Austin, Texas

Zero Waste Strategic Plan



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www.ecocycle.org/zerowaste/zwsystem

December 4, 2008

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CITY COUNCIL RESOLUTION

EXECUTIVE SUMMARY

Zero Waste is a design principle that goes beyond recycling to focus first on reducing wastes and reusing products and then recycling and composting the rest. Zero Waste works to redesign the system to mimic natural systems, recognizing that one man's trash is another man's treasure and everything is a resource for something or someone else. Currently, Austin is estimated to lose over $40 million annually by sending materials that could be recycled or reused to area landfills.

Austin's Zero Waste system will strive to recover that estimated loss and eliminate waste, or get darn close. This Plan defines success as reducing by 20% the per capita solid waste disposed to landfills by 2012, diverting 75% of waste from landfills and incinerators by 2020, and 90% by 2040.

Zero Waste Businesses are already leading the way, diverting over 90% of their wastes from landfills and incinerators. Local Zero Waste Businesses have documented that they save money, reduce their liabilities, increase their efficiency and contribute significantly to addressing climate change. Austin's Zero Waste Plan considered Austin's current and planned public and private solid waste infrastructure, as well as the City's Climate Protection Program.

Recommendations developed through this process are integral to achieve the City adopted United Nations Urban Environmental Accord's goal to reduce by 20% the per capita solid waste disposal to landfills by 2012 and Zero Waste by 2040. Zero Waste initiatives could reduce greenhouse gases by nearly 500,000 metric ton carbon equivalent (MTCE), making Zero Waste one of the most significant contributors to reducing climate change that the City can influence at the local level.

The City of Austin was an early leader to implement recycling and to adopt producer responsibility and commercial recycling policies. The City of Austin's Zero Waste Plan proposes to build on the City's past success to work together throughout the region and state to:

- Expand and improve local and regional reuse, recycling, and composting programs;
- Adopt new rules and incentives to reward those who embrace the goal of Zero Waste;
- Develop Green Campuses and Resource Recovery Parks for Zero Waste infrastructure;
- Advocate for producer and retailer responsibility for product and packaging wastes, and bans on problem materials;
- Educate and advocate for a Zero Waste agenda as part of climate change and sustainability policies and programs; and
- Involve the community through collaboration and partnerships to achieve Zero Waste.

On a regional scale, the Capital Area Council of Government's (CAPCOG) Solid Waste Advisory Committee noted that Austin's Zero Waste initiatives support the waste reduction goals of the Regional Solid Waste Management Plan and the recommendations of the Market Analysis of Recoverable Materials (2007) prepared for the CAPCOG region by R.W. Beck.

The City of Austin has already taken the first critical step by committing to Zero Waste. This plan is intended to serve as the first step on a long path towards a Zero Waste future. Dedication, collaboration, and continual re-evaluation will be essential to Austin's success.

A. BACKGROUND AND EXISTING SYSTEM

1. BACKGROUND

In 2005, the City of Austin Solid Waste Advisory Commission (SWAC) and its Long-Range Solid Waste Planning Task Force (Task Force) worked with staff of the City Solid Waste Services Department to develop a scope of work for the Zero Waste Plan. A consultant was solicited to develop a Zero Waste Plan that would:

- Consider current and planned public and private solid waste infrastructure;
- Consider the City of Austin's Climate Protection Program and the United Nations Urban Environmental Accords goal to reduce by 20% the per capita solid waste disposal to landfills by 2012 and zero waste by 2040;
- Emphasize reduction, reuse, and recycling of waste;
- Include a specific timetable for each priority, including actions to be taken for the greatest impact on the diversion of materials sent to landfills;
- Estimate order of magnitude costs for each priority action;
- Include public education and outreach to promote the concepts of the plan;
- Integrate the concept of eco-industrial parks;
- Include effective methodologies for maximizing Producer Responsibility;
- Address applicable rules, regulations and policies necessary to support zero waste goals;
- Address rules, regulations, policies and infrastructure investments that constitute barriers to achieve these goals; and
- Obtain input from the Task Force and SWAC, and seek input from a broad range of stakeholders, including businesses, environmental organizations, and the community at large.

On November 29, 2007, the City Council awarded a contract to Gary Liss & Associates (GLA), Loomis, CA to develop a Zero Waste Plan for the City of Austin.[1] GLA reviewed background information provided by City staff then met in Austin monthly over the following four months in an extensive series of public meetings, focus groups and interviews with key stakeholders, business leaders, environmental organizations and the community at-large. A list of the meetings held by GLA can be found in Appendix A.

At the first public presentation before the SWAC in January 2008, over 50 stakeholders and the public attended. The event received media attention from four local TV stations, two radio stations and two Austin newspapers. The focus of the first presentation was an Introduction to Zero Waste and what other communities and businesses were doing around the country. In February, GLA presented its preliminary findings to over 100 stakeholders and the public on its analysis of Austin's existing programs and facilities as well as untapped service opportunities that could help Austin achieve Zero Waste. In March 2008, GLA met with over 100 individuals in a series of three focus groups on: Organics; Green Building; and Construction and Demolition Debris Recycling and Reuse. For each of the focus groups, GLA invited service providers and waste generators, as well as other interested stakeholders, to help clarify the needs for Austin. In March, GLA also made an initial presentation to the Capital Area Council of Governments

(CAPCOG) Solid Waste Advisory Committee (SWAC), to obtain their input on Austin's Zero Waste initiatives. In April 2008, GLA presented Draft Recommendations to be part of the Zero Waste Plan, and solicited input from stakeholders and the public. GLA also met with the CAPCOG SWAC and separately with Travis County leaders to explore how Austin could work best with its regional partners on its Zero Waste initiatives. The public input and recommended policy options received were categorized based on goals/objectives and can be found in Appendix B.

This Plan summarizes the analysis and input received on Zero Waste and makes recommendations for the City of Austin on how to proceed to Zero Waste. Although there are several recommendations included in this Plan, there is no one right way to get to Zero Waste. Many paths can be taken. Zero Waste is about the commitment and the journey. Austin has taken the first step to commit to this goal. Everything else should fall into place by repeatedly evaluating whether and how it will contribute to Zero Waste. To reach its goal, the City will require a great deal of effort and support by all stakeholders: City staff and elected officials; solid waste, reuse, recycling and composting service providers; local businesses; environmental and civic groups; schools and colleges; religious leaders; County and regional staff and elected officials, State representatives for this region in the State Legislature, and State agencies. Hopefully this collaborative Zero Waste Plan process will serve as the genesis to continue discussion, planning, and action towards a Zero Waste future.

2. ZERO WASTE AND CLIMATE CHANGE

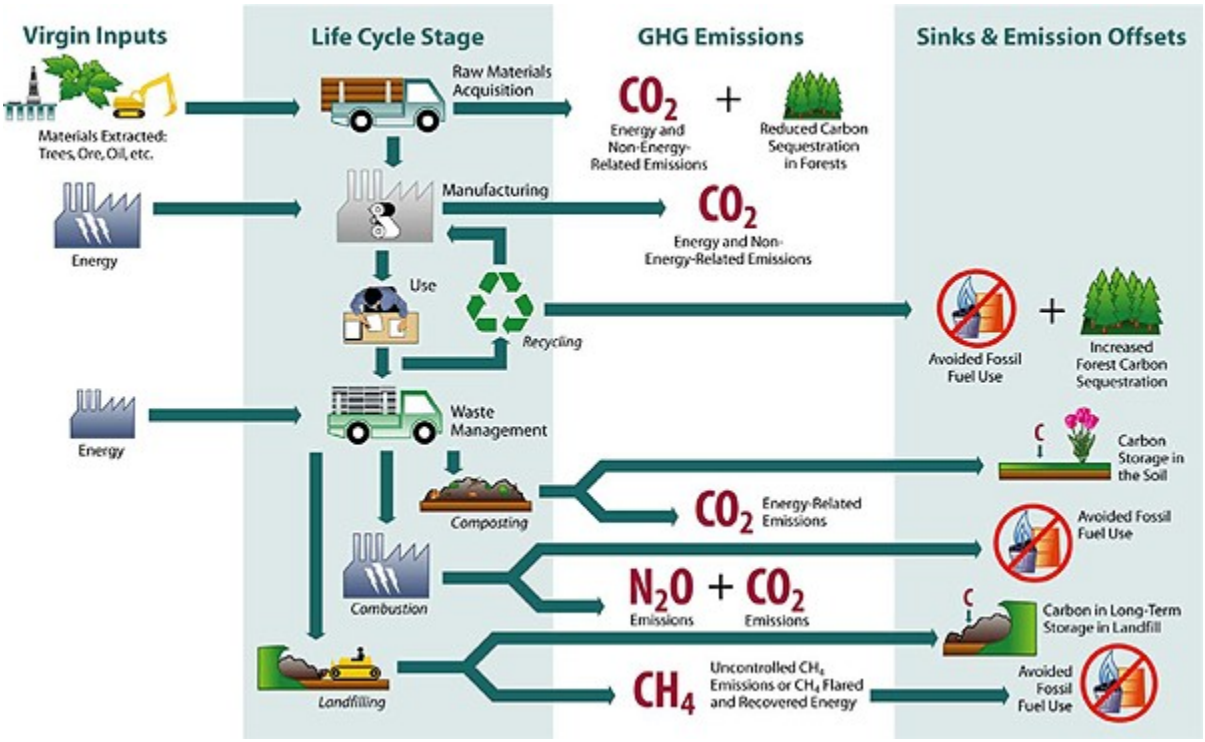
Concern about climate change has altered how communities handle and think about solid waste. Under Mayor Will Wynn's leadership, the City signed onto the Urban Environmental Accords which commits Austin to reduce its waste per capita by 20% by 2012 and achieve Zero Waste by 2040.[2] In 2007, the City of Austin also adopted its **Climate Protection Plan (CPP)** that highlights the importance of these issues**.** The intent of the CPP is to reduce greenhouse gas (GHG) emissions, the primary contributor to climate change, make Austin the leading city in the nation in the fight against global warming.[3] The CPP elements include:

- Municipal Plan - Make City of Austin facilities, fleets and operations carbon-neutral by 2020.
- Utility Plan - Expand conservation, energy efficiency, and renewable energy programs to reduce Austin Energy's carbon footprint; cap carbon dioxide emissions from existing power plants; and make any new electricity generation carbon-neutral.
- Homes and Buildings - Update building codes for new buildings to be the most energy-efficient in the nation, pursue energy efficiency upgrades for existing buildings, and enhance Austin Energy's Green Building program.
- Community-wide - Engage Austin citizens, community groups, and businesses to reduce greenhouse gas emissions throughout the community.
- "Go Neutral" Plan - Provide tools and resources for citizens, businesses, organizations, and visitors to measure and reduce their carbon footprint.

But how does Zero Waste influence Climate Change?

The U.S. Environmental Protection Agency has been studying the links between solid waste and climate change for over a decade. Their website contains detailed analysis and summary steps that individuals and businesses can take to reduce their carbon footprint.[4] The EPA graphic below (Figure 1) highlights "the different sources of GHG emissions from waste….The disposal of solid waste produces GHGs in a number of ways. First, the anaerobic decomposition of waste in landfills produces methane, a GHG 21 times more potent than carbon dioxide. Second, the incineration of waste produces carbon dioxide as a by-product. In addition, the transportation of waste to disposal sites produces GHGs from the combustion of the fuel used in the equipment. Finally, disposal of materials indicate 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." [5]

Figure 1
Life Cycle of Waste



The State of California has given additional consideration to the relationship between climate change and solid waste disposal. The California Air Resources Board (CARB) is responsible for implementing AB32, the Global Warming Solutions Act. CARB convened the Economic and Technology Advancement Advisory Committee (ETAAC) which was comprised mostly of business leaders from different sectors of the state's economy. In their Final Report adopted in February 11, 2008, ETAAC recognized the connections between solid waste disposal and climate change:

> "ETAAC recognizes the hierarchy of waste reduction, reuse, and recycling to reduce GHG emissions. These waste management strategies also avoid the energy use and other environmental impacts associated with extracting, processing, and transporting raw materials. Eliminating upstream emissions by reducing,

recycling and composting can result in substantial climate change mitigation benefits."[6]

ETAAC then recommended the following measures to be adopted by the State:

- Develop Suite of Emission Reduction Protocols for Recycling
- Increase Commercial-Sector Recycling
- Remove Barriers to Composting
- Reduce Agricultural Emissions through Composting

The latest report on these issues, *Stop Trashing the Climate*, "provides compelling evidence that preventing waste and expanding reuse, recycling, and composting programs — that is, **aiming for Zero Waste — is one of the fastest, cheapest, and most effective strategies available for combating climate change**. This report documents the link between climate change and unsustainable patterns of consumption and wasting, dispels myths about the climate benefits of landfill gas recovery and waste incineration, outlines policies needed to affect change, and offers a roadmap for how to significantly reduce greenhouse gas (GHG) emissions within a short period."[7] The report also finds that "**significantly decreasing waste** disposed in landfills and incinerators **will reduce greenhouse gas emissions the equivalent to closing 21% of U.S. coal-fired power plants.** This is **comparable to** leading climate protection proposals such as **improving national vehicle fuel efficiency**. Indeed, preventing waste and expanding reuse, recycling, and composting are essential to put us on the path to climate stability."[8]

Based on the information gathered above, one of the keys to addressing climate change locally is by reducing the waste sent to landfills to reduce the methane produced in anaerobic conditions. **Even the best-managed landfills *over the average lifetime of the facility* are not expected to recover over 75% of the gases produced.**[9] In addition, 30 years after landfills are approved by the federal government for complete closure, private owners are no longer required to manage those landfills under federal law. The surfaces of sites that are not maintained open up allowing rain to enter through the cracks. Gas and leachate are produced and are no longer controlled. In addition to these direct landfill impacts locally, **for every ton of solid waste produced locally, there are 71 tons of waste produced "upstream" from mining, manufacturing and distribution of products.**[10] These upstream impacts also have many climate change implications as well, some of which are factored into calculators available from the US Environmental Protection Agency.

Based on this data, Zero Waste needs to be an integral part of the City's climate change initiatives. This will take close coordination and strong partnerships between the City's Climate Protection staff and the staff of the Solid Waste Services Department. In addition, all City of Austin facilities, fleets and operations should take an active role in evaluating and implementing ways to help meet Zero Waste goals as part of these climate change initiatives.

3. EXISTING SOLID WASTE AND RECYCLING SYSTEM

In considering how to get to Zero Waste, it is important to understand how Austin's solid waste management system currently functions, including what is within the City of Austin's control and what is not.

The City of Austin's Solid Waste Services Department is responsible for city-wide litter abatement and collection of solid waste from 163,965 residential customers, 234,965 anti-litter customers, and 2,603 commercial customers, which includes small multi-family dwellings of 4 units or less and a limited number of qualifying small businesses. In addition to providing weekly garbage pick services, the City also offers curbside recycling to its customers.

Using a conservative 7.3 lbs. per person per day and Austin's population of 743,358, GLA estimated that the annual tons generated for landfill in Austin, Texas is projected to be about 1,000,000 tons per year.[11] Modeling information from regional data and other cities of similar size and character, GLA then estimated the percentages by market categories of contributing materials in the 1,000,000 tons per year of discards. Many of the values were reconfirmed through site visits with recycling and composting industry representatives in the area. City recycling collection data also indicates that this analysis is fairly accurate. In FY06/07, the City collected over 70,000 tons of recyclable and organic resources: 31,876 tons (45.5%) from curbside recycling; 26,635 tons (38.1%) from collection of yard trimmings and brush; and 12,122 tons (17.3%) from private users of the City's materials recovery facility. Figure 2 separates these materials into categories and identifies compostable organics compose over half of the total material discarded. These categories were then broken out to the estimated annual tonnages of marketable resources and issued a value based on current market prices (See Table 1). Calculations indicate that the **value of the materials currently sent to the landfill and lost to the local economy is over $40 million annually**.[12]

Figure 2

Austin Texas Discards Sorted into the 12 Market Categories

Note: Half of the Materials are Suitable for Compost

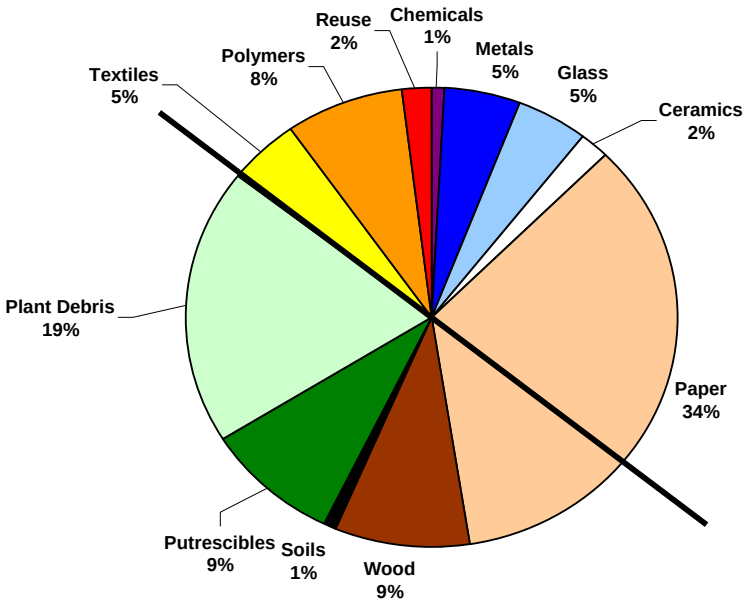


Table 1
Resource Commodity Analysis Austin Texas
(In order of value of materials discarded)

Categories	%	Annual Tons	$/Ton[13]	Annual $
Paper	36	360,000	50	18,000,000
Reusables	2	20,000	550	11,000,000
Textiles	5	50,000	100	5,000,000
Polymers	8	80,000	50	4,000,000
Metals	5	50,000	40	2,000,000
Plant Debris	20	200,000	7	1,400,000
Putrescibles[14]	9	90,000	7	630,000
Glass	5	50,000	10	500,000
Wood	6	60,000	8	480,000
Ceramics	2	20,000	4	80,000
Soils	1	10,000	7	70,000
Chemicals	1	10,000	5	50,000
Total	**100**	**1,000,000**		**$ 43,210,000**

With nearly 60% of the residents of Austin living in single-family dwellings and participating in curbside recycling for recyclable materials and organics, achieving Zero Waste among single-family residents is an ambitious, but achievable goal. Yet, is the same true for commercial and multi-family contributors?

While the City is responsible for single-family residential collection, multi-family residences, businesses, and institutions must contract with private haulers to collect and process their materials. Currently, the City can only control the flow of the residential streams, but not the commercial streams. The City can, however, influence what happens in the commercial sector through the policies, programs, and ordinances it adopts. This is best evidenced in the City's Commercial Recycling Ordinance passed by the Austin City Council in 1998 (Appendix C).[15]

According to the City's Recycling Ordinance:

- Apartments and Multi-Family Communities with 100 units or more must provide on-site recycling of any four of the following materials: aluminum cans, tin/steel cans, glass containers, plastic bottles, newspaper, cardboard, kraft paper bags, and home office paper.
- Businesses and Office Buildings with 100 employees ore more must provide on-site recycling of any two of the following materials: aluminum cans, tin/steel cans, glass containers, plastic bottles.

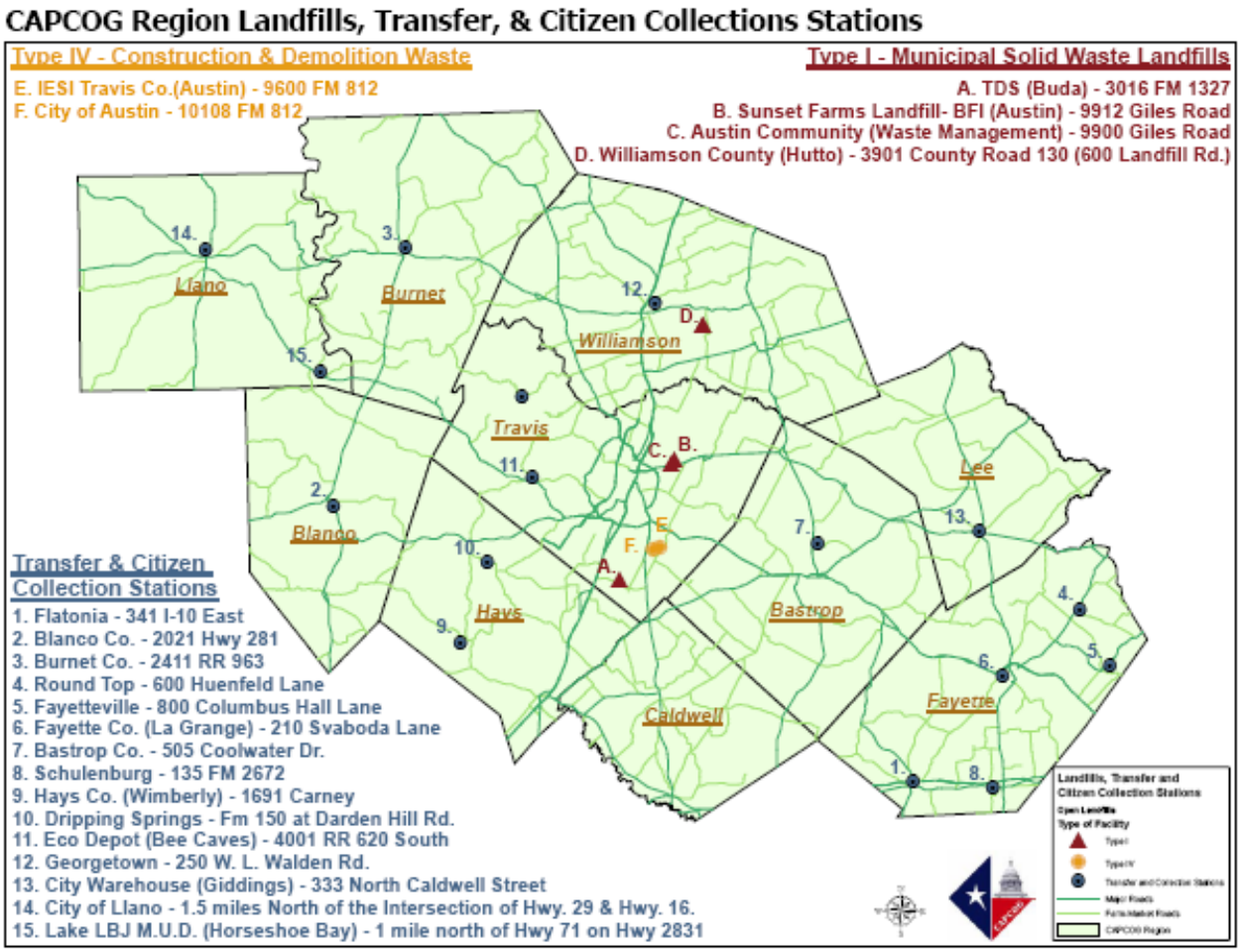
In part because of the Recycling Ordinance, numerous large buildings recycle paper, thereby supporting a substantially sized paper recovery industry in Austin. Similar benefits from the Recycling Ordinance were reported for other recyclables making the recovery of materials in Austin well established for most commodities. International markets are also thriving and have dramatically increased the value of these commodities in recent years contributing to the success

and sustainability of these markets. Clearly, the City is capable of having a greater impact on the commercial and institutional collection system by collaborating with stakeholders to adopt policies and programs that incentivize, encourage, and, as a last resort, require more environmental responsibility to stimulate a sustainable green market economy. Where collaboration falls short, the City can influence waste management practices by leveraging its regulatory authority over waste haulers.

Under Texas State Law, cities have the authority to regulate solid waste service providers in their communities. The City of Austin currently issues licenses to regulate commercial solid waste haulers authorized to transport waste in the City limits. The current annual fee is a multi-tiered system based on the number of containers and the number and size of trucks operating within the City limits by the hauler. The City of Austin may be able to use its regulatory authority to obtain more information about the total amount of waste being disposed by haulers, develop funding resources to support Zero Waste initiatives, and develop incentives to encourage recycling.

As noted above, the City has limited control over the disposal system. In fact, now that the City has closed its own landfill, it is just like the many other regional landfill users. Like many Texas cities, Austin is part of a regional system of landfills, transfer stations and citizen collection stations as depicted in Figure 3.[16] According to the Capital Area Council of Government's

Figure 3



(CAPCOG) Regional Solid Waste Management Plan, "…the implementation of Subtitle-D Regulations has produced the most significant impact on solid waste disposal in the State of Texas…. moving away from reliance on smaller rural landfills, to more regionalized systems, based on larger landfills."[17] In 1990, there were thirteen (13) landfills receiving waste in the CAPCOG region. By 1995, there were six (6) permitted landfills in the CAPCOG region receiving waste. As of 2008, the CAPCOG region still has six (6) permitted landfills receiving waste.

With the CAPCOG Region continually growing and outpacing other Texas communities, this region will be faced with a need to expand existing landfills, open new landfills, or divert a drastic amount of waste from current landfills to properly ensure the health and safety of the region. It has been projected that a total of 33 counties send some if not all of their waste to the four Austin area landfills in addition to the ten Counties that make up CAPCOG. Although there are some possibilities for controlling the flow of wastes going to those landfills, it will take a strong regional consensus to move those possibilities forward.

The focus of CAPCOG, outlined in the most recently adopted Regional Plan, is to:

- Encourage Household Hazardous Waste Collection and Diversion Programs
- Promote public education on integrated solid waste management
- Promote community clean up events to provide alternatives to illegal dumping
- Continue and enhance current illegal dumping enforcement programs
- Continue effective and efficient management and operation of recycling services
- Explore alternatives to dealing with the disposal of special wastes, including construction and demolition debris, oil, used tires and electronics
- Encourage proper management and disposal of solid waste
- Promote reduction in the disposal amount of yard waste and encourage recycling

Many of the focus items identified by the Regional Plan are addressed in the following analysis and recommendations, highlighting how Zero Waste is a logical extension of the policies and programs that have already been adopted in the region.

B. POLICY AND PROGRAM OPPORTUNITIES

1. SERVICE OPPORTUNITY ANALYSIS

Service opportunity analyses identify existing services available and highlight where new services are needed to help the community reach Zero Waste. In a Zero Waste systems approach, one of the first steps to be completed is an inventory of the materials generated in the service area and identification of the facilities that reuse, repair, recycle and/or compost the materials. This analysis incorporates all material generated and all facilities processing the materials, including self-hauled, public, and private service providers. The inventory does not, however, include landfills or incinerators. A complete analysis of the inventory will not only identify existing programs and facilities in the Austin area that currently reuse, recycle or compost discarded materials generated in Austin, but will also reveal voids or gaps in material markets and services available.

Discards are identified by standard classifications and sorted into twelve market categories, similar to the pie chart in Figure 2. For each classification, market options are identified, both inside Austin and outside Austin, including internationally. This step also allows identification of products or packages that have unacceptable disposal options and/or need opportunities for new services.

Issues of access, opportunity, availability and knowledge are addressed next. In many cases, such as disposable diapers, the inventory shows that there is no reuse, recycle or compost option. In such instances, these items should be addressed as producer responsibility issues. As Martin Bourque of the Berkeley Ecology Center explains, "If it can't be reused, repaired, rebuilt, refurbished, refinished, resold, recycled or composted, then it should be restricted, redesigned, or removed from production."[18]

The results of the market inventory can be found in Appendix D. Options to improve existing systems are summarized in the Program and Facility Analysis section of this Plan.

2. PROGRAM AND FACILITY ANALYSIS

A review of the service opportunities identify the areas where new rules coupled with redesigned storage, collection and processing systems would allow for the diversion of more materials from area landfills. Table 2 identifies the key opportunities.

Based on the information gathered, the most opportunity to improve diversion exists among the materials that already have a market potential to be reused, composted, or recycled such as used construction materials, treated wood, and organic materials such as food wastes. Several of the policy options discussed later in this Plan have the same goal as Single Stream Recycling and Resource Recovery Centers, making services more readily available in order to increase participation and expand the diversion services provided in Austin. There is also a significant amount of work needed in the area of making manufacturers responsible for taking back products and packaging they sell in the area that are not safe for landfills or are difficult to recycle locally.

Table 2
Program and Facility Opportunities

Material	Current Services	Program/Facility Opportunity
Food Waste	Some commercial food discards are accepted at one site.	Operating capacity is needed for the whole city.
Fish and Meat Waste	Some commercial discards are accepted at one site.	Operating capacity is needed for the whole city.
Used Construction Materials	Two companies take selected materials.	Need 12-category resource recovery centers located in neighborhoods to handle.
Treated Wood	One company is limited to accepting reusables.	Need 12-category resource recovery centers located in neighborhoods to handle.
Fines (e.g. soil from C&D excavation)	Residential market available. Limited commercial services available.	Need 12-category resource recovery centers located in neighborhoods to handle clean soil or establish systems for nurseries and contractors handle these materials directly
Window and Other Glass	Limited market if recovered completely during construction/demolition.	Need glass market for window and other glass
#3-7 and Other Plastics	Limited local market	Existing infrastructure should be evaluated to determine if it is capable of handling capacity.
Diapers/Hygiene Products	No market.	Products need redesign, restrictions or regulations.

4. ZERO WASTE POLICY AND PROGRAM OPTIONS

As previously stated, there is no one right way to achieve Zero Waste and many paths can be taken. The City has already adopted significant local policies establishing rules for residents and businesses to participate in the City's solid waste and recycling system. The City's Recycling Ordinance was designed to:

- Increase access to the benefits of recycling and waste reduction for area businesses and multi-family properties within the City of Austin
- Help increase the life of local landfills
- Decrease disposal costs for area businesses and multi-family properties
- Have a positive impact on the environment generally in terms of reduced pollution and energy consumption.

The Recycling Ordinance empowers the Director of the Solid Waste Services Department to adopt and revise rules, procedures and forms to regulate commercial and multi-family recycling in the City of Austin. Revisions to existing policies as well as most of the additional policies

recommended below could cite the same authorities and purposes identified by the Recycling Ordinance and enhanced by the provisions of the CPP adopted by Austin City Council in 2007.

During the Zero Waste Plan process, several policy and program options were discussed among community members and stakeholders. Appendix B details the options discussed with and recommended by the public to provide a better understanding of everything considered in making recommendations for the City of Austin and the region. Additionally, as the City achieves its goals, staff can look back at the options discussed with and recommended by the public to discuss and evaluate whether or not to implement the remaining options. The policy and program options detailed in Appendix B are organized by the following categories:

- **Upstream** - Advocate for Extended Producer Responsibility (EPR) legislation and programs for producers to take back their products and packaging.
- **Downstream** - Reduce, reuse, recycle and compost all materials that are discarded for their highest and best use.
- **Green Business, Green Buildings and Jobs** - Reinvest discarded resources into the local economy with incentives and support for green, sustainable, and Zero Waste businesses. Entrepreneurs will create new green collar jobs from discarded resources if given the opportunity, resources and stimulus to do so.
- **Residuals Management and Regional Coordination** – Stop or regulate the flow of wastes from outside the area into landfills in the Austin area as the region reduces its reliance on landfills.

These options were not intended to be adopted together. Some are complementary while others work best independently. In some cases, options may even conflict with one another. Each of the listed policies and programs were further organized into 3 categories:

- **Voluntary, Education & Incentives** may be the easiest policies and programs to implement, but may not achieve goals by themselves. Most of these options would complement other policies and programs.

- **New Rules & Advocacy** may be done with virtually no City funding required, except for initial education and ongoing enforcement staffing. These options may also require the largest investment of political capital to adopt them, but could also shift the responsibility for funding new programs to those who are currently benefiting the most from the sale of products and packaging. These approaches may also require the City to work with other interested communities and stakeholders in Texas to develop collaborative policies and programs, and/or to work with the State Legislature to adopt new policies and programs statewide.

- **New City Programs** will generally require the most funding. For example, new City programs could expand the approach used to serve single-family residents to serve multi-family residents and businesses. Whether the City provides the services itself, or contracts for services to be provided, it will need to budget for those services and plan for the likelihood of on-going expenses. New programs for multi-family and commercial businesses will require new funding sources,

which could be obtained through cooperative efforts with private service providers or from new rate structures, fees, or taxes on disposal.

UPSTREAM POLICY AND PROGRAM OPTIONS

Wasting is a design decision and does not have to be inevitable. Producers design products and packaging "upstream" from the local government solid waste and recycling system. For every ton of waste in the local solid waste and recycling system, there are 71 tons produced "upstream" from mining, manufacturing and distribution of wastes.[19] Producers and retailers have shifted the responsibility of managing the disposal of after-life products to local governments. In a Zero Waste system, once they accept physical and/or financial responsibility for their products and packaging, producers and retailers will have an incentive to design waste out of the system. This is known as "Extended Producer Responsibility" (EPR) or "Product Stewardship."

EPR is one of the most powerful opportunities that exist to move society and the economy towards Zero Waste, particularly for products and packaging items that are toxic or currently difficult to reuse, recycle or compost. In advocating for EPR, the system should establish efficient repair and reuse programs to retain the form and functions of products, rather than taking back products and packaging to just be crushed or shredded for recycling. EPR systems should also ensure the redesign of products and packaging to eliminate waste and encourage durability and longer product life cycles.

Local governments have authority in the area of health and sanitation to make rules as to what can and cannot be placed into the City waste system. If a material has been designated by a State or Federal Agency to be a pollutant or banned from the landfill, local governments can require the seller of the material to be responsible for disposal of that product. In New York City, an ordinance was recently adopted that requires all retailers of electronic products to take back those products to be reused or recycled.[20] The statutory basis for the New York City legislation was the state's Solid Waste Management Act, which requires local governments to provide solid waste and recycling services. Although Texas's Solid Waste Disposal Act does not provide local governments with the exact same regulatory authority as in New York, Austin can work with other regions and surrounding communities to identify key elements of the Texas Solid Waste Disposal Act that can be utilized or modified to help the Austin area achieve Zero Waste goals.

Under the Texas Solid Waste Disposal Act, the City of Austin and other local governments can assert their combined influence to develop and adopt policies that keep certain materials out of regional landfills. Once City and/or regional staff identify and agree on the options they are most interested in, further legal review will determine how the policy can be adopted locally, regionally, or whether legal authority from the State may be required. If State legislation is required, the City could use this opportunity to collaborate with surrounding communities, identify the materials that are most difficult and costly to manage locally/regionally, and unite local governments behind a common goal of shifting disposal responsibility of certain materials back to the producer.

Under Mayor Kirk Watson's leadership from 1997-2002, the City of Austin was an early leader in favor of producer responsibility and take back programs. In 2007, the Austin City Council and other local governments took a stand in favor of producer take back recycling of electronic

waste.[21] As a State Senator, Kirk Watson sponsored HB2714, landmark legislation passed in 2007 by the Texas Legislature requiring manufacturers who sell computers in Texas to provide convenient and free computer recycling. This is a model for other ways to collaborate on a statewide basis to develop the new rules, policies and incentives that will be essential to achieve Zero Waste.

DOWNSTREAM POLICY AND PROGRAM OPTIONS

Downstream policies and programs are designed to reduce, reuse, recycle and compost materials that are discarded based on their highest and best use. Highest and Best Use Hierarchies attempt to rank systems based on their ability to maximize resource conservation and minimize environmental and economic impacts. Austin may wish to use or adopt the hierarchy in Appendix H to guide its evaluation and consideration of future Zero Waste downstream policy and program options.

Zero Waste has been defined by the Zero Waste International Alliance as an economic and physical system that emulates natural cycles, where all outputs are simply an input for another process. This means designing and managing materials and products to place the highest priority on conserving resources and retaining their form and function without burning, burying, or otherwise destroying their form and function. It means eliminating discharges to land, water or air that harm natural systems. It means preventing rather than managing waste and pollution, and recommitting to the priority order of the waste reduction hierarchy which is: (1) reduce consumption; (2) reuse what is left; (3) recycle anything that is no longer usable; and (4) landfill any residuals.

Voluntary policies, education and incentives should be designed to engage, educate, motivate and inspire diverse audiences with simple, positive, clear communications. Policies and programs should develop partnerships within and beyond Austin, among other government agencies, businesses, and non-government organizations. Policies, incentives and new rules should aim to reduce and eliminate incentives for landfilling materials and phase out use of toxic materials in products and processes. Educational initiatives should champion, highlight, and celebrate successes in moving towards Zero Waste. The City should provide information about Zero Waste and sustainability actions – what to do, how to do it, and why it is important.

The two key areas of discussion for downstream options focused on (1) expansion of reuse, recycling, and composting opportunities and (2) modifying existing systems such as fee structures and permitting processes to create incentives to recycle more and reduce waste.

Expanding Reuse, Recycling, and Composting Opportunities. Like Austin, many communities are now implementing "single-stream" recycling programs for their single-family residential customers. Austin is replacing the current 18-gallon recycling bins with 90-gallon rolling carts in which all recyclables can be combined together. The new program is expected to increase recycling participation rates by 40%, based on the success of City conducted pilot programs. The reason for such a high increase in participation can be attributed to the fact that single-stream recycling programs make it more convenient for the public to participate and recover more materials.

The key to the success of single-stream recycling programs is providing strong education and information to participants and ensuring that processing facilities are designed and operated to produce no more than 10% residue. For Austin, it will also mean educating the public that separating "wet" waste from "dry" recyclable materials, which will be collected together in the single-stream carts, will be essential to ensuring single stream's success. Many successful Zero Waste communities implemented single-stream recycling carts, and later added another cart for all organics including yard trimmings, food scraps and food-soiled paper. After Austin launches its single-stream recycling program and has time to fine-tune the new city-wide recycling system, the next step should be to evaluate how to provide composting of all organics, including food scraps.

Resource Recovery Centers can help provide recycling services where no other options are available. Resource Recovery Centers are generally locations or facilities where all 12 market categories of materials can be brought by residents and/or businesses to be reused, recycled or composted. Typically the materials are placed into commercial or industrial-sized containers like roll-off boxes, or placed into designated areas on the ground separated by large concrete blocks to separate the different material drop-off areas. As the City continually evaluates its Recycling Ordinance, Resource Recovery Centers may be a viable alternative option for smaller commercial and multi-family customers.

Rate and Fee Structures. Garbage rate structures and permitting fees are two powerful tools to encourage increased diversion. The City of Austin adopted a Pay as You Throw rate structure to encourage residential customers to reduce and recycle. However, changes in that rate structure could significantly contribute to meeting Zero Waste goals as services are expanded and new programs are brought on line. Suggested changes to that rate structure are detailed in the Downstream Options in Appendix B.

While the City does not control private collection fees, like public service providers, private haulers should pay for valuable materials and provide free or low cost hauling for clean, source-separated materials. Service providers should also make up any lost revenues by charging more for solid waste hauling services, not recyclables. Such a fee structure rewards businesses and organizations that comply with the City Recycling Ordinance, which requires source separation of reusable, recyclable and compostable materials.

To encourage participation in recycling and diversion efforts, especially among construction projects, the City could also incentivize recycling of construction materials with adjustments to its permitting fees or by requiring deposits refunded when waste diversion goals are met. The City could also use its authority to add fees, taxes, and data reporting requirements on waste hauling as conditions of service providers operating in the City. To fund new Zero Waste initiatives, the City could encourage the adoption of fees and taxes on waste disposal by counties and the State. These fees would be particularly important if the City selected to provide any of the new City program options identified in Appendix B.

GREEN BUSINESS, GREEN BUILDINGS AND JOBS

Zero Waste policy goals should recognize the significant opportunity for generating "Green Collar" jobs through reinvestment of discarded resources into the local economy. Zero Waste

policies must help retain and expand local and regional reuse, recycling, composting and green manufacturing businesses and facilities, which are critical elements to sustain Zero Waste initiatives and become a truly sustainable city.

The City should offer tangible economic incentives and technical assistance for green, sustainable, and Zero Waste businesses. Expanding existing incentive programs, including Green Building and Green Business programs, will also support and energize businesses around Zero Waste goals. The City could assist existing reuse, recycling and composting service providers to upgrade their appearance and operations, in order to be good neighbors. To identify the best locations for needed services, the City could also work with environmental justice, neighborhood, workforce development, and business development organizations.

Austin has already experienced major successes in the use of recycled materials, particularly at City Hall, green buildings in the downtown area, and the new Long Center for the Performing Arts, which recycled 97% of the old Palmer Auditorium. Austin Energy (AE) highlighted that most products are delivered to job sites in protective packaging which results in cardboard, plastic, and Styrofoam waste even though the product itself may not create any additional waste in its installation.[22] Some materials that do not have construction waste may not have manufacturing waste, since they are fabricated in a controlled process that generates little, if any, waste. The AE Green Building (AEGB) rating program attempts to provide incentives for use of products that are more durable, have a longer lifespan, require no additional finishing on-site and have less frequent maintenance and repair cycles. AE's programs also give credits for products made from recycled content.

Most of the projects enrolled in the AEGB program surpassed the 50% waste diversion requirement significantly. AE's multi-family residential program recently separated from the commercial program in August 2007 and adopted the same standard waste diversion requirement of 50% and optional credit base of 75% waste diversion as used under the commercial program. The AE single-family residential program has documented diversion rates on the Mueller redevelopment project, which requires a minimum of 25% diversion rate, even though most builders have documented rates of over 30% and 40% in the first six months of construction.

Businesses are leading the way to Zero Waste, diverting over 90% of their wastes from landfills and incinerators.[23] Zero Waste businesses that have been documented have all saved money, reduced their liabilities, increased their efficiency, and contributed significantly to addressing climate change. Designing waste out of the system by process improvements and decreasing the amount of materials used in products and packaging saves the most money. Reusing products and packaging (e.g., use of returnable shipping containers and pallets) saves the next most money. Recycling and composting both avoid solid waste collection and disposal costs, as well as generate revenue from the sale of the materials recovered. Once a Zero Waste system is established in Austin, local businesses that embrace Zero Waste goals should save money, and those that don't embrace the goals could pay more for wasting.

RESIDUALS MANAGEMENT AND REGIONAL COORDINATION

Although Austin is striving for Zero Waste, the City must recognize that it will have an on-going need for some amount of disposal capacity as programs are phased in. This Plan defines success

at achieving the Zero Waste goal to be reducing by 20% the per capita solid waste disposed to landfills by 2012, diverting 75% of waste from landfills and incinerators by 2020, and 90% by 2040. This means that there still may be up to 10% of solid waste to dispose of otherwise. As a result, the City does need to ensure that there is some on-going disposal capacity to meet its long-term needs. If others use up available landfill space, then the Austin Zero Waste initiatives will not solve Austin's long-term waste management needs by themselves.[24]

In Travis and Williamson Counties, landfills reported to Texas Conservation on Environmental Quality (TCEQ) that they receive wastes from up to 33 counties within approximately 100 miles surrounding this area as depicted in Appendix E. This disposal practice evolved over the past decade as smaller landfills in outlying areas closed down because they could not afford to comply with new Federal and State regulations implementing Subtitle D landfill regulations of the Federal Resource Conservation and Recovery Act. The low cost of large regional landfills in Travis and Williamson Counties acted as a magnet for waste from an even larger region and undercut the economics of reuse, recycling and composting.

Therefore, although a majority of the landfills in the Capital Area are privately owned and cannot be controlled by local governments, **Austin's Zero Waste Plans must include finding ways to stop or regulate the flow of wastes from outside the area into landfills in the Austin area**. While local governments cannot demand flow control among private landfills, there maybe ways to influence flow control.

Under Texas law, counties with landfills in their jurisdiction can adopt policies not to allow NEW landfills.[25] Counties are also empowered to develop solid waste management plans that could stipulate conditions for use of area facilities. If new landfills opened, Travis and Williamson Counties Solid Waste Management Plans could add language that only allows the use of landfills in the County by counties that have adopted Zero Waste goals appropriate for their communities, and are working to implement those goals.

Under federal law, counties or cities could stop or limit the flow of wastes into landfills that are publicly owned. Currently, only one municipal solid waste landfill is publicly owned and it is located in Williamson County. Private landfill owners, however, may consider public acquisition in exchange for allowing them to continue operating the facility, and transferring long-term responsibility for the landfill to the public entity. The public agency could be a city or county government or a Solid Waste District composed of one or more of the above. Once public ownership is obtained, the public agency could prioritize phasing out imported wastes from outside the CAPCOG region.

Contracts between agreeing parties are also significant tools that could be used to address the lack of regulatory authority. Travis County, or a regional Solid Waste District, could negotiate with landfill owners in the region to voluntarily adopt a landfill surcharge to fund new reuse, recycling and composting programs, and to fund long-term liabilities after the state and federally mandated 30-year post-closure care period. In exchange, landfill owners could be enticed to participate in these initiatives if they were also considered to be eligible parties for grants or low-cost loans to fund new reuse, recycling and/or composting programs that they would like to build locally. Contracts could be structured between the governmental entity and the landfill owner not to go into effect until all the landfills in Travis County adopt comparable provisions. [26] This approach could generate a new source of cash for landfill owners that they could not afford to

charge themselves alone, as they would be put at a competitive disadvantage. Such an agreement could level the playing field for existing landfill owners to invest in more waste reduction activities and provide more Zero Waste programs and services.

As part of this Zero Waste Plan process, the City met with Travis County and the Solid Waste Advisory Committee of CAPCOG. As an outcome of those meetings, the City received letters supporting the City's Zero Waste initiatives, including working together on areas of common interest, such as:

- Expanded tire recycling programs;
- Expanded composting and organic waste diversion programs;
- Expanded Green Building initiatives throughout the region;
- Expanded recycling and reuse of construction and demolition debris;
- Development of Green Campuses and Resource Recovery Parks; and
- Support for Extended Producer Responsibility and manufacturer take-back policies and programs.

CAP Cog's SWAC also noted that Zero Waste initiatives support the waste reduction goals of the Regional Solid Waste Management Plan, and the recommendations of the Market Analysis of Recoverable Materials (2007) prepared for the CAPCOG region by R.W. Beck.[27]

Neighboring communities and counties should clearly understand that Austin alone cannot control what happens with solid waste in the region nor is that Austin's goal. Instead, Austin must collaborate with CAPCOG and surrounding communities to address the waste management challenges and opportunities facing the region.

One additional area in which regional cooperation would be particularly helpful would be in documenting the amount of solid waste disposed of in area landfills from different communities and different sectors, and how much is being reused, recycled or composted within the region through public, private and nonprofit activities. It is widely recognized that such data is not currently available to accurately assess the current status of wasting and recycling in the area. Data should be reported and assessed using the 12 market categories detailed previously. This data would be helpful for the City's design of residential solid waste, reuse, recycling and composting facilities. It would also provide a measurable baseline for evaluating progress towards the Zero Waste goals and greatly assist in enforcement and understanding of how effective existing ordinances such as the Commercial Recycling Ordinance and future policies and programs are in achieving the City's goals.

Since the flow of materials occur on a regional basis, it would be best if more detailed reporting and data analysis were developed on a regional basis. Collaborating with CAPCOG will be critical to collecting this data. In many locations, data is required to be reported from private operators as conditions of permits, franchises or contracts. In Austin, a revised system of operating permits should include detailed data reporting requirements, as is commonly done in many other locations. Data for such reports could be sent to an independent third-party to protect private business practices from public review and ensure fair competition.

Additionally, the region may want to consider a regional waste characterization study funded by CAPCOG grants to get a better understanding of the existing waste system.

5. ENVIRONMENTAL IMPACTS

If recovered for recycling, reuse, and/or composting, the amount of materials shown in Resource and Commodity Table (Table 1) would have a clear impact on global warming and greenhouse gas production. Significant savings come from avoiding the wastes produced from mining, manufacturing and distribution of products equivalent to 71 tons of waste for every ton of products in the local waste stream. Using the total amount of the materials currently land filled in Austin, the EPA WARM computer model calculated that the Austin area could experience an estimated reduction of carbon measured by metric tons of carbon equivalent (MTCE) of nearly 500,000.[28] This is a significant emission reductions noted in Table 3.

Table 3 - EPA WARM Model Summary: Recycled Materials vs. Landfilling[29]

Material	Tons Land filled	Total MTCE*	Tons Recycled / Composted	Total MTCE
Glass	50,000	518	50,000	(3,789)
Dimensional Lumber	12,000	(1,596)	12,000	(8,038)
Food Scraps	90,000	17,764	90,000	(4,874)
Yard Trimmings	200,000	(11,947)	200,000	(10,831)
Mixed Paper	360,000	34,187	360,000	(347,263)
Mixed Metals	50,000	518	50,000	(71,692)
Mixed Plastics	80,000	829	80,000	(32,600)
Mixed Organics	58,000	3,737	58,000	(3,141)
Aggregate	20,000	207	20,000	(42)
Total	**920,000**	**44,217**	**920,000**	**(482,270)**
*MTCE = Metric Ton Carbon Equivalent				

6. ZERO WASTE AND JOBS ANALYSIS

> "Austin has 5 colleges. It has a greater concentration of people with intellectual ability than any other city in the Southwest. Combined with shrewd mercantile ability and manufacturing know-how, it has also become one of the computer capitals of the world. I believe we should use Austin's gifts to solve some of the world's problems...."[30]

In keeping with the spirit of Paul Robbins quote above, a Zero Waste approach would lead to many job opportunities from the processing of reused, recycled and composted materials, manufacturing of new products, and the sale and distribution of those products.

For every 10,000 tons of waste land filled, only 1 job is created. For every 10,000 tons of organic materials composted, 4 jobs are created. For every 10,000 tons of recyclables processed, 10 jobs are created. For every 10,000 tons of reusables processed, 75-250 jobs are created.[31] The recycling industry in America is as large as the automobile industry.[32] In California, the

recycling industry is as large as the movie and video industry.[33] Each dollar spent on diversion instead of landfill disposal generates nearly twice as many sales tax revenue dollars and jobs.[34]

For the million tons of wastes currently disposed in Austin area landfills, the total number of jobs that could be generated is estimated to be just over 1,800 as explained in Table 4.

Table 4 - Jobs from Discards[35]

Market Category	Tons Per Year	Jobs Potential
1. Reuse	20,000	249
2. Paper	360,000	63
3. Plant Trimmings	200,000	60
4. Putrescibles	90,000	40
5. Wood	60,000	36
6. Ceramics	20,000	7
7. Soils	10,000	20
8. Metals	50,000	29
9. Glass	50,000	125
10. Polymers	80,000	745
11. Textiles	50,000	425
12. Chemicals	10,000	20
Total	1,000,000	**1,819**

C. POLICY AND PROGRAM RECOMMENDATIONS

The recommendations listed below are based upon the public input received and detailed in Appendix B as well as a cursory analysis of Austin's legislative authority and potential for developing sustainable green markets. After implementing the recommendations, the City can utilize the remaining options listed in Appendix B to serve as guidance in developing new initiatives and continuing on a path towards Zero Waste.

1. UPSTREAM POLICY AND PROGRAM RECOMMENDATIONS

a. Be a strong advocate for Extended Producer Responsibility (EPR) legislation and programs regionally, statewide and nationally. Work to form the Texas Product Stewardship Council composed only of representatives of local government to clearly address this "unfunded mandate."
b. Work to obtain legal authority and regional cooperation to ban problem products and packaging or require businesses and institutions to take back designated products and packaging sold in Austin, CAPCOG, and in the State that are toxic in their manufacture, use, or disposal, and/or are not currently recyclable in the area.
c. Develop public/private and or intergovernmental partnerships to setup convenient neighborhood centers for reusables, recyclables, compos tables, construction and demolition (C&D) debris and household hazardous wastes funded by producers and/or retailers.
d. Explore other ways to encourage and support on-site composting at homes, schools and colleges, businesses and institutions with sufficient space so that the producers of these organic wastes take care of it themselves.

2. DOWNSTREAM POLICY AND PROGRAM RECOMMENDATIONS

a. City of Austin agencies lead by example to implement all actions asked or required of residents and businesses.
b. Encourage venues and special events to adopt Zero Waste goals as part of a larger "green events" policy and use incentives and technical assistance to help them implement goals.
c. Continue programs on an on-going basis to educate residents, businesses and visitors about how and where to reduce, reuse and recycle in Austin.
d. Update, expand, educate, enforce, and effectively implement the Commercial and Multi-Family Recycling Ordinance and encourage other governmental entities to follow Austin's lead.
e. City review residential Pay-As-You-Throw rate structure on regular basis at a minimum of every five years to phase-in more incentives for residents to reduce wastes and recycle more, particularly once the single-stream recycling program is implemented. Include innovative ways to address the use of excess garbage bags and stickers to promote recycling. Include additional revenue needed to fund new residential Zero Waste initiatives in structuring rates.
f. Support continuation and expansion of local, regional and state landfill fees and surcharges, hauling fees, and bond issues to fund low-interest loans, grants, contracts and/or staffing (comparable to other large cities) to develop needed programs and infrastructure to support Zero Waste programs and initiatives.

g. Set up system for commercial waste hauling that specifies recycling services, reporting and hauling fees.
h. Adopt a City goal that no compostable organics go to landfill by 2015, including support of a statewide legislative initiative.
i. Develop pilot programs by the City of Austin and through public/private partnerships to incorporate food scraps and food-soiled paper to City of Austin's residential and commercial organics collection program.
j. Investigate and develop needed legal authority to require businesses and institutions in Texas to recycle food scraps and food-soiled paper and mandate private haulers and solid waste management facility operators to establish needed infrastructure to properly manage those materials.

3. GREEN BUSINESS, GREEN BUILDINGS AND GREEN JOBS

a. Adopt Precautionary Principle for City purchases and Zero Waste purchasing goals.
b. Develop one or more Green Campuses and/or Resource Recovery Parks in the Austin or nearby and encourage development within CAPCOG region.
c. Ask Businesses to adopt and implement Zero Waste goals.
d. Work with Austin Energy Green Building Program to:
    1) Review recycling goals and ensure that they are based on % diverted from facilities certified by Austin Energy or another City department.
    2) Evaluate how to revise its reuse goals to value the recovered products by the price for which they are sold, or some multiple of their weight, to reflect the higher value of reuse.
e. Expand Austin's use of required Green Building waste management and recycling standards for all major projects in the City, not just special development areas.
f. Work to pass an Ordinance to require in all new construction that adequate space be provided for recycling, composting and trash containers.
g. Work with state agencies and local governments to use more recycled and compost products, especially in the CAPCOG region.

4. REGIONAL COORDINATION AND RESIDUALS MANAGEMENT

a. Ask CAPCOG SWAC to adopt a resolution in support of Austin's Zero Waste Plan.
b. Ask CAPCOG and all counties that currently use landfills in Travis and Williamson Counties to support Austin's Zero Waste goal and to work together to implement that goal.
c. Work with CAPCOG to develop more detailed data reporting system for solid waste and recycling for the entire region.
d. Work with Travis County, Williamson County, and the CAPCOG SWAC to identify ways to influence, stop, or regulate the flow of wastes from outside the CAPCOG area into landfills in the Austin area.
e. Investigate alternatives for regional and state cooperation to support and implement the Zero Waste policies in jurisdictions outside the City of Austin and support needed State legislative initiatives.

Zero Waste is an ambitious but important endeavor. No single strategy will result in success and each community must carve its own path, cognizant of and willing to work within its existing political environment, financial boundaries, and legislative systems. The next step down the path to Zero Waste will be the development of a Solid Waste Services Master Plan that will include detailed timetables and budget to implement this Zero Waste Plan. By utilizing various strategies identified in this plan, developing supportive partnerships, and remaining dedicated to the long term goal of Zero Waste, Austin will achieve its goal of being among the most sustainable cities in the nation.

Endonotes

[1] Gary Liss & Associates. *Home Page*. 29 November 2008. <http://www.garyliss.com>
[2] Sustainable Development Networking Program. *World Environment Day 2005: Urban Environmental Accord.* 29 November 2008. <http://www.sdnpbd.org/sdi/international_days/wed/2005/wed2005/accord.htm>
[3] City of Austin. 2007. *Austin Climate Protection Program: About the Program*. 29 November 2008. <http://www.coolaustin.org/accp.htm>
[4] United States. Environmental Protection Agency (EPA). 24 June 2004. *Climate Change and Waste*. 29 November 2008. <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsWaste.html>
[5] Ibid. *Global Warming – Waste: Basic Information.* 29 November 2008. <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsWasteBasicInfoGeneralLifeCycle.html>
[6] State of California. Environmental Protection Agency Air Resources Board. 11 February 2008. *Recommendations of the Economic and Technology Advancement Advisory Committee Final Report*. 29 November 2008. <http://www.arb.ca.gov/cc/etaac/ETAACFinalReport2-11-08.pdf>
[7] Institute for Local Self Reliance. June 2008. *Stop Trashing the Climate Full Report.* 29 November 2008. <http://stoptrashingtheclimate.org/>
[8] Ibid.
[9] Netherlands Environmental Assessment Agency. 2007. *Mitigation of Climate Change: Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Chapter 10, page 16. 29 November 2008. <http://www.mnp.nl/ipcc/pages_media/AR4-chapters.html>. States that "estimates of 'lifetime' recovery efficiencies may be as low as 20%."
[10] GrassRoots Recycling Network. 2000. *Wasting and Recycling in the United States 2000*. Page 13. 29 November 2008. <http://www.grrn.org/order/w2kinfo.html>
[11] Data derived from two sources. Regarding estimated tons per day per person, Capital Area Council of Governments. 9 February 2005. *Regional Solid Waste Management Plan 2000-2022*. Pages 10 and 15. 29 November 2008. <http://www.capcog.org/documents/solidwaste/RSWMP%20Vol%20II%20as%20Adopted.pdf> Regarding estimated City of Austin population, see United States Census. *Fact Finder projected 2006*. 10 December 2008. <www.census.gov> Calculation: 7.3 lbs/day x 743,358 x 365 days/year.
[12] Estimated calculations do not include the cost to separate, process, and transport the materials.
[13] Ibid.
[14] Putrescibles are also considered food scraps.
[15] City of Austin, Ordinance No. 981022-P, Chapter 15-6, Article V
[16] CAPCOG serves as an advocate, planner, and coordinator of special initiatives that, when undertaken on a regional basis, can be more effective and efficient. This includes coordinating regional solid waste management needs using the Regional Solid Waste Management Plan. The Texas Commission on Environmental Quality (TCEQ) regulates all Texas landfills.
[17] Capital Area Council of Governments. 9 February 2005. *Regional Solid Waste Management Plan 2000-2022*. Page 11. 29 November 2008. <http://www.capcog.org/documents/solidwaste/RSWMP%20Vol%20II%20as%20Adopted.pdf>
[18] GrassRoots Recycling Network Zero Waste Conference, New York City, April 2005.
[19] GrassRoots Recycling Network. 2000. *Wasting and Recycling in the United States 2000*. Page 13. 29 November 2008. <http://www.grrn.org/order/w2kinfo.html>
[20] "NY City Council Overrides E-Waste Veto." WasteAge.com. 20 May 2008. WasteAge Magazine. 29 November 2008. <http://wasteage.com/news/NYC_e-waste_veto_overridden/>
[21] The Central Texas cities of Georgetown, Kyle, San Marcos, Lakeway and Round Rock as well as Hays and Travis Counties all passed resolutions in favor of producer takeback recycling of electronic waste.

[22] Cook, Miki, 8 April 2008. Email to the Author. 1 October 2008.
[23] Zero Waste Businesses identified to date in the Capital Area include, but are not limited to: Toyota (San Antonio), Dell Computers, Applied Materials, Barr Mansion, Habitat Suites, Goodwill Computer Works, Balcones Recycling, and Allied Recycling
[24] According to the latest landfill data available from TCEQ from calendar year 2007, there is about 30 million tons of remaining capacity in area landfills, and it is currently being used at a rate of 2.2 million tons per year. That yields a total remaining life in area landfills at current use levels of 13.6 years.
[25] Under Section 364.012 of the Texas Health and Safety Code, the County may prohibit the disposal of solid waste in one location as long as it designates another area of the County where such disposal is not prohibited. See: <http://tlo2.tlc.state.tx.us/statutes/docs/HS/content/htm/hs.005.00.000364.00.htm#364.012.00>
[26] Such an agreement could also include Williamson County as well.
[27] Capital Area Council of Governments. September 2007. *Market Analysis of Recoverable Materials: Final Report*. 29 November 2008. <http://www.capcog.org/documents/solidwaste/Recoverable_Materials.pdf>
[28] United States Environmental Protection Agency (EPA). *Climate Change: WARM Model*. 10 December 2009. <http://www.epa.gov/climatechange/wycd/waste/calculators/Warm_home.html> EPA created the Waste Reduction Model (WARM) to help solid waste planners and organizations track and voluntarily report greenhouse gas emissions reductions from waste management practices.
[29] Ibid.
[30] Robbins, Paul. *Austin Environmental Directory 2003: Creating An Employment Base From Environmental Business*. Page 2. 29 November 2008. <http://environmentaldirectory.info/PDFs/EBusinessPart3.pdf>
[31] Institute for Local Self-Reliance. *Waste to Wealth: Recycling Means Business*. 10 December 2008. <http://www.ilsr.org/recycling/recyclingmeansbusiness.html>
[32] USEPA. *Waste Resource Conservation: Recycling Market Development*. 10 December 2008. <http://www.epa.gov/jtr/econ/rei-rw/rei-rw.htm>
[33] State of California Integrated Waste Management Board. September 20, 2004. *Recycling: Good for the Environment/Good for the Economy*. Page 5. 10 December 2008. <http://www.ciwmb.ca.gov/Publications/Economics/41004002.pdf>
[34] Alameda County, California. 10 December 2008. <www.stopwaste.org>
[35] Based on analysis done by Institute for Local Self-Reliance for State of Delaware 2005.

APPENDICES

- **APPENDIX A. LIST OF ZERO WASTE PLAN MEETINGS**
- **APPENDIX B. PUBLIC RECOMMENDED POLICY & PROGRAM OPTIONS**
- **APPENDIX C. EXISTING RECYCLING ORDINANCE**
- **APPENDIX D. PRODUCT & MATERIALS MARKET INVENTORY**
- **APPENDIX E. MAP OF CONTRIBUTING COUNTIES**
- **APPENDIX F. REGIONAL LETTERS OF SUPPORT**
- **APPENDIX G. MODEL EPR RESOLUTION**
- **APPENDIX H. HIGHEST AND BEST USE HIERARCHY**
- **APPENDIX I. ZERO WASTE RESOURCES**

APPENDIX A.
LIST OF ZERO WASTE PLAN MEETINGS

January 2008

- Solid Waste Services Department (SWS) Staff
- Orientation Tour of Facilities (Balcones Recycling, Hornsby Bend Dillo Dirt Composting Program, TRIAD Building Maintenance, Goodwill Industries, Center of Maximum Potential, Habitat for Humanity, BFI Recycling, Ecology Action, Texas Disposal System)
- Austin Solid Waste Advisory Commission

February 2008

- Public Meeting
- Green Business (open to the public)
- City Staff
- Service Providers
- Austin Long Range Solid Waste Planning Task Force (invite Cap COG reps.)
- Austin Energy Green Building
- Texas Campaign for the Environment

March 2008

- City Council Candidates and City Council Aides (scheduled, but rained out)
- Public Meeting (scheduled, but rained out); Zero Waste Challenge issued
- Green Business Public meeting
- Organics Focus Group (Hotels, Bars, Restaurants, grocers, food distributors, nurseries)
- Green Buildings + Construction and Demolition debris Focus Group - Architects, Contractors, Developers, Austin Energy
- Thrift shops and Reuse - Service Providers (private and nonprofits)
- Austin Long Range Solid Waste Planning Task Force
- Elected officials and Business Leaders at Barr Mansion
- City Economic Development and Small Business Development staff
- Capital Area Council of Governments (CAPCOG) SWAC
- Recycling and Composting Service Providers

April 2008

- SWS staff
- Citywide Dept. Directors and Asst. Directors
- City Council Aides
- Austin Long Range Solid Waste Planning Task Force
- Austin Small Business Development Program
- State Staff (TXDOT)
- Travis County (Comm. Gomez, Eckhardt, aides and staff)
- Austin Independent School District
- CAPCOG SWAC

APPENDIX B.
PUBLIC RECOMMENDED POLICY & PROGRAM OPTIONS

UPSTREAM PROGRAM & POLICY OPTIONS

Goal : Require Producers to Take Responsibility for Products	
Voluntary, Education, and Incentives	Engage industry, make them aware of materials and products that are problems for Austin, and establish a process for producers to resolve those problems. Encourage businesses and institutions to take back products and packaging sold in Austin that are toxic in their manufacture, use, or disposal, and/or are not currently recyclable in the area.[1]
New Rules and Advocacy	Be a strong advocate for legislation and programs regionally, statewide and nationally to make business responsible for their packages and products. ▪ Expand upon existing EPR Resolution (2000803-68) supporting changes to procurement policy by adopting a new EPR Resolution to clearly establish support of EPR as City policy. [2] ▪ Help set up TX Product Stewardship Council ▪ Work with other local governments and organizations such as the TX Municipal League, Natl. League of Cities, Product Policy Institute, and Product Stewardship Institute to promote EPR and clearly authorize local governments to adopt policies and programs. Ban products or packaging from being sold in Austin that are toxic in their manufacture, use, or disposal, and/or are not currently recyclable in the area and join with other local governments in the region to do the same. Require businesses and institutions to take back designated products and packaging sold in Austin that are toxic in their manufacture, use, or disposal, and/or are not currently recyclable in the area and join with other local governments in the region to do the same.
New City Programs	Establish centers throughout the City to receive household hazardous wastes (e.g., e-waste, batteries, oil, paint, pesticides, cleaners) and join with other local governments in the region to do the same. Develop public- private partnership to develop industry sponsored facilities to receive household hazardous wastes and difficult to recycle materials. ▪ Evaluate similar programs like those in Boulder, CO CHaRM Center and BC Product Care Centers. [3] ▪ Join with other local governments in the region to do the same.

DOWNSTREAM PROGRAM & POLICY OPTIONS

Goal : Lead by example. Reduce/recycle City of Austin agency waste.	
Voluntary, Education, and Incentives	Evaluate employee incentives to encourage recycling. ▪ Department Challenges similar to the Combined Charities Event Challenges ▪ Offer recognition to the departments that recycle the most material. Evaluate employee education and outreach programs to increase participation in recycling and reduction efforts. ▪ Utilize inter-office website, emails, meetings, and magazines to communicate information ▪ Establish "green teams" in each department or office building to encourage other employees to recycle, continually evaluate reduction efforts and recycling services, and recommend improvements to the City's departmental programs. Educate employees to distinguish between recycling systems. Once composting program is in place, use colors and graphics to support the message that one color (blue) is for recyclables and another color (green) is for compostables.
New Rules and Advocacy	Require all public venues and special events, starting with large events, to implement a Zero Waste program. For City solid waste contracts of their own facilities, require that all materials be reused, recycled, or composted, and only inerts be buried in landfill Review current purchasing practices and develop specifications with "green" in mind. This could include requiring reduced packaging, delivery of computers with minimal packaging, purchasing office supplies with a certain amount of post-consumer recycled content, etc. Adopt Precautionary Principle for City purchases and Zero Waste purchasing goals. Require city facilities and public projects to use the mulch and compost made from the City's composting program towards landscaping local roads, public venues, and public property. Require the use of other recycled materials in sub-base (e.g., recycled concrete aggregate), road mixes (e.g., crumb rubber) and surface treatments (e.g., glass traffic beads) in all public projects in Austin and surrounding areas. Include C&D derived aggregate material as part of City Public Works Master specification. Work with TXDOT engineers to develop specifications. Require buildings leased to house City departments and services to provide space for recycling and/or offer recycling services. Austin Energy should stop including landfill gas as a green energy source in its "Green Choice" program. The recovery of gases should be required for environmental reasons, and not provided incentives. Any incentives given to landfills make Zero Waste less economic.
New City Programs	Provide single stream recycling to all City of Austin departments and office buildings and evaluate progress annually. Train managers and maintenance staffs of city buildings and facilities about Zero Waste policies, systems, and resources. Place recycling bins wherever there are trash bins in all public locations, including parks facilities. Once organic composting program is fully functional, include organics bins wherever food is served in public locations.

DOWNSTREAM PROGRAM & POLICY OPTIONS (continued)

Goal: Reduce waste from single family homes.	
Voluntary, Education, and Incentives	Evaluate rate structure for incentives. Once single stream recycling program is implemented: ▪ Adopt closer-to-linear Pay-As-You-Throw rates to provide greater incentive for residents to reduce wastes. o Once comprehensive organics program is implemented, that includes food scraps and food soiled paper, adopt a linear pay-as-you-throw rate structure,[4] and o Develop a pilot program to evaluate how to offer lower rates for less frequent garbage collection service.
New Rules and Advocacy	Adopt policy that no compostable organics should go to landfill. Once single stream recycling program **and** "all" organics programs are implemented, establish rules to keep "wet" garbage separate from "dry" materials.
New City Programs	Develop one or more Green Campuses and/or Resource Recovery Parks in Austin (or nearby) to accept all 12 market categories of reusables, recyclables and compostables from the public. [5] ▪ Provide locations for reuse, recycling and composting businesses to process materials, manufacture products and sell products to the public. ▪ Encourage similar development in CAPCOG region. ▪ Partner with nonprofit organizations, thrift shops, home stores, supermarkets and shopping malls to establish drop-off recycling centers and swap shops throughout the City to receive 5 clusters of all 12 market categories of materials. [6] Require reuse, recycle or composting of all bulky items collected by City. ▪ Partner with local non-profit organizations and thrift stores to achieve most cost effectively. Once single stream recycling program is performing successfully, add food scraps and food-soiled paper to residential organics collection program. ▪ Start with pilot program to determine how best to roll-out citywide. ▪ Tour other communities that offer such services first to help design pilot. Help fund development of new processing facilities for local reuse nonprofit organizations. Consider designating part of Green Campus processing facility for this activity.

DOWNSTREAM PROGRAM & POLICY OPTIONS (continued)

Goal: Reduce waste from commercial, multi-family, and institutional entities.	
Voluntary, Education, and Incentives	Develop programs on on-going basis to educate residents, businesses and visitors about the new rules and changes over time. ▪ Reinvigorate the Greater Austin Waste Reduction Association to work with City staff on outreach and education with businesses. ▪ Develop Master Recycler education of local residents who can act as advocates in the community. ▪ Train university students to help on outreach to local businesses to implement City's Recycling Ordinance like Fresno.[7] ▪ Use MySpace, YouTube, texting and celebrities to talk about Zero Waste. Develop major community based social marketing campaign to support Zero Waste. ▪ Explore other ways to encourage and support on-site composting at homes, schools and colleges, businesses and institutions with sufficient space. Ask major businesses in Austin area to use Resource Management techniques to contract for solid waste services that require that all materials be reused, recycled or composted, and only inerts buried in landfill to reduce business' liabilities.[8] Ask Businesses to adopt and implement Zero Waste goals. Help promote reuse businesses throughout City. ▪ Develop and continually update a Reuse Guide to be distributed to all thrift stores, available on the City's website, and utilize other innovative approaches. ▪ Designate "Reuse Zones" to encourage expansion of reuse stores in those areas (e.g., South Congress and Burnet Streets are naturally doing this).
New Rules and Advocacy	Update, educate, expand and effectively implement Commercial and Multi-Family Recycling Ordinance to require ALL multi-family dwellings, businesses and institutions to recycle and compost. Develop a regulatory system for commercial waste hauling that specifies types of recycling services, reporting requirements and fee payments that vary with the amount of waste diverted from landfill and incineration.[9] Set hauler/landfill fees to provide more economic incentives for recycling, and to generate funds for new Zero Waste programs. Agree upon and require all permitted waste haulers and recyclers to achieve waste diversion targets. Require that all permitted haulers provide equal amount of container service (size and frequency of collection) for recycling as provided for garbage service. Once food scrap composting program services are available, develop pilot programs by the City of Austin and/or through public/private partnerships to collect and process food scraps and food-soiled paper from businesses and institutions. Help market using urban organics to farmers to restore the health of soils and reduce use of fertilizers, pesticides and irrigation water. Work with local and state permitting agencies to make it easier for farmers to use such resources.
New City Programs	Develop and fund programs that can evaluate and approve waste management plans and monitor commercial and multi-family diversion activities to confirm that they are reaching agreed upon goals. Develop and fund recognition programs to promote businesses that achieve diversion goals. Develop drop-off recycling centers and swap shops throughout the City to receive 5 clusters of all 12 market categories of materials, partnering with nonprofit organizations, thrift shops, home stores, supermarkets and shopping malls.[10] Help develop new processing facilities for local reuse nonprofit organizations (e.g., by designating part of processing facility in Green Campus to be used partly for this activity).

DOWNSTREAM PROGRAM & POLICY OPTIONS (continued)

Goal: Reduce waste from development projects.	
Voluntary, Education, and Incentives	For projects that appropriately document that they reused, recycled or composted a certain percentage of their construction/demolition materials, return a portion of their fees/deposits based on the percentage of diversion.
New Rules and Advocacy	Require all contractors and developers to certify to the City that they reuse, recycle or compost at least 50% of materials from C&D projects and to maintain weight slips as an audit trail to document those activities Require waste management plans from businesses and service providers, and deposits for all construction/demolition projects. Work with Austin Energy Green Building Program to revise recycling goals to be based on % diverted from facilities certified by Austin Energy another City department. Work with Austin Energy Green Building Program to revise its reuse goals to value the recovered products by the price for which they are sold, or some multiple of their weight, to reflect the higher value of reuse.
New City Programs	Develop, fund, and staff programs that approve waste management plans and monitor data from construction projects to verify that debris has been recycled or composted. Develop and fund programs that recognize the success of development projects that consistently achieve agreed upon diversion goals.

Goal: Develop and invest in Zero Waste infrastructure	
Voluntary, Education, and Incentives	Include Zero Waste infrastructure needs, such as Resource Recovery Parks and Green Campuses, as part of local climate action plans. Support continuation and expansion of local, regional and state landfill fees, hauling fees, and bond issues to fund low-interest loans and/or grants, contracts and/or staffing (comparable to other large cities) to local governments, private businesses, and nonprofit organizations to develop needed programs and infrastructure.[11]
New Rules and Advocacy	Modify Zoning Code to facilitate the development and expansion of Zero Waste infrastructure in appropriate zones. This will need to be done very carefully and require high standards for design, signage, landscaping and operations to be compatible with neighborhoods. Consider Berkeley, CA Recycling Zone as a model of land use overlay
New City Programs	Form partnerships with the private sector and nonprofit organizations for Zero Waste infrastructure development such as composting programs, Resource Recovery parks, etc. Perform a complete evaluation of current infrastructure and identify infrastructure needed to implement Zero Waste strategies Work with job training programs to support reuse, recycling and composting programs.

DOWNSTREAM PROGRAM & POLICY OPTIONS (continued)

Goal: Enlist region to support Austin Zero Waste efforts	
Voluntary, Education, and Incentives	Work with school districts to integrate Zero Waste into curriculum and implement Zero Waste systems for all schools and administrative offices. Ask regional agencies and TXDOT regional offices to include in their contractor specifications the use of mulch and compost made from urban organics to landscape freeways, and the use of other recycled materials in sub-base (e.g., C&D debris), road mixes (e.g., crumb rubber) and surface treatments (e.g., glass traffic beads).[12] Ask CAPCOG and all counties that currently use landfills in Travis and Williamson Counties to adopt Zero Waste as a goal and to work to implement that goal. Investigate alternatives for regional and state cooperation to support and implement the above policies in jurisdictions outside the City of Austin and support needed State legislative initiatives.
New Rules and Advocacy	Require landfill operators to confirm with drivers the source of wastes delivered, and to report that information to TCEQ and/or CAPCOG so that better planning can be done in future. Ask State to require all landfills in area to develop a Resource Recovery Park to accept all 12 market categories of reusables, recyclables and compostables from the public. For NE Travis County landfills, require the development of a single Resource Recovery Park at their landfills or nearby. Fund initiatives with landfill surcharges.
New City Programs	

GREEN BUSINESS, GREEN BUILDING, AND GREEN JOBS

Goal : Retain and Expand Green Businesses and Green Collar Jobs	
Voluntary, Education, and Incentives	Provide preferences in Austin procurement, funding and permitting for certified Green Businesses in Austin. Encourage businesses to purchase Zero Waste products and services: return to vendor any wasteful packaging; reduce packaging and buy in larger units; use reusable shipping containers; purchase reused, recycled and compost products; buy remanufactured equipment; lease, rent and share equipment; buy durables, using life-cycle cost analyses; and buy less toxic products. Ask businesses to adopt Zero Waste goals and plans that follow Zero Waste Business Principles.[13] Expand "go to head of line" for permits and financing help for Zero Waste businesses (not just for Affordable Housing projects as currently set up). Encourage Austin Community College to offer Management/Development of Green Business, Green collar" job training and certification courses, Green product/process R&D, Green continuing education courses for the general public, on-campus "Green centers" to support the curriculum and provide recycling and other services to nearby communities, like the partnership with the high tech industry and Chamber of Commerce in the 1990s.
New Rules and Advocacy	Adopt Precautionary Principle for all City of Austin purchases
New City Programs	Require City to purchase Zero Waste products and services, including contract services: ▪ Return to vendor any wasteful packaging; ▪ Reduce packaging and buy in larger units; ▪ Use reusable shipping containers; ▪ Purchase reused, recycled and compost products; ▪ Buy remanufactured equipment; ▪ Lease, rent and share equipment; ▪ Buy durables, using life-cycle cost analyses; and ▪ Buy less toxic products. Support research and development into new products and business opportunities from discarded materials at Green Campus. Support "think pads" at proposed Green Campus to stay on the cutting edge of Zero Waste practices. Provide one-time start-up grants and/or loans for needed Zero Waste infrastructure out of funding recommended in Zero Waste Plan (e.g., landfill surcharge or fees on commercial hauling). Set aside portion of Workforce Development funds for green job training and wages.

GREEN BUSINESSES, GREEN BUILDINGS, AND GREEN JOBS (continued)

Goal : Encourage Green Building Construction Standards	
Voluntary, Education, and Incentives	Encourage residents and businesses to restore functional buildings, rather than demolish them. Encourage businesses to include Green Buildings in their specifications for rental spaces. Help promote residential developments that are certified as green buildings. Levy mitigation fees on high impact facilities to mitigate impacts of operation and to compensate those most impacted by needed facilities. Encourage on-site crushing of recycled materials in Green Building projects with best available control technology especially over sensitive karst limestone geology. Expand "go to head of line" for permits and financing help for Zero Waste businesses (not just for Affordable Housing projects as currently set up).
New Rules and Advocacy	Expand Austin's use of required Green Building standards for all major projects in the City, not just in special development areas. Get check-off box on permit renewal requirements for Green Building and Zero Waste projects. Require advertising of upcoming demolition projects while permits are being finalized, so that maximum deconstruction can be arranged. Require general contractor and subs training on C&D reuse and recycling requirements as condition of permits. Work with Austin Energy Green Building Program to: ▪ Base success on reuse of highest and best use of products in buildings and decorative architectural features and by value of materials recovered (not by weight); ▪ Evaluate adding another "innovative point" to realize higher lifecycle benefits by recovering higher value of reused products. ▪ Evaluate adding Zero Waste as "bonus point." Work with Austin Energy Green Building Program to base Green Building "status" on recycling goals achieved through % diverted from facilities, not by weights from each project. Require in all new construction that adequate space is provided for recycling, composting and trash containers, comparable to MRP1 in LEED – and add provision for organics/compostables. Once infrastructure and markets are established for C&D materials, prohibit landfilling C& D debris.
New City Programs	Evaluate how Solid Waste Services staff, AE staff, AWU staff, and WPDRD permitting staff can work together to establish and sustain a certification program to certify Green Buildings that meet BOTH green building requirements and Zero Waste goals.

Notes

[1] The City of Ottawa Ontario developed a voluntary takeback program that publicizes businesses that voluntarily accept products they sell from their customers, which engenders customer loyalty and appreciation for their corporate responsibility.
[2] See Appendix G based on model resolution from Product Policy Institute at: http://www.productpolicy.org/assets/word/MODEL_Local_EPR_Resolution.doc
[3] Ecocycle. *Center for Hard to Recycle Materials*. 10 December 2008. <http://www.ecocycle.org/charm/index.cfm>
[4] For example, offer 32-gallon-cart option for garbage from Austin residents at 50% of the cost of a 64-gallon-cart option and provide cost alternatives for low-income large families.
[5] This would be comparable to the City's Green Campus proposal, with addition of reuse and composting activities, or at least collection of all 12 market categories. It would also be good to include a major baler at the Green Campus to help in marketing the single-stream materials to be processed there.
[6] Set up at least one center in each "waste shed" of City to conveniently take from the public Reusables, Recyclables, Compostables, Concrete and Demolition Materials, and recyclable Household Hazardous Wastes (e.g., batteries, oil and paint). In California, the state requires supermarkets to establish convenient recycling centers in their parking lots (or within 2 miles of the store) to receive designated recyclable materials.
[7] City of Fresno, CA hired 5 students to contact every business in the City to help them implement a similar mandatory Recycling Ordinance. See article in April 2008 *Resource Recycling* journal.
[8] United States EPA. *Waste Partnerships – Waste Wise Program*. 10 December 2008. <http://www.epa.gov/epaoswer/non-hw/reduce/wstewise/wrr/rm.htm>
[9] State of California Integrated Waste Management Board. *Incentive Programs for Local Government and Waste Reduction*. 10 December 2008. <http://www.ciwmb.ca.gov./LGLibrary/Innovations/Incentives> Monrovia, California, reduces its nonexclusive commercial service agreement fees directly proportional to the amount of wastes diverted. Franchise fees are 16 percent for haulers diverting 24 percent or less, 12 percent if they divert 25 to 49 percent, and 8 percent if they divert 50 percent or more.
[10] Set up at least one center in each "waste shed" of City to conveniently take from the public Reusables, Recyclables, Compostables, Construction & Demolition Materials, and recyclable Household Hazardous Wastes (e.g., batteries, oil and paint). In California, the state requires supermarkets to establish convenient recycling centers in their parking lots (or within 2 miles of the store) to receive designated recyclable materials.
[11] Particularly include as eligible costs the startup of new takeback programs by industry sectors that agree to levy an industry-wide fee to keep such programs going after grant is over.
[12] Texas Department of Transportation. *Recycling Summary*. 10 December 2009. <http://www.txdot.gov/business/contractors_consultants/recycling/performance.htm>
[13] GrassRoots Recycling Network. *Zero Waste Business Principals*. 10 December 2009. <http://www.grrn.org/zerowaste/business>

APPENDIX C.
EXISTING RECYCLING ORDINANCE

7.0 COMMERCIAL / MULTI-FAMILY RECYCLING GUIDELINES[1]

7.1.0 SCOPE OF RULES

The City of Austin requires that all businesses with 100 employees or more and multi-family properties with 100 units or more must provide on-site recycling services. Under this requirement, businesses and multi-family properties continue to choose their own waste haulers and recyclers and to negotiate prices for these services.

The Recycling guidelines contained within this document are intended to articulate the standards and expectations for commercial and multi-family recyclables collection as authorized in the City Code Chapter 12-3, Article VI.

7.2.0 ADOPTION AND REVISION OF RECYCLING GUIDELINES

Under authority of City Code Chapter 12-3, Article VI, the Director of the Solid Waste Services Department [*hereinafter* Director] is authorized to adopt and revise rules, procedures and forms to implement provisions of that Chapter which regulate commercial and multi-family recycling in the City of Austin.

7.3.0 GENERAL PRINCIPLES

City Code Chapter 12-3, Article VI is designed to increase access to the benefits of recycling and waste reduction for area businesses and multi-family properties within the City of Austin and thus help increase the life of local landfills, decrease disposal costs for area businesses and multi-family properties, and have a positive impact on the environment generally in terms of reduced pollution and energy consumption.

The Ordinance requires that multi-family property owners and business owners provide on-site recycling opportunities to their residents and employees in much the same way that the City of Austin has provided this opportunity to single-family homes through curbside recycling. As is the case with the City of Austin's curbside program, the participation of each individual resident or employee is voluntary.

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[1] City of Austin Solid Waste Services Department. *Chapter 12-3: Solid Waste Guidelines.* 10 December 2008. Page 13. <http://www.ci.austin.tx.us/sws/downloads/rules.pdf>

APPENDIX D.
PRODUCT & MATERIALS MARKET INVENTORY[1]

Item	Programs/Facilities Accepting Materials
1. Reusable	
Appliances (e –waste)	Goodwill, Computers for Kids, Axcess Technologies, Earth Protection Services
White Goods[2]	Goodwill: Salvation Army: TDS Landfill, COA Diversion Recycling Center, Austin Energy's refrigerator pickup and recycling program
Durable plastic products	Goodwill, Salvation Army, Thrift stores
Usable Textiles	Goodwill, Salvation Army, St. Vincent de Paul Store, Assistance League of Austin Thrift House,
Mattresses	Salvation Army: Habitat for Humanity:
Furniture	Goodwill: Salvation Army Re-Sale, Big Brother/Big Sister, ARCH, any non-profit organization, St. Vincent de Paul Store, Assistance League of Austin Thrift House
Books	Goodwill, Salvation Army Re-Sale, Bookstores, Library, Austin libraries, Ecology Action, Half Price Books stores various locations
Building Materials	Habitat for Humanity (limited)
Other reusables and repairables	Goodwill, Salvation Army Re-Sale, Habitat for Humanity, Austin's Yellow Bike Project, Bikes Not Bombs
2. Paper	
Cardboard	COA-MRF, Balcones Recycling, Allied Waste Services, Moving Company, Ecology Action, Solid Waste Services, Ecology Action
White ledger	COA-MRF, Balcones Recycling, Allied Waste Services, Recycle curbside, Paper retriever dumpsters, Ecology Action, Solid Waste Services
Newsprint	COA-MRF, Balcones Recycling, Allied Waste Services, Recycle curbside, Paper retriever dumpsters, Ecology Action, Solid Waste Services
Magazines / Catalogs	COA-MRF, Balcones Recycling, Allied Waste Services, Recycle curbside, Paper retriever dumpsters, Ecology Action, Solid Waste Services
Other office paper	COA-MRF, Balcones Recycling, Allied Waste Services, Recycle curbside, Paper retriever dumpsters, Ecology Action, Solid Waste Services
Paperboard	COA-MRF, Balcones Recycling, Allied Waste Services, Recycle curbside, Paper retriever dumpsters, Ecology Action
Other / Composite paper	Balcones Recycling, Recycle curbside, Paper retriever dumpsters, Ecology Action
3. Plant Debris	
Leaves & Grass	TDS Landfill (composting program), COA Hornsby Bend Facility Compost, Curbside yard Solid Waste Services [3]
Prunings	TDS Landfill (composting program), COA Hornsby Bend Facility Compost, Curbside yard Solid Waste Services
Branches & stumps	Whittlesey Landscape Supplies, TDS Landfill (composting program), COA Hornsby Bend Facility Compost, Curbside yard Solid Waste Services

Product and Materials Market Inventory (continued)

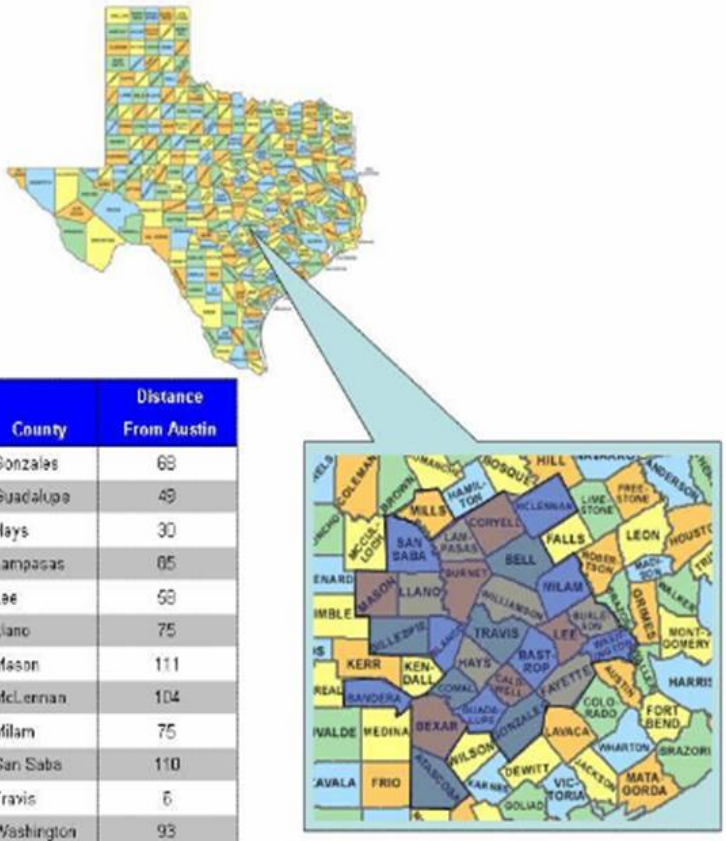
Item	Programs/Facilities Accepting Materials
4. Putrescibles	
Food waste	Compost Texas Disposal Systems, Texas Organic Products composting (Accepts commercial food waste on limited basis).
Fish and meat waste	Unclear
Sewage sludge	Austin Water Utility, City of Austin's Hornsby Bend Wastewater treatment plant
5. Wood	
Untreated wood	Habitat for Humanity, Austin Wood Recycling, Texas Organic Products composting program
Treated wood	Habitat for Humanity (Limited)
6. Ceramics	
Concrete	Habitat for Humanity, Roadmix Co, Marcelo's Sand and Loam
Asphalt paving	Roadmix Co, Marcelo's Sand and Loam
7. Soils	
Gypsum board	TDS Landfill, Habitat for Humanity
Fines	(Unclear)
8. Metals	
Auto bodies	Salvage yards, Commercial metals, CMC-Austin/AMP Recycling
Aluminum cans	COA-MRF, All American Recycling, Southside Recycling, DNT Recycling, Allied Waste Services, Gardner Iron & Metal, Ecology Action, Curbside recycling. Solid Waste Services, CMC-Austin/AMP Recycling, Austin Metal and Iron, Beaman Metal Co.
Steel cans	COA-MRF, All American Recycling, Southside Recycling, DNT Recycling, Allied Waste Services, Gardner Iron & Metal, Ecology Action, Curbside recycling. Solid Waste Services, CMC-Austin/AMP Recycling, Austin Metal and Iron, Beaman Metal Co.
Other Ferrous metals	COA-MRF, Commercial Metals, All American Recycling, Southside Recycling, DNT Recycling, Allied Waste Services, Austin Metal & Iron, Ecology Action, Austin Metal and Iron, Gardner Iron and Metal
Other Non-ferrous	COA Diversion Recycling Center, COA-MRF, Commercial Metals, All American Recycling. Southside Recycling, DNT Recycling, Allied Waste Services, Austin Metal & Iron, Ecology Action, Austin Metal and Iron, Gardner Iron and Metal
9. Glass	
Clear glass	COA MRF, Ecology Action, Curbside recycling, Local recycling center, Tri-Recycling
Green glass	COA MRF, Ecology Action, Curbside recycling, Local recycling center, Tri-Recycling
Mixed glass	COA MRF, Ecology Action, Curbside recycling, Local recycling center, Tri-Recycling
Brown glass	COA MRF, Ecology Action, Curbside recycling, Local recycling center, Tri-Recycling
Window glass	Habitat for Humanity, Ecology Action
Other glass	Ecology Action

Product and Materials Market Inventory (continued)

Item	Programs/Facilities Accepting Materials
10. Polymers	
# 1 PET	COA Curbside, Ecology Action, Local recycling center, BFI MRF, Cycled Plastics
#2 HDPE	COA Curbside, Ecology Action, Local recycling center, BFI MRF, Cycled Plastics
#3 PVC	COA Curbside, Ecology Action, Cycled Plastics
#4 LDPE	COA Curbside, Ecology Action, Cycled Plastics
#5 PP	COA Curbside, Ecology Action, Cycled Plastics
# 6 PS	COA Curbside, Ecology Action, Cycled Plastics
#7 plastic	Ecology Action (limited)
Other plastics	
Asphalt Roofing	Marcelo's Sand and Loam
Tires	Sears stores ($2 fee), Most tire stores—call first, Eco Depot
11. Textiles	
Poly fibers	Goodwill, Salvation Army, St. Vincent de Paul Store, Assistance League of Austin Thrift House
Cotton and wool	Goodwill, Salvation Army, St. Vincent de Paul Store, Assistance League of Austin Thrift House
12. Chemicals	
Used motor oil	COA/SWS-Disposal Services/, Oil change shops, Solid Waste Services' Household Hazardous Waste Facility, Eco Depot
Household Hazardous Wastes	COA COA/SWS-Disposal Services/HHW, Solid Waste Services Household Hazardous Waste Facility
Disposable Diapers	Stericycle Biohazardous Waste
Medical waste	Stericycle Biohazardous Waste, COA HHW

[1] The Market Inventory is constantly evolving. Staff will need to work diligently to keep the information up to date.
[2] White Goods are also known as home appliances
[3] City currently collects yard trimmings from containers provided by homeowners.

APPENDIX E.
MAP OF CONTRIBUTING COUNTIES



County	Distance From Austin	County	Distance From Austin
Atascosa	112	Gonzales	68
Bandera	126	Guadalupe	49
Bastrop	29	Hays	30
Bell	59	Lampasas	85
Bexar	76	Lee	58
Blanco	45	Llano	75
Burleson	86	Mason	111
Burnet	50	McLennan	104
Caldwell	34	Milam	75
Comal	66	San Saba	110
Coryell	89	Travis	6
Fayette	59	Washington	93
Gillespie	86	Williamson	35

APPENDIX F.
REGIONAL LETTERS OF SUPPORT

Travis County Commissioners Court

SAMUEL T. BISCOE
County Judge

RON DAVIS
Commissioner, Pct. 1

SARAH ECKHARDT
Commissioner, Pct. 2

GERALD DAUGHERTY
Commissioner, Pct. 3

MARGARET J. GÓMEZ
Commissioner, Pct. 4

Travis County Administration Building, 314 W. 11th, Commissioners Courtroom, 1st Floor, Austin, Tx 78701

May 13, 2008

The Hon. Will Wynn, Mayor
City of Austin
P.O. Box 1088
Austin, TX 78767

Dear Mayor Wynn:

The Travis County Commissioners Court would like to support and contribute to the City of Austin goal of achieving Zero-Waste. We would welcome the opportunity to work with the City of Austin, the Capital Area Council of Governments and local governments in the region on policies and programs to reduce the waste going to landfills by:

- Expanding tire recycling programs
- Expanding composting and organic waste diversion programs
- Expanding Green Building initiatives
- Recycling and reuse of construction/demolition debris
- Developing Green Districts and Resource Recovery Parks
- Supporting programs and policies for Extended Producer Responsibility

Thank you for your leadership in this vital component of your Climate Protection Initiative. We look forward to working with you and your Zero Waste team to pioneer these policies and programs in the region.

Sincerely,

Samuel T. Biscoe
County Judge

Ron Davis
Commissioner, Precinct One

Sarah Eckhardt
Commissioner, Precinct Two

Gerald Daugherty
Commissioner, Precinct Three

Margaret J. Gomez
Commissioner, Precinct Four

Capital Area Council of Governments

P.O. Box 17848
Austin, TX 78760-7848

6800 Burleson Road
Building 310, Ste. 165
Austin TX 78744

PH: 512.916.6000
FAX: 512.916.6001

www.capcog.org

Bastrop

Blanco

Burnet

Caldwell

Fayette

Hays

Lee

Llano

Travis

Williamson

Counties

May 14, 2008

Mayor Will Wynn
P.O. Box 1088
Austin, Texas 78767

Dear Mayor Wynn:

The Solid Waste Advisory Committee (SWAC) of the Capital Area Council of Governments (CAPCOG) would like to lend our support to the City of Austin's Zero Waste initiatives, which are consistent with the past and continuing efforts of CAPCOG and the SWAC. These initiatives also support the waste reduction goals of the Regional Solid Waste Management Plan, and the recommendations of the Market Analysis of Recoverable Materials (2007) prepared for the CAPCOG region by R.W. Beck.

We would welcome the opportunity to work on policies and programs together throughout the region, including:

- expanded tire recycling programs
- expanded composting and organic waste diversion programs
- expanded Green Building initiatives throughout the region
- expanded recycling and reuse of construction and demolition debris
- development of Green Districts and Resource Recovery Parks, and
- support for Extended Producer Responsibility and manufacturer take-back policies and programs.

Thank you for your leadership in this vital component of your Climate Protection Initiative. We look forward to working with you and your Zero Waste team to pioneer these policies and programs in the region.

Sincerely,

Maurice Pitts, Jr.

The Honorable Maurice Pitts, Jr, SWAC Chair

cc: Melissa Martinez, City of Austin Solid Waste Services

APPENDIX G.
MODEL EPR RESOLUTION

MODEL RESOLUTION NO. _____
RESOLUTION OF THE CITY OF AUSTIN
SUPPORTING EXTENDED PRODUCER
RESPONSIBILITY

WHEREAS, approximately 1,000,000 tons of discarded materials and products are currently sent to disposal from our community which are valued at over $40 million per year; and

WHEREAS, federal and state rules ban landfill disposal of certain products that are deemed hazardous, including [confirm ones that apply: household batteries, fluorescent bulbs and tubes, thermostats and other items that contain mercury, as well as electronic devices such as video cassette recorders, microwave ovens, cellular phones, cordless phones, printers, and radios]; and

WHEREAS, it is anticipated that the list of waste products determined to be hazardous and therefore banned from landfills will continue to grow; and

WHEREAS, state policies currently make local governments responsible for achieving waste diversion goals; and

WHEREAS, household hazardous waste management costs are currently paid by taxpayers and rate payers of the City of Austin and are expected to increase substantially in the short term unless policy changes are made; and

WHEREAS, local governments have no input on the design of the products, make no profit from the products, and do not have the resources to adequately address the rising volume of discarded products; and

WHEREAS, costs paid by local governments to manage products are in effect subsidies to the producers of hazardous products and products designed for disposal; and

WHEREAS, the City Council of the City of Austin supports statewide efforts to hold producers responsible for hazardous products and other product and packaging waste management costs; and

WHEREAS, there are significant environmental and human health impacts associated with improper management of hazardous products; and

WHEREAS, Extended Producer Responsibility (EPR) is a policy approach in which producers assume responsibility for management of hazardous waste products and which has been shown to be effective; and

WHEREAS, when producers are responsible for ensuring their products are reused or recycled responsibly, and when health and environmental costs are included in the product price, there is an incentive to design products that are more durable, easier to repair and recycle, and less toxic; and

WHEREAS, EPR framework legislation establishes transparent and fair principles and procedures for applying EPR to categories of products for which improved design and management infrastructure is in the public interest; and

WHEREAS, the California Product Stewardship Council (CPSC) is an organization of California local governments working to speak with one voice in promoting transparent and fair EPR systems in California; and

WHEREAS, in (Date), the City of Austin adopted a municipal Zero Waste Plan, and this plan describes how zero waste cannot be achieved unless product manufacturers reduce the toxics in their products and design them to be reusable and recyclable; and

WHEREAS, the City of Austin wishes to incorporate EPR policies into the City's and County's product procurement practices to reduce costs and protect the environment;

NOW, THEREFORE BE IT RESOLVED BY THE COUNCIL OF THE CITY OF AUSTIN that the Council of the City of Austin urges the Texas Commission on Environmental Quality (TCEQ) to support legislation, policies and programs on Extended Producer Responsibility; and

BE IT FURTHER RESOLVED, that the Council of the City of Austin encourages the formation of a Texas Product Stewardship Council as an organization of Texas local governments working to speak with one voice in promoting transparent and fair EPR systems in Texas to shift waste management costs from local government to the producers of the product, and which will give producers the incentive to redesign products to make them less toxic and easier to reuse and recycle; and

BE IT FURTHER RESOLVED, that the Director of Solid Waste Services Department be authorized to send letters to Texas local government organizations, state agencies and the State legislature and to use other advocacy methods to urge support for EPR legislation; and

BE IT FURTHER RESOLVED, that the (Jurisdiction name) encourages all manufacturers to share in the responsibility for eliminating waste through minimizing excess packaging, designing products for durability, reusability and the ability to be recycled; using recycled materials in the manufacture of new products; and providing financial support for collection, processing, recycling, or disposal of used materials; and

BE IT FURTHER RESOLVED, that the City of Austin will lead by example to develop producer responsibility policies for its own purchases, such as leasing products rather

than purchasing them and requiring producers to offer less toxic alternatives and to take responsibility for collecting and recycling their products and the end of their useful life.

PASSED AND ADOPTED by the Council of the City of Austin, State of Texas on _____ by the following vote:

AYES:
NOES:
ABSENT:
ABSTAIN:

Signed: _____ Date: (mo/day/year)
Will Wynn, Mayor

ATTEST: _____
(Name), Clerk
City of Austin

APPENDIX H.
HIGHEST AND BEST USE HIERARCHY

Zero Waste has been defined by the Zero Waste International Alliance as a philosophy and visionary goal in which manufacturing and supply chains emulate natural cycles, where all outputs are usable inputs for other value-added processes. It means designing products and managing materials and systems for maximum resource conservation, highest, most efficient use, and minimum negative environmental impact. It means eliminating harmful discharges to land, water and air, by preventing rather than managing waste and pollution.

Highest Use

Redesign Manufacturing & Supply Chain

Mandate Extended Producer Responsibility (EPR)
Produce durable, reusable, recyclable, and recycled-content products
Use environmentally sustainable feedstocks & materials
Design for repair, reconditioning, disassembly, deconstruction and recycling
Make brand owners/first importers responsible to take back products & packaging

Reduce/Refuse/Return

Reduce Toxicity
Reduce toxic materials in products
Replace toxic materials in products with less toxic or non-toxic alternatives
Reduce Consumption
Purchase and use less
Apply Environmentally Preferable Purchasing (EPP) standards to purchasing
Reduce Packaging
Purchase products with less packaging
Incentive durable, reusable packaging

Reuse/Preserve Form & Function

Repair and recondition products
Deconstruct and salvage buildings and building products
Support thrift stores and charity collection

Recycle/Compost/Digestion

Recover & return materials to economic mainstream for remanufacture to like-value products
Recover & return materials to economic mainstream for composting to value-added soil amendment products
Ambient temperature (<200 degrees) processing of organic materials for recovery of fuels and energy, with composting of residue

Down Cycle

Recover & return materials to economic mainstream for remanufacture to non- or marginally-recyclable products, such as office paper to tissue paper, or soda bottles to toys or clothing

Waste-Based Energy[1]

Biological energy recovery technologies, including anaerobic digestion
Thermal energy recovery technologies including gasification, plasma arc, pyrolysis

Bury/Incinerate

Bioreactor landfilling, when design incorporates sufficient safety & environmental protections
"Beneficial" landfill use, such as alternative daily cover (ADC) or landfill construction
Traditional landfilling

Lowest Use

[1] Revision made by staff with SWAC input.

APPENDIX I.
ZERO WASTE RESOURCES

Austin Zero Waste:	www.austinrecycles.com Jessica King 512-974-2728 jessica.king@ci.austin.tx.us Rebecca Hays 512-974-7720 rebecca.hays@ci.austin.tx.us
GrassRoots Recycling Network:	www.grrn.org
Zero Waste International Alliance:	www.zwia.org
Earth Resource Foundation:	www.earthresource.org/zerowaste.html
Gary Liss & Associates:	www.garyliss.com/id18.html