NATURAL CAPITALISM SOLUTIONS
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Chapter 5: Develop a Local Action Plan Long Term Initiatives **Waste Management**

DOCUMENT CONTENTS

This process of generating garbage and what becomes of it when it is thrown away produces greenhouse gases (GHGs) in a variety of ways. There is an enormous amount that a community can do to reduce the waste that it produces. Helping citizens reduce waste is part of a program to protect the climate.

In 2003 the U.S produced more than 236 million tons of Municipal Solid Waste (MSW), or trash. This is equal to approximately 4.5 pounds of waste per person per day.[1] The sources of waste generation break down as follows[2]:

- *Paper: 35.2%*
- *Yard Trimmings: 12.1%*
- *Food Scraps: 11.7%*
- *Plastics: 11.3%*
- *Metals: 8.0%*
- *Rubber, Leather, and Textiles: 7.4%*
- *Glass: 5.3%*
- *Wood: 5.8%*
- *Other: 3.4%*

The United States Environmental Protection Agency (EPA) website explains:

The anaerobic decomposition of waste in landfills produces methane.

The incineration of waste produces CO_2 as a by-product.

The transportation of waste to disposal sites produces GHGs from the equipment's fuel combustion.

The disposal of materials indicates that new products are being produced as replacements; this production often requires the use of fossil fuels to obtain raw materials and manufacture the items."[3]

EPA describes four main stages of product life-cycle (raw material acquisition, manufacturing, recycling, and waste management) and illustrates how they connect with GHG emissions. Similarly,

[1] If all forms of the materials flow required to produce what Americans use are counted, including all of the water, gasses and mine tailings, it amounts to 20 times your body weight for every American every day. Yet of all of this stuff, less that 1% is ever embodied in a product and is still there six months after sales. All the rest is waste. For more information on the staggering amounts that we waste, see Hawken, Lovins and Lovins, Natural Capitalism, P52, Little Brown, 1999.
[2] These are 2003 numbers courtesy of EPA Municipal Solid Waste Facts www.epa.gov/msw/facts.htm, 30 September 2006.
[3] U.S. EPA Global Warming, yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsWasteBasicInfoGeneral.html, 5 October 2006.

reducing this waste (through source reduction, recycling and composting) can reduce the methane emitted from landfills, GHG emissions from incinerators, and carbon dioxide emitted from energy consumption. Using fewer wood and paper products decreases deforestation and can result in increased capacity of forests to sequester carbon.[4]

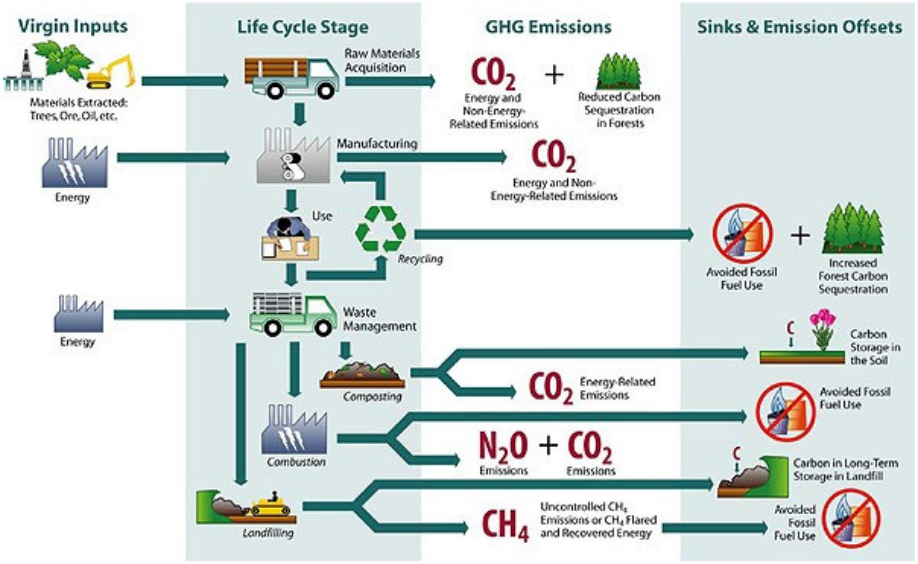


Figure: United States Environmental Protection Agency[5]

Strategies for Municipal Solid Waste Management

There are several management strategies for cities to consider in reducing their waste generation:[6]

Source Reduction

Recycling/ Composting

Incineration/ Combustion

Landfill

Source Reduction

Source reduction is a management strategy to reduce the amount of waste generated from the beginning. These initiatives include altering the design, manufacture and use of materials to decrease the amount of materials that are sent to the landfill. Although cities cannot dictate these practices throughout the community, there are ways to educate businesses and residents to enable them to institute practices that eliminate waste before it is created. One approach is to implement environmental purchasing policies. These policies and practices for municipal operations are described in the Best Bets Section of Chapter 5. Cities can also encourage local businesses to create products in more environmentally friendly ways. Approaches like Design for Environment, and lean manufacturing are gaining in popularity, in part because they reduce the cost of producing goods.[7]

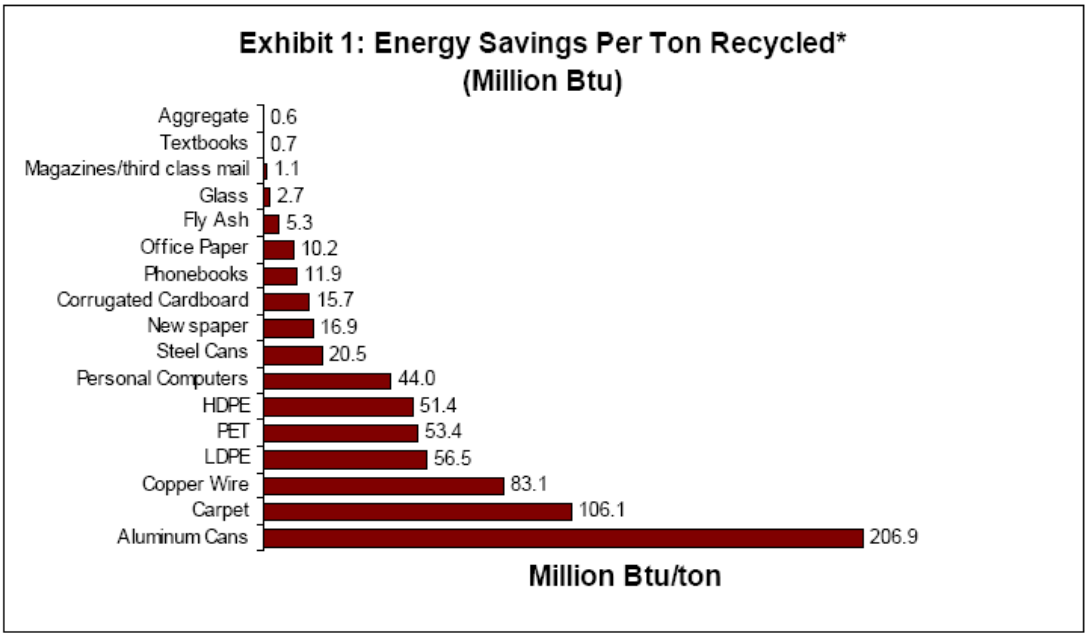
Recycling/ Composting

Much of the focus of MSW management is on diverting waste that is sent to the landfill after it has already been created or disposed of. According to the EPA, recycling and composting diverted 72 million tons of material away from disposal in 2003 - up from 15 million tons in 1980, when the recycle rate was just 10% and 90% of MSW was being landfilled.

[4] U.S. EPA, yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsWasteBasicInfoGeneral.html, 6 October 2006.
[5] U.S. EPA, yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsWasteBasicInfoGeneralLifeCycle.html, 6 October 2006.
[6] EPA Municipal Solid Waste Facts www.epa.gov/msw/facts.htm, 30 September 2006.
[7] For more information on Design for Environment see: www.epa.gov/dfe/. For more information on lean manufacturing see: www.sme.org/leandirections and www.isixsigma.com/me/lean_manufacturing/, 15 January 2007.

Recycling

Materials that are recycled include batteries, recycled at a rate of 93%, paper and paperboard at 48%, and yard trimmings at 56%. Some cities provide curbside recycling programs drop-off centers, buy-back programs and deposit systems.[8] Recycling reduces GHG emissions at two levels: emissions from landfill or incineration and emissions saved from avoiding further need for the virgin material. Energy savings that can be achieved from recycling depend in part on energy intensity of virgin versus recycled material, but range as illustrated by the table below.



* Assumes recycled materials would otherwise have been landfilled. Includes embedded energy.

Table: EPA Waste Management and Energy Savings: Benefits by the Numbers[9]

Composting

Composting is the process of diverting organic waste from the landfill, enabling it to be converted to a soil amendment and using it as fertilizer. Not only does this keep the material from rotting in the landfill and releasing methane, but it reintroduces the carbon to the soil where it can be held for years. Since 1997 the city of Clifton, New Jersey has been actively engaged in educating citizens about waste reduction and climate change. As part of this, the city promotes backyard composting and leaving grass clippings on the lawn. An education campaign explains that, "for every 7.4 tons of materials the city composts, it decreases greenhouse gas emissions by an amount equal to the annual emissions of one car." Due to composting grass and food waste, the city estimates citizens have reduced GHG emissions equivalent to 582 cars' annual emissions.[10]

Yard trimmings and food residuals together constitute 23% of the U.S. municipal solid waste stream.[11] Compostable material includes[12]:

[8] Ibid.
[9] Choate,A., Pederson, L. ,Scharfenberg, J. (ICF Consulting) & Ferland, H,(U.S. Environmental Protection Agency). "Waste Management and Energy Savings: Benefits by the Numbers." yosemite.epa.gov/oar/globalwarming.nsf/UniqueKeyLookup/TMAL6GDR3K/$File/Energy%20Savings.pdf, 6 October 2006.
[10] "City of Clifton: Education is Key to Reducing Climate Change" www.epa.gov/wastewise/pubs/clifton.pdf#search=%22climate%20change%20composting%22, also archived at, www.natcapsolutions.org/ClimateManual/Cities/Chapter5/LongTermInitiatives/WasteManagement/Clifton_WasteWise.pdf, 19 October 2006.
[11] EPA Composting website, www.epa.gov/epaoswer/non-hw/composting/index.htm, 4 October 2006.
[12] EPA Composting website, www.epa.gov/epaoswer/non-hw/composting/basic.htm, 4 October 2006.

- Animal manure
- Cardboard rolls
- Clean paper
- Coffee grounds and filters
- Cotton rags
- Dryer and vacuum cleaner lint
- Eggshells
- Fireplace ashes
- Fruits and vegetables
- Grass clippings
- Hair and fur
- Hay and straw
- Houseplants
- Leaves
- Nut shells
- Sawdust
- Shredded newspaper
- Tea bags
- Wood chips
- Wool rags
- Yard trimmings

Compost programs can be carried out differently depending upon the cities' needs. Common composting methods include source separation of organic compostables done by residents or businesses and separation of mixed waste streams at a centralized location. Major concerns in any composting program include the quality of the compost produced, the cost, and residential involvement.

According to Cornell Waste Management Institute Fact Sheets on Composting:

> There are several trade-offs between source separation and centralized separation of compostables. It is clear that source separation can produce a higher quality, less contaminated compost, as well as maximize the recycling of glass and paper. And while source separation is generally less convenient for the waste generator, pilot programs are finding that many generators like to do it. However, two other important factors, the overall system cost and the quantities of materials recovered for recycling and composting, have not yet been adequately researched or evaluated.[13]

Although it is generally believed that mixed waste collection leads to in increased participation, the results are not conclusive. A few pilot studies have shown that programs requiring separated compostables can have high participation rates as well. For example, projections for materials diverted from landfills for separated streams usually range from 25-50%. Fillmore County in Minnesota has exceeded these projections with 50% compostable diversion rate with an additional 15-20% for recycled material.[14]

Obtaining residential and business involvement is clearly important to maximize the success of composting programs. To educate and encourage participation, the city of Santa Clara offers a master composter training course. The program started in 1995 to educate residents in starting and maintaining home compost. Upon completing the program, master composters are required to volunteer 50 hours to conduct composting workshops and educational outreach in their community. In the past 10 years, the program has trained 275 people, who have collectively donated over 24,000 hours of volunteer time.[15]

Incineration/ Combustion

According to EPA, "To reduce waste volume, local governments or private operators can implement a controlled burning process called combustion or incineration. In addition to reducing volume, combustors, when properly equipped, can convert water into steam to fuel heating systems or generate electricity. Materials can be removed for recycling prior to incineration facilities."[16]

Burning MSW can generate energy while reducing the amount of waste by up to 90% in volume and 75% in weight. In 2001, there were 97 combustors in the United States with energy recovery with the capacity to burn up to 95,000 tons of MSW per day.

While scrubbers and filters can reduce pollutants emitted into the air, incineration still produces carbon dioxide as a by-product, as well as other harmful emissions.

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[13] Tom Richard, Municipal Solid Waste Composting Fact Sheet, Cornell Waste Management Institute, compost.css.cornell.edu/MSWFactSheets/msw.fs1.html, 4 October 2006.
[14] Tom Richard, Municipal Solid Waste Composting Fact Sheet, Cornell Waste Management Institute, compost.css.cornell.edu/MSWFactSheets/msw.fs3.html, 4 October 2006.
[15] Santa Clara County Composting, www.sccgov.org/portal/site/iwm/menuitem.244564f66e6d425580b558bb35cda429/?path=%2Fv7%2FIntegrated%20Waste%20Management%20%28DIV%29%2FHome%20Composting, 4 October 2006.
[16] EPA Waste, www.epa.gov/epaoswer/non-hw/muncpl/landfill/sw_combst.htm, 5 October 2006.

Environmental impacts of MSW-fired power generation plants include:

- Air emission impacts[17]
- Water Resources
- Water Discharge
- Solid Waste
- Land Use Resources

Types of incinerators include:[18]
Modular incinerators, which burn 15-100 tons per day, are small mass burn plants. The main advantage to this system is flexibility - if more capacity is needed, more units can be added onto existing ones. Costs limit the use of this technology because the payback in terms of energy produced over time is much lower than in mass burn plants.

Mass Burning Systems, which burn 200-750 tons per day per unit. The resulting steam can be used for industrial uses or generating electricity. These can combust without any preprocessing or separation, although most mass burn plants can remove non-combustible steel and iron for recycling before combustion using magnetic separation processes. Other non-ferrous metals can be recovered from the leftover ash.

Refuse-derived fuel systems process solid waste before it is burned. A typical plant will remove non-combustible items, such as glass, metals and other recyclable materials. The remaining solid waste is then shredded into smaller pieces for burning. RDF plants require significantly more sorting and handling than mass burn, but can recover recyclables and remove potentially environmentally harmful materials prior to combustion. RDF can be burned in power boilers at factories or even at large housing complexes.

Landfill

The number of landfills in the United States is steadily decreasing—from 8,000 in 1988 to 1,767 in 2002. The capacity, however, has remained relatively constant. New landfills are much larger than in the past.[19]

According to the EPA, MSW landfills are the largest source of human-related methane emissions in the United States, accounting for about 25% of these emissions in 2004. These methane emissions from landfills represent a lost opportunity to capture and use a significant energy resource. Landfill gas (LFG) is created as organic solid waste decomposes in a landfill. This gas consists of about 50% methane (CH_4), the primary component of natural gas, about 50% carbon dioxide (CO_2), and a small amount of non-methane organic compounds.[20] [21] [22] Projects to capture and use landfill gas are explained and examples provided in Chapter 5, Best Bets, Municipal Infrastructure Section.

[17] The average air emission rates in the United States from municipal solid waste-fired generation are: 2988 lbs/MWh of CO2, (it is estimated that the fossil fuel-derived portion of carbon dioxide emissions represent approximately one-third of the total carbon emissions) 0.8 lbs/MWh of sulfur dioxide, and 5.4 lbs/MWh of nitrogen oxides. U.S. EPA, *Compilation of Air Pollutant Emission Factors (AP-42)*, taken from the www.epa.gov/ttn/chief/ap42/, 15 October 2006.
[18] Keep America Beautiful, www.kab.org/partners.asp?id=538&rid=539#MB, 15 October 2006.
[19] To learn more about methane emissions from landfills in the U.S., visit EPA's methane emissions and sources page, www.epa.gov/methane/sources.html, 4 October 2006.
[20] EPA Methane, www.epa.gov/methane/sources.html, 4 October 2006.
[21] For more information on methane emissions from landfills internationally, visit EPA's International Analyses, www.epa.gov/nonco2/econ-inv/international.html, 4 October 2006.
[22] EPA LMOP, www.epa.gov/outreach/lmop/overview.htm, 4 October 2006.

Municipal Solid Waste Management

CASE STUDY: Rapid City, SD

With the realization that their landfills were quickly filling Rapid City, South Dakota, initiated an aggressive composting and recycling programs. A Solid Waste Plan was first passed by the City Council in 1992, but it was not until 2003 that the plan became fully operational.[23] According to Barbara Petroff, project manager for USFilter's IPS Composting System, which was used in the facility, these efforts will extend the life of the landfill by 30 years and enable the city to avoid the purchase of over 1,000 additional acres.

The system composts wastewater biosolids, food, paper, yard waste and other organic residuals and is designed to convert 213 tons of waste into compost per day. A chemical scrubber and biofilter treat the processed air generated at the composting building to remove odors. The city sells the compost for use in golf courses, nursery potting soil, reclaiming land and other applications, for about $20-30 yard. These sales help pay for operating the compost facility, which uses no tax dollars to maintain operations.[24]

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Municipal Solid Waste Management

CASE STUDY: Northwest Indiana

In 2004, the Northwest Indiana Solid Waste District Board[25] began offering education grants for schools in the six-county district. The funds are available for schools to support waste reduction education and recycling. $30,000 is appropriated each year with each county receiving up to $5,000. This augments funding the district has had available for cities and towns since 1997.

Each year, the District Board allocates $120,000 for the Cities and Towns Grant Program to implement or expand waste management programs that coincide with the District's objectives for waste reduction.[26] The purpose of the grant is to support integrated waste management programs around source reduction, recycling, composting and education. $20,000 is allotted for division among the successful applicants from each county. Cities and towns must match grants given by the board by 25%; however, education grants given to schools do not have a matching requirement.

The Board is involved in outreach and education projects throughout the district. Funding for the Board and for grants comes from landfill tipping fees collected in the district. The District encourages creativity and

[23] Rapid City Solid Waste Operations, www.rcgov.com/pubworks/solidwaste/04_solidwaste_report.pdf, also archived at, www.natcapsolutions.org/ClimateManual/Cities/Chapter5/LongTermInitiatives/WasteManagement/RapidCity_solidwaste_report.pdf, 19 October 2006.

[24] Turning Cash into Trash, www.dnrec.delaware.gov/NR/rdonlyres/BB472D80-ECCC-4397-9EAF-B7BE6A544A9E/63/RapidCitySDTurningTrashIntoCashcomposting.pdf, also archived at, www.natcapsolutions.org/ClimateManual/Cities/Chapter5/LongTermInitiatives/WasteManagement/RapidCity_TurningTrashIntoCash.pdf, 4 October 2006.

[25] Northwest Indiana Solid Waste District, www.nwiswd.org, 5 October 2006.

[26] Northwest Indiana Solid Waste District Grants, www.nwiswd.org/grants/citiesandtowns.pdf#search=%22cities%20waste%20reduction%20goals%22, also archived at, www.natcapsolutions.org/ClimateManual/Cities/Chapter5/LongTermInitiatives/WasteManagement/NorthwestIndiana_grants.pdf, 4 October 2006.

unique planning for projects. A short list of some suggestions is provided here:

- **Starting a curbside recycling program–purchasing bins and promotion**
- **Starting a drop-off recycling program–purchasing equipment and promotion**
- **Starting a yardwaste collection program–purchasing equipment and promotion**
- **Starting a backyard composting program–organizing a sale of bins and education**
- **Equipment purchases–to expand current recycling or waste reduction programs**
- **Market enhancement activities–organizing events to promote recycled items**
- **Educational or promotional activities–fairs, festivals, etc.**
- **Buying recycled products–large items for public places to promote recycled items**

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Municipal Solid Waste Management

CASE STUDY: Palo Alto, CA

The city of Palo Alto, California adopted a Zero Waste Resolution in 2005. The goal is to divert 73% of their waste by 2011 and 100% by 2021.[27] The Council also adopted the Zero Waste Strategic Plan as guidance for city staff to achieve the goals.[28]

In 2003, the total tons generated were 166,548. The current city diversion rate of 57% equals about 95,000 tons per year. To achieve its goals for 73% diversion by 2011 as part of a Zero Waste Strategic Plan, the city needs to divert an additional 26,000 tons per year of materials.

Current processing, transfer and disposal costs are about $82.50/ton. On that basis, the avoided costs of processing, transfer and disposal for this additional 26,000 tons would be approximately $2.1 million/year.

Based on assumptions detailed in its strategic management plan, the city estimates that diverting this amount will result in an overall savings of over $800,000 per year.

The Strategic Management Plan suggests city programs, policies, rates, and financial and contractual commitments should be adjusted to help achieve the Zero Waste goal as follows:

Encourage All Sectors to Implement Zero Waste.

Develop Infrastructure Beyond Recycling.

Lead by Example and Advocate Zero Waste.

Update Waste Data and Develop Zero Waste Operational Plan.

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[27] Palo Alto Zero Waste Resolution, www.city.palo-alto.ca.us/zerowaste/documents/zw-Palo_Alto_ZW_Resolution.pdf, also archived at, www.natcapsolutions.org/ClimateManual/Cities/Chapter5/LongTermInitiatives/WasteManagement/Palo_Alto_ZW_Resolution.pdf, 4 October 2006.

[28] Palo Alto, Zero Waste Strategic Plan, www.city.palo-alto.ca.us/zerowaste/documents/Strategic_Plan_FInal_100405.pdf, also archived at, www.natcapsolutions.org/ClimateManual/Cities/Chapter5/LongTermInitiatives/WasteManagement/PaloAlto_Strategic_Plan.pdf, 4 October 2006.

Municipal Solid Waste Management

CASE STUDY: San Jose, CA

San Jose has been one of the leaders in creating incentives for reducing waste by implementing "pay as you throw"[29] policies. Citizens are charged to dispose of garbage and the rate is based on the size of garbage carts. Recycling is unlimited at no charge.

As San Jose website states "By recycling as much as you can, you will be able to use the smaller garbage cart sizes, which cost less."[30]

San Jose is one of the few cities that recycles more than 64% of their solid waste. Since the curbside recycling started the city has recycled:

372,000 tons of newspaper

277,000 tons of mixed paper

132,000 tons of glass

135,000 tons of mixed recyclables

1,900,000 tons of yard trimmings

San Jose Curbside Setup[31]

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Tools for Community Waste Prevention

The community waste prevention toolkit was created by INFORM to help a city walk through eight key questions: [32]

1. **Who is responsible for waste disposal, recycling, and waste prevention in your area?**
   - Which political subdivision (e.g., the city, town, county, etc.) is responsible for solid waste prevention, recycling, and disposal policies and programs? What role does the state play in solid waste regulation, funding, etc?
   - Which specific agency or office is responsible for overseeing solid waste prevention, recycling, and disposal? Who heads it? To whom does this agency report on its operation? Are any other governing bodies involved in an

[29] EPA Pay as You Throw Program www.epa.gov/payt/, 4 October 2006.
[30] San Jose Pay as you Throw Program, www.epa.gov/epaoswer/non-hw/payt/tools/ssanjose.htm, 5 October 2006.
[31] San Jose Curbside Setup, www.recycleplus.org/images/curb_setout_lg.jpg, 4 October 2006.
[32] INFORM, www.informinc.org/cwp_03.php, 4 October 2006.

oversight or funding capacity?
- Who is the community (and state) waste prevention program manager? If there is no such position, who is the recycling coordinator? Is promoting waste prevention officially part of his or her job responsibility? Does the community have any additional staff devoted to waste prevention programs and policy development? What are their responsibilities?

2. **What is the size of the waste challenge?**
   - How much waste does the community/state generate each year, either by weight (tonnage) or volume (cubic yards)? Are waste generation rates increasing, as they are nationally? Where is this information published? How much waste did the community/state generate in the most recent year? What is the trend in generation over the last five years? Absolute waste and waste per capita? What is projected for the next five? Absolute and per capita?

3. **What goals have been set for waste generation, disposal, recycling, and waste prevention?**
   Do specific goals for waste prevention exist? Are they distinct from goals for recycling? How do the goals compare to other state or municipal goals? Have the recycling and waste prevention goals been met? How much waste prevention is projected over the next five years?

4. **How does the community handle its waste?**
   - Is it collected by the municipality or by private carters? Is waste generated by residents, institutions and businesses handled differently? How much waste goes to landfill, to incineration, and to recycling? What are the landfill, incineration and recycling trends over the last five years? What is projected for the next five years?

5. **What waste prevention strategies are being used?**
   - Does the community operate or fund any materials reuse programs, such as drop-off sites, a telephone hotline or a web site facilitating donations and/or exchanges of furniture, appliances, office equipment, art supplies and other items that can be reused?
   - Has the community or state banned curbside collection or disposal of certain items such as tires, batteries, yard waste, appliances and computer monitors in order to promote reuse and recycling?
   - Does the community operate or fund on-site composting, "leave-it-on-the-lawn," or other waste prevention programs for grass, leaves, food scraps, and other types of organic materials? Does it help residents to set up their own backyard composting systems? Do any public offices or institutions compost their own waste?
   - Does the local government have a program to send surplus items to other public offices or institutions for reuse? Does it operate a surplus warehouse? How does the government agency in charge of the surplus program publicize the availability of reusable items to potential recipients? Is the warehouse easily accessible to government employees? Are available items listed on the Internet?
   - Do local schools and other public institutions with food service facilities use reusable dishes and/or cutlery? If not, do they have access to (and space for) dishwashing equipment? How much are they paying to buy and dispose of single-use items?
   - Are leftover paint, carpet, fixtures and other items from construction projects diverted to other community projects?

6. **How does the community educate the public about waste prevention and recycling?**
   - Are there any ad campaigns devoted specifically to waste prevention? Are any written materials provided to residents, businesses and public institutions? How are they disseminated?

7. **What is the waste economic picture?**
   - How much of the community's budget is used to pay for solid waste collection, processing, and disposal (tipping fees)? What is the budget for waste prevention (beyond what is available to promote recycling)? Is the waste prevention budget commensurate with the portion of waste it is expected to address? What is the cost per ton of the community's waste prevention, recycling and disposal programs?
   - Does the community provide residents, businesses, and/or public institutions with economic incentives to reduce their generation of waste? For example, do residents, businesses or public institutions pay for disposal based on the amount of waste they generate?

8. **What laws and public policies promote waste prevention?**

   Has the local or state government adopted any goals or mandates for reducing the amount of waste generated (in addition to recycling goals and mandates)? What are the respective timeframes for reaching these goals or mandates? How does the community plan to measure whether waste reduction goals or mandates have been met?
   - Has the community or state passed any legislation promoting waste prevention, such as mandatory bottle deposits or requirements that product manufacturers collect electronics, batteries, carpeting or other items for reuse or recycling (considered to be "extended producer responsibility" requirements).
   - Has the locality enacted any executive orders or laws directing government agencies to practice waste prevention and/or environmentally preferable purchasing? Are public agencies encouraged to use products powered by alternatives to batteries or to use rechargeable batteries? Do public agencies use duplexing copiers and printers, remanufactured laser toner cartridges and other waste-reducing products? Who is in charge of the community's EPP program?
   - Does the local government encourage vendors to practice waste prevention? For example, have government contracts been written to give preference to or require vendors to ship their products in bulk or reusable containers?
   - Does the local government or state provide incentives for businesses to practice waste prevention? For example, does it provide financial support to businesses that want to acquire dishwashing equipment? Is technical support available to facilitate waste prevention among businesses? Does the community reward or publicize companies that encourage waste prevention (for example, by taking back hangers and packaging material for reuse)?

Additional Resources

List of **Waste Management Resources**
www.dnrec.delaware.gov/SWMTWG/Documents.htm

EPA WasteWise Program
WasteWise is a free, voluntary, EPA program through which organizations eliminate costly municipal solid waste and select industrial wastes, benefiting their bottom line and the environment. WasteWise is a flexible program that allows partners to design their own waste reduction programs tailored to their needs.
www.epa.gov/wastewise/

EPA Waste Reduction Model (WARM)
EPA online calculator created to help solid waste planners and organizations track and voluntarily report greenhouse gas emissions reductions from several different waste management practices.
yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsWasteWARM.html

U.S. Composting Council
The USCC is a trade and professional organization promoting compost. They are involved in research, public education, composting and compost standards, expansion of compost markets and the enlistment of public support.
www.compostingcouncil.org/index.cfm

Grassroots Recycling Network Zero waste Briefing Kit,
www.grrn.org/zerowaste/kit/briefing/index.html

Conversion facility, fermentation to methane
www.jgpress.com/archives/_free/000479.html

Gasification for Power Generation
www.alamedapt.com/newsroom/reports/finalgasification.html

Toronto Study on New Technologies—good brief descriptions
www.toronto.ca/wes/techservices/involved/swm/net/pdf/overview_net.pdf

UC Davis Review of New Technology
biomass.ucdavis.edu/pages/reports/Conversion-PhaseI_IWM-C0172.pdf

City of Berkeley Resolution
No. 62,849–N.S, Adopted March 22, 2005
Reaffirming the city's zero waste goal and referring the issue to the solid waste commission.
www.ci.berkeley.ca.us/sustainable/government/62849.pdf

For more resources, check the footnotes of this document.

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