriculture.

VinylPlus will play a key role by contributing its decades of experience and best practices to the activities of the Working Groups and to discussions over the new definitions of post-industrial and consumer waste under ISO standards. Since December 2019, the VinylPlus Managing Director is chairing the CPA Construction Working Group.

<sup>24</sup> WUPPI: Danish company set up to collect and recycle rigid PVC ([www.wuppi.dk](http://www.wuppi.dk))

<sup>25</sup> Ramboll: a leading engineering, design and consultancy company founded in Denmark in 1945

<sup>26</sup> PVC Forum Italia: the Italian association of the PVC value chain ([www.pvcforum.it](http://www.pvcforum.it))

<sup>27</sup> <https://www.interreg-central.eu/Content.Node/CIRCE2020.html>



PHOTO: COURTESY OF INTERNORM

PVC window profiles provide excellent thermal insulation and play an important role in reducing energy losses in buildings.

On 12 February 2020, a plenary session of the European Parliament voted in favour of this resolution objecting to the draft Commission regulation. The draft proposal was then returned to the Commission for review.

ECHA's proposal for lead-content limits requires that recycled PVC containing lead be completely encapsulated within a layer of virgin PVC in soft applications and in specific rigid applications. VinylPlus started a specific project on the development of soft PVC applications with a barrier layer. The project will investigate materials suitable for such barriers, including virgin soft PVC and rigid PVC films. It will look at the available converting technologies and at applications' durability, recyclability and costs. A dedicated consortium will also be set up for the development of new technologies.

Another outcome of the same REACH Committee meeting in November 2019 was that ECHA is expected to work again on the revision of the cadmium restriction in the first half of 2020.

## LEGACY ADDITIVES

Legacy additives are substances that are no longer used in new PVC products but can be present 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.

Over the years, VinylPlus has contributed to discussions on legacy additives by supporting research and a considerable number of studies. Several substances (such as cadmium compounds, lead-based stabilisers and DEHP) have been investigated from several angles. New studies are now ongoing on the development and validation of the PRE<sup>28</sup> legacy-additives screening protocol; and on complementary tests and modelling for legacy-additives leaching.

### Lead and Cadmium Restriction

In November 2019, the REACH Committee accepted<sup>29</sup> the European Chemical Agency's (ECHA) proposal of the lead-content limits revision for articles containing recycled PVC,<sup>30</sup> with a derogation period of 15 years, to be reviewed after 7.5 years. The draft regulation was sent for scrutiny to the European Parliament and Council. On 21 January 2020, the European Parliament ENVI Committee adopted a motion for resolution objecting to the draft EU Commission regulation, considering it incompatible with the aim and content of the REACH Regulation.



<sup>28</sup> PRE: Plastics Recyclers Europe ([www.plasticsrecyclers.eu](http://www.plasticsrecyclers.eu))

<sup>29</sup> [https://ec.europa.eu/transparency/regcomitology/index.cfm?do=search.documentdetail&Dos\\_ID=18479&DS\\_ID=65137&Version=1](https://ec.europa.eu/transparency/regcomitology/index.cfm?do=search.documentdetail&Dos_ID=18479&DS_ID=65137&Version=1)

<sup>30</sup> Also see p. 10 of VinylPlus Progress Report 2019



## CONTROLLED-LOOP COMMITTEE

2019 was another critical year for the whole European plastics industry. Global debate and pressure on plastics grew throughout the year. The European PVC industry was busy starting to develop its new sustainability programme for the next decade, while working to deliver on its 2020 targets.

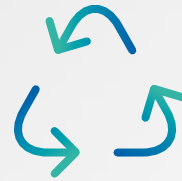
With a view to the commitments on recycling volumes beyond 2020, the consultancy Conversio ([www.conversio-gmbh.com](http://www.conversio-gmbh.com)) was asked to develop a new dynamic model to estimate post-consumer waste. The model, which is nearing completion, is expected to estimate the yearly amounts of available and collectable post-consumer PVC waste over the 2020-2040 period. The model considers over 20 product categories in geographical Recovinyl clusters across Europe. Recovinyl and the PVC Applications Sectors (converters) will be actively engaged during 2020 in the implementation of the dynamic model.

In September 2019, the Controlled-Loop Committee (CLC) organised a workshop with representatives of the PVC

## COMMITTED TO RECYCLING



**1 million tonnes**  
of PVC waste by 2030



**50%** of all  
plastics waste  
by 2040

Applications Sectors, EuPC and Recovinyl on the VinylPlus collection and recycling strategy beyond 2020. The workshop also discussed the re-evaluation of definitions of recycling for each sector so that these definitions could also be taken up in the framework of the Circular Plastics Alliance.

VinylPlus asked the consultant TNO ([www.tno.nl](http://www.tno.nl)) to carry out a desk study to systematically and critically investigate PVC chemical recycling technologies available on the market. This also in relation to the work undertaken by the Oreade project. After a preliminary screening, it was decided that TNO should assess three technologies: Ebara-Ube (gasification); Agylis (pyrolysis); and Oreade. Municipal solid waste (MSW) incineration will be used as a reference. Results will include eco and energy-efficiency performance as well as costs.

The issue of legacy additives remains a significant threat to the VinylPlus recycling programme and is making converters increasingly reluctant to use recycled PVC containing legacy additives in new products. In 2019, the CLC strengthened its cooperation with Plastics Recyclers Europe, which is currently working on the certification of the recycling plants, on the traceability of recyclates in every sector and on monitoring policies.

From a regulatory point of view, the CLC in 2019 developed a range of arguments to address the hypothesis of mandatory content of recycled plastics in new products. Instead, the Committee is in favour of initiatives aimed at increasing the availability of high-quality recyclates in the market. In 2020, the CLC will continue to prepare further documentation to support recycling whilst ensuring that there are no market distortions – which could be the case with mandatory targets.

Traffic management applications made of recycled PVC protect bikers and prevent other vehicles on the road from invading the cycle lane.



PHOTO: COURTESY OF CIGLA

# CHALLENGE 2

## ORGANOCHLORINE EMISSIONS:

“

*We will help to ensure that persistent organic compounds do not accumulate in nature and that other emissions are reduced.*<sup>31</sup>

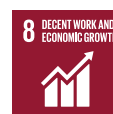
VINYLPLUS' **CHALLENGE 2**  
CONTRIBUTES TO THE FOLLOWING  
SUSTAINABLE DEVELOPMENT GOALS:<sup>32</sup>



TARGET  
1.5



TARGET  
3.9



TARGET  
8.8



TARGET  
9.4



TARGET  
12.4



TARGET  
14.1

## SAFE TRANSPORT

There were no transport accidents in Europe with VCM release in 2019.

PHOTO: COURTESY OF VEKA

363,137 tonnes of PVC window profiles were recycled in 2019 within the VinylPlus framework.

## PVC RESIN INDUSTRY PRODUCTION CHARTERS

The industry charters for suspension (VCM and S-PVC Charter) and emulsion (E-PVC Charter) PVC are aimed at reducing environmental impact in the production phase. In 2019, they were updated, taking into account the current best available techniques, and unified into a single document: *ECVM Industry Charter for the Production of Vinyl Chloride Monomer and PVC*.<sup>33</sup>

The updated Charter includes two new commitments: to limit workers' exposure to VCM as much as technically feasible and to participate in the Operation Clean Sweep® programme by applying the auditing method adapted to PVC plants.

The PVC resin industry is committed to achieving 100% compliance with the updated Charter by the end of 2021.

<sup>31</sup> Targets, deadlines and status of achievement are summarised in the Appendix, p. 36

<sup>32</sup> <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

<sup>33</sup> The updated version of the ECVM Industry Charter can be downloaded at <https://pvc.org/about-ecvm/ecvms-charter/>; the previous versions are available at: [https://pvc.org/wp-content/uploads/2019/03/ECVM\\_Charter\\_VCM\\_PVC.pdf](https://pvc.org/wp-content/uploads/2019/03/ECVM_Charter_VCM_PVC.pdf) and <https://pvc.org/wp-content/uploads/2019/03/Emulsion-PVC-Charter.pdf>



# CHALLENGE 3

## SUSTAINABLE USE OF ADDITIVES:

“

*We will review the use of PVC additives and move towards more sustainable additive systems.*<sup>34</sup>

VINYLPLUS' **CHALLENGE 3**  
CONTRIBUTES TO THE FOLLOWING  
SUSTAINABLE DEVELOPMENT GOALS:<sup>35</sup>



TARGET  
6.3



TARGET  
12.4

## STABILISERS

In October 2018, ESPA appointed VITO<sup>36</sup> to conduct a life-cycle assessment for Ba-Zn and Ca-Zn liquid mixed-metal (LMM) stabilisers, mainly used in flexible PVC applications. The final report was issued in November 2019 and concluded that LMM stabilisers have a low impact, given their very low content into the final PVC articles, and the fact that their current components have been designed to fulfil with the REACH requirements. Overall, LMM stabilisers contribute between 0.1% and 3% in all impact categories for a PVC product. On this basis, and taking into account the beneficial properties they provide to the final articles in terms of aesthetic appearance, durability and recyclability, LMM stabilisers can be considered an appropriate family of additives for sustainable use.

PVC flooring, glass, mirrors and gloss finishes with hidden LEDs characterise the spaces of Clínica Jardim dental clinic, in Lisbon, Portugal, duplicating the natural light and increasing the patients' comfort.

PHOTO: COURTESY OF FERNANDO GUERRA

<sup>34</sup> Targets, deadlines and status of achievement are summarised in the Appendix, p. 36

<sup>35</sup> <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

<sup>36</sup> VITO: Vlaamse Instelling voor Technologisch Onderzoek (Flemish Institute for Technological Research – [www.vito.be](http://www.vito.be))



PHOTO: COURTESY OF TARKETT

## PLASTICISERS

Estimates by European Plasticisers confirm a constant growth in the use of high molecular weight (HMW) orthophthalates, cyclohexanoates, terephthalates and other plasticisers in Europe, together with a progressive decline in the use of low molecular weight (LMW) orthophthalates. Given the large tonnages involved, the conversion from SVHC (Substances of Very High Concern) low molecular weight phthalates to non-SVHC phthalates and other plasticisers has involved major investment (over 6 billion euros) by the European plasticiser industry. Toxicological testing and risk assessments were conducted on the alternative plasticisers during this period by regulators with the involvement of all stakeholders via public consultations and meetings.

### Studies and Research

A scientific project aimed at developing a PBPK (physiologically-based pharmacokinetic) model for plasticisers was started in 2017 by European Plasticisers and co-funded by VinylPlus. Its objective is to demonstrate the safe use of plasticised PVC and support scientifically solid risk assessments, in particular compared to potential risk assessments based on simple in-vitro studies.

The PBPK model for DINCH has already been published,<sup>37</sup> and the model for DINP was submitted for publication in December 2019. PBPK models for DEHTP and DPHP

are under evaluation. Since the metabolism of adipates differs significantly from that of phthalates, PBPK models for DEHA, DINA and DBA are being developed based on urinary data.


Preliminary results of a state-of-the-art study, which is being completed by the University of Edinburgh, UK, confirm that DINP does not have reproductive effects and is hence different from the phthalates classified as SVHC, such as DBP.



PHOTO: COURTESY OF TNG

<sup>37</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6897292/>





Heterogeneous vinyl floors offer creative solutions for commercial and residential use. Being extremely resistant, they keep their performance unchanged over time, even after intense clamping.

## Regulatory Updates

In December 2019, EFSA<sup>38</sup> issued an update<sup>39</sup> of the risk assessment of the phthalates DBP, BBP, DEHP, DINP and DIDP for use in food-contact materials. EFSA's CEP Panel<sup>40</sup> concluded that *"current exposure to these five phthalates from food is not a concern for public health"*.<sup>41</sup> Nevertheless, on a temporary basis, it adopted a group TDI (tolerable daily intake) limit of 50 µg/kg of body weight (bw) per day for the combined total intake of DBP, BBP, DEHP, DINP, and confirmed a TDI of 150 µg/kg of bw per day for DIDP.

European Plasticisers questions the CEP Panel's approach of grouping the non-classified high molecular weight DINP<sup>42</sup> with the SVHC low molecular weight phthalates DEHP, DBP and BBP. Its view is based on the fact that neither scientific evidence nor ECHA's Risk Assessment Committee's assessment of DINP support the EFSA's opinion. European Plasticisers provided input to the EFSA public consultation in April 2019 and supports further assessment of substances

in food-contact materials with robust weight-of-evidence approach, using all the scientific data, including recent studies, as well as the opinions of other EU agencies.

In June 2019, the European Commission's Scientific Committee on Health, Environmental and Emerging Risks (SCHEER) issued guidelines for the use of DEHP in medical devices as included in the new medical device regulation (Regulation (EU) 2017/745), which will enter into force on 26 May 2020.<sup>43</sup>

In July 2019, ECHA submitted a recommendation to the European Commission to amend the Authorisation List (Annex XIV of REACH) entries by adding the endocrine disrupting properties of the four phthalates DEHP, BBP, DBP and DIBP.<sup>44</sup> Once the Commission decides on the amendment, some previously exempted uses will require authorisation (e.g. in case DEHP is listed as endocrine disruptor for the environment, authorisation applications will have to be submitted for its use in food-contact materials and medical devices).



Hi-tech and innovative PVC fabrics used in the automotive industry guarantee high mechanical resistance to scratches and abrasions, as well as thermal and chemical resistance (soiling and cleanability). At the same time, they ensure excellent visual and tactile characteristics together with anti-squeak properties.

<sup>38</sup> European Food Safety Authority ([www.efsa.europa.eu](http://www.efsa.europa.eu))

<sup>39</sup> <https://www.efsa.europa.eu/en/efsajournal/pub/5838>

<sup>40</sup> The EFSA Panel on Food Contact Materials, Enzymes and Processing Aids

<sup>41</sup> <https://www.efsa.europa.eu/en/news/faq-phthalates-plastic-food-contact-materials>

<sup>42</sup> Also see p. 15-16 of VinylPlus Progress Report 2019

<sup>43</sup> [https://ec.europa.eu/health/sites/health/files/scientific\\_committees/scheer/docs/scheer\\_o\\_015.pdf](https://ec.europa.eu/health/sites/health/files/scientific_committees/scheer/docs/scheer_o_015.pdf)

<sup>44</sup> <https://echa.europa.eu/fr/-/endocrine-disrupting-properties-to-be-added-for-four-phthalates-in-the-authorisation-list>



PHOTO: COURTESY OF MOROSO

The furniture collection created by the Italian designer Federica Capitani originates from the playful combination of two flowing, intertwined PVC loops.

The restriction proposal<sup>45</sup> on DEHP, BBP, DBP and DIBP by ECHA and Denmark, which was adopted<sup>46</sup> by the European Commission in December 2018, will enter fully into force in July 2020.

Authorisation for the manufacture and use of virgin DEHP is still pending, although those companies who applied for authorisation at least 18 months before the sunset date can continue to supply it for non-restricted uses.

A sustainable tourist resort where pale grey canvas made of PVC provide a muted insulation covering. The geodesic structures are made of PVC triangular modules. The forms are extremely strong, yet use little material and remain lightweight.

## CRITERIA FOR THE SUSTAINABLE USE OF ADDITIVES

### Additive Sustainability Footprint

The ASF (Additive Sustainability Footprint – <https://vinylplus.eu/asf>) is the methodology developed by the VinylPlus Additives Committee and The Natural Step<sup>47</sup> to evaluate the use of additives in PVC products from the perspective

of sustainable development. A peer-reviewed paper explaining the ASF methodology and its criteria was published by the Journal of Vinyl & Additive Technology in August 2019.<sup>48</sup> After the critical review of the methodology carried out in 2018 by an independent LCA expert (Prof. Azapagic, University of Manchester, UK), the validation of the ASF criteria can be now considered as fully achieved.

In 2018, ReVinylFloor initiated the ASF assessment of the lifecycle sustainability footprint of the key additives in a generic homogeneous PVC floor covering.

In 2019, as the first step of the assessment, PVC flooring converters were asked to provide information about the additives used in 2000, 2010 and 2018.

These historical data helped to assess the recyclability of older products, while the current data are needed to perform the ASF assessment and predict the composition of subsequent waste. The first step of the information collection ranked the three most-used additives from eight classes (plasticisers, stabilisers, lubricants, pigments, fillers, flame retardants, antioxidants and others) in 2000, 2010 and 2018, showing the progressive evolution of the flooring formulations.

The second step of the information collection is ongoing and is aimed at assessing the typical formulations with the most-used additives.

<sup>45</sup> [https://echa.europa.eu/documents/10162/23821863/nr\\_annex\\_rac\\_seac\\_march.pdf/fcc9fe3c-1221-93ad-0fe0-e5772436e97c](https://echa.europa.eu/documents/10162/23821863/nr_annex_rac_seac_march.pdf/fcc9fe3c-1221-93ad-0fe0-e5772436e97c)

<sup>46</sup> Commission Regulation (EU) 2018/2005

<sup>47</sup> Sustainability NGO acting as critical friend and sustainability advisor to VinylPlus ([www.thenaturalstep.org](http://www.thenaturalstep.org))

<sup>48</sup> <https://onlinelibrary.wiley.com/doi/full/10.1002/vnl.21733>



# 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.*<sup>49</sup>

VINYLPUS' **CHALLENGE 4**  
CONTRIBUTES TO THE FOLLOWING  
SUSTAINABLE DEVELOPMENT GOALS:<sup>50</sup>



TARGET  
7.3



TARGET  
8.4



TARGET  
12.2



TARGET  
13.1

## ENERGY EFFICIENCY

PVC resin producers are committed to diminishing their energy consumption for the production of EDC, VCM and PVC, targeting a 20% reduction by 2020.

As reported in last year's Progress Report, in 2018 IFEU<sup>51</sup> completed a new verification of ECVm members' energy consumption data for 2015-2016. There was no significant progress compared to the previous verification of consumption data, and actually an apparent setback.<sup>52</sup> Investigation of the reasons showed that changes in production plants' set weighted for 0.5% of the result; and that a 10% reduction in energy consumption might be very close to the current thermodynamic limits of the plants in question. Further investigations are on-going.

## RENEWABLE RAW MATERIALS

Since the publication of its first Status Report<sup>53</sup> on renewable raw materials in 2015, VinylPlus has continued to monitor developments. Thanks to technical and scientific improvements, industry innovation, as well as changes in market conditions over the past few years,



Vertical PVC shades protect the western facade following the path of the sun. The house protects its residents from outside views, while providing optimal levels of transparency necessary for creating pleasant spaces.

non-fossil-based PVC additives, compounds and applications are starting to become available. In October 2019 and February 2020, commercially viable bio-attributed certified PVC resins were launched on the market by two ECVm member companies.<sup>54 55</sup>

VinylPlus will produce an updated Status Report on renewable raw materials by the end of 2020.

<sup>49</sup> Targets, deadlines and status of achievement are summarised in the Appendix, p. 36

<sup>50</sup> <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

<sup>51</sup> IFEU: Institut für Energie- und Umweltforschung Heidelberg GmbH (German Institute for Energy and Environmental Research – [www.ifeu.de](http://www.ifeu.de))

<sup>52</sup> Also see p. 17-18 of VinylPlus Progress Report 2019

<sup>53</sup> [http://www.vinylplus.eu/uploads/docs/Report\\_on\\_Renewable\\_Raw\\_Materials.pdf](http://www.vinylplus.eu/uploads/docs/Report_on_Renewable_Raw_Materials.pdf)

<sup>54</sup> <https://www.inovyn.com/news/inovyn-launches-worlds-first-commercially-available-grade-of-bio-attributed-pvc/>

<sup>55</sup> <https://www.vynova-group.com/bio-attributed-pvc>

# 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.<sup>56</sup>*

VINYLPLUS' **CHALLENGE 5**  
CONTRIBUTES TO THE FOLLOWING  
SUSTAINABLE DEVELOPMENT GOALS:<sup>57</sup>



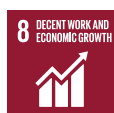
TARGET  
3.9



TARGET  
4.4  
4.7



TARGET  
5.1



TARGET  
8.8



TARGET  
12.6  
12.7  
12.8  
12.A



TARGET  
17.7  
17.16  
17.17

## STAKEHOLDER DIALOGUE AND COMMUNICATIONS

VinylPlus is committed to raising awareness of sustainability at all points in the value chain and to a frank and open dialogue with all of its stakeholders – whether they be inside or outside the PVC industry. In line with its commitment, VinylPlus took part in a series of major national and international conferences and scientific events in 2019, where it presented its approach, projects and achievements and exchanged experiences and best practices.

In February 2019, VinylPlus organised a workshop in Rome, Italy, on the *VinylPlus Contribution to a Circular Economy and the EU Plastics Strategy*. The workshop was an opportunity to present VinylPlus progress to representatives of the Italian Ministries of Economic Development, Environment and Health, as well as officials from other relevant national authorities, and for an exchange of views on possible ways forward, with particular reference to Italian and EU policies on the circular economy and plastics.

At Identiplast 2019, the 14<sup>th</sup> International Conference on the Recycling and Recovery of Plastics held in March in London, UK, VinylPlus contributed to the debate in the session *What is Industry Doing to Meet the Challenges?*

In April, the *Voluntary Commitments of the European PVC Industry in the Context of the EU Circular Economy*

<sup>56</sup> Targets, deadlines and status of achievement are summarised in the Appendix, p. 36

<sup>57</sup> <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>





was presented at the PVC Formulation 2019 conference, in Cologne, Germany.

At the 10<sup>th</sup> International Symposium on Feedstock Recycling of Polymeric Materials, in Budapest, Hungary, in May 2019, VinylPlus gave a speech on *Chemical Recycling of Specific Plastics Waste Streams – The Case of PVC*. The speech featured in the session in Memoriam of Prof. Alfons Buekens, who was Chairman of the VinylPlus Monitoring Committee for many years.

The 7<sup>th</sup> VinylPlus Sustainability Forum (VSF2019) took place in Prague, Czech Republic, in May, with the theme *Accelerating Innovation*. The Forum brought together 185 stakeholders from 32 countries, including representatives from the European Commission, European Parliament, the Czech Ministry of Environment, the United Nations, NGOs, academic institutions, specifiers, architects, designers, recyclers and the PVC value chain. Discussions focused on the challenges and opportunities presented by new technologies in shaping the PVC sector's future in the context of the circular economy. The topics explored at the VSF2019 were further debated at the one-day events organised by the three national associate members of VinylPlus in Germany, Italy and the UK. These events provided an update on VinylPlus progress and innovations that are transforming the PVC industry. They highlighted the essential role the industry has to play in driving sustainable innovation.

The Innovation Forum conference held in Amsterdam, The Netherlands, in October 2019, was dedicated to the Future of Plastics. The VinylPlus journey over the last 19 years was the focus of a dedicated case study,

which detailed what VinylPlus has achieved and what it will do next. The case study also highlighted what are the key learning points for making substantive, credible collaboration work in the plastics industry.

On the occasion of the special show *Plastics Shape the Future* at the K 2019 fair in Düsseldorf, Germany, VinylPlus took part in the session debating sustainability initiatives in the European plastics value chain.



A moment of the plant visit organised by the European Chemical Sectoral Social Partners and VinylPlus.

## Cooperation Agreement of the Social Partners of the European Chemical SSDC<sup>58</sup> and VinylPlus on the European PVC Industry

As a follow-up to the outcome of the 2018 workshop *Health and Safety at PVC Converters and Recyclers: Status Quo and Launch of Cooperation*,<sup>59</sup> a plant visit to the Belgian company Deceuninck<sup>60</sup> was organised in December 2019 by the European Chemical Sectoral Social Partners (made up of ECEG<sup>61</sup> and industriAll Europe<sup>62</sup>) and VinylPlus and its partners.

The yoga mats, provided by VinylPlus for the campaign *Sport for All, No Borders No Limits* during the European Week of Sport – #BEACTIVE – were donated to local hospitals for use in their rehabilitation programmes. In the photo: Bram Mombers-Schepers, Cliniques de l'Europe ASBL (left) receiving the donation from Brigitte Dero, VinylPlus (right); and Bernadette Erpicum, ASBL Vidonne – Brussels Yoga Day.



<sup>58</sup> SSDC: Sectoral Social Dialogue Committee

<sup>59</sup> Also see p. 21 of VinylPlus Progress Report 2019

<sup>60</sup> Deceuninck is a Belgian designer and producer of PVC systems for windows and doors, cladding, and terraces. ([www.deceuninck.com](http://www.deceuninck.com)). It is a Partner of VinylPlus

<sup>61</sup> ECEG: European Chemical Employers Group. ECEG is the European employers' organisation representing the interests of the chemical, pharmaceutical, rubber and plastics industries at the European level ([www.eceg.org](http://www.eceg.org))

<sup>62</sup> industriAll European Trade Union represents workers across supply chains in manufacturing, mining and energy sectors across Europe ([www.industriAll-europe.eu](http://www.industriAll-europe.eu))

The visit focused on the preparation and use of recycled material, and participants were able to deepen their knowledge of the good practices within the PVC industry. This was achieved by learning in greater detail about the VinylPlus Voluntary Commitment and the VinylPlus® Product Label (see p. 25), as well as observing the sustainability and worker-safety best practices applied in the plant. Participants were also able to know and discuss available HSE (Health, Safety and Environment) tools and documents. These practices can now be shared with smaller companies, to raise awareness of how to further improve the HSE of converters and recyclers. Regular PVC plant visits will be organised involving IndustriAll, ECEG, and MEPS.

## Partnering with the Sports Community for Sustainability

Sports play a key role in ensuring social wellbeing and in spreading positive values such as education, fairness and gender equality. At the same time, sustainable development, climate change and the circular economy are increasingly becoming key priorities for sporting events.

Combining youth, sports, education and gender equality, She Runs – Active Girls’ Lead 2019 was the perfect event for VinylPlus to partner with and promote sustainability in the sport community.



As part of its commitment to sustainability awareness, VinylPlus gave new impetus to its involvement with the sports community in 2019. It engaged with an active youth audience and demonstrated how to reduce the environmental impact of sporting events using materials such as PVC that can be reused and recycled.

In March, VinylPlus championed the sustainable use of PVC at the running event She Runs – Active Girls’ Lead 2019 ([www.sheruns.eu](http://www.sheruns.eu)), which attracted 2,500 young women from 35 countries. Organised in Paris, France, by the International School Sport Federation (ISF), the event aimed to promote girls’ health, emancipation, and leadership through school sport.

The joint *Environmental Action*<sup>63</sup> commitment signed by VinylPlus and ISF for the She Runs event ensured that PVC was used sustainably during and after the event and that the lessons learned could be shared. A report, *Introducing Material Circularity to an International Youth Sports Event*,<sup>64</sup> co-signed by VinylPlus and ISF, was officially presented at the She Runs – Active Girls’ Lead conference organised in Brussels during the European Week of Sport in September 2019. The report was presented to key stakeholders from the European institutions, international and European sports organisations and the city of Brussels, as well as to experts on gender equality in sport and international athletes.



<sup>63</sup> [https://vinylplus.eu/uploads/Modules/Mediareom/charter\\_enandfr\\_a4\\_final.pdf](https://vinylplus.eu/uploads/Modules/Mediareom/charter_enandfr_a4_final.pdf)

<sup>64</sup> [https://vinylplus.eu/uploads/SheRuns/VinylPlus\\_She\\_Runs\\_Report\\_EN.PDF](https://vinylplus.eu/uploads/SheRuns/VinylPlus_She_Runs_Report_EN.PDF)





During the Fourth Session of the United Nations Environment Assembly (UNEA-4), VinylPlus contributed as a panellist in the Green Tent Event organised by the Business and Industry Major Group.

As part of its strategic partnership with the sports community, VinylPlus was also involved in the European Week of Sport, the largest publicly-funded sports initiative in the world. In collaboration with the non-profit citizenship association Schuman Square, VinylPlus was present for one week at the Schuman roundabout, in the heart of Brussels' European Institutions district, for the campaign *Sport for All, No Borders No Limits*. For VinylPlus,

the event was an opportunity to highlight the sustainable use of PVC in sports, as well as its reuse and recyclability. A range of sporting activities took place there, including yoga, martial arts, traditional Scottish highland games and chess. VinylPlus provided yoga mats and high-performance PVC flooring, which contains 32% recycled PVC. The Schuman Square association plans to reuse the flooring at future events, while the yoga mats were donated to local hospitals for use in their rehabilitation programmes.



The headquarters of the confectionery brand Maina, in Italy, is one of the trendiest examples of interior design. A versatile light PVC membrane characterises the sculptural aerial ladder, that is shaped as a long red ribbon.

## Engaging Globally

As part of the commitment to promote its approach to the worldwide PVC industry, VinylPlus participated in the 24<sup>th</sup> Asia Pacific Vinyl Network (APVN) General Assembly in November 2019. It contributed a keynote address on a *Strategy for PVC in a Circular Economy*.

VinylPlus also continued to actively share experience, knowledge and best practices with the other regional PVC associations in the GVC (Global Vinyl Council). In 2019, the GVC's bi-annual meetings took place in May in Prague, Czech Republic, and in November in Mumbai, India. VinylPlus' experience and the continuous exchange of best practices over the past years have actively contributed to the set-up in 2019 of the Vinyl India Council, the Indian PVC association.

PVC floorings offer hygiene and long-lasting comfort, they are water-resistant and suitable for every room.



“

*The underpinning value of the combined social, economic and environmental pillars is vital; sustainable development is about more than durability. VinylPlus is a good case of a holistic approach to these underpinning values.*

**ILCHEONG YI**  
UNRISD

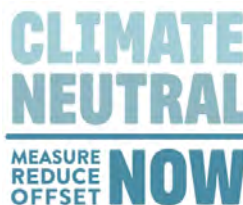
## United Nations

In 2019, VinylPlus continued to engage in a proactive dialogue with UN bodies and organisations.

In March, VinylPlus participated in the Fourth Session of the United Nations Environment Assembly (UNEA-4) – the world’s highest-level decision-making body on the environment – which gathered in Nairobi, Kenya, under the overarching theme *Innovative Solutions for Environmental Challenges and Sustainable Consumption*

and Production. The conference attracted more than 4,700 delegates from 179 countries, including heads of state, ministers, senior UN officials, business leaders, NGOs and civil society representatives. VinylPlus contributed as a panellist in the Green Tent Event organised by the Business and Industry Major Group, which brought together representatives of the private and public sectors to address innovative solutions for a circular economy.

In May, Ilcheong Yi, Senior Research Coordinator at the United Nations Research Institute for Social Development (UNRISD), participated as keynote speaker in the VinylPlus Sustainability Forum. His presentation stimulated a debate on the sustainable development impact indicators for social and for-profit businesses. Arab Hoballah, former Chief of Sustainable Consumption and Production at UNEP, gave the closing speech *PVC Industry Facing Sustainability Challenges*.



VinylPlus joined the UNFCCC’s Climate Neutral Now initiative<sup>65</sup> in 2018, signing a pledge of climate neutrality for its annual event.

Unavoidable emissions caused by holding the VinylPlus Sustainability Forum 2019 were compensated by the use of United Nations-certified offsets.

In 2019, VinylPlus continued to share its progress and contributions to the Sustainable Development Goals (SDGs) through annual reporting on the UN Partnerships for the SDGs Platform.<sup>66</sup>







PHOTO: COURTESY OF GERFLOR

## VINYLPLUS® PRODUCT LABEL

The VinylPlus® Product Label (<https://productlabel.vinylplus.eu>) is a sustainability certification scheme for PVC products in the building and construction sector. It was developed by VinylPlus in cooperation with BRE<sup>67</sup> and The Natural Step. Its criteria combine elements of BRE's *Framework Standard for the Responsible Sourcing of Construction Products (BES 6001)* and VinylPlus' five sustainability challenges.

To date, 112 products and product systems manufactured by 10 companies in 18 European sites have been certified. Audits have been carried out for the first construction films producer, in Italy. Other companies from several application sectors are applying for the Label. In addition, one PVC producer from eastern Europe asked to be verified for its compliance with the standards of the ECVM Charters, in order to help its customers to fulfil the VinylPlus® Product Label requirements.

In March 2019, the VinylPlus® Product Label was validated for ISO/IEC 17065 accreditation in Italy by Accredia ([www.accredia.it/en](http://www.accredia.it/en)), the Italian National Accreditation Body. Seven auditors from three recognized European Certification Bodies were trained in April 2019.

In 2019, the VinylPlus® Product Label was updated to include the new version 3.1 of the BES 6001 standard. This update, already validated by Accredia, should ultimately allow holders of the Label to automatically obtain BES 6001 certification. It should also facilitate the Label's recognition



as a responsible sourcing certification scheme within the BREEAM<sup>68</sup> sustainability assessment method. Furthermore, the VinylPlus® Product Label is under evaluation by DGNB (the German Sustainable

Building Council – [www.dgnb.de/en](http://www.dgnb.de/en)) for potential recognition within the DGNB System Certification for green buildings. The Label has been recognized in the new voluntary Sustainable Carpentry label launched by the Belgian Construction Certification Association for the Belgian manufacturers of exterior carpentry.<sup>69</sup> The integration of the Label into the Russian Green Book for Environmental Building Products is also under evaluation.

It was also decided to develop VinylPlus Supplier Certificates (VSC) covering raw materials relevant to the PVC value chain, starting with the compounders. A scheme was developed to certify the upstream sustainability of VinylPlus-labelled products. The certificate aims to help customers of PVC compounders to get the VinylPlus® Product Label, by speeding up the process and optimising costs.

By helping buyers to identify products which comply with relevant indicators fostering a circular economy, the VinylPlus® Product Label has been recognized as a facilitator for Green Deals on Circular Procurement which were launched in several European regions and countries. In 2019, the Label was a decisive factor that enabled VinylPlus to sign two regional commitments in Belgium: the Flemish Green Deal on Circular Construction and the Walloon Green Deal on Circular Procurement.

Debating the PVC sector's innovation and future in the context of the circular economy at the VinylPlus Sustainability Forum 2019.

<sup>65</sup> <https://unfccc.int/climate-action/climate-neutral-now/company-organization/climate-neutral-now-signatories>

<sup>66</sup> <https://sustainabledevelopment.un.org/partnership/?p=91>

<sup>67</sup> BRE: Building Research Establishment, UK-based certification experts on responsible sourcing for building and construction products ([www.bregroup.com](http://www.bregroup.com))

<sup>68</sup> BREEAM is the world's leading sustainability assessment method for master planning projects, infrastructure and buildings (<https://www.breeam.com/>)

<sup>69</sup> Label Duurzaam Schijnwerk/Menuiserie Durable (<https://duurzaamschijnwerk.be/>)

# VINYLPUS JOINT COMMUNICATIONS PROJECTS

Every year VinylPlus co-funds a range of projects with the aim of expanding the scope of its communications activities. Thirteen projects<sup>70</sup> were implemented in 2019, by three European and one national industry sector organisations and by five national PVC associations.

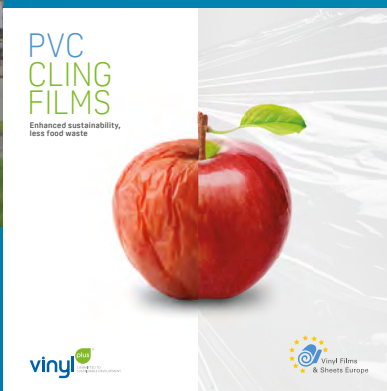


## MEDIA FIELD TRIP: EXPLORING THE PVC VALUE CHAIN

To raise awareness about plasticisers and the PVC industry sustainability programme among media, two media field trips were organised, one in June and another in November. The first trip took place in the Netherlands and included visits to the Shin Etsu's PVC production plant, the Kräs Recycling facility and Draka's manufacturing plant. The second trip was in the Netherlands and Germany and included visits to Vynova's PVC production plant and CIFRA's recycling facility.

### PROJECT LED BY EUROPEAN PLASTICISERS

*Geographic scope: EU*



## KEY SUSTAINABILITY PERFORMANCE INDICATORS FOR PVC CLING FILMS FOR FOOD

The objective of this project was to promote the sustainability advantages of PVC cling films, by taking into account the priorities and targets set by the UN SDGs. A major aim was to underline the benefits of PVC cling films in terms of their contributions to sustainability – for example, food waste prevention. A promotional brochure was produced based on the LCA study carried out by a consulting company in 2018. The outcomes of the project were communicated in 2019 through a media campaign and a workshop for food retailer associations.

### PROJECT LED BY VFSE

*Geographic scope: EU*



## VINYLPUS® PRODUCT LABEL – NATIONAL MEDIA OUTREACH

The project focused on communicating the VinylPlus® Product Label in the four most important European markets for PVC windows: France, Germany, Poland and the UK. Advertising materials and articles were prepared in 2019, explaining how the Label works and what it stands for. This should help final consumers to make a conscious choice to buy labelled products. It should also raise awareness of producers of PVC building-and-construction applications, stimulating their interest in the Label. Publication in the trade and consumer press was scheduled to take place from January to March 2020.

### PROJECT LED BY EPPA

*Geographic scope: FR, DE, PL, UK*

<sup>70</sup> <https://vinylplus.eu/progress/communications-projects/2019-3>

<sup>71</sup> AgPR: Arbeitsgemeinschaft PVC-Bodenbelag Recycling (Association for the Recycling of PVC Floor-Coverings – [www.agpr.de](http://www.agpr.de))





## THE VINYLPLUS SUCCESS STORY FOR CSR AND SUSTAINABILITY MANAGERS

The project targeted sustainability and corporate social responsibility (CSR) managers and high-level specialists in industry and regulatory authorities. The aim was to position VinylPlus as a role model for sustainability commitment in selected magazines for CSR and sustainability managers, as well as making VinylPlus more visible and better known to the target groups in Germany. Advertorials on VinylPlus, featuring the programme's highlights and achievements, were published in the sustainability magazine Forum Nachhaltig Wirtschaften in May and November 2019.

### PROJECT LED BY AGPU

*Geographic scope: Germany*

## OPERATION PVC RECYCLING: PVC RECYCLERS MEET PVC CONVERTERS

The project aimed to share the plastics industry's best practices and know-how in recycling and recovery and to enhance cooperation with related associations. Three events of the AGPU series 'PVC recyclers meet PVC converters' were organised in 2019, in June, September and November. A total of almost 90 recycling experts from the entire PVC value chain gathered to discuss their recycling activities and to present their products and services, as well as their needs for recycling materials and methods. The three regional events were organised by AGPU with the support of VinylPlus, AgPR,<sup>71</sup> Rewindo, IVK Europe and Roofcollect.

### PROJECT LED BY AGPU

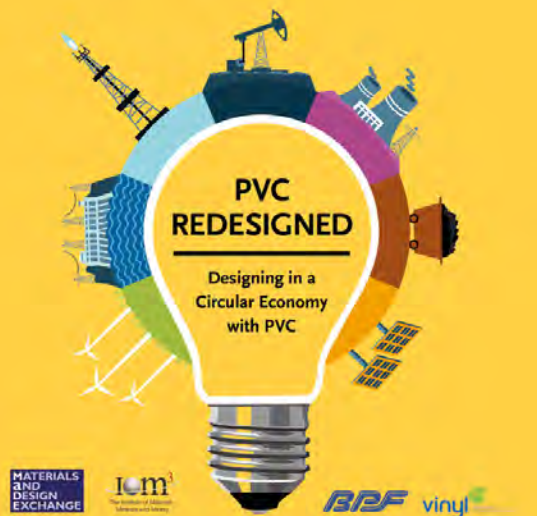
*Geographic scope: Germany*

## VINYLPLUS DIALOGUE WITH DECISION MAKERS AND INFLUENCERS

This project aimed to raise awareness of VinylPlus and to open a positive dialogue with real-estate management companies, demolition and recycling companies, local authorities and political influencers. AGPU was present with a booth at three main national events: the 22<sup>nd</sup> Internationaler Altkunststofftag Bad Neuenahr, organised by BVSE (the German Federal Association for Secondary Raw Materials and Waste Management); the SPD Party Convention in Bochum in September 2019; and the KPV – Kommunalpolitische Vereinigung der CDU und CSU Deutschlands in Würzburg, in November 2019.

### PROJECT LED BY AGPU

*Geographic scope: Germany*



## PVC REDESIGNED PROJECT, A CIRCULAR ECONOMY DESIGN COMPETITION FOR STUDENTS

The competition *PVC redesigned – designing in a circular economy with PVC* aimed to improve the image of PVC and promote awareness in the design community. It also showcased PVC's credentials in sustainability and cost-effectiveness, as well as the design opportunities it presents. The project started in 2018 with a workshop to bring together designers, manufacturers and materials experts, so they could learn about the properties, applications and sustainability credentials of PVC. In 2019, the competition involved the students of six design universities. Two of the three winning projects are particularly relevant for their social value in developing countries: Yuna, a portable water purifier for the poorest communities; and Nari, a low-cost menstrual cup sanitisation device to be used in educational programmes in India.

### PROJECT LED BY VINYLPLUS UK

*Geographic scope: UK*



## VINYLPLUS AT SUSTAINABLE BUILT ENVIRONMENT D-A-CH CONFERENCE 2019

The project supported the participation of VinylPlus at the D-A-CH Conference organised in Graz, Austria, by the Graz University of Technology, in co-operation with Karlsruhe Institute of Technology, ETH Zurich and BOKU Vienna (University of Life Sciences). VinylPlus, the VinylPlus® Product Label and the ASF were presented during the special forum *Should the VinylPlus® Product Label be Integrated in Existing Sustainability Label Schemes for Buildings?* and at a VinylPlus information stand. Participation in the conference reinforced the relationship with primary opinion leaders and with DGNB – the German Society for Sustainable Building. In September 2019, VinylPlus signed the *Graz Declaration for Climate Protection in the Built Environment*.

### PROJECT LED BY API <sup>72</sup>

*Geographic scope: Austria*



## PVC PARK – A HOLISTIC APPROACH WITH PVC FOR GREEN AND COMMON SPACES IN SUSTAINABLE CITIES

The project aimed to spread new criteria for the sustainable design of green and common spaces using PVC applications. It also aimed to improve the perception of PVC products by promoting their use as sustainable solutions for the design and requalification of urban green areas (SDG11, Sustainable cities and communities, target 11.7). Whenever possible, the products used were made from recycled PVC, to show that PVC can be recycled into numerous applications, and to raise awareness of VinylPlus' contribution to a circular economy. The project included the development of a real architectural plan for the requalification of green areas; the development of data sheets for the different PVC components; communications materials and tools; and presentations of the project to Italian institutions, authorities, local administrations and media.

### PROJECT LED BY PVC FORUM ITALIA

*Geographic scope: Italy*

<sup>72</sup> API – PVC- und Umweltberatung GmbH ([www.pvc.at](http://www.pvc.at))





## PROMOTE THE VINYLPLUS® PRODUCT LABEL AMONG WINDOW MANUFACTURERS

The objective of the project was to promote the VinylPlus® Product Label among window manufacturers and real-estate companies in the context of PVC window recycling and the use of recyclates in new profiles and windows. Two advertisements and articles were published in DW – Die Wohnungswirtschaft Edition and BauelementeBau, which are leading magazines for the window manufacturing industry and real-estate sector.

### PROJECT LED BY REWINDO

*Geographic scope: Germany*

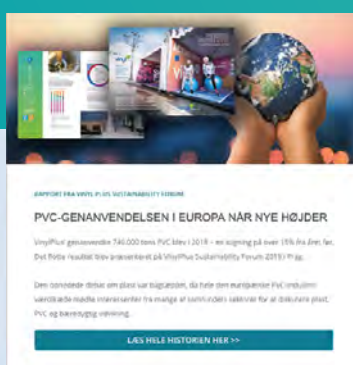


## ENERGY- AND RESOURCE-EFFICIENT PRODUCTS FOR GREEN PUBLIC PROCUREMENT

This project started in 2016 and focused on PVC products providing sustainable solutions in public procurement, thanks to their energy- and resource-efficiency, as well as their low whole-life cost. The magazine *KBD* was confirmed as media partner for advertorials and an article published in 2019, because of its special relevance for decision makers, local authorities and public procurement operators.

### PROJECT LED BY AGPU

*Geographic scope: Germany*



## PROFILING PVC AS A SUSTAINABLE MATERIAL IN THE CONTEXT OF THE CIRCULAR ECONOMY

The objective of the 2019 project was to further strengthen the visibility of VinylPlus and to increase external recognition for WUPPI owners and associated companies and their products. The target groups were public and private decision makers in the building sector, such as municipalities, large contractors and architectural offices.

### PROJECT LED BY WUPPI

*Geographic scope: Denmark*



## WINDOW RECYCLING BEST PRACTICES

The main objective of the project was to raise awareness among window manufacturers, real-estate companies and demolition companies of PVC window recycling solutions and the VinylPlus Voluntary Commitment in general. On-site press conferences were organised with specialised media and local press to show how PVC windows can represent a resource-efficient solution and that it is possible to reduce CO<sub>2</sub> emissions through Rewindo recycling activities.

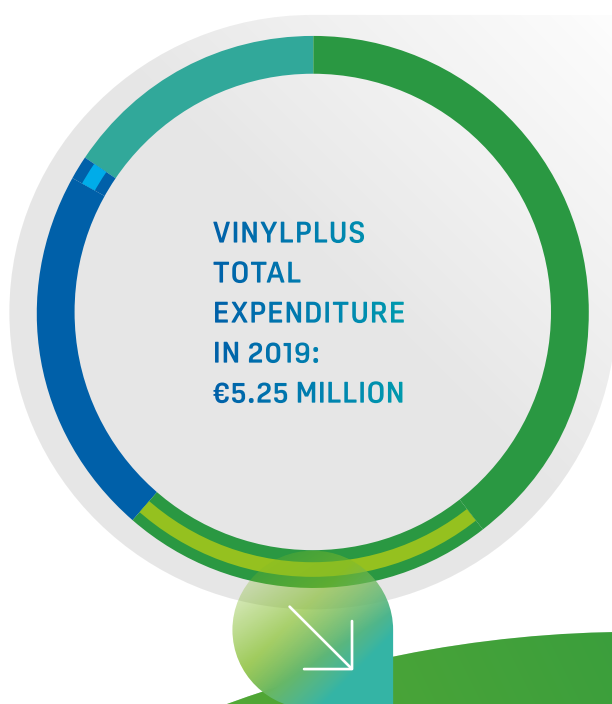
### PROJECT LED BY REWINDO

*Geographic scope: Germany*

# FINANCIAL REPORT

In 2019, industry expense remained stable or slightly decreased. The allocation of funds remained stable among technical projects, communications and overheads.

Expenditure by VinylPlus, including EuPC and its members, and national and sectoral co-funding, amounted to €5.25 million in 2019.



**61.4%**

— WASTE MANAGEMENT AND TECHNICAL PROJECTS, including national and sectoral co-funding amounting to **21.7%** of total industry funding

**23.3%**

— COMMUNICATIONS, including national and sectoral co-funding amounting to **1.5%** of total industry funding

**15.3%**

— OVERHEADS AND VOLUNTARY COMMITMENT DEVELOPMENT

## WASTE MANAGEMENT AND TECHNICAL PROJECTS

FIGURES IN €1,000s

Films and coated fabrics related projects	38
Flooring related projects	472
EPPA	356
ESWA/Roofcollect®	88
Recovinyl	1,300
Studies, start-up & pull concept	198
TEPPFA	459
Medical applications recycling	52
Resysta® consortium	2
Oreade chemical recycling	365
Development of recycling applications in automotive (VFSE)	0
Urban agriculture	0

**TOTAL PROJECTS**

## TOTAL EXPENDITURE INCLUDING EUPC AND ITS MEMBERS

**2018**

**2019**

38	31
472	548
356	343
88	62
1,300	1,100
198	466
459	479
52	85
2	12
365	15
0	37
0	45
<b>3,331</b>	<b>3,224</b>



# RECYCLED PVC TONNAGES

The table below summarises the tonnages of PVC recycled within the VinylPlus framework in the period 1 January 2019 to 31 December 2019, by initiatives of EuPC sector groups and sectoral associations, and by Recovinyl.

The complete Report of Factual Findings regarding the Agreed-Upon Procedures (“AUP”) Engagement can be found at page 33.

PROJECT	TYPE OF PVC	TONNAGE RECYCLED IN 2018	TONNAGE RECYCLED IN 2019
<b>Recovinyl</b> (incl. IVK Europe)	Coated fabrics	9,573 <sup>A</sup>	7,114 <sup>A</sup>
Flooring recycling initiative (formerly <b>EPFLOOR</b> )	Flooring	2,387 <sup>A</sup>	3,157 <sup>A</sup>
<b>EPPA</b> (incl. Recovinyl)	Window profiles & related profiles	326,276 <sup>B</sup>	363,137 <sup>B</sup>
<b>TEPPFA</b> (incl. Recovinyl)	Pipes & fittings	82,635 <sup>B</sup>	85,260 <sup>B</sup>
<b>Recovinyl</b> and <b>ESWA – ROOFCOLLECT®</b>	Flexible PVC and films	167,148 which consist of:	170,042 which consist of:
<b>ESWA – ROOFCOLLECT®</b>	Flexible PVC	3,531 <sup>A</sup>	414 <sup>A C</sup>
<b>Recovinyl</b> (excluding EPFLOOR)	Flexible PVC and films	163,617 <sup>B</sup>	169,628 <sup>B</sup>
<b>Recovinyl</b>	Cables	151,506	142,603
<b>TOTAL</b>		<b>739,525</b>	<b>771,313</b>

<sup>A</sup> Tonnage including Norway and Switzerland

<sup>B</sup> Tonnage including Switzerland

<sup>C</sup> Volumes partially transferred under the Recovinyl flexible PVC and films category

# 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 1, 2019 to December 31, 2019 prepared by the management of VinylPlus.

#### SCOPE OF WORK

Our engagement was carried out in accordance with:

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

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

VinylPlus management is responsible for the overview, analytical accounting and supporting documents.

The scope of these agreed-upon procedures has been determined solely by the management of VinylPlus. We are not responsible for the suitability and appropriateness of these procedures.

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

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

#### SOURCES OF INFORMATION

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

#### PROCEDURES AND FACTUAL FINDINGS

- 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 2019 and verify the mathematical accuracy of this.  
The total expenses amount to KEUR 5,253.  
We found no exceptions as a result of applying this procedure.
- Verify that these costs are recorded in the financial statements 2019 of VinylPlus AISBL.  
We found no exceptions as a result of applying this procedure.
- For project not covered by the above procedures, obtain confirmation of costs from legal entity managing or contributing to the project or from external advisor.  
We found no exceptions as a result of applying this procedure, which represents 24.33% of total expenses.

Note that financial statements of VinylPlus AISBL, TEPPFA AISBL and Recovynil AISBL 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 this specified party.

**KPMG Réviseurs d'Entreprises SCRL**

Statutory Auditor represented by



**DOMINIC ROUSSELLE,**  
**Réviseur d'Entreprises**

Mont-Saint-Guibert, March 6, 2020



# KPMG REPORT OF FACTUAL FINDINGS

## REGARDING THE AGREED-UPON PROCEDURES (“AUP”) ENGAGEMENT: TONNAGES OF PVC RECYCLED IN THE EU-28 (PLUS NORWAY AND/OR SWITZERLAND) IN 2019, WITHIN THE DIFFERENT PROJECTS OF VINYLPLUS

To the General Manager of VinylPlus AISBL (hereafter “VinylPlus”)

We have performed the procedures agreed with you and enumerated below with respect to the tonnages of recycled PVC (within the following projects of VinylPlus) in 2019:

- in the EU-28 by the sector association The European Plastic Pipes and Fittings Association (hereafter “TEPPFA”);
- in the EU-28 (plus Norway and Switzerland) within the ROOFCOLLECT system by the members of the sector association European Single ply Waterproofing Association (hereafter “ESWA”) and by the sector association European PVC window Profile and related building Products Association (hereafter “EPPA”);
- in the EU-28 (plus Norway and Switzerland) by the (members of the) Arbeitsgemeinschaft PVC-Bodenbelag Recycling (hereafter “AgPR”) and ReVinylFloor;
- in the EU-28 (plus Norway and Switzerland) within the IVK Europe project; and
- in the EU-28 (plus Switzerland) within the operations of Recovinyl;

as set forth in the accompanying engagement letter dated February 28, 2020. Our engagement was undertaken in accordance with the International Standard on Related Services (ISRS 4400) applicable to Agreed-Upon Procedures Engagements. The procedures were performed solely to assist you in evaluating the tonnages of recycled PVC within the above-mentioned projects of VinylPlus in 2019 and are summarised as follows:

With regard to the MS Excel spreadsheet “KPMG calculation\_consoRecycled\_VinylPlus (2019)” for the accounting period January 1, 2019 to December 31, 2019, prepared by management of VinylPlus, regarding the tonnages of recycled PVC (within the above-mentioned projects of VinylPlus) in 2019, we performed the following procedures:

1. Verify, in sheet “VinylPlus 2019” (which contains detailed calculations for the management of VinylPlus), whether the quantities mentioned in the columns H, L, M and N, regarding the quantities of PVC that have been recycled in 2019 by the different projects of VinylPlus, agree with quantities that are mentioned in the:
  - Reports of Factual Findings regarding the Agreed-Upon Procedures (“AUP”) Engagements performed by KPMG Réviseurs d’Entreprises SCRL / KPMG Bedrijfsrevisoren CVBA concerning tonnages of PVC recycled in the EU-28 plus Switzerland in 2019, within the operations of Recovinyl;
  - Recycling confirmations regarding PVC flooring;

- Extracts of Recovinyl internal audit tracking system on audit status for relevant companies;
- Communication from the concerned projects of VinylPlus;

obtained by management of VinylPlus and/or the Senior Project Controller, Mr Geoffroy Tillieux.

2. Verify, in sheet “VinylPlus 2019” the mathematical accuracy of the calculations (to avoid double counting), regarding the quantities recycled PVC in 2019.
3. Verify, in sheet “Table for progress report” (which contains the table for publication in the VinylPlus Progress Report 2020), the mathematical accuracy of the calculations in column F regarding the tonnages recycled in 2019, based on the concerned tonnages mentioned in sheet “VinylPlus 2019”.

*The table mentioned above is reproduced in the VinylPlus Progress Report 2020, at page 31 with a total recycled tonnage for 2019 of 771,313 tonnes.*

We report our findings below:

- with respect to the procedures 1, 2 and 3, we found no exceptions.

Because the above procedures 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 tonnages of recycled PVC within the above-mentioned projects of VinylPlus in 2019.

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.

Our report is solely for the purpose set forth in the first paragraph of this report and for your information and is not be used for any other purpose or be distributed to any other parties, except for publication for informational purposes in the VinylPlus Progress Report 2020. Should any third party wish to rely on the report for any purpose they will do so entirely at their own risk. This report relates only to the tonnages of recycled PVC within the above-mentioned projects of VinylPlus in 2019 and items specified above and does not extend to any financial statements of VinylPlus, taken as a whole.

**KPMG Réviseurs d’Entreprises SCRL**  
Statutory Auditor represented by



**DOMINIC ROUSSELLE,**  
Réviseur d’Entreprises

Mont-Saint-Guibert, March 18, 2020

# SGS INDEPENDENT VERIFICATION STATEMENT ABOUT THIS VINYLPLUS PROGRESS REPORT 2020

SGS is the world's leading inspection, verification, testing and certification company. We are recognized as the global benchmark for quality and integrity. With more than 94,000 employees, we operate a network of more than 2,600 offices and laboratories around the world.

SGS was commissioned by VinylPlus to provide an independent verification of the "Progress Report 2020". This report presents the commitments and achievements made by the VinylPlus project in 2019.

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;
- The reports Communication 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 chapter Financial Report;
- The chapter KPMG Certification of Expenditure;
- The KPMG Report on Tonnes Recycled.

## ✓ 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 2020" represents VinylPlus' performance in 2019 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,  
division Certification and Business Enhancement  
Certification Manager

25 March 2020





# THE NATURAL STEP'S COMMENTARY ON VINYLPLUS PROGRESS REPORT FOR 2019

The Natural Step (TNS) acts as an external advisor, stakeholder intermediary and capacity builder to VinylPlus. Our commentary highlights some of the areas where we see good progress and others where further attention may be needed. Whilst we acknowledge VinylPlus is largely on track toward its commitments we continue to emphasize the dynamic nature of sustainable development and the need to match ambitions with changing awareness and expectations.

## ✓ PROGRESS TOWARDS CONTROLLED LOOP PVC MANAGEMENT

One of VinylPlus's key achievements is recycling. With continued focus on plastics in the circular economy we are pleased once again to see that recycling volumes are edging closer to the 2020 target.

Recalling our commentary from last year we also note that recycling volumes should be related to the actual amounts of "waste arising" and available for collection in any given year. The work on dynamic modelling of post-consumer waste is therefore important as it enables prediction of future waste streams and context-based target-setting. This should help to plan collection infrastructure and lift recycling rates.

We are also encouraged by the continued development of industry-sector projects, studies addressing recycling and waste management and investment in new recycling technologies. These are all critical given the increased waste volumes to be handled within Europe's borders.

Topics such as traceability and product design now also appear to be getting much-needed focus and we are pleased VinylPlus is able to take a leadership role within the Circular Plastics Alliance.

## ✓ CONCERNS REGARDING LEGACY ADDITIVES

As noted in the progress report, close engagement with regulators and other stakeholders on the topic of legacy additives needs to continue. Market acceptance of products with recycled content depends upon an assurance that where legacy additives are present, they have been deemed safe for reuse.

Studies to identify the presence of legacy additives in recyclates and to understand legacy additive leaching demonstrate the industry's commitment. Better communication about secondary applications and traceability is needed with clearer blue-prints for intentional material cycles through consecutive 'generations' of PVC products.

With recent political uncertainty on this topic we add our view that the goals of a non-toxic environment and a resource-efficient, circular economy need to be pursued simultaneously but not at the expense of one or the other. To do so misses the point that these are both important parts of the larger sustainability transition for society

## ✓ SUSTAINABLE USE OF ADDITIVES

TNS provided support during 2019 to customize our strategic life cycle assessment (SLCA) protocol for the assessment of additives. The resultant Additive Sustainability Footprint tool is intended to help take a wider perspective on the life cycle of chemical products, identify hotspots and areas for action to move toward a clear set of criteria.

We believe the use of this tool can help in the design of new additives and it allows for pre-emptive screening for potential

unforeseen issues that are not the focus of regulation. Foresight is clearly necessary when chemical legislation is advancing. We now look forward to additive manufacturers beginning to adopt the new tool.

## ✓ CLIMATE CRISIS CALLS FOR A STRONGER RESPONSE

When considering the global youth movement demanding climate action, more visible signs of climate change and an accelerating clean energy revolution, we believe that industry progress on energy and climate issues, while reasoned, is stalling and needs a rethink.

Given carbon neutrality is likely to become part of EU policy in the emerging EU Green Deal, we would like to see VinylPlus communicate more action on this front. At the company level we do note that some actors are now commercializing 'bio-based' and 'circular' ethylene which yield a dramatically lower climate impact. This is very promising.

## ✓ SUSTAINABILITY PERFORMANCE BENCHMARKS

Blanket treatment of "plastics" as one category is a growing problem we see. The same is also true within the PVC family. We need to learn to distinguish between materials based on their different life cycle footprints, formulations, applications and the value they provide. Tools like the VinylPlus Product Label and the VinylPlus Supplier Sustainability Certificate are great examples demonstrating that there is a new class of performance to choose from. We are encouraged that these tools are making a difference.

## ✓ THE HOME STRETCH OR THE WARMUP ACT?

At this year's VinylPlus Sustainability Forum, we presented on the changing approaches to sustainability within businesses, lessons learned from engaging with industry and ideas for accelerating innovation. As we enter 2020 and the last year of the current industry commitment, we are hoping that VinylPlus's will continue to reflect on these themes. The year ahead should focus on delivering on existing targets and setting the foundation for a new programme with even braver ambitions.



**RICHARD BLUME**  
TNS Project Leader & Senior Advisor



**PATRIK SANDIN**  
Chair of The Natural Step International

Stockholm, February 2020

# APPENDIX

## CHALLENGES

 <p><b>1</b></p> <p><b>CONTROLLED-LOOP MANAGEMENT:</b></p> <p><i>"We will work towards the more efficient use and control of PVC throughout its life cycle."</i></p>	<p><b>TARGETS</b></p> <p>1. Recycle 800,000 tonnes/year of PVC by 2020.  <b>&gt; ongoing</b></p>
 <p><b>2</b></p> <p><b>ORGANOCHLORINE EMISSIONS:</b></p> <p><i>"We will help to ensure that persistent organic compounds do not accumulate in nature and that other emissions are reduced."</i></p>	<p><b>TARGETS</b></p> <p>1. Engage with external stakeholders in the discussion on organochlorine emissions during 2012.  <b>&gt; achieved</b></p>
 <p><b>3</b></p> <p><b>SUSTAINABLE USE OF ADDITIVES:</b></p> <p><i>"We will review the use of PVC additives and move towards more sustainable additive systems."</i></p>	<p><b>TARGETS</b></p> <p>1. Lead (Pb) replacement in the EU-27 by end 2015 (extended to the EU-28 in 2014).  <b>&gt; achieved</b></p>
 <p><b>4</b></p> <p><b>SUSTAINABLE USE OF ENERGY AND RAW MATERIALS:</b></p> <p><i>"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."</i></p>	<p><b>TARGETS</b></p> <p>1. Establish Energy Efficiency Task Force by end 2011. <b>&gt; achieved</b></p> <p>2. PVC resin producers to reduce their specific energy consumption, targeting 20% by 2020. <b>&gt; ongoing</b></p>
 <p><b>5</b></p> <p><b>SUSTAINABILITY AWARENESS:</b></p> <p><i>"We will continue to build sustainability awareness across the value chain – including stakeholders inside and outside the industry – to accelerate resolving our sustainability challenges."</i></p>	<p><b>TARGETS</b></p> <p>1. VinylPlus web portal to go online in summer 2011.  <b>&gt; achieved</b></p> <p>2. VinylPlus Monitoring Committee, which will meet a minimum of twice a year, will be established by end 2011.  <b>&gt; achieved + ongoing</b></p> <p>3. A VinylPlus Membership Certificate will be launched end 2011.  <b>&gt; achieved</b></p>

73 Even though this target has had to be withdrawn (see p. 12 of VinylPlus Progress Report 2017), VinylPlus will continue to pursue efforts to find technically and economically viable solutions for difficult-to-recycle PVC waste

74 Converters 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 many of the subsectors

75 Even though this target was not achieved in 2013, VinylPlus continued to work on increasing the number of programme participants. It will continue to do so in the future



# VINYLPUS VOLUNTARY COMMITMENT TARGETS

**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.  
**> withdrawn<sup>73</sup>**

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

**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**  
**3.a.** Achieve full compliance with the updated Charter by 2021.

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

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

**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. **> achieved**  
**3.a.** Develop a methodology for the sustainable choice of additives for profiles. **> achieved**  
**3.b.** Develop a methodology for the sustainable choice of additives for flexible applications. **> ongoing**  
**3.c.** Develop a systematic framework methodology, taking into account the EU PEF concept. **> achieved**

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

**3.** Define targets for specific energy reduction for converters by end 2012.  
**> partially achieved<sup>74</sup>**  
**3.a.** PVC converters will report their gains in energy efficiency year on year. **> ongoing**

**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 + extended**  
**6.a.** Updated status report by the end of 2020.

**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 + ongoing**

**5.** Annual external stakeholder meetings will be organised, commencing in 2012.  
**> achieved + ongoing**

**6.** A VinylPlus product label will be launched by end 2012.  
**> launch achieved in 2014; implementation ongoing**

**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-28.  
**> ongoing**

**9.** VinylPlus will increase the number of programme participants by 20% compared to 2010 by end 2013. **> not achieved<sup>75</sup>**

**10.** VinylPlus will engage with five global brand holders by end 2013.  
**> partially achieved + ongoing**

**11.** A review of progress towards the globalisation of the approach will be undertaken by end 2015.  
**> achieved**

**12.** A Social dialogue commitment endorsed by the EU Sectoral Social Dialogue Committee for the Chemical Industry will be included in the VinylPlus programme by the end of 2016.  
**> achieved + ongoing**

## GLOSSARY

<b>AGPU</b>	Arbeitsgemeinschaft PVC und Umwelt e.V. – the German association of the PVC value chain ( <a href="http://www.agpu.com">www.agpu.com</a> )	<b>KPMG</b>	KPMG is a global network of professional firms providing audit, tax and advisory services ( <a href="http://www.kpmg.com">www.kpmg.com</a> )
<b>ASF</b>	Additive Sustainability Footprint	<b>LCA</b>	Life cycle assessment
<b>Ba</b>	Barium	<b>LMM stabilisers</b>	Liquid mixed-metal stabilisers
<b>BAT</b>	Best available technique	<b>LMW phthalates</b>	Low molecular weight phthalates
<b>BBP</b>	Butyl benzyl phthalate	<b>MEP</b>	Member of the European Parliament
<b>B&amp;C</b>	Building and construction	<b>Pb</b>	Lead
<b>BPF VinylPlus UK</b>	The PVC value chain's Members Group of the British Plastics Federation ( <a href="http://www.bpf.co.uk">www.bpf.co.uk</a> )	<b>PEF</b>	Product Environmental Footprint
<b>Ca</b>	Calcium	<b>PlasticisersPlus</b>	European Plasticisers' legal entity, based in Brussels, Belgium
<b>DBA</b>	Di-n-butyl adipate	<b>ppm</b>	Part per million (also equivalent to 1 mg per kg)
<b>DBP</b>	Di-n-butyl phthalate	<b>PRE</b>	Plastics Recyclers Europe ( <a href="http://www.plasticsrecyclers.eu">www.plasticsrecyclers.eu</a> )
<b>DEHA</b>	Di(2-ethylhexyl) adipate	<b>PVC</b>	Polyvinyl chloride
<b>DEHP</b>	Di(2-ethylhexyl) phthalate	<b>PVC Forum Italia</b>	The Italian association of the PVC value chain ( <a href="http://www.pvcforum.it">www.pvcforum.it</a> )
<b>DEHTP</b>	Di-octyl terephthalate	<b>P-PVC</b>	Plasticised PVC
<b>DIBP</b>	Di-isobutyl phthalate	<b>RAC</b>	Committee for Risk Assessment
<b>DIDP</b>	Di-isodecyl phthalate	<b>REACH</b>	Registration, Evaluation, Authorisation and Restriction of Chemicals
<b>DINA</b>	Di-isononyl adipate	<b>Rewindo</b>	the German recycling initiative for PVC windows, roller shutters and related products ( <a href="http://www.rewindo.de">www.rewindo.de</a> )
<b>DINCH</b>	Di-isononyl cyclohexane dicarboxylate	<b>R-PVC</b>	Recycled PVC
<b>DINP</b>	Di-isononyl phthalate	<b>SDGs</b>	Sustainable Development Goals
<b>DPHP</b>	Di(2-propyl heptyl) phthalate	<b>SEAC</b>	Committee for Socio-Economic Analysis
<b>EC</b>	European Commission	<b>SGS</b>	Société Générale de Surveillance, the world's leading testing and verification organisation ( <a href="http://www.sgs.com">www.sgs.com</a> )
<b>ECHA</b>	European Chemicals Agency ( <a href="http://echa.europa.eu">http://echa.europa.eu</a> )	<b>S-PVC</b>	Suspension polyvinyl chloride
<b>ECVM</b>	The European Council of Vinyl Manufacturers ( <a href="http://www.pvc.org">www.pvc.org</a> )	<b>StabilisersPlus</b>	ESPA' legal entity, based in Brussels, Belgium
<b>ECVM 2010</b>	The ECVM's formal legal entity, registered in Belgium	<b>SSDC</b>	Sectoral Social Dialogue Committee
<b>EDC</b>	Ethylene dichloride or 1,2-dichloroethane	<b>SVHC</b>	Substances of Very High Concern
<b>EFSA</b>	European Food Safety Authority ( <a href="http://www.efsa.europa.eu">www.efsa.europa.eu</a> )	<b>TDI</b>	Tolerable daily intake
<b>EPA</b>	Environmental Protection Agency	<b>TEPPFA</b>	The European Plastic Pipes and Fittings Association ( <a href="http://www.teppfa.eu">www.teppfa.eu</a> )
<b>EPPA</b>	European PVC Window Profile and Related Building Products Association ( <a href="http://www.eppa-profiles.eu">www.eppa-profiles.eu</a> )	<b>The Natural Step</b>	A sustainability NGO acting as critical friend and sustainability advisor to VinylPlus ( <a href="http://www.thenaturalstep.org">www.thenaturalstep.org</a> )
<b>E-PVC</b>	Emulsion polyvinyl chloride	<b>UN</b>	United Nations
<b>ESPA</b>	The European Stabiliser Producers Association ( <a href="http://www.stabilisers.eu">www.stabilisers.eu</a> )	<b>UNEP</b>	United Nations Environment Programme
<b>ESWA</b>	European Single Ply Waterproofing Association, an EuPC sectoral association ( <a href="http://www.eswa.be">www.eswa.be</a> )	<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>EuPC</b>	European Plastics Converters ( <a href="http://www.plasticsconverters.eu">www.plasticsconverters.eu</a> )	<b>UNRISD</b>	United Nations Research Institute for Social Development
<b>European Plasticisers</b>	former ECPI ( <a href="http://www.europeanplasticisers.eu">www.europeanplasticisers.eu</a> )	<b>U-PVC</b>	Unplasticised PVC
<b>HCl</b>	Hydrogen Chloride	<b>VCM</b>	Vinyl chloride monomer
<b>HMW phthalates</b>	High molecular weight phthalates	<b>VFSE</b>	Vinyl Films and Sheets Europe ( <a href="http://www.vfse.org">www.vfse.org</a> )
<b>HSE</b>	Health, Safety and Environment	<b>Vinyl 2010</b>	The first 10-year Voluntary Commitment of the European PVC industry, signed in 2000
<b>Industry Charters</b>	ECVM Industry Charters for the Production of VCM and S-PVC (1995) and for the Production of E-PVC (1998)	<b>WUPPI</b>	Danish company set up to collect and recycle rigid PVC ( <a href="http://www.wuppi.dk">www.wuppi.dk</a> )
<b>IVK Europe</b>	Industrieverband Kunststoffbahnen e.V. (Plastic Sheets and Films Association – <a href="http://www.ivk-europe.com">www.ivk-europe.com</a> )	<b>Zn</b>	Zinc



# THE EUROPEAN PVC INDUSTRY

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

PVC is an intrinsically low-carbon plastic: 57% of its molecular weight is accounted for by chlorine derived from common salt, 5% by hydrogen and 38% by carbon. It 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 resulted in both lower total energy consumption and lower CO<sub>2</sub> emissions.

Due to its light weight, durability and stability, PVC can offer energy, cost and material efficiency gains for sectors such as building and construction, water distribution, health and transportation.

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



## THE EUROPEAN COUNCIL OF VINYL MANUFACTURERS,

representing six leading European producers of PVC resin, which account for around 70% of the PVC resin manufactured in Europe. These businesses operate around 40 different plants spread over 23 sites and employ approximately 7,000 people.

[www.pvc.org](http://www.pvc.org)



## EUROPEAN PLASTICS CONVERTERS,

an association representing more than 50,000 companies in Europe, which produce over 50 million tonnes of plastic products every year both from virgin and recycled polymers. They employ more than 1.6 million people, generating turnover in excess of €260 billion per year.

[www.plasticsconverters.eu](http://www.plasticsconverters.eu)



## THE EUROPEAN STABILISER PRODUCERS ASSOCIATION,

representing nine companies that produce more than 95% of the stabilisers sold in Europe. They provide direct employment to more than 2,000 people in the EU

[www.stabilisers.eu](http://www.stabilisers.eu)



## EUROPEAN PLASTICISERS,

representing eight major European plasticiser manufacturers, producing approximately 90% of the plasticisers manufactured in Europe. They employ approximately 1,200 people in plasticiser production.

[www.europeanplasticisers.eu](http://www.europeanplasticisers.eu)

## SUSTAINABILITY AND COMMUNITY ENGAGEMENT

Not only sports, but also community engagement. The strategic partnerships with sports organisations developed by VinylPlus in 2019, proved to be an extremely effective means to build new relationships with European institutions, global, regional and local authorities and the youth, as well as with the large number of people from general public and local communities who came to the sporting events.

The chess tournaments organised in the temporary structure at the Schumann roundabout during #BEACTIVE, the European Week of Sport, gave VinylPlus a unique opportunity to address a varied audience, different from the people VinylPlus usually talks to. VinylPlus is eager to engage with the community in an open, constructive dialogue, including on sensitive or controversial topics. This is a way to receive input and suggestions for facing the challenges ahead, as well as to raise awareness of the European PVC industry's contribution to the circular economy and the Sustainable Development Goals.

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