



## Chapter 10: Energy and Environment

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## ***10.1 Introduction – Edina’s History of Environmental Action.***

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From the early 1970s, when recycling was still a novel idea and environmental programs were first being established, to the present, as the City takes on the challenges of global warming and energy policy, Edina has sought to be in the forefront on environmental and natural resource issues.

This Chapter 10 identifies the City’s goals, policies, and objectives in the following areas:

- Climate Change and Global Warming
- Clean Energy and Energy Efficiency
- Recycling and Solid Waste Management
- Outdoor and Indoor Air Quality

The following environmental topics are covered in other chapters of this plan:

- Land Use and Community Design - See Chapter 4
- Transportation – See Chapter 7
- Water Quality and Water Resource Management—See Chapter 8.
- Urban Forest, Parks, and Open Space - See Chapter 9
- Noise – See Section 11.4

### **History of the Energy and Environment Commission**

In 1971 the City of Edina established the Environmental Quality Commission, which was disbanded in 1977. On April 3, 2007, the Edina City Council established the Energy and Environment Commission in response to the global warming crisis, and to support and advance environmental protection, conservation efforts, energy conservation, and water protection. On June 18, 2007, the City Council appointed the first members of the newly created Energy and Environment Commission, significantly expanding Edina’s commitment to comprehensively address environmental and energy issues.



### **Duties of the Edina Energy and Environment Commission.**

The Council gave the new commission its mandate in City Ordinance Section 146:

- A. Examine and recommend best practices for energy conservation for Edina's citizens and businesses, including recommendations for a "green" building code, use of Energy Star appliances, and other energy reduction targets.
- B. Examine and recommend changes in City Government purchasing and operations to conserve energy.
- C. Evaluate and monitor the provision of a residential recycling program.
- D. Evaluate and monitor the provision of a privately provided solid waste program, as well as a reduction in municipal solid waste produced by Edina residents and businesses.
- E. Evaluate and encourage improvements in air and water quality.
- F. Promote the establishment of targets for the reduction of greenhouse gas emissions produced by the City's buildings, equipment and operations.
- G. Educate the public about energy issues, reduction, conservation, reuse, recycling and environmental protection.
- H. Examine and promote renewable energy options for transportation, heating, and cooling, and other energy uses.

The Energy and Environment Commission held its first meeting in July 2007. Since then, the nine-member commission has formed three Working Groups (WG): (i) Climate Change; (ii) Education and Outreach; and (iii) Recycling and Solid Waste. The three WG have taken on additional citizen volunteers and are now developing and implementing work plans in their areas. The next sections of this chapter discuss Edina's policies, goals and actions in the areas of global warming and climate change, energy use and conservation, recycling and waste management, and air quality.





## **10. 2. Climate Change and Global Warming.**

**10.2.1. Introduction and Current Conditions – Climate Change and Global Warming.** *“Global warming is a reality. It threatens both our society and life, as we know it on earth. The overwhelming consensus of the scientific community for the past decade has been that the planetary warming we are now experiencing, and the resulting climate change, is largely a human induced phenomenon. This is brought on mainly by the release of carbon dioxide through the burning of fossil fuels, which blankets our atmosphere raising the earth’s surface temperature.”<sup>2</sup>*

This was the message that renowned polar explorer Will Steger brought to Edina on January 11, 2007, when he spoke at St. Patrick’s Church in the first “Edina Dialogue” sponsored by the Edina Community Foundation and Edina High School’s Project Earth student group. Over 1,000 residents, including Edina’s mayor and City Council members, resolved to respond to the problem of global warming.

### **10.2.2. Trends and Challenges – Climate Change and Global Warming.**

The City has since taken two very significant actions to address global warming. First, on February 6, 2007, Edina joined over 700 U.S. cities in signing the U.S. Mayors Climate Protection Agreement. Second, on November 5, 2007, the City Council voted to join the International Council for Local Environmental Initiative (ICLEI) Cities for Climate Protection (CCP). The City and the Energy and Environment Commission are now identifying actions that will reduce greenhouse gas emissions in our community.

#### **The U.S. Mayors Climate Protection Agreement.**

The Energy and Environment Commission is now working to implement many of the actions under the Mayor’s Agreement. These activities are discussed in this chapter. The U.S. Mayors Climate Protection Agreement reads as follows:

A. Urge the federal government and state governments to enact policies and programs to meet or beat the target of reducing global warming pollution levels to seven percent below 1990 levels by 2012, including efforts to: reduce the United



States' dependence on fossil fuels and accelerate the development of clean, economical energy resources and fuel-efficient technologies such as conservation, methane recovery for energy generation, waste to energy, wind and solar energy, fuel cells, efficient motor vehicles, and biofuels; (Note: In 2007, the Minnesota legislature adopted one of the most aggressive goals in the nation. This omnibus energy policy bill includes the Global Warming Mitigation Act of 2007 which commits to reducing the State's greenhouse gas emissions by 15% by 2015, 30% by 2025, and 80% by 2050 compared to 2005.)

B. Urge the U.S. Congress to pass bipartisan greenhouse gas reduction legislation that 1) includes clear timetables and emissions limits and 2) a flexible, market-based system of tradable allowances among emitting industries; (Note: In the fall of 2007, Edina Mayor Jim Hovland signed a letter urging Edina's congressional members to pass such legislation, as proposed in the Safe Climate Act, H.R.1590.)

C. Strive to meet or exceed Kyoto Protocol targets for reducing global warming pollution by taking actions in our own operations and communities such as:

1. Inventory global warming emissions in City operations and in the community, set reduction targets and create an action plan;
2. Adopt and enforce land-use policies that reduce sprawl, preserve open space, and create compact, walkable urban communities;
3. Promote transportation options such as bicycle trails, commute trip reduction programs, incentives for car-pooling and public transit;
4. Increase the use of clean, alternative energy by, for example, investing in "green tags", advocating for the development of renewable energy resources, recovering landfill methane for energy production, and supporting the use of waste to energy technology;
5. Make energy efficiency a priority through building code improvements, retrofitting City facilities with energy efficient lighting and urging employees to conserve energy and save money;
6. Purchase only Energy Star equipment and appliances for City use;
7. Practice and promote sustainable building practices using the U.S. Green Building Council's LEED program or a similar system;
8. Increase the average fuel efficiency of municipal fleet vehicles; reduce the number of vehicles; launch an employee education program including anti-idling messages; convert diesel vehicles to bio-diesel;



9. Evaluate opportunities to increase pump efficiency in water and wastewater systems; recover wastewater treatment methane for energy production;
10. Increase recycling rates in City operations and in the community;
11. Maintain healthy urban forests; promote tree planting to increase shading and to absorb CO<sub>2</sub>; and
12. Help educate the public, schools, other jurisdictions, professional associations, business and industry about reducing global warming pollution.

### **ICLEI Cities for Climate Protection Campaign.**

On November 5, 2007, the City Council unanimously approved Edina's membership in ICLEI's Cities for Climate Protection (CCP) campaign. Edina is the eighth city in the state of Minnesota to join ICLEI. Hennepin, Ramsey and Dakota counties are also members.

ICLEI – the International Council for Local Environmental Initiatives – is an international association of local governments and national and regional local government organizations that have made a commitment to sustainable development. ICLEI created the CCP in 1994, and today this effort assists over 800 cities across the world to adopt policies and implement quantifiable measures to reduce local greenhouse gas emissions, improve air quality and enhance urban livability and sustainability.

Edina's membership in ICLEI's CCP will provide the City with technical support, training and specific action steps for reducing carbon emissions. The City should also realize financial savings in reduced utility and fuel costs and improved air quality, contributing to the general health and well being of the community. The CCP works with the U.S. Mayors Climate Protection Agreement to help local governments reduce carbon emissions and integrate climate change mitigation into their decision-making processes.

The CCP campaign is based on an innovative performance framework structured around five milestones that allow local governments to understand how municipal decisions affect energy use and how these decisions can be used to mitigate global climate change while improving community quality of life. The five milestones provide a flexible framework that can accommodate varying levels of analysis, effort, and availability of data. ICLEI's CCP provides member cities with a simple, standardized means of calculating greenhouse gas emissions, establishing targets to lower emissions, reducing greenhouse gas emissions, and



measuring and reporting performance. ICLEI has developed several software tools that help cities comply with the methodology.

### **10.2.3. Goals and Policies - Climate Change and Global Warming.**

The City's actions in joining the U.S. Mayors Climate Protection Agreement and ICLEI's Cities for Climate Protection campaign have framed Edina's goals and policies on climate change. The goals and policies adopted by the City under the U.S. Mayors Climate Protection Agreement are listed in Section 10.2.2. In addition, the five ICLEI CCP milestones form a framework for the implementation of the goals and policies of the Mayors Agreement. The five ICLEI milestones that serve as the City's goals and policies on climate change are:

**Milestone 1. Conduct a baseline emissions inventory and forecast.** Based on energy consumption and waste generation, the City will calculate greenhouse gas emissions for a base year (e.g., 2007) and for a forecast year (e.g., 2015). The inventory and forecast provide a benchmark against which the City can measure progress.

**Milestone 2. Adopt an overall greenhouse gas reduction goal and an emissions reduction target based on the forecast year.** The City will use its best efforts to reduce community greenhouse gases by 15 percent by 2015, 25 percent by 2025, and 80 percent by 2050 in agreement with the Global Warming Mitigation Act of 2007. The City will also develop milestone emission reduction target for City operations from the baseline year. The GHG reduction goal and reduction targets both foster political will and create a framework to guide the planning and implementation of measures.

**Milestone 3. Develop a Local Action Plan.** The City will develop a Local Action Plan that describes the specific policies and measures that it will take to reduce greenhouse gas emissions and achieve its emissions reduction target. The plan should include a timeline, a description of financing mechanisms, and an assignment of responsibility to departments and staff, and incorporate public awareness and education efforts.

**Milestone 4. Implement policies and measures.** The City will implement the policies and measures in the Local Action Plan. Policies and measures should include energy efficiency improvements to municipal buildings and water treatment facilities, streetlight retrofits, public transit improvements, and installation of renewable power applications.



**Milestone 5. Monitor and verify results.** The City will monitor and verify progress on the implementation of measures to reduce or avoid greenhouse gas emissions in an ongoing process. Monitoring should begin once measures are implemented and continue for the life of the measures, providing important feedback that can be use to improve the measures over time.

#### ***10.2.4. Implementation – Climate Change and Global Warming.***

The main focus of the Edina Energy and Environment Commission's Climate Change Committee will be to implement the action steps and milestones outlined in the Mayors Climate Protection Agreement and ICLEI Cities for Climate Protection campaign as limited by the City of Edina's Ordinance in Section 146. These actions will include: (1) establishing the municipal carbon footprint, including an emissions inventory, baseline, and forecast for greenhouse gas emissions; (2) identifying actions that will reduce greenhouse gas emissions, (3) implementing educational actions with public and private partners, including the school district, residential, commercial and industrial sectors, that will result in quantifiable greenhouse gas reductions, and (4) establishing a procedure for measuring and reporting greenhouse gas reductions in the community. The outcome of these actions will be, at a minimum, a reduction of greenhouse gas emissions by the percentages set in the Minnesota Global Warming Mitigation Act of 2007.

## ***10.3 Energy***

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### ***10.3.1 Introduction - Energy***

Energy is the driver of the modern world as we know it. Sources of energy can be either converted to electricity or transported to homes and businesses over power lines, or directly used ("burned") to power machines. A majority of the electricity consumed in Edina is generated from coal, gas, and nuclear reactors. The last decade has brought clarity to the immense consequences of such fossil fuel based sources on our shared environment and social structure. The impact of global climate change is already being felt across the globe and is only expected to accelerate in the coming decades. The City of Edina must not only strive to secure adequate energy to meet its needs in the future but also ensure that it uses and produce energy that is "clean", affordable, and safe. Alternative energy sources such as solar power, wind power, geothermal, and power from biomass, are classified as renewable and clean sources of energy because of



their potentially unlimited supply and minimal environmental impact. As we learn more about alternative forms of energy, it is important to note that we should evaluate them in a comprehensive manner to determine the forms of energy that are ideally suited for Edina. As new technologies develop and current technologies mature with respect to cost (referred to as "grid parity"), these evaluations must be revisited. This section will describe the current energy status of Edina, current trends and challenges, and will lay out the goals and suggest policies that will put Edina at the forefront of energy efficiency, utilization, and renewable energy in the State.

### **10.3.2 Current Conditions - Energy**

Coal-fired power plants typically account for nearly two-thirds of Minnesota's electricity generation. Two nuclear plants near the Twin Cities also account for nearly one-fourth of the State's electricity production.<sup>3</sup> Thus, greater than 95% of electricity in Minnesota during 2005 was generated from energy sources that are neither clean nor renewable.<sup>4</sup>

The good news is that Minnesota has one of the strongest renewable energy standards in the US. Xcel Energy, the largest electricity producer in the state, has been mandated to generate 30 percent of its energy from renewable resources by 2020, with at least 25 percent generated by wind energy. All other utilities are required to generate at least 20 percent of their energy from renewable sources by 2025.

Edina residents and businesses are customers of Xcel Energy. They can subscribe to wind energy through the Windsource Program by dedicating either a portion or their entire electrical consumption to energy produced using wind power. Windsource customers also get a credit for the avoided fuel costs of conventional sources of energy, resulting in a net wind energy service adjustment charge of less than a dollar per 100 kWh. Xcel Energy also offers the residential Saver's Switch program. Residents receive a bill credit during the summer months in exchange for agreeing to have their air conditioning systems cycled on and off during peak energy demand periods.

Natural gas is the preferred energy source in Minnesota for residential and commercial heating and it is transported through federally regulated interstate pipelines. Center Point Energy is the Edina's provider of natural gas. It offers energy saving programs such as energy audits and rebates for heating systems, food service equipment and for the installation of heat recovery systems.



Personal and commercial transportation relies on either gasoline or diesel fuels. By Minnesota statute, gasoline sold in the state must be blended with 10% ethanol (E10), and diesel must contain 2% biodiesel (B2). The Agriculture and Veteran bill signed by Gov. Pawlenty in May 2008 contains provisions (Section 51) that increase the state B2 mandate to B5 (i.e. 5%) by 2009, B10 by 2012 and B20 by 2015. These blends help reduce CO2 emissions and displace the amount of harmful additives, such as benzene, found in petroleum-based fuels. Minnesota also has over 300 gas stations<sup>5</sup> selling E85, a blend containing 85% ethanol that can be used in flex-fuel vehicles. E85 is not sold in Edina, but it can be found at gas stations in neighboring Eden Prairie, Bloomington, Richfield and Minneapolis<sup>5</sup>.

Efforts by Edina's government, residents and businesses to reduce energy use and make the transition toward renewable energy sources can play a significant role in reducing the negative impact of our energy consumption.

The City of Edina currently does not have an energy and environment policy. The Energy and Environment Commission will study, develop, and recommend such policy to the City Council. It is important that Edina accelerates the use and generation of alternative energy sources, promotes energy efficiency, and finds avenues to reduce dependence on fossil fuel based energy for government, residences, and commercial establishments.

### ***10.3.3 Trends and Challenges – Energy***

A variety of alternative energy sources are being implemented across the country and the globe. Solar, wind, geothermal, and biomass are the most popular and promising approaches for alternative energy. States like California and Arizona, due to abundant sun light throughout the year, are aggressively promoting adoption of solar power. States in the central US region, such as Texas and Minnesota, are good candidates for wind energy applications because of the high wind speed in this section of the nation. The Buffalo Ridge area in southern Minnesota is a leading region for wind power generation in the country. This region also hosts one of the major wind turbine blade manufacturers (Suzlon Rotor Corporation).

Minnesota is a major corn producer and there has been a large investment in ethanol based energy production in the State. Many other sources of energy are in the research stage, with the University of Minnesota taking a lead in biomass energy research.



For an overview of the above renewable energy sources and their comparison to conventional energy sources, please refer to the 2005 report on renewable energy by the League of Women Voters of Edina<sup>6</sup>. This report provides information on how the sources work, their cost and availability, their current level of use in Minnesota, related incentives provided by governments, and environmental impact, if any.

The primary challenge with most of the alternative energy sources is cost. For example, solar energy costs \$0.20-0.50/kW-hr and wind energy costs \$0.06/kW-hr compared to \$0.02/kW-hr for electricity from coal or gas<sup>7</sup>. The second challenge is transportation of energy. For example, new transmission lines are often required to transport wind-generated electricity from remote wind farms to urban areas. The ideal source of energy is one that can produce electricity cheaply, all year round, and be locally produced. This forces cities such as Edina to look at comprehensive approaches to energy, where more than one form of renewable energy could be combined to address the needs and goals of the City.

### **10.3.4 Goals and Policies – Energy**

1. *Lead by example in conserving energy and developing renewable energy for city buildings, fleets, and operations.*
2. *Promote community and business energy conservation, including adopting ordinances and policies to provide incentives for energy efficiency, renewable energy, and reductions in greenhouse gases.*
3. *Adopt purchasing guidelines for the City of Edina that include renewable energy sources, Examples are purchasing wind energy for electrical consumption and purchasing blended fuels for the City fleet.*
4. *Promote educational programs to inform residents and businesses of the availability of renewable energy options in energy and fuel supply, and carbon-neutral actions.*
5. *Work with public and private institutions to obtain grants for adoption of renewable energy sources by the City and residents. Work with these institutions to make these projects economically self-sustaining.*

### **10.3.5 Implementation – Energy**

Energy option programs approved by the City Council should include specific timetables for implementation and measurement for success.



Implementation of these goals will require a variety of resources from the commission, its working groups, City Hall, local businesses, local non-profit organizations, and potential support from state and federal governments.

The outcome of these actions will be, at a minimum, a reduction of greenhouse gas emissions by the percentages set in the Minnesota Global Warming Mitigation Act of 2007.

## **10.4 Solar Protection**

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### **10.4.1 Introduction - Solar Protection**

One of the most important contributions the City can make in the transition to renewable energy sources is to protect the access that individual residents, businesses and industry have to renewable sources of energy - most notably solar power. Active solar rooftop collectors and passive solar technologies require maximum exposure to sunlight, which can be reduced by the proximity of tall structures. To help ensure that sufficient exposure is available for all homeowners and businesses, the City already has ordinances for building setbacks, building height restrictions, and maximum lot coverage.

### **10.4.2 Current Conditions - Solar Protection**

The Minnesota Solar and Wind Access Law of 1978 (S.F. 145, Article 4, Section 15) provides for the creation of solar and wind easements for solar and wind-energy systems in the form of voluntary contracts. It also allows local zoning boards to restrict development for the purpose of protecting solar access.

The 1998 Comprehensive Plan stressed that protecting "the access that individual residents, businesses and industry have to renewable sources of energy – most notably solar power" was "one of the most direct contributions the City can make in the transition to renewable energy source"<sup>8</sup>. However, only two homes in Edina had solar power by 2004<sup>9</sup>. The high cost of solar installation is still a barrier to large scale adoption of solar energy. Payback for solar installation on existing single-family homes can be 15 year or more, even after rebates. However, excellent return on investment can be achieved in new constructions designed to optimize solar access. Increased property value and tax exemptions are two additional benefits of solar installation.



Combined actions by the City of Edina that protect solar access, facilitate financing mechanisms, and revise current building codes, can result in a wide adoption of solar energy in Edina.

#### **10.4.3 Trends and Challenges - Solar Protection**

Installation of solar panels on City building has proven to be a good approach for increasing the visibility of solar energy, while providing clean energy for building use. Examples are the City of Chicago, which has installed a 2 MW system on museums, public schools, etc., and Cambridge, MA which has installed a 28 kW system providing 10 percent of the electrical needs of the City Hall Annex,

Rising energy costs and concerns about reducing carbon emissions should motivate more homeowners and businesses to invest in solar generated power. But cost, as well as a housing stock that is not constructed to facilitate solar power, continue to impede solar panel investment. Edina's commitment to ICLEI provides a well of resources for finding solar solutions that have been successfully implemented in other US cities. Establishing an environment in which builders design structures to be solar-panel friendly is a critical action. The City of Edina can devise new financing mechanisms, such as low interest rates financing through bond issues, to make solar energy use more economical than it is for individuals or businesses.

#### **10.4.4 Goals and Policies - Solar Protection**

1. *Continue to enforce setback, building height, and lot coverage ordinances that can serve as protection to solar access*
2. *Consider access to solar protection when reviewing variance requests*
3. *Promote the use of active and passive solar energy for heating, lighting, and other aspects in design, construction, remodeling, and operation of City buildings.*
4. *Leverage the Solar and Wind Access Law to establish policies that restrict development for the purpose of protecting solar access to light*

#### **10.4.5 - Implementation Solar Protection**

Solar Protection programs approved by the City Council should include specific timetables for implementation and measurement for success.



The combined outcome of these actions will be, at a minimum, a reduction of greenhouse gas emissions by the percentages set in the Minnesota Global Warming Mitigation Act of 2007.

## ***10.5 Residential Energy Consumption***

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### ***10.5.1 Introduction - Residential Energy Consumption***

Energy consumed by residents of Edina can be broken into three main categories - electricity, natural gas, and transportation fuels.

Residential electricity consumption was measured at 210 million KWh in 2007, or 4,420 kWh per household<sup>10</sup> – greater than the average Minnesota consumption of 4,252 kWh in 2005<sup>11</sup>.

Total natural gas consumption during 2007 was 1.8 billion cubic feet, or 124,000 cubic feet per residential customer in Edina<sup>12</sup>. This is compared to the state average of about 100,000 cubic feet per residential customer.

In the year 2000, the City of Edina recorded 527 million Vehicle Miles Traveled (VMT) on its local streets, collector roads and primary arterial roads. National estimates suggest that motor fuel consumption for the average vehicle has risen from 698 gallons per year to 732 gallons between 1994 and 1999, down to 697 gallons in 2006, a trend due to steady price increases<sup>13</sup>. In 2008, the price of gasoline reached \$4.00 per gallon resulting in a dramatic switch of consumers away from low gas mileage SUVs toward compact cars and hybrid vehicles.

### ***10.5.2 Current Conditions - Residential Energy Consumption***

The average Minnesota Household Energy bill consists of heating (60%), water heating (9%), lighting (7%), air conditioning (4%), and other household appliances and uses (20%). Heating and air-conditioning system problem areas leading to excessive energy use include:

- Equipment sizing: average unit is oversized 47% compared to design.
- Indoor coil air flow: 78% of units have low airflow.
- Refrigerant charge: 72% of units are incorrectly charged.
- Ductwork: over 80% of units have excessive duct leakage.<sup>14</sup>

A simple but effective way to save a large amount of energy would be investing in educational programs that teach how to properly maintain heating and air-



conditioning systems and the importance of replacing old and inefficient appliances, heating and air-conditioning systems.

ENERGY STAR qualified lighting uses about 75% less energy than standard lighting, produces 75 percent less heat, and lasts up to 10 times longer. If every American home replaced just one light bulb with an ENERGY STAR qualified bulb, we would save enough energy to light more than 3 million homes for a year, more than \$600 million in annual energy costs, and prevent greenhouse gases equivalent to the emissions of more than 800,000 cars.

The American Council for an Energy Efficient Economy (ACEEE) has a consumer guide with simple steps homeowners can take to reduce energy usage.

### ***10.5.3 Trends and Challenges - Residential Energy Consumption***

Energy costs are going nowhere but up, due to increased global demand and high sensitivity to global political conditions. Homeowners are feeling the effects of the rising energy costs but may not know how or what to do. They may lack the resources in time and money to employ the energy conservation measures available to them.

### ***10.5.4 Goals and Policies - Residential Energy Consumption***

- 1. Inform residents of the opportunities available to them to control and reduce their energy consumption.*
- 2. Create incentives in the form of tax rebates and low interest financing to reduce residential energy demand and promote renewable energy and low-carbon energy use.*
- 3. Promote the adoption by homeowners, builders and remodelers of Edina's and Minnesota State government energy guidelines, with the goal of meeting LEED certification standards for new constructions.*
- 4. Encourage the use of green materials (building materials and vegetation) to reduce the need for summer cooling and winter heating.*
- 5. Inform/educate new homebuilders and remodelers in Edina of energy efficient options.*



### ***10.5.5 Implementation - Residential Energy Consumption***

Energy conservation programs approved by the City Council should include specific timetables for implementation and measurement for success. The combined outcome of these actions will be, at a minimum, a reduction of greenhouse gas emissions by the percentages set in the Minnesota Global Warming Mitigation Act of 2007.

## ***10.6 Commercial and Industrial Energy Consumption***

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### ***10.6.1 - Introduction Commercial/Industrial Energy Consumption***

Commercial and industrial energy consumption is generally much more intensive than that of residential consumers. In 2007 for instance, commercial and industrial operations consumed about 413 million kWh of electricity (Xcel energy data) and over 1.2 billion cubic feet (approx. 873,000 cu. ft./account) of natural gas. Due to this intensive use, the potential for energy conservation is likely to be high and the City will encourage its businesses and industries to invest in energy conservation measures.

### ***10.6.2 Current Conditions - Commercial/Industrial Energy Consumption***

According to the EPA's ENERGY STAR Building program, energy costs for existing US commercial space, 78 billion square ft, total \$110 billion annually. They estimate improving energy efficiency could save \$25 billion. Further, worker productivity will increase in a more comfortable working environment.. In spite of this, energy conservation opportunities go unrealized, perhaps for lack of recognition, perceived resources or clear direction.

### ***10.6.3 Trends and Challenges - Commercial/Industrial Energy Consumption***

The cost of energy in the commercial and industrial sector will also go nowhere but up. A recent study by McKinsey & Company<sup>15</sup> concluded that significant energy savings opportunities exist with lighting and heating and cooling in



commercial and industrial buildings. However, landlords and building owners have traditionally made decisions based on low first cost rather than long-term energy costs. Energy costs and any savings are passed through to the tenant. In owner occupied buildings, some of the same opportunities exist. The high turnover of building ownership has also been a deterrent to making long-term investments in energy conservation. Rebate programs providing incentives are available but building owners may not be fully aware or know how to take advantage of them.

#### **10.6.4 Goals and Policies - Commercial/Industrial Energy Consumption**

It will be the goal of the City of Edina to help educate and inform the commercial and industrial sector about energy conservation opportunities. Providing tax incentives or rebates may help building owners take action on energy conservation opportunities. Efforts by the commercial and industrial sector to limit energy consumption during peak demand periods are critical to reducing the incentive for creating more centrally stationed power plants. The City will explore ways to partner with State and Federal programs to facilitate such action.

1. *Promote the adoption by local businesses of locally generated renewable energy to power part or all of their energy needs.*

#### **10.6.5 Implementation - Commercial/Industrial Energy Consumption**

Any programs approved by the City Council should include a timetable for implementation, as well as measurement of accomplishments. The outcome of these actions will be, at a minimum, a reduction of greenhouse gas emissions by the percentages set in the Minnesota Global Warming Mitigation Act of 2007.

## **10.7 City Energy Consumption**

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### **10.7.1 Introduction - City Energy Consumption**



The City itself is a consumer of energy and can play a strong leadership role in reducing energy use at its City-owned facilities, and in the areas of street lighting and traffic signals. It also operates a substantial fleet of motor vehicles. Energy costs associated with these facilities and vehicles have amounted to roughly 5 percent of the City's budget. Given the high consumption of energy by these City-owned properties and vehicles, steps taken to conserve energy can potentially have a significant effect on the demand for energy and the quality of the local environment. The City recognizes this and has taken many steps to improve the energy efficiency of the buildings and facilities that it owns, including energy audits and the installation of energy efficient equipment. As technologies improve and equipment replacement occurs, the City will continue to look for ways to improve its energy efficiency.

### **10.7.2 Current Conditions - City Energy Consumption**

As part of Milestone 1 of the ICLEI protocol, the Energy Commission collected data on energy use for the 2007 baseline year. The year 2007 was chosen because the Commission was able to collect a complete set of data from all sources for this year only. The Commission collected data from Xcel and Center Point utilities, from the City Engineering Department and from a survey of employee commuters. The data show a total consumption of 155,000 MMBtu (Million British Thermal Units) or the equivalent of 27,400 tons of CO<sub>2</sub> emitted. The breakdown in energy use was 56 percent from building, 33 percent from operation of water and sewage equipment, 5 percent from the City fleet, 2 percent from street lights and 4 percent from employee commute.

### **10.7.3 Trends and Challenges - City Energy Consumption**

As with the other sectors, energy costs in the public sector will continue to rise. The most significant challenge is in the allocation of limited resources that can be attributed to energy conservation opportunities.

### **10.7.4 Goals and Policies - City Energy Consumption**

1. *Create benchmarks of current energy use in all public facilities and set a goal to reduce energy use and costs according to the ICLEI milestones and the Minnesota Global Warming Mitigation Act of 2007.*
2. *Establish a policy that all public buildings report annually on the cost of operation, goals for further reduction.*



### **10.7.5. Implementation – City Energy Consumption**

Once approved by the City Council, programs should have a timeline for implementation and measurements for success.

The combined outcome of these actions will be, at a minimum, a reduction of greenhouse gas emissions by the percentages set in the Minnesota Global Warming Mitigation Act of 2007.

## **10.8 Waste**

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### **10.8.1 Introduction - Waste**

*History of Edina's Recycling Program* - The Edina Garden Council began operating the first recycling collection in Edina in 1970 with a drop off site for glass in the parking lot of the Southdale Red Owl. In 1972 the drop-off location was moved to the Edina Public Works Garage at 5121 Brookside Avenue. The drop-off site expanded to include paper, Goodwill items, cans and used oil. The Edina recycling drop-off center closed on November 1, 1993, although residential weekly collection had already begun in a pilot area in 1986. In 1989, the program expanded City wide, collecting cans, glass, newspaper and corrugated paper.

Edina was one of the first cities in Minnesota to create a commission dedicated to environmental issues when, in 1974, the City established the Recycling Commission, starting one of the first recycling programs in the State. In 1992, its name was changed to the Recycling and Solid Waste Commission. The Commission continued until 2007, when it was disbanded and its functions folded into the new Energy and Environment Commission.

Edina's 2007 residential recycling program is a weekly curbside collection of ten items collected in two categories, paper and rigids. The paper items include: newspaper, magazines, mail, boxboard, corrugated paper, magazines and phone books. The rigids include: cans, glass, and #1 and #2 plastic (bottles with necks). Recycling service in 2007 reached 14,183 single family and duplex homes and 382 multi-family dwellings of three to eight units. Over 90 percent of Edina's households participate in recycling. The annual weight of recyclables collected as of 2007 has been over 5,000 tons for the last five years.

The generation and management of solid waste has become an increasingly important and complex issue for both Edina and Hennepin County. The State of



Minnesota established a waste “hierarchy” in 1980 that emphasizes waste reduction, reuse, and recycling over landfilling. Waste-to-energy is preferred over landfilling, but is less desirable than reduction, reuse and recycling. Consistent with this hierarchy, the State legislature has banned yard wastes from landfills, established municipal recycling programs and established hazardous waste drop-off facilities. Waste reduction programs have been initiated in businesses, public facilities, and private residences. Waste incineration has also been started on a large scale because it significantly reduces the volume of waste that must be buried at landfills.

Further reductions in the amount of waste that cannot be reused or recycled can provide significant environmental and economic benefits to the residents and businesses within Edina. In addition to saving landfill space and reducing methane, a potent greenhouse gas, adhering to the “3 R’s” – reduce, reuse, and recycle – conserves natural resources, protects air and water quality, lowers disposal costs and reduces taxpayer money that must be used to build new waste management facilities. Finding creative and effective ways to reduce the amount of existing and emerging waste streams that are produced in Edina should reduce the economic, environmental and social costs of waste disposal now and in the future.

### **10.8.2 Current Conditions - Waste**

In Edina, recycling is an accepted part of everyday life that reduces the amount of waste that would have gone to landfills, avoids pollution and saves our natural resources. Despite our recycling success, the amount of waste continues to grow, threatening the quality of air, water, soil and human health. In ten (10) years the amount of municipal solid waste generated in Minnesota has increased more than 33 percent, rising from approximately 4,500,000 tons in 1995 to over 6,000,000 tons in 2006.<sup>16</sup>

Even as more waste is being diverted into recycling and hazardous waste facilities, waste incinerators, and compost sites, the overall amount of waste that must be managed is increasing. Minnesota Municipal Solid Waste (MSW) generation totaled 6,985,744 tons in 2005. Greater Minnesota accounted for 42 percent MSW generation and the seven county metro area accounted for 58 percent MSW generation. For 2004-2005 the amount of MSW generated in Minnesota increased by 1.8 percent while the population increased by 1.2 percent. That’s 2,338 lbs of waste and recyclable materials for every man, woman and child in the State<sup>17</sup>. This increased waste creation incurs significant costs, including the use of virgin resources to make the products, carbon dioxide emissions and packaging that produces the waste, transportation costs



associated with the transport of those resources and finished products and the money spent on constructing new waste management facilities.

Minnesota's 2005 recycling rate of 48.5 percent ranked second in the nation according to *BioCycle* magazine's annual survey. The state's base recycling rate, (which is the actual percentage of materials recycled and does not include the additional yard waste recycling and recycling reduction efforts) is 41 percent. In 2005, recycling programs in Minnesota collected 2.5 million tons of recyclable materials (paper, metal, glass, plastic, food, problem materials, etc), an increase of nearly 70,000 tons, or 3 percent from the previous year. Edina's residential recycling collection, however, remained static at 222 lbs per person.

The challenge for Edina and the rest of Hennepin County is to focus both on better management of existing waste and the prevention of the need to manage waste at all through the use of closed loop systems wherein all products are designed so that they are reusable, recyclable or compostable. Finding ways to prevent the creation of waste is often the most cost-effective management technique in the long run.

### **10.8.3 Trends and Challenges – Waste**

Challenges and opportunities exist in the areas of recycling #3-7 plastics, source separated organics, and toxic/electronic waste.

*Plastics* – The number on the bottom of a plastic container is a code representing the type of materials in the plastic. Edina's recycling program currently includes #1 and #2 plastics, which are basically necked bottles. Technology exists to recycle more than #1 and #2 plastics, but no after market as yet exists for them. Without demand, #3 - #7 cannot be recycled.

*Source Separated Organics (SSO)* - These include organic material other than yard waste. SSO can be composted or used to generate energy such as compressed natural gas (CNG). SSO includes, without being limited to, the following.

Compostable food waste including vegetables, fruits, coffee grounds, eggs and eggshells, meat, oil, bones, grease, and dairy products;

Non-recyclable but compostable paper such as coffee filters, paper tissues, paper napkins, paper towels, paper plates and paper cups; and



Waxy cardboard such as refrigerator/freezer packaging, egg cartons, and milk cartons.

Not included are yard waste (leaves, grass clippings, weeds, tree branches), recyclable paper, or any non-compostable product such as metal, ceramics, rubber, leather, glass, any plastic including plastic wrap, plastic bags, and plastic packaging. (Note: While yard waste is not SSO, the programs currently picking up and composting SSO do pick up and compost yard waste as well)

Taking SSO out of the waste stream makes it possible to compost SSO either: 1) in conventional aerobic piles, or 2) in anaerobic digesters where methane produced can be used generate energy. Removing SSO from the waste stream has many benefits as follows:

a. Hennepin County's incinerator is at processing capacity. Because garbage continues to increase, solid waste is sent to landfills both in state and out of state. Organic matter in landfills is a prime cause of emissions of methane into the atmosphere. Methane is 23 times worse as a greenhouse gas than carbon dioxide.

b. Incinerators operate more efficiently with wet material removed, and release less methane. As an analogy, try burning wet noodles on a campfire.

c. SSO collection may have the side effect of boosting the recycling rate. The city of Wayzata experienced a 23% increase in recycling after beginning an SSO collection program.<sup>18</sup>

d. Recycling SSO also reduces tipping fees (fee charged to haulers to leave materials at landfills or compost sites) at landfills. The tipping fee for organics is less than the tipping fee for solid waste - \$15 per ton vs about \$41.85 per ton. SSO is also exempt from the county solid waste fee of 14.5% and state solid waste tax of 17%.

e. Composting SSO provides an earth friendly end product. Instead of taking up space in a landfill or being burned in an incinerator, organics are recycled into a valuable resource that reduces the need for watering and weeding, replenish soils, reduces soil erosion, and prevents stormwater runoff from contaminating wetlands, lakes, and streams, plus captures carbon dioxide for climate protection through the plantings, which compost encourages.



f. Collected SSO can also be used as feedstock for future biodigesters. Biogasification in the biodigester process captures the energy, and yields a higher energy benefit than incineration or composting. Biodigesters are good applications for recycling SSO and capturing their methane byproduct, but none is currently available to any of the City of Edina's licensed solid waste haulers, or to the City's recycling hauler.

*Electronic Waste (E-waste)* - In addition to the challenges posted by the increasing volume of solid waste, the composition of the waste is also becoming more toxic. Electronic waste presents special environmental, health and economic challenges. "Monitors and televisions made with tubes (not flat panels) have between 4 and 8 pounds of lead in them. Most of the flat panel monitors and TV's contain less lead, but more mercury, from their mercury lamps. About 40% of the heavy metals, including lead, mercury and cadmium, in landfills come from electronic equipment discards. The health effects of lead are well known; just 1/70th of a teaspoon of mercury can contaminate 20 acres of a lake, making the fish unfit to eat."<sup>19</sup> "Rapid advances in technology mean that electronic products are becoming obsolete more quickly. This, coupled with explosive sales in consumer electronics, means that more products are being disposed of, finding their way into landfills and incinerators. To make matters worse, the FCC mandated transition to digital television (like HDTV), in February 2009, will only speed up the pace, as consumers will soon be dumping large numbers of old TVs that can't receive the new digital-only signals."<sup>20</sup>

Minnesota has banned the disposal of cathode ray tubes in municipal solid waste, and in 2007, the Minnesota legislature passed MN Stat 1115A.1310 - 1330 to establish a statewide collection and recycling system for managing electronic waste, which includes televisions, computer monitors, and other electronic products. By July 1 of each year, beginning in 2008, a retailer must report to a manufacturer the number of video display devices, by video display device model, labeled with the manufacturer's brand, sold to households during the previous program year. A retailer who sells new video display devices must provide information to households describing where and how they may recycle video display devices and advising them of opportunities and locations for the convenient collection of video display devices for the purpose of recycling.

#### **10.8.4 Goals and Policies – Waste**



1. *Continue to operate a household recycling program for single-family and multi-family housing, encouraging the 3 R's, reduction, reuse and recycling.*
2. *Encourage backyard home composting of organic wastes. This includes food scraps as well as yard waste.*
3. *Support City-wide co-collection of Source Separated Organics with yard waste.*
4. *Encourage local businesses to participate in the Minnesota Chamber of Commerce's WasteWise program. [www.MNWasteWise.org](http://www.MNWasteWise.org)*
5. *Encourage proper disposal of hazardous and other problem materials such as e-waste through public education about Hennepin Co hazardous waste collection sites as well as MN Stat. 115A.1310-1330.*
6. *Educate consumers to avoid purchasing products with harmful ingredients and instead buy "green".*
7. *Recommend changes to the City purchasing policy to encourage the use of materials that are re-usable, recycled, compostable, or which use minimal packaging. Incentivize City vendors to deliver products in reusable containers.*
8. *Expand the range of plastics that can be included in residential recycling from only #1 and #2 to include #3 through #7 as markets permit.*
9. *Encourage greater recycling among local businesses*
10. *Identify an Edina site that would produce renewable energy from City waste, such as an anaerobic digester, away from residential areas.*

### **10.8.5 Implementation - Waste**

The immediate implementation is to use a Request for Proposal (RFP) or contract bidding for the City's recycling contract, which expires on 12-31-08, to solicit greater recycling.

The long term implementation will be, at a minimum, a reduction of greenhouse gas emissions by the percentages set in the Minnesota Global Warming Mitigation Act of 2007.



## **10.10 Air**

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### **10.10.1 Introduction - Air**

The quality of the air in Edina is a significant determinant of the health and comfort of the City's residents. Pollutants in the air can cause anything from minor irritations or annoyances to serious respiratory health problems. In Edina, the outdoor air quality is generally very good; however there are certain sections of the City, which are at particular risk for degradation of air quality - mostly due to auto emissions during traffic congestion.

### **10.10.2 Current Conditions - Outdoor Air Quality**

As part of the Twin City metro area, Edina shares with its neighbors the two major causes of air quality degradation: pollutants from nearby coal plants and emissions from automobiles. In 2006, the Twin City area experienced 169 days of moderate quality and three days of unhealthy air quality due to ozone and particulate matter (as reported by the Minnesota Pollution Control Agency). Pollutants, such as high ozone levels due to automobile emissions, and particulate matter (soot) from nearby coal plants contribute to asthma attacks and other respiratory illnesses. It is important for Edina to seek ways to reduce the sources of air pollution. While local improvements may dwarf in comparison to the conditions in the larger Twin City metropolitan area, similar actions by neighboring cities can result in a net overall improvement in air quality. Such measures will also reduce carbon emissions, as described in the milestones set by the ICLEI membership.

The City of Edina can reduce the impact of coal burning on air quality by supporting the use of renewable energy for the production of the electricity and promoting energy conservation. The City should work with utility companies, such as Xcel energy, to reduce electrical consumption by City operations and enroll in utility-sponsored programs for the development of renewable electrical capacity, such as Windsorce by Xcel energy.

With the proximity of three principal roadways (TH 100, I-494, and TH 62/Crosstown) and the Southdale shopping area, traffic congestion in these areas creates localized threats to outdoor air quality. The solutions outlined in the Transportation Chapter (Chapter Seven) of this Comprehensive Plan will improve



air quality while reducing congestion and promoting walking, biking and use of public transportation.

Idling of passenger cars and commercial vehicles during the winter and summer months can contribute to indoor air degradation when such vehicles are parked near buildings, parks, and schools. Idling also imposes an economic cost and has a negative impact on quality of life (odor and noise nuisance). The City of Edina should design measures, such as a citywide ordinance, to restrict or eliminate idling of passenger cars and commercial vehicles. No-idling signs should be posted in front of public building, schools and parks, to warn drivers of the ordinance and its related penalties.

#### **10.10.2.1 Current Conditions - Indoor Air Quality**

Indoor air quality is also an issue of importance to those who live and work in Edina. In high enough concentrations, pollutants such as chemical vapors, mold spores, dust mites and many others can cause significant illness or discomfort for those in a building if it is not properly ventilated. The Environmental Protection Agency (EPA) has determined that the levels of pollutants inside buildings may be 2-5 times higher than they are outdoors - a serious problem considering that the typical person spends 90 percent of their time inside a building. Ironically, efforts to make buildings more energy efficient in recent years have aggravated this problem by sealing indoor air inside. These tightly sealed buildings, along with inadequate as well as poorly maintained and operated ventilation systems, synthetic building materials and furnishings, and chemical cleaning and personal care products are the most common causes of poor indoor air quality.

The MPCA does not currently maintain data on indoor air quality. Until such time as the data becomes available, the City will attempt to identify the areas, which are of concern for possible air quality problems and seek to minimize the sources of air pollution in that area.

Inadequate maintenance and operation of heating, ventilating and air-conditioning systems result in excessive energy use and also negatively affect air quality. Overheating, poor ventilation and lack of clean indoor air all are results.

### **10. 10.3 Trends and Challenges - Air**

There is increasing concern over air pollution caused by idling vehicles at locations such as schools, construction sites, delivery sites and drive-up

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windows. The air pollution from idling vehicles not only pollutes outdoor air, but it also finds its way indoors via doors, windows, and even ventilation systems. Greater education of motorists, signage at problematic sites, a City ordinance and lobbying for a State law banning idling all should be considered.

#### **10.10.4 Goals and Policies - Air**

1. *Cooperate with enforcement of the Clean Air Act and other laws and regulations relating to air quality including Minnesota's Freedom to Breathe Act*
2. *Encourage and consider requiring mechanical ventilation systems in new homes*
3. *Provide incentives for building practices that improve indoor air quality*
4. *Encourage property owners to plant trees along roadways where possible to help reduce traffic noise and absorb carbon dioxide*
5. *Enact an ordinance that prohibits vehicle idling in Edina and post 'No Idling' signs at all schools and public parking lots*
6. *Promote the use of renewable energy sources at the City and State level to reduce the amount of particulate matter generated by coal plants.*

#### **10.10.5 Implementation - Air**

Develop and implement a plan and process for educating the community on measures to improve indoor air quality.



## 10.11.1 References

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- <sup>2</sup> Will Steger letter, Global Warming 101 Expedition;  
<http://www.globalwarming101.com/content/view/396/88888961/>
- <sup>3</sup> US Energy Information Administration, updated Jan 10, 2008,  
[http://tonto.eia.doe.gov/state/state\\_energy\\_profiles.cfm?sid=MN#map](http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=MN#map).
- <sup>4</sup> US Department of Energy, *Primary Energy Consumed in Minnesota by Source, 1995*, Website:  
[www.eia.doe.gov](http://www.eia.doe.gov).
- <sup>5</sup> Clean Air Choice, American Lung Association of the Midwest ([www.cleanairchoice.org](http://www.cleanairchoice.org))
- <sup>6</sup> "A Study of Renewable Energy," The League of Women Voters of Edina, April 2005.
- <sup>7</sup> Nathan S. Lewis, "Powering the Planet," MRS Bulletin, vol. 32, October 2007, pp. 810
- <sup>8</sup> City of Edina 1998 Comprehensive Plan, Chapt. on Environmental Quality, Section 2.1.
- <sup>9</sup> League of Women Voters of Edina's *Study of Renewable Energy*, April 2005, p.13.
- <sup>10</sup> Phone conversation, Stu Fraser, Northern States Power, August 1998.
- <sup>11</sup> Energy Information Administration, Official Energy Statistics from the US government.  
[http://www.eia.doe.gov/emeu/states/\\_seds.html](http://www.eia.doe.gov/emeu/states/_seds.html)
- <sup>12</sup> Minnegasco records.
- <sup>13</sup> US Department of Energy, Energy Information Administration, *Household Vehicles Energy Consumption 1994*.
- <sup>14</sup> US Department of Energy, *Comprehensive National Energy Strategy*, p.4.
- <sup>15</sup> Curbing global energy demand growth: the energy productivity opportunity. McKinsey Global Institute, May 2007
- <sup>16</sup> Solid Waste Management Rept (discussion only) MN Pollution Control Agency, p. 12,  
<http://www.pca.state.mn.us/oea/policy/policy2007/071012roadmap.pdf>.
- <sup>17</sup> Minn. Pollution Control Agency's 2005 SCORE p. 3.
- <sup>18</sup> *Curbside Collection of SSO in the City of Wayzata MN Cost/Benefit Analysis Conclusions and Recommendations*, May 2005.
- <sup>19</sup> Computer Takeback Campaign, [http://www.computertakeback.com/the\\_problem/index.cfm](http://www.computertakeback.com/the_problem/index.cfm).
- <sup>20</sup> Computer Takeback Campaign, [http://www.computertakeback.com/the\\_problem/index.cfm](http://www.computertakeback.com/the_problem/index.cfm).