# CARE 2019 Annual Report

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Mission Statement
The mission of CARE is to advance market-based solutions that increase landfill diversion and recycling of post-consumer carpet, encourage design for recyclability and meet meaningful goals as approved by the CARE Board of Directors.

Vision
Post-consumer carpet diversion and recycling are economically, socially and environmentally sustainable for all stakeholders.

Core Values
We believe in:
• Market-Based solutions
• Entrepreneurship
• Hierarchy of Waste Management
• Sustainable practices (economic, social and environmental)
• Resource conservation
• Transparency
• Multi-stakeholder collaboration
• Professional ethics and integrity
• Anti-trust compliance

CARE 2019 Leaders
Sustainability Leaders
Aquafil USA
Dixie Group
Engineered Floors
Interface
Milliken & Company
The Mohawk Group
Shaw Industries
Tarkett
Universal Fibers
Wellman Plastics

CARE Members
CARE now has 162 members- please go to www.carpetrecovery.org for a complete list of CARE members.
Message from the Chairman of the CARE Board of Directors

2019 proved to be another milestone year in the continuing progress of CARE in accomplishing our mission “to advance market-based solutions that increase landfill diversion and recycling of post-consumer carpet, encourage design for recyclability and meet meaningful goals as approved by the CARE Board of Directors.”

As this Annual Report will demonstrate, we have seen increasing advancements in recycling technologies, a renewed national focus on plastics recycling and key progress with the California Carpet Stewardship Program. The collegial efforts of our membership have pushed us forward in accelerating the diversion of carpet from landfills and new and exciting means of converting post-consumer carpets into useful, viable products.

Dr. Bob Peoples, CARE’s Executive Director, has continued to provide excellent leadership for the organization. His deep knowledge of the carpet recycling industry and related technologies is unsurpassed. The CARE staff has done outstanding work as the scope of responsibilities of our organization continues to deepen and expand.

We have great support from our membership at large and particularly from our Board of Directors. We are fortunate to have a diverse, well-rounded group of leaders who are dedicated to our cause. We also appreciate the expert input and direction we receive from our advisors and consultants. We express our thanks to our key organizational executives who volunteer countless hours to ensure that CARE is financially sound, legally compliant and structurally robust to meet our objectives.

I am proud to be associated with CARE and am excited for our future opportunities to drive towards our sustainability objectives. These objectives will be met as we work together in a dynamic and evolving landscape to find technical and structural solutions to our challenges. CARE will continue to provide support and encouragement to its members, governmental institutions, technology developers and other organizations with congruent sustainability goals.

CARE is well set to meet the opportunities which the future will provide. Thank you for the support of all who join us in striving for market-based solutions for the carpet recycling industry.

Sincerely,

Joseph W. Foye
Chairman, Board of Director
Message from the CARE Executive Director

The year 2019 proved to be one of growth and promise after 17 years of ups and downs and continuing challenges. We saw new members join the effort, new technology being introduced, and new products being developed and brought to market. Perhaps the most exciting development was the advance of chemical recycling and the volume it could command once implemented. A number of major chemical companies have projects underway. The first to come on-line in late 2019 was the Eastman Chemical Company Carbon Renewal Technology consuming post-consumer PET and some potential for PP. Output from Carbon Renewal is a basic chemical building block that is used in a variety of applications.

Progress was strong in 2019 and there was optimism for the first time in a long time for carpet recycling. So much so, that the theme of the 2020 Annual Conference was set as, “Carpet Recycling Comes of Age.”

Our efforts in California finally gained traction and the recycling rate increased every quarter. While we did not hit the mandated 24%, for reasons beyond the control of our recyclers or CARE, we came close and set the stage for continued growth again in 2020. This comes at a time when many state-wide efforts in California are trending in the downward direction.

Of course, I write these word in mid-2020 and it is hard to put the current reality into perspective given the unanticipated collapse in oil prices and the impact of the global pandemic. While our report focuses on the good work and accomplishments of 2019, I have added a short narrative on Covid-19 impacts - it was impossible to ignore.

Finally, I want to thank the members of CARE for their tireless efforts and energy. It is a dedicated community of very talented entrepreneurs and they provide a great deal of the inspiration necessary to do this job. I am grateful to the CARE Board and especially our hard-working committees as we continue to tackle the challenges. And CARE is fortunate to have such a talented Team working together to find and implement ideas and provide support any way we possible.

Sincerely,

Robert Peoples, PhD
Executive Director, CARE
Key Results for CARE in 2019

Financial Report, 2019

CARE continues to manage three distinct operations: CA Carpet Stewardship Program, The Voluntary Product Stewardship Program (VPS), and CARE Core Operations.

The VPS program launched on January 1st, 2015. The program was renewed for 2019 with a budget of $4 Million. The program has now been operational 5 years. Limited demand for certain polymer types continued to have a negative impact in 2019. Many macroeconomic factors have contributed to this on-going challenge. The report will go into greater detail about the challenges in subsequent sections.

CARE continues to serve as the carpet stewardship organization (CSO) that manages and implements the California Stewardship Plan. On April 1, 2016, the assessment increased in California from 10 cents to 20 cents per square yard. On October 1 of 2017, the assessment increased to 25 cents per square yard. On January 1, 2019, the assessment increased to 35 cents per square yard. Along with the Voluntary Product Stewardship Program (VPS) and Core operations, the CARE organization is responsible for administration of a $35 million operational budget in its management of all 3 programs.

CARE underwent three independent financial audits in 2019, by Nichols Cauley. The first was an audit of CARE core operations. The second was an audit of our AB 2398 financials. Finally, an audit of the VPS program was completed. There were no material findings for CARE under any of the audits performed. In addition to the Nicolas Cauley audits, CARE has been audited by CalRecycle for a number of years. CARE has now had audits performed in 2013, 2014, 2015, 2016, 2017, 2018, and 2019. Since CARE began routine audits in 2013, there have been no material findings. This is a testament to CARE’s financial structure and internal controls.

In addition to the financial audits performed over the years, CARE has had opportunities to manage any number of difficult events in the recycling industry. As a result, CARE has evolved a solid culture as a learning organization and has put in place a strong program of internal controls and agreed upon procedures (AUPs). This is now viewed as a core competency of which the organization is proud.

CARE Operations

The financial operations of CARE are managed separately from its other programs. The operations of CARE have a separate and distinct financial ledger, budget, income statement, and balance sheet as does the VPS and AB 2398 programs.

The 2019 Annual Report provides a complete financial statement and summary of CARE Core operations. Financial details of the CA Program may be found in the CARE California Annual Report to CalRecycle, usually available by early September of each year.
CARE Operations Income and Expense Statement

- Net Income (revenues minus expenses) through December 2019 was ($149,191).
- Expenses were under budget by 15%. Revenue was over budget by 3%.
- Our budget for 2019 was set as an intentional loss due to positive net income from previous years, thus increasing the amount of cash and cash equivalents above our Safe Harbor of $300,000. This action was taken at the advice of our accountants to avoid raising any red flags with the IRS.

CARE Operations Balance Sheet:

- Cash balance at end of December 2019 was $396,486 vs. $554,450 at the end of 2018.
- Members’ equity as of 12/31/2019 was $680,596, up slightly from $654,484 at the end of December 2018.
- CARE maintains a minimum annual cash reserve of $300,000.

Business Results, 2019

- In 2019, CARE finished the year with 162 members.
- CARE successfully managed the California AB 2398 program as the Carpet Stewardship Organization. CARE successfully managed the fifth year of the Voluntary Product Stewardship Program in 2019.
- More than $2M were paid out in VPS subsidies in 2019.
- CARE participated in the IDEA Conference in Miami, FL in May of 2019
- CARE participated at the GreenBuild Conference and Expo in Atlanta, GA in November of 2019
Covid-19 Implications - Special Section

The scope of this Annual Report provides results for the year 2019. However, given the exceptional implications of the global pandemic which began to impact the United States in Q1, a few forward looking perspectives are in order.

As of the time this report issued in June 2020, the full scope, impact and recovery trajectory of the Covid-19 pandemic are still unknown. Coupled with the collapse in oil prices and shutdown of the automotive manufacturing section and associated supply chain, initial impacts of the economic recession catalyzed by Covid-19 initial began to manifest in the second half of March. By April, U.S. Shelter-in-Place orders resulted in a steep decline in demand and operations.

CARE took aggressive steps to develop an Action Plan for both the CA and VPS programs. Unfortunately, the carpet industry was not immune to the recession which resulted in plant closures and more than 10,000 jobs lost or furloughed. A difficult decision was made by the carpet industry leadership to terminate the VPS program effective June 30, 2020 to help off-set lost revenues.

At the present time it is not possible to know how deep the recession will be, how long it will last and what the recovery profile might look like. This challenge is compounded by the potential for additional Covid-19 impacts as the economy moves to restart in the later part of Q2. Of equal concern is the loss of carpet recyclers and associated infrastructure during this recession.

CARE remains committed to do its best to be there to support and be the voice of the recycling community across the United States.

2019 CARE Annual Survey Results of the U.S. Carpet Recycling Industry

- Employment increased from 882 in 2018 to 1,170 in 2019, an increase of 24%.
  - The largest progress was made in the State of California, where new processing and collection capacity came online in 2019
- Total post-consumer carpet discards, based on sales, were estimated at 3.9 billion pounds.
- Total gross collections were 335 million pounds\(^1\), up from 281 million pounds in 2018.

\(^1\) This number is derived from the mass balance approach seen in Figure 7 on page 23
- A large increase in the amount of material processed in California, accompanied with the cement kiln pilot in the VPS Program that began in Q4 of 2019, produced an increase in the amount of carpet collection throughout the country
- Gross post-consumer carpet generation is estimated at 12 pounds per capita.
- Gross post-consumer carpet collection equated to approximately 1 pound per capita for 2019.
- Total Materials flows were as follows:
  - Recycled Output (reuse plus recycle) was 56% of gross collections
  - Waste-to-Energy (WTE) represented 1%
  - CAAF and kiln output reported at 3%
  - 71% of recycled materials went to resin and molding applications, up just 1% from 2018
    - This is encouraging, given the fact that there have been limited market outlets over the past few years. Additional diversification of end markets is encouraging
  - Carpet face fiber use was 5% of recycled output, up from 2% in 2018 (depolymerization of nylon 6)
  - Carpet backing use was 4%, unchanged from previous year
  - PC4, calcium carbonate extracted from post-consumer carpeted, use accounted for 10% of output
    - Increase of 8% from 2018
    - This is due to a high subsidy from the California AB 2398 Program
  - Other applications represented 11% of recycled uses (pad, insulation, packaging, geotextile, etc.).
- 98% of the post-consumer carpet collected was processed in the United States.
- 83% of respondents felt CARE is meeting their business needs
- Since it was founded in 2002, CARE members have diverted over 5.6 billion gross pounds of post-consumer carpet from landfills in the United States.
- Greenhouse gas equivalents saved was calculated to be 228,663 mTCO2E using the 2019 EPA WARM model: [www.epa.gov/warm/versions-waste-reduction-model-warm#WARM Tool V14](http://www.epa.gov/warm/versions-waste-reduction-model-warm#WARM Tool V14)

**California AB2398 Results for 2019**

2019 marked CARE’s eighth year having the privilege to serve as the Carpet Stewardship Organization implementing California’s Carpet Stewardship Laws. Building upon years of market and product development efforts, the Program realized the most significant program increase in recycled output ever achieving a Q4 2019 recycling rate of 22.5%. This rate is a 44% increase over Q4 2018 and resulted in the Program achieving an overall annual recycling rate of 19.1%.

As background, California Assembly Bill (AB) 2398 launched the program in 2011, which was subsequently amended by AB 1158 in 2017 and AB 729 in 2019. Since inception, the program has facilitated the recycling and/or reuse of over 378 million pounds of postconsumer carpet. In total, via recycling, reuse and other diversion efforts the program has diverted over 563 million pounds of postconsumer carpet from California landfill disposal.

With the AB 1158 and AB 729 legislative amendments, several changes were incorporated into the Carpet Stewardship Law including:

- Achieve a 24% recycling rate for postconsumer carpet by January 1, 2020, and any other recycling rate established by the department pursuant to Section 42972.2.
- Increase the weight of postconsumer carpet that is recycled and reduce the disposal of carpet.
- Increase the collection convenience for the recycling of postconsumer carpet and increase the collection of postconsumer carpet for recycling.
- Increase the reuse of postconsumer carpet.
- Provide incentives or grants to state-approved apprenticeship programs for training apprentice and journey-level carpet installers in proper carpet recycling practices.
- Grants and subsidies should be structured to incentivize Highest Recyclability.
- Ensure that assessment fee funds shall not be expended on penalties or litigation against the state.
- Ensure that subsidies for Carpet as Alternative Fuel (CAAF) and Kiln are discontinued.
- Formalize a Carpet Advisory Committee to provide comments and recommendations on carpet stewardship plans, amendments to plans and annual reports. The CSO must adopt or respond to such recommendations.
- Stipulates that the California Department of General Services ensure that carpet removed from state buildings is managed consistent with carpet stewardship laws and carpet purchased by a state agency contains a minimum amount of postconsumer content by DGS by July 1, 2018.
- Requires development of contingency plan, including establishment of a trust fund or escrow account for unexpended monies and ongoing consumer assessments, to ensure program continuity should a CSO Plan not be approved.
- Requires the establishment of differential assessments that take into account the financial burden that a particular carpet material has on the stewardship program, and the amount of postconsumer recycled content contained in a particular carpet, as prescribed.
- Administrative penalties increased from $1,000 per day to $5,000 per day.
- Removes the 5% cap on CalRecycle to administrative fee recovery.

In response, under CARE’s 2018-2022 5-year California Plan the Program carried out the following highlighted key activities to work toward meeting the objectives of the Carpet Stewardship Law:

- To support program expansion per the newly legislated requirements, January 1, 2019, the Carpet Recycling Assessment was increased to $0.35 per square yard of carpet sold into California, resulting in total assessment remittances of $28.2 million in funds paid to CARE.

- Incentives to support Recycling/Landfill Diversion: In 2019, the CARE California Program invested a total of $23.3 million in subsidies, grants and other incentives to further accelerate recycling, reuse, diversion and recycled product development efforts in California.

- Grants to support Market Development: CARE awarded approximately $2.5M for 7 capital grants supporting processors and manufacturers; approximately $235K for 3 product testing grants supporting manufacturers; and approximately $82K for 6
micro-grants supporting drop-off sites and collections. Key focus areas for grant awards were California-based businesses, Highest Recyclability and deliverable recycled output in 2019.

- Built upon historical market development successes through processor partnering to evaluate long-term market making opportunities via increased material value by improving fiber processing, CARE’s grant program, noted above, provided the $900K capital equipment funds needed to secure a long-term end market opportunity for PET pellets.

- Three new subsidies were adopted including Highest Recyclability ($0.05/lb.) for Processors, and for Manufacturers using postconsumer carpet materials into their products: PET Pellet Payout ($0.11/lb.), Nylon 66 Payout ($0.10/lb.)

Studies:

a) Completed the first ever state-wide convenient collection study garnering input from Retailers, Commercial Carpet Installers, Installers for Small and Medium Flooring Retailers, Installers Groups for Big Box/Large Retailers, Remodeling and Demolition/Construction & Demolition Contractors, and Residents on how to make carpet recycling more convenient.

b) Completed an initial Cost Analysis to help evaluate the Program’s subsidy and cost models.

c) Evaluated Discards Study analysis and results to better determine the amount of carpet disposed on an annual basis, as carpet is not a consistent and regularly disposed material as observed through standard waste characterization studies.

Between a culmination of long-planned capacity expansion efforts funded by private industry, CARE grants and strategic subsidy support, 2019 resulted in CARE achieving an all-time program high of 22.5% in Q4, just slightly below the 24% recycling rate required by January 1, 2020. As noted below in Figure 1, CARE’s California Program efforts continued to provide a consistent upward growth trend in carpet recycling. This strong and significant growth was achieved despite a handful of key external challenges including:

1. Utility service delay in power delivery to a new processor directly related to a devastating Northern California wildfire. Full power service delivery was reasonably anticipated in May 2019 and is still not anticipated until Q2 2020.

2. Local municipality permitting delays on an existing processing facility expansion project. Project completion scheduled for August 2019 was delayed until Q1 2020 permit approval was received, with resulting startup now moved until Q2 2020.

3. Unanticipated processing capacity challenges experienced by an existing processor resulting in decreased recycled output.

4. Tile processing start-up slated for Q1 2019 experienced technical challenges, resulting in recycled output delay until late Q4 2019.

5. Long anticipated, and CARE grant funded, processor projecting a modest Q4 start-up experienced extended delays due to China tariffs, power company service level challenges and property sale. Likely start-up delayed to 2021.

Any of these delays, some individually and others in combination, would have enabled CARE to report a recycling rate of >24%.
CARE’s California Carpet Stewardship Program efforts in building, and in some cases rebuilding market sectors for material types that economically fall below that of both post-industrial and post-consumer curbside plastics, has been slow and steady. After eight years of navigating precipitous drops in oil pricing (2015) as shown in Figure 1 and the worldwide postconsumer plastics market challenges directly resulting from China’s National Sword, CARE’s eight years of dedicated California Program efforts held steady. This steady gain directly contrasts to California’s statewide recycling rate which, after nearly 30 years of planning, working within long established market sectors and billions of dollars’ worth of investments by many involved, has witnessed steadily declining recycling rates from 50% in 2014, to 44% in 2016 and again to 40% in 2018. Figure X provides a graphical comparison.

Figure 1: AB 2398 Recycling Rate vs. California Recycling Rate
Quantitative 2019 California Results:

- 82.1 million pounds of post-consumer carpet was collected before it could go to landfill (down 12% from the 93.5 million collected in 2018).
- 58.0 million pounds of recycled output was produced (up 18% from the 49.3 million pounds recycled in 2018).
- 19.1% of total estimated California post-consumer carpet discards were recycled in 2019, and for the first time ever, three consecutive quarters of program high recycling rates with 18.4%, 19.9% and 22.5%, respectively in Q2-Q4.
- The overall 2019 California recycling rate was 19.1%, up 25% versus 2018. While Q4 2019 at 22.5% was up 44% over Q4 2018
- CARE California progress in their recycling rate, while slightly below the 24% by January 1, 2020 goal, has continued to show a consistent and reliable upward growth trend in recycling as shown in Figure 2.
ADDITIONAL INDICATORS

Since the start of the California program in 2011, the following information applies:

- 875 million pounds of postconsumer carpet was gross collected by collector sorter entrepreneurs.
- 10.2 million pounds of postconsumer carpet was gross collected in 2019 through the CARE public Drop-off Site program - A 28% increase over 2018.
- 563 million pounds of postconsumer carpet were diverted from California landfills as reuse, recycled output, energy recovery, export or other methods since program inception.²
- 378 million pounds of postconsumer carpet has been reused or recycled.
- 110 million pounds of recycled output have been manufactured into new Tier 2 non-nylon products such as carpet cushion, underlayment, pellets, insulation, manufactured decking, erosion control and other products.
- $94 million in assessment funds have been invested in recycling efforts to date.
- 71% overall yield rates on recovered materials have increased considerably over the 28% yield rates in 2011-2012 due to market development efforts and grant supported processor capacity expansion and creation and addition of the PC4 subsidy.

² After collection, carpet is processed for recycling. On average nearly 71% of gross collected material is reused or recycled (yield), while only 19% of the by-product of recycling is then sent to landfill, hence the net diversion figure. In 2019, 71% of gross collections were recycled.
The reader should note, this summary of CA performance is included to provide an integrated US picture. The official CARE CA 2019 report will not be submitted until September 1, 2020. The reader should refer to that report for specific CA information, including any updates or corrections to the CA data presented here. The CARE 2019 CA Report will serve as the official record for all CA performance data.

**VPS Program**

The VPS Program began in January of 2015 and initially had a life expectancy of two years. The VPS Program is market-based, and Collector/Sorter Entrepreneurs (CSEs) participants agree to accept and manage all applicable post-consumer carpet, regardless of polymer type or primary materials or construction. VPS is funded by members of the Carpet and Rug Institute. The VPS program incentivizes sorters of post-consumer carpet who ship and sell material to processors in the United States and internationally. The program completed its fifth year of operation in 2019 with a budget of $4 million.

The VPS Program was initially approved for two years and expected to sunset as new PET recycling opportunities were developed. However, deteriorating market conditions have resulted in several extensions of the program. A number of macroeconomic factors have contributed to a decreased demand for post-consumer carpet including the price of oil. The price of oil held steady in Q3 and Q4 of 2019, averaging $50-$60 per barrel for the second half of the year. As a result, the VPS Program quarterly output increased in 2019.

Overall output of the VPS Program increased in 2019. Carpet pad prices remained high for most of the year, allowing many CSEs to collect more post-consumer carpet. Consistency in oil prices and higher volumes from the automotive sector drove demand throughout the first half of the year. The initial decline came at the end of the third quarter. The United Auto Workers strike in September interrupted many supply chains and temporarily stopped a portion of automotive manufacturing in the United States. This continued well into Quarter 4, with impacts expected to be felt into 2020.

The VPS Program funds two types of output: Type 1 and Type 2. Material that is re-used, shipped internationally and shipped inside of the U.S. is considered Type 1 and is funded at $0.02 per pound of output. Material that is sent to a waste to energy facility, a pyrolysis
application, cement kiln, and CAAF is considered Type 2 and is funded at $0.01 per pound of output. Table 1 breaks the material down by type. Cells shaded green represent Type 2 output. The cement kiln pilot was introduced in Q4 2019 and is designed to fund material sent to an approved cement kiln at $0.06 per pound. The pilot was funded through the end of 2020.

Output continued to grow in the first three quarters of 2019 prior to the United Auto Workers strike.

Table 1: VPS Output Destinations

<table>
<thead>
<tr>
<th>Pounds of Output</th>
<th>Q1 2019</th>
<th>Q2 2019</th>
<th>Q3 2019</th>
<th>Q4 2019</th>
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<tr>
<td>Broadloom Re-Used ($.02)</td>
<td>66,840</td>
<td>43,680</td>
<td>66,448</td>
<td>51,115</td>
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<tr>
<td>Carpet Tile Re-used ($.02)</td>
<td>317,959</td>
<td>347,100</td>
<td>499,092</td>
<td>394,853</td>
</tr>
<tr>
<td>Shipped Internationally ($.02)</td>
<td>1,102,734</td>
<td>2,916,521</td>
<td>1,292,731</td>
<td>712,342</td>
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<tr>
<td>Shipped inside U.S. ($.02)</td>
<td>19,054,700</td>
<td>20,264,916</td>
<td>22,756,734</td>
<td>17,312,530</td>
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<td>Waste-to-Energy ($.01)</td>
<td>386,060</td>
<td>555,206</td>
<td>1,958,183</td>
<td>717,594</td>
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<td>Pyrolysis ($.01)</td>
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<td>-</td>
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<td>-</td>
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<td>Cement Kiln ($.01)</td>
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<td>1,353,442</td>
<td>3,389,112</td>
<td>2,005,070</td>
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<tr>
<td>CAAF ($.01)</td>
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<td>3,832,845</td>
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<td>Kiln Pilot Locations</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>21,586,258</td>
<td>25,480,865</td>
<td>29,962,300</td>
<td>23,144,381</td>
</tr>
</tbody>
</table>

Table 2 breaks down the output by fiber type. CARE feels that this represents the demand for various fiber types in the marketplace, but this does not reflect what is currently in the waste stream. Since there are fiber types that are in higher demand than others, many CSEs have been more selective of the material entering their facility. Some CSEs posit that polyester carpet makes up as much as 50% of the waste stream in some geographic areas. This has resulted in many CSEs changing their business models and being more selective of the materials that they collect.

Nylon 6 material decreased as the year progressed. This is directly attributable to the decreased demand in the automotive industry. Nylon 6,6 material was in high demand in 2019. While it’s been that way for a couple of years, there’s not a lot of this type of material left in the post-consumer carpet stream. Some CARE members report that Nylon 6,6 material makes up less than 10% of the material currently being collected.
Table 2: Face Fiber Breakdown - Shipped and Sold

<table>
<thead>
<tr>
<th>Face Fiber Breakdown - Shipped and Sold</th>
<th>Q1 2019</th>
<th>Q2 2019</th>
<th>Q3 2019</th>
<th>Q4 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nylon 6</td>
<td>58%</td>
<td>53%</td>
<td>50%</td>
<td>39%</td>
</tr>
<tr>
<td>Nylon 6,6</td>
<td>28%</td>
<td>32%</td>
<td>24%</td>
<td>25%</td>
</tr>
<tr>
<td>Modular Carpet Tile</td>
<td>3%</td>
<td>2%</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td>Polypropylene</td>
<td>2%</td>
<td>2%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>PET</td>
<td>8%</td>
<td>11%</td>
<td>17%</td>
<td>29%</td>
</tr>
</tbody>
</table>

Figure 5 tracks the sorted output over time. The data starts with Q1 2015 and ends with Q4 2019, so this graph includes all the recycled output data since the VPS Program’s inception. The data presented in the graph includes both Type 1 and Type 2 outputs. You can find more detailed information about the VPS Program at www.carpetrecovery.org.

Output for Quarter 1 of 2019 was at the lowest level since the VPS Program’s inception in 2015, but the downward trend reversed in Quarter 2. Output increased for the next 2 quarters, before falling again in Quarter 4 due to the normal market sales cycle. Again, the UAW strike was a negative factor. Normalcy also returned to oil markets in 2019, with price fluctuations decreasing compared to past years.

Figure 5: 2015 - 2019 CSE Output

Figure 6 represents the inventory levels. Inventory levels remained lower in 2019 than in 2018. This is due to a couple of factors: more demand for material and increased selectivity of material that collectors are bringing into their facilities. It’s not clear...
whether the inventory levels will increase in 2020. CARE expects inventory levels may grow in Quarter 1 of 2020 due to the fallout from the UAW strike.

**Figure 6: 2015-2019 CSE Inventory Levels**

CARE 2019 Annual Survey Results

Each year, as required by the CARE Bylaws, CARE prepares an Annual Survey to report on carpet diversion and recycling results achieved by the respondents to the Annual Survey. All information from respondents is confidential. The collected information is aggregated and analyzed for the Annual Report.

2019 Carpet Recycling Industry Landscape

CARE weathered another challenging year in 2019, but there was certainly a lot of positivity surrounding carpet recycling. CARE is the designated stewardship organization for the AB 2398 recycling law in the State of California and the Voluntary Product Stewardship Program funded by the Carpet and Rug Institute. CARE also operates on a day-to-day basis as it continues its search for market-based solutions. CARE is responsible operationally for over $35 million between the three programs.

The data represented here includes the consolidation of material from all the programs that CARE manages. This provides an integrated picture of the total U.S. impact. California and VPS numbers were presented independently in the earlier sections of this report.

As mentioned earlier, decreased demand due to lack of end markets has negatively impacted all players in the supply chain. Lower oil prices have made virgin products more cost-effective than recycled materials. A strike by UAW had a negative impact on processors outside of California, as recyclers in California are more insulated from market interruptions due to a wider product base inclusive of PET options. The CA recycled output totals increased at a much higher rate than the rest of the United States.
Annual Survey Methodology

To form a complete picture of the national Carpet Recycling Industry, respondents were asked questions regarding the following issues on the Annual Survey:

- Recycled output pounds
- Recycling versus other end-uses for the material diverted (i.e., reuse, end-product manufacturing, carpet as alternative fuel (CAAF), cement kiln, waste-to-energy, PC4 and landfill)
- Types and amounts of carpets recycled by polymer type
- End products manufactured from recycled materials
- Steps in the recycling process performed by the respondent
- Geographical locations and employment information
- International versus domestic customers (outlets)
- Employment data

In addition to the quantitative information sought, CARE also requested input on the organization’s performance and the value that CARE provides to its membership. This information is used to improve CARE’s overall operations, program structures, and resource allocation. CARE continues to refine its reporting and data analysis. For the 2019 survey, CARE used the same mass balance approach method instituted in 2016. CARE also developed two surveys targeted at different parts of the supply chain. CARE collected data throughout the year in its management of the Voluntary Product Stewardship and AB 2398 programs, so the surveys were designed to account for missing information in the mass balance analysis.

The first survey was sent to Collectors and Sorters. Almost all the CSEs in the United States participate in the Voluntary Product Stewardship and report their numbers on a monthly basis, so CARE already had most of the information required. The survey was sent to 35 CSEs; 22 completed the survey for a response rate of 63%.

The second survey was directed to companies that process the carpet and/or use post-consumer carpet material in a product. This survey was sent to 10 processors and manufacturers across the US. All recipients of the survey responded.

A copy of both 2019 surveys are attached at the end of the Annual Report in Appendix 1.

CARE assessed the responses received and followed up as needed with individual companies to maximize participation and to ensure that it minimized double-counting wherever possible. By doing so, the reported data is more accurate and reflects a truer picture of the amount of carpet diverted and recycled in 2019. CARE wishes to acknowledge the support of Dr. Matthew Realff of the Georgia Institute of Technology for his assistance in evaluating the data.

CARE makes no warranty as to the accuracy of this data and assumes no responsibility or liability for how this information is used by individuals or companies and makes no warranties for its use.
Evaluation of Progress in 2019

Carpet Discard Methodology

In 2011, the CARE Board of Directors adopted a formula for calculating carpet discards, which more accurately reflects actual sales and carpet discards in the United States. CARE believes the formula provides a more accurate picture of both gross collections and recycling rates for annual reports. In the fall of 2012, CalRecycle agreed to the use of this formula for calculations involving post-consumer recycling in California. Several factors of the formula are typically updated annually.

The purpose of the methodology is to update the discards on an annual basis, using actual sales data, and upgraded by factors that influence the calculation. Those factors include changes in imports/exports, percent of the market that is replacement, average face weight, deselection, and demolition rate. CARE methodology uses a mass balance approach. Since operators know with great accuracy the pounds of material shipped out of a facility (the shipper is either being paid by the pound by a customer or is paying by the pound for landfilling or energy conversion), CARE simply collects all output data, including inventory changes, and back calculates what must have come in to support the reported outputs (a mass balance). It is worth noting that with the rapid rise of LVT, new information about deselection came to light in late 2019 and will be further explored in 2020.

Formula for Calculating Carpet Discards

The approved formula for calculation of discards is:

\[ \text{Discards} = ((\text{Sales} \times R) \times P) + D + DS \]

The factors used to calculate the amount of carpet available for diversion include:

- **S**: Carpet Sales in the US for the reporting period (square yards)
  
  Sales Data comes from Market Insights, an independent market research firm, who is collecting the confidential sales data from carpet manufacturers doing business in the US.

- **R**: Percent of carpet that is replacement, or carpet replacing existing carpet.
  
  Replacement carpet is the carpet destined for the landfill. The carpet industry has worked with Market Insights to quantify the replacement rate to be 71% currently.

- **P**: Average weight of carpet per square yard.
  
  A carpet weight analysis was conducted in 2018. (Raw data was supplied by the industry and analyzed by CARE. Weighted averages of carpet weights of broadloom and tile used in the commercial and residential sectors were calculated.) The average weight used is now 4.5

- **D**: Pounds of carpet from demolition projects not replaced.
  
  In 2017, the weighted demolition rate (87% residential and 13% commercial) was estimated at 1.31%, (estimate provided by Market Insights). D is converted to pounds by multiplying Sales x R x P.
DS = Deselection pounds resulting from a decision to rip out old carpet and not replace it with new carpet. The overall deselection estimate is ca. 34% per year. DS is calculated by taking S x 0.34.

Note that the term demolition represents the teardown of a building. There is no easy way to know the actual square yards of carpet coming out of such a process. By assuming the actual demolition rate obtained from Marketing Insights we are likely overestimating the total volume of carpet sent to landfill from the demolition source. However, this is a tiny fraction (<1%) of the overall amount and does not significantly alter the flow.

Deselection is a separate element of the PCC flow to landfill. CARE has always assumed this parameter to be very small (<1%). CARE worked to develop a more quantitative estimate of deselection in 2016. Based on an analysis of historical data back to 1975, in 5-year increments, it was estimated that deselection represents <0.75% per year. However, as noted, two independent sources of information have now indicated deselection may be around 34% in 2019. Based on 2019 total estimated discards of 3.9 billion pounds, deselection equates to an estimated 970 million pounds.

Application of the formula to generate discards is shown in the following example using actual U.S. data from 2019 and rounded for clarity.

Discards = (((Sales * R) * P) + D + DS)

Sales 2019: 893 Million square yards

Discards = (893 *0.71 *4.5) = 2,854 million pounds + D +DS

Where D = 2,854 *0.0025 = 82.3 million pounds

Where DS = 2,854 *0.34 = 970 million pounds

Thus, Discards =2,854 + 82 +970 = 3,907 million pounds

Post-Consumer Carpet Collection and Recycling: Quantitative Results for 2019

CARE continues to work to quantify metrics necessary to understand the marketplace for carpet recycling in the United States. It is important to recognize that CARE discloses and works with the data as received. These numbers have been voluntarily given to CARE by the independent post-consumer carpet sorters and processors that are members of CARE. CARE has not audited the numbers nor does CARE guarantee the accuracy of the numbers submitted. However, it should be noted that all VPS and CA program participants are subject to an independent Agreed Upon Procedure protocol that works to verify and validate data submitted. National key results include:

- 335 million pounds of gross collected post-consumer carpet in 2019 = Diversion Rate of 10%
- 202 million pounds of post-consumer carpet was recycled in 2019, a recycling rate of 5%
- Recycled output yield was 60% (Output/gross collection)
- Over 5.6 billion Pounds of cumulative diversion since 2002
• 134 million pounds were sent back to landfill in 2019
• Inventory decreased by 17 million pounds
• 98% of all reported recycled lbs. were processed in the United States
• Engineered Resins made up 71% of end market outlets

Table 3 shows a comparison by pounds and percentage of the quantity of post-consumer carpet recycled and diverted from landfill since program inception in 2002 through 2019. CARE began using the new methodology for measuring carpet discards and a mass balance calculation of input based on measured pounds of outputs in 2013. CARE continues efforts to refine this method each year. CARE members have reported they have now diverted over 5.6 billion lbs. of carpet from landfills in the United States since 2002. The amount of recycled output increased by 41 million lbs. in 2019 compared to 2018. The amount of material sent back to landfill in 2019 also increased by 36 million lbs. The yield (recycled output/gross collections) is higher this year. CARE believes that this is due to CSEs being more selective about the material that they’re bringing into their facilities and due to the subsidy paid to recycle PC4 in CA (post-consumer carpet calcium carbonate). For example, if a CSE is currently collecting from an area that produces a large amount of PET and Nylon 6 material, then the CSE may chose not to offer the collection service in that area. And with the use of PC4, more of the carpet is used, thus further increasing the yields.

Table 3: Post-Consumer Carpet Recycling and Diversion Statistics, 2002-2019

<table>
<thead>
<tr>
<th></th>
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<tr>
<td>Total Discards*</td>
<td>4,560</td>
<td>4,228</td>
<td>3,718</td>
<td>3,373</td>
<td>3,816</td>
<td>3,540</td>
<td>3,703</td>
<td>3,426</td>
<td>3,427</td>
<td>3,756</td>
<td>3,371</td>
<td>3,207</td>
<td>4,074</td>
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<td>Diversion</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Reuse</td>
<td>0</td>
<td>4</td>
<td>12</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>12</td>
<td>2</td>
<td>13</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Recycled Output**</td>
<td>250</td>
<td>294</td>
<td>185</td>
<td>114</td>
<td>170</td>
<td>167</td>
<td>178</td>
<td>157</td>
<td>183</td>
<td>161</td>
<td>164</td>
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<td>Int’l Recycle Yield (60%)</td>
<td>10</td>
<td>7</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
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<tr>
<td>Total Recycled</td>
<td>275</td>
<td>243</td>
<td>246</td>
<td>271</td>
<td>250</td>
<td>294</td>
<td>185</td>
<td>124</td>
<td>177</td>
<td>171</td>
<td>183</td>
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<tr>
<td>Total Reuse + Recycle</td>
<td>275</td>
<td>247</td>
<td>258</td>
<td>273</td>
<td>251</td>
<td>299</td>
<td>197</td>
<td>126</td>
<td>190</td>
<td>174</td>
<td>185</td>
<td>164</td>
<td>205</td>
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<td>Waste-to-Energy</td>
<td>19</td>
<td>41</td>
<td>47</td>
<td>38</td>
<td>46</td>
<td>42</td>
<td>58</td>
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<td>68</td>
<td>55</td>
<td>46</td>
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<td>5</td>
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<td>CAAF or Cement Kiln</td>
<td>2</td>
<td>2</td>
<td>12</td>
<td>26</td>
<td>36</td>
<td>11</td>
<td>23</td>
<td>113</td>
<td>120</td>
<td>89</td>
<td>44</td>
<td>20</td>
<td>12</td>
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<td>Int’l Ship (Gross-Yield)</td>
<td>31</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>4</td>
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<td>4</td>
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<tr>
<td>Other Internal Use</td>
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<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>Sent back to Landfill</td>
<td>224</td>
<td>191</td>
<td>174</td>
<td>107</td>
<td>98</td>
<td>134</td>
<td>134</td>
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<td>134</td>
<td>134</td>
<td>134</td>
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<tr>
<td>TOTAL Diverted</td>
<td>296</td>
<td>290</td>
<td>317</td>
<td>337</td>
<td>333</td>
<td>352</td>
<td>463</td>
<td>404</td>
<td>555</td>
<td>489</td>
<td>458</td>
<td>358</td>
<td>424</td>
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<tr>
<td>Net Diversion***</td>
<td>180</td>
<td>364</td>
<td>315</td>
<td>351</td>
<td>260</td>
<td>290</td>
<td>290</td>
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<td>290</td>
<td>290</td>
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<tr>
<td>Recycling Rate</td>
<td>6%</td>
<td>6%</td>
<td>7%</td>
<td>8%</td>
<td>7%</td>
<td>8%</td>
<td>5%</td>
<td>4%</td>
<td>6%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Gross Diversion Rate</td>
<td>6%</td>
<td>7%</td>
<td>9%</td>
<td>10%</td>
<td>9%</td>
<td>10%</td>
<td>13%</td>
<td>12%</td>
<td>16%</td>
<td>13%</td>
<td>14%</td>
<td>11%</td>
<td>10%</td>
</tr>
</tbody>
</table>

The mass balance of outputs method depicted in Figure 7 assumes that the sorters and processors accurately know the weight of goods sold and shipped to customers, landfill, WtE or kilns since there are profits or costs associated with these activities. Reported pounds received on the front end are considered gross estimates since most loads are not weighed. Therefore, by combining all outputs, CARE can, with better accuracy, measure inputs. CARE manages two programs that accumulate data from all three parts of the supply chain. The VPS program collects data from the National collection network, and AB
2398 collects data from collectors, processors and manufacturers of CA PCC, so CARE feels confident in the veracity of this data.

Due mainly to California’s increased consumption, gross collections were up significantly this year at 335 million pounds, compared to 281 million pounds in 2018. CAAF/Kiln dropped precipitously as well. Rising transportation costs and accessibility to these facilities have caused this decline. However, an increase was seen beginning in late 2019 as the national Cement Kiln Pilot beginning in the VPS Program in Quarter 4 of 2019. The pilot was planned to continue through 2020.

Figure 7: Mass Balance Approach to Estimating Gross Collection in 2019

![Diagram of mass balance approach to estimating gross collection in 2019]

**Recycled & Reuse + WtE + Landfill + Kiln + Inventory Change = 201 + 134 + 5 + 12 + 7 - 17 = 335 M lbs. input required**

Figure 8 represents the historical trend of gross pounds of post-consumer carpet collected each year since 2002. Using the mass balance approach, gross collection for 2019 is calculated to be 335 million pounds. This is an increase of 54 million lbs. from 2018 and is the result of a large increase of output in the State of California. While the rest of the country had modest increases in Quarters 2 and 3, California output continued to grow throughout 2019. This is due to the heavily subsidized carpet recycling industry in California. The heavy subsidies buffer - to a certain extent - many businesses in the state from free market dynamics and macroeconomic changes.

Please note that CARE began using the mass balance methodology in 2013. This explains the large jump from 2012 to 2013. Cumulative diversion from landfill since CARE’s inception totals 5.6 billion pounds. CARE is excited about the future and expects this number to grow in the coming years as new technologies continue to be developed and chemical recycling becomes more prevalent.
Figure 9 represents the next step in the supply chain. After the post-consumer carpet is brought to a sorting facility, it is then sent to a processor. Of the pounds collected and sorted in 2019, 37% were sent back to the landfill. This number is 3% higher than 2018. While this is what was calculated through the mass balance, it should be noted that it is impossible for CARE to calculate the amount that would have been landfilled had CSEs not been selective of material coming into their facilities.

The amount of material sent to recycling processes increased from 52% in 2018 to 55% in 2019. CARE believes that the changes are due to the material selectivity mentioned earlier, ultimately resulting from the market challenges (oil markets, raw material prices, etc.). CAAF and Kiln and Waste-To-Energy output both dropped by 4 percentage points. This is due to rising transportation costs and accessibility to CAAF, Kiln, and WTE facilities. Again, the kiln output is expected to increase in 2020 through the VPS pilot kiln Program. Note, there is no subsidy for CAAF, kiln or WTE for CA PCC.

For historical data, the reader is encouraged to visit https://carpetrecovery.org/newsblog/reading-room/.
End Products Manufactured from Post-Consumer Carpet

Respondents reported that 71% of recycled post-consumer carpet is manufactured into engineered resins. This is up 1% from last year. Use of PCC face fiber going back into carpet fiber increased from 2% in 2018 to 5% in 2019. Carpet backing going back into carpet backing represented 4% of the end-market output. Stated another way, 9% of the recycled output is going back into a carpet application - a true cradle-to-cradle scenario.

PC4 is a term coined by CARE that means post-consumer carpet calcium carbonate. Because of a large subsidy in California, manufacturers have found ways to incorporate this material into their products. This is the second year that CARE has reported PC4. The amount of PC4 did decrease vs. 2018, but it’s still encouraging to see the material maintain its position as an end-market outlet.
International Markets for Post-Consumer Carpet Material

In 2019, the US consumed 98% of the post-consumer carpet material collected. This was down 1% from 2018. Approximately 7 million pounds of PCC material was shipped internationally in 2019. Of the material shipped, it is estimated that 4.2 million pounds was recycled and that 2.8 million pounds went back to the landfill. This estimation is based on the recycled output rate (yield) of 60% for the United States. China’s Green Fence and National Sword has hindered international growth in the past few years. China was once a large consumer of post-consumer carpet prior to these initiatives. Today, most of these 7 million pounds of material is being shipped to Canada, with a small amount of material being shipped to Southeast Asia.

Nylon 6 and Nylon 6,6 Sorted Output Decreased; PET Output Increased from 2018-2019

In 2019, Nylon 6 and Nylon 6,6 fibers accounted for 63% of the total sorted carpet fiber. The amount of nylon 6 decreased by 2% in 2019. Nylon 6,6 decreased by 3%. Many sorters have a large supply of Nylon 6 in their inventory, but consistency with oil prices and demand in 2019 has assisted in lowering those levels somewhat. As depicted in the VPS section of the report, inventory levels are starting to decline. This is happening because many collectors are collecting less carpet material and focusing solely on the high-value pad material.

Demand for nylon material remains high, accounting for over half of the sorted output in 2019.
For historical perspectives, Figure 12 shows the shift in carpet face fiber from 2008-2017. Remember that the percentages are based on what is reported. Due to collection selectivity based on market available for face fiber types, this is not an accurate depiction of what’s actually in the waste stream. The biggest change from 2016 to 2017 is the drop in Nylon 6. The drop-in demand has made this material less desirable to many CSEs. Nylon 6,6 collection has remained constant, but there’s been an increased demand in the past couple of years. Polypropylene is in a similar situation. The demand for the material is there, but there’s little available in the waste stream as PP represents only about 10% of sales. As consumer preferences and product offerings continue to shift towards polyester material, there will be even less Nylon 6,6 or Polypropylene material in the waste stream.
CARE Carpet Recycling Survey Respondents Employed 1,170 People in Local Communities across the U.S. in 2019

The respondents to the CARE Annual Survey employed 1,170 people in local communities in 2019, an increase of 288 people or 24% versus 2018. With potentially new market outlets forecasted to come online in 2020, it’s difficult for CARE to anticipate growth or decline in the future. However, the impact of Covid-19 in terms of delays and the termination of the VPS program will be significant factors to contend with in 2020.

3 Figure 12 based on reported estimated pounds collected, an estimate known to under-estimate collections.
Collection of Carpet by Region

Figure 14 show where respondents collected carpet, by region.

Figure 14: Reporting Regions in the U.S.

Figure 15 shows that post-consumer carpet collection is highest in the California (33%), followed by the Southwest (30%), the Southeast (27%), Midwest (6%), the Northeast (3%), then the Northwest (1%). It’s important to note that California, the Southeast and the Southwest accounts for 90% of all collections. This isn’t surprising given the fact that almost all processors reside in these regions.
Figure 15: Collection of Carpet by Region, 2019

Table 4: Region Distribution Change 2018 vs 2019

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>111,093,322</td>
<td>122,922,202</td>
<td>89,959,135</td>
<td>98,243,675</td>
<td>9%</td>
</tr>
<tr>
<td>NW</td>
<td>8,953,545</td>
<td>7,250,921</td>
<td>2,523,638</td>
<td>3,576,950</td>
<td>42%</td>
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<tr>
<td>MW</td>
<td>30,710,679</td>
<td>8,527,702</td>
<td>7,748,079</td>
<td>17,549,078</td>
<td>126%</td>
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<tr>
<td>NE</td>
<td>23,317,435</td>
<td>12,164,023</td>
<td>5,200,049</td>
<td>8,872,806</td>
<td>71%</td>
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<tr>
<td>SE</td>
<td>131,741,939</td>
<td>109,148,010</td>
<td>59,373,046</td>
<td>81,226,812</td>
<td>37%</td>
</tr>
<tr>
<td>SW</td>
<td>71,186,359</td>
<td>42,687,449</td>
<td>60,660,043</td>
<td>91,168,897</td>
<td>50%</td>
</tr>
</tbody>
</table>

Figure 16 depicts the geographic distribution of carpet collection for 2019, but it doesn’t present a comparison to 2018. Table 4 compares 2019 to 2018 and tracks the fluctuations by both percentage points and lbs. All regions increased the amount of material that was collected in 2019. California jumped by 9% and about 8 million pounds but remember that CA already represented a third of all material collected. The Southeast did increase by a significant number as well. Due to rising logistics costs, many processors in the Southeast started to accept material from this region and deselecting California; however, California’s output continued to grow because of additional processing capacity that came online in the year.
Qualitative Feedback from CARE 2019 Survey Respondents

In the 2019 survey, 83% of respondents (n=24) said CARE was meeting their needs. This is identical to 2018’s result and CARE continues to look for ways to increase value and support for its members.

Figure 16: Survey respondents’ view of whether CARE is meeting their needs

Summary

- CARE continued to use the mass balance approach in the analysis of collections. Refinements will continue to be made to both the Annual Survey and the reporting forms for the programs that CARE manages.

- Challenges persist in the marketplace, but CARE entered 2020 excited about the prospects of chemical recycling. There’s a lot of momentum occurring with carpet recycling and plastics recycling.

- Engineered resins represent 71% of recycled products. This represents a 1% increase and still accounts for a large majority of end-products. It’s good that post-consumer carpet material is finding other market outlets. Diversification is a positive development. There’s hope that this trend will continue in the future with the emergence of chemical recycling.

- “Closed loop recycle” increased from 7% in 2018 to 9% in 2019. This is largely due to a new fiber recycling operation that consumes California carpet - a direct result of the AB 2398 Program.

- International activity modestly increased in 2019. This material is being sent to Canada. A small amount is being sent to Southeast Asia, but output to China remains nonexistent. CARE does not anticipate this changing in the coming years.

- Overall collections were up significantly. All regions reported an increase in collections. Processors in some regions are having difficulties in getting enough carpet. Because different outlets depend on different fiber types, it can be a challenge to get enough material for various operations.
• 83% percent of all respondents from the Annual Survey feel that CARE is meeting their needs. This is unchanged from 2018.

**Survey Methodology**

In developing a survey methodology to establish quantitative estimates of recycling of a waste stream, two key factors must be taken into account: 1) participation and 2) double-counting. Participation is essential in any surveying process, and even more so in this type of survey, where there is no logical or reliable way to extrapolate results from respondents to the general population. This means that respondents’ survey responses will represent the complete and total results. Thus, every effort must be made to maximize participation.

However, with increasing participation comes another potential problem: double counting. Since a given pound of used carpet may pass through several different entities on its way from the point of generation to its ultimate disposition (reuse, recycling or disposal), and, since these different types of entities (collectors, sorting facilities, processors and manufacturers) are included in the survey, the chance exists that a pound of carpet could be counted more than once. As participation increases, the likelihood of double-counting increases, since there is a greater chance that more than one company may be reporting on their handling of the same material. Design and analysis of the survey data are built to help minimize this concern.

Several features were built into the surveying process to address these two key issues:

Confidentiality of data is often the key to participation, and all aspects of the survey were designed to preserve confidentiality. A web-based surveying tool was again used to allow respondents to provide data completely anonymously, if they desired. In addition, all written and verbal communication with potential survey respondents stressed the confidentiality of data.

Simplicity and ease of response was also a key to participation rates. The survey questions were streamlined to the maximum extent possible so that only the most critical data were included, based upon the philosophy that it is much better to have the basic data from many respondents than detailed information from a few (particularly since there is no basis for extrapolation).

Participation rates can also be boosted through the application of multiple means of contact, as well as repeated contact. Thus, extensive e-mail and telephone communications were used to contact survey respondents. Every effort was made to include new participants, as they became known to CARE.

To reduce the chances of double counting, survey respondents were asked to identify the geographic sources of their material to the extent they were known. If there is information from two or more companies that might reflect handling of the same material, the geographic sources of these companies could be reviewed to determine if that was likely.

In another attempt to reduce the chances for double counting, survey respondents were asked about the type of companies that received the material their company shipped out. This information not only allows for identification of possible double counting, but also serves to provide a more complete picture of the overall flow of post-consumer carpet through the collection and recycling process. In some cases, receiving companies are contacted to verify numbers.
With those basic principles in mind, the surveying process was implemented, using the steps outlined below, which are described in general chronological order:

1. The survey used in 2019 was updated based on respondents’ feedback from last year. The 2019 survey form is shown in Appendix 1.

2. The survey was web-based, and results were password protected and available solely to two CARE staff members to preserve confidentiality.

3. Based upon past experiences with this survey process, the survey was focused on those companies for which specific individuals have been identified as points of contact.

4. Companies with specific contacts and e-mail addresses were notified via e-mail and were provided the survey URL so that they could respond electronically. A total of about 60 different companies were sent e-mail notifications of the survey (more than one individual was contacted from an individual firm in several instances). The e-mail notification stressed the confidentiality of the information they were asked to provide.

5. Approximately two weeks after the initial e-mail was sent, follow-up activities were initiated. These included e-mails to those companies that had not responded, as well as telephone calls to prompt responses and answer questions some potential respondents had raised.

6. All survey responses were reviewed for any inconsistencies or unclear responses. The survey responses were also reviewed to determine if there were any questionable responses (e.g. data that appeared to be off by orders of magnitude with regards to company size). Where there was some question about the responses provided and the respondents had provided their names (respondents can choose to respond anonymously), follow-up was attempted to clarify the responses. In most cases these efforts were successful. In a few cases site visits were conducted for clarity.

7. Data were transferred to a spreadsheet-based database. This database contains all the quantitative responses, as well as summaries of any descriptive information provided by the companies.

8. Data to eliminate potential double counting was received and appropriate adjustments made to the data compilations where/when necessary.

9. The data were compiled and analyzed to produce the results described herein. CARE acknowledges Dr. Matthew Realff for his assistance in the logistics analysis and mass balance calculations.

10. Efforts to maintain consistency year to year are considered important to plot trends and look for patterns.

Assessment of Survey Approach and Results

As noted previously, there are three key factors that led to the conclusion that this year’s survey results are high in quality (i.e. believed to be more representative of real-world conditions):

1. Response rate was again very high, meaning that a greater proportion of the total number of companies involved in post-consumer carpet recycling responded by submitting survey results.
2. CARE had already possessed a large part of the data through the management of the Voluntary Product Stewardship and AB 2398 Programs.

3. Manufacturers who use the material within their own manufacturing process, handled a significant portion of the post-consumer carpet. This eliminated the possibility for double counting of this material.

For these reasons, double counting does not appear to be a significant issue with the data presented in the 2019 CARE Annual Report.

While CARE staff handled all VPS program and national data, Aprio, who manages reporting for the CA program, handled the analysis and summary reports of all CA data prior to integration with the national survey results.

CARE Outreach Results, 2019

17th Annual CARE Conference

In 2019, members and colleagues of CARE gathered at its 17th Annual Conference, in Houston, Texas in early May. The conference format included a one-day event. The venue provided great opportunities for business interactions, including with vendors/exhibitors. CARE also recognized the outstanding individuals and companies who made significant contributions to the CARE organization during the year. The following awards were given:

2018 Recycler of the Year - Circular Polymers

Circular Polymers was founded in 2018 by David Bender, Jeff Kupets, Nick Fiore, and Mark Babich. Operating in Lincoln, CA, Circular Polymers uses a novel process to recycle post-consumer carpet. Their process technology converts the post-consumer carpet into high quality consistent feedstock that meets customer specifications. The propriety technology used by Circular Polymers was developed by Broadview Group International, LLC. of Ohio. The process produces high yields from processing and produces a clean material, a technological breakthrough for the industry. Circular Polymers used a grant received from the CARE in 2018 to expand its operations and is now one of the fastest growing carpet recyclers in the United States.

CARE Executive Director Bob Peoples (left), Circular Polymers CEO David Bender, Circular Polymers President Nick Fiore, and CARE Chairman Joe Foye
2018 CARE Persons of the Year - Matthew Realff and Rachel Palopoli

Matthew Realff, Ph.D. has served as a long-term advisor to the CARE Board. Dr. Realff is the David Wang Senior Faculty Fellow and Professor in the School of Chemical and Biomolecular Engineering at the Georgia Institute of Technology. Dr. Realff has produced multiple peer-reviewed academic studies about the carpet recycling industry throughout his career and has worked closely with the Executive Director on special projects.

"I cannot even begin to imagine doing the work of CARE without the keen mind of Dr. Realff. We have collaborated since the beginning of his tenure at Georgia Tech. Mass balances, process technology, greenhouse gas analysis, reverse supply chain logistics, Matthew helps with it all," said Robert Peoples.

Matthew Realff (right) accepts CARE Person of the Year award from Executive Director Dr. Robert Peoples (left)

Rachel Palopoli serves as an advisor to the CARE Board, the Chair of the California Carpet Council, and manages the family carpet recycling and retail business that her father, Sal Palopoli, founded 20 years ago. Rachel has over 25 years of experience in the waste management and recycling business. Planet Recycling operates in the Phoenix and San Diego markets.

"Rachel is a smart, driven asset to this industry. Her sharp mind and high energy continually help us tackle the tough challenges that face our industry," said Dr. Robert Peoples, Executive Director of CARE.
CARE Website Traffic

The following charts provide a general overview of website activities for 2019.

Figure 17: CARE US - Based Website Visits, 2019
Website acquisition is a metric that measures how users access the content. For example, “organic search” describes a user searching for a term, maybe “carpet recycling” or something similar, and CARE’s website shows up in the browser for various search engines. 36% of all users on our website accessed the website by typing our web address, www.carpetrecovery.org. 33% accessed it via a search engine, then 29% accessed the site through a referral from another website. This would be a website that would include a link to CARE’s site for further reference.
Dear CARE Carpet Reclamation and Recycling Partner,

Thank you for taking the time to complete the 2019 Carpet America Recovery Effort (CARE) Annual Survey. Your complete answers to this survey will allow us to perform quantitative analysis on the carpet recycling stream and create a detailed Annual Report for the stakeholders of CARE.

Please report only the quantity of post-consumer carpet managed through your business. For purposes of the CARE Annual Report, we will NOT include information on post-industrial carpet. ONLY POST-CONSUMER CARPET.

The survey should take less than 20 minutes to complete. To minimize the amount of time spent on completing the survey, we recommend that you read through the survey and have your data available before completing the survey.

If you need any assistance or have questions while completing this survey, please contact Anthony Cline, CARE’s Operations Director, at acline@carpetrecovery.org or 706-428-2127.

Due to the time sensitive nature of this survey, please complete the survey by close of business on Friday, January 31, 2020.

Note - All Company information and answers to this survey will be CONFIDENTIAL, and will only be seen and used by CARE’s Executive Director and Operations Director.

All data collected will be reported in the aggregate, thus removing any references to individual companies.

Thank you

Bob Peoples

Executive Director, Carpet America Recovery Effort (CARE)

* 1. Of your total employees, how many are specifically associated with the diversion/recycling of post-consumer carpet?
* 2. Please select the type of company from the list below, based upon the descriptions provided. If your company performs more than one function, check all boxes that apply.

☐ Collector - A company that consolidates and temporarily stores recovered commercial and/or residential carpet.

☐ Sorting Facility – A facility that segregates collected carpet into the various backing types (PVC, SBR Latex, etc.) and/or fiber types (e.g., Nylon 6, Nylon 6.6, Polypropylene and Polyester).

☐ Processor - A company or facility that receives post-consumer carpeting (whether handled by a sorting facility or brought directly by a collector) and processes it for use as a feedstock in a manufacturing facility.

☐ Manufacturer - A company or facility that utilizes processed carpeting materials and transforms them into other products, or uses them as raw materials in a manufacturing process.

Included is a flow chart that represents the various stages of the carpet recycling process. This will be used throughout the survey.
Definitions

**Carpet as Alternative Fuel (CAAF):** Fuel that has been produced from source-separated carpet and processed, including (1) extraction of components if at all possible; (2) size reduction, shredding, and/or blending with coal fines, etc.

**Cement Kiln:** Cement production facility that may use CAAF as a source of energy and/or as an additives for cement production.

**Landfilling:** Landfilling includes the placement of post-consumer carpet and/or the residuals from a post-consumer carpet management method into a landfill disposal facility.

**Reuse:** Refurbishing and donating/selling recovered carpet back into the market for its original intended use. The reuse of recovered carpet retains the original purpose and performance characteristics of the carpet.

**Waste-to-Energy:** Process of recovering thermal energy from MSW through combustion.

**PC4 (Post-Consumer Calcium Carbonate):** The residual, non-fiber content that is collected by a processor when a carpet is separated.

**Example:** A recycling business person collects 1 million lbs of carpet. The recycler sorts and shears this material and sends it to a processor. Along the way, some of the post-consumer carpet is reused, and some is not able to be recycled, for various reasons, and is either sent to a CAAF or a cement kiln facility, waste-to-energy, or the landfill. The recycler tracks the amount of material as it progresses through the process. For this example, the recycler would answer the next questions as follows:
3. Please use the Processor Flow Chart to answer this question.
*Do not use commas

**Example:**

<table>
<thead>
<tr>
<th></th>
<th>Pounds received from sorter</th>
<th>Pounds of Starting Inventory</th>
<th>Pounds to Landfill</th>
<th>Pounds to International</th>
<th>Pounds of Ending Inventory</th>
<th>Pounds Reused</th>
<th>Pounds to CAAF</th>
<th>Pounds of Processed Fiber</th>
<th>Pounds of Filler</th>
<th>Pounds to Cement Kiln</th>
<th>Pounds to WTE</th>
<th>Pounds of PC4 Output</th>
</tr>
</thead>
</table>

4. How are you handling the PET carpet you receive (outlets or landfill)?

5. How are you handling the Nylon 6 carpet you receive (outlets or landfill)?
6. Please use the Manufacturer Flow Chart for this question.  
* Do not use commas

Example:

a. - Lbs. received from processor  
b. - Lbs. of starting inventory material

c. Pounds to Landfill  
d. Pounds to International  
e. Pounds of Ending Inventory  
f. Pounds Reused  
g. Pounds to CAAF  
h. Pounds Sent to Other Manufacturer  
i. Pounds Used by Your Product  
j. Pounds to Cement Kilns  
k. Pounds to WTE
If you are a manufacturer:

a. _______ Lbs your products

b. _______ Lbs Engineered Resin

c. _______ Lbs Molded/Extruded

d. _______ Lbs Carpet Fiber

e. _______ Lbs Carpet Backing

f. _______ Lbs Carpet Cushion

g. _______ Lbs of ____________

h. _______ Lbs PC4
7. This question is inquiring about the products that are manufactured using post-consumer carpet. The first blank, "a", asks for the total lbs. of material that are included in manufactured products. The entries on the right-hand side are requesting the specific numbers on the type of product was manufactured with the material.

*Do not use commas

<table>
<thead>
<tr>
<th>a. Pounds of Material Used Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Pounds to Engineered Resin</td>
</tr>
<tr>
<td>c. Pounds Molded/Extruded</td>
</tr>
<tr>
<td>d. Pounds for Carpet Fiber</td>
</tr>
<tr>
<td>e. Pounds for Carpet Backing</td>
</tr>
<tr>
<td>f. Pounds for Carpet Cushion</td>
</tr>
<tr>
<td>g. Miscellaneous</td>
</tr>
<tr>
<td>h. Pounds for PC4</td>
</tr>
</tbody>
</table>
8. To the extent known, identify what percent of the material received came from each geographic area:

Note - Totals must equal 100%

a. California
b. Northwest
c. Midwest
d. Northeast
e. Southeast
f. Southwest

9. Overall, is CARE meeting your and your business’s needs?

☐ Yes
☐ No
10. If you answered no to the previous question, please specify where CARE can provide more support for your business.

11. I affirm that the answers provided in this survey are accurate and complete to the best of my knowledge.

Print Name:

* 12. Company and Contact Information

<table>
<thead>
<tr>
<th>Field</th>
<th>Input Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>Company</td>
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<tr>
<td>Address</td>
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</tr>
<tr>
<td>Address 2</td>
<td></td>
</tr>
<tr>
<td>City/Town</td>
<td></td>
</tr>
<tr>
<td>State</td>
<td>-- select state --</td>
</tr>
<tr>
<td>ZIP</td>
<td></td>
</tr>
<tr>
<td>Country</td>
<td></td>
</tr>
<tr>
<td>Email Address</td>
<td></td>
</tr>
<tr>
<td>Phone Number</td>
<td></td>
</tr>
</tbody>
</table>
Dear CARE Carpet Reclamation and Recycling Partner,

Thank you for taking the time to complete the 2019 Carpet America Recovery Effort (CARE) Annual Survey. Your complete answers to this survey will allow us to perform quantitative analysis on the carpet recycling stream and create a detailed Annual Report for the stakeholders of CARE.

Please report only the quantity of post-consumer carpet managed through your business. For purposes of the CARE Annual Report, we will NOT include information on post-industrial carpet, ONLY POST-CONSUMER CARPET.

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Note - All Company information and answers to this survey will be CONFIDENTIAL, and will only be seen and used by CARE’s Executive Director and Operations Director.

All data collected will be reported in the aggregate, thus removing any references to individual companies.

Thank you

Bob Peoples

Executive Director, Carpet America Recovery Effort (CARE)

* 1. For every square yard of Nylon carpet you collect in the waste stream, how many square yards of PET carpet do you see?

   

* 2. For every square yard of Nylon 6,6 carpet you collect in the waste stream, how much Nylon 6 carpet do you see?

   

3. Please indicate (in percentages) all regions that your sorted output (material for processing or WTE) was shipped to.

**Note - Totals must equal 100%**
- California
- Northwest
- Midwest
- Northeast
- Southeast
- Southwest
- International

4. Overall, is CARE meeting your and your business’s needs?
   - [ ] Yes
   - [ ] No

5. If you answered no to the previous question, please specify where CARE can provide more support for your business.

6. What was your ending inventory as of December 31, 2019?

7. Which fiber analyzer device are you currently using in your facility?

8. I affirm that the answers provided in this survey are accurate and complete to the best of my knowledge.
9. What are the biggest challenges that you anticipate facing in 2020 and beyond?

10. Are you seeing back-stamped (fiber labeled) carpet enter your facility?

11. Contact Info
   - Name
   - Company
   - Address
   - Address 2
   - City/Town
   - State/Province
   - ZIP/Postal Code
   - Country
   - Email Address
   - Phone Number
Appendix 2
Definitions Used in the CARE 2019 Annual Report

Carpet: A manufactured article that is used in commercial or residential flooring applications as a decorative or functional feature and that is primarily constructed of a top visible surface of synthetic or natural face fibers or yarns or tufts attached to a backing system derived from synthetic or natural materials. “Carpet” includes, but is not limited to, a commercial or a residential broadloom carpet or carpet tiles. “Carpet” does not include a rug, pad, cushion, or underlayment used in conjunction with, or separately from, a carpet.

Carpet as Alternative Fuel (CAAF): Fuel that has been produced from source-separated, and sorted post-consumer carpet and processed, including (1) extraction of component for recycling if at all possible; and (2) size reduction, shredding, and/or blending with coal fines, etc.

Carpet America Recovery Effort (CARE): A nationwide, 501(c) (3) non-profit organization whose focus is on post-consumer carpet stewardship.

Carpet Industry: The universe of participants involved in the production of carpet, including carpet manufacturers, fiber manufacturers, material suppliers, etc. It includes but is not limited to members of the Carpet and Rug Institute (CRI).

Cement Kiln: Cement production facility that may use CAAF as a source of energy and/or as an additive for cement production.

Collection: Any method of consolidating and temporarily storing recovered commercial and/or residential carpet.

Disposal Diversion: Carpet removed from the waste stream that was destined for the landfill or incineration, for the purpose of reuse, recycling, CAAF or waste-to-energy (WtE).

Disposal Facility: Facilities that are licensed and permitted to provide final disposal for the specific wastes they accept, including waste-to-energy, incineration, and landfilling.

Entrepreneur: Individual or privately held company who is not a carpet manufacturer, and who actively, collects, sorts, processes or manufactures products made from post-consumer carpet.

Filler: Materials such as calcium carbonate, etc. used in the production of carpet backing.

Higher Value Recycling Material: Output of the materials with the most benefits to manufacturers of finished products. Examples of higher value recycling materials include post-consumer carpet fiber, post-consumer carpet backing, engineered resins and material for carpet cushion.

Incineration: Complete burning of material to ashes, with no energy recovery, to reduce waste volume.

Input: The post-consumer carpet that is collected, sorted and readied for processing.

Landfilling: Landfilling includes the placement of post-consumer carpet and/or the residuals from a post-consumer carpet management method into a landfill disposal facility.
**Lower Value Recycling Material:** Output of the materials with benefit to manufacturers of finished products, but a lower value than higher value recycling materials. Examples of lower value recycling materials include carpet filler and non-functional filler.

**Memorandum of Understanding (MOU) for Carpet Stewardship:** An agreement entered into by multi-stakeholders, including carpet industry, entrepreneurs, government entities and non-governmental organizations.

**Output:** The material that results from the processing (shredding, shearing, hammer milling) of post-consumer carpet from the processor. Examples of output include fiber, shredded carpet tile, depolymerized chemical components, and carpet filler.

**Recycled Content:** Also known as recovered material content, the percentage of material, by weight, a product is made from that has been recovered from consumers in the municipal solid waste stream (post-consumer content) plus any industrial materials salvaged for reuse (pre-consumer/post-industrial content).

**PC4:** post-consumer calcium carbonate extracted from carpet backing

**Post-Consumer Recycled Carpet Content:** The amount or percent of carpet, by weight, that is no longer used for or has served its manufactured purpose, that is incorporated into the manufacturing process of the same or a different product.

**Post-Industrial/Pre-Consumer Recycled Carpet Content:** The amount or percent of carpet material, by weight, generated by manufacturers or product converters, such as trimming, overruns, and products returned to the mills, that are incorporated back into the manufacturing process of the same or a different product.

**Post-Consumer Carpet Materials:** Carpet that has completed its life cycle as a consumer item or is no longer used for its manufactured purpose.

**Post-Industrial/Pre-Consumer Carpet Material:** Carpet materials generated in manufacturing and conversion processes, including, but not limited to manufacturing scrap and trimmings/cuttings.

**Processing:** Preparing carpet material for reuse, recycling, CAAF, WTE, or disposal.

**Recycling:** Transforming or remanufacturing discarded carpet materials into usable or marketable materials, rather than for landfill disposal, incineration, WTE, CAAF, or reuse.

**Reuse:** Refurbishing and donating/selling recovered carpet back into the market for its original intended use. The reuse of recovered carpet retains the original purpose and performance characteristics of the carpet.

**Rug:** A loose laid (not installed or attached at wall base soft floor covering manufactured from natural or synthetic fiber, including carpet cut into room or area dimensions that is not intended to cover the entire floor.
Sorting: The method used for segregating collected carpet into the various backing types (PVC, SBR Latex, etc.) and/or fiber types (e.g., Nylon 6, Nylon 6.6, Polypropylene and Polyester)

Source Reduction: The result of using less product or material in manufacturing and use of carpet, and/or reducing the amount of discarded carpet generated.

Source Separation: The process by which carpet is separated/segregated from all other materials at the end of its useful life (or when discarded).


Appendix 3

CARE Board of Directors, 2019

Ranae Anderson - Universal Fibers
Russell Bennett - Tarkett
Eric Boender - Starnet Flooring
Chad Chaffin - Southeastern Recycling
Dennis Daniel - Dixie Group
Anna Delage - South Carolina Department of Commerce
Russ Delozier - Engineered Floors
Joe Foye - Mohawk Industries
Ron Greitzer - Los Angeles Fiber
Philip Ivey - Milliken
Eric Nelson - Interface
Robert Peoples - CARE
Sean Ragiel - CarpetCycle
Louis Renbaum - Wellman Plastics
Wyatt Rollins - Shaw Industries
Jim Lindsey - Aquafil USA
Kasey Wakefield - Kruse Recycling
Joe Yarbrough - Carpet and Rug Institute

CARE Board Advisors

Frank Endrenyi - Sustainable Solutions
Dennis Hayford - Consultant
Glenn Odom - Consultant
Rachel Palopoli - Planet Recycling
Dr. Matthew Realff - Georgia Institute of Technology

About CARE

Established in 2002, CARE is a 501 (C) 3 non-profit organization. Carpet America Recovery Effort (CARE) is a joint industry-government effort to increase the amount of recycling and reuse of post-consumer carpet and reduce the amount of waste carpet going to landfills. www.carpetrecovery.org