

REPORT ON SENATE MEMORIAL 60

A memorial requesting the Department of Environment to convene a meeting to develop a plan to maximize the use of biodegradable wood chips for the betterment of the environment.

Introduced by Senator Sue Wilson Beffort
2009

Background

The New Mexico Environment Department convened two meetings to develop a plan to maximize the use of biodegradable wood chips for the betterment of the environment. Stakeholders present at the meetings included representatives from the Ciudad Soil & Water Conservation District, New Mexico Department of Transportation, private sector composters, NMSU Cooperative Extension Service, City of Albuquerque compost staff, City Forester of Albuquerque, New Mexico State Forestry, and the New Mexico Recycling Coalition.

Opportunities

Enormous landfill and atmospheric benefits can be realized through utilizing wood chip resources by saving landfill space and reducing quantities of methane produced by the uncontrolled decomposition of the wood in landfills. Methane is an explosive gas and is 30-60 times more potent as a greenhouse gas than is CO₂. Numerous watershed health benefits can also be reaped by wood chip utilization.

Recycling opportunities for organic waste materials fall into two primary categories: horticulture and energy production. For horticultural applications, organic materials must typically be stabilized to prevent rapid decomposition with consequent odor production, and attraction of undesirable vector organisms. Controlled microbial decomposition processes, such as composting, have commonly been employed in New Mexico for stabilizing organic materials for horticultural reuse. In contrast, unstabilized organic matter is preferred for energy production applications. Common energy production methods applied to organic waste streams have included anaerobic digestion for methane gas production and direct conversion to thermal energy through combustion.

Each organics recycling alternative approach offers benefits beyond the diversion of solid waste away from landfills. Horticultural reuse of stabilized organic matter improves soil stability, inhibiting erosion, and enhances soil fertility, reducing requirements for costly water, pesticides and fertilizers. Mulch is a commodity that can also be marketed with very limited processing costs for erosion control, weed control water retention, or beautification to generate direct revenue.

Collecting biogas (methane) from decaying organic matter also provides opportunities to produce revenue, either from direct sale of the gas or from the sale of electricity produced by generators burning the gas. Moreover, organic residues remaining after biogas production are excellent feedstocks for composting, from which the additional benefits and revenue potentials described above can be reaped.

Opportunities for recycling organic materials were previously reviewed by the New Mexico Organics Recycling Organization in their May 1998 report entitled “The State of Composting in New Mexico and Recommendations for Increased Organics Reuse.” The report is available from the NM Environment Department Solid Waste Bureau.

On-going Projects in the State of New Mexico Using Wood Chips

There are numerous existing projects around New Mexico in which wood chips are used for beneficial purposes.

Biosolids and agricultural composting programs

Biosolids are the semi-solid organic residual from municipal wastewater treatment. Composting, a controlled aerobic biodegradation process, is growing in popularity as a means for converting wastewater biosolids into a safe, high-quality organic soil builder that can be sold for use in landscaping and horticultural applications. To ensure protection of public health and the environment, the US Environmental Protection Agency and the NM Environment Department carefully regulate the biosolids composting industry.

Several New Mexico municipalities employ wood chips and other dry organic wastes as additives to improve and expedite the biosolids composting process. Examples of municipalities that compost biosolids along with wood chips and other organic wastes include the Albuquerque Bernalillo County Water Utility Authority (who produced two million pounds of compost in March 2009 alone); the Santa Fe Waste Water Treatment Plant; the Las Cruces Waste Water Treatment Plant; the Carlsbad Waste Water Treatment Plant; the Artesia Waste Water Treatment Plant; and the Santa Ana Pueblo Waste Water Treatment Plant.

Wood chips are similarly useful as an additive when composting is used as a management practice for agricultural wastes. Dairy manure composting reduces soil degradation through the accumulation of salts when manure is disposed by application to the land. An example of manure composting in New Mexico is a compost project utilizing dairy manure and wood chips from pruning a pecan orchard that is presently underway in the Mesilla Valley. Mortality/Butcher waste composting is increasing in popularity throughout the state. All of these facilities can employ wood chips as additives for the compost process.

Erosion Control and Revegetation

In response to 100 years of fire suppression, New Mexico mountain and bosque forests are overgrown and at risk for catastrophic fires. Contractor thinning of forest areas for fire risk reduction is at an all time high and harvested trees are commonly reduced to wood chips that are spread at a depth of 2” in the treated area to enhance retention of rain water and snow melt, reducing the potential for erosion until the natural understory of grasses and shrubs is re-established. Good examples are the East Mountain Forest Health Program operated in Bernalillo County by the Ciudad Soil and Water Conservation District, in cooperation with NM State Forestry, and bosque thinning projects operated by Santo Domingo Pueblo and the City of Albuquerque Open Space Division. Additionally, the US Forest Service utilizes wood chips for fuel breaks around subdivisions.

The NM Department of Transportation has several successful revegetation projects that utilize filter socks filled with wood chips and composted wood chip blankets for erosion control and revegetation on the steep slopes often associated with highways. NMDOT manages 200,000 acres of right of way along highways in the state, providing a large market for erosion control and soil improvement products such as wood chips.

One recent example of a successful NMDOT application of composted wood chips and wood chip-filled “filter socks” for erosion control is the Exit 108 project along I-40 near Acoma. In addition, NMDOT recently purchased 2,100 tons of compost blankets for the *Rail Runner* and 71 miles of filter sock composted mulch for erosion control. All of these organic materials were products created from wood wastes and biosolids produced in the Albuquerque area. NMDOT has incorporated specifications for composted wood chips and filter socks into their standard specifications for highway projects, and is presently revising current state-wide purchase agreements with suppliers of wood chips, composted mulch, wood chip filter socks, and compost/mulch filter socks. This new agreement will allow vendors to bid on each individual item separately if they are not able to provide all of the items.

Organics Recycling Education in New Mexico

The long-standing impetus for re-using organic wastes, including wood chips, for beneficial purposes in New Mexico is resulted in numerous public education initiatives. Backyard composting workshops have been historically sponsored by the Cooperative Extension Service, by the NM Environment Department, and by other agencies. Recent backyard composting workshops have been sponsored at the Albuquerque Open Space Visitor’s Center, the Bernalillo County Open Space Visitor’s Center, the Bernalillo County Sanchez Farm, and the MesillaValley Bosque State Park in Las Cruces.

Other examples of ongoing education about composting and organics re-use conducted by the NMED Solid Waste Bureau include Butcher Waste & Mortality Composting Workshops, on-call Stable Waste Compost Assistance, and the New Mexico Compost Facility Operator Certification Course held April & October each year.

Senate Memorial 60 Recommendations Generated From Stakeholder Meetings

The recommendations produced during the two stakeholder meetings fall into six general categories, listed below in order of importance based on the number of recommendations made by participants.

- Encourage state agencies to provide examples and highlight their accomplishments.
- Support public education of organics reuse.
- Support technical and economic research
- Encourage market development.
- Coordinate with regional and national programs on organic recycling programs.
- Revise regulations and permitting

Provide Examples of Organic Recycling in State Government

Mandate organics recycling at all buildings occupied by government agencies - leased or owned. For example, engage participation by the New Mexico Building Services Division in chipping landscape organic maintenance wastes. Determine the amount of green waste generated by state buildings in Santa Fe and associated landfill tipping fees, and develop figures on additional personnel or equipment required for larger agencies to compost yard waste.

Encourage use of mulch in all public recreation sites, regardless of jurisdiction and management agency. Create an incentive or mandate for appropriate state agencies to specify recycled organic materials for soil reclamation projects and landscaping uses. Allow state and municipal land to be used for mulch/compost demonstration and garden sites by public information and outreach organizations involved with solid waste reduction and reuse. The state forest representative in the stakeholder meetings suggested specifically that funds be set aside for green waste treatment (i.e. grinders, screens, filter sock production equipment and field saw mills) for small diameter wood products resulting from forest thinning projects.

Encourage, and require where possible, the inclusion of recycling and waste stream diversion as a part of public employees' position description and performance evaluation.

Support Public Education in Organics Recycling

Provide recurring State funding for proven educational and demonstration programs, to be administered by NMED, that encourage organics recycling through mulching and composting. Such funding will allow the education of more solid waste operators through NMED Certification Courses (Landfill, Recycling, Transfer Station, and Compost Facility Operators) about the benefits of utilizing wood chips for beneficial use,

including production and application of mulch/compost filter socks and erosion control blankets.

One of the biggest problems associated with mulch produced by municipalities is the contamination of this product by other solid wastes such as plastics, paints and other non-biodegradable items. NMED needs ongoing funding to develop an educational program that provides instruction on how to keep mulch products clean from other solid wastes. This information can be gleaned from private sector wood chip vendors who have existing, well managed programs. Ongoing funding will allow the NMED Solid Waste Bureau Outreach Section to develop quality control program manuals and presentations, including market development guidance and estimates of costs associated with mulching. Manuals could be distributed to all communities and growers interested in pursuing mulching/composting operations. NMED should also continue public education courses on production and application of mulch/compost filter socks and erosion control blankets.

Support public demonstration sites on small diameter timber reuse through mulch and compost production with NM State Forestry staff and city foresters as instructors.

Support demonstration projects using wood chips in erosion control and revegetation. The Albuquerque/Bernalillo Water Utility Authority has offered to provide mulch, compost and free transport for comparative research projects around the state.

Place NMED sponsored features in industry newsletters to advertise the benefits of recycling organic materials and how organic materials can be used to promote water conservation and erosion control. Encourage employers to educate employees about their responsibilities and opportunities for recycling.

Support Technical and Economic Research into Organics Recycling Alternatives

Estimating the volume of wood that will be produced during a thinning or harvesting project is crucial to determining the potential re-use of the wood as mulch or for other applications. Much of the work on predicting stand volume has focused on estimating merchantable timber and resulting slash volume produced during timber harvest. Equations have been developed for specific regions to predict the number of board feet or cords of a given species that will be harvested. Due to the focus on timber and fuelwood production, the equations predict volume of wood. Other common units of volume include cubic feet, cubic yards, and cubic meters. With regards to slash or non-merchantable timber the total weight of material or biomass may be more applicable to the utilization than volume. The relationship between weight and volume is described by either the bulk density or the specific gravity of the wood. Methods to estimate biomass of non-commercial species such as non-native phreatophytes and low stature woodland species are extremely limited. Publications by Wynsma, et. al. (2007), Hardy (1996), and Ottmar et. al. (2000), listed under Publications at the end of this report, are useful in estimating stand volumes, and a starting point for further research in this critical area.

Continued research is needed into options for producing energy from wood chips in New Mexico. As a starting point for directing this research, the Governor's Biomass Energy Task Force developed a report and recommendations after their deliberations in 2005. The report is available from the NM Energy, Minerals and Natural Resources Department.

Provide State support and funding for research and pilot projects involving large-scale anaerobic digestion of organic waste for producing marketable biogas and/or electricity. The City of Albuquerque, in conjunction with the NM Engineering Research Institute and NMED, conducted a feasibility assessment in 1998 for producing biogas from municipal solid waste. The report is available from the Urban Consortium Energy Task Force of Public Technology, Inc.

Provide State support and funding for academic research into the economic effects of organics recycling, to include avoided disposal costs, facility operational costs, product revenue potentials, valuation of conserved resources, increased market values for agricultural products, etc.

Public grant funding available for research and demonstration projects using wood chips include the Collaborative Forest Restoration Program Grant Program, from which the New Mexico Recycling Association has recently been awarded \$200,000 and the Santo Domingo Tribe has recently been awarded \$400,000, and the Woody Biomass Utilization Grants—Forest Restoration Activities on National Forest System Lands (USDA-FS-2008-01), both administered by the US Forest Service.

Encourage Product and Market Development for Recycled Organics

Mandate that publicly funded organizations (eg. highways, universities, parks, etc.) use organics produced from diverted solid waste, when available, for soil improvement, water retention and erosion control. Proactively communicate with strip mine owners and reclamation specialists to encourage the use of organic wastes in mining projects.

Support communications among producers and consumers of wood chip and compost products. An organics waste-exchange program would be very beneficial for the organics recycling industry and could be developed and maintained by either the NM Recycling Coalition or the NM Environment Department Solid Waste Bureau. This would facilitate connecting producers and users of recycled organic materials.

Seek legislative funding for continued phreatophyte removal in bosque environments and for thinning forest stands in mountainous environments. Seek additional funding to assist with developing markets for chips and for small-diameter wood products (such as fence poles or vigas) that can reduce the volume of wood waste requiring chipping. Funds are also still needed to provide equipment for particle size reduction and transport of organic materials throughout New Mexico.

Revise Regulations and Permitting Programs to Encourage Organics Recycling

Encourage private enterprise participation in the organics waste reduction arena by encouraging contracted salvage rights at municipal solid waste drop-off sites and re-use of wood-based construction materials such as the Re-Store program operated by Habitat for Humanity.

Modify public health regulations to allow and encourage diversion of food wastes from landfills. Wood chips can then be incorporated to create a final compost product.

Support a phased landfill green waste ban or increased rates for green waste disposal.

Coordinate with Local, Regional and National Programs in Organics Recycling

State funds should be allocated for start-up programs to encourage larger communities and agricultural entities to source-separate organic material from solid wastes for recycling and composting, either at the curb or through transfer stations. Larger cities should assist tree trimming operations with “wood chip drop-off sites” to connect chippers and end-product users.

Research other state and federal government procurement policies regarding locally produced mulches/composts and make suggestions to the New Mexico General Services Department based on the findings.

Coordinate NMED organics recycling activities with the Office of the State Engineer water conservation program. Mulching techniques stressed in this program are often the lowest cost water supply conservation strategy.

Contact the Department of Military Affairs and State Penitentiary System regarding their interest in, or land availability for, mulch or compost production.

Roster - Stakeholder Meetings

Greg Baker
New Mexico Environment Department
Solid Waste Bureau, Outreach Section
1190 St. Francis Dr., Ste. S2050
P.O. Box 5469
Santa Fe, NM 87502-5469
505-827-2780
E-mail: greg.baker@state.nm.us

Joe Bailey, Superintendent, Soils Amendment Facility
Albuquerque/Bernalillo County Water Utility Authority
4200 2nd St. SW
Albuquerque, NM 87105
505-205-5721
E-mail: jbailey@abcwua.org

Jim Brooks
Soilutions, Inc., Owner
P.O. Box 1479
Tijeras, NM 87059
505-877-0220
E-mail: jim@soilutions.net

Lawrence Crane
New Mexico Energy, Minerals and Natural Resources Department
Forestry Division, Bernalillo District
5105 Santa Fe Hills Blvd. NE
Rio Rancho, NM 87144
505-867-2334
E-mail: Lawrence.Crane@state.nm.us

Steve Glass
County of Bernalillo
Public Works Division, Water Resources Planner
2400 Broadway, SE
Albuquerque, New Mexico, 87102
505-224-1673
sglass@berncogov

Robert Flynn
NMSU Cooperative Extension Service
Artesia, NM
575-748-1228
E-mail: rfflynn@nmsu.edu

Sue Hansen
Ciudad Soil & Water Conservation District
6200 Jefferson NE, Room 125
Albuquerque, NM 87109
505-761-5446
E-mail: Sue.hansen@nm.nacdnet.net

Bill Hutchinson, Landscape Architect
New Mexico Department of Transportation
P.O. Box 1149
Santa Fe, NM 87504
505-827-9862
E-mail: williams.hutchinson@state.nm.us

Nick Kuhn
City of Albuquerque
City Forester
Parks and Recreation Department
1801 4th Street NW
Albuquerque, NM 87102
505-768-5370
E-mail: NKuhn@cabq.gov

Website References:

www.nmenv.state.nm.us/swb

New Mexico Environment Department Solid Waste

www.recyclenewmexico.com

New Mexico Recycling Coalition

www.cabq.gov

City of Albuquerque

www.nmforestry.com

New Mexico State Forestry

www.soilutions.net

Soilutions, Inc.

[www.forestsandrangelands.gov/Woody Biomass](http://www.forestsandrangelands.gov/Woody_Biomass)

www.nawpa.org

Northern Arizona Wood Products Association

Publications

Utilizing Municipal Trees: Ideas from Across the Country

Stephen M. Bratkovich

US Department of Agriculture

Forest Service

Northeastern Area – State and Private Forestry

NA-TP-06-01

October 2001

Recycling Municipal Trees: A Guide for Marketing Sawlogs from Street Tree Removals in Municipalities

US Department of Agriculture

Forest Service

Northeastern Area – State and Private Forestry

Morgantown, WV

NA-TP-02-94

Revised August 2003

Wynsma, B., R. Aubuchon, D. Len, M. Daugherty, and E. Gee. 2007. USDA Forest Service National Technology and Development Program. Available at: http://www.forestsandrangelands.gov/Woody_Biomass/documents/biomass_deskguide.pdf. A US Forest Service comprehensive biomass utilization guide that covers a wide range of project planning considerations as well as biomass conversion factors and volume to weight calculations.

Hardy, Colin C. 1996. Guidelines for estimating volume, biomass, and smoke production for piled slash. Gen. Tech. Rep. PNW-GTR-364. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 17 pp. A US Forest Service publication that provides methods for estimating biomass based on the shape and dimensions of slash piles:

Ottmar, R.D., R.E. Vihnanek, J.C. Regelbrugge. 2000. Stereo photo series for quantifying natural fuels. Volume IV: Pinyon-juniper, sagebrush, and chaparral types in the Southwestern United States. PMS 833. Boise, ID: National Wildfire Coordinating Group, National Interagency Fire Center. 97 pp. A photo series that can be compared to a stand to provide a rough estimate of biomass by size class to determine whether slash can be distributed on-site or will need to be removed based on fuel loading considerations.

