Responses to Additional Questions
February 18, 2015 National Recycling Coalition: Sustainable Materials Management Webinar
David Allaway, Oregon Department of Environmental Quality

Q1. Isn't the key to weighing choices making the info and data available so the CONSUMERS can make informed choices?

Not necessarily. While consumers are the ultimate drivers of economic activity (and associated impacts of materials), when it comes to making information and data available, it may be equally if not more important to work with producers. Whether a demand-pull or supply-push strategy is more important depends on the material in question. But generally speaking, the number of producers is far smaller than the number of consumers and so engagement with producers may be easier and more cost-effective. In addition, simply providing information to consumers has limited effectiveness. A very short paper on DEQ's website summarizes some of the limitations of the "rational choice model" of consumer behavior and the confounding barriers that work against sustainable consumption; see Literature Review: Key Challenges in Sustainable Consumption.

Q2. When considering how people consider what they use you do not include the levels of packaging utilized in the product delivery system. Is that not a critical aspect of product consideration in your system?

The example I provided (primary packaging of coffee) did not include the impacts of transport packaging. However, as the flexible packaging is delivered to the coffee plant in compact rolls, which are then formed into pouches at the point of filling, it is likely that the inclusion of transport packaging would simply reinforce the general conclusion of this study: less is best. In any event, the inclusion of transport packaging is not necessary a "critical aspect"; many life cycle analyses of product/packaging systems conclude that 80% or more (in some cases, easily 95%) of the environmental impacts are associated with the product, not the packaging.

Q3. Regarding an example of waste in nature. What could you call the La Brea tar pits in California Nothing is recycled or reuse by nature. Is the content then not waste?

This is a clever rhetorical foil but it raises an important point. The aphorism "there is no waste in nature" is inspiring to many people but not actually true. For example, photosynthetic efficiency (the percentage of light energy that is converted to chemical energy by plants) is typically in the range of only 0.1 to 2 percent. A different example involves coal, which represents a recycling of sorts of carbon molecules from dead plants. "Nature" (acting through geologic forces) has "recycled" the carbon into coal, but that doesn't mean that digging up this coal and burning it (and thereby allowing the carbon molecules to "recycle" back into more plants via photosynthesis, with of course some of the carbon remaining in the atmosphere and heating the planet) is necessarily a good thing. Fundamentally, the Second Law of Thermodynamics guarantees that any physical process (including biological ones) will result in waste.

Q4. Fascinating, thank you! Can you talk more about how reuse, along with waste prevention, don't necessarily belong on the hierarchy, and how promoting recycling gets in the way of these?

Prevention and reuse are generally preferable to recycling; in most cases, they conserve more resources and reduce more pollution. (Although there are of course instances in which prevention and reuse are not preferable.) But are they really about "managing solid wastes"? The environmental benefit of reuse is about displacing the producing of new products, not avoiding landfilling, and as such the element of reuse that is most important is in *using reused materials* (demand-side action). The (supply-side) act of diverting unwanted but reusable materials to a reuse operation is an essential part of the cycle of reuse, but not the critical piece. More clearly, waste prevention has almost nothing to do with "managing waste" as the behaviors and actions involved occur in very different realms – the realms of purchasing and using materials.

In my experience, and this is also supported in some the literature from Europe, many "waste prevention" initiatives are limited in their effectiveness because they are framed in the context of "waste". For example, one business I worked with expressed confusion when I tried to encourage them to reduce their use of packaging materials; their response was "but wait, our packaging materials are all recyclable, consumers can recycle them and keep them out of the landfill, isn't that what you wanted? Why do we need to do this 'waste prevention' thing?" In my experience working directly on prevention, this is a fairly common response.

Put differently: if one studies and quantifies the environmental impacts of materials, it is clear that the impacts of production (including resource extraction) are typically far greater than the impacts of disposal. In other words, the problem of production (and its corollary, consumption) is larger than the problem of waste. When the public understands the problem through the narrow lens of "waste", then the upper tiers of the hierarchy don't matter. Why bother with prevention, when we're already recycling? For that matter, if the goal is just to keep stuff out of landfills, why sort recyclables when we could burn all the garbage and generate energy?

Recycling is valuable; we need more and better recycling. How, then, to promote it? If you want to promote environmental benefits, talk about how recycling conserves resources and reduces pollution when recycled wastes are used to make new products. This is where the primary benefits are (these upstream benefits are typically far larger than avoided landfill impacts). It also avoids the whole "waste" and "landfills" frame, which creates barriers to moving further up the hierarchy.

Q5. Industry has light weighted aluminum cans and plastic bottles, how do we get the cardboard box light weighted? Is it the plastic bag?

Actually, the paper industry has already realized some reductions in the weight of corrugated boxes. There are many examples of how corrugated box manufacturers have redesigned boxes to use less material. For example, the use of the newer edge crush test (in lieu of the older bursting strength test) for specifying boxes has allowed for significant reductions in corrugated use; see "Choosing

between ECT and bursting strength at http://www.deq.state.or.us/lq/sw/packaging/bestpractices.htm for more details on this point. The same website provides several other best practices for source reduction of cardboard boxes. Several examples are described here: http://www.deq.state.or.us/lq/sw/packaging/casestudies.htm.

There are also instances in which a cardboard box can be replaced with some other material, such as paper or polyethylene shipping bags for shipping non-breakable items. See the e-commerce packaging LCA at http://www.deq.state.or.us/lq/sw/packaging/resources.htm for more details.

Q6. Can the flexible Folgers pouch be put in a waste to energy facility?

Yes.

Q7. Shouldn't we also buy things in bulk? At my food coop you can grind the beans right there at the store.

Buying in bulk offers the potential for two environmental improvements. First, reduction of packaging waste, and second, reduction of food waste (assuming that buying in bulk allows one to purchase just the right amount of food, and not the converse, where buying in bulk leads to overpurchasing, and thus waste). Of the two, the food element is probably the more important. As much as packaging is vilified as an environmental scourge, the environmental impacts of food production are far greater.

Q8. How to convince municipal leaders to think from the broader SMM perspective when they are most concerned re: budgets and the town's recycling rate . . . and have little power over broader purchasing and product design?

Waste collection (including recycling) is a core function of many city governments; purchasing is less so and product design is not. Regardless, sustainable materials management requires consideration of *impacts* and *actions*. Perhaps the actions available to your city are limited to waste collection. (Although some cities do try to influence product design through purchasing strategies.) Even if the only action you take is recycling, you should consider its impacts. Why does your city recycle? Why is your city concerned about its recycling rate? Hopefully it isn't some abstract concept, but rather because the recycling rate is a gauge of how effective your city is at conserving energy and reducing pollution. If so, use EPA's WARM tool to quantify these benefits and use them to frame discussion of recycling.

This question illustrates an important point: while municipalities are central players in managing discards, the universe of players is broader when one expands the concept to managing *materials*. As Oregon DEQ has transitioned from managing discards to managing materials, the types of organizations we've worked with has broadened considerably.

Q9. How does a local recycler work within the larger world view . . . what is the role we should be playing? Just educating people on the right choices? Getting engaged in the national dialog? Or something else (and what is that)?

Recycling is part of SMM, so first and foremost, a local recycler should pursue their core responsibility: recycling!

Recycling's primary value, from a sustainability perspective, is in providing industry with materials that can be used, in lieu of virgin feedstocks, to make new product. So recycling programs need to be designed and implemented with the primary objective of feeding and sustaining markets, not keeping waste out of landfills or chasing numerical landfill avoidance goals. Of course, more recycling is better than less recycling, but only as long as the markets are being provided with material they can use. Maintaining markets should be the primary organizing principle.

Recyclers should also be careful in how they promote recycling: not to overhype its benefits ("Recycle! You'll save the Earth!") and also not to promote recycling in a way that creates barriers to waste prevention ("Landfills are awful! We must keep stuff out of landfills! Recycling is the solution!").

If advocating for a more recyclable waste stream, recyclers also need to be very careful to not discriminate against materials that, while potentially not recyclable, offer the same (or better) environmental benefits that recycling does. For example, using my coffee example, selling coffee in the flexible packaging (requiring disposal) may result in lower overall environmental impacts than selling the same product in recyclable plastic or steel.

Finally, recyclers should please avoid the temptation to rebrand recycling as "sustainable materials management" (SMM). Recycling is part of SMM, but SMM is far broader than recycling. Calling recycling "SMM" and developing an "SMM Plan" or "SMM Agenda" that is only about recycling is both inconsistent with the EPA definition, and makes it all the more difficult for organizations (like mine) that are trying to do the broader work of SMM.

Q10. Please reference the Portland study on 20:1 ratio so we can find calculation that's GREAT to know!

The calculations for the 20:1 ratio (energy savings when curbside recyclables get to market vs. energy required to collect curbside recyclables) were never published but are not difficult to replicate using some basic information available in many communities (plus the background materials for EPA's WARM tool). If you need a citation, you can cite my presentation.

Q11. In the Chattanooga example, how did the cost for collecting trash factored into it? That is, gas was used for either trash collection of recycling. Unless the recyclables had to travel significantly

further than trash to disposal, how is that specific cost not just a wash between the two collection efforts?

> Collecting a fixed quantity of material in two trucks does require more fuel than collecting the same quantity of material in one truck. Fuel use is a function of both total distance driven and also the amount of acceleration required. Each time a collection vehicle stops to pick up material and then restarts, fuel is used. The number of stops required for two trucks is potentially twice as many as the number of stops required for one.
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> I wasn't party to Chattanooga's calculations but rather merely heard (in a news report) the mayor justifying discontinuation of the curbside recycling program on the grounds that it was "wasting fuel". (Side note: press reports to the contrary, Chattanooga ultimately decided not to drop curbside recycling but rather went from weekly to monthly collection; the City's website now says they are planning on increasing frequency to bi-weekly.) The point in my webinar presentation: while recycling collection may require more fuel use, this increase in fuel is easily justified by the significantly larger energy savings when recyclables displace virgin feedstock in manufacturing. The mayor was looking at fuel use from a narrow (collection fleet) perspective; SMM requires us to look at environmental impacts over the full life cycle of materials.