

# **Working Together to Increase Carpet Recycling in Washington**

## **Findings from Interviews**

### **September 2014**

#### **INTRODUCTION**

Seattle Public Utilities and King County LinkUp, along with partner Zero Waste Washington, are collaborating with diverse stakeholders to significantly increase carpet recycling throughout Washington. During late 2013 and 2014, we conducted several outreach efforts to broaden knowledge and contacts.

Following up on a widely-attended webinar and an on-line survey of interested parties mainly in Washington, we conducted 17 interviews (December 2013 - April 2014) to obtain greater depth of discussion about what is needed. Interviewees – sometimes two or three people from a company – were selected from various stakeholder types, both those already engaged with carpet recycling and some who are not. We especially sought several stakeholder types we had not previously spoken with in depth. Stakeholder types included:

- property management and architecture-and-design firms;
- flooring sellers and installers;
- recycling transporters;
- carpet sorters/consolidators and processors;
- carpet manufacturers;
- end-users of locally recovered materials;
- trade associations; and
- local governments outside of Puget Sound.

Names are omitted in this report.

The following questions, which are similar to questions used in our on-line survey, guided the interviews:

1. What is your company's involvement in recycling carpet? How much of the carpet you remove is recycled?
2. Is carpet recycling important to you or to your business? Why?
3. What needs to be changed or improved for you and others to recycle more carpet?
4. What do you think an effective system for carpet recycling should look like? How would it look different from what we have now?
5. What needs to be changed for carpet recycling to be more widespread throughout the state?
6. What specific things would need to change in order to increase carpet recycling?
7. What do you think should happen next to build a coalition of stakeholders to increase carpet recycling in Washington?

The insights of our interviewees provided much information to contribute to understanding what system/approaches could work best around the state. We sincerely appreciate their generosity, time and expertise.

#### **KEY OBSERVATIONS**

Although important strides have been taken to advance carpet recycling in Washington, the system to recycle discarded carpet is facing significant challenges. There is not enough market demand for the fiber and non-fiber materials in carpet, with the exception of nylon. Processing technology is inadequate and the yield is low, with shearing only capturing about 20 percent of the carpet. Carpet is durable and hard to take apart, and not designed to be recycled or repurposed. Many interviewees, including collectors, sorters, and processors, described the financial challenges of making recycling work. At the nexus of these issues is carpet made with PET, which is not currently recyclable. This is creating a financial crisis for processors who not only can't recycle the PET but who are then left paying for handling and disposal. There are also collection challenges such as lack of

convenient drop-off locations and contamination issues. Even if a convenient statewide collection infrastructure were established, carpet recycling will not be viable in the long-term without consistent market demand.

## **SUMMARY OF FINDINGS**

The rest of this document summarizes the current carpet landscape as described by interviewees. To honor the breadth and diversity of thoughts they offered, we include all the solutions they raised for increasing carpet recycling in Washington.

### ***Reasons to recycle carpet***

Interviewees care about carpet recycling for a range of reasons, including sustainability (commitment to recycling and being a good steward; keeping carpet out of landfills; desire to derive raw materials from recycled sources; taking responsibility for their carpet), customer service (if it's important to customers, it's important to the company), and marketing benefits (appealing to customers seeking LEED or other green building certification). For some, it also makes economic sense in locations where recycling costs less than landfilling or incineration. However, some local governments do not prioritize carpet recycling because carpet is not considered toxic, brings in revenue, and is not a problem at their transfer stations, landfills or incinerators.

### ***Customer demand for recycling***

Interviewees said that their residential and commercial customers who use carpet rarely request carpet recycling, but often respond positively when it's offered, especially as it may cost less. Demand for carpet recycling is stronger when customers are seeking LEED certification. The two processors in the Puget Sound region are receiving as much carpet as they can currently handle and are not currently taking new customers despite regular requests from potential customers.

### ***Collection system***

Carpet recycling tip fees are lower than disposal tip fees and therefore offset other recycling costs (travel to the drop site, separating materials, separate loading, cleanup around collection containers, etc.). [Note: in some parts of the state, disposal tip fees may be similar or lower to carpet recycling tip fees at consolidators or processors.] However the cost difference isn't typically enough to make recycling consistently viable, especially when the potential loss of revenue from time spent recycling rather than working on another job is factored in. The small number of processors in Washington often means long haul distances, especially from locations in central and eastern Washington, and higher cost. Interviewees said there are not enough "one stop" drop-off locations for garbage and recycling to make it easy, quick and inexpensive to recycle carpet. In areas with small populations, there's not enough carpet to fill a dedicated trailer quickly enough. One interviewee noted that recycling carpet is more expensive in Washington than elsewhere in the country. A few interviewees commented that processors don't take all types of carpet, and installers don't have the knowledge or ability to identify and sort carpet by type. Finally, they said contractors and the public don't know that carpet recycling is available. Despite these issues, one interviewee thought the collection infrastructure will be readily adaptable once processing and recycling is available.

The following potential solutions were offered by interviewees:

- Increase the number and convenience of carpet drop-off locations to make the system financially viable for those who remove carpet, including contractors, demolition firms, installers, handypersons, and homeowners. Utilize carpet shops (centralized hubs where installers purchase and take back carpet), transfer stations, and construction and demolition (C&D) sorters.
- Create collection "milk runs" for installers to leave carpet on the curb for pick up and transport to a processor.
- Provide containers for carpet recycling at transfer stations to provide a "one stop" option for bringing multiple materials to the same location. This could be especially useful in parts of the state where other

drop-off locations might not be available, as well as for smaller contractors not working with dealers who provide drop-off.

- Receiving facilities (transfer stations, processors, etc.) need to monitor for asbestos and build in funds to cover unseen asbestos.
- More processing locations are needed throughout the state, perhaps co-located near transfer stations. (There are currently only two processors in Washington, both in the Puget Sound area.)
- Bring together carpet collectors, truckers, consolidators, and processors to take advantage of backhaul and other opportunities for logistics efficiencies.
- To facilitate sorting, the backs of carpet should be stamped by resin type. (Recognize that carpet currently in use will not be stamped and that stamping won't be visible on double-stuck carpet [carpet glued to the pad, which is glued to subfloor] or where glue obscures it.)
- Provide public recognition of carpet installers, dealers, and other companies fully engaged in recycling carpet.
- Educate the public, contractors and installers that carpet recycling is available, about specific programs, and what resources are available. Educate facility managers about "asset farming" in their projects (value of various removed materials). Educate about how to get recycled materials to markets. Specific ideas included brochures at places installers show up every morning; a tent in certain locations one day during the week; and TV commercials by solid waste agencies. One interviewee recommended trying education before regulations or laws.

### ***Reuse***

Although the interview questions did not specifically ask about reuse, one interviewee identified it as an important part of the solution. Carpet tile can be salvaged and reused. However, it's more difficult to find a reuse option for "rolled goods." Clients demanding LEED certification pay attention to reuse. Architectural salvage stores in the Seattle area want more carpet tile for reuse and Planet Reuse maintains an on-line database listing of available products by location.

The following potential solution was offered by an interviewee:

- Direct more carpet for reuse to salvage stores and reuse databases.

### ***New carpet scrap***

A significant amount of new carpet is wasted during installation (5-7 percent of the job) and when carpet samples at retail locations are disposed.

The following potential solution was offered by interviewees:

- Capture for recycling new carpet scrap from installation jobs and carpet samples from various sources (designers as well as sellers).

### ***Contamination***

Contamination interferes with recyclability. Processors who find asbestos rolled up in carpet will either turn away the load or bill customers to handle it. Some interviewees questioned whose responsibility it would be if a drop-off location finds asbestos in their carpet container. Carpet can also be contaminated with other flooring materials, such as glue, tack strips, razor blades, etc. It's challenging for collectors and sorters to determine if carpet is contaminated because it typically arrives rolled up. Finally, some interviewees said they must keep

carpet dry. Not all collectors, sorters and processors have adequate indoor storage space and many containers let in water.

The following potential solutions were offered by interviewees:

- Provide staffing at drop-off locations to monitor and screen out asbestos and other non-accepted materials.
- Perform good removal practices. In addition to asbestos concerns, don't use carpet as a drop cloth, avoid water in collection containers, etc. Educate contractors and installers about contamination issues and best practices. (See *Carpet Removal Best Practices for Carpet Recycling Field Guide*.)
- Use/develop containers that keep carpet dry. Retrofit or adapt moving or shipping containers.
- Keep carpet under cover to prevent it from getting wet.
- Require customers to guarantee to the C&D sorter that the carpets are presorted or prescreened for contamination and meet certain standards. Require customers to label carpet rolls and sign a form stating that they are responsible for any additional fees associated with contamination.
- Focus on carpet from commercial and new construction past a certain date because it is more likely to be clean of asbestos.
- During demolition or remodeling, work upfront with an abatement hazmat consultant to determine a process for salvaging/recycling carpet and ensuring it's not contaminated.

### ***Consolidation and processing***

Carpet consolidation and sorting is financially challenging because it costs money every time carpet is handled. Processing is also time consuming and expensive. Handling is labor-intensive (loading and unloading bulky carpet; identifying and separating by fiber type) and requires capital expenditures for equipment and trailers. Processing yield is low. Shearing leaves nylon in the carcass and only captures about 20 percent of the carpet. Processors don't want commercial carpet for recycling because the short pile means very little fiber is recovered from shearing. However, some manufacturers take back their carpet tile for recycling into new backing. Calcium carbonate is abrasive and hard on machinery, and difficult to separate from the carpet.

PET is a serious problem for processors. There is not enough value in PET from carpet to cover the processing costs. The value of PET is lower than the cost of shearing. Processors accept carpet made from all resins because there is no economical way to pre-identify the resin. When the face fiber is PET, it has a negative value because it must be disposed. One interviewee called PET a disaster, with processors at a crisis point. There's concern that processors will collapse if something does not change.

Processing technologies need to be improved to increase recycling yield and financial viability. Work is being done in this area, but the necessary breakthrough hasn't happened yet. There's more demand for processing than local capacity.

The following potential solutions were offered by interviewees:

- Design products to be recyclable.
- Increase demand for materials from discarded carpet. That will increase income to processors, allowing them to buy more equipment, collect more carpet, and perhaps pay consolidators for the carpet they deliver.

- Some carpet manufacturers are investing in technologies and research to overcome the difficulties with PET by providing funding to support the Carpet America Recovery Effort (CARE) in searching for viable outlets for PET. One interviewee suggested that PET would not be an ongoing problem, believing carpet manufacturing is dynamic and companies can be quick to adapt.
- Lower the costs of processing so that PET is more viable in the current market.
- Educate the architectural community about the PET issue. Possible avenues include American Institute of Architects (AIA), Construction Specification Institute (CSI), and LEEDUser.com.
- See other solutions related to PET under “*End use and market demand*,” “*Design*,” and “*Financial*.”
- Continue technology development. Look to replicate successful models. Involve universities in research, similar to what’s done with sustainable energy.
- Design recycling facilities/processes to mirror manufacturing. Don’t expect less technology to take apart these complex products than to make them.
- Independently certify facilities’ proper handling of carpet and use as customer assurance/marketing incentive.

### ***End use and market demand***

Market demand is key to making recycling work, but there is not enough demand for the materials contained in discarded carpet. Interviewees pointed out that it’s difficult for recycled plastics from carpet to compete economically with virgin plastics made from easily available petrochemicals. Without consistent market demand, programs won’t be viable long-term. It’s risky to start collecting a product and then have to stop, because customers will be less likely to start again.

Demand differs for different fiber resins. Interviewees reported that there are good markets for both nylon 6 and nylon 6,6. For example, nylon 6,6 can be ground up and used in carpet tile backing. One interviewee reported strong demand for recycled-content nylon. On the other hand, demand for PET from carpet is poor, and a processor said PET fiber is about 25-30 percent of the carpet he receives and it’s going up all the time.

PET from plastic bottles is an inexpensive feedstock for making virgin carpet fiber and some carpet companies have invested hundreds of millions of dollars to produce large quantities of PET carpet. Some consumers and apartment property managers want this more affordable option. One interviewee commented that carpet is an excellent application for PET plastic bottles and there’s great benefit to using it. There’s a very limited market for PET from carpet because it cannot compete with PET from plastic bottles, which is abundant, easily flaked for recycling, and basically free, while PET carpet processing remains costly and the PET loses viscosity. PET is also a serious problem for processors, as described in the previous section.

Alternative markets for calcium carbonate and other non-fiber materials are also needed. The carcass and calcium carbonate filler are currently disposal costs.

The following potential solutions were offered by interviewees:

- Create recycling system where post-consumer material from carpet is used in new carpet.
- Carpet manufacturers should play a main role in finding end uses for materials from discarded carpet in their new flooring products, thus increasing demand. If carpet mills build the demand, others will turn on the faucet to build the system and create the supply.

- Talk to manufacturers before taking a regulatory approach to determine why materials from old carpets don't have a recycling use in their process.
- Address PET. See related solutions under “*Consolidation and processing*,” “*Design*,” and “*Financial*.”)
- Develop local manufacturing and markets. Attract a plastic recycling facility to locate in the Northwest. Types of products mentioned as possible end uses were PET pad, fiber grade products, and oil containment and absorption products.
- Consider using carpet as fuel, as feedstock for plastic-to-oil, or in waste-to-energy incineration. However, one interviewee referenced a report indicating waste-to-energy as a least attractive option for carpet.
- Increase demand by tightening purchasing specifications for carpet to require recycled content from discarded carpet. Currently, buying green means buying carpet with recycled content from PET plastic bottles.
- Incentivize the purchase of nylon rather than PET. The city or county could incentivize property management companies, including the Housing Authority, to use nylon rather than PET. Government incentives would offset the purchase price of nylon.
- Explore alternative markets for calcium carbonate. One interviewee said there is a market if the particle size is right and the purity is high. Possible markets to explore include use as a soil amendment, as grit for non-slip flooring surfaces, and in cement and roads.

### ***Design***

Carpet is designed to be very durable and is difficult to take apart. It is not designed to be recycled or repurposed. The properties of the resins used for face fiber and backing can have a critical impact on whether the carpet is recyclable. As described above, PET is not readily recyclable and causes significant problems for recyclers and processors. Another challenge is commercial carpet that is typically glued down or “double-stuck,” making it difficult to separate the glued-together pad and carpet.

A number of the recycling challenges mentioned in other sections of this report also relate to design. For example, 1) multiple types of resins in carpet make it uneconomical for installers to identify and sort recyclable from non-recyclable carpet; 2) some commercial carpet is not considered recyclable; and 3) calcium carbonate filler is abrasive on machinery and difficult to separate from the other materials in carpet.

The following potential solutions were offered by interviewees:

- Engage carpet manufacturers in providing information about how their products are sustainably recycled. Create a definition for “sustainably recycled” and create a list of the viable carpet recycling processes.
- Ask carpet manufacturers to pay attention to design-for-recycling and create recyclable products. Carpet needs to be constructed with some reasonable expectation of being recycled. Manufacturers should communicate with processors during the evolution of carpet design to ensure that the recyclers are capable of handling it. Manufacturers should also work with the supply chain to influence design. For example, some brand owners of other products use an environmental scorecard with their suppliers.
- Encourage or require manufacturers to use one or a limited number of resins that can be recycled.
- Make face fiber and backing using only one polymer that can be recycled over and over again.

- Manufacturers should stick to the historic standard construction of polymer on the face tufted into a primary backing, with latex and calcium carbonate on the back with a secondary backing. Some different construction types are appearing that will be difficult to figure out how to disassemble.
- Don't introduce a product into the economy unless it is recyclable. In some European countries, you cannot sell a product unless it's recyclable in practical terms. PET carpets would not be allowed because they are not recyclable.

### ***Financial***

Many interviewees, including collectors, sorters, and processors, described financial challenges. Although the following suggestions are grouped based on where the financial mechanism is applied, many of the suggestions would help support the entire recycling system from collection through processing and end markets.

The following potential solutions were offered by interviewees:

- One interviewee said that it's much more expensive to recycle carpet in Seattle than anywhere else in the country. Research this issue and determine why that is the case.

#### *Financial solutions related to consumers (point of purchase):*

- Provide tax incentives to consumers who recycle carpet.
- Tax non-recyclable carpet, such as carpet made of PET.

#### *Financial solutions related to collectors (point of collection):*

- Provide an incentive to contractors who recycle, such as a B&O tax credit or deduction on monthly sales tax based on amount of carpet recycled. Make sure the incentive is structured so it won't create an unfair market advantage for larger contractors and drive smaller ones including minority contractors out of business.
- Provide incentives or grants to people who start businesses to collect carpet.
- Have collectors pay for transportation and recycling and pass that cost to their customers. This must be across the board to create a level playing field among competitors so that retailers who are recycling won't be at a competitive disadvantage to those who are not recycling.

#### *Financial solutions related to consolidators and processors:*

- Provide grants to processors to purchase equipment or develop technology/equipment that can better handle carpet and better separate materials.
- Increase landfill tip fees to discourage disposal and thereby increase recycling. Entrepreneurs would see this as an opportunity to make money and would find alternate homes for carpet.
- Require carpet to be sent to a material recovery facility (MRF) and provide a tip fee incentive to the MRFs for carpet that is recycled. For example, in the Metro area of Oregon, all "dry waste" including C&D must be sent to a MRF before it is landfilled. For each ton that the MRF diverts to recovery, they keep \$30 of the tip fee as an incentive.

#### *Financial solutions related to producers:*

- Producer responsibility will move the market to make more sustainably recycled products. If recycling costs more than landfilling, you're going to have to go down the product stewardship road. Companies need to make sure they'll be in business in 50 to 70 years; in the future, companies will take back what they make.

- Perhaps carpet manufacturers should be incentivized or required to put manufacturing facilities in the four corners of the country. If manufacturers saw an advantage to recycling carpet, they would build infrastructure to create the market and the demand.
- Manufacturers made the carpet and should take care of it when it's old and worn out. The ideal system would be manufacturer responsibility where the price of the carpet might go up a few pennies to cover the recycling cost. It should not be a point of sale fee, but instead be included in the cost.
- The ideal would be a national program, with carpet manufacturers stepping forward to work with others on a standardized system that's paid by manufacturers, free of charge to consumers, and the same in all states.
- Recycling costs would be in the price of the carpet or there would be a charge when carpet is bought. Give people some money back as an incentive when they recycle the carpet (like car batteries or tires) with the rest paying for recycling.
- A subsidy is needed to keep carpet processors in business. Manufacturers will keep making carpet out of PET, and processors need either a subsidy or better markets. Manufacturers should pay processors to handle, transport, and dispose of it.
- If carpet is sustainably recyclable, there's no need to tax or legislate it although there might need to be a small charge to cover some costs. If it's not recyclable or very expensive to recycle, the amount will need to be higher.
- Washington could use the same law language as California.
- Take-back should be voluntary and incentivized for retail stores.
- One interviewee said that carpet companies are opposed to programs where the producers pay. The solution must be cost effective and must make sense to customers and manufacturers. Manufacturers are not the only part of the solution.
- Some interviewees expressed additional concern about aspects of product stewardship:
  - Adding the cost of recycling to the price will ultimately make carpet more expensive for the consumer.
  - The bill proposed in Washington put responsibility on manufacturers without any funding from the state and didn't provide direction about the program.
  - Manufacturers are concerned that people will de-select carpet as a floor covering if carpet prices go up due to producer responsibility. However, there were widely differing opinions about how much costs would increase and whether it would impact customer choice. Some thought the increase would be small and noted there's no evidence consumers are de-selecting carpet in California. Others thought prices could go up 15-20 percent to homeowners for expensive infrastructure changes.

***Solutions to motivate carpet users/owners to choose to recycle***

- Ban carpet from landfills to divert it to recycling. While a number of interviewees discussed bans, many were concerned that bans are premature without adequate processing infrastructure and end markets in place. A ban might also drive carpet out of the county where it was generated. Education should be tried first. On the other hand, policy can force innovation and a landfill ban could be needed to make carpet recycling work. It should be across the board to create a level playing field.
- Require proof of recycling to get a building permit or a demo permit. Include documentation of where the materials go, a clean air report, and an asbestos-free report.
- Create and use purchasing specifications requiring discarded carpet to be recycled. Architects should specify that carpet be recycled and include that requirement in the contract with the demolition contractor or the installation subcontractor.
- Encourage LEED certification, which has been a strong driver for reusing and recycling carpet. Quantifying waste diversion and cost savings through the rigorous LEED structure helps clients make the case to their stakeholders for spending time and money to reuse and recycle. LEED Version 4 aims to



move away from combustion and “alternative daily cover” at landfills to a truer recycling scenario where the end use is product-to-product and more salvage/reuse.

- As construction projects are planned and designed, involve the contractor upfront so that sustainability will be built into the design process rather than being an afterthought.

### **FURTHER INFORMATION**

For additional information visit the *carpet pages* at [www.kingcounty.gov/linkup](http://www.kingcounty.gov/linkup). To be added to our contact list to receive updates by email, please contact one of the following:

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