PROGRESS REPORT 2022

REPORTING ON 2021 ACTIVITIES

vinyl plus®
COMMITTED TO SUSTAINABLE DEVELOPMENT

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FOREWORD

17 June 2021 was a special date for VinylPlus. That day, on the occasion of the 9th VinylPlus Sustainability Forum, we officially signed and launched VinylPlus 2030, the next ten-year Commitment of the European PVC industry to sustainable development. This is an ambitious and concrete Commitment that once again reaffirms our determination to proceed, as a united industry, on a journey towards a sustainable and circular future.

STEFAN SOMMER
Chair of VinylPlus

We have taken responsibility for accelerating the transition of the European PVC value chain to a more sustainable and circular industry. Our ambition is to be pacesetters in innovation and collaboration by acting at the forefront of the circular economy and sustainable development in the plastics sector.

In alignment with EU policy objectives and the Sustainable Development Goals (SDGs) of the United Nations 2030 Agenda, we have identified three pathways and 12 action areas. These will enable us to scale up the PVC value chain's circularity, demonstrate progress towards carbon neutrality, and minimise our environmental footprint. We identified these pathways and action areas through an open and transparent process, taking into account stakeholder expectations for the long-term sustainability of the PVC industry.

Another reason that 17 June was a special date is that we were able to celebrate the completion of our second 10-year Voluntary Commitment and our achievements over the past two decades.

In particular, I would like to emphasise the efforts made along the entire value chain to advance the circularity of our industry. These have allowed us to recycle close to 7.3 million tonnes of PVC into new products since 2000, preventing the release of more than 14.5 million tonnes of CO_2 into the atmosphere. The commitment to circularity was further strengthened recently through an intense and active participation in the actions and initiatives of the European Commission's Circular Plastics Alliance.

We have also launched several other flagship initiatives that will be fundamental to the implementation of our new Commitment. RecoTrace™ has been developed by Recovinyl® to further enhance its recording and tracing schemes for recycling volumes and the uptake of recyclates in new products, and it is the first system to comply with the Circular Plastics Alliance's monitoring requirements. The VinylPlus® Product Label is the first scheme dedicated to plastic building and construction products that has been recognized as a Responsible Sourcing Certification Scheme within BREEAM® – the world's most widely used green building standard. And the Additive Sustainability Footprint® methodology allows VinylPlus partner companies to self-assess the lifecycle sustainability of their PVC formulations.

I also want to emphasise the importance of research and innovation, which are the basis of all our Commitments and provide effective and science-based solutions for our journey towards sustainability. You will find many concrete examples in this Progress Report.

We are aware of the challenges that we still have to face, all the more so in the current turbulent times. As can be seen in sports events, challenges are not won alone but by teams. With our new Commitment, we want to make even clearer that we want to share our experience and expertise and that we are committed to collaborate with everyone, by building partnerships and coalitions.

VinylPlus has accomplished a lot since its beginnings, but our achievements so far are only milestones on the road to a sustainable, circular future. With our 2030 Commitment, we are ready to do much more – and to do it together.

ABOUT VINYLPLUS

VinylPlus® is the European PVC industry's commitment to sustainable development. Through VinylPlus, the European PVC industry is creating a long-term sustainability framework for the entire PVC value chain, improving PVC products' sustainability and circularity and their contribution to a sustainable society. It covers the EU-27, Norway, Switzerland and the UK.

FOUNDING MEMBERS AND PARTNERS

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 39 different plants spread over 22 sites and employ approximately 7,000 people.

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 from both virgin and recycled polymers. They employ more than 1.6 million people, generating turnover in excess of €260 billion per year.

plasticsconverters.eu

THE EUROPEAN STABILISER PRODUCERS ASSOCIATION

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

stabilisers.eu

EUROPEAN PLASTICISERS

a Sector Group of Cefic representing 10 major European plasticiser manufacturers, producing approximately 90% of the plasticisers manufactured in Europe. Over €6 billion has been invested in innovative, safe and sustainable alternative plasticisers over the last 25 years.

europeanplasticisers.eu

200 COMPANIES

3 NATIONAL ASSOCIATE MEMBERS

recovinyl plus®

150 recycler partners

PVC: A SMART MATERIAL FOR A SUSTAINABLE SOCIETY

Polyvinyl chloride, or PVC, is one of the most versatile and widely used polymers in the world. PVC continues to make life safer and more comfortable through its extensive use in building and construction, as well as in water distribution, automotive, cabling, smart cards and credit cards, packaging, fashion and design, sports, agriculture, telecommunications, medical devices and a wide array of other areas and products.

PVC is an intrinsically low-carbon plastic: 57% of its molecular weight is chlorine derived from common salt; 5% is hydrogen; and 38% is carbon. It is an extremely durable and cost-efficient material which can be recycled several times at the end of its life without losing its essential properties.

Several PVC applications – such as pipes, window profiles, cables, flooring, membranes and films – have been analysed through lifecycle assessments (LCA) and in terms of eco-efficiency, and they have shown excellent environmental performance.

Thanks to their intrinsic characteristics and properties, PVC products can make positive contributions towards several targets of the UN Sustainable Development Goals (SDGs).

GOVERNANCE

VINYLPLUS STEERING BOARD

VinylPlus is managed by a Steering Board composed of six voting members and six substitutes, all from partner companies in representation of VinylPlus founding members, and with the participation of the VinylPlus and the Vinyl Foundation[1] Managing Directors. The Steering Board is supported by an Advisory Council composed of representatives from the VinylPlus member associations and groups of partner companies chosen to ensure a broad representation of all sector groups. Its role is to monitor industry trends, as well as regulatory and policy developments, and to advise the Steering Board.

MEMBERS

Mr Dirk Breitbach › EuPC[2]
Mr Filipe Constant › ECVM 2010[3]
Dr Brigitte Dero › Managing Director of VinylPlus
Mr Hendrik Fischer[(a)] › European Plasticisers[4]
Mr Rainer Grasmück[(b)] › ESPA[5]
Mr Andreas Hartleif › EuPC
Mr Andy Jones[(c)] › ESPA
Dr Ettore Nanni › Treasurer (ESPA)
Dr Matthias Pfeiffer › European Plasticisers
Mr Hans-Christoph Porth › ECVM 2010
Mr Nigel Sarginson[(d)] › European Plasticisers
Dr Karl-Martin Schellerer › ECVM 2010
Mr Stefan Sommer › Chair (ECVM 2010)
Mr Geoffroy Tillieux › Managing Director of the Vinyl Foundation
Ms Myriam Tryjefaczka › Vice Chair (EuPC)
Mr Christian Vergeylen › EuPC

MONITORING COMMITTEE

The VinylPlus Monitoring Committee is the independent body supervising the implementation of the Commitment. It 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 2021, in April and in December, in virtual form due to COVID-19 social-distancing measures.

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
Mr Armand De Wasch › Euroconsumers Group[6]
Dr Brigitte Dero › Managing Director of VinylPlus
Prof. Dr Ir. Jo Dewulf[7] › Chair of the Monitoring Committee
Mr Ondřej Knotek › Member of the European Parliament
Mr Sylvain Lefebvre › Deputy General Secretary, industriAll European Trade Union[8]
Mr Nuno Melo › Member of the European Parliament
Dr Ettore Nanni › Treasurer of VinylPlus
Mr Geoffroy Tillieux › Managing Director of the Vinyl Foundation

(a) From October 2021 **(b)** Until February 2021 **(c)** From February 2021 **(d)** Until October 2021

1 Vinyl Foundation: the funding mechanism run by EuPC to collect PVC converters' contribution to VinylPlus (**https://www.vinylfoundation.org**)
2 EuPC: European Plastics Converters (**www.plasticsconverters.eu**)
3 ECVM 2010: the formal legal entity of ECVM (The European Council of Vinyl Manufacturers – **www.pvc.org**), registered in Belgium
4 European Plasticisers: a Sector Group within Cefic, the European Chemical Industry Council. European Plasticisers (**www.europeanplasticisers.eu**) is legally represented in VinylPlus by PlasticisersPlus, the legal entity registered in Belgium
5 ESPA: European Stabiliser Producers Association, is a Sector Group within Cefic. ESPA (**www.stabilisers.eu**) is legally represented in VinylPlus by StabilisersPlus, the legal entity registered in Belgium
6 European consumer organisation (**www.euroconsumers.org**)
7 Faculty of Bioscience Engineering, Ghent University, Belgium (**www.ugent.be/en**)
8 industriAll: European Trade Union (**www.industriall-europe.eu**)

VINYLPLUS **PARTNERS**

IN 2021, THE CONTRIBUTORS WERE:

CONVERTERS:

A. Kolckmann GmbH (Germany)
Alfatherm SpA (Italy)
Aliaxis Group (Belgium)
Altro (UK)
Altro Debolon Dessauer Bodenbeläge GmbH & Co. KG (Germany)
aluplast Austria GmbH (Austria)
aluplast GmbH (Germany)
alwitra GmbH & Co (Germany)
AMS Kunststofftechnik GmbH & Co. KG (Germany)
Amtico International (UK)
APA SpA (Italy)
Beaulieu International Group (Belgium)
BM S.L. (Spain)
BMI Group (Germany)
BT Bautechnik Impex GmbH & Co. KG (Germany)
BTH Fitting Kft. (Hungary)
CF Kunststofprofielen (Netherlands)
Chieftain Fabrics (Ireland)
CIFRA (France)
Danosa (Spain)
Deceuninck Germany GmbH (Germany)
Deceuninck Ltd (UK)
Deceuninck NV (Belgium)
Deceuninck SAS (France)
Dekura GmbH (Germany)
Delta Tecnic SA (Spain)*
DHM (UK)
Dow Europe GmbH (Switzerland)
Dyka BV (Netherlands)
Dyka Plastics NV (Belgium)
Dyka Polska Sp. z o.o. (Poland)
Dyka SAS (France)
Elbtal Plastics GmbH & Co. KG (Germany)
Epwin Window Systems (UK)
Ergis SA (Poland)
Eurocompound Srl (Italy)
Fatra a.s. (Czech Republic)
FDT FlachdachTechnologie GmbH & Co. KG (Germany)
Finstral AG (Italy)
FIP (Italy)
Forbo Flooring BV (Netherlands)
Forbo Novilon BV (Netherlands)
Forbo Sarlino SAS (France)
Forbo-Giubiasco SA (Switzerland)
Funzionano AS (Norway)
Gealan Fenster-Systeme GmbH (Germany)
Georg Fischer Deka GmbH (Germany)
Gerflor Mipolam GmbH (Germany)
Gerflor SAS (France)
Gerflor Tarare (France)
Gernord Ltd (Ireland)
Girpi (France)
Gislaved Folie AB (Sweden)*
Griffine Enduction (France)
H-fasader AS, former H-producter AS (Norway)
Holland Colours NV (Netherlands)
Hundhausen Kunststofftechnik GmbH (Germany)
Imerys Talc Europe (France)
Industrias REHAU SA (Spain)
Inoutic/Deceuninck Sp. z o.o. (Poland)
Internorm Bauelemente GmbH (Austria)
IVC BVBA (Belgium)
Jimten (Spain)
Liveo Research, former Bilcare Research (Germany)
Low & Bonar GmbH (Germany)
Lubrizol Advanced Materials Europe BVBA (Belgium)
Manufacturas JBA (Spain)
Marley Deutschland (Germany)
Marley Hungária (Hungary)
MKF-Ergis GmbH (Germany)
MKF-Ergis Sp. z o.o. (Poland)
Molecor (Spain)
Mondoplastico SpA (Italy)
Nicoll (France)
Nicoll Italy (Italy)
Nordisk Wavin AS (Denmark)
Norsk Wavin AS (Norway)
Novafloor (France)
NYLOPLAST EUROPE BV (Netherlands)
Omya International AG (Switzerland)
PACCOR Hungary Kft. (Hungary)
Palram DPL Ltd (UK)
Perlen Packaging (Switzerland)
Pipelife Austria (Austria)
Pipelife Belgium NV (Belgium)
Pipelife Czech s.r.o (Czech Republic)
Pipelife Deutschland GmbH (Germany)
Pipelife Eesti AS (Estonia)
Pipelife Finland Oy (Finland)
Pipelife France (France)
Pipelife Hungária Kft. (Hungary)
Pipelife Nederland BV (Netherlands)
Pipelife Norge AS (Norway)
Pipelife Polska SA (Poland)
Pipelife Sverige AB (Sweden)
Poliplast (Poland)
Poloplast GmbH & Co. KG (Austria)
Polyflor (UK)
Polymer-Chemie GmbH (Germany)
PreZero Kunststoffrecycling GmbH & Co. KG (Germany)
profine GmbH – International Profile Group (Germany)
Protan AS (Norway)
Redi (Italy)
REHAU AG & Co (Germany)
REHAU GmbH (Austria)
REHAU Ltd (UK)
REHAU SA (France)
REHAU Sp. z o.o. (Poland)
RENOLIT Belgium NV (Belgium)
RENOLIT Cramlington Ltd (UK)
RENOLIT Hispania SA (Spain)
RENOLIT Ibérica SA (Spain)
RENOLIT Milano Srl (Italy)
RENOLIT Nederland BV (Netherlands)
RENOLIT Ondex SAS (France)
RENOLIT SE (Germany)
Resysta International GmbH (Germany)
Riflex Film (Sweden)
Riuvert (Spain)
Roechling Engineering Plastics KG (Germany)
Saint Clair Textiles, former Dickson Coating (France)
Salamander Industrie Produkte GmbH (Germany)
Sattler PRO-TEX GmbH (Austria)
Schüco Polymer Technologies KG (Germany)
Serge Ferrari SAS (France)
Sika Services AG (Switzerland)
Sika Trocal GmbH (Germany)
SIMONA AG (Germany)
SKZ-Testing GmbH (Germany)
Soprema Srl (Italy)
Stöckel GmbH (Germany)
Tarkett AB (Sweden)
Tarkett France (France)
Tarkett GDL SA (Luxembourg)
Tarkett Holding GmbH (Germany)
Tarkett Limited (UK)
Teraplast SA (Romania)
TMG Automotive (Portugal)
Veka AG (Germany)
Veka Ibérica (Spain)
Veka Plc (UK)
Veka Polska (Poland)
Veka SAS (France)
Verseidag-Indutex GmbH (Germany)
Vescom BV (Netherlands)
Vinilchimica Srl (Italy)
Vulcaflex SpA (Italy)
Wavin Baltic (Lithuania)
Wavin Belgium BV (Belgium)
Wavin BV (Netherlands)
Wavin France SAS (France)
Wavin GmbH (Germany)
Wavin Hungary (Hungary)
Wavin Ireland Ltd (Ireland)
Wavin Metalplast (Poland)
Wavin Nederland BV (Netherlands)
Wavin Plastics Ltd (UK)

PVC RESIN PRODUCERS:

Ercros (Spain)
INOVYN (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 Chemson Kimya San. ve Tic. A.Ş.
Asúa Products S.A.
Baerlocher GmbH
Galata Chemicals GmbH
IKA GmbH & Co. KG
PMC Group Inc.
Reagens SpA
Valtris Specialty Chemicals Ltd

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
Proviron

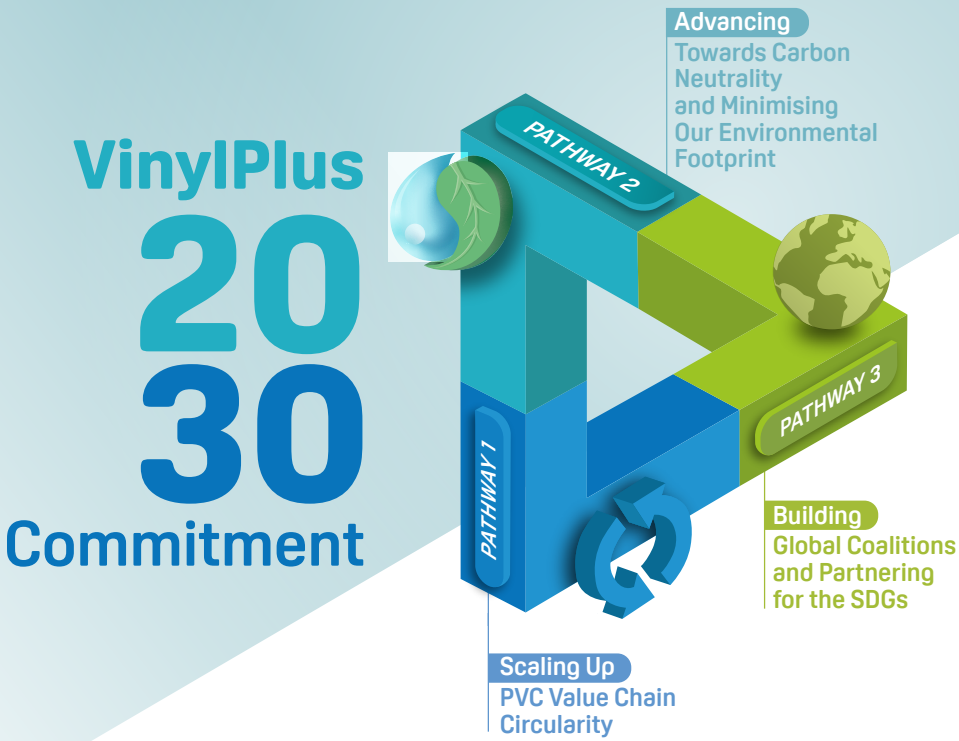
ASSOCIATE MEMBERS:

British Plastics Federation (BPF) VinylPlus UK
PVC Forum Italia (Italy)
VinylPlus Deutschland e.V. (Germany)

* Companies that joined VinylPlus in 2021

THE VINYLPLUS **2030** COMMITMENT

"Within the next 10 years, the resin and additives producers, converters and recyclers of the PVC industry will actively work together and share responsibility for accelerating the transition of the European PVC value chain to a circular economy.
We will act as a pacesetter in innovation, collaboration and communication, adhering to science-based principles to demonstrate that PVC is a material of choice for a sustainable society, thereby acting at the forefront of the circular economy and sustainable development in the plastics sector both in Europe and worldwide".



A NEW ROADMAP FOR 2030

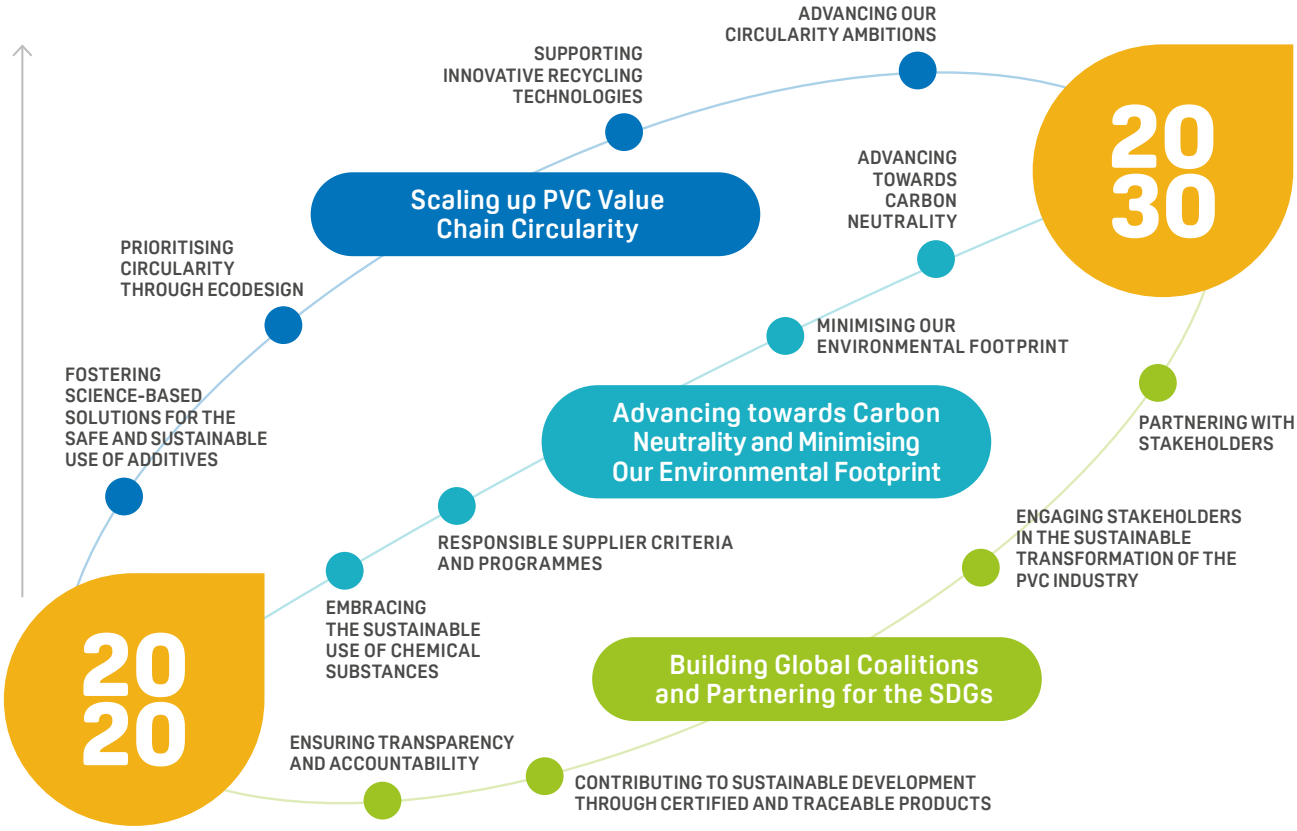
For over 20 years, VinylPlus has been acting as a frontrunner in sustainability and the circular economy. Recognizing that progress towards sustainable development is a journey of continuous improvements, the European PVC industry reconfirmed its strong commitment in 2021 by launching an even more ambitious programme for the next 10 years.

With its next 10-year Commitment towards 2030, VinylPlus again confirms the united European PVC value chain's dedication to creating a sustainable future and to ensuring that PVC remains a safe and circular material, fit for the circular economy.

Brigitte Dero | Managing Director of VinylPlus

The VinylPlus 2030 Commitment has been developed bottom-up through industry workshops and with an outside-in approach to goal setting[9] through an open process of stakeholder consultation.

9 The 'outside-in' approach is identified by the SDG Compass (**https://sdgcompass.org**) as better addressing global needs: *"By looking at what is needed externally from a global perspective and setting goals accordingly, business will bridge the gap between current performance and required performance"*, SDG Compass Guide 2015, p. 19



Addressing internal and external stakeholders' expectations and priorities through three pathways and 12 action areas.

ADDRESSING PRIORITIES AT THE EUROPEAN AND GLOBAL LEVELS

Aiming to contribute to the United Nations 2030 Agenda for Sustainable Development, with a particular focus on sustainable consumption and production, climate change and partnerships.

SUSTAINABLE DEVELOPMENT GOALS

Aligning with relevant EU policies under the European Green Deal, such as the EU Circular Economy Action Plan and the EU Chemicals Strategy for Sustainability.

Embracing the EU Circular Plastics Alliance's (CPA)[10] targets on the use of recycled plastics in new products.

10 CPA: Circular Plastics Alliance. The European Commission's multi-stakeholder platform aimed at boosting the market for recycled plastics to 10 million tonnes by 2025 (**https://ec.europa.eu/growth/industry/policy/circular-plastics-alliance_en**)

VinylPlus 2030 addresses macro sustainability perspectives reflecting European and global priorities, as well as stakeholder expectations for the long-term sustainability of the PVC industry. It focuses on accelerating the transition towards the circular economy, sustainable production and value-chain decarbonisation, as well as on engagement with civil society and NGOs.

Three pathways have been identified for the next 10 years, encompassing 12 key action areas and 39 targets.[11]

All targets will be subject to a mid-term review in 2025 to take into account technological progress, as well as the evolution of socio-economic, regulatory and environmental trends at the European and global levels.

Through its Commitment, VinylPlus aims to contribute proactively to addressing the global sustainability challenges and priorities identified in the UN SDGs.

3 GOOD HEALTH AND WELL-BEING — TARGET 3.9

6 CLEAN WATER AND SANITATION — TARGET 6.3

7 AFFORDABLE AND CLEAN ENERGY — TARGET 7.2

8 DECENT WORK AND ECONOMIC GROWTH — TARGET 8.4

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE — TARGET 9.4

12 RESPONSIBLE CONSUMPTION AND PRODUCTION — TARGET 12.2, 12.4, 12.6, 12.8

13 CLIMATE ACTION — TARGET 13.1

14 LIFE BELOW WATER — TARGET 14.1

3 GOOD HEALTH AND WELL-BEING — TARGET 3.4

4 QUALITY EDUCATION — TARGET 4.7

5 GENDER EQUALITY — TARGET 5.1

7 AFFORDABLE AND CLEAN ENERGY — TARGET 7.3

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE — TARGET 9.5

11 SUSTAINABLE CITIES AND COMMUNITIES — TARGET(S) DEPENDING ON PROJECTS THAT WILL BE DEVELOPED

13 CLIMATE ACTION — TARGET 13.1

12 RESPONSIBLE CONSUMPTION AND PRODUCTION — TARGET 12.4, 12.5

13 CLIMATE ACTION — TARGET 13.1

12 RESPONSIBLE CONSUMPTION AND PRODUCTION — TARGET 12.4, 12.6, 12.7, 12.8

17 PARTNERSHIPS FOR THE GOALS — TARGET 17.17

11 Targets and deadlines are summarised in Appendix, p. 36-38

PHOTO: COURTESY OF PHILIPPE CHANCEL

2021 ACTIVITIES

PATHWAY 1

CIRCULAR ECONOMY

SCALING UP PVC VALUE CHAIN CIRCULARITY

"The PVC industry embraces the circular economy. We commit to building upon the achievements made over the last 20 years to accelerate towards circularity. We aim to ensure controlled-loop management of PVC, from circular product design, the development of additional collection schemes and advanced recycling technologies, to ensuring the safe use of recyclate in new high-performance, durable products."

COMMITTED TO RECYCLING

900,000 TONNES
of PVC recycled
per year by 2025

1 MILLION TONNES
of PVC recycled
per year by 2030

Through Pathway 1, the European PVC industry has confirmed the recycling commitments made to the European Commission in the framework of the EU CPA and possibly to go beyond these. The objective is to transform PVC waste into a high-quality, safe and valued resource, contributing in particular to SDG12 – sustainable consumption and production – of the United Nations 2030 Agenda.

Since research and innovation play a critical role in achieving circularity targets, VinylPlus is concentrating its efforts and resources to support technical projects, R&D and innovation in three main areas:

- improve existing collection and recycling schemes and set up new ones for additional PVC streams

Through Pathway 1, we believe that we will maintain leadership and act as a blueprint for the whole of the European plastics industry.

Jason Leadbitter
Chair of VinylPlus Circular Vinyls Commitee

PVC windows and profiles guarantee excellent thermal and acoustic insulation to this innovative building, and they are fully recyclable.

- support the development of chemical recycling and other recycling and sorting technologies
- investigate solutions to detect, sort, and remove legacy additives from end-of-life PVC products.

Two dedicated VinylPlus Committees, the Circular Vinyls Committee (CVC) and the Legacy Additives Committee (LAC), will help to achieve the 2030 Commitment's recycling targets and fulfil its obligation to foster science-based solutions for the safe and sustainable use of additives.

In 2021, the CVC finalised revision of the VinylPlus recycling definitions, according to the new CPA terms and methodology.[12] All PVC converting sectors participated in the process, providing input into how the definitions[13] apply to their specific manufacturing and distribution processes.

VINYLPLUS DEFINITION OF PVC RECYCLING

Recycled PVC *(rPVC) is prepared by processing PVC waste for the original purpose or other purposes, excluding energy recovery and fuel production.*

By-product: re-utilised material that has been generated as an integral part of the production process and is capable of being reclaimed as part of a normal industrial practice. Reuse of the material is certain and lawful. This is sometimes also called 'internally reused material' (IRM), 'regrind' or 'rework'. Reuse of by-products is not considered recycling, and ***it is not counted towards the recycling targets***.

PVC waste: any PVC material that the holder discards, intends to, or is required to discard.

Pre-consumer waste: material diverted during a manufacturing process that the holder discards, intends to, or is required to discard.

Post-consumer waste: material returned from distribution or generated by the end-users of products that has fulfilled its intended purpose or can no longer be used and which the holder discards, intends to, or is required to discard.

VinylPlus intends to remain the data champion in Europe on PVC recycling and the use of recycled PVC in new products.

1.1 ADVANCING OUR CIRCULARITY AMBITIONS

VinylPlus is committed to recycling at least 900,000 tonnes of PVC waste into new products by 2025 and 1 million tonnes by 2030.

In 2021, despite the contraction of economic activities caused by the COVID-19 pandemic, 810,775 tonnes of PVC waste were recycled within the VinylPlus framework, of which 63.6% was pre-consumer waste and 36.4% post-consumer waste.

The PVC ceiling of this amazing footbridge strengthens the structure and prevents excessive overheating, while PVC flooring dampens vibrations.

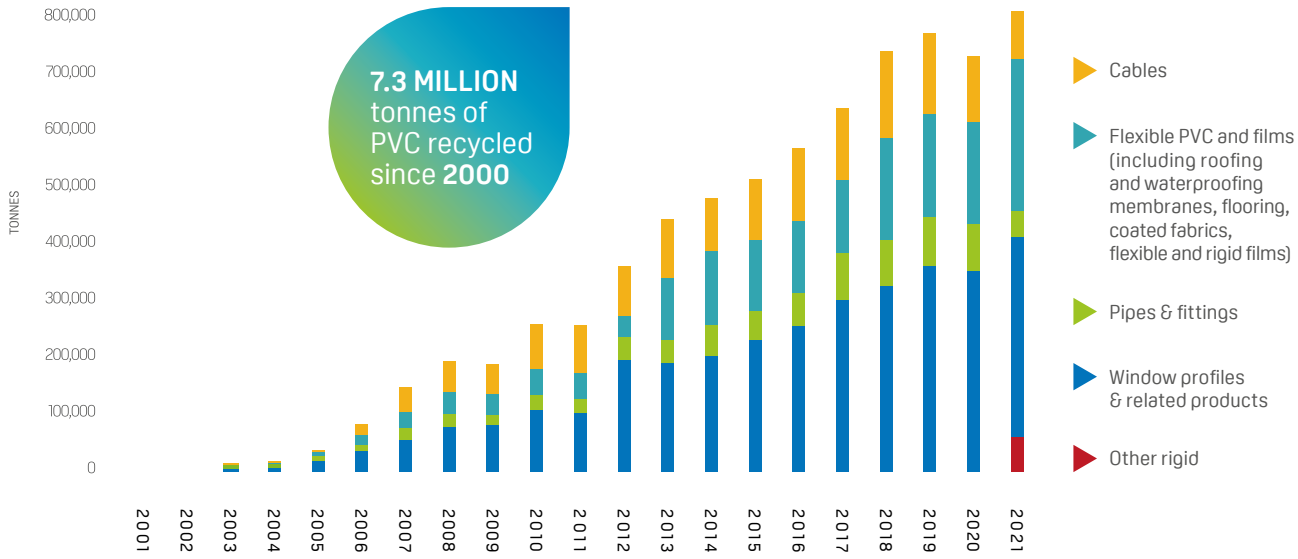
PHOTO: COURTESY OF BOYSPLAYNICE

12 https://ec.europa.eu/docsroom/documents/46954

13 Specific, detailed definitions for each sector are available at https://productlabel.vinylplus.eu/wp-content/uploads/2022/03/VinylPlus-Definitions-Revision_8-September-2021.pdf

Creative, community-building reuse of end-of-life PVC pipes in Denmark.

PVC RECYCLED WITHIN THE VINYLPLUS FRAMEWORK



7.3 MILLION
tonnes of PVC recycled since 2000

14.5 MILLION
tonnes of CO_2 saved since 2000

+1.6 THOUSAND
direct jobs in recycling plants

RecoTrace™

Recovinyl monitors, verifies, and reports European PVC recycling tonnages and the use of this material through its data collection system RecoTrace™

RECYCLING ACTIVITY
Recyclers and converters register how much PVC waste they have recycled

BRINGING TOGETHER RECYCLERS AND CONVERTERS TO GUARANTEE THE CIRCULARITY OF PVC

CONVERTING ACTIVITY
Converters register how much recycled PVC material has been used in new products

PHOTO: COURTESY OF PVC INFORMATION COUNCIL DENMARK

The amount of PVC waste recycled represented around 26.9% of the total PVC waste generated in 2021 in the EU-27, Norway, Switzerland and the UK.

Nevertheless, it was not possible to satisfy the high demand for recycled PVC, which was mainly driven by high prices and shortages in the supply of virgin resins.

In line with the commitment taken within the CPA – to set up a harmonised, voluntary, transparent and trusted system for the EU value chain to monitor volumes of recycled plastics used in European products and to ensure traceability of data – Recovinyl[14] in 2020 developed RecoTrace™ (https://recotrace.com), a data collection system to monitor, verify and report PVC recycling and uptake in Europe. RecoTrace™ is the first system to comply with the CPA Monitoring Requirements and Audit Protocol.

› Research, innovation and best practices

To exploit all the possible opportunities to achieve higher recycling rates of post-consumer PVC waste in Europe, VinylPlus continued to support innovative projects to improve the existing collection and recycling of specific PVC applications, set up additional collection and recycling schemes where appropriate and increase the use of recycled PVC in new products.

Promoting reuse and recycling in new products

To enhance the uptake of roofing membrane recyclates, a workshop was organised in the Netherlands by **Roofcollect®** – ESWA[15] Recycling Project (www.eswa-synthetics.org/recycling) – on new prototype examples for new product applications such as brackets for solar panels on roofs.

The completion of the **EATS Recycling Project**, which was aimed at developing a new application using recycled PVC from the automotive industry in a closed loop, was announced in June 2021 by the VFSE[16] Automotive Working Group (EATS – European Automotive Trim Suppliers). Based on a market study, heel mats were chosen as the most promising product, and technical development was started by the project partner CIFRA (www.cifra.fr/en).

The **Resysta®** recycling consortium (www.resysta.com/en) produces a recyclable wood-like material based on rice husks and PVC. In 2021, the Resysta network continued to develop its European collection points for waste Resysta material. LCAs and EPDs for Resysta material and end products were also finalised.

Through the **Green Community Growth in Reused PVC** project, the PVC Information Council Denmark promoted the reuse of end-of-life PVC pipes as a go-to material for community-building urban gardening in Denmark.
(See also partnership projects on page 29).

In line with the CPA's principles, VinylPlus is committed to ensuring the proper traceability of waste. Traceability and certification ensure quality and secure investment in recycling, so that the best technology is in place.

14 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 Commitments (**www.recovinyl.com**)

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

16 VFSE: Vinyl Films and Sheets Europe, the association representing the European suppliers of plastics sheets and foils (**www.vfse.org**)

PVC can be recycled several times without losing its technical performance.

PHOTO: COURTESY OF RENOLIT

Improving collection and recycling

To boost the PVC window sector's contribution to the recycling targets set for 2025, **EPPA**[17] developed a joint action plan with Recovinyl in 2020, focusing on France, Germany and Poland – the three countries with the most promising opportunities to increase recycling further. In Germany, the collaboration extended to Rewindo[18] and focused on three areas: intensifying the promotion and communication activities for window recycling along the entire supply chain; strengthening collection and recycling schemes; and supporting the optimisation of rPVC use in new windows, in both quantitative and qualitative terms. In France, in view of the application of the upcoming EPR (Extended Producer Responsibility)[19] regulation, collaboration with the UFME (Union des Fabricants de Menuiseries – the Association of Doors and Windows Manufacturers, www.ufme.fr) and SNEP (Syndicat National de l'Extrusion Plastique, www.snep.org) has been further strengthened both organisationally and managerially. An acceleration was also announced of the implementation of the network for dismantling and collecting end-of-life windows. In Poland, an organisational and managerial structure was implemented, aimed at improving infrastructure to increase the collection and recycling of post-consumer windows.

WREP, the Italian Waste Recycling Project, is promoting the development of pilot schemes for sorting, collecting and recycling PVC from bulky urban waste in collaboration with multi-utilities and recyclers. To date, the operational phase has involved four multi-utilities in the northeast of Italy and in central Tuscany. This phase confirmed that intercepting and recycling PVC waste from bulky urban waste is economically and environmentally worthwhile. Four other utilities were scheduled to join the project in 2022. In 2021, the design and prototype production of a handheld device to sort PVC from other plastics using near-infrared hyperspectral technology (NIR) was commissioned to the company Phoenix (www.phoenix-rto.com). Following very positive initial field-tests, Phoenix was also commissioned to carry out a preliminary study of the feasibility of designing a manual instrument based on XRF (XFluorescence) technology to detect lead and DEHP presence in post-consumer PVC. WREP was included as an example of best practice in the EU CIRCE2020[20] and CONDEREFF[21] Interreg projects.

WREP IN NUMBERS

500+ tonnes of PVC waste sorted and collected

1,000+ tonnes of CO_2 emissions avoided

€80,000 saved

10,000+ tonnes/year potentially collectable nationwide

The **PVC Recyclers meet PVC Converters** event series by VinylPlus Deutschland continued in 2021, with the support of VinylPlus, AgPR,[22] Rewindo and IVK Europe.[23] Its objective was to raise awareness of existing PVC recycling activities and boost rPVC uptake. Around 70 recycling experts from the entire PVC value chain participated in two virtual meetings, one in May and the other in November.

PHOTO: COURTESY OF FILIPPO ROMANO, RESSTENDE

PVC and fiberglass roller screens help optimise natural light and the thermal performance of innovative buildings.

17 EPPA: the European Trade Association of PVC Window System Suppliers (**www.eppa-profiles.eu**)

18 Rewindo: the German recycling initiative for PVC windows, roller shutters and related products (**www.rewindo.de**)

19 EPR: Extended Producer Responsibility, a policy approach under which producers are given a significant responsibility for the treatment or disposal of post-consumer products

20 **https://www.interreg-central.eu/Content.Node/CIRCE2020.html**

21 **https://www.interregeurope.eu/good-practices/wrep-waste-recycling-project**

22 AgPR: Arbeitsgemeinschaft PVC-Bodenbelag Recycling (Association for the Recycling of PVC Floor-Coverings – **www.agpr.de**)

23 IVK Europe: Industrieverband Kunstoffbahnen e.V. (Plastic Sheets and Films Association – **www.ivk-europe.com**)

Advancing circularity in the healthcare sector

About 30% of all plastics-based medical devices used in hospitals are made of PVC. Most PVC medical waste is non-infectious and can be recycled when properly sorted and collected. VinylPlus actively supports initiatives aimed at increasing the recycling potential of PVC waste in the healthcare sector.

PHOTO: VINYLPLUS®

Launched in February 2021, **VinylPlus® Med**[24] is aimed at accelerating sustainability in healthcare across Europe through the recycling of discarded single-use PVC medical devices. It brings together hospitals, waste management companies, recyclers and the PVC industry. (See also partnership projects on page 29).

RecoMed is a well-established project aimed at collecting and recycling non-contaminated used PVC medical devices from UK hospitals, including face masks and tubing. The project currently involves 43 hospitals, and another 98 are on the waiting list. Due to COVID-19, the collection of PVC waste had to be paused. Nevertheless, RecoMed continued its awareness raising activities in 2021 and registered growing interest from healthcare structures, recyclers and the national government. RecoMed is a partnership project between the British Plastics Federation (BPF)[25] and Axion,[26] which is co-funded by VinylPlus.

VinylPlus® PharmPack is aimed at demonstrating the sustainability and recyclability of PVC pharma blister packaging in the framework of European packaging directive 94/62/EG and national laws. The project involves a multidisciplinary and international team that includes pharma film producers and recyclers, as well as VinylPlus national representatives, VinylPlus® Med and the PVC Med Alliance.[27] Following a preparatory phase in 2021, the project is expected to be officially launched in 2022.

Single-use, PVC-based medical devices are fundamental in hospitals. Besides being hygienic, safe and affordable, PVC is easily recyclable.

24 https://www.vinylplus.eu/sustainability/our-contribution-to-sustainability/vinylplus-med-accelerates-sustainability-in-healthcare/

25 BPF: British Plastics Federation, the leading trade association for the UK plastics industry (www.bpf.co.uk)

26 Axion: circular economy specialists (www.axiongroup.co.uk)

27 https://pvcmed.org/

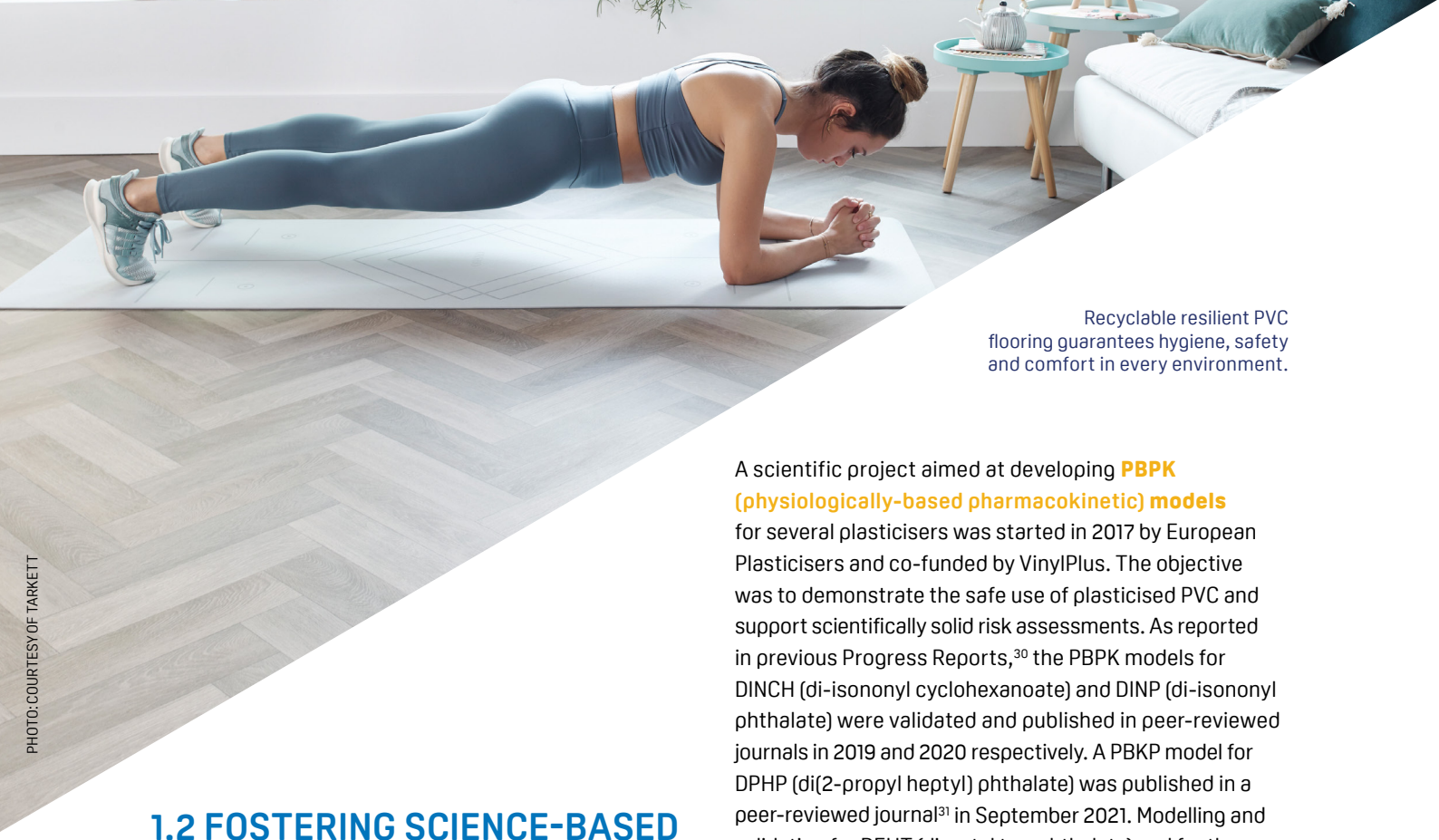


PHOTO: COURTESY OF TARKETT

Recyclable resilient PVC flooring guarantees hygiene, safety and comfort in every environment.

1.2 FOSTERING SCIENCE-BASED SOLUTIONS FOR THE SAFE AND SUSTAINABLE USE OF ADDITIVES

VinylPlus will continue engaging with regulatory bodies to overcome legislative uncertainties, by providing science-based risk evaluations to demonstrate the safe use of additives and of PVC articles containing recyclates with legacy additives.[28] In parallel, VinylPlus will support participation in R&D projects that detect, sort, reduce or remove legacy additives in PVC waste streams.

› Research, innovation and best practices

For a safe use of additives and recyclates with legacy additives

Following German authorities' call for evidence on a proposal for a broad **bisphenol A (BPA)** restriction in articles marketed in Europe,[29] a study is being undertaken of the socio-economic impacts of exposure to endocrine-disrupting substances present in soft rPVC. BPA was phased out of PVC resin production by all ECVM member companies in 2001. Although not used anymore by the European PVC industry, legacy endocrine-disrupting substances such as BPA can still be present in some old end-of-life products.

A scientific project aimed at developing **PBPK (physiologically-based pharmacokinetic) models** for several plasticisers was started in 2017 by European Plasticisers and co-funded by VinylPlus. The objective was to demonstrate the safe use of plasticised PVC and support scientifically solid risk assessments. As reported in previous Progress Reports,[30] the PBPK models for DINCH (di-isononyl cyclohexanoate) and DINP (di-isononyl phthalate) were validated and published in peer-reviewed journals in 2019 and 2020 respectively. A PBKP model for DPHP (di(2-propyl heptyl) phthalate) was published in a peer-reviewed journal[31] in September 2021. Modelling and validation for DEHT (di-octyl terephthalate) and for the DINA (di-isononyl adipate) and DOA (di-octyl adipate) adipates are ongoing.

Scientific research to assess **plasticisers concentration under equilibrium conditions** is being carried out by Virginia Tech (https://vt.edu). The project was commissioned by European Plasticisers in the framework of the Cefic Long-range Research Initiative (LRI – http://cefic-lri.org) and is co-funded by VinylPlus. The objective is to obtain updated data on the impact of plasticisers on indoor air quality and to confirm plasticisers' environmental performance and safe use. The project started in February 2021 and will be completed by December 2022.

In relation to the ongoing discussions on the restriction of rPVC containing **lead (Pb)** as a legacy additive, TEPPFA[32]

In the Torre Sevilla, in Spain, retractable PVC canvas protects pedestrians from the sun at the hottest time of the year.

PHOTO: COURTESY OF PELLI CLARKE PELLI

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

29 **https://chemicalwatch.com/359275/germany-invites-more-comments-on-broad-bisphenol-a-restriction-proposal**

30 Also see p. 30 of VinylPlus Progress Report 2021

31 **https://www.frontiersin.org/articles/10.3389/fphar.2021.692442/full**

32 TEPPFA: The European Plastic Pipes and Fittings Association (**www.teppfa.eu**)

is implementing a technical project aimed at mapping the lead content in commercially available rPVC compounds from potential European suppliers. The project is also investigating the percentage of rPVC as function of pipe diameter and assessing rPVC dilution with virgin materials in relation to regulation. The project is expected to be finalised in the third quarter of 2022.

Reducing and removing legacy additives in PVC waste streams

Revinylfloor is the platform set up within ERFMI[33] and co-funded by VinylPlus to promote a circular economy for the PVC flooring sector in Europe. In 2020, Revinylfloor selected the consultancy firm Solfirmus (www.solfirmus.be) to carry out an in-depth analysis of suitable recycling technologies and to investigate sorting and extracting technologies for PVC flooring containing legacy additives. The trials carried out in 2021 proved that it is possible to separate flooring with legacy additives from flooring without legacy additives using commercially available NIR (near-infrared) sorting technologies. But the trials also indicated the need to improve the accuracy with which different plasticisers are distinguished. New in-field trials are planned to further refine the sorting technology. Trials to extract legacy additives with microwave, ultrasound and thermal desorption were successful, but the technologies used have not yet been commercially proven. Further tests are foreseen in 2022 to investigate the viability of extracting legacy additives with supercritical CO_2 technology.

Launched in June 2019, the **REMADYL** project[34] is aimed at removing hazardous legacy phthalates and lead from PVC and at recycling 'old PVC' into high-purity PVC.[35] The research teams are currently developing an innovative one-step continuous process based on an extractive extrusion technology in combination with new solvents and melt filtration. This process has the potential to rejuvenate old PVC into high-performance PVC at a competitive cost. A lab-scale synthesis to obtain a precursor material for lead scavenger yielded positive results. Researchers from the University of Valencia (UVEG) then successfully optimised a semi-pilot synthesis to obtain the precursor material at a larger scale. In parallel, the Fraunhofer Institute for Chemical Technology (www.ict.fraunhofer.de) is developing a continuous extraction process for PVC plasticisers using a co-rotating twin-screw extruder. Further developments are ongoing to improve the extraction conditions in terms of temperature and pressure.

R&D is fundamental to developing effective technologies to detect, sort, reduce or remove legacy additives in PVC waste streams.

1.3 SUPPORTING INNOVATIVE RECYCLING TECHNOLOGIES

To accelerate towards circularity, VinylPlus is committed to supporting the development of chemical recycling technologies capable of handling difficult PVC waste that cannot be mechanically recycled in an eco-efficient manner. It is also committed to supporting the development of improved sorting and separation technologies for complex (e.g., composite) PVC products.

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

34 https://cordis.europa.eu/project/id/821136 and www.remadyl.eu

35 Also see p. 23-24 of VinylPlus Progress Report 2021

31 DIFFERENT RECOVERY OPTIONS INVESTIGATED SINCE 2000

Waste separation: **7**

Conventional mechanical recycling with special features: **5**

Inclusion in other materials: **2**

Feedstock recycling: **8**

Non-conventional mechanical recycling: **3**

Incineration with energy recovery and material recycling: **6**

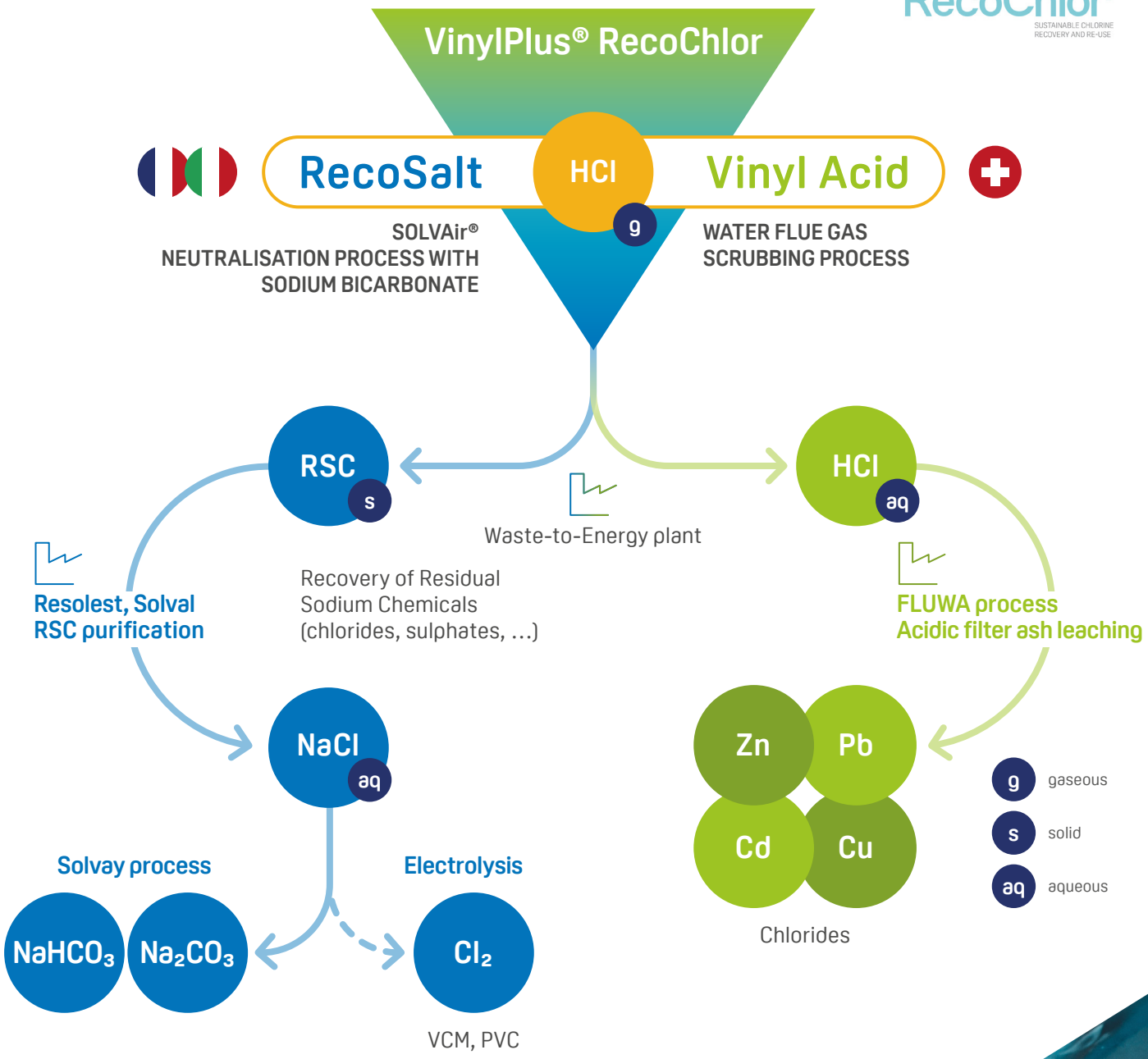
› Research, innovation and best practices

Recovering and recycling chlorine from end-of-life PVC articles

VinylPlus® RecoChlor is a programme dedicated to the PVC waste treatment methodology to recover and recycle chlorine from difficult-to-recycle end-of-life PVC products. This chemical recycling process leads to the production of hydrochloric acid (HCl) in waste-to-energy treatment plants, which is then reused to obtain new products.

VinylPlus® RecoChlor recently launched two major projects leading to the recovery and reuse of chlorine.

CHEMICAL RECYCLING: CHLORINE RECOVERY AND REUSE



The **RecoSalt** project is based on a chlorine chemical recycling process that was studied at the Oreade-Suez plant in France in 2019-2020.[36] Based on the successful results of the first trials, the most suitable waste-to-energy plants across Europe that use the chlorine neutralisation technology based on the SolvAir® process were reviewed in 2021 and selected for further trials. In 2022, the trials will start with several thousand tonnes of selected PVC waste. They will investigate different plant configurations and treatment parameters to assess the efficiency of the chlorine recovery and evaluate the overall economics of the process.

The **Vinyl Acid** project, based on the FLUWA[37] technology, focuses on additional HCl generation from PVC wastes that are not suitable for mechanical recycling. Being implemented in Swiss municipal solid waste incineration (MSWI) plants, its scope is to increase the acid production in flue-gas scrubbers and to use the recovered acid for the recycling of heavy metals contained in MSWI bottom ashes. The FLUWA process will become mandatory in Switzerland in 2026.

Sorting and separation technologies for complex PVC products

The **EUPolySep** project is aimed at setting up a small pilot plant in Belgium to separate PVC from complex laminated products. Polymer-laminated materials and polymeric materials with composite structures are commonly used to combine the strengths of different polymers. The Australian PVC Separation (PVCS) technology has been identified as the most promising to be tested at pilot scale. This innovative process allows polymers to be delaminated and separated from polymer-composite structures for subsequent recycling. A pilot plant is currently under construction in a shipping container in Brisbane, Australia. The plant is scheduled to be installed at the Centexbel (www.centexbel.be/en) facilities in Liège, Belgium, in June 2022. The first trials on composite materials are scheduled to start in the third quarter of 2022.

Recyclable PVC membranes represent one of the most versatile solutions in modern architecture.

PHOTO: COURTESY OF SATTLER

36 Also see p. 23 of VinylPlus Progress Report 2021

37 **https://www.vivis.de/wp-content/uploads/ASS/2013_ASS_377_398_Schlumberger.pdf**

An excellent example of PVC tarpaulins recycled into cool pillows.

PHOTO: COURTESY OF PILLOW TALKS

In this amazing structure in Thailand, PVC sheets are used instead of giant door panels and glass sheets to reduce both weight and the construction budget, thus saving natural and economic resources.

In 2020, **IVK Europe** started a technical project aimed at exploring the mechanical separation of soft PVC material lined with woven fabric or polyester.[38] Based on the promising results of the trials carried out by the recycling company KKF reVinyl GmbH (re-vinyl.de), further processing tests were conducted in 2021 on different types of pre-consumption products with variable percentages of PVC. Part of the separated PVC was successfully utilised by KKF reVinyl in its production, while part of the recovered PVC was sent back to the manufacturers to be tested for reuse in their own production processes. Based on the quality of the separated PVC, IVK Europe member companies agreed on larger-scale trials to evaluate the economic viability of this recycling technique.

ChemRecPolymer is a multi-stakeholder project coordinated by BKV GmbH (www.bkv-gmbh.de) and partnered by VinylPlus Deutschland. The project is aimed at developing a chemical recycling process for plastics-containing waste in the framework of the KuRT (Plastics Recycling Technologies) programme subsidised by the BMBF (Federal Ministry of Education and Research – www.bmbf.de). A scalable, flexible pyrolysis technology for mixed plastic fractions will be identified for optimisation in the concept phase, which started in October 2021. The realisation phase could start after the selection process by BMBF in 2022. VinylPlus Deutschland and four PVC producers are involved in and contributing to three of the project's working groups.

1.4 PRIORITISING CIRCULARITY THROUGH ECODESIGN

Ecodesign covers a fundamental role in circularity, by facilitating future recycling through smart product design. As part of the 2030 Commitment, VinylPlus will help raise awareness of ecodesign among partner companies. It will also contribute to the work on ecodesign developed in the framework of the CPA in collaboration with its product groups. And it will encourage the development of ecodesign guidelines to facilitate circularity.

To achieve those targets, VinylPlus Partner Associations EPPA, ERFMI, IVK Europe and TEPPFA launched product teams in October 2020 to prepare **Design-for-Recycling (DfR) guidelines** for their sectors. The first draft guidelines were presented in 2021, paving the way to extend the use of rPVC to further products. The guidelines were conceptually prepared according to the structure of the European standards and in coordination with the CPA policy. The VinylPlus Partner Associations will now support their member companies in the implementation of DfR guidelines.

355,329 tonnes of PVC windows and related profiles were recycled in the framework of VinylPlus in 2021.

38 Also see p. 25 of VinylPlus Progress Report 2021

PVC pipes last up to 100 years with a minimum of maintenance, and they are easily recyclable.

PHOTO: COURTESY OF ALIAXIS

PHOTO: COURTESY OF EPPA

PHOTO: COURTESY OF SPACESHIFT STUDIO

PATHWAY 2

DECARBONISATION AND ENVIRONMENTAL FOOTPRINT MINIMISATION

ADVANCING TOWARDS CARBON NEUTRALITY AND MINIMISING OUR ENVIRONMENTAL FOOTPRINT

"Sustainable chemistry and carbon neutrality are at the heart of a sustainable economy. By applying a science-based approach, we commit to ensuring that all PVC products, including their supply chains and manufacturing processes, continue to reduce their impact on human health and the environment."

Pathway 2 recognizes the need to take urgent action to combat climate change in line with the European Commission's Green Deal targets; to minimise the environmental footprint of production processes and products in line with the EU Chemicals Strategy for Sustainability; and to increase resource efficiency in consumption and production.

Sustainable chemistry and carbon neutrality are at the heart of a sustainable economy. By applying a science-and evidence-based approach, VinylPlus is committed to ensuring that all PVC products, as well as their supply chains and manufacturing processes, continue to reduce their impact on human health and the environment.

Two dedicated VinylPlus Committees, the newly established Environmental Footprint Committee (EFC) and the Sustainable Use of Additives Committee (SAC), will coordinate VinylPlus efforts to achieving Pathway 2 targets. The EFC will be chaired by Prof. Adisa Azapagic, Professor of Sustainable Chemical Engineering at the

PHOTO: COURTESY OF RENOLIT

PVC products save energy and are vital in renewable energy technologies.

University of Manchester in the UK. Its work will build on the conclusions of a study carried out in cooperation with the University of Ghent in Belgium to evaluate material flows in the PVC industry over a 10-year period[39] and develop them further.

2.1 ADVANCING TOWARDS CARBON NEUTRALITY

Shifting towards renewable energy and material feedstocks to mitigate climate change impacts is a responsibility for all of us: producers and consumers. It is good to see that also the European PVC industry sets a clear commitment in this direction with VinylPlus 2030.

Prof. Dr Ir. Jo Dewulf
Faculty of Bioscience Engineering, Ghent University

2.2 EMBRACING THE SUSTAINABLE USE OF CHEMICAL SUBSTANCES

Additive Sustainability Footprint® Methodology

- Methodology developed in collaboration with The Natural Step.[40]
- Assesses the lifecycle sustainability of additives used in PVC products.
- Peer reviewed by LCA experts and validated.

VinylPlus will continue to support the sustainable use of additives with one of its flagship initiatives, the **Additive Sustainability Footprint®** (ASF).[41] The ASF methodology allows users to proactively assess and promote the sustainable production and use of PVC additives throughout entire product lifecycles, including the roles of additives in the performance of PVC products.

Pilot implementations of the methodology were carried out on the key additives used in generic PVC window profiles and homogeneous PVC flooring. These demonstrated that

Within the new VinylPlus 2030 Commitment, European Plasticisers will continue to transform challenges into opportunities and prove its contribution to achieving the objectives of the Green Deal and the Circular Economy Action Plan, continuing a sustainability journey which started over 20 years ago. European Plasticisers, together with VinylPlus, will carry on driving science-based solutions for the safe and sustainable use of plasticisers and flexible PVC and will engage with key stakeholders to promote best practices of the plasticiser and PVC industry.

Nigel Sarginson
Chair of European Plasticisers

SUSTAINABLE USE OF ENERGY

PVC RESIN PRODUCTION

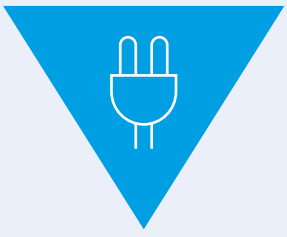
-9.5% ENERGY CONSUMPTION

-14.4% CO_2 EMISSIONS

to produce 1 tonne of PVC in 2015-2016 compared to 2007-2008

MAIN PVC APPLICATIONS

BETWEEN **-16%** AND **-26.5%** IN ENERGY CONSUMPTION



for window profiles, pipes, flooring, films and sheets in 2020 compared to 2010

39 Also see p. 27 of VinylPlus Progress Report 2021
40 The Natural Step: sustainability expert **(www.thenaturalstep.org)**
41 **https://www.vinylplus.eu/sustainability/our-contribution-to-sustainability/additive-sustainability-footprint**

the ASF methodology is workable, is robustly founded on science-based sustainability principles and takes account of multiple dimensions associated with the sustainable use of additives throughout the full societal lifecycle of the articles they are incorporated into.

ASF WEBINAR: FIRST TARGET ACHIEVED!

The first target of VinylPlus 2030 (2.2.1 By 2021, *organisation of at least one introductory ASF webinar by VinylPlus)* was achieved in December 2021 with the organisation of the first webinar, *Building Towards Sustainable PVC*, which was focused on the ASF methodology.

A total of 139 delegates from 19 countries participated in the webinar, which received excellent feedback in the post-webinar survey.

An ASF company training programme has been developed in cooperation with The Natural Step. The programme supports VinylPlus partners in the use and implementation of the ASF methodology for their own companies' product portfolios.

The VinylPlus Sustainable Use of Additives Committee will work on further refinement and implementation of the ASF. The Committee will also compare it with other available methodologies and train and support VinylPlus partner companies on ASF use.

2.3 MINIMISING OUR ENVIRONMENTAL FOOTPRINT

ECVM members are committed to the continuous reduction of their environmental impact in conformity with the requirements of the ECVM Industry Charter[42] for the Production of Vinyl Chloride Monomer and PVC, updated in 2019.

An industry-wide verification was scheduled to be carried out in 39 European VCM and PVC plants between February and June 2022 to assess that compliance with the updated Charter had been achieved by the end of 2021. Dekra (www.dekra.com) has been selected as third-party certification body. Verification results are expected to be published in autumn 2022.

2.4 RESPONSIBLE SUPPLIER CRITERIA AND PROGRAMMES

For transparency on the sustainability performance of the whole value chain, including of suppliers of raw materials, VinylPlus will collect and map the certification schemes of the upstream supply chain to demonstrate that suppliers' production facilities are progressing towards sustainability. VinylPlus will also assist its partners in communicating the sustainability progress made by the upstream supply chain.

European Plasticisers held its second essay competition in 2021, aimed at students of environmental chemistry, material science, chemistry, and architecture from European universities. The competition, **Hands on Vinyl: Students of Today, Experts of Tomorrow**, called for essays on plasticisers and flexible PVC applications. The objective was to promote research on plasticisers and PVC among the younger generation and facilitate a scientific debate.

42 ECVM Industry Charter: it is aimed at minimising any detrimental effects from activities and products to the environment or human health in the production phase **(https://pvc.org/about-ecvm/ecvms-charter/)**

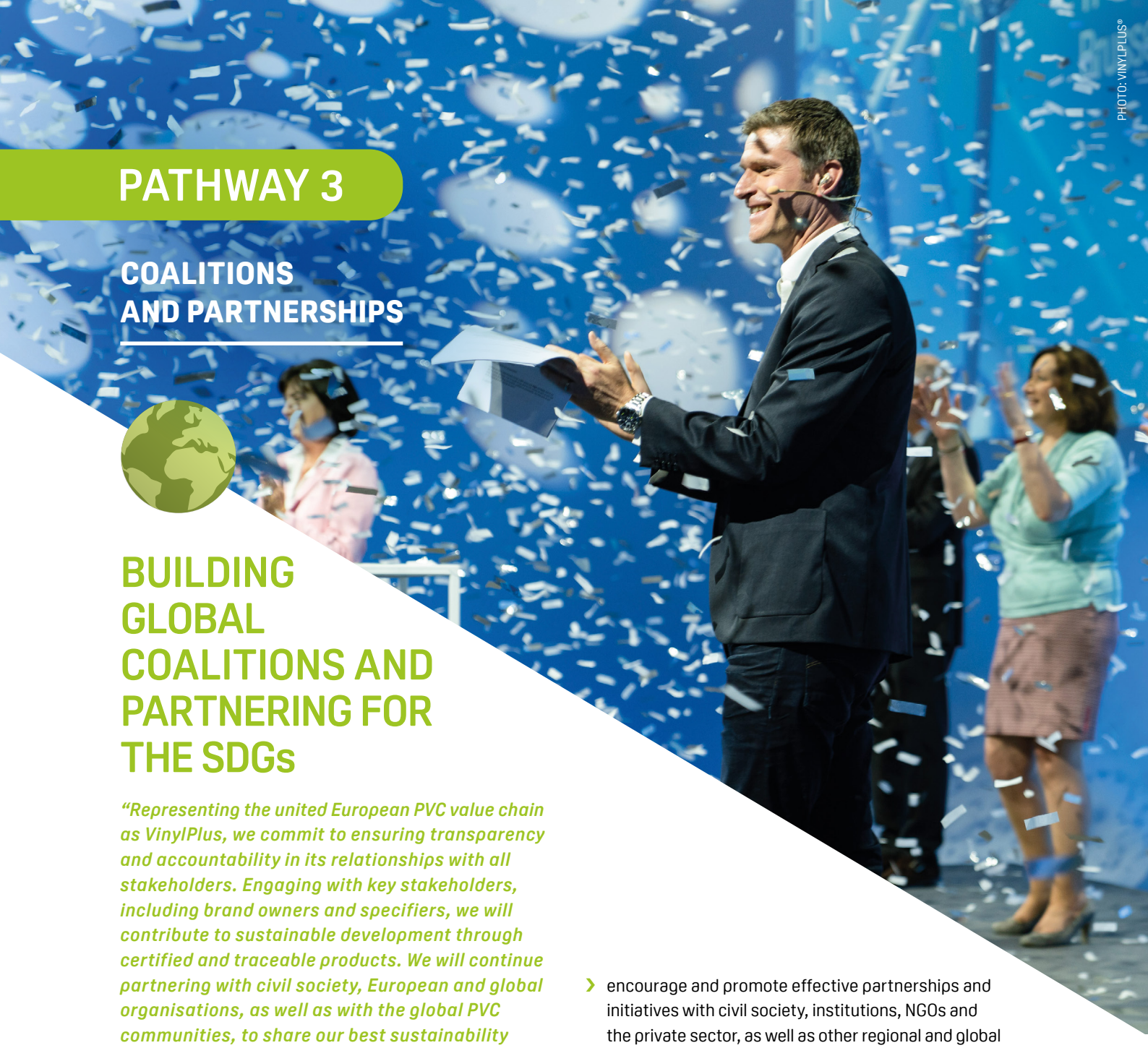


PHOTO: VINYLPLUS®

PATHWAY 3

COALITIONS AND PARTNERSHIPS

BUILDING GLOBAL COALITIONS AND PARTNERING FOR THE SDGs

"Representing the united European PVC value chain as VinylPlus, we commit to ensuring transparency and accountability in its relationships with all stakeholders. Engaging with key stakeholders, including brand owners and specifiers, we will contribute to sustainable development through certified and traceable products. We will continue partnering with civil society, European and global organisations, as well as with the global PVC communities, to share our best sustainability practices and contribute to the UN SDGs."

Recognizing the key role of the UN SDGs in contributing to global development, promoting human wellbeing and protecting the environment, VinylPlus has committed to Pathway 3 to address broader societal needs. It will:

- provide maximum transparency and accountability in its governance and reporting
- encourage its partner companies to adopt sustainable practices and to integrate sustainability information into their reporting cycles
- enhance the industry's contribution to sustainability through labelling and certifications, helping promote sustainable procurement practices in both the private and public sectors
- encourage and promote effective partnerships and initiatives with civil society, institutions, NGOs and the private sector, as well as other regional and global value-chain bodies.

ECVM members are fully committed to achieving all the VinylPlus targets. We provided a number of experts to work in VinylPlus committees and working groups, at the same time assuring a good information flow regarding VinylPlus objectives and achievements within our companies.

Stefan Sommer
Chair of ECVM

The launch of VinylPlus 2030 at the VSF2021.

3.1 ENSURING TRANSPARENCY AND ACCOUNTABILITY

As with the previous Commitments, an independently verified and audited report detailing the progress being made against each target will be published annually and proactively circulated to relevant stakeholders.

The Progress Report 2022 has been independently verified by SGS, while tonnages of recycled PVC waste and expenditures have been audited and certified by KPMG.

The VinylPlus 2030 Commitment contains a joint set of targets and ambitions that all industries engaging in it want to achieve together. In 2021, each industry sector (ECVM, ESPA, European Plasticisers and EuPC) applied the Commitment to its specific operations, cascading the targets down, including through presentations and debates at their general assemblies, to engage more colleagues in partner companies.

The Commitment was closely elaborated with members of the Vinyl Foundation. Its implementation was then discussed by the Board and cascaded to the different compounding and converting sector associations, both at Executive Committee level and in dedicated working groups. A focus area is to continue to develop mechanical recycling, by expanding collection networks and improving quality of recyclate. In rigid applications, enabling a safe management of legacy additives is key. In flexible applications, the focus is on developing new technologies that enable recycling of complex products, better sorting, and extraction of legacy additives. Reducing CO_2 and the environmental footprint is also a priority for all sectors.

Myriam Tryjefaczka
Chair of the Vinyl Foundation and member of EuPC Steering Committee

In October 2021, the ESPA General Assembly included presentations and in-depth debates on the targets. Member companies enthusiastically agreed on several actions to contribute to the Commitment. All ESPA members actively promote Vinyl 2030 objectives, which are underpinned by company strategies and visible in actions and behaviours. For example, through our membership in other regional vinyl associations around the world, we promote the adoption of VinylPlus principles with local raw material suppliers and converters, as well as the use of sustainable additives through participation in relevant global events and conferences.

Ettore Nanni
President of ESPA

MONITORING COMMITTEE

To guarantee maximum transparency, accountability and participation, VinylPlus maintains a Monitoring Committee. This is an independent body supervising the implementation of the Commitment and providing guidance and guidelines. (See p. 5 for a list of members)

European Commission
European Parliament
Euroconsumers
Academia
industriAll EUROPEAN TRADE UNION

The discussions on the new VinylPlus Commitment witnessed an active participation of representatives from all European Plasticisers member companies. VinylPlus 2030 was presented to the European Plasticisers General Assembly and was adopted and broadly shared – internally as well as with external stakeholders. Following major investments over the last 25 years of €6 billion by the European plasticiser industry, a major transition to safe and sustainable plasticisers has occurred. This is continuing and is now being implemented beyond the EU.

Matthias Pfeiffer
Vice Chair of European Plasticisers

PVC is a perfect and versatile material for applications aimed at improving the quality of life in resilient cities.

3.2 CONTRIBUTING TO SUSTAINABLE DEVELOPMENT THROUGH CERTIFIED AND TRACEABLE PRODUCTS

The **VinylPlus® Product Label** is a third-party-certified sustainability scheme for PVC products in the building and construction (B&C) sector, developed in cooperation with BRE[43] and The Natural Step.

Despite the pandemic, all the converters holding the Product Label were recertified in 2021. Remote audits were organised whenever travel restrictions did not allow onsite assessments. Two new applications (floor decking and skin foam sheets) were certified.

Sustainability is no longer a topic for Sunday speeches but offers competitive advantages. As architects, we are increasingly being urged by developers to only install certified sustainable products, because their end customers are international investment funds that only include sustainable buildings in their funds based on their ESG criteria. The VinylPlus® Product Label, as the first sustainability label for plastics recognized by BREEAM, qualifies PVC windows for use in sustainable buildings, securing market opportunities.

Professor Bernhard Franken
Franken Generalplaner GmbH

THE VINYLPLUS® PRODUCT LABEL CONTINUES TO EXPAND:

11 companies have been awarded the Label for **130** products and product systems manufactured at **22** European sites.

VinylPlus continued to develop and promote widespread recognition of the VinylPlus® Product Label, with the aims of helping PVC users select products with the best sustainability performance, and VinylPlus partners access markets more easily thanks to third-party certification of their sustainability performance. As a result, the Product Label will be recognized in the 2022 version of the Cahier des Charges-Type Bâtiments (CCTB2022 – https://batiments.wallonie.be), an e-tool developed to help the Walloon and Brussels public and private sectors draft compulsory specifications for sustainable buildings and renovations. In 2021, the VinylPlus® Product Label has been recognized as a label for sustainable products on circubuild.be, the Belgian website referencing best practices for circular buildings.

A dedicated VinylPlus® Product Label Committee has been set up to coordinate efforts to achieve the Label-specific targets. The Committee will also update the criteria scheme to fully reflect the targets of the VinylPlus 2030 Commitment and to incorporate the modifications of the latest version (version 4, currently under review) of BRE's Responsible Sourcing Framework Standard BES 6001.

Two new sustainability schemes, the **VinylPlus® Supplier Certificates** (VSC) for additive producers and compounders that are partners of VinylPlus, have been finalised and approved with specific differentiated criteria. These two schemes will allow raw material suppliers to demonstrate their sustainability efforts and facilitate converters in obtaining the Product Label. All ESPA members with production facilities in Europe have committed to initiate the VSC certification process in 2022.

Helping promote sustainable private and public procurement practices

Two media campaigns by VinylPlus Deutschland in 2021 continued to promote the VinylPlus® Product Label as the sustainability mark for B&C products and VinylPlus as a role model for sustainability. The campaigns targeted **public procurers and corporate social responsibility**

43 BRE: Building Research Establishment, UK-based certification experts on responsible sourcing for B&C products **(www.bre.co.uk)**

PHOTO: COURTESY OF SERGIO GRAZIA

(CSR) **managers** in magazines such as KBD and Forum Nachhaltig Wirtschaften. A campaign was also run in the magazine Hotelbau to address purchasers from the hospitality sector.

The **European Renovation Brochure** project, implemented by EPPA jointly with RAL-Gütegemeinschaft Kunststoff-Fensterprofilsysteme (GKFP – www.gkfp.de/en), aims to promote responsible and sustainable choices for energy-efficient renovation. The brochure is supported by a micro website (www.eppa-profiles.eu/renovation) and is available in five languages. It highlights the contribution of PVC window profiles to sustainability and energy saving through improved thermal insulation, window recycling and the VinylPlus® Product Label.

3.3 ENGAGING STAKEHOLDERS IN THE SUSTAINABLE TRANSFORMATION OF THE PVC INDUSTRY

The **VinylPlus Sustainability Forum** (VSF) is the most important annual event for the PVC value chain, as it provides an opportunity for the industry to come together to discuss progress on sustainability and exchange points of view with partners and stakeholders. The 9th edition, *#Towards2030*, was especially significant, as it was the occasion of the official launch and signing ceremony of the VinylPlus 2030 Commitment. VSF2021 took place on 17 June 2021 as a hybrid event. It was held in Brussels and livestreamed to allow the widest possible worldwide participation. It brought together more than 500 stakeholders from 44 countries, including representatives from the European Commission, European Parliament, the United Nations, consumer organisations, academia, specifiers, recyclers and the PVC value chain. Along with the launch of VinylPlus 2030, VSF2021 celebrated the completion of the second 10-year Voluntary Commitment of the Europe PVC industry and its main achievements of the last two decades.

The European PVC industry, through VinylPlus, has a role to play in the large-scale renovation efforts that were identified by the European Commission as key areas for investment thanks to their potential to improve the environmental footprint of buildings across the EU and to create jobs.

Ondřej Knotek
Member of the European Parliament

PVC window profiles can play an important role in reducing energy loss in buildings.

PHOTO: COURTESY OF GKFP

What are some of the commendable actions on the ground from the private sector, particularly VinylPlus? You have created an excellent pre-competitive space for industry on circularity, which we usually point to when we talk with other stakeholders. The voluntary R&D supported by the value-chain actors and your Commitment for 2030 are very valuable, as are your efforts to exchange experiences and information globally.

Nilgün Tas
Deputy Director, Department of Environment, UNIDO

VinylPlus achievements and the 10-year Commitment were also presented at the **World Resources Forum** (WRF) in October 2021. The WRF is a multi-stakeholder dialogue to put the Earth's resources at the heart of the global green transition. Under the theme *A Green Deal for Sustainable Resources*, WRF2021 was held in a hybrid format, with sessions taking place online, in Switzerland and in Ghana. It involved over 950 participants from more than 100 countries. VinylPlus was invited to share its experience with a presentation, *VinylPlus: driving the European PVC industry towards a low-carbon circular economy,* in the virtual session *Circular economy across plastics value chains – challenges and opportunities*. In addition, VinylPlus was invited to submit an extended paper to the Journal of Circular Economy and Sustainability.

VinylPlus is committed to continue to pursue global engagement over the next decade with international and intergovernmental organisations, initiatives and programmes. It will also share its knowledge, experience and business model for sustainability, as well as gathering input and feedback.

The achievements of VinylPlus have really become a role model, particularly for developing countries, to set up similar kinds of activities in their countries.

Shreekant Moreshwar Diwan
Vice President of the Indian Vinyl Council

PHOTO: VINYLPLUS®

In 2021, VinylPlus continued to share its progress and contributions to the UN Sustainable Development Goals (SDGs) through annual reporting to the **SDGs Partnerships Platform** of progress made on the 2020 Commitment.[44] The VinylPlus 2030 Commitment is currently being submitted for registration.

VinylPlus also continued to co-operate with other regional PVC associations in 2021 and to actively share experience, knowledge and best practices in the **Global Vinyl Council**'s (GVC) bi-annual meetings.

3.4 PARTNERING WITH STAKEHOLDERS

To enhance the PVC industry's contribution to the SDGs, VinylPlus is committed to continuing to engage with civil society, including young generations, local communities, institutions and associations of public authorities, including at the cities and regions levels, as well as with the private sector, to develop partnerships, joint projects and initiatives.

Engaging with civil society

Sports play a key role in ensuring social wellbeing and spreading positive values such as education, fairness and gender equality. As part of its engagement with the sports community, VinylPlus renewed its partnership with

44 https://sustainabledevelopment.un.org/partnership/?p=91

For the Belgium Yoga Day, VinylPlus provided 200 yoga mats signed by © Peyo, which were donated to hospitals and youth associations after the event.

Belgium Yoga Day, the 2021 edition of which was held on 20 June. The event, livestreamed by Belgian television channel RTL TVI, took place for a restricted group of people in the park of the Pairi Daiza (www.pairidaiza.eu) zoo and botanical garden in southern Belgium. VinylPlus provided PVC yoga mats for the event, which were donated afterwards to hospitals and youth associations.

The **Green Community Growth in Reused PVC Pipes** project was developed by PVC Information Council Denmark in partnership with Miklsn (miklsn.dk) and VinylPlus. Its objective is to promote the reuse of PVC pipes as a go-to material for urban gardening, and so contribute to the building of communities. PVC pipes were recovered from urban waste and repurposed to build a community garden placed as central hub in the public park of the Marselisborg Rehabilitation Centre in Aarhus. The local community, from the young to the elderly, helped to build the garden. The project attracted the interest of the Aarhus Municipality's office for cooperation and green growth and has been nominated by the Aarhus City Council for the city's Spireprisen (Sprout Award), an award for active contributions to the green transition.

Sorting and recycling non-infectious plastic waste can significantly reduce hospitals' environmental impacts and operational costs. **VinylPlus® Med** was launched in February 2021 to accelerate sustainability in the healthcare sector across Europe through the recycling of discarded single-use PVC medical devices. Building on the success of the RecoMed scheme to recycle PVC masks and tubing, which was co-funded by VinylPlus in the UK, VinylPlus® Med started with a pilot recycling scheme for Belgian hospitals. The project's partners are waste management company Renewi (www.renewi.com/en), recycler Raff Plastics (www.raffplastics.be/en) and VinylPlus. All Belgian VinylPlus® Med partners are located within a radius of 120 km to limit transport distances and minimise the carbon footprint. Initially launched at Europe Hospitals (www.cliniquesdeleurope.be/en), VinylPlus® Med currently has more than 20 hospitals on the waiting list.

Engaging with institutions and local communities

In **Denmark**, WUPPI,[45] the PVC Information Council Denmark and VinylPlus continued to cooperate in 2021. They aimed to increase awareness of the European PVC industry's sustainability achievements and of WUPPI's collection and recycling activities, as well as to secure a position for PVC in the Danish circular economy. Activities included a multimedia campaign and ad hoc newsletters. In addition, VinylPlus and the PVC Information Council Denmark built a partnership with Miljøstyrelsen (the Danish Environmental Protection Agency) focusing on the restriction of problematic chemicals in PVC to ensure that the EU's high consumer protection is extended worldwide.

In **France**, a webinar on *Decarbonation and circular economy actions in the PVC industry* was organised for French politicians and institutions in December 2021 by VinylPlus France and partner companies Inovyn and Tarkett. The objective was to raise awareness of European and national initiatives to move the PVC industry towards carbon neutrality.

In **Germany**, VinylPlus Deutschland in 2021 continued its positive dialogue with politicians, local authorities and political influencers on VinylPlus' achievements and its 2030 Commitment. In June, VinylPlus Deutschland participated in a virtual panel discussion on climate protection organised by the Kommunalpolitische Vereinigung der CDU und CSU Deutschlands (KPV). VinylPlus Deutschland supported its participation with advertorials in the magazine kommunalwelt.de.

In **Italy**, one-on-one meetings with Italian institutions, regulators, sport authorities and local administrations restarted in 2021 in the framework of the 2026 Winter Olympics Milano-Cortina project. The progressive easing of pandemic emergency measures also made possible meetings and contacts with possible business partners (PVC manufacturers and contractors). The meetings aimed to raise awareness of PVC's sustainability and recyclability features, as well as its technical and economic characteristics, to highlight how PVC can contribute to a sustainable sporting event.

In the framework of the VinylPlus® Med project, healthcare staff are trained to sort and collect PVC medical devices for recycling.

PHOTO: VINYLPLUS®

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

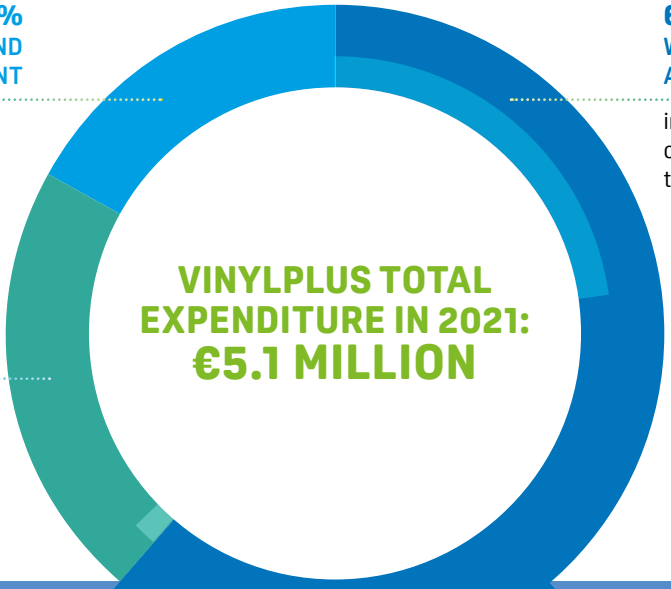
FINANCIAL **REPORT**

In 2021, industry expense decreased by 12%. This is mainly explained by projects for which implementation was postponed and by revised allocation rules.

The expenditure of VinylPlus – including EuPC and its members, as well as national and sectoral co-funding – amounted to €5.1 million in 2021.

16.7%
OVERHEADS AND COMMITMENT DEVELOPMENT

61.5%
WASTE MANAGEMENT AND TECHNICAL PROJECTS,
including national and sectoral co-funding, which amounted to **22.7%** of total industry funding



21.8%
COMMUNICATIONS,
including national and sectoral co-funding, which amounted to **1.4%** of total industry funding

WASTE MANAGEMENT AND TECHNICAL PROJECTS	TOTAL EXPENDITURE INCLUDING EUPC AND ITS MEMBERS	
Figures in €1,000s	2020	2021
Films and coated fabrics related projects	65	91
Flooring related projects	672	770
EPPA	765	633
ESWA/Roofcollect®	84	0
Recovinyl®	1,020	1,000
Studies, start-up & pull concept	201	219
TEPPFA*	479	257
Medical applications recycling	55	60
Resysta® consortium	15	0
Oreade chemical recycling	-307	38
Development of recycling applications in automotive (VFSE)	33	0
Urban agriculture	0	0
Set up of a soft PVC collection scheme in Denmark	59	0
EuPolySep (PVC composites delamination)	70	70
Total projects	**3,212**	**3,137**

* Expense allocation takes into account collected polymer

RECYCLED **PVC TONNAGES**

The table below summarises the tonnages of PVC recycled within the VinylPlus framework in the period 1 January 2021 to 31 December 2021, 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 on page 33.

PROJECT	TYPE OF PVC	TONNAGE RECYCLED IN 2020		TONNAGE RECYCLED IN 2021	
		POST-CONSUMER	*PRE-CONSUMER*	*POST-CONSUMER*	*PRE-CONSUMER*
Recovinyl® (incl. IVK Europe)	Coated fabrics	4,515 [A]	3,015 [A]	476 [A]	1,301 [A]
Flooring post-consumer recycling initiative (part of **Revinylfloor**)	Flooring	1,560 [A]	1,350 [A]	2,162 [A]	1,662 [A]
EPPA (incl. Recovinyl®)	Window profiles & related profiles	134,205 [B]	219,238 [B]	141,420 [B]	213,909 [B]
TEPPFA (incl. Recovinyl®)	Pipes & fittings	27,869 [B]	54,475 [B]	10,254 [B]	34,043 [B]
Other rigid	Other rigid	NA	NA	25,991	32,065
Recovinyl and **ESWA – Roofcollect®**	Flexible PVC and films	170,042 which consists of:		262,760 which consists of:	
ESWA – Roofcollect®	Flexible PVC	369 [A]	0	217 [A]	0
Recovinyl® (excluding Revinylfloor)	Flexible PVC and films	32,479 [B]	137,334 [B]	40,500 [B]	222,043 [B]
Recovinyl®	Cables	111,154	3,898	74,253	10,479
TOTAL		312,151	419,310	295,273	515,502
		731,461		**810,775**	

A Tonnage including Norway and Switzerland

B Tonnage including Switzerland

Note: in 2021, the new RecoTrace™ registration system based on the Recovinyl® system was implemented. Reporting categories in 2021 may not exactly match those of 2020. A new category, 'Other rigid', has been added. New stricter definitions for pipes waste also explain the lower volumes reported.

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, 2021 to December 31, 2021 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*.

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

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

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

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

Sources of Information

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

Procedures and Factual Findings

a. Obtain the breakdown of costs declared in the table presenting the supported charges for the different projects of VinylPlus, as included in the VinylPlus Progress Report related to the activities of the year 2021 and verify the mathematical accuracy of this.

The total expenses amount to KEUR 5,099.

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

b. Verify that these costs are recorded in the financial statements 2021 of VinylPlus AISBL.

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

c. 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 25.29% of total expenses.

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 Bedrijfsrevisoren – Réviseurs d'Entreprises
Statutory Auditor represented by

Dominic Rousselle
Bedrijfsrevisor /
Réviseur d'Entreprises

Mont-Saint-Guibert, April 12, 2022

KPMG REPORT OF FACTUAL FINDINGS

REGARDING THE AGREED-UPON PROCEDURES (AUP) ENGAGEMENT: TONNAGES OF PVC RECYCLED IN THE EU-27 (PLUS NORWAY AND/OR SWITZERLAND AND THE UK) IN 2021, 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 2021:

- in the EU-27 (plus Switzerland and the UK) by the sector association The European Plastic Pipes and Fittings Association (hereafter 'TEPPFA');
- in the EU-27 (plus Norway, Switzerland and the UK) 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-27 (plus Norway, Switzerland and the UK) by the (members of the) Arbeitsgemeinschaft PVC-Bodenbelag Recycling (hereafter 'AgPR') and Revinylfloor;
- in the EU-27 (plus Norway, Switzerland and the UK) within the IVK Europe project; and
- in the EU-27 (plus Switzerland and the UK) within the operations of Recovinyl;

as set forth in the engagement letter dated March 1, 2022. 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 2021 and are summarised as follows:

With regard to the MS Excelspreadsheet 'Calculation_consoTrecycled_VinylPlus (2021)' for the accounting period January 1, 2021 to December 31, 2021, prepared by management of VinylPlus, regarding the tonnages of recycled PVC (within the above-mentioned projects of VinylPlus) in 2021, we performed the following procedures:

1. Verify, in sheet 'VinylPlus 2021' (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 2021 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 Bedrijfsrevisoren – KPMG Réviseurs d'Entreprises BV/SRL concerning the tonnages of PVC recycled in the EU-27 plus Switzerland and the UK in 2021, 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 2021' the mathematical accuracy of the calculations (to avoid double counting), regarding the quantities of recycled PVC in 2021.
3. Verify, in sheet 'Progress report' (which contains the table for publication in the VinylPlus Progress Report 2022), the mathematical accuracy of the calculations in column F regarding the tonnages recycled in 2021, based on the concerned tonnages mentioned in sheet 'VinylPlus 2021'.

   The table mentioned above is reproduced in the VinylPlus Progress Report 2022, on page 31 with a total recycled tonnage for 2021 of 810,775 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 2021.

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 to be used for any other purpose or be distributed to any other parties, except for publication for informational purposes in the VinylPlus Progress Report 2022. 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 2021 and items specified above and does not extend to any financial statements of VinylPlus, taken as a whole.

KPMG Bedrijfsrevisoren – Réviseurs d'Entreprises
Statutory Auditor represented by

Dominic Rousselle
Bedrijfsrevisor /
Réviseur d'Entreprises

Mont-Saint-Guibert, April 12, 2022

SGS INDEPENDENT VERIFICATION STATEMENT ABOUT THE VINYLPLUS PROGRESS REPORT 2022

SGS is the world's leading testing, inspection and certification company. We are recognized as the global benchmark for quality and integrity. With more than 96,000 employees, we operate a network of 2,600 offices and laboratories around the world.

SGS was commissioned by VinylPlus to provide an independent verification of the 'Progress Report 2022'. This report presents the commitments and achievements made by the VinylPlus project in 2021.

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

Verification Process

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

The verification process included the following activities:

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

The verification did not cover the following:

- The underlying data and information on which the desk-top review documentation is based.
- The Financial Report.
- The PVC Tonnages.
- The KPMG Certification of Expenditure.
- The KPMG Report of Factual Findings.

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 2022' represents VinylPlus' performance and activities in 2021 in a reliable way.

ir Pieter Weterings
SGS Belgium NV
Certification Manager
30 March 2022

APPENDIX

VINYLPLUS WORKING PRINCIPLES

In implementing its 2030 Commitment, VinylPlus applies the following guiding principles:

MEASURABLE TARGETS AND DEADLINES
Ensure accountable objectives that all industries engaging in the Commitment will seek to achieve together.

TRANSPARENCY AND ACCOUNTABILITY
Guarantee openness, transparency and accountability through the involvement of external third parties in the monitoring and verification of progress and achievements.

DIALOGUE AND COLLABORATION
Work together as a united PVC value chain and engage with interested stakeholders to find solutions that no single player can implement.

SCIENCE-BASED SOLUTIONS AND RESEARCH
Make sure that technologies, processes and materials are assessed according to solid, credible and science-based sustainability indicators.

PRIORITY TO SUSTAINABILITY INNOVATION
Prioritise research, design and innovation that enhance the sustainability potential of PVC.

LABELLING AND TRACEABILITY
Ensure that consumers, users and public procurers are provided with clear and correct information, facilitating the recognition of sustainable and recycled products.

GLOBAL ACTION AND KNOWLEDGE TRANSFER
Play an active part in supporting an integrated, cross-border, sustainable and circular PVC value chain, including through best-practice sharing and cooperation with other regional PVC actors at the global level.

PATHWAY 1

SCALING UP PVC VALUE CHAIN CIRCULARITY

"The PVC industry embraces the circular economy. We commit to building upon the achievements made over the last 20 years to accelerate towards circularity. We aim to ensure controlled-loop management of PVC, from circular product design, the development of additional collection schemes and advanced recycling technologies, to ensuring the safe use of recyclate in new high-performance, durable products."

ACTION AREAS AND TARGETS

1.1 ADVANCING OUR CIRCULARITY AMBITIONS

1. Achieve at least 900,000 and 1 million tonnes per year of recycled PVC used in new products by 2025 and 2030, respectively.
2. By 2024, set additional 'stretch' recycling targets.
3. Carry out a review of existing collection and recycling schemes by 2022.
4. By 2023, set-up a list of applications, projects, and initiatives where additional collection schemes to reduce landfill would be required.
5. Where appropriate, support the set-up of additional collection and recycling schemes and produce a status report by 2025.

1.2 FOSTERING SCIENCE-BASED SOLUTIONS FOR THE SAFE AND SUSTAINABLE USE OF ADDITIVES

1. Carry out a gap analysis on existing scientific data and review it annually starting from 2022.
2. Report annually on active support of and data generation for relevant risk assessment, human bio-monitoring and socio-economic studies.
3. Report annually on support given to technical projects that enable and demonstrate the safe use of recyclates containing legacy additives.
4. Continue investigating solutions to detect specific substances in PVC waste streams and produce a report by 2023.
5. By 2025, develop at least one sorting technology for PVC waste with specific additives.
6. Report annually on VinylPlus' continued support to relevant technical projects leading to the removal of legacy additives.

1.3 SUPPORTING INNOVATIVE RECYCLING TECHNOLOGIES

1. Assess where chemical recycling could be a valuable complementary recovery solution to mechanical recycling, based on cost-benefit and LCA assessments. By 2022, identify and evaluate relevant chemical recycling technologies for plastics waste containing PVC.
2. Confirm the feasibility of thermal treatment of difficult-to-recycle PVC waste to recover chlorine and move to an operational status (TRL 7)[46] by 2024.
3. By 2025, encourage the establishment of and participate in consortia aiming to build chemical recycling capacities for plastics waste containing PVC.
4. A valid sorting or separation technology for complex (e.g., composite) PVC products tested (TRL 5) by 2025.

1.4 PRIORITISING CIRCULARITY THROUGH ECODESIGN

1. Promote the ecodesign guidelines developed in the framework of the CPA to foster the PVC value chain's transition to circularity, and, starting from 2022, report annually on the best examples of products and services developed by VinylPlus partners.

46 TRL: Technology Readiness Levels. A type of measurement system used to assess the maturity level of a particular technology **(https://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf)**

PATHWAY 2

ADVANCING TOWARDS CARBON NEUTRALITY AND MINIMISING OUR ENVIRONMENTAL FOOTPRINT

"Sustainable chemistry and carbon neutrality are at the heart of a sustainable economy. By applying a science-based approach, we commit to ensuring that all PVC products, including their supply chains and manufacturing processes, continue to reduce their impact on human health and the environment."

ACTION AREAS AND TARGETS

2.1 ADVANCING TOWARDS CARBON NEUTRALITY

1. VinylPlus will evaluate the potential and, by 2025, report on projected core carbon reduction progress to be achieved by 2030.
2. By 2025, report on the use of renewable energy.
3. By 2025, report on sustainable feedstock sourcing.

2.2 EMBRACING THE SUSTAINABLE USE OF CHEMICAL SUBSTANCES

1. By 2021, organisation of at least one introductory ASF webinar by VinylPlus.
2. By 2022, produce a report on the sectors' / partners' experience and application of the ASF tool.

2.3 MINIMISING OUR ENVIRONMENTAL FOOTPRINT

1. By 2021, achieve full compliance with the ECVM Charter (updated version 2019).
2. Issue ECVM Charter updates in 2025 and 2030.
3. Sectors will set up, as appropriate, indicators to support the reduction targets of the water footprint of processes and products. Review reports will be produced in 2025 and 2030.
4. Triennial review on the improvement of the eco-profiles of PVC products, starting from 2022.
5. VinylPlus takes an active role in guiding its partners and will recommend relevant schemes for the minimisation and responsible treatment of spillages of polymers and polymer compounds, enabling VinylPlus partners to adopt one scheme by 2022.

2.4 RESPONSIBLE SUPPLIER CRITERIA AND PROGRAMMES

1. By 2024, produce an inventory of relevant certification schemes applied by the chlorine, ethylene and by other extractive industries, to provide the VinylPlus partners with relevant and transparent information on the sustainability progress of the upstream supply chain.

PATHWAY 3

BUILDING GLOBAL COALITIONS AND PARTNERING FOR THE SDGs

"Representing the united European PVC value chain as VinylPlus, we commit to ensuring transparency and accountability in its relationships with all stakeholders. Engaging with key stakeholders, including brand owners and specifiers, we will contribute to sustainable development through certified and traceable products. We will continue partnering with civil society, European and global organisations, as well as with the global PVC communities, to share our best sustainability practices and contribute to the UN SDGs."

ACTION AREAS AND TARGETS

3.1 ENSURING TRANSPARENCY AND ACCOUNTABILITY

1. A public, and independently audited, VinylPlus Progress Report will be published annually and proactively promoted to key stakeholders.
2. By 2021, each VinylPlus industry sector will define its specific contributions to the common targets and ensure that they are properly disseminated within the partner companies.
3. By 2025, develop guidelines and supporting information to help VinylPlus partners demonstrate the progress of the PVC value chain towards sustainability.

3.2 CONTRIBUTING TO SUSTAINABLE DEVELOPMENT THROUGH CERTIFIED AND TRACEABLE PRODUCTS

1. Extend the scope of the VinylPlus® Product Label:
   a. Obtain recognition by at least one additional major green building standard by 2022.
   b. Obtain the Label's inclusion in three different procurement systems by 2025.
   c. Expand the scope of the Label's certification scheme to at least one additional PVC application by 2025.
2. Extend the scope of the VinylPlus® Supplier Certificate:
   a. By 2022, five production sites to have obtained the VinylPlus® Supplier Certificate.
   b. By 2025, twenty production sites to have obtained the VinylPlus® Supplier Certificate.
3. Assess PVC products' contribution as sustainable solutions for end-users:
   a. Starting from 2023, produce a biennial report on contribution to climate change reduction by PVC products.
   b. By 2025, evaluate the potential of the 'Carbon handprint methodology'[47] or other suitable tool(s) to assess the contribution of PVC products to the improvement of the environmental footprint of end-users.

3.3 ENGAGING STAKEHOLDERS IN THE SUSTAINABLE TRANSFORMATION OF THE PVC INDUSTRY

1. Pursue engagement with international and intergovernmental organisations to share VinylPlus' knowledge, experience and business model for sustainability and report annually.
2. By 2024, engage regularly with at least one well-known NGO.
3. Co-operate with regional and global value chain bodies to exchange best practices and communicate the VinylPlus sustainability model at the regional and global levels. Annually report on progress, starting from 2022.

3.4 PARTNERING WITH STAKEHOLDERS

1. Keep engaging with civil society, including young generations, on joint projects for sustainable development and report annually.
2. By 2024, develop at least one joint project per year with local communities and institutions/associations of public authorities to progress on one or more of the SDGs' targets.
3. By 2025, develop partnerships with three consumer-facing global brand owners or private sector sustainability leaders to progress on one or more of the SDGs' targets.

47 Carbon handprint refers to the positive environmental impact of a product throughout its lifecycle. It can be used by organisations to communicate the climate benefits of their products, services, and technologies **(https://www.researchgate.net/publication/330563782_Carbon_Handprint_Guide)**

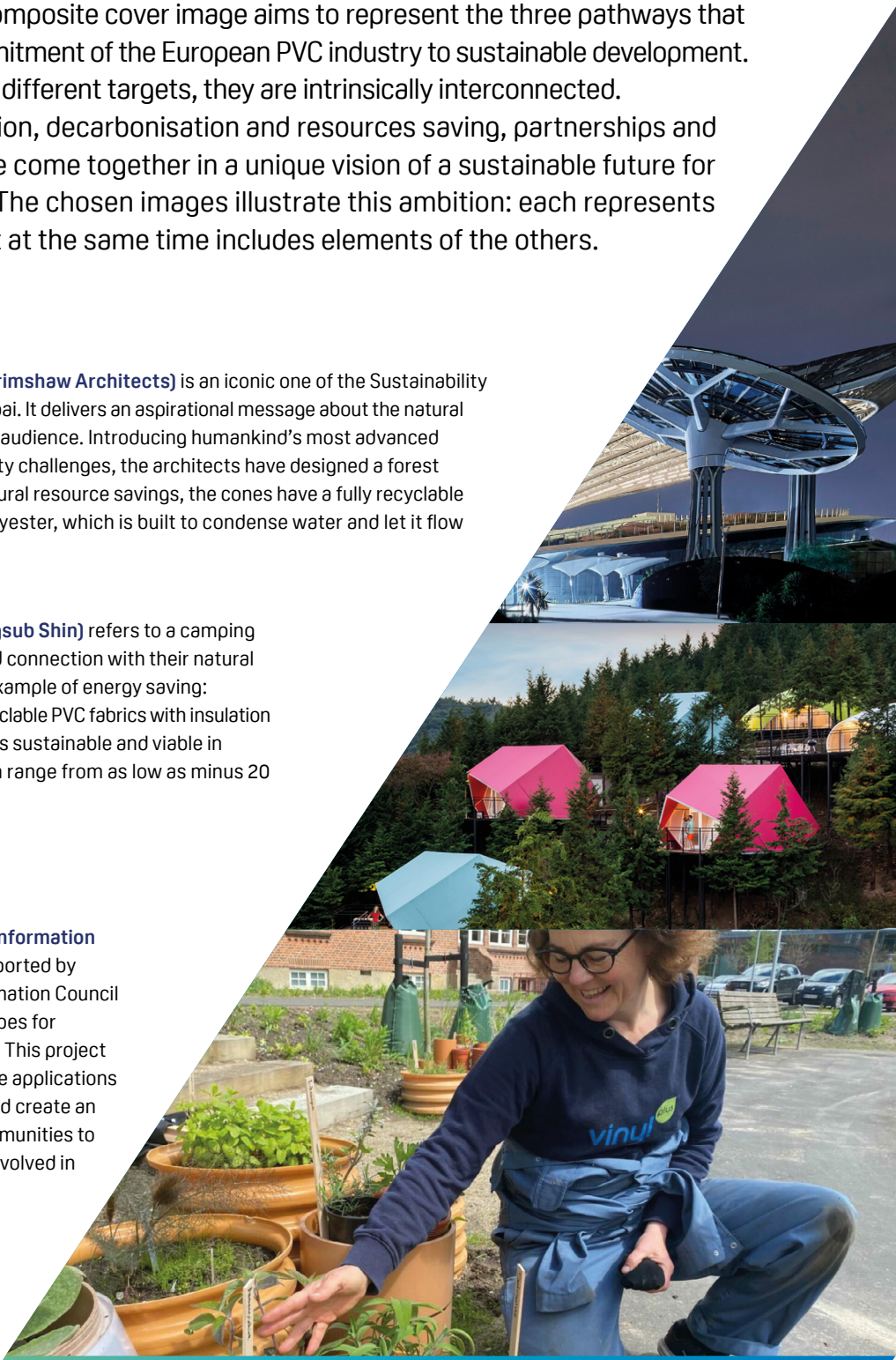
A NEW ROADMAP FOR **2030**

The 2022 Progress Report's composite cover image aims to represent the three pathways that make up the new 10-year Commitment of the European PVC industry to sustainable development. While the three pathways have different targets, they are intrinsically interconnected. Circular economy and innovation, decarbonisation and resources saving, partnerships and community building – all these come together in a unique vision of a sustainable future for our industry and our society. The chosen images illustrate this ambition: each represents one of the three pathways but at the same time includes elements of the others.

The bottom image **(photo: courtesy of Grimshaw Architects)** is an iconic one of the Sustainability Pavilion at the 2020 World Expo held in Dubai. It delivers an aspirational message about the natural world, ecology and technology to a global audience. Introducing humankind's most advanced technologies as responses to sustainability challenges, the architects have designed a forest of impluvium cones. As an example of natural resource savings, the cones have a fully recyclable composite membrane of PVC-coated polyester, which is built to condense water and let it flow through traditional irrigation channels.

The top image **(photo: courtesy of Kyungsub Shin)** refers to a camping resort that offers guests a direct and vivid connection with their natural surroundings. The resort represents an example of energy saving: the technology used – double layers of recyclable PVC fabrics with insulation between layers – keeps the glamping units sustainable and viable in a climate where annual temperatures can range from as low as minus 20 degrees Celsius to as high as 40 degrees.

The third image **(photo: courtesy of PVC Information Council Denmark)** refers to a project supported by VinylPlus and conceived by the PVC Information Council Denmark, focusing on the reuse of PVC pipes for urban gardening and community building. This project demonstrates how the reuse of end-of-life applications can contribute to the circular economy and create an opportunity for institutions and local communities to form partnerships and become actively involved in the green urban transformation.



COMMITTED TO SUSTAINABLE DEVELOPMENT

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