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# The future relationship of sustainability and traditional waste and recycling may be a key piece in solving our waste puzzle

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While mingling at a waste convention, I introduced myself as a sustainability consultant to a landfill manager; I got the “talk to the hand.” While he was not serious, he said, “You’re trying to put me out of business!” My response to him was, “Actually, it is quite the opposite: existing solid waste facilities, including landfills, are central to the transport of waste and will continue to be essential operational locations as waste management evolves from disposal to recovery.” This evolution ultimately provides more business opportunities that existing facility owners are well poised to profit from.

Sustainability is best when viewed with a whole systems approach. Municipalities with traditional waste and recycling facilities can inspire communities to strive for zero waste with potential for successful public/private partnerships. The waste and recycling industry

is well-positioned to make an enormous impact in solving our waste addiction.

### **What's wrong with the status quo?**

Landfills across the country are nearing capacity, and building more landfills requires using more land that could be used for neighborhoods, agriculture, or natural space. A shift in the way we think about “waste” will be key as we reframe waste as a resource and begin to treat it as an asset. Burying waste in landfills, while it provides an economical short-term solution, creates risks for air and water pollution and squanders the embodied energy embedded within waste materials. However, consider if landfills were reframed as material storage sites, where materials viewed as valuable resources could be recovered in the future— offsetting the need to mine or harvest new resources.

### **If these materials are so valuable, why aren't they already being recovered?**

To date, the infrastructure to sustainably manage various wastes is made inefficient by the mixed composition of the general waste stream. Mixed waste requires a lot of sorting to redirect individual materials to higher uses. Waste characterization studies identify even easily recoverable recyclable materials, such as aluminum cans, are still being thrown out; even with single-stream recycling, many consumers are confused or inconvenienced by separating recyclables. Advanced sorting and processing technologies for mixed waste streams are making it increasingly economically viable to recover not just materials that are currently seen as valuable, but eventually all materials become viable as they are further categorized.

### **How do landfills fit in with sustainability?**

Landfills and the transfer stations that serve them are already the central collection points for waste, and the management system is already in place to transport waste to them. As an incremental approach is taken to implement sustainability, less and less waste will be placed into the landfill. But! The existing infrastructure, equipment, and hauling routes can be repurposed to house new components of the waste recovery system. As their name implies, MRFs (material recovery facilities) are already places where materials are recovered. Circularity centers are, in a way, a specific type of MRF that takes the idea of materials recovery and brings it full circle to bring materials through to their next life. This can be accomplished by adding new components to existing MRFs that use materials they currently consider waste and implementing innovative methods to extract value.

While landfills can produce large volumes of methane gas, and much of it can be captured, purpose-built anaerobic digestion (AD) facilities can inherently perform even better in the gas generation and collection arena through source-separating organics. These AD facilities can be located at or near a landfill with existing gas recovery to make use of its gas processing and transport infrastructure while getting the maximum recovery of gas from the waste. Residuals from the AD process are then composted and land applied, re-earthing the nutrients rather than burying them.

## **What can current waste infrastructure be repurposed for?**

Two types of landfills can be viewed as future recovery locations: municipal solid waste (MSW) and industrial/construction and demolition (C&D). Hazardous waste landfills are defined as the third type, which contain the highest concentrations of toxic materials and are unlikely to ever be viewed for recovery. Other facets of the current waste management system, particularly collection infrastructure, can be used for essentially their same existing function.

## **Transitioning the system**

A circular economy cannot be built all at once. Landfilling and waste-to-energy are still needed while diversion infrastructure is built up to provide waste disposal needs. This would allow for slowly implementing circular components while using existing infrastructure. Waste recovery processes can be meshed with one another to complement and increase the efficiency of existing disposal scenarios and create opportunities to use wastes from other facilities.

At a broader scale, circularity in a community goes beyond a single circularity center and involves the coordination of several facilities within a waste shed to share “wastes” with other facilities that can use them as inputs to be processed. Coordination across industries that, at surface level, may not appear related is often necessary to optimize the waste management system. Co-digestion is an example of co-opting wastewater treatment with organics processing to produce biogas, as well as nutrient-rich byproducts for land application.

## **What about the existing workers?**

Waste recovery creates more jobs than disposal. Economists estimate that millions of jobs could be created by 2030 through transitions toward a circular economy. Even jobs can be viewed as having circularity within a community: some jobs, such as truck drivers, would see very little transition; equipment operators and mechanics readily have the skills needed to operate components of circularity centers; and for employees directly operating the landfill, a small amount of retraining could provide opportunities for more desirable jobs at new facilities.

## **How do communities benefit?**

Jobs, money, and material resources cycle within a community. Disposing of any fraction of the products of the associated effort discards the blood, sweat, and tears that went into creating a product in the first place. By providing resources for reuse and repair and recovering materials from products that are no longer useful, communities can benefit from new jobs and business opportunities, as well as educational aspects and keeping resources within the community.

Adults in the job market are not the only people who benefit from circularity. Educational opportunities are an important way that circularity centers interact with the greater community. These opportunities can include youth programs, repair clinics, community gardening, entrepreneurial opportunities, technical school or community college level circularity operator training, and general education on waste disposal best practices. Future generations will also benefit from being able to use the recovered products and the land that would otherwise be landfill.

Public-private partnerships (PPP) are a further way that communities can benefit from circularity centers. By contributing financing and assuming a portion of the ownership for a project as the public, communities can speed the introduction of advanced technologies and provide public buy-in to ensure the success of new approaches and nurture markets for end products. Public funds supporting the creation of jobs and new community revenues help to continue the cycle of resources within that community.

### **What will the partnering of sustainability with traditional methods look like?**

Circularity centers, also known as sustainability campuses, are facilities that use a whole-systems approach to direct discarded materials to their highest and best use. Moving away from a linear “take-make-waste” path toward a zero-waste closed loop is a viable solution to the growing challenge of waste management. Zero waste strategies aim to conserve resources and divert materials by means of responsible production, consumption, reuse, and recovery of all production byproducts and product packaging.

There are numerous reasons to envision existing solid waste infrastructure as components of circularity centers. These facilities can contribute to the sustainable future of communities by:

- Changing the mindset around waste from a liability to an asset which can positively impact the economy.
- Promoting a “cradle-to-cradle” production model that creates a product with its next life in mind.
- Becoming a community-centric offering for reuse and educational opportunities that promotes a focus on repair, reuse, and rethinking consumer habits.
- Extending the remaining lifespan of existing landfills and establishing beneficial outlets for low-grade materials, which may eventually be economical to recover.
- Providing localized power sources that contribute to a resilient power grid and minimizing transmission losses over longer distances. (In particular, anaerobic digestion offers recovery of natural gas and nutrient rich byproducts for re-earthing.)
- Achieving triple bottom line benefits that balance considerations among people, profit, and our planet.
- Supporting future waste diversion goals by using innovative sustainability programs in

circularity centers.

- Creating educational spaces where residents can learn about what happens to their waste while being given the opportunity to give unwanted items a second chance for use at last-chance stores.
- Customizing circularity centers to inputs such as a traditional landfill, materials recovery facilities, and construction and demolition waste sites.

Reframing waste as a resource, the idea of capturing the embodied energy will require transitioning to a circular economy. Efficiencies of the transition will require circularity centers that will not only extend the life of the landfill but will serve the community providing an educational platform to introduce the concept of sustainability to the next generation of waste, recycling, and environmental professionals. Together, they will continue to disrupt the status quo, moving the industry into a more sustainable and circular future.

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