

Metro Wood Waste Markets Alternatives Project Briefing Paper
Metro Solid Waste Alternatives Advisory Committee
December 10, 2014

BACKGROUND

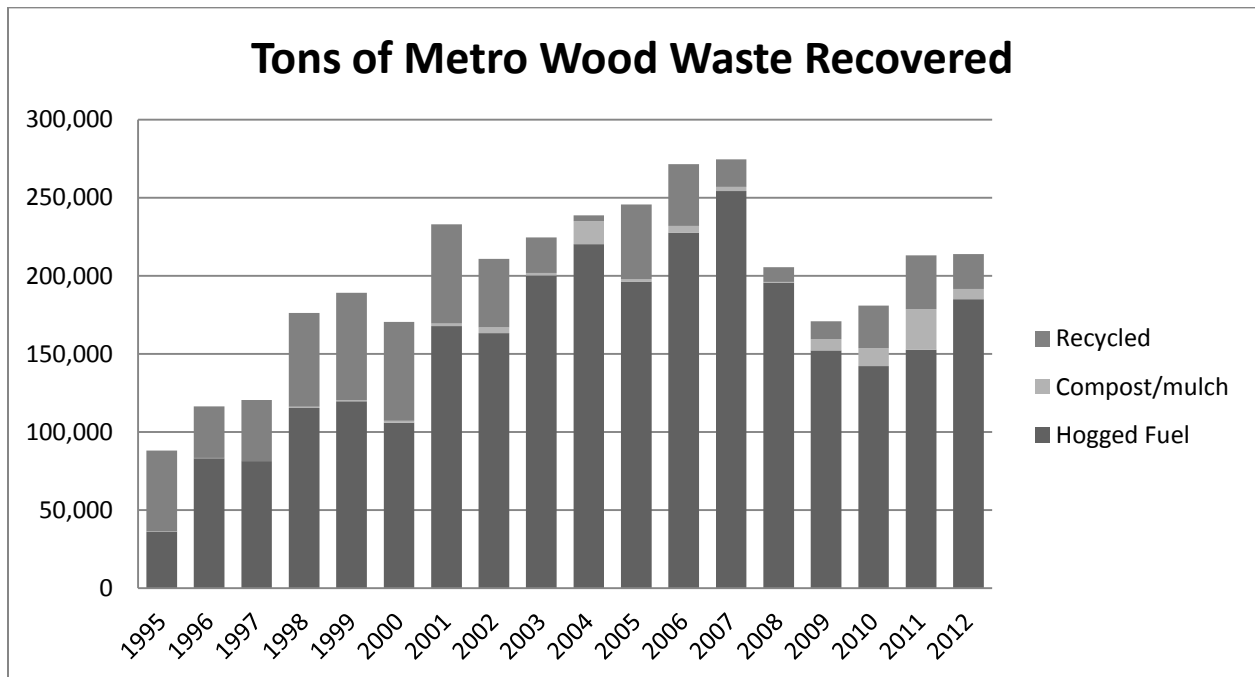
This paper provides background for discussion of Metro’s Wood Waste Markets Alternatives project that will be discussed at the December 10, 2014 meeting of the Solid Waste Alternatives Advisory Committee.

Project Purpose

The purpose of this project is to identify and assess options for maintaining and improving the end-market capacity, stability and environmental outcomes for the region’s urban wood waste that can be implemented within the next 10 years, with emphasis on roles that Metro and other public sector entities could play.

Generation and Recovery Data

Construction and demolition (C&D) waste is a major component of the region’s waste stream, accounts for most of the region’s urban wood waste (UWW), and is a priority focus of the Regional Solid Waste Management Plan (RSWMP). 248,000 tons of UWW were generated in 2009, which is the most current year for which waste composition data is available. Approximately 80 percent of this tonnage was from C&D activity and the remainder was mostly from commercial/retail pallets and crating. Of the C&D portion of wood generated, Metro estimates that 70% is from demolition/renovation activities and the remaining 30% is from new construction. The generation rate for urban wood waste is closely tied to construction activity and is currently increasing as the construction economy recovers from the recession. Metro estimates that the region’s current wood waste recovery rate is 60-70%. Approximately 65% of the UWW recovered is from source-separated wood loads and 35% is from mixed dry waste.



End Markets

Almost all of the region's UWW is now processed into hogged fuel that is burned at three local paper mills to generate energy and steam, and two of these mills are phasing out their use of this fuel. As the graph above shows, this is a change from 10 years ago when there were other higher-value markets for this material including paper mill furnish, feedstock for engineered lumber products (medium density fiberboard) and erosion control products. For a variety of reasons, those higher value markets have largely disappeared, resulting in the region's current reliance on hogged fuel combustion by paper mills. The lack of other markets for the region's urban wood waste creates operational challenges for wood waste processors when demand from paper mills ebbs, such as when mills close for maintenance.

Intermediate Processing Facilities

The majority of the UWW generated in the region is collected source-separated at construction sites and delivered to one of the region's 20 privately-owned intermediate processing facilities. Processors that produce hogged fuel generally accept painted and unpainted wood, all types of engineered wood and limited quantities of pressure treated wood, and wood with nails and other fasteners in it. Processors assess the quality of inbound loads by visual inspection. Loads are rarely refused unless they contain visibly high levels of melamine laminates, high pressure plastic laminates, plastic or plastic composite lumber, fiber cement composite siding products, creosote treated lumber (railroad ties) or other non-wood material or wood products that are bonded or glued to other non-wood materials like vinyl flooring.

Approximately 35% of the region's UWW is collected in mixed dry waste loads and dropped at one of 11 dry waste material recovery facilities (MRFs). These facilities use hand or mechanical sort lines to recover wood, cardboard and metal before disposing of the residual material. The recovered wood is then processed on or off site into hogged fuel. Generally, the wood recovered from mixed loads has more contaminants than the wood collected via source separation. Metro owns two solid waste transfer stations where contract operators recover wood from mixed dry waste loads. The remaining nine dry waste MRFs are privately owned.

The decline in end markets for hogged fuel has had an impact on the Metro region's capacity to process wood waste into hogged fuel. In late June 2013, NW Wood and Fiber Recovery, which was one of the region's largest intermediate processors of urban wood waste, closed after 18 years of operation.

Salvage and Reuse

Over the last 20 years, the privately-owned building material reuse industry in the Metro region has expanded and evolved. A growing group of deconstruction contractors now bid on work and there is a wide range of reuse-related entities. Across all of these entities, wood continues to be the most common material that is reused and it is a major source of revenue

While the salvage and deconstruction industry recognizes that the best way to capture reusable building materials is through front-end job-site reclamation and deconstruction, this is not the dominant practice for taking down buildings. Mechanical demolition with excavators is still very common in both the residential and commercial sectors. As a result, a large quantity of salvageable/reusable material still ends up in drop boxes bound for source-separated wood waste processing yards and dry waste processing facilities.

Metro research shows that timbers, dimensional lumber and sheet goods like plywood are durable enough to make it through the waste loading and drop box transport process intact and potentially reusable. This has been measured at dry waste processing facilities, but not at source-separated wood waste processing facilities. DEQ data suggest that up to 20% of the wood that arrives at a dry waste processing facility meets material quality and size specifications for reuse at local building material reuse facilities.

In fiscal year 2014-15, Metro is undertaking small-scale efforts to help build the region's salvage capacity through projects to develop a region-wide salvage brokerage partnership, conduct pre-demolition deconstruction cost-benefit assessments, and assess needs and options for standardizing demolition permitting practices.

Environmental Issues to Consider

As mentioned above, current collection and processing is geared for making hogged fuel. Alternatives include various forms of reuse, recycling, and energy recovery. As part of this project, Metro intends to assess the relative environmental benefits of each alternative based on greenhouse gas emissions, water pollution, human health and ecotoxicity. This is intended to help identify which alternatives appear to be environmentally preferable to the status quo.

PROJECT FINDINGS TO DATE

Metro hired the team of Evergreen Engineering and Good Company to do a preliminary identification and assessment of market alternatives. Their findings are described below.

- UWW is a tough material to utilize but there are practical ways to get it out of the waste stream and into higher value products and applications.
- Our region is already doing as good a job as any place in North America in diverting UWW from the landfill.
- There is no doubt that the region must continue to rely heavily on existing hog fuel markets in the short term.
- UWW is being successfully recycled into composite panelboard and fuel pellets on a large scale in Europe using systems that probably could be implemented successfully in the Metro region. Biochar, fuel for district energy, and use of UWW as a bulking material in dry anaerobic digestion also are potentially feasible options.
- Salvage opportunities seem ripe for growth if supported with building permit interventions requiring deconstruction and clean wood recovery that is separate from other C&D waste separation.
- In the northwest, UWW competes for markets with virgin mill residuals. This presents a challenge for many options. Moreover, residential and commercial remodeling drives the generation of both UWW and competing virgin mill residuals.
- There is a significant environmental benefit to diverting UWW into reuse and recycling markets such as reclaimed building materials and wood products, refurbished pallets, biochar, and composite panelboard and pulp raw material.
- The relative environmental benefits of energy recovery versus landfilling depend on carbon accounting, emissions controls, displaced fuels, and impact costs. These need to be researched further.
- The painted, treated, and laminated portions of the UWW stream are the most difficult to divert from landfill.

SCENARIOS

The consultant team concluded that the following scenarios may be feasible and worth investigating further.

1. Enhanced Base Case: Reclaimed Wood Products, Refurbished Pallets, Hogged Fuel, Landfill and Waste-to-Energy (WTE).

Description: This is the status quo, but with implementation of best practices to increase reuse. Clean hogged fuel would be sent to traditional markets. Some treated wood would go to the Covanta WTE facility in Marion County and some would be landfilled.

Implementation: Work with generators and receiving stations to upgrade ability to reclaim used lumber, panels, pallets and other wooden building materials (doors, case goods) through changes in collection procedures and sorting capabilities. Some processing (e.g., pulling nails, sawing to rough size) may be needed.

2. Enhanced Base Case Plus District Heat and Biochar

Description: Implement the Enhanced Base Case and then build a thermochemical (pyrolysis) processing facility to convert hogged fuel into biochar, biogas, and bio-oil. Strategically locate facility so that the biogas and bio-oil could heat the pyrolysis unit and make steam or hot water for sale to a new district heat system.

Implementation: Build a stand-alone heat plant as the centerpiece of a new eco-plex to revitalize a strategic neighborhood in the Metro area. Subdivide the property into commercial and light industrial zones and install underground hydronic heating distribution to all locations. Add capabilities to enhance the biochar through screening, filling, and packaging. Recruit tenants to the eco-plex through low-cost thermal energy supply contracts and tax incentives. Sell biochar to local governments in the region for stormwater filtration and to nursery soil producers.

3. Enhanced Base Case Plus Clean Raw Material for Composite Panelboard, Pulp Chips, and Densified Wood Fuels

Description: Implement the Enhanced Base Case, but add a sort to divert clean wood assemblies like broken pallets and crates or pieces too small for lumber reclaim. Equip a central facility with the coarse grinding, chipping, screening, and cleaning equipment needed to remove metal, plastic, paper, and grit to produce quality chips for the pulp, pellet, and particleboard markets.

Implementation: Sort targeted material out of hogged fuel stream prior to grinding. Accumulate sorted material at receiving facilities for periodic transfer to a central processing facility. Negotiate supply contracts and quality specs with regional pulp, pellet, and particleboard producers. Acquire cleaning equipment for use either at central processing facility or at manufacturing plant.

4. Enhanced Base Case Plus Anaerobic Digestion.

Description: Implement the Enhanced Base Case, but add a sort to divert clean wood assemblies like broken pallets and cut ends or pieces too small for lumber reclaim to coarse grinding, chipping,

screening, and metal removal equipment capable. Produce quality chips to provide structure and voids for wetter material used in dry anaerobic digestion (AD) process to produce biogas. Compost the AD digestate and augment with other products as necessary. Develop public market for soil products at this scale.

Implementation: Develop sorting standards and best practices. Consider capitalizing screening equipment to remove plastics. Work with public agencies to require public procurement of compost-based erosion control blankets and berms.

DISCUSSION QUESTIONS FOR SWAAC MEMBERS

1. What are your general impressions of these scenarios?
2. Given the nature of the scenarios, what are your thoughts about the role that Metro and local governments should play in implementing them?
3. In general, salvage and recycling options provide greater environmental benefit on a per unit basis than energy recovery options, while recovery options probably can handle much more material. If Metro were to invest time and money in market development, on which types of options do you think it should focus its resources?