

**+VANTAGE
VINYL** FOR A
SUSTAINABLE
FUTURE.



MAKING OUR MARK.

2022 PROGRESS REPORT

OUR PURPOSE

Connecting the vinyl value chain
to continuously improve the
sustainability of the industry.

WHAT'S INSIDE

04

CONNECTING THE VALUE CHAIN

05

CONTRIBUTING TO A
SUSTAINABLE FUTURE

06 VSC Gold Level Sponsors

10

2022 YEAR IN REVIEW

11 Company Compliance
13 Pillar Compliance

19

CELEBRATING LEADERSHIP

19 Recycling Award
19 Social Impact Award

20

MAKING PROGRESS IN THREE
IMPACT CATEGORIES

21 Resource Efficiency
24 Emissions
26 People & Community

29

LOOKING AHEAD

MESSAGE FROM LEADERSHIP

We are proud to report that 2022 was a year of continued progress in advancing sustainability in the industry, growth in program participation, and the maturation of the industry verification standard known as +Vantage Vinyl.

Through participation in the verification standard and year-over-year improvement, the industry is fulfilling the Vinyl Sustainability Council's mission of continuous improvement in sustainability. Twenty-six companies are now verified to +Vantage Vinyl, a 50% increase over 2021. Equally important, companies in their second year of program participation reported a 20% improvement in compliance with the environmental stewardship pillar under the Guiding Principles.

When we started the Vinyl Sustainability Council (VSC) eight years ago, we knew that one day we would witness a breakthrough year of wider acceptance, measurable company progress, and real improvement in our sustainability journey. Calendar year 2022 was that breakthrough year.

Adding to this breakthrough, the industry developed several new and important initiatives, including a recycling grant program. Working under the trademark VIABILITY™, up to \$3 million in grant funding will be made available to eligible organizations to advance technologies and programs that will increase the post-consumer vinyl recycling rate over the next three years. Our hope is that VIABILITY will be a transformative program in advancing PVC recycling in the years to come. And it is another solid example of the vinyl industry's commitment to supporting our sustainability journey and to providing resources to reach our public goals.

The vinyl industry plays a critical role in helping the world achieve the United Nation's 2030 agenda for sustainable development. Critical infrastructure for electrification, delivering clean and safe water, protecting against infectious diseases, maintaining food safety, and delivering lifesaving medical treatments all rely on vinyl products. Reliably continuing to deliver these important products while reducing environmental impacts is the goal of the Vinyl Sustainability Council. We are proud of the industry's 2022 efforts towards that goal as outlined in the pages of this Progress Report.



JAY THOMAS

Executive Director,
Vinyl Sustainability Council



ERIC COTTERMAN

Chairperson,
Vinyl Sustainability Council



50%

INCREASE IN +VANTAGE VINYL-VERIFIED COMPANIES



20%

IMPROVED COMPLIANCE WITH ENVIRONMENTAL STEWARDSHIP GUIDING PRINCIPLES

for companies in their **second** year.



\$3M

3 YEAR TOTAL IN FUNDING MADE AVAILABLE TO ELIGIBLE ORGANIZATIONS

for the **VIABILITY** recycling grant program.



CONNECTING THE VALUE CHAIN

The Vinyl Sustainability Council is a consortium of 75 organizations from throughout the vinyl value chain and vinyl industry trade associations with a common mission of advancing sustainability in the industry.

Supply chain collaboration is essential to achieving sustainability goals. VSC provides an organizational structure to facilitate needed collaboration.

Because the +Vantage Vinyl® program is open to any company in the value chain, it is now possible to verify supply chain sustainability from vinyl resin production through to the end product manufacturer.

The VSC Gold Level Sponsor companies featured on pages 6 through 8 contributed additional funds to the VSC communications outreach program and to this report. Here, you can read in their own words how they are making a difference by working to enhance sustainability in their business.



RESIN SUPPLIERS

Companies that make vinyl polymer



ADDITIVE SUPPLIERS

Companies that make chemicals that are added to vinyl polymer to improve processing or performance



MATERIAL COMPOUNDERS

Companies that combine vinyl polymer with additives to create specific vinyl formulations



END-PRODUCT MANUFACTURERS

Companies that make products from vinyl formulations



RECYCLERS

Companies that process production scrap and end-of-life vinyl for reintroduction into product production



CONTRIBUTING TO A SUSTAINABLE FUTURE

The +Vantage Vinyl® sustainability initiative drives improvements by identifying the most relevant potential performance improvement areas for companies operating within the vinyl supply chain and having company commitments verified by an independent third-party program.

We report industry progress across five pillars of sustainable performance – environmental stewardship, social diligence, economic soundness, collaboration, and open communications.



ENVIRONMENTAL
STEWARDSHIP



SOCIAL
DILIGENCE



ECONOMIC
SOUNDNESS



COLLABORATION



OPEN
COMMUNICATIONS



Company verifications are performed by **GreenCircle Certified, LLC**, an independent third-party auditor that has issued over 2,000 sustainability certifications since 2009. Achieving +Vantage Vinyl verification assures the public that a company is meeting the requirements of the program.



VSC GOLD LEVEL SPONSOR

RAISING THE ROOF, PUTTING SUSTAINABILITY ON TOP

+ SIKA SARNAFIL'S SUSTAINABILITY JOURNEY

A +Vantage Vinyl®-verified company through the Vinyl Sustainability Council, Sika Sarnafil's commitment to sustainability is evident across its enterprise – in its product innovations, and in its manufacturing operations.

A worldwide leader in thermoplastic, single-ply commercial roofing, Sika Sarnafil was a pioneer in building energy and carbon savings with the introduction of the EnergySmart Roof® in the 1990s. This highly reflective white roofing material reflects the sun's energy, reducing the electricity required for building cooling and the building's contribution to local "heat islands." When the roof reaches the end of its useful life, Sika Sarnafil has a recycling program that can take back the material and recycle it into new roofing membrane, a circular solution to construction waste. These innovations led to Sika Sarnafil providing the industry with the first NSF/ANSI 347 Platinum certified roofing product. This certification identifies products that meet strict environmental attributes and impacts across the entire product life cycle.

To meet the demand for transparent product information, the company published Environmental Product Declarations (EPDs) to deliver detailed environmental impact data. This traces the product's journey from raw material extraction to production, delivery to a job site, installation, maintenance, and end of service life. This level of detail empowers key construction stakeholders to make more informed decisions about the environmental impact of the products they specify for a commercial roofing project.



"Sustainability has been a cornerstone of our operations," said Bill Bellico, vice president of marketing and inside sales at Sika USA. "There has always been a belief in investing properly as a sustainable company and in offering sustainable products to the marketplace."

To drive energy efficiency and reduce its carbon footprint as a manufacturer, Sika Sarnafil maintains a large solar park on the main distribution hub of its headquarters, enabling the operation to offset the facility's energy demand through solar energy. The company also partners with an off-site solar energy provider to provide green energy at its production facility.




Photo courtesy of Sika Sarnafil

VESTOLIT'S COMMITMENT TO THRIVING COMMUNITIES

+ ISO CERTIFICATIONS, ENGAGEMENT
MAKE THE DIFFERENCE

Vestolit, a part of Orbia's Polymer Solutions business group, has more than 70 years of experience in resin production. This long track record of vinyl production and supply has given the company deep industry expertise – which they are now utilizing to lead the charge toward a more sustainable future. Sustainability is a major focus for Vestolit, and the company currently offers resins combining fossil and non-fossil feedstocks using a mass balanced approach. Final products can be independently certified by International Sustainability & Carbon Certification PLUS (ISCC PLUS) as having employed sustainable feedstocks. The company also continues to research new ways to increase circularity.

For example, Vestolit's Marl plant already offers high-quality resins derived from bio-based feedstocks from non-food production sources. This has reduced associated CO₂ emissions by at least 60% with no change needed for operation. This bio-attributed PVC, which Vestolit calls "Future-Fit Bio," is available now and produced using non-food production vegetable oils, with 100% renewable electricity.

"Future-Fit Bio" products are already a core offering for Vestolit today. But the company has plans for more sustainable PVC products down the line.

"Future-Fit Circular" is a potential opportunity for Vestolit's PVC production and is directly related to innovations in recycling. This innovative method utilizes pyrolysis oil obtained through chemical recycling of waste plastics and will help push PVC toward circularity.

"Future-Fit CCU" is a potential emerging technology that would use atmospheric carbon, captured and converted to ethanol, with technology that uniquely avoids the need for a steam cracker to generate ethanol. This technology could create a pathway to carbon-neutral production – making PVC an integral part of the solution to fight carbon emissions by using it as a carbon sink.

Vestolit is helping drive the industry forward in its sustainable product development with its "Future-Fit Bio" line of products – and the company has no plans to stop innovating any time soon.

VSC GOLD LEVEL SPONSOR

BUILDING A SAFER TOMORROW



Cornerstone Building Brands is committed to mitigating its impact on climate change and reducing waste, energy, water and land use. From reducing GHG emissions and the energy intensity of operations to optimizing water and material consumption in manufacturing capabilities, Cornerstone Building Brands is making continual and measurable progress to build a safer tomorrow for its customers, communities and future generations.

LESS WASTE, REDUCED WATER & LAND USE

Building a safer tomorrow requires careful stewardship of natural resources today. Cornerstone Building Brands is on a journey of continuous improvement, ensuring compliance with environmental regulations and requirements while developing new programs and strategies. Areas of focus include waste diversion and product circularity programs, reducing water and material consumption, and responsible sourcing and securing of supplies.

GIVING VINYL SIDING A NEW LIFE

Cornerstone Building Brands participates in the Vinyl Siding Institute's recycling program to use scrap vinyl from house demolitions as source material in new vinyl siding. In FY 2022, this cooperative, with other building exterior manufacturers, generated more than 40 tons of recycled vinyl scrap, diverting it from landfills and reducing the need for virgin plastic raw materials.

PRESERVING WATER

Water is a limited resource critical to sustaining the environment but essential to some production processes. To manage water use responsibly, Cornerstone Building Brands routinely evaluates initiatives to treat, conserve, recycle and reuse water where possible. The company's vinyl extrusion process uses a closed loop system to minimize discharges and reduce the need for fresh water.

ABOUT CORNERSTONE BUILDING BRANDS

Cornerstone Building Brands is a premier exterior building solutions provider committed to creating value for its customers and communities. With unrelenting customer focus and strong emphasis on quality and performance, the company's products and solutions serve both the residential and commercial markets across North America.

To learn more about Cornerstone Building Brands' sustainability initiatives, read their [2022 ESG Report](#).

THE FIRST LINK OF THE CHAIN

+ SHINING THE SPOTLIGHT ON VANTAGE VINYL®-VERIFIED RESIN SUPPLIERS



Formosa Plastics

Formosa Plastics is committed to sustainability initiatives and is working with Calhoun County, Texas, to install a recycling center transfer station within

the county, supplemented by funding a recycling program in the City of Point Comfort, Texas. Formosa Plastics awarded a grant to Calhoun County for \$670,000 from the Formosa Plastics Environmental Endowment Fund Trust to convert the current recycling center into a transfer station, which will decrease trips necessary to the next closest transfer station, located in Corpus Christi, Texas (approximately 80 miles southwest of Calhoun County). The City of Point Comfort received 315 bins for its recycling program, which is currently set to extend until 2026. The addition of the transfer station, coupled with the recycling program – which has already seen success in participation and adhering to material instruction – solidifies Formosa's commitment to the community and its sustainability initiatives.

Photo courtesy of Formosa Plastics



OxyChem

OxyChem has been active in supporting its communities since the beginning of its plant operations. The company takes

pride in supporting its local schools and economic development in the communities where it operates. In 2019, OxyChem joined the Department of Energy (DOE) Better Plants program to reduce its energy consumption across its facilities. As part of the Better Plants Program, OxyChem explored partnering with the Industrial Assessment Centers (IAC) to perform energy audits at its facilities to help the company look for opportunities to reduce energy consumption. The IACs are made up of graduate students from local universities who perform energy audits of applicable manufacturing facilities in the U.S.

As an industry leader in sustainability, OxyChem engaged the IACs at Louisiana State University and Texas A&M University to determine if they would perform free energy audits at schools to help local communities with energy conservation. The DOE supported the community energy assessment program through the IACs, led by OxyChem, to help schools lower their energy costs.

The energy audits identified opportunities to reduce the schools' energy consumption by installing energy-efficient light bulbs and fixtures, occupancy sensors and heating, ventilation, and air conditioning improvements. OxyChem donated over \$40,000 to Paulina Elementary to make the recommended improvements. Since the improvements were completed in early 2023, the school has saved over 377,896 kWh of energy and \$34,000.

Photo courtesy of Oxy



Shintech, Inc., the U.S. subsidiary of the Japanese Shin-Etsu Group, operates under the same corporate guidelines as its parent company. These guidelines have

been ranked #1 by Forbes Japan for Climate Change Ranking – exemplifying the group's commitment to reducing emissions and lowering its carbon footprint. Moving toward carbon neutrality is a significant goal for Shintech and the Shin-Etsu Group, and both entities are actively studying how to best integrate sustainable practices to best achieve these goals.

Shintech is actively engaged with its parent company, its customers, and the VSC to improve recyclability. The company is investing in new technologies that will help to reduce energy consumption and help lower the company's overall environmental impact.

Photo courtesy of Shintech



Westlake

Westlake takes the reduction of its environmental footprint seriously and collaborates with its customers or end-use

consumers, partners and suppliers, and also works with regulatory authorities. The company strives to improve its environmental impact at its own facilities and along its value chain to meet customer demand for products with a lower carbon footprint.

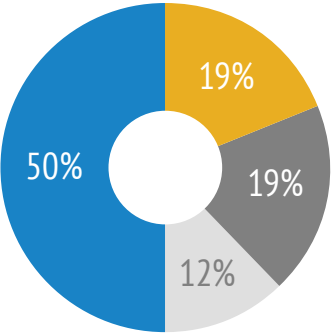
In February 2022, Westlake established a major climate goal: a 20% reduction in its Scope 1 and Scope 2 CO₂e emissions per ton of production by 2030 from a 2016 baseline. Its strategy for achieving net reductions in CO₂e emissions intensity is centered on investment in both proven and emerging technologies, including less carbon-intensive manufacturing of products and operational innovations.

As Westlake identifies new interim emissions-based goals and develops its longer-term ESG strategy, the Westlake teams are researching economically feasible technologies, which could play a role in building a plan to establish updates and achievable interim carbon intensity reduction goals, and ultimately develop a path to reach operational net-zero direct carbon emissions during or before 2050.

2022 YEAR IN REVIEW

BY THE NUMBERS

INDUSTRY PARTICIPATION



- End Product Manufacturer
- Resin Manufacturer
- Compounders/Converters
- Additive Manufacturer



26 + VANTAGE VINYL®-VERIFIED COMPANIES
(as of June 2023)



86%

AVERAGE COMPLIANCE RATE OF +VANTAGE VINYL-VERIFIED COMPANIES



09 FIRST TIME + VANTAGE VINYL-VERIFIED COMPANIES



91%

AVERAGE SECOND YEAR COMPLIANCE FOR 17 COMPANIES



76%

AVERAGE FIRST YEAR COMPLIANCE FOR 9 COMPANIES

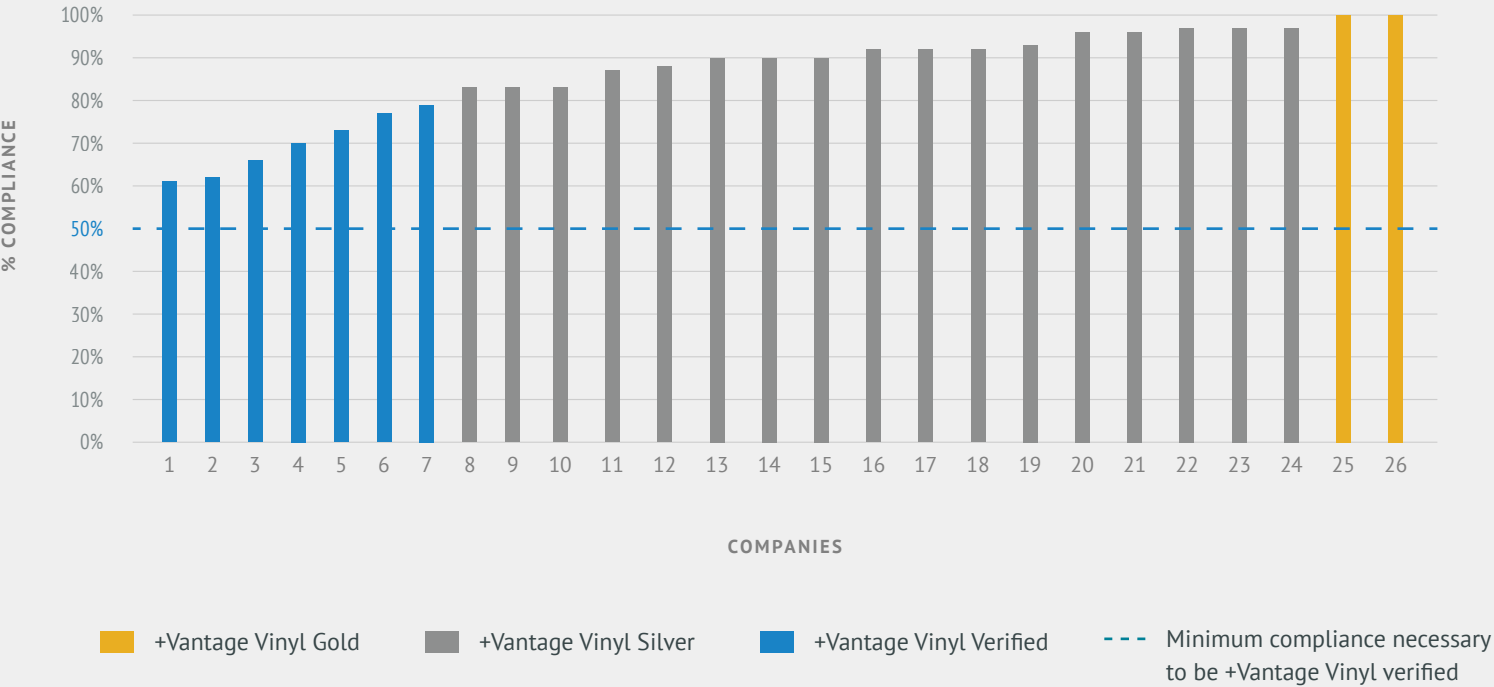


100%

OF PROGRAM PARTICIPANTS MET THE 50% COMPLIANCE MINIMUM FOR +VANTAGE VINYL VERIFICATION

COMPANY COMPLIANCE

The +Vantage Vinyl® program is designed to recognize continuous improvements in different areas and to different degrees by participating companies. A commitment to continuous improvement allows verified companies to seize the available opportunities and never assume that today's performance is the best achievable. Companies achieving compliance with the Guiding Principles have provided documentation to support their achievement.



To receive +Vantage Vinyl verification, companies must achieve at least 50% compliance with the Guiding Principles, including compliance with all mandatory Guiding Principles. Companies that go above the 50% threshold can qualify for the following silver or gold verification designations:



+Vantage Vinyl Gold
A company has achieved 100% compliance with all applicable Guiding Principles and has implemented at least two Advanced Practices and one Innovative Practice Achievement.



+Vantage Vinyl Silver
A company has achieved greater than 80% compliance with all applicable Guiding Principles and has implemented at least one Advanced Practice Achievement.

The Advanced and Innovative Practices highlight the industry's quest for continuous improvement. They provide a roadmap within the Guiding Principles that show how the industry is stepping forward and driving sustainability objectives at the company level. The +Vantage Vinyl Gold and +Vantage Vinyl Silver designations celebrate and recognize companies that are sustainability leaders in the vinyl industry.

All **+Vantage Vinyl-verified** companies were above 50% compliance with the program's Guiding Principles. Seventeen of the companies recommitted to the verification process and nine companies verified for the first time.

INDUSTRY LEADERS



+VANTAGE VINYL-
VERIFIED COMPANIES

3M

Achilles

AURORA PLASTICS

AVERY DENNISON

THE **AZEK**
COMPANY

BÄRLOCHER 

CORNERSTONE
BUILDING BRANDS

deceuninck

EASTMAN


Formosa Plastics®

GEON
Performance Solutions

HMTX
INDUSTRIES

IB Roof Systems
PVC and Fluid Applied Roofing Solutions

Lubrizol

MANNINGTON MILLS.

NORAC
ADDITIVES
A PETER GRUBEN GROUP COMPANY

OMNOVA
A Division of SURTECO

OxyChem

PROFUSION 

ResinTech
An EMERAUDE... company


SHINTECH

Sika
Sarnafil®

 **Tarkett**

TA
TEKNOR APEX

vestolit
An Orbia business.

Westlake

PILLAR COMPLIANCE

The +Vantage Vinyl® program’s Guiding Principles set the direction and parameters for what companies strive to achieve over time.

The Guiding Principles are organized within **five pillars** that serve as the guideposts for companies on their journey of continuous improvement.



ENVIRONMENTAL
STEWARDSHIP



SOCIAL
DILIGENCE



ECONOMIC
SOUNDNESS



COLLABORATION



OPEN
COMMUNICATIONS

The relevance of each guiding principle is dependent on a company’s position in the supply chain. If a company’s participation in a specific guiding principle is not relevant to its operations, then the guiding principle is noted as “not applicable.”

Additionally, where a company’s participation is noted as “not fulfilled,” this indicates that a company did not provide documentation to support the achievement of that specific guiding principle.

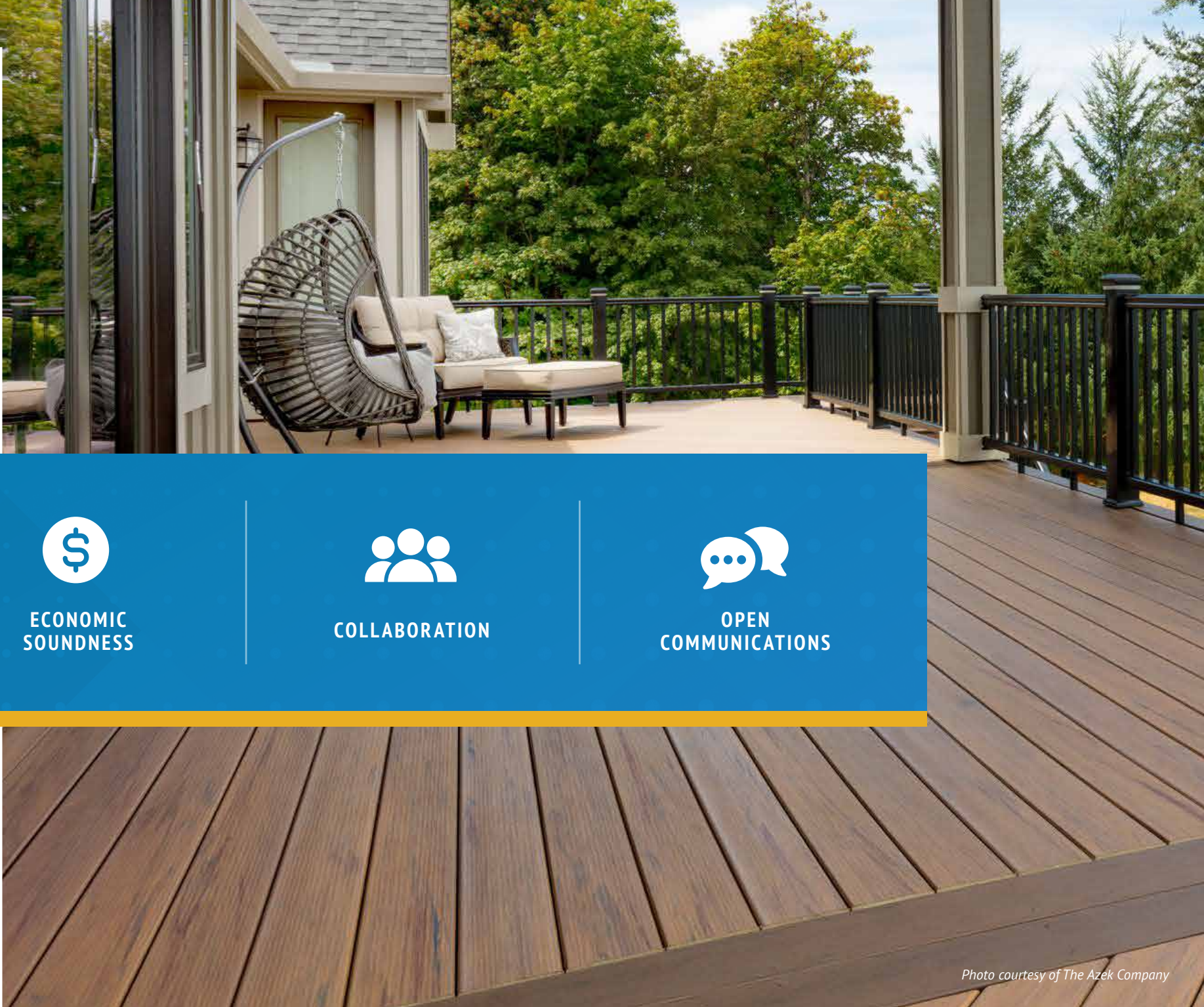
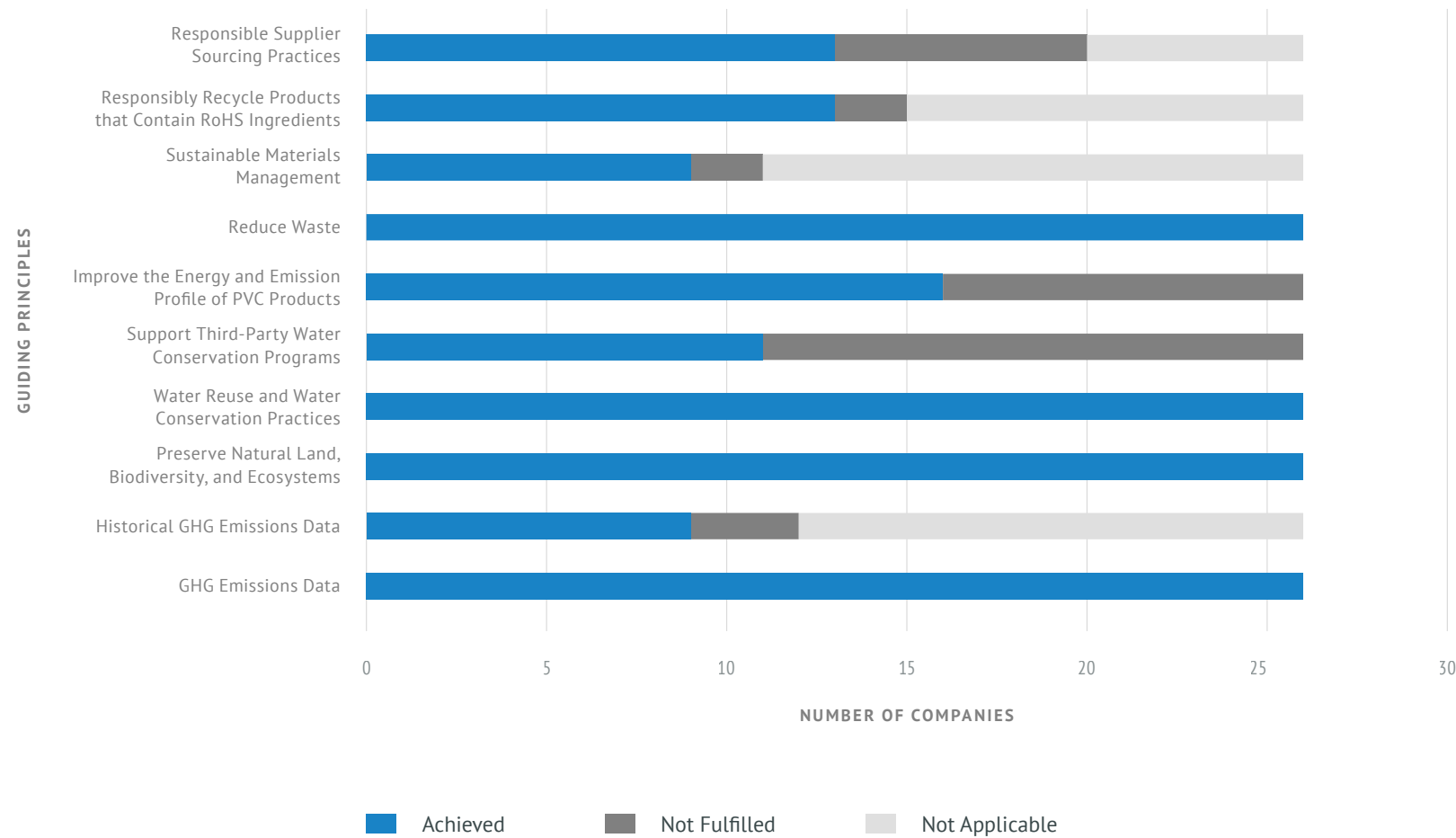


Photo courtesy of The Azek Company



Environmental Stewardship

We strive to protect our natural environment, biodiversity, and ecosystems. On average 85% of the +Vantage Vinyl®-verified companies complied with all the Guiding Principles in this pillar.



Achieved: A company provided documentation to support the achievement of a particular guiding principle.

Not Fulfilled: A company did not provide documentation to support the achievement of a particular guiding principle.

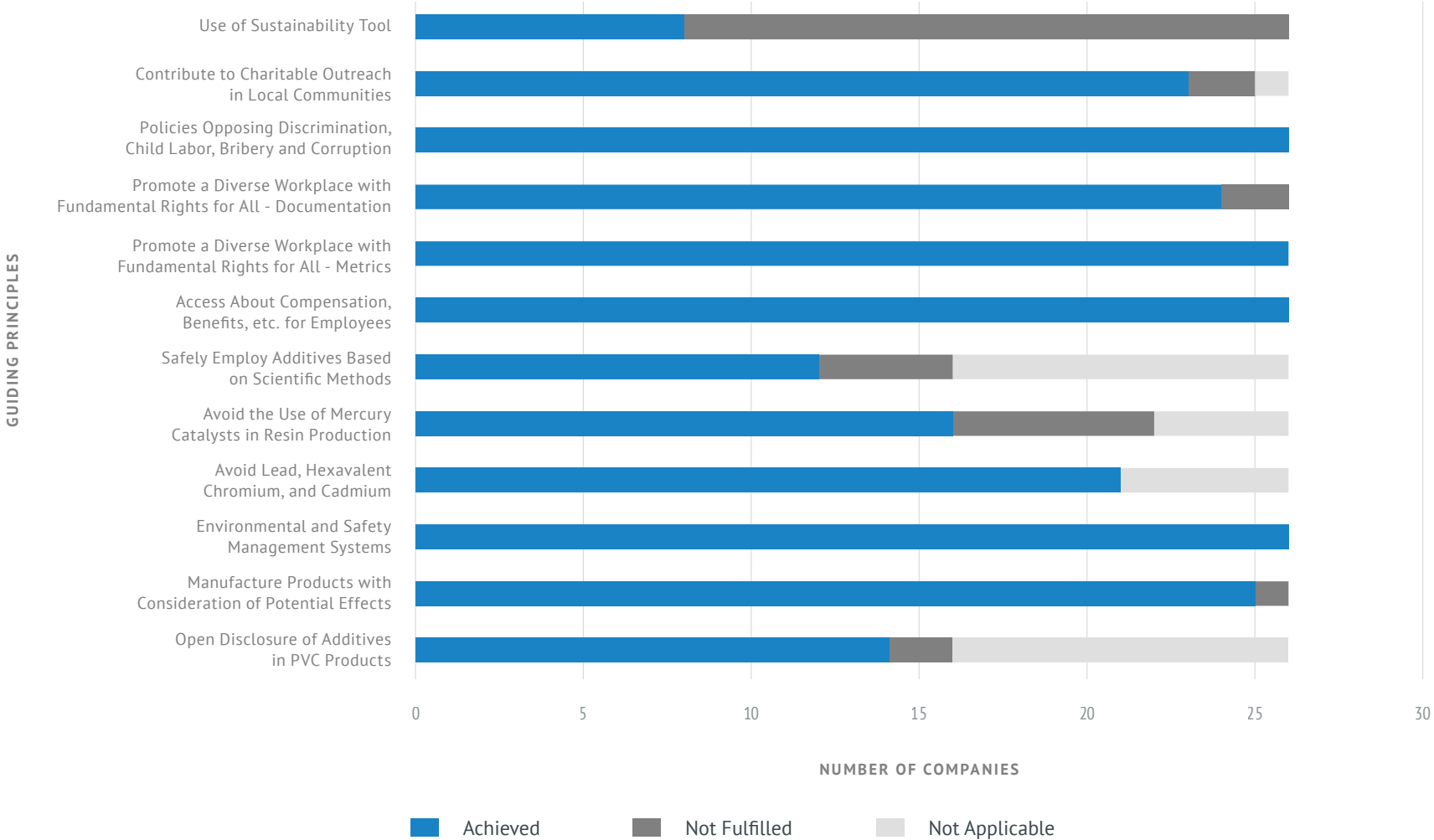
Not Applicable: A particular guiding principle is not relevant to a company's manufacturing process.





Social Diligence

We aim to manufacture safe and user-friendly products while taking care of our employees and communities. On average, 87% of the +Vantage Vinyl®-verified companies complied with the Guiding Principles within this pillar.

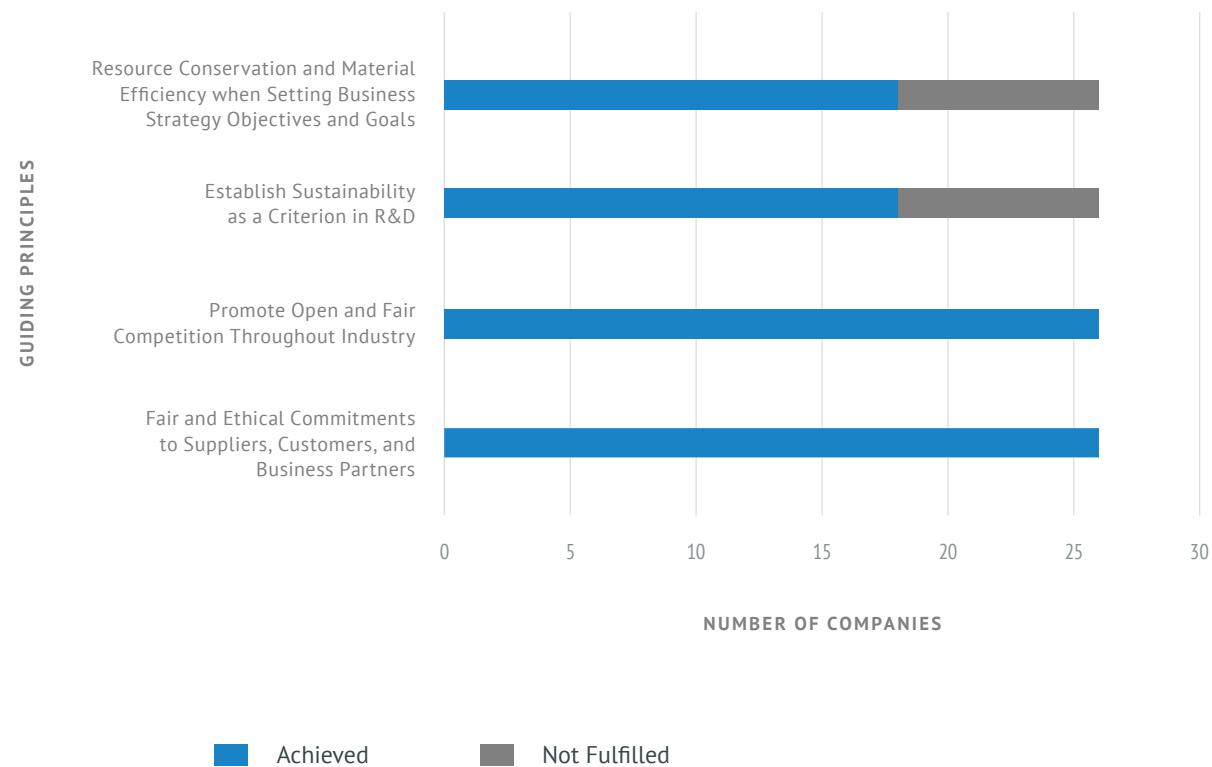


Achieved: A company provided documentation to support the achievement of a particular guiding principle.
Not Fulfilled: A company did not provide documentation to support the achievement of a particular guiding principle.
Not Applicable: A particular guiding principle is not relevant to a company's manufacturing process.



Economic Soundness

We promote open and fair competition, support sustainability education and research, and integrate resource conservation and efficiency into business planning. On average, 85% of the +Vantage Vinyl®-verified companies complied with the Guiding Principles within this pillar.



Achieved: A company provided documentation to support the achievement of a particular guiding principle.

Not Fulfilled: A company did not provide documentation to support the achievement of a particular guiding principle.





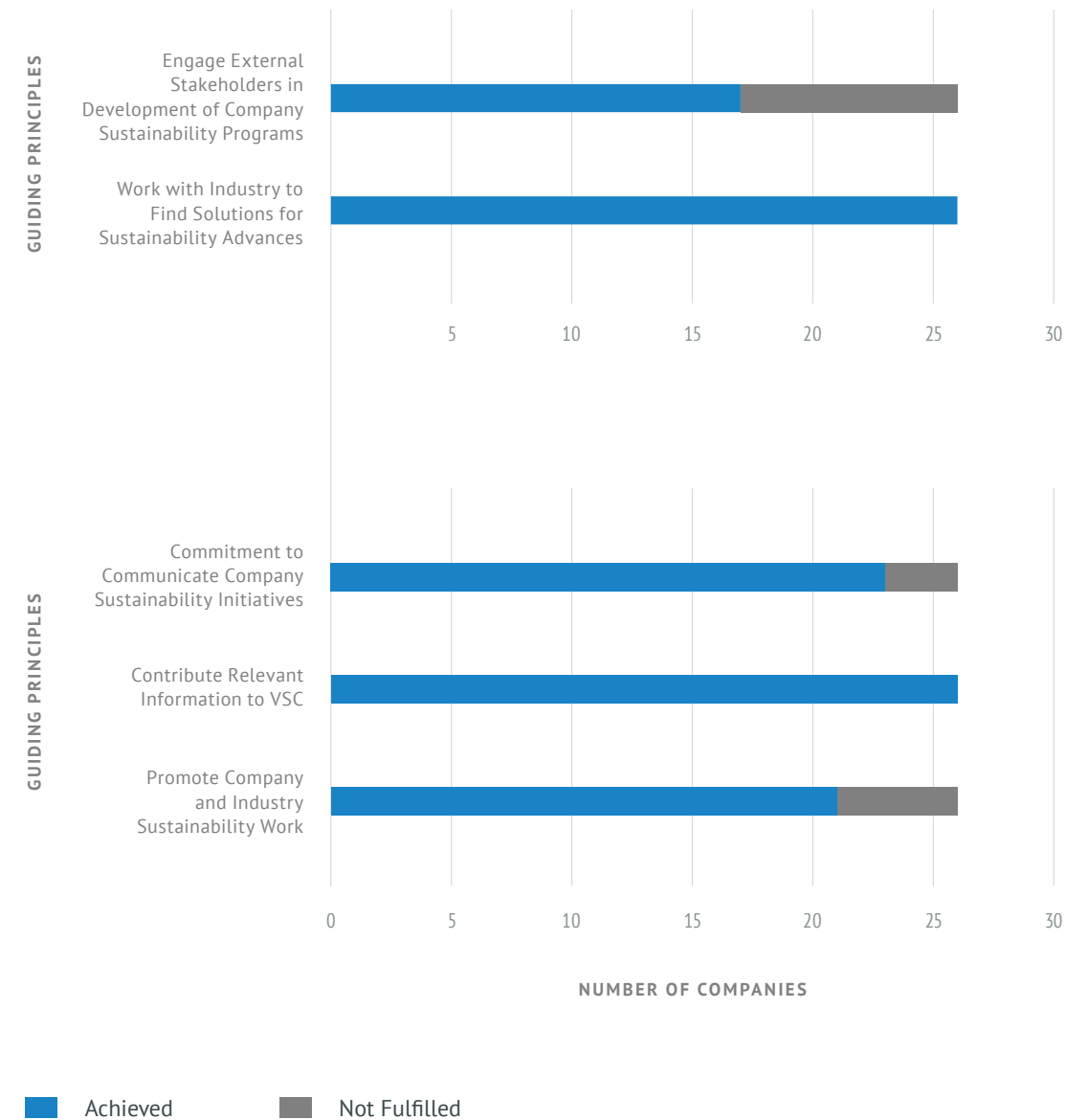
Collaboration

We work within the industry to find solutions and with external stakeholders to ensure we are on the right track. On average, 83% of the +Vantage Vinyl®-verified companies complied with all the Guiding Principles in this pillar.



Open Communications

We value transparency and use data to communicate our progress when promoting the +Vantage Vinyl program. On average, 90% of +Vantage Vinyl-verified companies complied with all the Guiding Principles in this pillar.

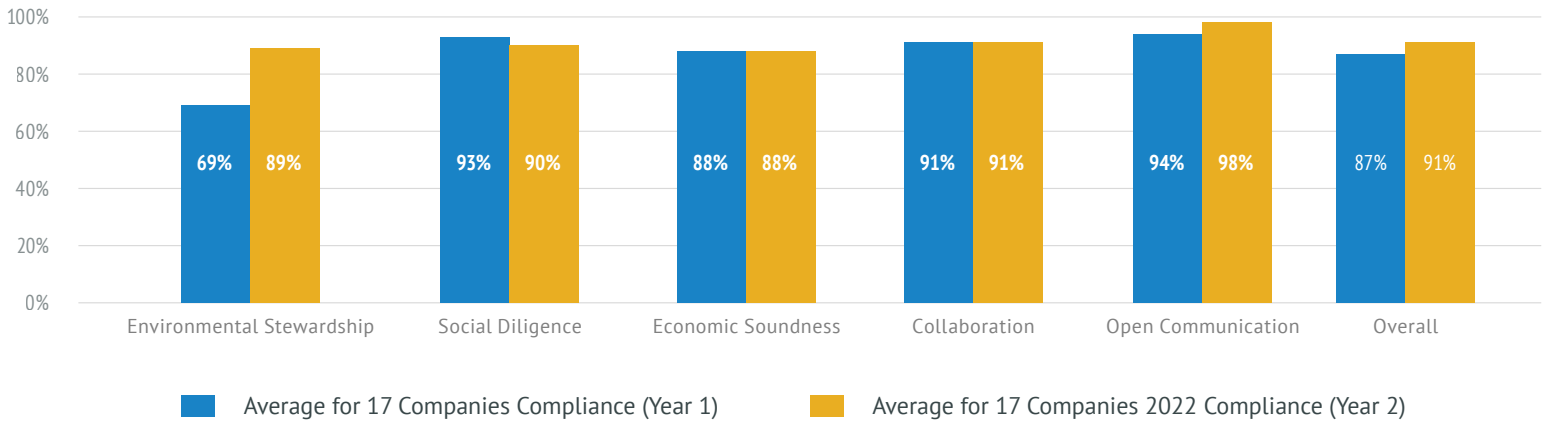


Achieved: A company provided documentation to support the achievement of a particular guiding principle.
Not Fulfilled: A company did not provide documentation to support the achievement of a particular guiding principle.

YEAR-OVER-YEAR COMPARISON

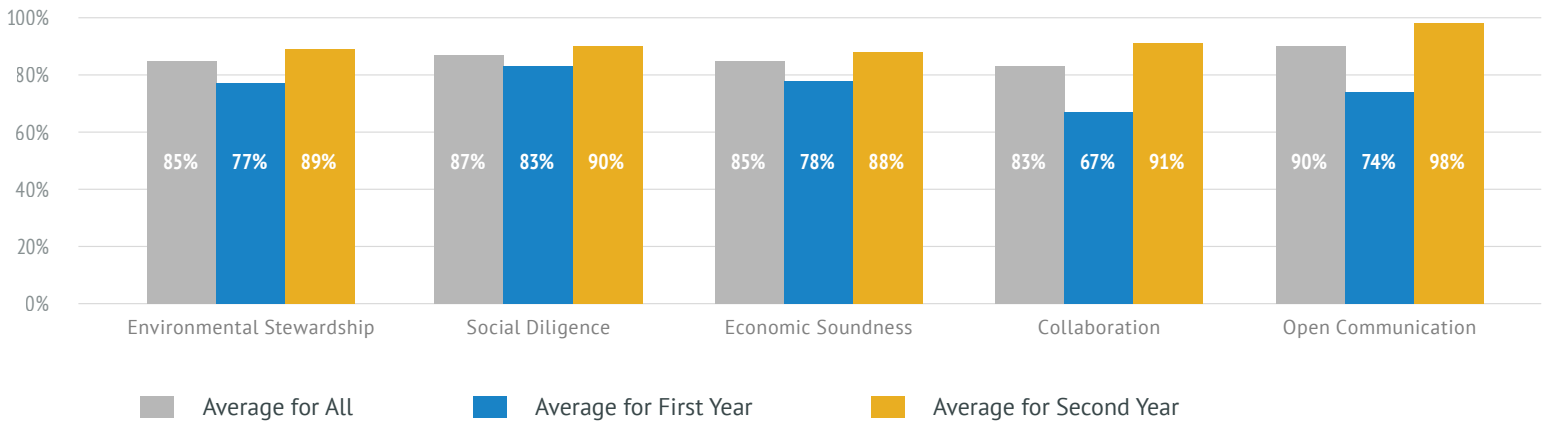
2022 marks the second year of measuring compliance with the program Guiding Principles. Returning companies showed continuous improvement, with higher average compliance in 2 of the 5 program sustainability pillars. Environmental stewardship showed the largest improvement, from 69% compliance in 2021 to 89% in 2022.

2021 VS 2022 (17 RETURNING COMPANIES)



Returning companies also demonstrated a higher average compliance rate (88% - 98%) than first year participants (67% - 83% average compliance). This is further evidence of continuous improvement of verified companies over time within the program.

AVERAGE COMPLIANCE WITHIN EACH PILLAR TO GUIDING PRINCIPLES



CELEBRATING LEADERSHIP

INDUSTRY AWARDS

RECYCLING AWARD

The Vinyl Sustainability Council Recycling Award recognizes the efforts of recyclers and product manufacturers with operations in North America that find new solutions and or markets for PVC end-of-life or scrap materials, increase use of recycled vinyl content in their products, and/or engage in partnerships with companies in take-back programs. In 2022, the VSC recognized JP Industrial as they demonstrated their use of recycled materials as a core component of how they do business.



▲
*Jonathan Arnette of JP Industrial (left),
Jay Thomas of VSC (right)*

JP Industrial received the 2022 Recycling Award for its ability to overcome the challenge of recycling window scrap material, improving its screening technology, and preventing 100 million pounds of PVC from ending up in landfills.

SOCIAL IMPACT AWARD

The Vinyl Sustainability Council's Social Impact Award recognizes the efforts of a VSC member that has demonstrated a strong commitment to community well-being and longevity. This annual award acknowledges an outstanding project or program that addresses a social concern using a company's resources to have a positive impact. In 2022, this award went to Cornerstone Building Brands.



▲
*Eric Cotterman of Cornerstone Building Brands (left),
Jay Thomas of VSC (right)*

Cornerstone's "Home for Good" project focuses on a commitment to affordable housing in local communities and to partnering with organizations that amplify such impact on those communities. Mitigating the affordable housing crisis has been integrated into Cornerstone's core business strategy.

MAKING PROGRESS IN THREE IMPACT CATEGORIES

The VSC is focused on making industry advancements in three impact categories identified in a 2017 industry-wide materiality assessment, as follows:



Resource Efficiency addresses the priority areas of end-of-life disposition, landfill avoidance, and recycling.



Emissions addresses the priority areas of emissions to air, water, and soil, emphasizing climate and biodiversity impacts.



People & Community (formerly Health & Safety) addresses the priority areas of community health and safety and user health and safety. In 2023, the VSC renamed this impact category “People & Community” to better reflect the activities being undertaken by the task force group.





RESOURCE EFFICIENCY

The VSC is convening the entire vinyl value chain to address the challenge of post-consumer recycling. Through our pilot-to-program recycling strategy, we are collaborating with other interested parties to create scalable and sustainable approaches to growing the volume of recycled material.



FUNDING: Providing seed funding through the VIABILITY™ grant program to accelerate post-consumer PVC recycling.



SIDING: In partnership with the Vinyl Siding Institute, the industry is collecting used siding from homes in Northeast Ohio. This pilot program collected and recycled 84,000 lbs. of siding in 2022 and is expanding to more regions in the country in 2023.



ROOFING: In partnership with the Chemical Fabrics & Film Association, the industry currently collects and recycles vinyl roofs from commercial buildings when they are replaced after decades of use. In 2022, the industry recycled more than 1,000,000 lbs. of end-of-life roofing membrane.

MEDICAL DEVICES: A new medical device recycling program is underway in Rochester, NY. Under this program, non-hazardous medical devices such as saline bags, oxygen masks, and tubing will be collected and recycled into new vinyl products.

Ongoing U.S.A. PVC Industry Efforts to Increase Collection and Usage of Post-Consumer Recycled Content

The vinyl industry is committed to the responsible use of natural resources. We are extending the use of these materials through reusing, repurposing, recycling, and recovering the value locked inside vinyl materials at the end of their first useful life. Most vinyl products – like vinyl siding or PVC pipes – are durable and remain in use for decades.

For those products no longer in use, the industry has set a goal to increase post-consumer recycling from a 2020 baseline of 142 million pounds to 160 million pounds by 2025.

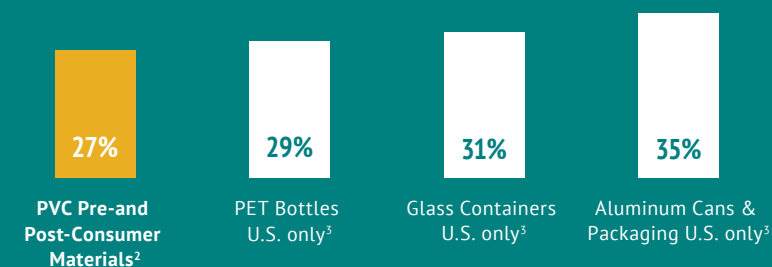




RESOURCE EFFICIENCY

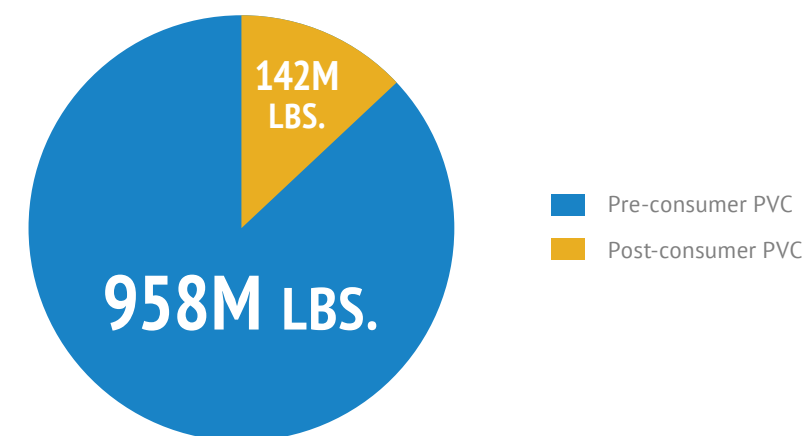
Industry Recycling Benchmarks

Recycling rates for all PVC materials is comparable to commonly recycled packaging. The Vinyl Institute (VI) assessed the recyclability of all PVC materials at the end-of-life, not just certain components. PVC compares favorably to EPA recycling rates for common post-consumer packaging materials.



Note: PVC recycling rate is estimated as Total Recycled Volume / (Total Recycled Volume + EPA Estimate for Municipal Solid Waste + VI Estimate for Construction & Demolition Waste)

1.1B lbs. of PVC materials are recycled annually in the U.S.A and Canada¹



Note: Estimates are from a survey of 140 recyclers in US and Canada, last completed in 2019. Totals exclude manufacturing scrap that is internally reused by the producer

¹ 2019 Tarnell Company Recyclers Survey (Amounts Sold)

² Krock, R., et al, "An Update on PVC Plastic Circularity and Emerging Advanced Recovery Technologies for End-of-Life PVC Materials." REMADE Institute Technical Conference, March 2023. Pre-consumer material includes scrap generated during production of materials which is being diverted from landfill, and excludes internally-consumed 'regrind' material.

³ 2018 U.S. EPA Plastics: Material Specific Data & Aluminum: Material Specifics Data & Glass: Material Specific Data

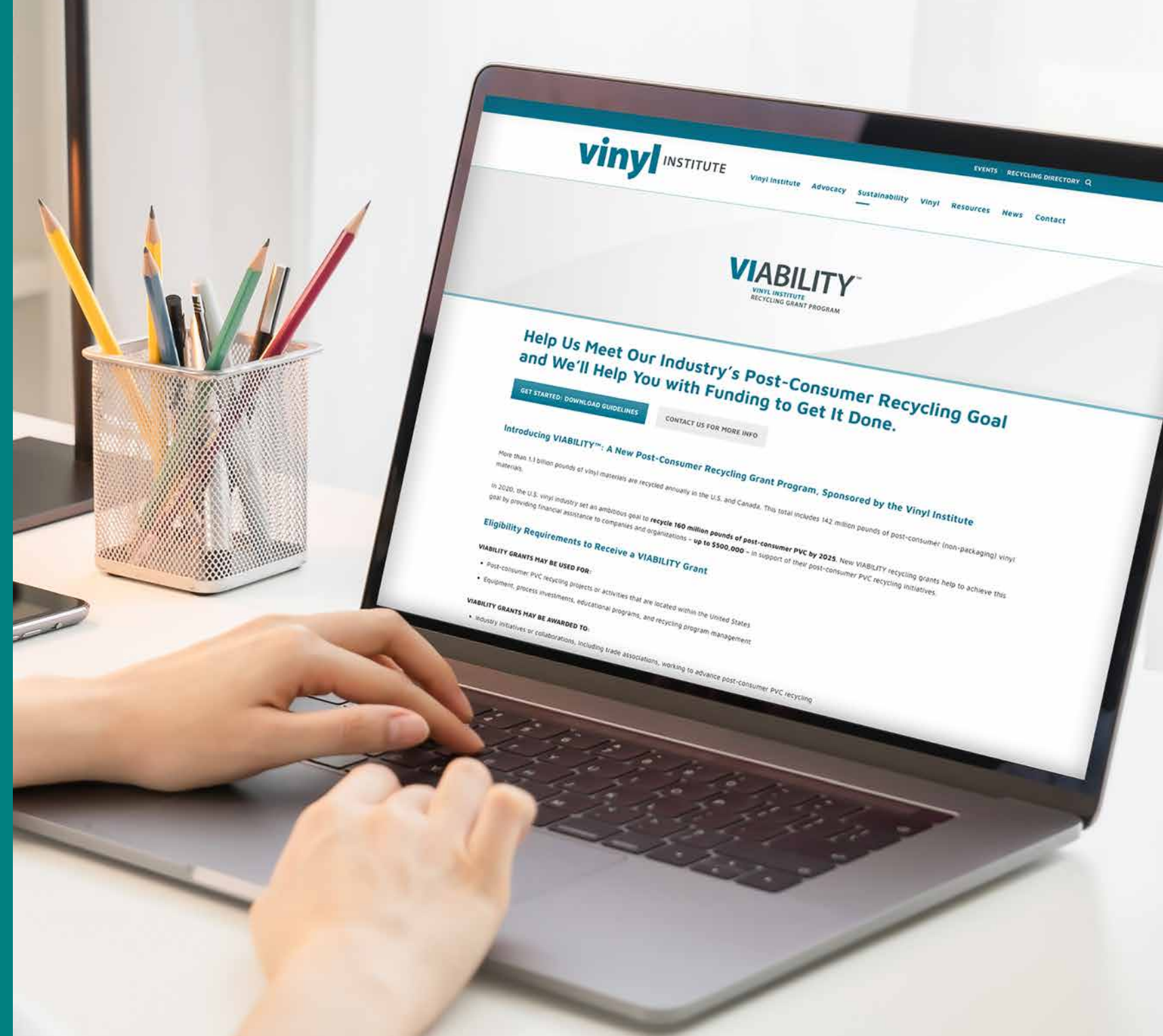




RESOURCE EFFICIENCY

In January 2023, the Vinyl Institute launched VIABILITY™, a first-of-its-kind, industry-wide vinyl recycling grant program aimed at accelerating post-consumer PVC recycling across the country. The grant program makes up to \$1 million in funds available per year over the next three years from four PVC resin manufacturers in the U.S. (Formosa, Oxy, Shintech, and Westlake). Individual recycling grants issued through VIABILITY are available to qualifying industry collaborations such as trade associations, material recovery facilities, construction and demolition waste facilities, recyclers, or colleges and universities in amounts up to \$500,000. The funds may be used for the purchase of equipment, process investments, research and development, educational programs, and program management that supports long-lasting and sustainable recycling of vinyl products.

For more information, please visit vinylinfo.org/recycling.





EMISSIONS

Embodied carbon is the carbon footprint of a material during its life cycle. It encompasses the mining, harvesting, processing, manufacturing, transportation, and installation of the end-product. Disposal of the material at end of life is also often considered in embodied carbon analyses. Reducing embodied carbon is an opportunity for material suppliers and product manufacturers to have an impact on climate health.

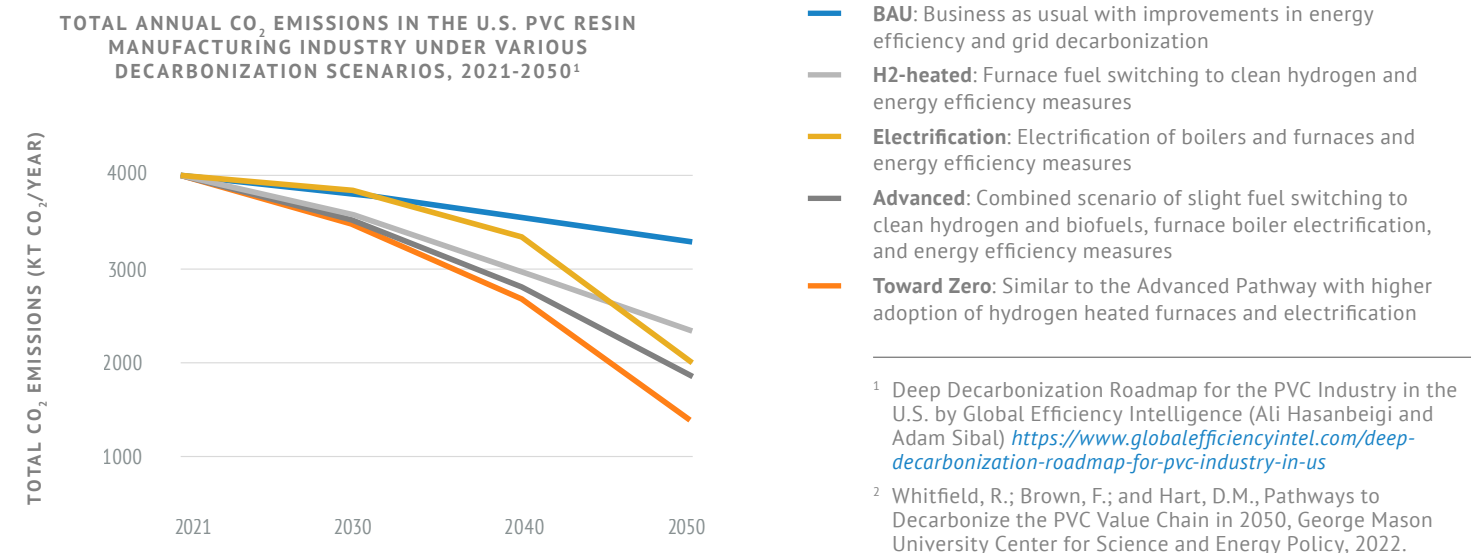
Over the years, the vinyl industry has developed and published life cycle analyses (LCA) and environmental product declarations (EPDs). To make this information more accessible to the design community, the Emissions Task Force is working with Building Transparency, a nonprofit providing open-access data and tools for addressing carbon in the building industry, to develop product categories within the Embodied Carbon in Construction Calculator (EC3). This will help increase the transparency of the embodied carbon in vinyl materials.

Working in conjunction with the Vinyl Siding Institute, the database was updated in 2022 to include vinyl siding to assist specifiers in making product selection.

Decarbonization

Reducing inputs, including the use of energy in production, is an important strategy to lowering the embodied carbon of vinyl products. A deep decarbonization roadmap report commissioned by the Vinyl Institute with the help of research and consulting firm Global Efficiency Intelligence demonstrated vinyl resin industry carbon reduction along four pathways.¹ The research found that the potential carbon savings by the year 2050 range from 21% to 75% as compared to the 2021 level, with an assumed 20% increase in PVC resin volume. Decarbonization of the energy grid, switching to cleaner fuels, converting production processes to electric energy usage, and improved energy efficiency are all important avenues to carbon reduction. The vinyl industry commissioned this study to help companies to understand the potentials, and all four resin producing members of the VI are currently implementing individual and specific decarbonization programs.

A second decarbonization study was conducted on the PVC value chain by researchers working through George Mason University. The team found that the vinyl industry may be able to achieve 80%-90% reduction in CO₂ emissions by 2050 in the United States using technologies approaching maturity today at a modest incremental cost.² They screened many technological options and explored two major decarbonization pathways in detail: carbon capture and sequestration (CCS) and hydrogen fuel. A key takeaway is that policies to accelerate the deployment at scale of these technologies should be debated and implemented to achieve this goal.





EMISSIONS

Celebrating Continuous Improvement

The PVC resin manufacturer's trade association, Vinyl Institute (VI), proudly recognizes member facilities in the PVC, EDC/VCM, plasticizer production, additive production, and PVC and chlorinated PVC compounding categories that have achieved outstanding performance in Environmental Excellence and Environmental Honor.

The performance criteria for these awards are based on the U.S. Environmental Protection Agency's (EPA) National Emissions Standards for Hazardous Air Pollutants (NESHAP), other regulatory permit performance, and the EPA's Toxic Release Inventory (TRI) data for air and water during the previous calendar year.

VI recognized 13 member facilities in 2022 that had outstanding environmental performance for five or more consecutive years.

EASTMAN

Plasticizer/Additive Manufacturing Plant
Texas City, Texas
5 Consecutive Years of Performance



Formosa Plastics®

PVC/CPVC Compounding Plant
Point Comfort, Texas
12 Consecutive Years of Performance

EDC-only Plant
Point Comfort, Texas
11 Consecutive Years of Performance



CPVC Compounding Plant
Louisville, Kentucky
8 Consecutive Years of Performance

OxyChem®

EDC-only Plant
Convent, Louisiana
11 Consecutive Years of Performance



TEKNOR APEX

PVC/CPVC Compounding Plant
Fountain Inn, South Carolina
7 Consecutive Years of Performance

PVC/CPVC Compounding Plant
Industry, California
5 Consecutive Years of Performance

PVC/CPVC Compounding Plant
Jamestown, North Carolina
5 Consecutive Years of Performance



PVC Plant
Pedricktown, New Jersey
7 Consecutive Years of Performance

Westlake

Plasticizer/Additive Manufacturing Plant
Aberdeen, Mississippi
10 Consecutive Years of Performance

PVC Compounding Plant
Aberdeen, Mississippi
10 Consecutive Years of Performance

PVC Compounding Plant
Madison, Mississippi
7 Consecutive Years of Performance

PVC Plant
Calvert City, Kentucky
6 Consecutive Years of Performance



PEOPLE & COMMUNITY

The People & Community Task Force maintains various key focus areas – user health & safety, community health & safety, ingredient transparency, community engagement, supply chain transparency & responsibility, and diversity, equity, & inclusion. The group works on educating members, providing tools and resources, and sharing best practices on these topics.

The Occupational Safety and Health Administration (OSHA) regulates workplace safety in the United States. Production facilities are mandated to report any recordable work-related accidents to OSHA on a regular basis. The vinyl industry resin and monomer producers' record on OSHA recordable injuries is best in class compared to both overall U.S. manufacturing and chemicals production.

In 2022, the Vinyl Institute recognized 26 production facilities for members that achieved zero OSHA recordable accidents. Seven of these facilities reported zero OSHA recordable accidents for over 5 years in a row.



Plasticizer/Additive Manufacturing Plant
Louisville, Kentucky
7 Consecutive Years of Performance



Formosa Plastics

PVC/CPVC Compounding Plant
Point Comfort, Texas
12 Consecutive Years of Performance

OxyChem

EDC/VCM Plant
Ingleside, Texas
6 Consecutive Years of Performance



PVC Plant
Plaquemine, Louisiana
10 Consecutive Years of Performance



TEKNOR APEX

Plasticizer/Additive Manufacturing Plant
Brownsville, Tennessee
9 Consecutive Years of Performance

Westlake

Plasticizer/Additive Manufacturing Plant
Aberdeen, Mississippi
7 Consecutive Years of Performance
EDC/VCM
Lake Charles South, Louisiana
7 Consecutive Years of Performance



scoreWISE

A smarter approach to sustainability scoring

In 2022, the People & Community Task Force worked with Sustainable Solutions Corporation to develop a sustainable scorecard tool, called scoreWISE, to assist companies in the integration of sustainability thinking in the product development process. Using scoreWISE, companies measure product performance across five metrics of sustainability – raw materials, hazardous or restricted materials, circularity, customer value creation, and carbon footprint.

scoreWISE provides users with both a visual and numerical representation of the tradeoffs and improvements of design decisions early in the process when it can have the most impact on product sustainability.

CONTRIBUTING TO THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS



One-quarter of all medical devices use PVC due to its performance and cost-effectiveness.

PVC Blood Bags Safely Preserve Blood for up to 42 Days¹

- + A storage period of up to 42 days is crucial for preserving the more than 14 million units of blood transfused in the U.S. annually.²
- + Patients' safety depends on a stable supply of blood, especially red blood cells that must meet the criteria of a low hemolysis rate without visible hemolysis in the supernatant.³

PVC Flooring, Wall Protection, and Coated Fabrics Help Prevent the Spread of Infectious Bacteria

- + PVC interior applications have surfaces that are smooth and impermeable which helps them withstand frequent harsh cleaning, disinfection, and sanitation protocols in medical facilities.⁴

PVC Medical Applications Protect Healthcare Professionals and Caregivers from Serious Contagions

- + PVC is one of the only materials that meet strict requirements for personal protective equipment (PPE) – face shields, goggles, and gloves – for doctors, nurses, and caregivers treating virulent diseases like Ebola.⁵
- + PVC sterile tubing helps medical professionals administer basic care to people.⁶
- + PVC sealant tape used in medical containment units creates an effective barrier for stopping the spread of infectious diseases.
- + PVC sealants for medical bottles and containers keep contents fresh and free from bacteria.

While the vinyl industry can contribute to each of the seventeen UN Sustainable Development Guides (or SDGs) to varying degrees, the four SDGs to which vinyl industry sustainability efforts contribute most substantially are:



PVC pipes safely deliver clean water and wastewater.

- + NSF standards in the United States and some 10 million quality control tests conducted since 1965 ensure that PVC and CPVC safely deliver clean drinking water.
- + PVC pipe has a smooth, non-corrosive surface that stays clean even after decades of use, unlike iron pipe, which suffers from tuberculation, a form of internal corrosion and bio-film contamination that can be a breeding ground for bacteria like E-coli⁷ and Legionella.⁸
- + The durability and non-corrosiveness of PVC pipes make them critical components of desalination plants.
- + PVC pipe is often used as a core component of water wells because they are long-lasting, easy to install, and cost-effective.
- + The non-corrosiveness of PVC pipe prevents loss of clean water and seepage of sewage in regions with corrosive soil conditions, unlike metal piping materials.



PVC pipes are a lower carbon solution for infrastructure.

- + PVC has a well-documented lower carbon footprint when compared to other piping materials like iron, copper, cement, or clay.⁹
- + Durable PVC pipes are also proven as the longest-lasting (100+ year service life) of all pipe materials, meaning fewer replacements are needed, and therefore less embodied carbon is required to maintain system integrity over time.⁹
- + PVC pipe is lightweight making it easier to transport and install resulting in less GHG emissions.⁹
- + PVC pipes have significantly lower total GHG emissions during production than other pipe materials.¹⁰
- + In sewer pipe applications, PVC has lower GHG emissions, approximately 45 percent lower than reinforced concrete pipes and 35 percent lower than ductile iron pipes.¹⁰
- + PVC piping systems require less energy to pump water resulting in cost, energy, and carbon savings.¹¹



PVC applications provide food safety and security, and stop waste.

- + PVC films protect food products from microorganisms that breed quickly on uncovered food and help prevent food waste.
- + Used as an interior metal can liner, vinyl coatings protect the can contents and protect the can from corroding due to acids in the food or beverage thereby increasing product shelf-life.
- + Vinyl sealants provide airtight seals for caps and closures on food and beverage bottles and jars keeping food fresh and bacteria out – also preventing food and beverage waste.
- + Clear PVC tubes are vital for the construction of bioreactors which produce algae for food, aquaculture, pollution control, and natural carbon sequestration.

- ¹ Carmen, R. (Jan. 1993): *The Selection of Plastic Materials for Blood Bags*, *Transfusion Medicine Reviews*, Vol. VII, No. 1
- ² Centers for Disease Control/Blood Safety <https://www.cdc.gov/bloodsafety/basics.html>
- ³ PVCMed Alliance <https://pvcmed.org/healthcare/applications/blood-bags/>
- ⁴ Interior and Sources, *The Time for Upholstered Fabric Performance in Healthcare is Now* (Aug. 8, 2022) <https://www.iands.design/products/textiles-fabrics/article/21066721/the-time-for-upholstered-fabric-performance-in-healthcare-is-now>
- ⁵ PVC Med Alliance, *Fighting Ebola with PVC* (Mar. 10, 2018) <https://pvcmed.org/fighting-ebola-with-pvc>
- ⁶ World Health Organization (WHO), *Interim List of WHO Medical Devices for Ebola Care*, Version 21 (Nov. 2014) <https://cdn.who.int/media/docs/default-source/medical-devices/meddev-list-ebola-25-nov-en.pdf>
- ⁷ PVC Pipe Association <https://www.uni-bell.org/About-Us/Public-Health>
- ⁸ National Academies, *Stronger Policies Needed to Protect the Public from Legionnaires Disease* (Aug. 2019) <https://www.nationalacademies.org/news/2019/08/stronger-policies-needed-to-protect-the-public-from-legionnaires-disease>
- ⁹ PVC Pipe Association Environmental Product Declaration <https://www.uni-bell.org/Portals/0/ResourceFile/environmental-product-declaration-2023.pdf>
- ¹⁰ McKinsey and Company, *Climate Impact of Plastics* (July 2022)
- ¹¹ 2022 cadeo Study Agriculture Energy Efficiency <https://www.vinylinfo.org/wp-content/uploads/2022/12/Ag-Efficiency.pdf>



LOOKING AHEAD

The VSC is an ecosystem of like-minded companies throughout the vinyl value chain with a common vision to reduce environmental impacts, ensure the health and safety of our stakeholders, and contribute to sustainable growth and success.

With 26 companies in the value chain verified to +Vantage Vinyl, including all of the major U.S. vinyl resin manufacturers, verification of sustainable operations throughout the supply chain is within reach. By aligning the value chain with +Vantage Vinyl-verified companies, the consumers of vinyl products will have confirmation of the sustainable operation of the supply chain that brought about the finished product.



VINYL SUSTAINABILITY COUNCIL

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