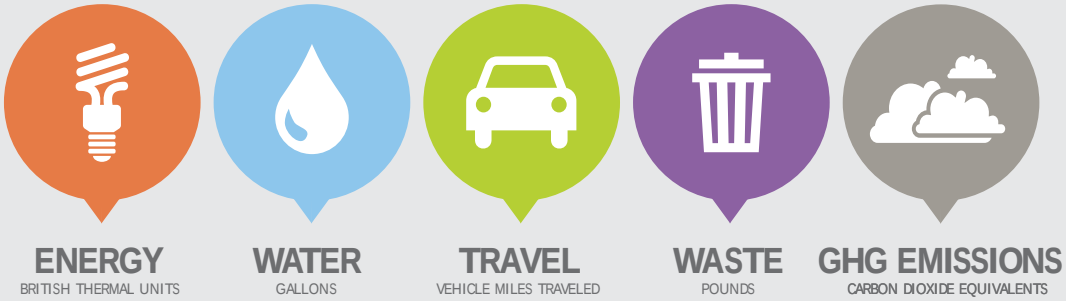
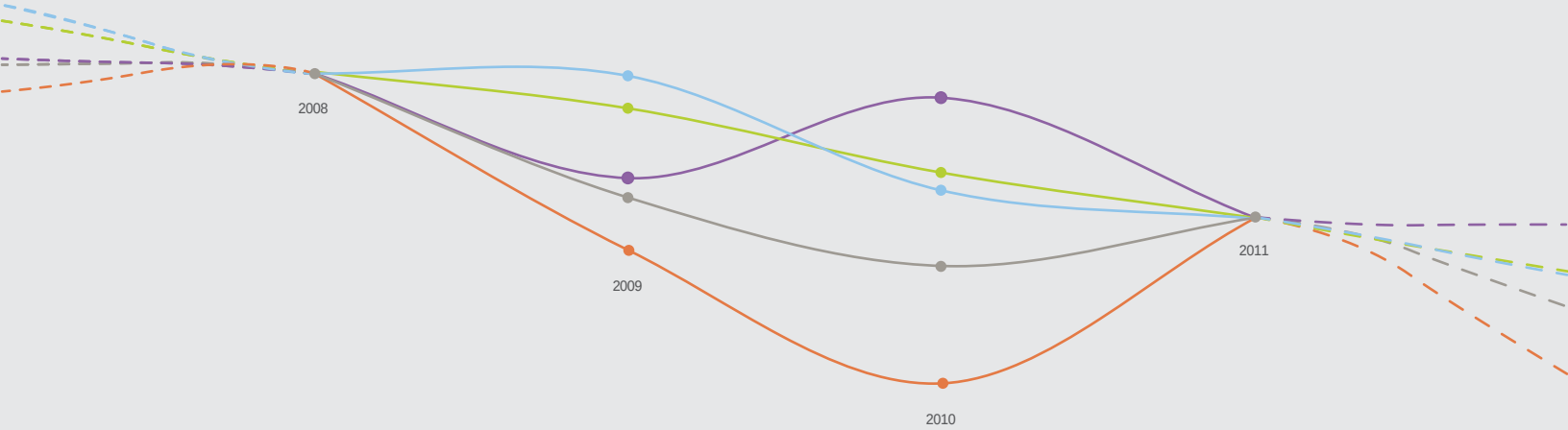
Final Minnesota Pollution Control Agency Report on:

REGIONAL INDICATORS INITIATIVE

Measuring City-Wide Performance

An Inventory of Energy, Potable Water, Travel, Waste, Greenhouse Gas Emissions and Costs for Twenty Minnesota Cities from 2008-2011





Prepared by:
LHB Inc. with ORANGE Environmental, LLC
March 2013

LHB PERFORMANCE DRIVEN DESIGN.

ORANGE ENVIRONMENTAL

ULI Urban Land Institute Minnesota

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Report on:

Regional Indicators Initiative:

Objective 1: Evaluation

TASK 1A: Collect Data

Final MPCA Report

Prepared by

LHB, Inc. with ORANGE Environmental, LLC

March 2013

Statement of Task

<u>OBJECTIVE 1: Evaluation</u>

Task 1A: Collect up to three years of energy, water, travel, and waste data from participating cities and train cities to collect.

Team members for this objective: LHB, Inc. and ORANGE Environmental, LLC

Work completed to date

Summary: The Regional Indicators Initiative (RII) has collected annual resource-use data for energy, water, travel and waste for twenty Minnesota cities for the years 2008-2011. In addition, the RII team prepared citywide, carbon baseline assessments that are consistent with the most applicable and current guide available; namely, the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions*, October 2012. The data collection process has been documented to be replicable so that data for additional years or cities can be integrated either by the RII team or other cities throughout Minnesota or across the country.

Previous to this phase of the project, a pilot study was done to determine what citywide data can be collected annually to effectively measure progress towards sustainability. Three cities - St. Louis Park, Falcon Heights, and Edina - funded the study and volunteered to release their resource-use data for a period of 2008-2010. The pilot study proved that four indicators of city-wide sustainability– energy, water, vehicle miles traveled (VMT), and waste– can be measured, gathered, and analyzed in a reasonable period of time (**See attachment: 1A.1 RII Pilot Analysis**).

The current twenty participant cities comprise a data sample size that represents over a quarter of Minnesota's population (27%) and includes municipalities of varying types, from large, central cities to inner and outer-ring suburbs of various sizes and population densities(**See attachment: 1A.2 Map of RII Participant Cities**):

CENTRAL/STAND-ALONE CITIES: Minneapolis, St. Paul, Duluth, Rochester

INNER-RING SUBURBS: Richfield, Hopkins, St. Louis Park, St. Anthony, Edina, Falcon Heights, Maplewood

OUTER-RING SUBURBS: White Bear Lake, Coon Rapids, Oakdale, Shoreview, Eagan, Eden Prairie, Minnetonka, Woodbury, Lake Elmo

Upon agreeing to participate in the Regional Indicators Initiative, a sample agreement form was signed by each city's mayor and Caren Dewar, Executive Director of the Urban Land Institute Minnesota (ULI MN) (**See attachment: 1A.3 Example City Agreement**).

The Regional Indicators Initiative has collected the following data that reflects the activities of the people who live, work, learn, travel, visit, and play within twenty of Minnesota's cities' geographical boundaries for the years 2008-2011:

Energy (in BTUs): electricity, natural gas, and district energy consumed citywide (subdivided into residential and commercial/industrial)

Water (in gallons): potable water consumed citywide (subdivided into residential and commercial/industrial)

Travel (in vehicle miles traveled): on-road distance traveled within city limits

Waste (in pounds): citywide municipal solid waste managed via recycling, composting, combustion, and landfilling (prorated from countywide data)

Greenhouse Gas Emissions (in tonnes of carbon dioxide equivalents, CO_2e): citywide greenhouse gas emissions associated with each of the four indicators plus each city's share of airport emissions and for wastewater treatment.

Cost (in dollars): cost estimates associated with each of the four indicators

Additionally, all data used to normalize the utility metrics—rainfall, heating degree days, cooling degree days, city area, population, number of households and jobs—has been collected from publicly available sources including the University of Minnesota Climatology Working Group, Weather Underground, the United States Census, and Metropolitan Council. Compiling the above information required the collection and organization of approximately 4,000 unique data points into over 300 spreadsheets that included over 11,000 calculations and nearly 600 tables and charts used to display the information.

Data for travel and waste is publicly accessible from the MN Department of Transportation (MN DOT) and the Minnesota Pollution Control Agency (MPCA). Water data was provided by the each individual city broken down into both residential and commercial/industrial categories. All energy data was requested from local utility providers by each city sending a letter provided to them explaining the Initiative, the city's involvement, and their need for basic utility information (**See attachment: 1A.4 Example Utility Request Letter**). The request also made it clear that data must be divided by commercial/industrial and residential use. Request letters were sent to ten different providers including Connexus, Xcel Energy, and CenterPoint as well as ten district energy companies.

Upon receiving the request letters, several utility companies quickly and easily provided the requesting city with all four years of data. Others were less responsive, needed reminders, or in one case, were unable to immediately provide all four years of data and excluded data due to recent changes in their

privacy policy. However, through persistence on behalf of LHB, the cities, and individuals within each utility company, data for all years (2008 through 2011) has been collected for all participating cities. All contact information for each city and dates of requests and receipt of utility data was recorded

(**See attachment: 1A.5 City Contract and Communication Spreadsheet**). In addition, the status of receipt of each type of utility data was recorded (**See attachment: 1A.6 Utility Data Status Spreadsheet**).

Individual city spreadsheets were maintained during the data collection process and have been distributed to each city (**See attachment: 1A.7 Example City Spreadsheet - Edina**). The spreadsheet contains between 16-20 tabs, outlining in detail each indicator data set. To summarize this data into a more legible and comparable format, each spreadsheet begins an 'Initiative Summary' tab, which highlights the key data from each indicator and normalizes this data by number of households, jobs and population (**See attachment: 1A.8 City Summary Pages**).

A corresponding report (also distributed to participating cities) explains in detail what content is included on each tab of the spreadsheet as well as the process of aggregating this data to generate greenhouse gas emissions data for each city according to the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions*, October 2012 (ICLEI Protocol) (**See attachment: 1A.9 Regional Indicators Initiative Report**).

The original intent for this task was that city staff would be trained to collect this data for subsequent years and for additional cities. In preparation for this, the RII team distributed a survey to all the city contacts asking about their methods and experiences regarding their city's data collection process, including the scale at which solid waste data can be collected, the city's interest in continuing data collection, and their suggestions for refining the current process. Their answers revealed a need for a standardized data collection method and the desire for the ability to annually track indicator data in the future. In addition, the responses reflected that the most significant obstacles to data collection were gaining cooperation of private utilities and receiving data in a timely manner and the cost and time to complete these tasks (**See attachment: 1A.10 Data Collection Survey Results**).

Based on this feedback and discussions with city staff about the feasibility of individual cities continuing to collect data, it has become clear that this is not a realistic possibility due to lack of city resources. Instead of training city staff to continue collecting this data, a report has been generated documenting the process of data collection used for this Initiative **(See attachment: 1A.11 Process of Data Collection).** The purpose of this report is to outline a replicable process to serve as a guide for both the Regional Indicators Initiative team as they continue to collect data as well as any other researcher who wishes to follow the RII process in other cities throughout Minnesota or across the country.

Next Steps

The Initiative team will continue to reach out to new cities and invite them to participate in the program. The Initiative team is currently in the process of collecting 2012 data for all current Initiative cities as well as adding five additional cities.

In an effort to further bolster the number of RII participants, LHB has applied for and been accepted to present the RII's purpose, findings, and implications at several conferences and events throughout Minnesota (**See attachment: 1A.12 Potential Conferences to Present the RII Project**). LHB will present the findings of this Initiative at presentations located in each participating city.

As more cities express interest in participating, LHB will likely be organized additional orientation meetings since the first two proved beneficial for the cities as well as a LHB and ORANGE Environmental, LLC.

Attachments

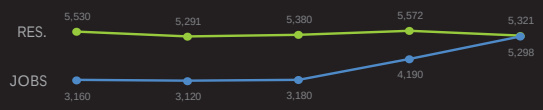
- **1A.1 RII Pilot Analysis**
- **1A.2 Map of RII Participants**
- **1A.3 Example City Agreement**
- **1A.4 Example Utility Request Letter**
- **1A.5 City Contact and Communication Spreadsheet**
- **1A.6 Utility Data Status Spreadsheet**
- **1A.7 City Summary Pages**
- **1A.8 Regional Indicators Initiative Report**
- **1A.9 Example City Spreadsheet - Edina**
- **1A.10 Data Collection Survey Results**
- **1A.11 Process of Data Collection**
- **1A.12 Potential Conferences to Present the RII Project**

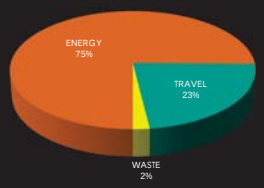
SCALED LAND USE

POPULATION AND EMPLOYMENT

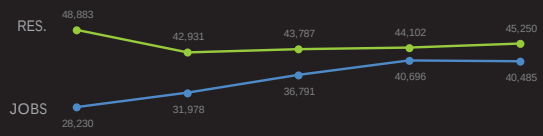
CO_2E EMISSIONS BY UNIT

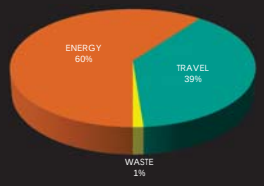
FALCON HEIGHTS



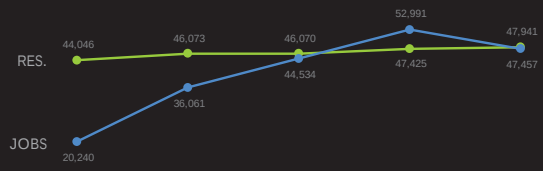


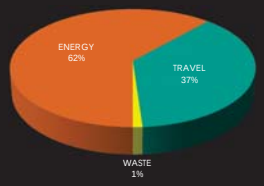
SAINT LOUIS PARK



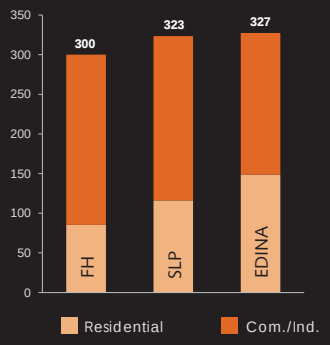


EDINA



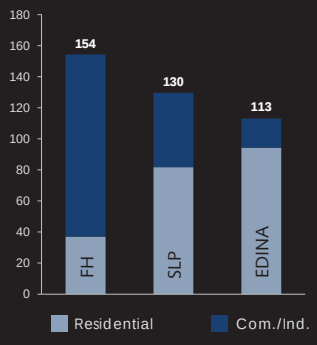


KBTU/CAPITA/DAY



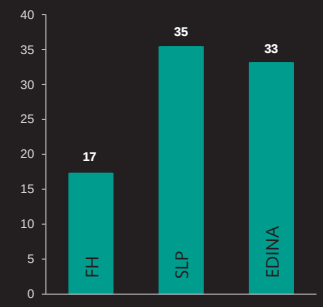
ENERGY

GALLONS/CAPITA/DAY



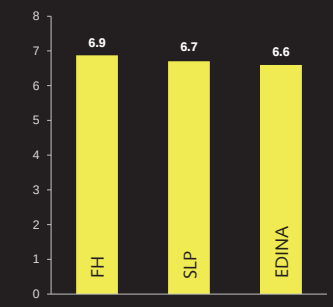
WATER

VEHICLE MILES TRAVELED/CAPITA/DAY



TRAVEL

POUNDS/PERSON/DAY

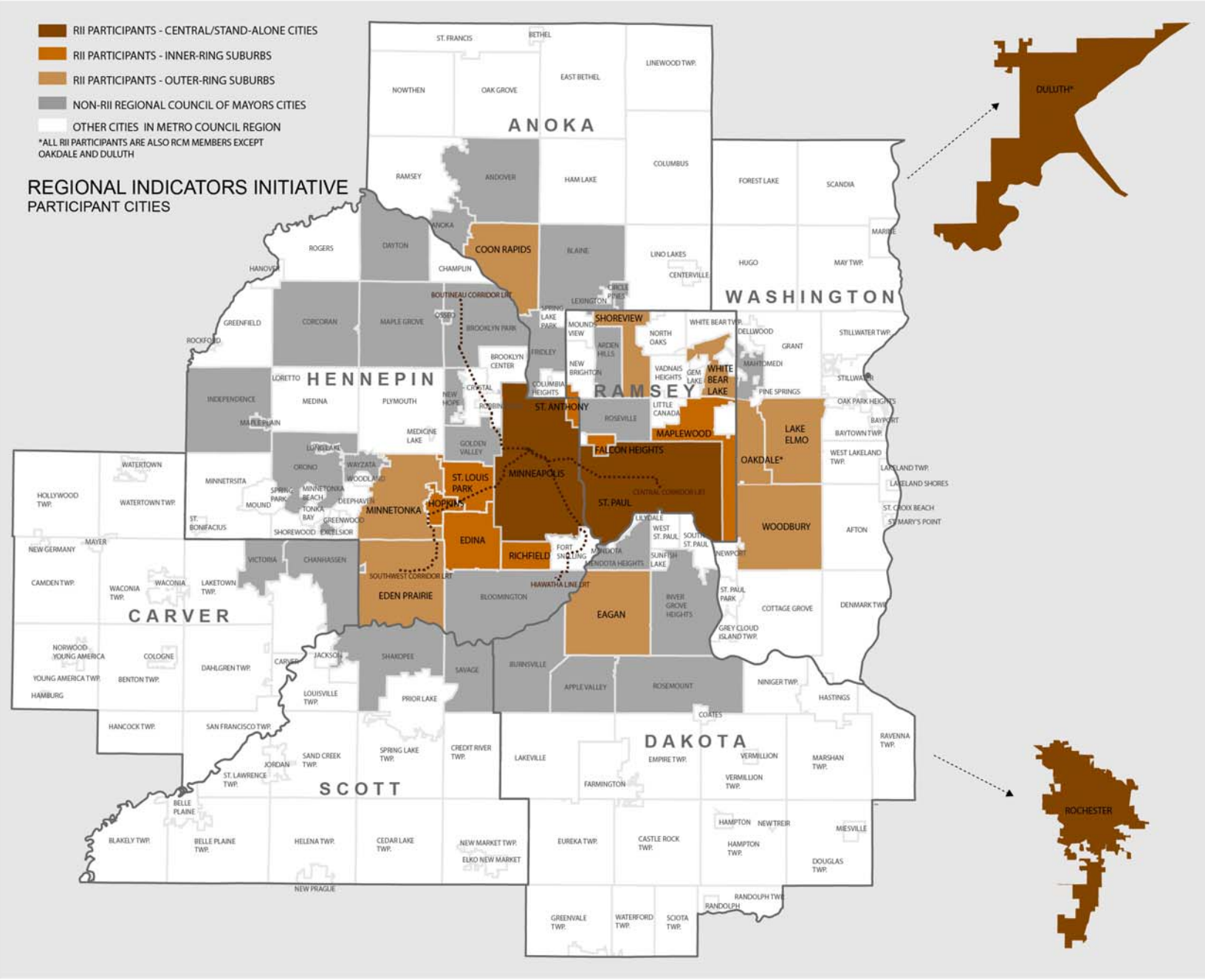


WASTE

LHB PERFORMANCE DRIVEN DESIGN.

URBAN LAND INSTITUTE | GREEN STEP CITIES - REGIONAL INDICATORS
Minnesota

1A.2 Map of RII Participant Cities



REGIONAL INDICATORS INITIATIVE AGREEMENT

THIS AGREEMENT is made and entered into this on _____ (date), by and between URBAN LAND INSTITUTE MINNESOTA ("ULI MN") and CITY OF _____ (the "City").

RECITALS

A. The Urban Land Institute's mission is to provide leadership in the responsible use of land and in creating and sustaining thriving communities worldwide.

B. The Regional Council of Mayors (RCM), supported by ULI Minnesota, provides a non-partisan platform that strategically engages mayors and land use professionals to support a more connected, more sustainable and more prosperous region.

C. The RCM Regional Indicators Initiative measures actual citywide environmental metrics.

D. The analysis will:
   - Deepen the understanding of opportunities to save energy and money;
   - Assist in promoting public understanding of the cities' effects on climate change;
   - Inform subsequent analyses, plans, and policy decisions by the cities and others; and
   - Serve as a model for other cities.

E. LHB, Inc. will serve as Project Manager of the Regional Indicators Initiative project.

F. The CITY OF _____ expressed interest in participating in the Regional Indicators Initiative project.

AGREEMENT

NOW, THEREFORE, in consideration of the mutual terms hereof, ULI MN and the City agree that the Regional Indicators Initiative project shall be as follows:

SCOPE OF WORK

Participating cities will pay a fee to cover the cost of the consultant team. This fee will cover the following:

- Assist with collecting the last four years of data for benchmarking (2008, 2009, 2010 and 2011).
- Establish a process for collecting data for the next year (2012).
- Evaluate the specific best management practices (BMP) selected by each city participants in and correlate them to the outcomes being measured.

- Produce a final report that measures each metric individually (i.e. kBTUs, gallons, vehicle miles traveled, and pounds) as well as in tons of carbon. The report will include data on a per-capita basis for residential data and on a per-jobs basis for commercial/industrial.
- Provide evaluation and comparisons of data for use in selecting strategies and establishing policy.
- Provide a communication template for public distribution of information.

The City will provide the following in support of the Regional Indicators Initiative project and in exchange for the services provided above.

- City staff will support LHB, Inc., with project assistance from ULI MN, in collecting information, coordinating City meetings, and providing guidance for the completion of services outlined above.
- The City will participate in sharing results and lessons learned to inform and shape the Regional Indicators Initiative.
- The City agrees to share all data collected publically.

SCHEDULE

We estimate the data collection phase for each city to take approximately 3-4 months. This schedule may vary, based upon the number of cities who elect to participate and the ability of the utilities to provide data in a timely manner. We are prepared to begin this process on within 30 days after this agreement is signed.

PAYMENT

A lump sum fee of Two Thousand Five Hundred Dollars ($2,500.00) will be due to LHB, Inc. at the time of the report, no later than 30 days after signing this agreement.

Except as amended, the Agreement is and shall remain in full force and effect in accordance with its terms.

IN WITNESS WHEREOF, the parties have caused this Agreement to be duly executed as of the date first above written.

Urban Land Institute Minnesota	The City of _____
By: _____	By: _____
Executive Director	City Mayor
Date: _____	Date: _____

Sample Request to Obtain Citywide Energy Consumption Data from Utilities:

Date

Address to the utility contact person:
Name
Title
Utility Company
Address

The City of X is participating in the Regional Indicators Initiative (Project). The Project is a collaborative effort involving approximately twenty Minnesota cities that are committed to collect on an annual basis a series of interrelated metrics, i.e. indicators, that will help guide city decisions toward a more sustainable future. The list of metrics includes energy consumption, vehicle miles traveled, solid waste management, water consumption, and others. These indicators will help the cities refine their comprehensive plans, sustainability plans, zoning and storm water management ordinances, etc.

An essential indicator is citywide energy consumption. Please consider this letter as the city's official request for annual totals of citywide electricity/natural gas consumption for the three study years: 2008, 2009, and 2010. We will include the annual totals only, and need to be able to break them out into two categories—1) residential and 2) commercial and industrial. There will be no chance of public disclosure of any data from a sole private customer.

Please let me know if Utility is involved in district energy within the City's jurisdiction so we can have a separate discussion regarding the incorporation of that data in our study.

Thank you in advance for your help in this important matter.

Sincerely,

1A.5 City Contact and Communication Spreadsheet

RII City Contact and Communication Spreadsheet
Updated: February 18th, 2013

Indicates: Waiting for Xcel Energy
Indicates: Missing Data

Status	City	City Contact	Date LHB received Check from City	Date LHB received signed city agreement	Signed by Caren (ULI)	Mailed back to City	Person(s) that attended 7/13 meeting at LHB	Person(s) that attended 10/25 meeting at LHB	Sent out Request Letters	Date request was sent:	Metric	Utility Company	Data Requested from:	Utility Contact's Information: Phone	Utility Contact's Information: Email	Utility Contact's Information: Address	Received Data: Date City Received	Received Data: Years of data (08-11)
Completed	Coon Rapids	Steve Gatlin					Matt Stemwedel		X	6/15/2012	Electric -	Connexus	Tom Keller			14601 Ramsey Boulevard Ramsey, MN 55303		2008 to 2011
		Matt Fulton							X	6/15/2012	Electric -	Xcel Energy	Bob Torres			8701 Monticello Lane Maple Grove, MN 55369	10/22/2012	2008 to 2011
									X	6/15/2012	Electric -	Anoka Municipal Utility	Dan Voss			2015 1st Ave. North Anoka, MN 55303	7/9/2012	2008 to 2011
									X	6/15/2012	Gas -	CenterPoint	Steve Guhanick	612-321-5421	steve.guhanick@centerpointenergy.com	700 West Linden Ave. Minneapolis, MN 55440		2008 to 2011
									X		Water -	City of Coon Rapids					7/16/2012	2008 to 2011
Completed	Duluth	DyAnn Andybur	10/9/2012	7/19/2012	7/19/2012	8/8/2012	DyAnn Andybur, Joe Miller, Tari Rayala (via video)	DyAnn Andybur (via video)	X	6/27/2012	Electric -	MN Power	Jason Risdall			30 West Superior Street Duluth, MN 55802	7/23/2012	2008 to 2011
									X	6/25/2012	Electric -	Duluth Steam	Jerry Pelofske			1 Lake Place Drive Duluth, MN 55802	8/3/2012	2008 to 2011
									X	6/25/2012	Gas -	Comfort Systems	Eric Schlacks			520 Garfield Ave., Duluth, MN 55802	7/5/2012	2008 to 2011
									X	7/23/2012	Water -	Comfort Systems	Eric Schlacks			521 Garfield Ave., Duluth, MN 55802	11/9/2012	2008 to 2011
Completed	Eagan	Juli Seydell Johnson	8/27/2012	8/27/2012	8/31/2012	8/31/2012	Cherryl Mesko	Juli Seydell Johnson	X	6/20/2012	Electric -	Dakota Electric	Tim Doherty			4300 220th Street West Farmington, MN 55024	7/18/2012	2008 to 2011
		Cheryl Mesko						Cheryl Mesko	X	6/20/2012	Electric / Gas-	Xcel Energy	Jennifer Abbott	651-229-2443	jennifer.m.abbott@xcelenergy.com	825 Rice Street St. Paul, MN 55117	11/19 /12	2008 to 2011
									X	7/9/2012	Gas -	MN Energy Resources	Jeff Larson			Via email to jwlanson@minnesotaenergyresources.com	7/16/2012	2008 to 2011
									X		Water -	City of Eagan					8/23/2012	2008 to 2011
Completed	Eden Prairie	Jackie Schwerm	12/24/2012	8/8/2012	8/14/2012	8/15/2012	Jackie Schwerm	Jackie Schwerm	X	6/26/2012	Electric -	Xcel Energy	Jennifer Abbott	651-229-2443	jennifer.m.abbott@xcelenergy.com	414 Nicollet Mall, Minneapolis, MN 55401	7/16/2012	2008 to 2011
									X	6/26/2012	Gas -	Center Point Energy	William Traylor	612-321-4716		800 LaSalle Ave. P.O. Box 59038 Minneapolis, Minnesota 55459	6/28/2012	2008 to 2011
									X		Water -	City of Eden Prairie	Robert Ellis	952-949-8310	rellis@edenprairie.org	8080 Mitchell Road, Eden Prairie, MN 55344-4485	10/2/2012	2008 to 2011
Completed	Edina	Ross Bintner	Received in Pilot Phase ---------->				Ross Bintner	Ross Bintner	X	8/9/2012	Electric -	Xcel Energy	Jennifer Abbott	651-229-2443	jennifer.m.abbott@xcelenergy.com	5309 W. 70th Street Edina, MN 55439	8/9/2012	2008 to 2011
									X		Gas -	Center Point Energy	Thomas Dolan		Thomas.Dolan@CenterPointEnergy.com		8/24/2012	2008 to 2011
									X		Water -	City of Edina						2008 to 2011
Completed	Falcon Heights	Bart Fischer	Received in Pilot Phase ---------->				Peter Lindstrom		X		Electric / Gas -	Xcel Energy	Jennifer Abbott	651-229-2443	jennifer.m.abbott@xcelenergy.com	825 Rice Street St. Paul, MN 55117	7/19/2012	2008 to 2011
									X		Water -	St. Paul Regional Water Utility					8/14/2012	2008 to 2011
Completed	Hopkins	Steve Stadler	8/24/2012	7/24/2012	7/26/2012	7/30/2012	Steve Stadler	Steve Stadler	X	7/5/2012	Electric -	Xcel Energy	Jennifer Abbott	651-229-2443	jennifer.m.abbott@xcelenergy.com	5309 W. 70th Street Edina, MN 55439	10/11/2012	2008 to 2011
									X	7/5/2012	Gas -	Center Point Energy	William Traylor	612-321-4716		700 West Linden Ave. Minneapolis, MN 55440	8/29/2012	2008 to 2011
									X		Water -	City of Hopkins					8/15/2012	2008 to 2011
Completed	Lake Elmo	Dean Zuleger	2/7/2013	12/4/2012	12/19/2012				X	11/26/2012	Electric / Gas -	Xcel Energy	Noel Hatcher	612-330-6387	noel.hatcher@xcelenergy.com	414 Nicollet Mall, MP-9 Minneapolis MN 55401		2008 to 2011
									X		Water -	City of Lake Elmo					12/3/2012	2008 to 2011
Completed	Maplewood	Shann Finwall	12/21/2012	12/7/2012	12/10/2012	12/12/2012			X	11/29/2012	Electric / Gas -	Xcel Energy	Jennifer Abbott	651-229-2443	jennifer.m.abbott@xcelenergy.com	5309 W. 70th Street Edina, MN 55439	11/27/2012	2008 to 2011
									X		Water -	City of Maplewood	Ruth O'Brien	651-266-6322	ruth.obrien@ci.stpaul.mn.us	1900 Rice Street, Saint Paul, MN 55113	11/28/2012	2008 to 2011
Completed	Minneapolis	Brendon Slotterback					Brendon Slotterback	Brendon Slotterback	X		Electric -	Xcel					8/23/2012	2008 to 2011
									X		Gas -	CenterPoint					8/23/2012	2008 to 2011
									X		Water -	City of Minneapolis					8/14/2012	2008 to 2011
Completed	Minnetonka	Julie Wischnack	8/9/2012	8/1/2012	8/2/2012	8/3/2012	Jeff Thomson		X	11/5/2012	Electric -	Xcel Energy	Michelle Swanson			5309 West 70th Street Edina MN 55439	10/25/2012	2008 to 2011
		Jeff Thomson							X	6/18/2012	Gas -	Center Point Energy	Dean Nicholas			700 West Linden Ave Minneapolis, MN 55403	7/25/2012	2008 to 2011
									X		Water -	City of Minnetonka					11/5/2012	2008 to 2011
Completed	Oakdale	Jennifer Hassebroek	10/15/2012	7/16/2012	7/26/2012	7/30/2012		Jen Hassevoniek	X	6/18/2012	Electric / Gas -	Xcel Energy	Jennifer Abbott	651-229-2443	jennifer.m.abbott@xcelenergy.com	5309 W. 70th Street Edina, MN 55439	7/10/2012	2008 to 2011
									X		Water -	City of Oakdale					8/1/2012	2008 to 2011
Completed	Richfield	Steve Devich	10/12/2012	7/16/2012	7/19/2012	8/8/2012	Pam Dmytrenko	Steve Devich	X	6/14/2012	Electric -	Xcel Energy	Michelle Swanson			5309 West 70th St. Edina, MN 55439	10/23/2012	2008 to 2011
									X	6/14/2012	Gas -	Center Point Energy				800 LaSalle Avenue PO BOX 59038 Minneapolis, MN 55459	10/25/2012	2008 to 2011
									X	7/12/2012	Water -	City of Richfield	Robert Hintgen				8/14/2012	2008 to 2011
Completed	Rochester	Phil Wheeler	10/20/2012	7/27/2012	7/31/2012	8/1/2012	Phil Wheeler (via phone)	Phil Wheeler	X		Electric -	Peoples Energy Cooperative					9/27/2012	2008 to 2011
									X		Electric -	Rochester Public Utilities	Larry J. Koshire	507-280-1601			7/18/2012	2008 to 2011
									X		Gas -	MN Energy Resources					11/14/2012	2008 to 2011
									X		Water -	City of Rochester						2008 to 2011
Completed	Saint Anthony	Mark Casey	10/11/2012	7/19/2012	7/19/2012	8/8/2012	Jay Hartman	Jay Hartman	X	6/18/2012	Electric -	Xcel Energy	Michael Anderson			1518 Chestneu Ave. 1st Floor Minneapolis, MN 55404	10/19/2012	2008 to 2011
									X	6/18/2012	Gas -	Center Point Energy	Tom Dolan			800 LaSalle Avenue 14th Floor Minneapolis, MN 55402		2008 to 2011
									X		Water -	City of St. Anthony					8/14/2012	2008 to 2011
Completed	Saint Louis Park	Kathy Larsen	Received in Pilot Phase ---------->					Jim Vaughan, Kathy Larsen	X	6/19/2012	Electric -	Xcel Energy					10/25/2012	2008 to 2011
									X	6/19/2012	Gas -	Center Point Energy	Tom Dolan			800 LaSalle Avenue 14th Floor Minneapolis, MN 55402	6/29/2012	2008 to 2011
									X		Water -	City of St. Louis Park					7/30/2012	2008 to 2011
Completed	Saint Paul	Anne Hunt	10/19/2012	9/12/2012			Anne Hunt		X	7/9/2012	Electric / Gas-	Xcel Energy	R. Scott Getty	651-229-2411	r.scott.getty@xcelenergy.com	825 Rice St. St. Paul, MN 55117	7/20/2012	2008 to 2011
		Jim Giebel					& Jim Giblet		X		Water -	St. Paul Regional Water Utility	Steve Schneider	651-266-6274	steve.schneider@ci.stpaul.mn.us		7/16/2012	2008 to 2011
Completed	Shoreview	Jessica Schaum	8/9/2012	7/26/2012	8/14/2012	8/15/2012	Jessica Schaum	Jessica Schaum	X	7/9/2012	Electric / Gas -	Xcel Energy	Jennifer Abbott	651-229-2443	jennifer.m.abbott@xcelenergy.com	825 Rice Street St. Paul, MN 55117	7/25/2012	2008 to 2011
									X	7/13/2012	Water -	City of Shoreview					7/23/2012	2008 to 2011
Completed	White Bear Lake	Ellen Richter	10/15/2012	11/7/2012	11/26/2012	12/3/2012	Ellen Richter	Ellen Richter	X		Electric / Gas -	Xcel Energy	Jennifer Abbott	651-229-2443	jennifer.m.abbott@xcelenergy.com	825 Rice Street St. Paul, MN 55117	8/27/2012	2008 to 2011
									X		Water -						10/2/2012	2008 to 2011
Completed	Woodbury	Jennifer McLoughlin	10/17/2012	7/26/2012	8/2/2012	8/3/2012		Jennifer McLoughlin	X	6/20/2012	Electric / Gas-	Xcel Energy	Colette Jurek		colette.c.jurek@xcelenergy.com	5309 W. 70th Street Edina, MN 55439	7/11/2012	2008 to 2011
									X	6/20/2012	Gas -	Center Point Energy	Robin Prow			700 W. Linden Ave. Minneapolis, MN 55403	7/16/2012	2008 to 2011
									X	7/13/2012	Water -	City of Woodbury	Dan Hansen			2301 Tower Drive Woodbury, MN 55125	7/13/2012	2008 to 2011

Regional Indicators Initiative Project Status Sheet

Michael Orange, updated 2/20/13

	County	City	Potable Water	Non-Metro Wastewater Treatment	Energy: Electricity Data	Energy: Electric Utility	Energy: GHG Emission Factor	Energy: Gas Data	Energy: Gas Utility	Energy: Other fuels [1]	Energy: District Energy Data [2]	Shared (allocated) Facility or Major (>5%) Source [3]: Power Plants	Shared: WTE Plants	Shared: Landfills	Shared: Wastewater Treatment Plants	Shared: Non-MSP Airports	Shared: Marine & Rail for Duluth	Forecasts for 2020 and 2030
1	Anoka	Coon Rapids	1		1	Connexus (power from GRE), Anoka Mun.. (power from MN Municipal Power Agency), Xcel	1	1	CP									
2	Dakota	Eagan	1		1	DEA (power from GRE) & Xcel	1	1	MN Energy Resources & Xcel	di minimis								
3	Hennepin	Eden Prairie	1		1	Xcel	1	1	CP	di minimis						Flying Cloud Airport completed		
4		Edina	1		1	Xcel	1	1	CP	di minimis								1
5		Hopkins	1		1	Xcel	1	1	CP									
6		Minneapolis	1		1	Xcel	1	1	CP	Have U of M data	Have all data for all systems	Steam plant and Riverside: completed including energy calculations	Completed HERC calculations					1
7		Minnetonka	1		1	Xcel	1	1	CP									
8		Richfield	1		1	Xcel	1	1	CP									
9		St. Louis Park	1		1	Xcel	1	1	CP	di minimis								
10	Olmsted	Rochester	1	1	1	RPU & People's Energy Coop	1	1	MN Energy Resources	di minimis	not a "Shared" facility; no coal	RPU power plants: Have gas consumption data	Completed OWEF (GHG assessment, waste processed, gas consumption, & exports of electricity and steam)	Kalamar Sanitary Landfill. Have data	Completed	RST completed		
11	Ramsey	Falcon Heights	1		1	Xcel	1	1	Xcel	Have U of M data								1
12		Maplewood	1		1	Xcel	1	1	Xcel	di minimis								
13		Oakdale	1		1	Xcel	1	1	Xcel									
14	& Hennepin	St. Anthony	1		1	Xcel	1	1	CP									
15		St. Paul	1		1	Xcel	1	1	Xcel	di minimis	Have U of M data	High Bridge gas data NOT included in citywide gas totals.			MCES plant completed	STP completed		
16		Shoreview	1		1	Xcel	1	1	Xcel									
17	Washington:	Lake Elmo	1		1	Xcel	1	1	Xcel							Lake Elmo Airport completed		
18	& Ramsey	White Bear Lake	1		1	Xcel	1	1	Xcel									
19		Woodbury	1		1	Xcel	1	1	Xcel and CP									
20	St. Louis	Duluth	1	1	1	MN Power	1	1	Duluth, PW&U Dept, Comfort Systems sole supplier	have data from MPCA	Duluth Steam Plant not a shared facility. Completed	Subtracted gas used by MN Power plant		WLSSD Sanitary Landfill not in city.	Western Lake Superior Sanitation District operates a plant in City. Electricity production and gas and fuel consumption subtracted from City totals. Completed	DLH completed	Completed; de minimis	
	Totals		**Completed**	**Completed**	**Completed**	**Completed**	**Completed**	**Completed**	**Completed**	**Completed**	**Completed**	**Completed**	**Completed**	**Completed**	**Completed**	**Completed**	**Completed**	**3**

Notes:

Abbreviations: "1" means completed, "d/m" means de minimis

1 Other fuels include fuel oil, propane, and diesel used for stationary combustion. Requested better information in January 2013 from Dr. Wu and Kari Palmer.

2 District energy: There are 10 systems in 4 cities that I know of:

Duluth: City of Duluth's Duluth Steam Plant: Burns coal, natural gas, and some fuel oil an supplies steam to downtown district energy system.

Minnesota Power's Hibbard power plant is a co-gen plant that uses biofuels (wood waste from the adjacent paper mill) and natural gas to produce electricity and steam this it supplies to the paper mill and a nearby paper recycling company.

Rochester: The Olmsted County incinerator provides steam-based energy to the Olmsted County District Energy System. The District Energy System provides heating, cooling, and electric services to over 25 buildings, including the Rochester Public Library, Government Center, and Federal Medical Center

St. Paul: St. Paul District Energy burns biomass (waste wood) and natural gas and provides hot and chilled water for heating and cooling for the downtown district energy system.

U of M operates a natural-gas-based district steam heating system for the St. Paul campus.

Macalester College has a district energy system burning natural gas and a de minimis amount of fuel oil.

Minneapolis: NRG Energy burns natural gas and provides steam and chilled water for the downtown district energy system.

Hennepin Energy Recovery Center (HERC) is a mass burn garbage incinerator that burns municipal solid waste and natural gas to produce electricity and steam for the downtown district energy system.

Hennepin County Energy Center burns natural gas and provides steam and chilled water for the downtown district energy system.

The University of Minnesota Steam Plant burns natural gas, coal, and biomass to produce electricity and steam for the Minneapolis campuses.

3 Shared facilities are defined as such by the ICLEI Community Protocol and emissions are shared proportionately among the users of the facilities. To avoid double-counting, facility emissions counted elsewhere (electricity and natural gas) must be subtracted from the host city.

Regional Indicators Initiative Project: City of Minneapolis

Updated 2/19/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		390,131	386,691	382,578	387,873	380,677
Jobs		291,460	281,710	282,500	288,761	298,367
Households		168,669	169,798	163,540	166,110	166,286
Pop. Density (Res/sq. mi.)[2]	53.97	7,229	7,165	7,089	7,187	7,054
Energy[3]						
Cooling Degree Days[4]		855	774	1,088	1,129	0
Electricity (MWh)	Res	949,853	927,259	973,120	985,877	0
	Com/Ind	3,321,624	3,195,514	3,229,110	3,185,153	0
	Total	**4,271,477**	**4,122,773**	**4,202,230**	**4,171,030**	**0**
Heating Degree Days[4]		8,264	7,778	7,170	7,357	0
Therms	Res	119,421,938	115,286,726	104,568,354	112,875,629	0
	Com/Ind	153,719,961	143,437,410	136,117,873	153,859,268	0
	Total	**273,141,899**	**258,724,136**	**240,686,227**	**266,734,897**	**0**
Total Energy (MMBtu)	Res	15,183,092	14,692,480	13,777,121	14,651,375	0
	Com/Ind	28,795,304	27,247,351	26,521,064	28,171,861	0
	Total	**43,978,396**	**41,939,831**	**40,298,184**	**42,823,236**	**0**
Res. Energy (kBtu/household/day)		**247**	**237**	**231**	**242**	**0**
Com/Ind Energy (kBtu/job/day)		**271**	**265**	**257**	**267**	**0**
Total Energy (kBtu/person/day)		**309**	**297**	**289**	**302**	**0**
Water (gallons)[5]						
Precipitation (inches)		23.7	25.6	37.3	30.0	0.0
Potable Water (gallons)	Res	8,045,204,718	8,065,157,859	7,707,955,726	7,512,004,530	0
	Com/Ind	5,818,937,369	5,613,625,300	5,479,471,456	5,293,878,613	0
	Total	**13,864,142,087**	**13,678,783,159**	**13,187,427,182**	**12,805,883,143**	**0**
Res. Water (gal./household/day)		**131**	**130**	**129**	**124**	**0**
Com/Ind Water (gal./job/day)		**55**	**55**	**53**	**50**	**0**
Total Water (gal./person/day)		**97**	**97**	**94**	**90**	**0**
Travel[6]						
Vehicle Miles Traveled		**2,436,024,630**	**2,385,221,345**	**2,400,983,870**	**2,400,983,870**	**0**
Travel (VMT per person per day)		**17.1**	**16.9**	**17.2**	**17.0**	**0.0**
Waste (pounds)[7]						
Recycled		349,834,000	319,772,000	312,176,000	329,892,124	0
Combusted		377,398,052	328,855,243	358,531,903	357,385,903	0
Landfill		131,468,524	139,806,125	172,005,997	149,007,291	0
	Total	**858,700,576**	**788,433,368**	**842,713,900**	**836,285,317**	**0**
Waste (pounds/person/day)		**6.0**	**5.6**	**6.0**	**5.9**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		4,064,745	3,757,015	3,510,177	3,723,958	0
VMT		1,158,296	1,116,325	1,105,984	1,097,513	0
Waste		86,683	78,267	83,409	87,547	0
	Total	**5,309,724**	**4,951,607**	**4,699,570**	**4,909,017**	**0**
CO_2e (tonnes/person/year)		**13.6**	**12.8**	**12.3**	**12.7**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**5,810,585**	**5,353,978**	**5,085,378**	**5,288,330**	**0**
CO_2e (tonnes/person/year)		**14.9**	**13.8**	**13.3**	**13.6**	**0.0**
Total Costs ($)[10]						
Energy		633,160,387	532,929,402	533,453,480	559,375,490	0
Water		3,096,074	3,257,632	3,155,665	3,195,903	0
VMT		442,805,409	313,137,972	371,149,981	472,400,044	0
Waste		72,289,688	66,091,398	70,376,936	70,115,126	0
	Total	**1,151,351,557**	**915,416,404**	**978,136,063**	**1,105,086,563**	**0**
Cost ($/person/year)		**2,951**	**2,367**	**2,557**	**2,849**	**0**

Regional Indicators Initiative Project: City of Minneapolis

Updated 2/19/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMSP, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55407. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

Regional Indicators Initiative Project: City of Saint Paul

Updated 2/12/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		288,055	287,501	285,068	286,367	285,301
Jobs		183,459	176,976	176,126	175,967	174,242
Households		115,088	115,435	111,001	111,620	114,605
Pop. Density (Res/sq. mi.)[2]	51.98	5,542	5,531	5,484	5,509	5,489
Energy[3]						
Cooling Degree Days[4]		899	718	1,005	980	0
Electricity (MWh)	Res	690,585	675,280	706,300	722,032	0
	Com/Ind	2,205,627	1,980,824	2,073,590	2,074,889	0
	Total	**2,896,212**	**2,656,104**	**2,779,890**	**2,796,921**	**0**
Heating Degree Days[4]		8,023	7,703	7,170	7,500	0
Therms	Res	85,163,544	81,083,898	72,301,845	78,878,077	0
	Com/Ind	109,750,719	101,611,322	88,651,028	97,786,302	0
	Total	**194,914,263**	**182,695,220**	**160,952,873**	**176,664,379**	**0**
Other Stationary Fuels (gal)	Com/Ind	759,948	759,948	759,948	759,948	0
Total Energy (MMBtu)	Res	10,872,629	10,412,444	9,640,081	10,351,381	0
	Com/Ind	18,610,296	17,029,329	16,049,817	16,967,776	0
	Total	**29,482,925**	**27,441,773**	**25,689,898**	**27,319,157**	**0**
Res. Energy (kBtu/household/day)		**259**	**247**	**238**	**254**	**0**
Com/Ind Energy (kBtu/job/day)		**278**	**264**	**250**	**264**	**0**
Total Energy (kBtu/person/day)		**280**	**262**	**247**	**261**	**0**
Water[5]						
Rainfall (inches)		23.8	25.0	36.7	35.0	0.0
Potable Water (gallons)	Res	4,260,052,984	4,074,199,668	3,952,915,208	3,913,755,164	0
	Com/Ind	4,837,911,408	4,764,958,220	4,401,316,524	4,338,716,404	0
	Total	**9,097,964,392**	**8,839,157,888**	**8,354,231,732**	**8,252,471,568**	**0**
Res. Water (gal./household/day)		**101**	**97**	**98**	**96**	**0**
Com/Ind Water (gal./job/day)		**72**	**74**	**68**	**68**	**0**
Total Water (gal./person/day)		**87**	**84**	**80**	**79**	**0**
Travel[6]						
Vehicle Miles Traveled		**2,009,716,248**	**1,992,530,255**	**1,965,954,240**	**1,991,082,875**	**0**
Travel (VMT/person/day)		**19.1**	**19.0**	**18.9**	**19.0**	**0.0**
Waste (pounds)[7]						
Recycled		331,617,502	321,725,829	329,613,798	326,918,290	0
Incinerated		194,831,490	208,187,622	205,218,247	231,065,224	0
Landfill		206,999,551	162,228,376	156,328,951	126,656,787	0
	Total	**733,448,543**	**692,141,827**	**691,160,996**	**684,640,301**	**0**
Waste (pounds/person/day)		**7.0**	**6.6**	**6.6**	**6.6**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		2,761,167	2,470,315	2,298,463	2,457,871	0
VMT		955,620	932,504	905,519	915,898	0
Waste		109,387	96,062	81,589	79,138	0
	Total	**3,826,174**	**3,498,881**	**3,285,571**	**3,452,907**	**0**
CO_2e (tonnes/person/year)		**13.3**	**12.2**	**11.5**	**12.1**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**4,140,868**	**3,769,882**	**3,532,074**	**3,694,608**	
CO_2e (tonnes/person/year)		**14.4**	**13.1**	**12.4**	**12.9**	
Total Costs ($)[10]						
Energy		431,891,213	351,340,003	353,471,226	372,988,540	0
Water		2,031,714	2,105,065	1,999,113	2,059,530	0
VMT		365,313,722	261,584,480	303,902,033	391,750,919	0
Waste		60,242,710	57,324,670	57,307,618	57,188,879	0
	Total	**859,479,360**	**672,354,217**	**716,679,990**	**823,987,868**	**0**
Cost ($/person/year)		**2,984**	**2,339**	**2,514**	**2,877**	**0**

Regional Indicators Initiative Project: City of Saint Paul

Updated 2/12/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KSTP, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55103. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

Regional Indicators Initiative Project: City of Rochester

Updated 2/12/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		102,437	104,578	106,769	108,725	110,714
Jobs		84,203	83,446	81,824	82,288	84,816
Households		42,058	42,930	44,089	45,035	45,981
Pop. Density (Res/sq. mi.)[2]	54.59	1,876	1,916	1,956	1,992	2,028
Energy[3]						
Cooling Degree Days[4]		651	506	831	851	0
Electricity (MWh)	Res	338,151	335,477	354,352	346,384	0
	Com/Ind	949,133	882,644	886,810	881,013	0
	Total	**1,287,283**	**1,218,122**	**1,241,162**	**1,227,396**	**0**
Heating Degree Days[4]		8,416	8,097	7,705	7,675	0
Therms	Res	38,069,969	37,014,126	34,161,034	35,997,870	0
	Com/Ind	52,217,731	57,534,054	57,312,583	57,707,581	0
	Total	**90,287,700**	**94,548,180**	**91,473,617**	**93,705,450**	**0**
Total Energy (MMBtu)	Res	4,960,767	4,846,062	4,625,152	4,781,648	0
	Com/Ind	8,460,213	8,764,987	8,757,053	8,776,773	0
	Total	**13,420,980**	**13,611,049**	**13,382,205**	**13,558,421**	**0**
Res. Energy (kBtu/household/day)		**323**	**309**	**287**	**291**	**0**
Com/Ind Energy (kBtu/job/day)		**275**	**288**	**293**	**292**	**0**
Total Energy (kBtu/person/day)		**359**	**357**	**343**	**342**	**0**
Water[5]						
Precipitation (inches)		30.6	28.2	39.8	29.1	0.0
Potable Water (gallons)	Res	2,352,591,049	2,251,589,956	2,089,315,000	2,115,846,829	0
	Com/Ind	2,181,192,799	2,150,589,012	2,104,172,300	2,103,128,500	0
	Total	**4,533,783,848**	**4,402,178,968**	**4,193,487,300**	**4,218,975,329**	**0**
Res. Water (gal./household/day)		**153**	**144**	**130**	**129**	**0**
Com/Ind Water (gal./job/day)		**71**	**71**	**70**	**70**	**0**
Total Water (gal./person/day)		**121**	**115**	**108**	**106**	**0**
Travel[7]						
Vehicle miles traveled		**729,132,390**	**728,483,425**	**750,259,325**	**750,259,325**	**0**
Travel (VMT/person/day)		**19.5**	**19.1**	**19.3**	**18.9**	**0.0**
Waste (pounds)[8]						
Recycled		89,036,385	63,417,252	73,637,213	189,224,337	0
Incinerated		80,403,687	82,264,603	98,578,205	108,931,924	0
Landfill		48,346,008	31,767,706	27,777,349	17,167,480	0
	Total	**217,786,081**	**177,449,562**	**199,992,767**	**315,323,741**	**0**
Waste (pounds/person/day)		**5.8**	**4.6**	**5.1**	**7.9**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		1,452,864	1,424,913	1,425,122	1,427,169	0
VMT		346,702	340,930	345,569	345,119	0
Waste		42,735	35,216	38,773	34,183	0
	Total	**1,842,301**	**1,801,060**	**1,809,464**	**1,806,472**	**0**
CO_2e (tonnes/person/year)		**18.0**	**17.2**	**16.9**	**16.6**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**1,873,957**	**1,831,758**	**1,836,495**	**1,833,791**	**0**
CO_2e (tonnes/person/year)		**18.3**	**17.5**	**17.2**	**16.9**	**0.0**
Total Costs ($)[10]						
Energy		192,264,784	168,717,795	170,267,419	173,327,327	0
Water		1,359,150	1,326,396	1,336,902	1,373,918	0
VMT		132,537,152	95,637,171	115,976,928	147,615,543	0
Waste		18,108,501	14,891,778	16,898,614	26,860,254	0
	Total	**344,269,586**	**280,573,140**	**304,479,863**	**349,177,043**	**0**
Cost ($/person/year)		**3,361**	**2,683**	**2,852**	**3,212**	**0**

Regional Indicators Initiative Project: City of Rochester

Updated 2/12/13

Keyed Notes on Sources:

1. Resident and household data from the Minnesota Department of Administration. http://www.demography.state.mn.us/resource.html?Id=19243; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Peoples Cooperative Power Association and Rochester Public Utilities for electricity and Minnesota Energy Resources for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KRST, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55901. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Rochester International Airport and the Rochester Water Reclamation Plant. Source for aircraft operations information by aircraft classification: US Federal Aviation Administration Air Traffic Activity System (ATADS); ATADS Report - http://aspm.faa.gov/opsnet/sys/opsnet-server-x.asp. Airport GHG emissions are based on from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. Source for the city's share of wastewater treatment emissions is Rochester Public Utilities.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: “2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota,” Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

Regional Indicators Initiative Project: City of Duluth

Updated 2/18/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		85,220	85,530	86,265	85,423	85,359
Jobs		61,251	58,681	58,682	58,101	57,479
Households		36,480	36,624	36,710	36,840	36,970
Pop. Density (Res/sq. mi.)[2]	67.79	1,257	1,262	1,273	1,260	1,259
Energy[3]						
Cooling Degree Days[4]		305	198	369	405	0
Electricity (MWh)	Res	282,311	279,883	271,207	275,410	0
	Com/Ind	1,175,714	1,072,845	1,167,060	1,157,233	0
	Total	**1,458,025**	**1,352,728**	**1,438,267**	**1,432,644**	**0**
Heating Degree Days[4]		9,366	8,992	8,343	8,896	0
Natural Gas (therms)	Res	27,178,458	24,902,950	24,924,240	25,353,568	0
	Com/Ind	24,063,504	23,023,755	23,220,768	23,798,085	
	Total	**51,241,962**	**47,926,705**	**48,145,008**	**49,151,652**	**0**
Heating & other fuels (gal)	Res	5,546,434	5,325,105	4,940,666	5,268,638	0
	Com/Ind	473,626	474,209	472,988	476,306	0
	Total	**6,020,061**	**5,799,314**	**5,413,654**	**5,744,944**	**0**
District energy (short tons coal)	Com/Ind	60,191	58,760	54,726	55,571	0
Total Energy (MMBtu)	Res	4,591,402	4,321,645	4,228,963	4,340,495	0
	Com/Ind	7,818,252	7,344,292	7,639,910	7,658,322	0
	Total	**12,409,655**	**11,665,937**	**11,868,872**	**11,998,817**	**0**
Res. Energy (kBtu/household/day)		**345**	**323**	**316**	**323**	**0**
Com/Ind Energy (kBtu/job/day)		**350**	**343**	**357**	**361**	**0**
Total Energy (kBtu/person/day)		**399**	**374**	**377**	**385**	**0**
Water[5]						
Precipitation (inches)		32.3	28.7	36.2	25.2	0.0
Potable Water (gallons)	Res	1,351,470,776	1,479,646,873	1,496,961,889	1,450,828,280	0
	Com/Ind	2,675,505,359	2,929,255,451	2,963,533,972	2,872,203,312	0
	Total	**4,026,976,135**	**4,408,902,324**	**4,460,495,861**	**4,323,031,592**	**0**
Res. Water (gal./household/day)		**101**	**111**	**112**	**108**	**0**
Com/Ind Water (gal./job/day)		**120**	**137**	**138**	**135**	**0**
Total Water (gal./person/day)		**129**	**141**	**142**	**139**	**0**
Travel[6]						
Vehicle Miles Traveled		**689,430,174**	**692,277,980**	**693,724,840**	**693,724,840**	**0**
Travel (VMT/person/day)		**22.2**	**22.2**	**22.0**	**22.2**	**0.0**
Waste (pounds)[7]						
Recycled		107,193,432	96,888,792	77,582,234	78,752,093	0
Incinerated		0	0	0	0	0
Landfill		113,359,148	102,797,283	99,216,632	91,909,961	0
	Total	**220,552,581**	**199,686,075**	**176,798,866**	**170,662,054**	**0**
Waste (pounds/person/day)		**7.1**	**6.4**	**5.6**	**5.5**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		1,843,807	1,720,011	1,792,057	1,797,270	0
VMT		327,824	323,986	319,530	319,113	0
Waste		15,620	14,332	13,897	11,866	0
	Total	**2,187,251**	**2,058,329**	**2,125,483**	**2,128,249**	**0**
CO_2e (tonnes/person/year)		**25.7**	**24.1**	**24.6**	**24.9**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**2,254,183**	**2,119,488**	**2,182,961**	**2,188,757**	**0**
CO_2e (tonnes/person/year)		**26.5**	**24.8**	**25.3**	**25.6**	**0.0**
Total Costs ($)[10]						
Energy		174,907,654	151,354,458	162,585,684	168,047,206	0
Water		1,207,217	1,328,421	1,422,025	1,407,805	0
VMT		125,320,330	90,884,028	107,237,689	136,492,231	0
Waste		17,329,980	15,688,350	13,787,696	13,357,400	0
	Total	**318,765,182**	**259,255,258**	**285,033,094**	**319,304,642**	**0**
Cost ($/person/year)		**3,740**	**3,031**	**3,304**	**3,738**	**0**

Regional Indicators Initiative Project: City of Duluth

Updated 2/18/13

Keyed Notes on Sources:

1. Resident and household data from the Minnesota Department of Administration. http://www.demography.state.mn.us/resource.html?Id=19243; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Minnesota Power for electricity and City of Duluth, Public Works and Utilities Department, Comfort Systems for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMNDULUT1, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55811. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Duluth International Airport and the Western Lake Superior Wastewater Treatment Plant. Source for aircraft operations information by aircraft classification: US Federal Aviation Administration Air Traffic Activity System (ATADS); ATADS Report - http://aspm.faa.gov/opsnet/sys/opsnet-server-x.asp. Airport GHG emissions are based on from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. Source for the city's share of wastewater treatment emissions is the Western Lake Superior Sanitation District.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: “2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota,” Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

Regional Indicators Initiative Project: City of Richfield

Updated 2/12/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		33,676	33,859	35,228	35,376	32,489
Jobs		17,177	16,066	15,599	17,601	17,321
Households		15,014	14,997	14,818	14,891	15,046
Pop. Density (Res/sq. mi.)[2]	6.87	4,902	4,929	5,128	5,149	4,729
Energy[3, 11]						
Cooling Degree Days[4]		859	774	1,088	1,129	0
Electricity (MWh)	Res	101,601	97,727	102,338	102,561	0
	Com/Ind	144,482	139,374	140,513	144,414	0
	Total	**246,083**	**237,100**	**242,851**	**246,975**	**0**
Heating Degree Days[4]		8,264	7,778	7,170	7,357	0
Therms	Res	10,319,769	9,854,086	8,942,743	9,450,400	0
	Com/Ind	6,487,071	6,173,531	5,648,306	6,137,214	0
	Total	**16,806,840**	**16,027,617**	**14,591,049**	**15,587,614**	**0**
Total Energy (MMBtu)	Res	1,378,639	1,318,852	1,243,452	1,294,980	0
	Com/Ind	1,141,681	1,092,895	1,044,260	1,106,461	0
	Total	**2,520,321**	**2,411,748**	**2,287,711**	**2,401,440**	**0**
Res. Energy (kBtu/household/day)		**252**	**241**	**230**	**238**	**0**
Com/Ind Energy (kBtu/job/day)		**182**	**186**	**183**	**172**	**0**
Total Energy (kBtu/person/day)		**205**	**195**	**178**	**186**	**0**
Water[5]						
Precipitation (inches)		23.7	25.3	34.5	26.8	0.0
Potable Water (gallons)	Res	659,655,000	659,046,000	569,903,000	572,908,000	0
	Com/Ind	487,368,000	485,992,000	424,104,000	481,276,000	0
	Total	**1,147,023,000**	**1,145,038,000**	**994,007,000**	**1,054,184,000**	**0**
Res. Water (gal./household/day)		**120**	**120**	**105**	**105**	**0**
Com/Ind Water (gal./job/day)		**78**	**83**	**74**	**75**	**0**
Total Water (gal./person/day)		**93**	**93**	**77**	**82**	**0**
Travel[6]						
Vehicle Miles Traveled		**315,282,282**	**316,614,140**	**357,906,955**	**357,906,955**	**0**
Travel (VMT/person/day)		**25.6**	**25.6**	**27.8**	**27.7**	**0.0**
Waste (pounds)[7]						
Recycled		34,390,133	33,195,510	34,491,817	34,305,697	0
Incinerated		28,078,009	24,854,489	21,523,462	24,727,783	0
Landfill		21,131,279	40,168,770	46,836,817	20,932,348	0
	Total	**83,599,421**	**98,218,770**	**102,852,096**	**79,965,828**	**0**
Waste (pounds/person/day)		**6.8**	**7.9**	**8.0**	**6.2**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		235,299	218,290	203,009	216,276	0
VMT		149,917	148,175	164,852	164,637	0
Waste		10,024	10,651	9,736	7,395	0
	Total	**395,240**	**377,116**	**377,597**	**388,308**	**0**
CO_2e (tonnes/person/year)		**11.7**	**11.1**	**10.7**	**11.0**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**459,731**	**432,960**	**427,697**	**436,800**	**0**
CO_2e (tonnes/person/year)		**13.7**	**12.8**	**12.1**	**12.3**	**0.0**
Total Costs ($)[10]						
Energy		38,723,765	32,941,367	32,871,807	34,571,485	0
Water		256,148	272,693	237,859	263,088	0
VMT		57,310,053	41,565,916	55,326,136	70,419,158	0
Waste		6,912,005	7,908,622	8,210,777	6,597,260	0
	Total	**103,201,970**	**82,688,598**	**96,646,579**	**111,850,991**	**0**
Cost ($/person/year)		**3,065**	**2,442**	**2,743**	**3,162**	**0**

Regional Indicators Initiative Project: City of Richfield

Updated 2/12/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMSP, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55423. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: “2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota,” Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

11. In September 2012, it was learned that Xcel Energy had instituted a new policy called the “15/15 Rule.” The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the wind-based electricial consumption data for the Commercial and Industrial sector in the case of the City. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of Commercial and Industrial consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Regional Indicators Initiative Project: City of Hopkins

Updated 2/11/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		17,481	17,290	17,591	17,701	18,090
Jobs		10,227	10,382	11,015	11,494	12,975
Households		8,523	8,433	8,366	8,440	8,960
Pop. Density (Res/sq. mi.)[2]	4.08	4,285	4,238	4,312	4,338	4,434
Energy[3]						
Cooling Degree Days[4]		771	685	1,024	1,037	0
Electricity (MWh)	Res	48,144	46,444	48,957	48,731	0
	Com/Ind	148,729	150,931	151,749	154,793	0
	Total	**196,874**	**197,376**	**200,706**	**203,524**	**0**
Heating Degree Days[4]		8,428	7,941	7,337	7,510	0
Therms	Res	3,941,862	3,785,728	3,433,213	3,597,507	0
	Com/Ind	7,408,387	6,838,444	6,097,265	6,711,029	0
	Total	**11,350,249**	**10,624,172**	**9,530,478**	**10,308,536**	**0**
Total Energy (MMBtu)	Res	558,455	537,041	510,362	526,020	0
	Com/Ind	1,248,303	1,198,822	1,127,493	1,199,258	0
	Total	**1,806,758**	**1,735,864**	**1,637,856**	**1,725,278**	**0**
Res. Energy (kBtu/household/day)		**180**	**174**	**167**	**171**	**0**
Com/Ind Energy (kBtu/job/day)		**334**	**316**	**280**	**286**	**0**
Total Energy (kBtu/person/day)		**283**	**275**	**255**	**267**	**0**
Water[5]						
Precipitation (inches)		24.9	26.9	35.9	28.1	0.0
Potable Water (gallons)	Res	542,589,036	521,421,666	479,935,924	487,094,718	0
	Com/Ind	161,811,931	154,976,752	154,791,225	157,135,286	0
	Total	**704,400,967**	**676,398,418**	**634,727,149**	**644,230,004**	**0**
Res. Water (gal./household/day)		**174**	**169**	**157**	**158**	**0**
Com/Ind Water (gal./job/day)		**43**	**41**	**39**	**37**	**0**
Total Water (gal./person/day)		**110**	**107**	**99**	**100**	**0**
Travel[6]						
Vehicle Miles Traveled		**124,702,422**	**116,936,510**	**113,845,690**	**113,845,690**	**0**
Travel (VMT/person/day)		**19.5**	**18.5**	**17.7**	**17.6**	**0.0**
Waste (pounds)[7]						
Recycled		17,851,702	16,951,191	17,223,389	17,165,455	0
Incinerated		14,575,118	12,691,873	10,747,679	12,372,978	0
Landfill		10,969,114	20,512,066	23,387,829	10,473,866	0
	Total	**43,395,934**	**50,155,129**	**51,358,897**	**40,012,300**	**0**
Waste (pounds/person/day)		**6.8**	**7.9**	**8.0**	**6.2**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		176,909	166,991	154,097	164,511	0
VMT		59,296	54,726	52,437	52,369	0
Waste		5,204	5,439	4,862	3,700	0
	Total	**241,408**	**227,156**	**211,396**	**220,581**	**0**
CO_2e (tonnes/person/year)		**13.8**	**13.1**	**12.0**	**12.5**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**259,104**	**242,479**	**225,162**	**234,062**	**0**
CO_2e (tonnes/person/year)		**14.8**	**14.0**	**12.8**	**13.2**	**0.0**
Total Costs ($)[10]						
Energy		27,209,597	23,460,227	23,413,783	24,650,963	0
Water		157,303	161,086	151,886	160,777	0
VMT		22,667,631	15,351,725	17,598,546	22,399,446	0
Waste		3,587,978	4,038,515	4,100,028	3,301,055	0
	Total	**53,622,509**	**43,011,552**	**45,264,243**	**50,512,241**	**0**
Cost ($/person/year)		**3,067**	**2,488**	**2,573**	**2,854**	**0**

Regional Indicators Initiative Project: City of Hopkins

Updated 2/11/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KFCM, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55343. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: “2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota,” Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

Regional Indicators Initiative Project: City of Saint Louis Park

Updated 2/12/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		47,221	46,293	45,250	45,505	44,919
Jobs		40,212	39,809	40,720	40,579	40,870
Households		22,347	22,390	21,743	21,890	22,552
Pop. Density (Res/sq. mi.)[2]	10.64	4,438	4,351	4,253	4,277	4,222
Energy[3, 11]						
Cooling Degree Days[4]		781	719	1,014	1,023	0
Electricity (MWh)	Res	146,276	141,167	147,610	147,669	0
	Com/Ind	362,246	352,173	361,855	365,216	0
	Total	**508,522**	**493,340**	**509,465**	**512,885**	**0**
Heating Degree Days[4]		8,509	8,001	7,363	7,565	0
Therms	Res	14,095,415	13,625,866	12,292,403	12,978,248	0
	Com/Ind	18,544,426	17,633,448	16,002,314	17,122,356	0
	Total	**32,639,841**	**31,259,314**	**28,294,717**	**30,100,604**	**0**
Total Energy (MMBtu)	Res	1,908,634	1,844,249	1,732,884	1,801,670	0
	Com/Ind	3,090,427	2,964,958	2,834,882	2,958,353	0
	Total	**4,999,061**	**4,809,206**	**4,567,766**	**4,760,023**	**0**
Res. Energy (kBtu/household/day)		**234**	**226**	**218**	**225**	**0**
Com/Ind Energy (kBtu/job/day)		**211**	**204**	**191**	**200**	**0**
Total Energy (kBtu/person/day)		**290**	**285**	**277**	**287**	**0**
Water[5]						
Precipitation (inches)		25.1	26.0	37.1	29.2	0.0
Potable Water (gallons)	Res	1,210,600,500	1,280,652,750	1,090,718,250	1,093,334,250	0
	Com/Ind	692,759,250	760,044,750	711,150,750	675,827,250	0
	Total	**1,903,359,750**	**2,040,697,500**	**1,801,869,000**	**1,769,161,500**	**0**
Res. Water (gal./household/day)		**148**	**157**	**137**	**137**	**0**
Com/Ind Water (gal./job/day)		**47**	**52**	**48**	**46**	**0**
Total Water (gal./person/day)		**110**	**121**	**109**	**107**	**0**
Travel[6]						
Vehicle Miles Traveled		**398,353,668**	**396,730,545**	**392,091,395**	**392,091,395**	**0**
Travel (VMT/person/day)		**23.1**	**23.5**	**23.7**	**23.6**	**0.0**
Waste (pounds)[7]						
Recycled		48,222,368	45,385,858	44,304,380	44,128,244	0
Incinerated		39,371,412	33,981,774	27,646,663	31,807,942	0
Landfill		29,630,602	54,919,899	60,161,405	26,925,782	0
	Total	**117,224,381**	**134,287,531**	**132,112,449**	**102,861,968**	**0**
Waste (pounds/person/day)		**6.8**	**7.9**	**8.0**	**6.2**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		474,633	442,623	413,120	436,596	0
VMT		189,417	185,670	180,597	180,362	0
Waste		14,056	14,563	12,505	9,512	0
	Total	**678,106**	**642,856**	**606,222**	**626,470**	**0**
CO_2e (tonnes/person/year)		**14.4**	**13.9**	**13.4**	**13.8**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**728,077**	**686,294**	**645,104**	**664,680**	**0**
CO_2e (tonnes/person/year)		**15.4**	**14.8**	**14.3**	**14.6**	**0.0**
Total Costs ($)[10]						
Energy		74,836,245	63,580,578	63,723,703	66,544,519	0
Water		425,049	485,997	431,176	441,521	0
VMT		72,410,253	52,083,803	60,610,450	77,145,038	0
Waste		9,692,118	10,812,896	10,546,657	8,486,215	0
	Total	**157,363,665**	**126,963,273**	**135,311,986**	**152,617,293**	**0**
Cost ($/person/year)		**3,332**	**2,743**	**2,990**	**3,354**	**0**

Regional Indicators Initiative Project: City of Saint Louis Park

Updated 2/12/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMNPLYMO2, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55426. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

11. In September 2012, it was learned that Xcel Energy had instituted a new policy called the "15/15 Rule." The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the wind-based electricial consumption data for the Commercial and Industrial sector in the case of the City. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of Commercial and Industrial consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Regional Indicators Initiative Project: City of St. Anthony

Updated 2/12/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		8,437	8,514	8,226	8,333	8,152
Jobs		2,989	3,003	2,984	3,145	3,253
Households		4,079	4,136	3,848	3,881	4,062
Pop. Density (Res/sq. mi.) [2]	2.25	3,750	3,784	3,656	3,704	3,623
Energy[3]						
Cooling Degree Days[4]		781	719	1,014	1,023	0
Electricity (MWh)	Res	25,371	24,106	25,457	26,031	0
	Com/Ind	40,739	39,178	40,507	40,725	0
	Total	**66,110**	**63,284**	**65,964**	**66,756**	**0**
Heating Degree Days[4]		8,509	8,001	7,367	7,565	0
Therms	Res	2,649,613	2,603,170	2,286,464	2,529,606	0
	Com/Ind	2,495,585	2,459,402	2,297,638	2,448,941	0
	Total	**5,145,198**	**5,062,572**	**4,584,102**	**4,978,547**	**0**
Total Energy (MMBtu)	Res	351,526	342,566	315,506	341,779	0
	Com/Ind	388,560	379,617	367,975	383,846	0
	Total	**740,086**	**722,183**	**683,480**	**725,625**	**0**
Res. Energy (kBtu/household/day)		**236**	**227**	**225**	**241**	**0**
Com/Ind Energy (kBtu/job/day)		**356**	**346**	**338**	**334**	**0**
Total Energy (kBtu/person/day)		**240**	**232**	**228**	**239**	**0**
Water[5]						
Precipitation (inches)		24.5	25.4	36.9	32.9	0.0
Potable Water (gallons)	Res	232,425,677	230,170,631	198,618,344	203,827,957	0
	Com/Ind	75,012,576	77,514,778	61,231,519	64,704,694	0
	Total	**307,438,253**	**307,685,409**	**259,849,863**	**268,532,651**	**0**
Res. Water (gal./household/day)		**156**	**152**	**141**	**144**	**0**
Com/Ind Water (gal./job/day)		**69**	**71**	**56**	**56**	**0**
Total Water (gal./person/day)		**100**	**99**	**87**	**88**	**0**
Travel[6]						
Vehicle Miles Traveled		**31,587,264**	**29,304,390**	**30,604,520**	**30,604,520**	**0**
Travel (VMT/person/day)		**10.3**	**9.4**	**10.2**	**10.1**	**0.0**
Waste (pounds)[7]						
Recycled		9,027,476	8,918,424	8,732,822	8,542,420	0
Incinerated		6,538,940	6,264,966	5,443,761	6,115,010	0
Landfill		5,582,433	7,926,978	8,320,299	4,537,761	0
	Total	**21,148,849**	**23,110,368**	**22,496,882**	**19,195,191**	**0**
Waste (pounds/person/day)		**6.9**	**7.4**	**7.5**	**6.3**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		66,612	62,516	58,501	62,597	0
VMT		15,020	13,714	14,096	14,078	0
Waste		2,752	2,960	2,519	1,970	0
	Total	**84,383**	**79,191**	**75,116**	**78,645**	**0**
CO_2e (tonnes/person/year)		**10.0**	**9.3**	**9.1**	**9.4**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**98,067**	**90,984**	**85,740**	**89,044**	**0**
CO_2e (tonnes/person/year)		**11.6**	**10.7**	**10.4**	**10.7**	**0.0**
Total Costs ($)[10]						
Energy		10,941,995	9,258,173	9,229,077	9,779,090	0
Water		68,656	73,276	62,180	67,016	0
VMT		5,741,736	3,847,155	4,730,922	6,021,522	0
Waste		1,744,219	1,880,956	1,821,841	1,590,157	0
	Total	**18,496,606**	**15,059,561**	**15,844,020**	**17,457,785**	**0**
Cost ($/person/year)		**2,192**	**1,769**	**1,926**	**2,095**	**0**

Regional Indicators Initiative Project: City of St. Anthony

Updated 2/12/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMIC, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55418. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

Regional Indicators Initiative Project: City of Edina

Updated 2/18/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		48,169	49,491	47,941	48,262	48,446
Jobs		49,202	47,006	47,676	49,018	49,883
Households		21,285	21,357	20,672	20,848	22,242
Pop. Density (Res/sq. mi.)[2]	15.45	3,118	3,203	3,103	3,124	3,136
Energy[3, 11]						
Cooling Degree Days[4]		859	774	1,088	1,129	0
Electricity (MWh)	Res	200,029	195,768	204,219	205,232	0
	Com/Ind	406,497	391,663	400,521	392,499	0
	Total	**606,526**	**587,431**	**604,740**	**597,731**	**0**
Heating Degree Days[4]		8,264	7,778	7,170	7,357	0
Therms	Res	20,511,175	19,953,060	18,209,218	19,152,383	0
	Com/Ind	18,249,768	17,815,739	16,804,837	17,804,060	0
	Total	**38,760,943**	**37,768,799**	**35,014,055**	**36,956,443**	**0**
Total Energy (MMBtu)	Res	2,733,617	2,663,266	2,517,717	2,615,489	0
	Com/Ind	3,211,945	3,117,927	3,047,062	3,119,612	0
	Total	**5,945,561**	**5,781,193**	**5,564,779**	**5,735,101**	**0**
Res. Energy (kBtu/household/day)		**352**	**342**	**334**	**344**	**0**
Com/Ind Energy (kBtu/job/day)		**179**	**182**	**175**	**174**	**0**
Total Energy (kBtu/person/day)		**338**	**320**	**318**	**326**	**0**
Water[5]						
Precipitation (inches)		24.5	26.7	35.6	28.1	0.0
Potable Water (gallons)	Res	1,789,110,326	1,860,343,660	1,651,793,579	1,685,927,885	0
	Com/Ind	577,517,490	589,620,252	529,013,678	541,999,198	0
	Total	**2,366,627,816**	**2,449,963,912**	**2,180,807,257**	**2,227,927,083**	**0**
Res. Water (gal./household/day)		**230**	**239**	**219**	**222**	**0**
Com/Ind Water (gal./job/day)		**32**	**34**	**30**	**30**	**0**
Total Water (gal./person/day)		**135**	**136**	**125**	**126**	**0**
Travel[6]						
Vehicle Miles Traveled		**508,313,244**	**506,846,665**	**498,974,345**	**498,974,345**	**0**
Travel (VMT/person/day)		**28.9**	**28.1**	**28.5**	**28.3**	**0.0**
Waste (pounds)[7]						
Recycled		49,190,471	48,521,191	46,939,145	46,801,831	0
Combusted		40,161,825	36,329,293	29,290,800	33,735,082	0
Landfill		30,225,460	58,713,860	63,739,180	28,557,128	0
	Total	**119,577,756**	**143,564,344**	**139,969,125**	**109,094,041**	**0**
Waste (pounds/person/day)		**6.8**	**7.9**	**8.0**	**6.2**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		564,984	529,694	497,839	518,991	0
VMT		241,703	237,204	229,828	229,528	0
Waste		14,338	15,569	13,249	10,088	0
	Total	**821,025**	**782,467**	**740,916**	**758,608**	**0**
CO_2e (tonnes/person/year)		**17.0**	**15.8**	**15.5**	**15.7**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**875,110**	**829,487**	**783,126**	**799,905**	**0**
CO_2e (tonnes/person/year)		**18.2**	**16.8**	**16.3**	**16.6**	**0.0**
Total Costs ($)[10]						
Energy		90,482,396	77,810,250	78,377,690	80,841,342	0
Water		528,504	583,464	521,853	556,013	0
VMT		92,398,021	66,540,129	77,132,679	98,174,546	0
Waste		9,886,696	11,559,869	11,173,863	9,000,367	0
	Total	**193,295,616**	**156,493,713**	**167,206,085**	**188,572,268**	**0**
Cost ($/person/year)		**4,013**	**3,162**	**3,488**	**3,907**	**0**

Regional Indicators Initiative Project: City of Edina

Updated 2/18/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMSP, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55436. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

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10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

11. In September 2012, it was learned that Xcel Energy had instituted a new policy called the "15/15 Rule." The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the wind-based electricial consumption data for the Commercial and Industrial sector in the case of the City. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of Commercial and Industrial consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Regional Indicators Initiative Project: City of Falcon Heights

Updated 2/20/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		5,746	5,762	5,321	5,385	5,625
Jobs		5,842	5,318	5,315	5,282	4,205
Households		2,256	2,268	2,131	2,146	2,243
Pop. Density (Res/sq. mi.)[2]	2.23	2,577	2,584	2,386	2,415	2,522
Energy[3, 11]						
Cooling Degree Days[4]		673	561	782	872	0
Electricity (MWh)	Res	13,596	12,913	13,301	13,772	0
	Com/Ind	8,117	7,810	9,710	6,548	0
	Total	**21,713**	**20,723**	**23,011**	**20,320**	**0**
Heating Degree Days[4]		8,412	8,013	7,519	7,805	0
Therms	Res	1,387,020	1,322,240	1,175,820	1,339,181	0
	Com/Ind	2,459,990	2,322,590	2,119,900	2,327,536	0
	Total	**3,847,010**	**3,644,830**	**3,295,720**	**3,666,717**	**0**
Total Energy (MMBtu)	Res	185,092	176,283	162,965	180,909	0
	Com/Ind	952,239	885,178	824,534	814,345	0
	Total	**1,137,330**	**1,061,462**	**987,499**	**995,254**	**0**
Res. Energy (kBtu/household/day)		**225**	**213**	**210**	**231**	**0**
Com/Ind Energy (kBtu/job/day)		**447**	**456**	**425**	**422**	**0**
Total Energy (kBtu/person/day)		**542**	**505**	**508**	**506**	**0**
Water[5]						
Precipitation (inches)		24.1	25.2	36.2	33.8	0.0
Potable Water (gallons)	Res	80,781,756	81,335,523	65,854,167	67,567,588	0
	Com/Ind	242,755,920	238,537,948	222,473,152	249,317,376	0
	Total	**323,537,676**	**319,873,471**	**288,327,319**	**316,884,964**	**0**
Res. Water (gal./household/day)		**98**	**98**	**85**	**86**	**0**
Com/Ind Water (gal./job/day)		**114**	**123**	**115**	**129**	**0**
Total Water (gal./person/day)		**154**	**152**	**148**	**161**	**0**
Travel[6]						
Vehicle Miles Traveled		**34,722,420**	**34,306,350**	**34,913,710**	**34,913,710**	**0**
Travel (VMT/person/day)		**16.6**	**16.3**	**18.0**	**17.8**	**0.0**
Waste (pounds)[7]						
Recycled		6,614,966	6,447,923	6,152,479	6,147,548	0
Combusted		3,886,417	4,172,427	3,830,547	4,345,075	0
Landfill		4,129,140	3,251,327	2,917,993	2,381,723	0
	Total	**14,630,523**	**13,871,678**	**12,901,019**	**12,874,347**	**0**
Waste (per person per day)		**7.0**	**6.6**	**6.6**	**6.6**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		71,691	66,398	61,823	61,570	0
VMT		16,511	16,055	16,081	16,060	0
Waste		2,182	1,925	1,523	1,488	0
	Total	**90,383**	**84,378**	**79,427**	**79,119**	**0**
CO_2e (tonnes/person/year)		**15.7**	**14.6**	**14.9**	**14.7**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**100,758**	**93,331**	**87,425**	**86,877**	**0**
CO_2e (tonnes/person/year)		**17.5**	**16.2**	**16.4**	**16.1**	**0.0**
Total Cost ($)[10]						
Energy		6,436,295	7,667,664	7,227,191	7,531,449	0
Water		72,251	76,179	68,995	79,083	0
VMT		6,311,626	4,503,826	5,397,047	6,869,366	0
Waste		1,201,696	1,148,882	1,069,688	1,075,411	0
	Total	**14,021,868**	**13,396,551**	**13,762,921**	**15,555,309**	**0**
Cost ($/person/year)		**2,440**	**2,325**	**2,587**	**2,889**	**0**

Regional Indicators Initiative Project: City of Falcon Heights

Updated 2/20/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMNSAINT2, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55113. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of*

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

11. In September 2012, it was learned that Xcel Energy had instituted a new policy called the "15/15 Rule." The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the wind-based electricial consumption data for the Commercial and Industrial sector in the case of the City and for natural gas consumption for the Commercial and Industrial sector. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of Commercial and Industrial electrical consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Regional Indicators Initiative Project: City of Maplewood

Updated 2/18/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		36,717	37,755	38,018	38,374	38,605
Jobs		27,862	27,005	27,643	27,619	28,697
Households		14,890	15,094	14,882	15,033	15,890
Pop. Density (Res/sq. mi.)[2]	16.98	2,162	2,223	2,239	2,260	2,274
Energy[3, 11]						
Cooling Degree Days[4]		673	561	782	872	0
Electricity (MWh)	Res	116,277	114,056	120,104	120,736	0
	Com/Ind	218,855	211,811	211,241	210,154	0
	Total	**335,133**	**325,867**	**331,345**	**330,890**	**0**
Heating Degree Days[4]		8,412	8,013	7,519	7,805	0
Therms	Res	11,378,560	11,025,376	9,921,259	10,577,506	0
	Com/Ind	9,824,940	9,249,420	8,656,861	9,128,529	0
	Total	**21,203,500**	**20,274,796**	**18,578,120**	**19,706,035**	**0**
Total Energy (MMBtu)	Res	1,534,595	1,491,697	1,401,919	1,469,702	0
	Com/Ind	1,729,227	1,647,641	1,586,441	1,629,897	0
	Total	**3,263,822**	**3,139,338**	**2,988,360**	**3,099,598**	**0**
Res. Energy (kBtu/household/day)		**282**	**271**	**258**	**268**	**0**
Com/Ind Energy (kBtu/job/day)		**170**	**167**	**157**	**162**	**0**
Total Energy (kBtu/person/day)		**244**	**228**	**215**	**221**	**0**
Water[5]						
Precipitation (inches)		25.6	28.1	36.9	33.6	0.0
Potable Water (gallons)	Res	675,632,777	675,406,730	572,985,732	567,586,802	0
	Com/Ind	841,748,879	813,793,152	755,399,673	785,332,937	0
	Total	**1,517,381,655**	**1,489,199,882**	**1,328,385,405**	**1,352,919,738**	**0**
Res. Water (gal./household/day)		**124**	**123**	**105**	**103**	**0**
Com/Ind Water (gal./job/day)		**83**	**83**	**75**	**78**	**0**
Total Water (gal./person/day)		**113**	**108**	**96**	**97**	**0**
Travel[6]						
Vehicle Miles Traveled		**343,204,056**	**380,143,485**	**343,259,140**	**343,259,140**	**0**
Travel (VMT/person/day)		**25.6**	**27.6**	**24.7**	**24.5**	**0.0**
Waste (pounds)[7]						
Recycled		42,269,705	42,249,448	43,958,836	43,807,989	0
Incinerated		24,834,243	27,339,465	27,368,864	30,963,403	0
Landfill		26,385,248	21,304,038	20,848,759	16,972,373	0
	Total	**93,489,195**	**90,892,952**	**92,176,459**	**91,743,766**	**0**
Waste (pounds/person/day)		**7.0**	**6.6**	**6.6**	**6.6**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		311,461	290,649	269,942	283,538	0
VMT		163,194	177,907	158,105	157,899	0
Waste		13,943	12,615	10,881	10,605	0
	Total	**488,598**	**481,171**	**438,928**	**452,042**	**0**
CO_2e (tonnes/person/year)		**13.3**	**12.7**	**11.5**	**11.8**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**530,914**	**517,775**	**471,751**	**484,068**	**0**
CO_2e (tonnes/person/year)		**14.5**	**13.7**	**12.4**	**12.6**	**0.0**
Total Costs ($)[10]						
Energy		50,060,193	42,900,367	43,118,783	44,862,458	0
Water		338,854	354,656	317,874	337,642	0
VMT		62,385,499	49,906,211	53,061,841	67,537,160	0
Waste		7,678,852	7,527,949	7,642,812	7,663,474	0
	Total	**120,463,398**	**100,689,183**	**104,141,309**	**120,400,734**	**0**
Cost ($/person/yr)		**3,281**	**2,667**	**2,739**	**3,138**	**0**

Regional Indicators Initiative Project: City of Maplewood

Updated 2/18/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMNSAINT2, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55109. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

11. In September 2012, it was learned that Xcel Energy had instituted a new policy called the "15/15 Rule." The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the electricial and natural gas consumption data for the Commercial and Industrial sector in the case of the City. The extent of the excluded data and for which years the rule was applied is not known.

Regional Indicators Initiative Project: City of White Bear Lake

Updated 2/12/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		24,679	24,734	23,797	23,820	24,820
Jobs		12,098	11,362	11,284	11,436	12,027
Households		10,080	10,138	9,945	9,990	9,977
Pop. Density (Res/sq. mi.)[2]	8.02	3,077	3,084	2,967	2,970	3,095
Energy[3, 11]						
Cooling Degree Days[4]		598	537	749	843	0
Electricity (MWh)	Res	81,693	79,641	82,619	83,335	0
	Com/Ind	114,905	109,417	108,505	106,316	0
	Total	**196,598**	**189,058**	**191,124**	**189,651**	**0**
Heating Degree Days[4]		8,435	8,069	7,468	7,675	0
Therms	Res	8,045,552	7,802,299	6,996,706	7,532,599	0
	Com/Ind	5,727,020	5,453,576	4,963,970	5,148,416	0
	Total	**13,772,572**	**13,255,875**	**11,960,676**	**12,681,015**	**0**
Total Energy (MMBtu)	Res	1,083,291	1,051,966	981,566	1,037,600	0
	Com/Ind	964,759	918,688	866,616	877,592	0
	Total	**2,048,050**	**1,970,655**	**1,848,182**	**1,915,191**	**0**
Res. Energy (kBtu/household/day)		**294**	**284**	**270**	**285**	**0**
Com/Ind Energy (kBtu/job/day)		**218**	**222**	**210**	**210**	**0**
Total Energy (kBtu/person/day)		**227**	**218**	**213**	**220**	**0**
Water[5]						
Precipitation (inches)		25.5	29.2	33.0	32.9	0.0
Potable Water (gallons)	Res	569,125,000	652,100,000	553,600,000	618,773,000	0
	Com/Ind	348,819,000	361,400,000	343,478,000	245,730,000	0
	Total	**917,944,000**	**1,013,500,000**	**897,078,000**	**864,503,000**	**0**
Res. Water (gal./household/day)		**155**	**176**	**153**	**170**	**0**
Com/Ind Water (gal./job/day)		**79**	**87**	**83**	**59**	**0**
Total Water (gal./person/day)		**102**	**112**	**103**	**99**	**0**
Travel[6]						
Vehicle Miles Traveled		**227,899,782**	**222,316,390**	**222,238,645**	**222,238,645**	**0**
Travel (VMT/person/day)		**25.3**	**24.6**	**25.6**	**25.6**	**0.0**
Waste (pounds)[7]						
Recycled		27,762,106	27,039,526	26,876,576	26,568,751	0
Incinerated		16,310,757	17,497,180	16,733,413	18,778,742	0
Landfill		17,329,434	13,634,523	12,747,000	10,293,436	0
	Total	**61,402,297**	**58,171,229**	**56,356,989**	**55,640,930**	**0**
Waste (pounds/person/day)		**6.8**	**6.4**	**6.5**	**6.4**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		191,204	177,942	163,555	171,236	0
VMT		108,366	104,044	102,363	102,230	0
Waste		9,158	8,074	6,653	6,432	0
	Total	**308,728**	**290,060**	**272,571**	**279,898**	**0**
CO_2e (tonnes/person/year)		**12.5**	**11.7**	**11.5**	**11.8**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**340,231**	**317,401**	**297,102**	**303,711**	**0**
CO_2e (tonnes/person/year)		**13.8**	**12.8**	**12.5**	**12.8**	**0.0**
Total Costs ($)[10]						
Energy		31,318,928	26,654,481	26,452,407	27,459,380	0
Water		204,991	241,367	214,665	215,750	0
VMT		41,426,205	29,186,266	34,354,195	43,726,052	0
Waste		5,043,354	4,817,866	4,672,840	4,647,758	0
	Total	**77,993,478**	**60,899,979**	**65,694,108**	**76,048,940**	**0**
Cost ($/person/year)		**3,160**	**2,462**	**2,761**	**3,193**	**0**

Regional Indicators Initiative Project: City of White Bear Lake

Updated 2/12/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMNVADNA4, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55110. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

11. In September 2012, it was learned that Xcel Energy had instituted a new policy called the "15/15 Rule." The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the wind-based electricial consumption data for the Residential and the Commercial and Industrial sector in the case of the City. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of electricial consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Regional Indicators Initiative Project: City of Coon Rapids

Updated 2/11/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		63,005	63,162	61,476	61,766	67,811
Jobs		24,735	23,697	23,366	23,645	24,563
Households		23,746	23,734	23,532	23,601	26,097
Pop. Density (Res/sq. mi.)[2]	22.61	2,787	2,794	2,719	2,732	2,999
Energy[3, 11]						
Cooling Degree Days[4]		709	651	961	983	0
Electricity (MWh)	Res	155,373	157,091	171,446	181,008	0
	Com/Ind	265,116	260,198	265,190	267,271	0
	Total	**420,488**	**417,289**	**436,636**	**448,279**	**0**
Heating Degree Days[4]		8,353	7,979	7,445	7,712	0
Therms	Res	18,631,603	17,406,218	16,176,837	16,978,872	0
	Com/Ind	10,584,773	9,971,716	9,282,193	9,939,624	0
	Total	**29,216,376**	**27,377,934**	**25,459,030**	**26,918,496**	**0**
Total Energy (MMBtu)	Res	2,393,292	2,276,617	2,202,659	2,315,488	0
	Com/Ind	1,963,052	1,884,967	1,833,046	1,905,890	0
	Total	**4,356,344**	**4,161,584**	**4,035,705**	**4,221,378**	**0**
Res. Energy (kBtu/household/day)		**276**	**263**	**256**	**269**	**0**
Com/Ind Energy (kBtu/job/day)		**217**	**218**	**215**	**221**	**0**
Total Energy (kBtu/person/day)		**189**	**181**	**180**	**187**	**0**
Water[5]						
Precipitation (inches)		24.9	26.0	32.5	33.2	0.0
Potable Water (gallons)	Res	2,273,773,000	2,259,102,800	2,132,259,300	1,901,105,100	0
	Com/Ind	499,130,100	485,144,300	459,365,800	440,210,300	0
	Total	**2,772,903,100**	**2,744,247,100**	**2,591,625,100**	**2,341,315,400**	**0**
Res. Water (gal./household/day)		**262**	**261**	**248**	**221**	**0**
Com/Ind Water (gal./job/day)		**55**	**56**	**54**	**51**	**0**
Total Water (gal./person/day)		**121**	**119**	**115**	**104**	**0**
Travel[6]						
Vehicle Miles Traveled		**566,894,472**	**549,276,820**	**554,059,050**	**554,059,050**	**0**
Travel (VMT/person/day)		**24.7**	**23.8**	**24.7**	**24.6**	**0.0**
Waste (pounds)[7]						
Recycled		52,373,045	51,489,459	51,106,371	50,021,199	0
Incinerated		49,028,062	48,589,689	45,154,323	47,948,744	0
Landfill		27,767,938	23,899,644	22,854,956	19,240,459	0
	Total	**129,169,045**	**123,978,792**	**119,115,650**	**117,210,402**	**0**
Waste (pounds/person/day)		**5.6**	**5.4**	**5.3**	**5.2**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		478,509	447,920	436,385	460,342	0
VMT		269,558	257,062	255,200	254,867	0
Waste		16,030	14,319	11,338	11,970	0
	Total	**764,098**	**719,300**	**702,923**	**727,179**	**0**
CO_2e (tonnes/person/year)		**12.1**	**11.4**	**11.4**	**11.8**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**804,640**	**754,741**	**734,576**	**758,146**	**0**
CO_2e (tonnes/person/year)		**12.8**	**11.9**	**11.9**	**12.3**	**0.0**
Total Costs ($)[10]						
Energy		66,236,418	56,953,539	58,206,659	61,659,537	0
Water		619,231	653,548	620,159	584,311	0
VMT		103,046,552	72,110,469	85,647,808	109,012,611	0
Waste		10,754,840	10,360,926	9,952,029	9,842,250	0
	Total	**180,657,041**	**140,078,483**	**154,426,655**	**181,098,709**	**0**
Cost ($/person/year)		**2,867**	**2,218**	**2,512**	**2,932**	**0**

Regional Indicators Initiative Project: City of Coon Rapids

Updated 2/11/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy and Connexus Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMNCOONR1, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55433. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

11. In September 2012, it was learned that Xcel Energy had instituted a new policy called the "15/15 Rule." The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the wind-based electricial consumption data for the Commercial and Industrial sector in the case of the City. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of Commercial and Industrial consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Regional Indicators Initiative Project: City of Oakdale

Updated 2/12/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		27,230	27,344	27,378	27,538	30,533
Jobs		8,579	8,399	8,678	9,294	9,610
Households		10,959	11,097	10,948	11,033	12,285
Pop. Density (Res/sq. mi.)[2]	10.95	2,487	2,497	2,500	2,515	2,788
Energy[3, 11]						
Cooling Degree Days[4]		673	561	782	872	0
Electricity (MWh)	Res	80,285	78,141	82,158	82,942	0
	Com/Ind	125,099	118,232	119,611	121,903	0
	Total	**205,384**	**196,373**	**201,769**	**204,845**	**0**
Heating Degree Days[4]		8,412	8,013	7,519	7,805	0
Therms	Res	8,235,510	7,908,345	7,077,556	7,537,723	0
	Com/Ind	3,292,740	3,233,438	2,920,745	3,207,826	0
	Total	**11,528,250**	**11,141,783**	**9,998,301**	**10,745,549**	**0**
Total Energy (MMBtu)	Res	1,097,484	1,057,452	988,079	1,036,771	0
	Com/Ind	756,112	726,752	700,188	736,715	0
	Total	**1,853,596**	**1,784,204**	**1,688,267**	**1,773,487**	**0**
Res. Energy (kBtu/household/day)		**274**	**261**	**247**	**257**	**0**
Com/Ind Energy (kBtu/job/day)		**241**	**237**	**221**	**217**	**0**
Total Energy (kBtu/person/day)		**186**	**179**	**169**	**176**	**0**
Water[5]						
Precipitation (inches)		27.4	28.5	38.2	33.0	0.0
Potable Water (gallons)	Res	627,573,000	848,628,000	718,479,000	508,383,562	0
	Com/Ind	462,506,000	225,726,000	206,769,000	424,601,006	0
	Total	**1,090,079,000**	**1,074,354,000**	**925,248,000**	**932,984,568**	**0**
Res. Water (gal./household/day)		**157**	**210**	**180**	**126**	**0**
Com/Ind Water (gal./job/day)		**148**	**74**	**65**	**125**	**0**
Total Water (gal./person/day)		**110**	**108**	**93**	**93**	**0**
Travel[6]						
Vehicle Miles Traveled		**258,090,756**	**257,644,010**	**248,347,825**	**248,347,825**	**0**
Travel (VMT/person/day)		**26.0**	**25.8**	**24.9**	**24.7**	**0.0**
Waste (pounds)[7]						
Recycled		31,347,988	30,599,097	31,656,189	31,437,546	0
Incinerated		18,417,530	19,800,565	19,709,210	22,219,998	0
Landfill		19,567,783	15,429,417	15,013,870	12,179,737	0
	Total	**69,333,300**	**65,829,079**	**66,379,270**	**65,837,281**	**0**
Waste (pounds/person/day)		**7.0**	**6.6**	**6.6**	**6.6**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		182,837	169,258	157,180	165,666	0
VMT		122,722	120,577	114,389	114,240	0
Waste		10,340	9,136	7,836	7,610	0
	Total	**315,900**	**298,971**	**279,405**	**287,516**	**0**
CO_2e (tonnes/person/year)		**11.6**	**10.9**	**10.2**	**10.4**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**340,780**	**320,616**	**298,967**	**306,680**	**0**
CO_2e (tonnes/person/year)		**12.5**	**11.7**	**10.9**	**11.1**	**0.0**
Total Costs ($)[10]						
Energy		29,673,409	25,684,910	25,737,352	27,113,953	0
Water		243,431	255,860	221,406	232,840	0
VMT		46,914,133	33,824,166	38,390,217	48,863,104	0
Waste		5,694,777	5,452,105	5,503,838	5,499,472	0
	Total	**82,525,750**	**65,217,041**	**69,852,812**	**81,709,370**	**0**
Cost ($/person/year)		**3,031**	**2,385**	**2,551**	**2,967**	**0**

Regional Indicators Initiative Project: City of Oakdale

Updated 2/12/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMNSAINT2, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55128. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

11. In September 2012, it was learned that Xcel Energy had instituted a new policy called the "15/15 Rule." The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the electricial consumption data for Residential and Commercial and Industrial wind in the case of the City and Commercial and Industrial natural gas. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of Commercial and Industrial consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Regional Indicators Initiative Project: City of Shoreview

Updated 2/12/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		26,036	25,882	25,043	25,118	28,187
Jobs		11,873	11,588	11,676	12,106	11,182
Households		10,455	10,424	10,402	10,436	11,559
Pop. Density (Res/sq. mi.)[2]	10.77	2,417	2,403	2,325	2,332	2,617
Energy[3, 11]						
Cooling Degree Days[4]		598	537	749	843	0
Electricity (MWh)	Res	90,949	88,204	90,984	91,090	0
	Com/Ind	150,386	151,728	154,893	160,231	0
	Total	**241,336**	**239,932**	**245,878**	**251,321**	**0**
Heating Degree Days[4]		8,435	8,069	7,468	7,675	0
Therms	Res	9,233,081	8,909,033	7,984,772	8,485,910	0
	Com/Ind	3,579,788	3,299,148	2,992,856	3,304,030	0
	Total	**12,812,869**	**12,208,181**	**10,977,628**	**11,789,940**	**0**
Total Energy (MMBtu)	Res	1,233,627	1,191,856	1,108,916	1,159,390	0
	Com/Ind	871,097	847,610	827,781	877,111	0
	Total	**2,104,724**	**2,039,465**	**1,936,697**	**2,036,501**	**0**
Res. Energy (kBtu/household/day)		**323**	**313**	**292**	**304**	**0**
Com/Ind Energy (kBtu/job/day)		**201**	**200**	**194**	**199**	**0**
Total Energy (kBtu/person/day)		**221**	**216**	**212**	**222**	**0**
Water[5]						
Precipitation (inches)		24.8	25.9	34.6	32.3	0.0
Potable Water (gallons)	Res	750,847,540	815,026,354	690,247,745	679,419,761	0
	Com/Ind	219,389,816	243,338,909	214,761,406	201,970,625	0
	Total	**970,237,356**	**1,058,365,263**	**905,009,151**	**881,390,386**	**0**
Res. Water (gal./household/day)		**197**	**214**	**182**	**178**	**0**
Com/Ind Water (gal./job/day)		**51**	**58**	**50**	**46**	**0**
Total Water (gal./person/day)		**102**	**112**	**99**	**96**	**0**
Travel[6]						
Vehicle Miles Traveled		**236,806,758**	**231,726,820**	**230,142,720**	**230,142,720**	**0**
Travel (VMT/person/day)		**24.9**	**24.5**	**25.2**	**25.1**	**0.0**
Waste (pounds)[7]						
Recycled		29,973,419	28,963,057	28,956,313	28,674,860	0
Incinerated		17,609,945	18,741,890	18,028,262	20,267,336	0
Landfill		18,709,761	14,604,453	13,733,376	11,109,399	0
	Total	**66,293,125**	**62,309,400**	**60,717,951**	**60,051,595**	**0**
Waste (pounds/person/day)		**7.0**	**6.6**	**6.6**	**6.6**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		210,305	198,616	184,471	195,413	0
VMT		112,602	108,448	106,004	105,866	0
Waste		9,887	8,648	7,168	6,941	0
	Total	**332,794**	**315,712**	**297,643**	**308,220**	**0**
CO_2e (tonnes/person/year)		**12.8**	**12.2**	**11.9**	**12.3**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**354,477**	**334,553**	**314,517**	**324,762**	**0**
CO_2e (tonnes/person/year)		**13.6**	**12.9**	**12.6**	**12.9**	**0.0**
Total Costs ($)[10]						
Energy		34,020,243	30,025,359	30,305,987	31,995,779	0
Water		216,669	252,052	216,563	219,964	0
VMT		43,045,260	30,421,691	35,576,027	45,281,200	0
Waste		5,445,069	5,160,598	5,034,429	5,016,186	0
	Total	**82,727,240**	**65,859,700**	**71,133,006**	**82,513,130**	**0**
Cost ($/person/year)		**3,177**	**2,545**	**2,840**	**3,285**	**0**

Regional Indicators Initiative Project: City of Shoreview

Updated 2/12/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMNVADNA4, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55126. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

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b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

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a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

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Regional Indicators Initiative Project: City of Eagan

Updated 2/18/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		65,847	65,933	64,206	64,456	74,446
Jobs		51,349	49,333	49,958	49,787	52,682
Households		25,561	25,562	25,249	25,373	28,725
Pop. Density (Res/sq. mi.)[2]	31.32	2,102	2,105	2,050	2,058	2,377
Energy[3, 11]						
Cooling Degree Days[4]		859	774	1,088	1,129	0
Electricity (MWh)	Res	225,743	221,466	235,197	226,173	0
	Com/Ind	779,145	752,542	761,251	759,999	0
	Total	**1,004,888**	**974,008**	**996,449**	**986,172**	**0**
Heating Degree Days[4]		8,264	7,778	7,170	7,357	0
Therms	Res	20,476,762	19,397,128	17,766,579	18,591,799	0
	Com/Ind	16,407,096	15,343,551	13,635,174	20,411,855	0
	Total	**36,883,858**	**34,740,679**	**31,401,753**	**39,003,654**	**0**
Total Energy (MMBtu)	Res	2,817,911	2,695,355	2,579,151	2,630,881	0
	Com/Ind	4,299,151	4,102,029	3,960,907	4,634,303	0
	Total	**7,117,062**	**6,797,384**	**6,540,058**	**7,265,184**	**0**
Res. Energy (kBtu/household/day)		**302**	**289**	**280**	**284**	**0**
Com/Ind Energy (kBtu/job/day)		**229**	**228**	**217**	**255**	**0**
Total Energy (kBtu/person/day)		**296**	**282**	**279**	**309**	**0**
Water[5]						
Precipitation (inches)		27.4	29.2	40.6	28.0	0.0
Potable Water (gallons)	Res	2,126,300,000	2,267,800,000	1,926,800,000	2,001,600,000	0
	Com/Ind	1,496,600,000	1,178,800,000	1,115,100,000	1,089,100,000	0
	Total	**3,622,900,000**	**3,446,600,000**	**3,041,900,000**	**3,090,700,000**	**0**
Res. Water (gal./household/day)		**228**	**243**	**209**	**216**	**0**
Com/Ind Water (gal./job/day)		**80**	**65**	**61**	**60**	**0**
Total Water (gal./person/day)		**151**	**143**	**130**	**131**	**0**
Travel[6]						
Vehicle Miles Traveled		**762,679,584**	**762,537,195**	**746,998,780**	**746,998,780**	**0**
Travel (VMT/person/day)		**31.7**	**31.7**	**31.9**	**31.8**	**0.0**
Waste (pounds)[7]						
Recycled		72,035,498	75,555,672	71,899,404	72,661,709	0
Incinerated		12,760,689	13,739,998	14,785,913	13,872,307	0
Landfill		64,690,798	56,981,712	60,848,070	54,717,855	0
	Total	**149,486,985**	**146,277,381**	**147,533,387**	**141,251,871**	**0**
Waste (pounds/person/day)		**6.2**	**6.1**	**6.3**	**6.0**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		967,177	886,694	854,667	900,749	0
VMT		362,654	356,867	344,068	343,619	0
Waste		11,934	11,296	11,762	10,831	0
	Total	**1,341,765**	**1,254,857**	**1,210,496**	**1,255,199**	**0**
CO_2e (tonnes/person/year)		**20.4**	**19.0**	**18.9**	**19.5**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**1,422,039**	**1,324,389**	**1,272,922**	**1,315,820**	**0**
CO_2e (tonnes/person/year)		**21.6**	**20.1**	**19.8**	**20.4**	**0.0**
Total Costs ($)[10]						
Energy		114,697,498	103,453,801	105,265,329	111,625,832	0
Water		809,049	820,815	727,907	771,331	0
VMT		138,635,152	100,107,838	115,472,905	146,974,022	0
Waste		11,929,660	11,755,656	11,816,702	11,357,117	0
	Total	**266,071,359**	**216,138,110**	**233,282,843**	**270,728,302**	**0**
Cost ($/person/year)		**4,041**	**3,278**	**3,633**	**4,200**	**0**

Regional Indicators Initiative Project: City of Eagan

Updated 2/18/13

Keyed Notes on Sources:

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2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMSP, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip Code: 55122. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

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c) Solid waste management costs: Source: “2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota,” Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

11. In September 2012, it was learned that Xcel Energy had instituted a new policy called the “15/15 Rule.” The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the electricial consumption data for Commercial and Industrial wind in the case of the City and Commercial and Industrial electricity and natural gas consumption. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of Commercial and Industrial consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Regional Indicators Initiative Project: City of Eden Prairie

Updated 1/31/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		62,610	62,536	60,797	61,151	69,183
Jobs		50,471	49,025	48,808	49,512	51,131
Households		24,166	24,300	23,930	24,068	26,825
Pop. Density (Res/sq. mi.)[2]	32.45	1,929	1,927	1,874	1,884	2,132
Energy[3, 11]						
Cooling Degree Days[4]		771	685	1,024	1,037	0
Electricity (MWh)	Res	223,410	216,487	225,223	224,221	0
	Com/Ind	587,855	565,746	560,461	557,776	0
	Total	**811,266**	**782,233**	**785,683**	**781,997**	**0**
Heating Degree Days[4]		8,428	7,941	7,337	7,510	0
Therms	Res	22,247,378	21,730,576	19,798,252	20,795,931	0
	Com/Ind	16,902,607	16,034,321	14,714,196	15,789,564	0
	Total	**39,149,985**	**37,764,897**	**34,512,448**	**36,585,495**	**0**
Total Energy (MMBtu)	Res	2,987,014	2,911,712	2,748,285	2,844,635	0
	Com/Ind	3,696,024	3,533,756	3,383,711	3,482,088	0
	Total	**6,683,037**	**6,445,468**	**6,131,996**	**6,326,723**	**0**
Res. Energy (kBtu/household/day)		**339**	**328**	**315**	**324**	**0**
Com/Ind Energy (kBtu/job/day)		**201**	**197**	**190**	**193**	**0**
Total Energy (kBtu/person/day)		**292**	**282**	**276**	**283**	**0**
Water[5]						
Precipitation (inches)		25.5	28.2	36.3	26.3	0.0
Potable Water (gallons)	Res	2,642,187,000	2,621,410,000	2,021,378,000	2,023,673,000	0
	Com/Ind	829,179,000	762,829,000	652,234,000	624,015,000	0
	Total	**3,471,366,000**	**3,384,239,000**	**2,673,612,000**	**2,647,688,000**	**0**
Res. Water (gal./household/day)		**300**	**296**	**231**	**230**	**0**
Com/Ind Water (gal./job/day)		**45**	**43**	**37**	**35**	**0**
Total Water (gal./person/day)		**152**	**148**	**120**	**119**	**0**
Travel[6]						
Vehicle Miles Traveled		**603,967,344**	**587,535,390**	**592,260,315**	**592,260,315**	**0**
Travel (VMT/person/day)		**26.4**	**25.7**	**26.7**	**26.5**	**0.0**
Waste (pounds)[7]						
Recycled		63,937,707	61,310,565	59,526,484	59,300,873	0
Incinerated		52,202,285	45,905,087	37,145,507	42,744,478	0
Landfill		39,287,012	74,189,852	80,831,667	36,183,684	0
	Total	**155,427,003**	**181,405,505**	**177,503,658**	**138,229,035**	**0**
Waste (pounds/person/day)		**6.8**	**7.9**	**8.0**	**6.2**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		687,232	637,898	587,761	615,384	0
VMT		287,186	274,967	272,795	272,440	0
Waste		18,637	19,672	16,802	12,783	0
	Total	**993,055**	**932,537**	**877,358**	**900,606**	**0**
CO_2e (tonnes/person/year)		**15.9**	**14.9**	**14.4**	**14.7**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**1,055,700**	**988,062**	**926,645**	**944,395**	**0**
CO_2e (tonnes/person/year)		**16.9**	**15.8**	**15.2**	**15.4**	**0.0**
Total Costs ($)[10]						
Energy		106,388,741	92,563,761	92,362,125	95,589,494	0
Water		775,209	805,964	639,778	660,771	0
VMT		109,785,428	77,133,152	91,553,054	116,528,812	0
Waste		12,850,713	14,606,857	14,170,279	11,404,033	0
	Total	**229,800,091**	**185,109,735**	**198,725,235**	**224,183,110**	**0**
Cost ($/person/year)		**3,670**	**2,960**	**3,269**	**3,666**	**0**

Regional Indicators Initiative Project: City of Eden Prairie

Updated 1/31/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KFCM, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55347. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

   a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

   b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

   c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

   d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

   a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

   b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

   c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

   d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

11. In September 2012, it was learned that Xcel Energy had instituted a new policy called the "15/15 Rule." The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the wind-based electricial consumption data for the Commercial and Industrial sector in the case of the City. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of Commercial and Industrial consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Regional Indicators Initiative Project: City of Minnetonka

Updated 2/12/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		51,756	51,451	49,734	50,046	53,696
Jobs		48,779	46,281	44,337	43,509	45,105
Households		22,256	22,215	21,901	22,133	23,915
Pop. Density (Res/sq. mi.)[2]	26.93	1,922	1,911	1,847	1,858	1,994
Energy[3, 11]						
Cooling Degree Days[4]		787	690	937	1,040	0
Electricity (MWh)	Res	209,969	202,889	211,196	211,637	0
	Com/Ind	468,963	457,308	455,479	449,336	0
	Total	**678,932**	**660,196**	**666,675**	**660,973**	**0**
Heating Degree Days[4]		8,331	7,896	7,355	7,466	0
Therms	Res	21,326,942	20,524,811	18,726,409	19,613,426	0
	Com/Ind	14,261,156	13,485,780	12,319,157	13,281,525	0
	Total	**35,588,098**	**34,010,591**	**31,045,566**	**32,894,951**	**0**
Total Energy (MMBtu)	Res	2,849,108	2,744,738	2,593,241	2,683,446	0
	Com/Ind	3,026,218	2,908,911	2,786,011	2,861,288	0
	Total	**5,875,326**	**5,653,649**	**5,379,252**	**5,544,734**	**0**
Res. Energy (kBtu/household/day)		**351**	**339**	**324**	**332**	**0**
Com/Ind Energy (kBtu/job/day)		**170**	**172**	**172**	**180**	**0**
Total Energy (kBtu/person/day)		**311**	**301**	**296**	**304**	**0**
Water[5]						
Precipitation (inches)		25.8	27.6	36.2	27.4	0.0
Potable Water (gallons)	Res	1,270,082,000	1,380,634,000	1,178,452,000	1,212,555,000	0
	Com/Ind	1,044,265,000	1,063,653,000	1,001,696,000	1,032,323,000	0
	Total	**2,314,347,000**	**2,444,287,000**	**2,180,148,000**	**2,244,878,000**	**0**
Res. Water (gal./household/day)		**156**	**170**	**147**	**150**	**0**
Com/Ind Water (gal./job/day)		**59**	**63**	**62**	**65**	**0**
Total Water (gal./person/day)		**123**	**130**	**120**	**123**	**0**
Travel[6]						
Vehicle Miles Traveled		**695,775,516**	**697,106,200**	**687,721,320**	**687,721,320**	**0**
Travel (VMT/person/day)		**36.8**	**37.1**	**37.9**	**37.6**	**0.0**
Waste (pounds)[7]						
Recycled		52,853,537	50,442,783	48,694,675	48,531,856	0
Incinerated		43,152,555	37,768,048	30,386,280	34,982,096	0
Landfill		32,476,259	61,039,115	66,123,034	29,612,739	0
	Total	**128,482,351**	**149,249,946**	**145,203,989**	**113,126,691**	**0**
Waste (pounds/person/day)		**6.8**	**7.9**	**8.0**	**6.2**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		590,029	550,951	507,970	530,445	0
VMT		330,841	326,246	316,764	316,352	0
Waste		15,406	16,185	13,745	10,461	0
	Total	**936,277**	**893,382**	**838,479**	**857,258**	**0**
CO_2e (tonnes/person/year)		**18.1**	**17.4**	**16.9**	**17.1**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**989,783**	**939,806**	**880,279**	**898,014**	**0**
CO_2e (tonnes/person/year)		**19.1**	**18.3**	**17.7**	**17.9**	**0.0**
Total Costs ($)[10]						
Energy		92,961,472	80,729,261	80,659,196	83,324,537	0
Water		516,829	582,112	521,695	560,243	0
VMT		126,473,747	91,517,889	106,309,650	135,311,022	0
Waste		10,622,928	12,017,677	11,591,767	9,333,065	0
	Total	**230,574,975**	**184,846,939**	**199,082,308**	**228,528,867**	**0**
Cost ($/person/year)		**4,455**	**3,593**	**4,003**	**4,566**	**0**

Regional Indicators Initiative Project: City of Minnetonka

Updated 2/12/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMNCHANH1, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55345. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

11. In September 2012, it was learned that Xcel Energy had instituted a new policy called the "15/15 Rule." The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the wind-based electricial consumption data for the Commercial and Industrial sector in the case of the City. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of Commercial and Industrial consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Regional Indicators Initiative Project: City of Woodbury

Updated 2/12/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		58,430	59,338	61,961	63,143	63,910
Jobs		19,684	18,936	19,424	20,393	20,522
Households		21,723	22,310	22,594	23,081	23,633
Pop. Density (Res/sq. mi.)[2]	34.73	1,682	1,709	1,784	1,818	1,840
Energy[3, 11]						
Cooling Degree Days[4]		681	618	816	836	0
Electricity (MWh)	Res	217,193	214,720	229,056	233,049	0
	Com/Ind	251,924	250,770	256,491	258,877	0
	Total	**469,117**	**465,490**	**485,547**	**491,926**	**0**
Heating Degree Days[4]		8,524	8,131	7,549	7,807	0
Therms	Res	21,120,922	21,033,355	19,199,501	20,883,085	0
	Com/Ind	7,905,335	7,525,271	6,918,528	7,513,145	0
	Total	**29,026,257**	**28,558,626**	**26,118,029**	**28,396,230**	**0**
Total Energy (MMBtu)	Res	2,853,156	2,835,959	2,701,488	2,883,473	0
	Com/Ind	1,650,098	1,608,153	1,567,001	1,634,603	0
	Total	**4,503,254**	**4,444,113**	**4,268,489**	**4,518,076**	**0**
Res. Energy (kBtu/household/day)		**360**	**348**	**328**	**342**	**0**
Com/Ind Energy (kBtu/job/day)		**230**	**233**	**221**	**220**	**0**
Total Energy (kBtu/person/day)		**211**	**205**	**189**	**196**	**0**
Water[5]						
Precipitation (inches)		27.7	29.5	39.7	30.1	0.0
Potable Water (gallons)	Res	2,220,252,000	2,214,391,000	1,959,753,000	2,032,821,000	0
	Com/Ind	531,281,703	509,984,000	450,193,000	486,707,000	0
	Total	**2,751,533,703**	**2,724,375,000**	**2,409,946,000**	**2,519,528,000**	**0**
Res. Water (gal./household/day)		**280**	**272**	**238**	**241**	**0**
Com/Ind Water (gal./job/day)		**74**	**74**	**63**	**65**	**0**
Total Water (gal./person/day)		**129**	**126**	**107**	**109**	**0**
Travel[6]						
Vehicle Miles Traveled		**604,125,822**	**621,193,500**	**548,644,640**	**548,644,640**	**0**
Travel (VMT/person/day)		**28.3**	**28.7**	**24.3**	**23.8**	**0.0**
Waste (pounds)[7]						
Recycled		44,347,838	40,918,993	46,854,793	47,322,453	0
Incinerated		32,603,894	34,730,652	35,226,307	39,927,086	0
Landfill		15,565,675	10,684,081	11,392,231	9,917,563	0
	Total	**92,517,408**	**86,333,726**	**93,473,332**	**97,167,102**	**0**
Waste (pounds/person/day)		**4.3**	**4.0**	**4.1**	**4.2**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		432,133	412,727	389,292	416,404	0
VMT		287,262	290,719	252,706	252,377	0
Waste		9,716	8,885	8,462	9,851	0
	Total	**729,111**	**712,331**	**650,460**	**678,631**	**0**
CO_2e (tonnes/person/year)		**12.5**	**12.0**	**10.5**	**10.7**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**781,998**	**758,306**	**691,649**	**718,746**	**0**
CO_2e (tonnes/person/year)		**13.4**	**12.8**	**11.2**	**11.4**	**0.0**
Total Costs ($)[10]						
Energy		71,964,959	63,828,121	65,306,458	69,088,790	0
Water		622,017	677,766	578,006	643,569	0
VMT		109,814,235	81,551,875	84,810,835	107,947,311	0
Waste		7,750,918	7,291,642	7,890,896	8,235,052	0
	Total	**190,152,129**	**153,349,404**	**158,586,196**	**185,914,721**	**0**
Cost ($/person/year)		**3,254**	**2,584**	**2,559**	**2,944**	**0**

Regional Indicators Initiative Project: City of Woodbury

Updated 2/12/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMNWOODB4, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Average of Zip codes: 55125 and 55129. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

11. In September 2012, it was learned that Xcel Energy had instituted a new policy called the "15/15 Rule." The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the wind-based electricial consumption data for the Residential and the Commercial and Industrial sector in the case of the City. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of electricial consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Regional Indicators Initiative Project: City of Lake Elmo

Updated 2/11/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		8,389	8,326	8,069	8,063	8,529
Jobs		1,886	1,777	1,950	2,015	1,923
Households		2,794	2,814	2,779	2,703	2,984
Pop. Density (Res/sq. mi.)[2]	22.25	377	374	363	362	383
Energy[3]						
Cooling Degree Days[4]		653	544	766	777	0
Electricity (MWh)	Res	35,111	35,025	36,538	37,550	0
	Com/Ind	17,646	16,548	16,809	17,385	0
	Total	**52,757**	**51,573**	**53,346**	**54,935**	**0**
Heating Degree Days[4]		8,584	8,384	7,588	8,073	0
Therms	Res	3,459,037	3,314,405	2,959,782	3,269,926	0
	Com/Ind	589,978	896,360	781,188	867,888	0
	Total	**4,049,015**	**4,210,765**	**3,740,970**	**4,137,814**	**0**
Total Energy (MMBtu)	Res	465,701	450,947	420,644	455,115	0
	Com/Ind	119,206	146,097	135,469	146,105	0
	Total	**584,907**	**597,044**	**556,114**	**601,220**	**0**
Res. Energy (kBtu/household/day)		**457**	**439**	**415**	**461**	**0**
Com/Ind Energy (kBtu/job/day)		**173**	**225**	**190**	**199**	**0**
Total Energy (kBtu/person/day)		**191**	**196**	**189**	**204**	**0**
Water[5]						
Precipitation (inches)		28.8	28.7	38.5	32.7	0.0
Potable Water (gallons)	Res	109,571,442	103,013,898	80,722,471	92,805,398	0
	Com/Ind	19,266,358	27,436,902	22,242,529	19,357,202	0
	Total	**128,837,800**	**130,450,800**	**102,965,000**	**112,162,600**	**0**
Res. Water (gal./household/day)		**107**	**100**	**80**	**94**	**0**
Com/Ind Water (gal./job/day)		**28**	**42**	**31**	**26**	**0**
Total Water (gal./person/day)		**42**	**43**	**35**	**38**	**0**
Travel[6]						
Vehicle Miles Traveled		**144,007,824**	**144,066,960**	**146,910,675**	**146,910,675**	**0**
Travel (VMT/person/day)		**47.0**	**47.4**	**49.9**	**49.9**	**0.0**
Waste (pounds)[7]						
Recycled		6,367,175	5,741,541	6,101,763	6,042,807	0
Incinerated		4,681,055	4,873,225	4,587,419	5,098,461	0
Landfill		2,234,819	1,499,135	1,483,577	1,266,416	0
	Total	**13,283,049**	**12,113,900**	**12,172,759**	**12,407,683**	**0**
Waste (pounds/person/day)		**4.3**	**4.0**	**4.1**	**4.2**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		52,817	51,357	47,435	51,690	0
VMT		68,476	67,423	67,667	67,579	0
Waste		1,395	1,247	1,102	1,258	0
	Total	**122,687**	**120,027**	**116,204**	**120,527**	**0**
CO_2e (tonnes/person/year)		**14.6**	**14.4**	**14.4**	**14.9**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**127,154**	**124,092**	**120,036**	**124,327**	**0**
CO_2e (tonnes/person/year)		**15.2**	**14.9**	**14.9**	**15.4**	**0.0**
Total Costs ($)[10]						
Energy		9,372,830	8,368,962	8,344,610	8,976,372	0
Water		28,771	31,067	24,639	27,992	0
VMT		26,176,847	18,913,480	22,709,813	28,905,071	0
Waste		1,112,827	1,023,125	1,027,608	1,051,569	0
	Total	**36,691,275**	**28,336,635**	**32,106,670**	**38,961,004**	**0**
Cost ($/person/year)		**4,374**	**3,403**	**3,979**	**4,832**	**0**

Regional Indicators Initiative Project: City of Lake Elmo

Updated 2/11/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: K21D, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip Code 55042, http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

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b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

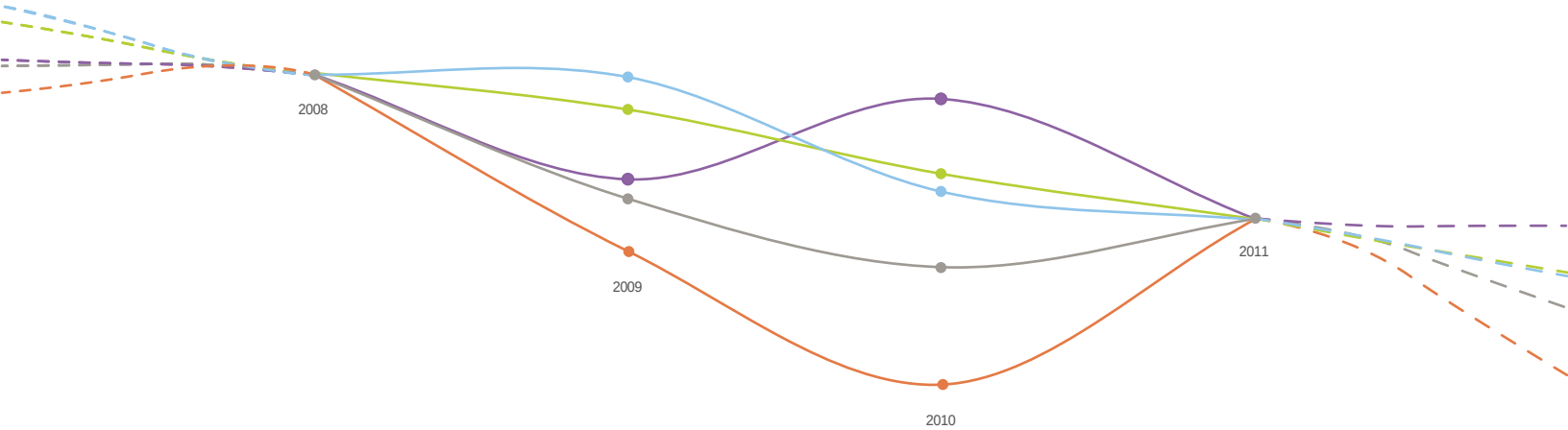
c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

REGIONAL INDICATORS INITIATIVE REPORT

Measuring City-Wide Performance

An inventory of Energy, Potable Water, Travel, Waste, Greenhouse Gas Emissions and Costs for Twenty Minnesota Cities from 2008-2011



Prepared by:
LHB Inc. with ORANGE Environmental, LLC
February 2013

Acknowledgements

Completion of this report and the accompanying spreadsheets required the gathering of over 4,200 data points from over 80 different sources to populate the 480 tables and charts contained in over 360 spreadsheets that included over 11,300 calculations. In addition to J. Michael Orange of ORANGE Environmental, LLC, who had primary responsibility for the reports, the following people helped make this possible:

Cities:
Steve Gatlin and Matt Fulton, Matt Stemwedel, City of Coon Rapids
DyAnne Andybur, Joe Miller, Tari Rayala, City of Duluth
Juli Seydell Johnson and Cherryl Mesko, City of Eagan
Jackie Schwerm, City of Eden Prairie
Ross Bintner, City of Edina
Bart Fischer, City of Falcon Heights
Steve Stadler, City of Hopkins
Dean Zuleger, City of Lake Elmo
Shann Finwall, City of Maplewood
Brendon Slotterback, City of Minneapolis
Julie Wischnack and Jeff Thomson, City of Minnetonka
Jennifer Hassebroek, City of Oakdale
Steve Devich, Pam Dmytrenko, and Robert Hintgen, City of Richfield
Phil Wheeler, City of Rochester
Anne Hunt and Jim Giebel, City of St. Paul
Jessica Schaum, City of Shoreview
Mark Casey, Jay Hartman, City of Saint Anthony
Kathy Larson, Jim Vaughan City of St. Louis Park
Ellen Richter, City of White Bear Lake
Jennifer McLoughlin and Dan Hansen, City of Woodbury

State and local government:
Peter Ciborowski, Sig Scheurle, Chun Yi Wu, and Phil Muessig, Minnesota Pollution Control Agency
Gene Hicks, Minnesota Department of Transportation
Larry Koshire, Chet Welle, and Craig Diekvoss, Rochester Public Utility
Lorilee Blais, Western Lake Superior Sanitation District
Tony Hainault, Hennepin County
Linda Henning, Mark Filipi, and Russell Owen, Metropolitan Council of the Twin Cities
Brian A. Grzanek, Olmsted County Waste to Energy Facility
Eric Schlacks and Jerry Pelofske, Duluth Comfort Systems and the Duluth Steam Plant
Roy Fuhrmann, Metropolitan Airports Commission
Kurt G. Claussen, Rochester International Airport
Jim Sharrow, Duluth Port Authority
Abby Finis, Minnesota Department of Commerce

Private Utilities:
Jennifer Abbott, R. Scott Getty, Bob Torres, Michelle Swanson, Michael Anderson, Colette Jurek, Xcel Energy
Timothy Doherty, Dakota Electric Association
Mark Strohfus, Great River Energy
William Traylor, Steven Guhanik, Thomas Dolan, Luke Litteken, and Robin Prow, CenterPoint Energy
Jason Risdall, Minnesota Power
Jeff Larson, Minnesota Energy Resources
Timothy Johnston, NRG Energy
Tom Keller, Connexus
Suzanne Hansen, Macalester College

Other:
Rick Carter, Elizabeth Turner, Michael Petesch, Becky Alexander, and Molly Eagen, LHB Inc.
Amy Malick and Alex Ramel, ICLEI Local Governments for Sustainability
Shane Stennes, University of Minnesota
Nina Axelson, St. Paul District Energy
Dan Voss, Anoka Municipal Utility

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Participating Cities

Coon Rapids	Minnetonka
Duluth	Oakdale
Eagan	Richfield
Eden Prairie	Rochester
Edina	Shoreview
Falcon Heights	St. Anthony
Hopkins	St. Louis Park
Lake Elmo	St. Paul
Maplewood	White Bear Lake
Minneapolis	Woodbury

Executive Summary

Project Overview: The Regional Indicators Initiative (Initiative) measures annual performance metrics for approximately 20 Minnesota cities that are committed to increasing their overall efficiency and level of sustainability. The Initiative addresses two crucial components of planning for sustainability—carbon baseline assessments and annual indicators. The project collects the following four primary indicators for the four study years of 2008 to 2011generated through the activities of the people who live, work, learn, travel, visit, and recreate within each city's geographical boundaries:

- Energy: Total energy consumed for electricity production and the stationary combustion of natural gas and other fuels (coal, fuel oil, diesel, gasoline, propane) primarily for space heating.
- Water: Potable water consumed.
- Waste: Municipal solid waste managed via recycling, composting, combustion, and landfilling.
- Travel: On-road vehicle miles traveled.

Most of the indicators are expressed not only as annual totals, but are also broken down into residential and commercial/industrial uses, and are "normalized" in terms of per-capita, per-household, and per-job calculations that enable them to be compared over time with the data from peer cities.

The carbon baseline assessment (Assessment) prepared for each participating city measures the greenhouse gas (GHG) emissions associated with each of the above indicators as well as each city's share of airport-related GHG emissions, emissions associated with wastewater treatment, the associated energy consumption, and cost estimates (except airport share). The Initiative correlates these metrics with strategies to achieve savings in energy, water, vehicle miles traveled, and waste, and to reduce GHG emissions. Starting in Section 2 of this report, the focus is on the carbon baseline assessment portion of the Initiative. A description of the other aspects of this project can be found on the website that has been developed to communicate the findings of the Initiative, along with other written reports.

Purpose: As described by David Osborne and Ted Gaebler in their book, Reinventing Government (1992), "If you don't measure results, you can't tell success from failure. If you can't see success, you can't reward it. If you can't see failure, you can't correct it." Baseline assessments and indicators are useful. Planners need them, elected officials want them, and the future may see their development as a basic requirement of State and federal funding.

Measuring the energy aspects of human activities and the associated GHG emissions offers a unique way to compare the effectiveness of various energy and sustainability best management practices. Greenhouse gas emissions and energy serve as common denominators for the comparison of kilowatts of electricity, natural gas therms, and gallons of liquid fuels consumed; as well as vehicle miles traveled, tons of waste processed, and gallons of potable water treated and distributed.

Regional Indicators Initiative

The Initiative supports planning for sustainability by defining a baseline, tracking a trajectory, and measuring outcomes of sustainable strategies at a citywide scale. By producing annually comparable indicators for twenty Minnesota cities – including 27% of the state's population – the success of the State's GreenSteps Cities Program can be measured. Additionally, the Initiative will indicate progress toward meeting the State's energy efficiency and GHG reduction goals, as defined by the Minnesota Next Generation Energy Act of 2007.

Background: The Initiative is an outgrowth of the Minnesota Pollution Control Agency's GreenStep Cities Program. To achieve GreenStep certification, a city must meet minimum requirements and choose from 28 best management practices designed to improve the city's sustainability. While the program tracks which practices cities have adopted, it does not currently have a method of tracking how effective these strategies have been at "moving the needle" towards sustainability.

The project began with a pilot study that proved that the above four indicators of city sustainability can be measured, gathered, and analyzed annually in a reasonable period of time and at a relatively low cost. The Initiative was launched to continue this study at a larger scale, opening up the possibility to compare data across a range of Minnesota cities.

Partners: The Initiative is a collaborative project managed by LHB and ULI Minnesota. The carbon baseline portion of the Initiative is primarily the work of ORANGE Environmental, LLC. Funding for the Initiative comes from several sources—grant funds from the Minnesota Department of Commerce and the Minnesota Pollution Control Agency; pro bono services from LHB and ULI Minnesota; and a $2,500 fee paid by each participating city.

Participating cities: To date, the 20 following cities are participating in the Initiative (listed in order of population density within each category):

- **Central/stand-alone cities:** Minneapolis, St. Paul, Rochester, Duluth
- **Inner-ring suburbs:** Richfield, Hopkins, St. Louis Park, St. Anthony, Edina, Falcon Heights, Maplewood
- **Outer-ring suburbs:** White Bear Lake, Coon Rapids, Oakdale, Shoreview, Eagan, Eden Prairie, Minnetonka, Woodbury, Lake Elmo

The ICLEI Community Protocol: This report focuses on the GHG Assessment portion of the Initiative. The has been prepared consistent with the most applicable and current guides available; namely, the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions*, October 2012 (ICLEI Community Protocol), and the *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories*, Version 1.1, May 2010 (Governmental Operations Protocol). Both of these documents were prepared by ICLEI – Local Governments for Sustainability (ICLEI), a United Nation's agency with a long and highly respected reputation for the development of such GHG assessment protocols.

The ICLEI Community Protocol addresses the important questions of what to measure (called Activities and Sources) and how to measure it. To address small Sources and Activities and allow their exclusion, it sets a minimum size threshold, called *de minimis*. The Protocol also

describes methods to avoid double counting emissions for facilities that are shared among multiple communities.

Five Basic Emissions Generating Activities and Sources: Consistent with the ICLEI Community Protocol, the Assessments include data regarding the following required Activities and Sources:

- Use of purchased electricity
- Use of fuel in stationary applications
- Use of on-road motor vehicles
- Use of energy in the production and distribution of potable water and wastewater treatment
- Solid waste disposal

These Activities and Sources are required because 1) cities are the level of government that has the greatest authority and responsibility over the emissions-generating activity; 2) the data needed to estimate emissions are reasonably available; 3) the emissions associated with the Activity tend to be significant in magnitude; and 4) the Activity is important and common across U.S. communities.

Greenhouse Gas Terms: The greenhouse gases of carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4) are aggregated and reported as carbon dioxide equivalents (CO_2e), which is a commonly used unit that combines greenhouse gases of differing impact on the Earth's climate into one weighted unit. Greenhouse gas emissions are referred to herein as carbon dioxide equivalents (CO_2e) or used interchangeably as simply greenhouse gases (GHG).

Spreadsheets: The Assessment for each individual city includes 17 or more spreadsheets that disclose the data and data sources, conversion factors, and trend analyses particular to each city. The Table of Contents provides the list of spreadsheets and Section 4 of this report describes each one.

1.0. Introduction

1.1. Project Overview: The Regional Indicators Initiative (Initiative) measures annual performance metrics for approximately 20 Minnesota cities that are committed to increasing their overall efficiency and level of sustainability. The Initiative addresses two crucial components of planning for sustainability—carbon baseline assessments and annual indicators. The project collects the following four primary indicators for the four study years of 2008 to 2011generated through the activities of the people who live, work, learn, travel, visit, and recreate within each city's geographical boundaries:

- Energy: Total energy consumed for electricity production and the stationary combustion of natural gas and other fuels (coal, fuel oil, diesel, gasoline, propane) primarily for space heating.
- Water: Potable water consumed.
- Waste: Municipal solid waste managed via recycling, composting, combustion, and landfilling.
- Travel: On-road vehicle miles traveled.

Most of the indicators are expressed not only as annual totals, but are also broken down into residential and commercial/industrial uses, and are "normalized" in terms of per-capita, per-household, and per-job calculations that enable them to be compared over time with the data from peer cities.

The carbon baseline assessment (Assessment) prepared for each participating city measures the greenhouse gas (GHG) emissions associated with each of the above indicators as well as each city's share of airport-related GHG emissions, emissions associated with wastewater treatment, the associated energy consumption, and cost estimates (except airport share). The Initiative correlates these metrics with strategies to achieve savings in energy, water, vehicle miles traveled, and waste, and to reduce GHG emissions.

Starting at Section 2.0, the remaining sections of this report. focus on the carbon baseline assessment portion of the Initiative. A description of the other aspects of this project can be found on the website that has been developed to communicate the findings of the Initiative, along with other written reports.

1.2. Purpose: As described by David Osborne and Ted Gaebler in their book, *Reinventing Government* (1992), "If you don't measure results, you can't tell success from failure. If you can't see success, you can't reward it. If you can't see failure, you can't correct it." Baseline assessments and indicators are useful. Planners need them, elected officials want them, and the future may see their development as a basic requirement of State and federal funding.

Measuring the energy aspects of human activities and the associated greenhouse gas emissions offers a unique way to compare the effectiveness of various energy and sustainability best management practices. Greenhouse gas emissions and

energy (expressed as kBtus) serve as common denominators for the comparison of kilowatts of electricity, natural gas therms, and gallons of liquid fuels consumed; as well as vehicle miles traveled, tons of waste processed, and gallons of potable water distributed.

Recording these performance metrics is essential to promoting efficiency and sustainable change. The Initiative supports planning for sustainability by defining a baseline, tracking a trajectory, and measuring outcomes of sustainable strategies at a citywide scale. By producing annually comparable indicators for twenty Minnesota cities – including 27% of the state's population – the success of the State's GreenSteps Cities Program can be measured. Additionally, the Initiative will indicate progress toward meeting the State's energy efficiency and GHG reduction goals, as defined by the Minnesota Next Generation Energy Act of 2007.[1]

Along with providing statewide benefits, the Initiative is valuable to participating cities. Taking inventory of the resources consumed at the community level will:

- Highlight opportunities to save resources and money.
- Provide a baseline for estimating the effectiveness of sustainability measures.
- Enable comparison with future inventories and peer cities.
- Inform subsequent analyses, plans, and policy decisions by the cities and others.
- Improve the cities' competitiveness for federal and state funding opportunities that are targeted to cities that have taken steps to measure and improve their energy efficiency and reduce their carbon footprints.
- Assist in promoting public understanding of the cities' effects on climate change.
- Serve as a model for other regions.

1.3. Background: The Initiative is an outgrowth of the Minnesota Pollution Control Agency's GreenStep Cities Program. To achieve GreenStep certification, a city must meet minimum requirements and choose from 28 best management practices designed to improve the city's sustainability. While the program tracks which practices cities have adopted, it does not currently have a method of tracking how effective these strategies have been at "moving the needle" towards sustainability.

[1] In 2007, Minnesota approved one of the nation's most environmentally progressive energy laws. The Next Generation Energy Act required electric utilities to produce at least 25% of their total energy from new, renewable sources—wind, solar, hydro, biomass—by the year 2025. The law required Xcel Energy, the state's largest utility, to reach 30% by 2020. Currently, about 5% of the state's power comes from renewable sources. The act established nationally aggressive statewide greenhouse gas reduction goals (using 2005 as a baseline) of 15% by 2015, 30% by 2025, and 80% by 2050.

The desire to measure the impacts of sustainable practices led to a collaborative project, managed by LHB for ULI Minnesota.[2] This team developed a pilot to determine what citywide data can be collected annually to effectively measure progress towards sustainability. Three cities – St. Louis Park, Falcon Heights, and Edina – volunteered to release their performance data for the period of 2008-2010. The pilot study proved that the following four indicators of city sustainability can be measured, gathered, and analyzed annually in a reasonable period of time and at a relatively low cost: energy, water, vehicle miles travelled, and solid waste. The Regional Indicators Initiative was developed to continue this study at a larger scale, opening up the possibility to compare data across a range of Minnesota cities.

1.4. **Partners:** The Initiative is a collaborative project managed by LHB and ULI Minnesota. The carbon baseline portion of Initiative is primarily the work of ORANGE Environmental, LLC. Funding for the Initiative comes from several sources—grant funds from the Minnesota Department of Commerce and the Minnesota Pollution Control Agency; pro bono services from LHB and ULI Minnesota; and a $2,500 fee paid by each participating city.

1.5. **Participating cities:** To date, the 20 following cities are participating in the Initiative (listed in order of population density within each category):

- **Central/stand-alone cities:** Minneapolis, St. Paul, Rochester, Duluth
- **Inner-ring suburbs:** Richfield, Hopkins, St. Louis Park, St. Anthony, Edina, Falcon Heights, Maplewood
- **Outer-ring suburbs:** White Bear Lake, Coon Rapids, Oakdale, Shoreview, Eagan, Eden Prairie, Minnetonka, Woodbury, Lake Elmo

2.0. **Greenhouse Gas Assessment:** The remainder of this report focuses on the GHG Assessment portion of the Initiative. The carbon baseline assessments prepared for each participating city have been prepared consistent with the most applicable and current guides available; namely, the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions*, October 2012 (ICLEI Community Protocol), and the *Local Government Operations Protocol for the Quantification and Reporting of Greenhouse Gas Emissions Inventories*, Version 1.1, May 2010 (Governmental

[2] From the LHB website "LHB is a multi-disciplinary engineering and architectural firm with 200 employees and offices throughout the Midwest. Founded in 1966, we serve a broad range of market sectors including Public Works and Structures, Pipeline, Industrial, Housing, Healthcare, Government, Education, and Commercial. LHB is dedicated to being environmentally responsible, reducing long term operating costs, and improving the quality of life for our clients."

From the ULI Minnesota website: "ULI Minnesota is a District Council of the Urban Land Institute, a 501(c) (3) nonprofit research and education organization supported by its members and sponsors. Founded in 1936, ULI has more than 30,000 members worldwide representing the full spectrum of land use and real estate development disciplines, including developers, builders, investors, architects, public officials, planners, real estate brokers, attorneys, engineers, financiers, academics and students. As the preeminent, multidisciplinary real estate forum, ULI facilitates the open exchange of ideas, information and experience among local, national and international industry leaders and policy makers dedicated to creating better places."

Operations Protocol). Both of these documents were prepared by ICLEI – Local Governments for Sustainability (ICLEI), a United Nation's agency with a long and highly respected reputation for the development of such assessment protocols.[3]

The ICLEI Community Protocol addresses the important questions of what to measure and how to measure it. These are no small matters. It has taken more than two decades of international collaboration to derive the best methods. The Protocol begins by clarifying the terms *Sources* and A*ctivities* and then divides emission sources and activities into two main categories, *Required* and *Optional*. To address small sources and allow their exclusion, the Protocol sets a minimum size threshold, called *de minimis* sources and activities. The ICLEI Community Protocol also describes methods to avoid double-counting emissions for facilities that are shared among multiple communities. Some carbon baseline assessments also include estimates of what is called *upstream* emissions or *life-cycle* emissions, which account for the embodied energy in materials. However, this potential source of emissions analysis has yet to be widely accepted for inclusion in GHG assessments because current methodologies result in questions regarding the double counting of emissions. Since it is not a Required Source or Activity according to the ICLEI Community Protocol, it is not included in the Initiative's assessments.

2.1. Sources and Activities: The following are the definitions of Sources and Activities from the ICLEI Community Protocol (p. 11): A Source is "Any physical process inside the jurisdictional boundary that releases GHG emissions into the atmosphere (e.g., combustion of gasoline in transportation; combustion of natural gas in electricity generation; methane emissions from a landfill)." An Activity is "The use of energy, materials, and/or services by members of the community that result in the creation of GHG emissions either directly (e.g., use of household furnaces and vehicles with internal combustion engines) or indirectly (e.g., use of electricity created through combustion of fossil fuels at a power plant, consumption of goods and services whose production, transport and/or disposal resulted in creation of GHG emissions)." While Sources are bound by the geography (the community boundary), Activities are not.

2.2. Required and Optional Emission Sources and Activities: The ICLEI Community Protocol divides the realm of possible emission Sources and Activities into two major groups: Five Basic Emissions Generating Activities (Required Activities), and Additional Community Emission Sources and Activities (Optional Sources and Activities). Section 4 below describes the

[3] ICLEI, along with its several international partner agencies, is considered the international leader in carbon baseline assessment protocols for local governments. According to its website, ICLEI – Local Governments for Sustainability is "an international association of almost 1,000 local governments worldwide and more than 250 in the US that have made commitments to sustainable development and climate protection. ICLEI, founded in 1990 as the International Council on Local Environmental Initiatives and now known officially as ICLEI – Local Governments for Sustainability, strives to advance solutions to global climate change through cumulative local action. ICLEI provides technical and policy assistance, software training, climate expertise, information services and peer networking to help members build capacity, share knowledge and implement sustainable development and climate protection at the local level."

various spreadsheets in the Assessments prepared for each city and identifies whether each emission category is a Required or an Optional Activity or Source.

2.2.1. Five Basic Emissions Generating Activities (Required Activities): To be consistent with the ICLEI Community Protocol, the following activities must be included in a communitywide assessment (Required Activities). These Activities are required at the city scale because 1) cities are the level of government with the greatest authority and responsibility over the emissions-generating activity;[4] 2) the data needed to estimate emissions are reasonably available; 3) the emissions associated with the Activity tend to be significant in magnitude; and 4) the Activity is important and common across U.S. communities. The following descriptions are adapted from the ICLEI Community Protocol:

- **Use of purchased electricity:** The Protocol requires the inclusion of power plant emissions associated with generating electricity used within the jurisdictional boundary of the community regardless of the location of the electricity generation facility. Local governments can often influence electricity use in local buildings through local building codes, financial incentives, minimum regulatory requirements, technical assistance, and other programs. The Assessments include all emissions from the consumption of electricity.
- **Use of fuel in stationary applications:** Each Assessment must include the combustion emissions associated with fuels used in stationary applications (e.g., natural gas and fuel oil used in furnaces and boilers) within the jurisdictional boundary of the community. Local governments can often influence use of fuels in stationary combustion applications through the same tools listed above for purchased electricity. All Assessments include emissions associated with natural gas combustion and major fuel oil and coal users.
- **Use of on-road motor vehicles:** Transportation fuels used by on-road motor vehicles comprise a major source of emissions. Local

[4] Numerous best practices are available to help cities both mitigate and adapt to climate change and conserve energy, for example:

- Adopt model sustainability plans, climate action plans, and peak oil action plans.
- Adopt model ordinances.
- Implement new urbanism, smart growth and smart shrinkage practices; implement transit-oriented development, complete streets programs, and travel demand management plans; and encourage traditional neighborhood design, mixed-use districts, and projects that meet the criteria of LEED for Neighborhood Development.
- Require high-performance building design, benchmarking, and building recommissioning, especially for public buildings.
- Encourage green power including renewable fuels, co-generation, district energy, and distributed generation.
- Green fleets.
- Require high-performance urban infrastructure.
- Foster sustainable urban forests and biodiversity corridors.

governments can influence transportation emissions by developing bicycle, pedestrian and public transit infrastructure, and by focusing new development along transit corridors, among other strategies. The Assessments include emissions associated with vehicle miles traveled (VMT).

- **Use of energy in the production and distribution of potable water and wastewater treatment:** The Protocol requires the collection of energy-related emissions associated with wastewater treatment and the production and delivery of potable water, regardless of the location of the water delivery and treatment infrastructure. Local governments can influence community water use through local building codes, promoting or providing incentives to foster conservation and efficiency, and through other programs and services.
  - **Potable water:** The Assessments include the amounts of potable water consumed within each city. While the electricity and natural gas consumed within each city to produce and distribute potable water are included in the citywide electricity and natural gas totals, they are not disaggregated for this analysis. A sampling analysis concluded that the emissions associated with these activities equal less than one percent of a community's total emissions, a level far below the *de minimis* threshold.
  - **Wastewater treatment:** The Assessments include each city's share of emissions associated with the treatment of its wastewater.
- **Solid waste disposal:** Although this Activity usually comprises a very small portion of a community's total emissions (generally less than 3%), the Protocol requires its inclusion because local governments can influence the amount of solid waste generated and sent to various disposal methods through their administration of garbage, recycling, and composting services. The Assessments account for end-of-life emissions (e.g., projected future methane emissions from landfills) associated with the disposal of waste generated by members of the community during the analysis year, regardless of disposal location or method (e.g., landfill, combustion, or biogenic treatment).

2.2.2. Additional Community Emission Sources and Activities (Optional Sources and Activities): The ICLEI Community Protocol recommends the inclusion of numerous optional emission sources and activities (Optional Sources and Activities) such as those associated with local rail travel, marine activities, and airplane travel. Expanding GHG inventory reporting to include Optional emission Sources and Activities is purely voluntary and is not required for a GHG emissions inventory report to be considered compliant with the Community Protocol. However, by

including a broader set of emission-generating Activities and Sources in their reporting, a local government can provide a more complete picture of how the community contributes to GHG emissions.

The Assessments include one such Optional Activity—airplane travel—because for the 18 participating cities in the Twin Cities area, each city's share of the emissions from the Minneapolis Saint Paul International Airport exceeds the 5% *de minimis* threshold described below. To be consistent for all participating cities, the Assessments for the cities of Rochester and Duluth also include their shares of airport emissions (Rochester International and Duluth International airports), and the Assessments for the host cities of the Reliever Airports include these Sources (St. Paul for the St. Paul Downtown Airport, Lake Elmo for the Lake Elmo Airport, and Eden Prairie for the Flying Cloud Airport).

The Initiative does not include the optional activities associated with upstream emissions or embodied energy in materials, due to the previously mentioned risk of double counting.

2.3. De Minimis Emission Threshold: The ICLEI Community Protocol defines *de minimis* emissions as "a quantity of GHG emissions from any combination of sources and/or gases, which, when summed, equal less than five percent (5%) of community GHG emissions that are required to be included in the community GHG emissions report. These emission sources must be identified and described in the community GHG emissions report, but need not be quantified." This Assessment excludes several de minimis emission sources that are sometimes included in other assessments, such as emissions associated with marine and railroad operations, refrigerant and fire suppressants leakage, agricultural and livestock operations, and minor combustors of liquid fuels (e.g. fuel oil, propane, and diesel-powered heaters).[5, 6] Other assessments for Minnesota cities have shown that these excluded emission sources are not likely to exceed the *de minimis* threshold. Other assessments also estimate emissions associated with large sources of CO_2 such as the local production of concrete and fugitive emissions (primarily methane) associated with agricultural activities. There are no other known large sources of GHG emissions within the Project cities that are not already included.

2.4. Shared Sources and the Risk of Double Counting: Normally, all of the major emission Sources located within a community should be included in a GHG

[5] The Assessment does include major fuel oil users and portside emissions from the Port of Duluth. The GHG assessment prepared for Duluth in 2008 estimated the GHG emissions for rail and marine operations and both were de minimis sources: Rail (1% of total), marine (0.3% of total). Source: *City of Duluth Emissions Greenhouse Gas Inventory and Forecast 2008*, by Wenck Associates, Inc, March 2011.

[6] The Minnesota Pollution Control Agency provided 2001 data for liquid fuel and waste wood combustion for the 17 cities in the Initiative for which the MPCA had data. Only the data for Duluth was included in the Assessments. The GHG emissions associated with consumption levels for the other 16 cities were a fraction of 1% and therefore *de minimis* amounts.

assessment. However, certain Sources serve more than one community; for example, wastewater treatment plants, power plants, garbage processing plants, landfills, seaports, and airports. For these kinds of Sources, the Protocol provides methodologies to allocate the emissions among each community that uses the facility and to avoid double counting emissions.

This issue can be confusing. At its heart is geography. For emissions from shared facilities that are included in an assessment, the location of the facility is not a factor. For example, the assessment will include the emissions on a per-MWh-consumed basis from the electricity utility regardless of the location of the power plant. The same is true for emissions on a per-ton-incinerated basis for garbage incineration, a per-gallon-treated basis for wastewater treatment, and the prorated share of airport-based emissions (which are based on each city's share of residential on-road trips to the regional airport). However, geography does come into play for the host city of a shared facility and, therefore, the issue of double counting becomes a factor. Consistent with the ICLEI Community Protocol, the Assessments avoid double-counting emissions for the following "shared" Sources:

- **Power plants:** Because the GHG emissions associated with electricity consumption within Minneapolis already account for the natural gas consumption required to generate the city's share of electricity production at Xcel Energy's Riverside Generating Station, which is located within the city, total natural gas consumption at the plant is subtracted from the Minneapolis citywide total.[7] The same is true for Rochester Public Utility's two natural gas-fired power plants that are located within the City of Rochester (Cascade Creek and Silver Lake), and Minnesota Power's Hibbard steam and power plant located in Duluth.
- **Processing municipal solid waste:** The ICLEI Protocol describes methods to account for the GHG emission associated with processing municipal solid waste (MSW) in waste-to-energy garbage incinerators including the Hennepin Energy Resources Center (HERC) located in downtown Minneapolis and the Olmsted County Waste-to-Energy Facility (OWEF) in Rochester. Section 4.12. provides detail regarding this matter.
- **Wastewater treatment plants:** The Assessments account for each city's share of emissions associated with wastewater treatment. The Metropolitan Wastewater Treatment Plant (Metro Plant), located in St. Paul, treats sanitary sewer discharges from communities throughout the region. Since it is a "shared" facility, the natural gas and electricity consumed by the Metro Plant are subtracted from the citywide totals for St. Paul to avoid double counting. The same is true in the cases of Rochester and Duluth, which also host wastewater treatment plants.
- **Landfills:** Since the ICLEI Community Protocol classifies landfills as Required Sources, the Assessments account for the GHG emissions

[7] Although Xcel Energy's High Bridge Generating Station is located within the City of St. Paul, Xcel staff stated that the citywide natural gas consumption data the utility provided for the city does not include gas consumption at the High Bridge plant. Therefore, there is no double counting.

associated with the landfilling of municipal solid waste (MSW) on a per-ton basis for each city.[8]

- **District energy facilities:** There are 9 district energy systems that serve four of the participating cities in the Initiative. None of these systems serve multiple cities so they are not "shared" facilities. The Assessments account for all of the fossil fuels consumed by these facilities (natural gas, electricity, fuel oil, diesel, gasoline, and coal). Consistent with the ICLEI Community Protocol, the city totals do not count GHG emissions associated with biomass fuels (i.e. the waste wood burned by St. Paul District Energy, the University of Minnesota's Southeast Steam Plant, and plants in Duluth) because combustion only releases carbon that was sequestered during the growth of the plant matter so the net GHG effect is zero.
- **Airport share:** The Minneapolis St. Paul International (MSP) Airport serves an area far larger than the Twin Cities. Through the GHG inventory completed for the airport and trip share analyses prepared by the Metropolitan Council, the GHG emissions associated with aircraft operations and ground operations at the MSP Airport can be attributed to the cities in the region, as described in more detail below in Section 4.13.

3.0. Purpose, Definitions, and Data Sources for the Greenhouse Gas Assessment

3.1. Overall Purpose: The goal of the carbon baseline Assessment prepared for each city is to estimate the GHG emissions associated with the activities of the people who live, work, learn, travel, visit, and recreate within each city's geographical boundaries. Each is a citywide assessment that includes all pertinent and available data for the study years 2008 to 2011. Each Assessment must be transparent and able to be replicated, updated, and compared with other similar baseline assessments. None includes a separate accounting for emissions associated with specific city governmental operations; however, these emissions are included in the citywide data.

3.2. Greenhouse Gas Definitions: The greenhouse gases of carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4) are aggregated and reported as carbon dioxide equivalents (CO_2e), which is a commonly used unit that combines greenhouse gases of differing impact on the Earth's climate into one weighted unit. Greenhouse gas emissions are referred to herein as carbon dioxide equivalents (CO_2e) or interchangeably as simply greenhouse gases (GHG). They are expressed in metric tons (tonnes), which equal 1,000 kilograms, or 2,204.6 pounds. The use of the term CO_2 only refers to the individual greenhouse gas, carbon dioxide.

[8] Olmsted County owns and operates the Kalamar sanitary landfill located outside the City of Rochester. The landfill does not utilize any form of methane capture. According to Rochester city staff, the landfill partly functions as an ash landfill and to accept overflow waste when the Olmsted County OWEF incinerator, which is located in the City, is not accepting waste. Currently, with three burners and enough solid waste to feed two of them, the County is excavating trash buried in previous years and burning it at its garbage incinerator.

3.3. Data Sources, Methodologies, and Disclosure: All of the sources of data for the Assessment are transparent, fully identified, verifiable, and reliable. They consist of city and county records and staff reports; utility records and reports to the Minnesota Public Utilities Commission; internationally recognized methodologies and published scientific papers regarding the calculation of GHG emissions; data from federal and State agencies (US Department of Transportation, US Environmental Protection Agency, Minnesota Department of Transportation, Minnesota Pollution Control Agency, and the Metropolitan Council of the Twin Cities); and other peer-reviewed, published sources. The following Section 4.0. and each of the spreadsheets contain information regarding the methodology used to estimate GHG emissions. The attached table, "Summary of Baseline Assessment Methodology for Estimating Greenhouse Gas Emissions and Energy," provides a summary listing of this information. To meet the requirements that the Assessments have full-disclosure and be replicable, all of the data used to estimate the GHG emissions and their energy equivalents are included in the spreadsheets.

3.4. Sensitivity Analysis: Virtually all of the data used to develop the Assessments were specific to each city or to the State of Minnesota, which helps to ensure their reliability and accuracy. However, there are a few important exceptions:

- **Vehicle miles traveled:** To derive the GHG emissions from vehicle use, the Assessment relies on the recent carbon baseline assessment prepared for the City of Minneapolis, the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Assessment*, *City of Minneapolis*, 5/11/12 (Minneapolis GHG Inventory). This analysis relies on scientifically determined GHG emission factors and Minnesota data (refer to Section 4.8.3. for additional information). However, to derive an annual ratio of GHG emissions per vehicle mile traveled, the analysis relies on the national driving characteristics used in the US Department of Transportation's Mobile 5 computer model as well as other national data. This is necessary because comparable State data is not available. The use of national data as opposed to State data may introduce error.

- **Other minor sources:** The Assessments include estimates of GHG emissions from minor sources with varying degrees of accuracy. Solid waste management is the primary category because, as described in Section 4.8.4. below, municipal estimates were based on the best available data, which is only at the county level. Some of the data for other minor sources such as stationary combustion of stationary fuels were not available for all study years so it was assumed in some cases that the figures were relatively stable over all study years. Since these minor sources represent less than two percent of total emissions, it is reasonable to assume that the Assessments would retain a statistically acceptable degree of accuracy.

To test this accuracy, a sensitivity analysis was prepared for the Initiative (refer to Table 2 at the end of this report) that estimates the margin of error in the Assessments. It approaches the matter from two directions:

- **Worst-case scenario:** Since the GHG-per-VMT ratio accounts for a significant part of the total community-wide GHG calculation (about 27% overall in 2010), the sensitivity analysis first incorporated very high margins of error for all of the other major data sources in the Assessments to determine the maximum allowable margin of error for the GHG-per-VMT ratio. The attachment's fourth column shows these figures. The conclusion was ±15%. In other words, even if all of the other major data sources are off the mark by very large margins, the GHG-per-VMT ratio could still be off by up to ±15% and still yield a final GHG estimate that was within an acceptable ±10% of the actual number. The attachment's fifth column derives these figures. A margin of error greater than ±10% would be unacceptable.

- **Most likely case:** It is highly unlikely that all of the primary data sources have margins of error as calculated in the worst-case scenario. Rather, the data sources are reasonably reliable and the variation between the national fleet mix and the local fleet mix will probably not be substantial. This more reasonable case yields a likely margin of error that is about ±4%, a number well within the range of acceptability. The attachment's last column derives these figures.

4.0. Spreadsheet Descriptions: The following provides a brief description of the spreadsheets that comprise the Assessments for each individual city:

4.1. Initiative Summary: This spreadsheet is a brief stand-alone summary that includes all of the key citywide metrics along with demographic and weather information, costs, and comparisons of residential versus commercial/industrial consumption on per-capita, per-household and per-job bases. It also presents both the total GHG emissions, as described in Section 2.0. as well as a subtotal of GHG emissions from the four key metrics.

4.2. Detailed GHG Summary: This spreadsheet is a more detailed complement to the Initiative Summary. It brings together all of the major components of the GHG Assessment. All of the data come from the other spreadsheets, so sources for the data can be found in the source spreadsheets. It shows the percent changes from year to year to facilitate trend analysis. It also lists key indicators; namely, city population change and per-capita emissions, the change in electric utility CO_2 emission rate for electricity production (which is often a major factor in the change in electricity-related CO_2e emissions), and heating and cooling degree days (which are factors that affect building energy consumption for cooling and heating). It also includes building energy data normalized for weather.

4.3. **Costs:** Protocols for carbon baseline assessments do not include the estimate of costs associated with the sources and activities included in the assessment; however, this cost data has been calculated for this Initiative. Cost estimates focus on the retail costs of energy to the consumer. In the case of electricity, natural gas, and other stationary fuels, the estimates include the average retail costs for all of the consumption costs and related fees. For vehicle miles traveled, the Assessments include the average statewide costs for the fuel only, not the full costs of driving.[9] For waste management, the costs are statewide averages of the total retail service costs and fees for the various waste management methods.[10] For potable water production and distribution, only the energy costs are included (electricity and natural gas).The specific cost factors can be found in the Cost Factors spreadsheet for each city.

4.4. **Sector Shares:** The pie charts and bar charts provide snapshots of the relative share of GHG emissions, energy consumption, and costs in 2010 associated with the main sectors: electricity and natural gas consumption, vehicle miles traveled, airport share, and solid waste management. The bar chart compares the 2010 shares of GHG emissions, energy, and costs for the primary sectors of electricity, natural gas, and vehicle miles traveled; and the line charts illustrate change over time for this information.

4.5. **Energy:** This spreadsheet summarizes the GHG emissions associated with consumption of electricity, natural gas, major users of other fuels (fuel oil, coal, diesel, etc.) and shows the changes over time. These are Required Emission Sources. The spreadsheet also includes per-capita emission rates and energy consumption normalized for variable weather conditions. The Minneapolis GHG Inventory includes an additional spreadsheet that estimates the energy equivalents for the University of Minnesota's Southeast Steam Plant and major users of back-up fuels. The Duluth Assessment includes several additional sheets that estimate energy consumption and GHG emissions associated with the combustion of the various fuels used primarily to provide space heating (for both residential and commercial/industrial) in on-site furnaces and boilers and at the Duluth Steam Plant.

4.6. **Electricity:** Utility consumption data for all electricity customers within each city's borders are shown on this spreadsheet. Data are in two primary use categories: Residential and Commercial/Industrial.

4.6.1. **Definitions:** The following is the definition of a "residential customer" from Xcel Energy (other utilities use similar definitions): "A residential

[9] The average statewide fuel costs for 2008 to 2011 range from 13 to 20 cents per mile. This is in contrast to the estimates of the US Internal Revenue Service, which also take into account costs of maintenance, depreciation, insurance, and repair, and total about 55 cents per mile.

[10] Excluded are costs associated with household hazardous waste and problem materials ($225 per ton), source-separated organics ($220 per ton), and re-use and reduction efforts (which are assumed to be cost neutral).

customer is one using electric service for domestic purposes in space occupied as living quarters such as single private residences, duplex units, townhouse units, condominium units, apartment units, mobile homes, fraternity houses, sorority houses, and rooming houses. Domestic purposes or uses are domestic lighting, heating, cooking, and power service." Other consumption is in the Commercial/Industrial category and the small Public Street and Highway Lighting category.[11, 12]

4.6.2. Xcel Energy's "15/15 Rule:" In September 2012, it was learned that Xcel Energy had instituted a new policy in Minnesota called the "15/15 Rule" that applies when the company responds to a request for consumption data. According to Xcel, the "15/15 Rule" has been adopted by Xcel and several utilities across the country to help protect customers' data privacy when it comes to aggregated reports going to a third party. The "15/15 Rule" has two main aspects. It prevents the utility from disclosing consumption data to a third party for any customer group with less than 15 customers. For example, if there are only 14 Commercial & Industrial (C&I) customers in a group, the utility cannot release the aggregate consumption data to a third party. The Rule also prevents the utility from releasing data for a group where an individual customer's data makes up more than 15% of the aggregated group total. For example, if there were 100 C&I customers on the report with an aggregate total consumption of 1,000 kWh and one of those customer's total was 150 kWh, the utility must remove that customer's data from the report. The utility must then repeat the process to determine if there is a customer with consumption at 127.5 kWh or more (15% of the remaining 850 kWh).

Xcel stated that the consumption data for the following 11 of the project's 20 participating cities have data excluded because of the application of the 15/15 Rule (the four cities with excluded electricity and natural gas data are underlined for emphasis):

- Coon Rapids: Commercial/Industrial wind
- <u>Eagan</u>: Commercial/Industrial gas and electric
- Eden Prairie: Commercial/Industrial wind
- Edina: Commercial/Industrial wind

[11] There can be a lot of "cross-over" between the residential and the commercial classifications in a single building. Consider this further clarification of Xcel Energy's methods of classification: "Apartment buildings often have individual electric meters for each unit, which are served on a residential rate and are included in the electric Residential class of service. They usually have another electric meter for laundry rooms and for common area lighting and cooling, served on a commercial electric rate and included in the Commercial class. These same apartment buildings often have one gas meter connected to a boiler and a water heater providing heat and hot water to all of the individual units. These meters are served on a commercial gas rate and are included in the gas Commercial class. However, if each unit has an individual gas meter serving only that unit's individual furnace and/or water heater, then it is served on a residential gas rate and included in the gas Residential class."

[12] In the case of the Duluth Steam Utility, this district energy system provides approximately 12% of its steam energy to buildings with multifamily units and mixed commercial/residential uses. The rest goes to non-residential uses. The spreadsheet file for the City of Duluth allocates the related emissions, energy, and costs accordingly.

- Falcon Heights: Commercial/Industrial wind and electric
- Maplewood: Commercial/Industrial gas and electric
- Minnetonka: Commercial/Industrial wind
- Oakdale – Residential wind and Commercial/Industrial wind and gas
- Richfield: Commercial/Industrial wind
- Shoreview: Residential and Commercial/Industrial wind
- St. Louis Park: Commercial/Industrial wind
- White Bear Lake: Residential and Commercial/Industrial wind

The excluded wind-based consumption is not likely to comprise a significant portion of overall consumption (probably less than 1%) and its exclusion has no effect on GHG emissions. The Assessments for these cities disclose the facts of this missing data. For the four cities where Xcel has withheld data for natural gas or non-wind-generated electricity due to the "15/15 Rule," the extent to which the disclosed data undercounts the actual data and for which years the rule was applied is not known. As such, the validity of this reported data is questionable.

4.7. Natural Gas: This spreadsheet includes the consumption data provided by natural gas suppliers. Consumption is categorized for Residential and for Commercial/Industrial uses using similar definitions as defined above for electricity. Refer to the above list of cities for which Xcel Energy has excluded gas consumption data per the 15/15 rule.

4.8. Conversion Factors: There are several components to the Conversion Factors spreadsheet:

4.8.1. Conversion Factors for Utilities: Table 1 provides the GHG emission factors and their references for electricity, natural gas, and other stationary fuel consumption. The conversion factors for electricity depend on the fuel mix used by each electricity supplier (i.e. the shares of coal, natural gas, biomass, wind, geothermal, and hydro) and the fuel mix for purchased electricity. The factors vary over time according to the particular power company. The electricity utilities provided annual emission factors for CO_2. Unlike electricity, the CO_2 emission factor for natural gas is relatively stable over time and among all suppliers. The table uses the conversion factors for the other primary greenhouse gases, N_2O and CH_4, to calculate the total CO_2 equivalent emission factor (CO_2e).

4.8.2. Greenhouse Gas Emission Sources and Conversion Factors for Other Fuels: Tables 2 and 3 work together to provide emission factors for a variety of fuels, their energy equivalents (in kBtu), and the tonnes of greenhouses gases per kBtu.

4.8.3. Energy Equivalents of Vehicle Miles Traveled: Table 4 relies on the recent carbon baseline assessment prepared for the City of Minneapolis, the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Assessment, City of Minneapolis*, 5/11/12 (Minneapolis GHG Inventory). The Minneapolis GHG Inventory includes an analysis of the fuel consumption by type of fuel using the national fleet average fuel economy assumptions from the Energy Information Administration's *2012 Annual Energy Outlook* and the national vehicle fleet mix from the Clean Air Climate Protection (CACP) software from ICLEI--Local Governments for Sustainability.[13] The national fuel consumption estimates were modified to account for Minnesota's requirement that all gasoline and diesel fuels sold in the State since 2006 include 10% and 5% ethanol respectively, and from 2001-2005 to account for the use of 10% ethanol in gasoline only (B5 diesel was introduced State-wide in late 2005). This information enabled the estimation of the amount of energy associated with vehicle miles traveled in Minnesota.

4.8.4. Conversion Factors for the Combustion of Municipal Solid Waste: This final table, Table 5, addresses the two primary methods for processing municipal solid waste (MSW) via combustion. The Minneapolis GHG Inventory is the source of the data:

- **Mass burn incineration:** The table includes the total MSW processed at the Hennepin Energy Resources Center (HERC) and the associated GHG emissions. These data yield conversion factors to calculate GHG emissions on a per-ton basis for MSW processed at the facility. As described above, the table also includes the GHG emissions associated with the electricity and steam that are produced as valuable byproducts of the incineration. The same is true for the Olmsted County Waste to Energy Facility (OWEF) located in Rochester.

- **Refuse derived fuel:** The other major combustion method is to process MSW into refuse derived fuel (RDF) pellets that are burned in certified Xcel Energy power plants in Minnesota. Section 4.14 provides additional detail regarding RDF processing.

4.9. Cost Factors: As described above, the Project includes estimates of retail costs to the consumer of energy (electricity, natural gas, and other fuels), the costs of transportation fuels, the statewide average costs for the various waste management methodologies, and the energy costs (electricity and natural gas) associated with the production and distribution of potable water and each city's share of wastewater treatment. This spreadsheet provides the conversion factors for these cost estimates and the sources for the data.

[13] Refer to: http://www.icleiusa.org/action-center/tools/cacp-software.

4.10. Seasonal Cooling and Heating Degree Days: Because temperature has an effect on building energy consumption, this spreadsheet includes the normalization of the data pertaining to building energy consumption to better assess year-to-year changes and trends and allow peer-city comparisons. The "Base" figures, which are the 118-year averages of seasonal Heating Degree Days and Cooling Degree Days (HDD/CDD) for the Twin Cities, serve as the bases for calculating the "Normalizing Factor" for all cities participating in the Project. For example, if the actual seasonal cooling degree day is 10% higher than the Base, the portion of electricity consumption attributable to air conditioning is decreased by 10% to be normalized. It is assumed that 25% of all electricity consumption is for air conditioning. The remaining 75% is unaffected. Similarly for heating, if the seasonal CDD figure is 10% higher than the Base, the portion of total natural gas consumption associated with heating (which is assumed to be 80%) is reduced by 10% for normalization.

4.11. On-Road Transportation: The ICLEI Community Protocol defines on-road transportation as a Required Emission activity, and describes two recommended methods to estimate emissions: the "Demand Method" and the "Polygon Method."[14] The latter method is used in this Assessment.

- **Translating Vehicle Miles Traveled into GHG Emissions:** The first step is to measure the number of vehicle miles traveled (VMT) within each city's boundaries. Fortunately, this is the easy step because the Minnesota Department of Transportation (MNDOT) compiles accurate data regarding VMT on all of the roads in the State and aggregates them by cities and counties.[15] [16] The Minneapolis GHG Inventory includes annual fuel consumption by fuel type, which permitted the estimation of a GHG emission rate that accounted for the Minnesota fleet mix and the State's biofuel concentrations, which are higher than the national average. This analysis yields a reasonably accurate estimate of the GHG emissions associated with vehicular travel.
- **Translating Vehicle Miles Traveled into Energy:** The Minneapolis GHG Inventory's inclusion of annual fuel consumption by fuel type also permitted the estimation of an annual rate of energy consumed per 100

[14] Compared to Demand Method, the Polygon Method will somewhat over-predict VMT for communities with a disproportionately large amount of through traffic on major roads and under-predict for the opposite case. The Demand Method has similar drawbacks. The authors of the Minneapolis Assessment compared both approaches and chose to use the Polygon Method.

[15] Refer to: http://www.dot.state.mn.us/roadway/data/reports/vmt.html

[16] MNDOT traffic engineers use a variety of devices to collect traffic data including permanently installed loop detectors every half mile on metro area freeways, Automatic Traffic Recorders (ATRs) permanently installed in key locations throughout the state, and tube counts. The biggest share of the statewide counts comes from road tubes that are placed on the roadway for a 48-hour period. These counts are then adjusted to annual average daily traffic (AADT) by using factors that are derived from continuous counting sites. Historically, MNDOT has collected traffic data on all state roads on a two-year cycle, and on all county state aid roads, county roads, and municipal state aid streets on a two or four-year cycle. Once MNDOT engineers obtain the AADT for each segment of roadway, they can compute VMT by multiplying the AADT by the segment length. To get an AADT estimate for a year that a road was not counted, engineers use growth factors that are derived from ATRs and from other roads that are counted that year. For lower level roads that are not counted, engineers estimate the traffic volume.

million VMT as detailed above in the description of Table 4 of the Conversion Factors spreadsheet (Section 4.8.3.).

4.12. Vehicle Miles Traveled Charts: This spreadsheet includes three charts that help describe long-term changes in roadway transportation: total VMT, per-capita VMT, and per-capita GHG emissions associated with VMT.

4.13. Airports: How an airport is addressed depends on whether it is located within the community and how large it is.

4.13.1. Community Share of the Minneapolis St. Paul International Airport Emissions: The Minneapolis Saint Paul International (MSP) Airport is a major hub airport that serves an area larger than the Twin Cities region. It is contiguous to Minneapolis, St. Paul and the suburban cities of Bloomington, Eagan, Mendota Heights, and Richfield.[17] According to the ICLEI Community Protocol, it is classified as an Optional Activity, which means on this basis alone, it could be excluded from this Assessment. However, the MSP Airport emissions are included because, for the 18 participating cities in the region, each city's share of these emissions exceeds the *de minimis* threshold of 5%. In other words, when allocating the MSP Airport's emissions to a city in the region, the amount is greater than 5% of that city's total emissions. If it were less than 5%, the city's share of the Airport's emissions could be excluded from its Assessment. However, to retain a consistent methodology, airport share is included for all participating cities.

The Metropolitan Airport Commission conducted a GHG baseline assessment for the MSP Airport for the years 2005, 2007, and 2009.[18] The Minneapolis GHG Inventory relied on this assessment and used linear regression analysis to estimate GHG emissions for 2006, 2008, and 2010. Consistent with the ICLEI Community Protocol, each city's share of the MSP Airport's total emissions were assumed to be equal to the percent of residential home-based vehicle trips associated with the city that had either an origin or destination at the Airport. The Metropolitan Council calculated the "percent of city resident, home-based trips, as a percent of MSP total home-based trips" for 2010. This percentage was used for all study years because it was assumed that each city's share of vehicle trips would be relatively stable and that whatever variation did exist, it was well within the statistical significance of the Assessment.

4.13.2. Duluth and Rochester International Airports: Two other large airports serve cities participating in the Initiative: Duluth International Airport (DLH) and Rochester International Airport (RST). Data for the cities of

[17] For more information: http://www.mspairport.com/directions.aspx

[18] Refer to: *Greenhouse Gas Report: Metropolitan Airports Commission*, December 2010, http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx.

Rochester and Duluth already capture ground-based emissions related to the operation of the airports including energy (electricity, natural gas, and fuel oil for buildings and facilities), vehicle miles traveled, municipal solid waste, and wastewater treatment. What remains are emissions related to aircraft operations. The Assessments for the cities include estimates that take into account aircraft fleet characteristics, average number of operations for each aircraft type from 2005 to 2011, typical fuel burn rates by aircraft type, estimated time of typical operation, and the GHG emission rate for aviation fuel.

According to the ICLEI Community Protocol, these airports would be classified as Optional Sources because their emissions occur within the jurisdictional boundary of the host cities. They are too small for their emissions to be treated as "shared" or "allocated," and the estimates show that emissions are *de minimis*. However, since the "airport share" emissions for the Minneapolis St. Paul Airport are not *de minimis*, emissions for these international airports are included in the respective city's assessments to maintain consistency of methodology among all 20 participating cities.

4.13.3. Reliever Airports: The Twin Cities include eight smaller airports with one of their roles being to relieve the MSP Airport of some of the private aircraft and cargo operations. Three of these airports are located within cities participating in the Initiative: The St. Paul Downtown Airport (Holman Field), the Flying Cloud Airport in Eden Prairie, and the Lake Elmo Airport in Lake Elmo.

Like the Rochester and Duluth airports, the ICLEI Community Protocol classifies these airports as Optional Sources because their emissions occur within the jurisdictional boundary of the host cities, and they are too small for their emissions to be treated as "shared" or "allocated." Again, since the "airport share" emissions for the Minneapolis St. Paul Airport are not *de minimis*, emissions for the reliever airports are included in the respective city's assessments to maintain consistency of methodology among all 20 participating cities.

4.14. Waste and Wastewater Treatment: The ICLEI Community Protocol classifies the emissions associated with the processing of solid waste as Required Activities. Although cities often gather selected data regarding city-sponsored residential recycling programs, counties are the primary compilers for comprehensive municipal solid waste (MSW) management data, which they report via Waste Certification Reports to the Minnesota Pollution Control Agency. In order to estimate waste management amounts at the municipal level, it is assumed that on

a per-capita basis, city waste will be generated and managed at the same rates as those measured for the county.[19]

4.14.1. Emissions and Byproducts from Solid Waste Incineration: The Hennepin Energy Resources Center (HERC) is a waste-to-energy garbage incinerator located in downtown Minneapolis that processes municipal solid waste from communities throughout the region. Emissions come in two forms: biogenic and non-biogenic (or fossil-based emission).[20] Only the non-biogenic/fossil-based emissions are counted for the purposes of carbon baseline assessments per the ICLEI Community Protocol. The fossil-based emissions include all of the CH_4 and N_2O emissions. To develop conversion factors for incineration that yield GHG tonnes per ton of waste incinerated at the HERC facility, this Assessment relies on the GHG assessment prepared for the City of Minneapolis, which, in turn, relies on the GHG assessment prepared for the HERC facility. HERC is a "shared" facility, so its emissions are allocated on a per-ton basis for all of the cities that send waste to it for processing.

A second garbage incinerator, the Olmsted County Waste-to-Energy Facility (OWEF), serves Rochester. The facility produces power and sends the spent steam into the city's downtown district energy system.[21] As with the HERC facility, the per-ton GHG emission rates were derived using the measured GHG emissions for the study years.

- **Natural gas consumption:** To avoid double counting, the other fuel consumed at the two garbage incinerators, natural gas, is subtracted from the natural gas consumption totals for Minneapolis and Rochester.
- **Exported energy:** The two incinerators are essentially co-generation power plants that produce two products: electricity that is dispatched to the electrical grid, and steam that is piped into the two downtown district energy systems. To highlight the value of the exported electricity and steam, the waste spreadsheets disclose the equivalent per-ton-incinerated GHG emissions associated for waste generated within each city. Consistent with the ICLEI Protocol, the GHG emissions associated with these byproducts are not treated as "negative" emissions in the calculation of the GHG emission rate. In other words, the Assessments only disclose for

[19] The data for the City of Minneapolis is from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Assessment, City of Minneapolis*, 5/11/12.

[20] According to the ICLEI Community Protocol (Appendix E, p. 15), "The combustion of MSW components originally manufactured from fossil fuels (e.g., plastics, certain textiles, rubber, liquid solvents, and waste oil) results in fossil based CO_2. The CO_2 emissions from combusting the biomass portion of MSW (e.g., yard waste, paper products) are biologic in origin and are reported separately."

[21] According to Rochester city staff, the chilled water and steam are actually more profitable for the plant than electricity. The steam is now being used to heat and cool the Rochester Community and Technical College campus and the downtown government, library and civic center campus.

informational purposes the GHG emissions attributable to the electricity and steam generated via the incineration of each city's portion of the waste stream.

4.14.2. Emissions and Byproducts from Refuse Derived Fuel Combustion: Two refuse derived fuel (RDF) facilities accept solid waste from cities within the region and process it into fuel pellets that are burned in certified Xcel Energy power plants in Minnesota (Elk River RDF plant and the Ramsey/Washington County RDF facility in Newport).[22] According to the EPA's Waste Reduction Model (WARM), processing MSW into RDF yields a more uniform fuel that has a higher heating value than that used for a mass burn facility (such as HERC). The EPA and ICLEI-USA have yet to derive a GHG emission rate that applies to MSW that has been processed and burned in this manner. As a default until an acceptable rate is available, the GHG emission rate for the HERC facility is used. The per-ton GHG equivalent of the electricity byproduct is assumed to be the same as for exported electricity for the HERC facility.

4.14.3. Emissions from Landfilling, Recycling, and Composting: ICLEI's Clean Air Climate Protection (CACP) Software provides estimates of GHG emissions associated with landfilling, which are primarily methane emissions from the anaerobic digestion of organic wastes. The CACP software accounts for this by incorporating the percent of the waste that is in landfills with methane recovery and the rate of recovery. The table in the Solid Waste spreadsheet accounts for that portion of the landfilled waste stream sent to landfills with no methane recovery by using a higher lifecycle-methane-production rate than waste sent to landfills with methane recovery. No GHG emissions are assumed to be directly associated with waste that is recycled or composted.

As stated above, the Olmsted County Kalamar Landfill is located within the City of Rochester. The Assessment for the City discloses the landfill's non-biogenic emissions, consistent with the Protocol.

4.14.4. Wastewater Treatment: Consistent with the ICLEI Protocol, the Assessments include each city's share of the GHG emissions from wastewater treatment facilities. The Metropolitan Council provided total emissions for the Metro Wastewater Treatment Plant in St. Paul and each participating city's percentage share of these emissions. The Rochester Water Reclamation Plant, located in Rochester, did not prepare a greenhouse gas assessment. Emission estimates for Rochester's wastewater are based upon the emission rate for the Metro Wastewater

[22] A fraction of the MSW collected in Dakota County is processed by the municipal incinerator in the City of Red Wing. Since the Assessments assume that a city's waste will be processed at the closest facility, the combusted portion of the City of Eagan's waste is assumed to be sent to the closer RDF facilities rather than the Red wing incinerator.

Treatment Plant multiplied by the known wastewater flow for the city. The same is true for the Western Lake Superior Wastewater Treatment Plant in Duluth.

4.15. Solid Waste Composition: The CACP software takes into account the composition of the MSW. This spreadsheet includes the results of two waste composition studies for comparison purposes and to confirm the appropriateness of the use of the Minnesota Pollution Control Agency study for this analysis.

4.16. Demographics: Many of the spreadsheets rely on per-capita, per-household, and per-job calculations. This spreadsheet provides population, household, and employment data for each city; and county and regional populations.

4.17. Precipitation and Potable Water: The Assessments include data regarding annual precipitation and the distribution of potable water within the city.[23] As stated above, the ICLEI Community Protocol requires the collection of emissions associated with energy used in delivery of water used within the jurisdictional boundary of the community, regardless of the location of the water delivery infrastructure. Carbon baseline assessments prepared for the cities of Minneapolis and Burnsville indicate that the energy (electricity and natural gas) needed to treat and distribute potable water constitutes less than 1% of the total GHG emissions for each city (well under the 5% de minimis threshold). While the Assessments do include the electricity and natural gas consumption data associated with the distribution of potable water, the data are not disaggregated from the citywide consumption data for each city.

4.18. Summary of Baseline Assessment Methodology for Estimating Greenhouse Gas Emissions and Energy: The intent of the following table is to provide a convenient summary that categorizes the various emission sources, lists their classifications per the ICLEI Community Protocol, and identifies the primary data sources. The table also includes the data resources used to calculate the energy value of the various emission sources and their costs.

Tables

1. Summary of Baseline Assessment Methodology for Estimating Greenhouse Gas Emissions, Energy, Costs, and Forecasts
2. Sensitivity Analysis

[23] Each city provided its own potable water distribution data.

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Summary of Baseline Assessment Methodology for Estimating Greenhouse Gas Emissions, Energy, Costs, and Forecasts				
Emission Source, Activity, and Classification		**Applicability**	**Source of Data**	**Estimation Methodology**
Electricity Consumption				
	Required Activity	All cities	A, B	MWh times conversion factors and energy content
	Shared Source [1]	Host city Minneapolis: Xcel Energy's Riverside Generating Station	A, C	Natural gas consumption subtracted from citywide total to avoid double counting
	Shared Source [1]	Host city St. Paul: Xcel Energy's High Bridge Generating Station	A	Natural gas consumption at the plant is not included in the citywide totals. No risk of double counting
	Not a shared Source: Virtually 100% of consumption within city limits.	Host City Rochester: Rochester Public Utility power plants: Cascade Creek (natural gas) and Silver Lake (coal and natural gas)	A	MWh times conversion factors and energy content
			B	Natural gas consumption subtracted from citywide total to avoid double counting.
	Not a shared Source: Virtually 100% of consumption within city limits.	Host city Duluth: Minnesota Power's Hibbard steam and power plant provides electricity and steam to the downtown district energy system	A, B	GHG emissions from natural gas and coal consumption subtracted from citywide total to avoid double counting. For coal-based energy, short tons of coal consumed times conversion factors.
Natural Gas Consumption, Required Activity		All cities	A, B	Therms times conversion factors and energy content
Fuel Oil Consumption, Optional Activity		Cities that host major fuel oil users	B, D	Gallons times conversion factors and energy content
Energy Consumption from District Energy Facilities, Required Activity				The Assessment accounts for all fossil fuels consumed by district energy facilities (natural gas, electricity, fuel oil, and coal).
	There are 9 district energy systems that serve 4 of the participating cities. None of these systems serves multiple cities so they are not "shared" facilities. [2]		A, B, D	
		Host city Duluth: Duluth Steam Plant provides steam to the downtown district energy system. It burns natural gas and coal.	A, B	The natural gas consumption is captured in Comfort Systems data. For coal consumption: Tons of coal times emission factor. For coal-based energy, short tons of coal consumed times conversion factors.
Vehicle Miles Traveled, Required Activity		All cities	E	VMT by roadway by city
			B, D, E, F	Calculation includes VMT, national vehicle fleet mix, average fuel economy statistics, Minnesota fuel characteristics
Airports Emissions, Optional Source				

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	Minneapolis Saint Paul International Airport; Optional Source (but exceeds de minimis threshold that would permit exclusion)	Cities in the Twin Cities	H	Total MSP Airport emissions in report
			I	Met Council analysis enabled allocation of MSP Airport emissions to each city in region.
	Rochester International Airport; Optional Source (de minimis)	Host city Rochester	B, N, P	Emissions are de minimis but since the "airport share" emissions for the Minneapolis St. Paul Airport are not de minimis, they are included to maintain a consistent methodology for all participating cities. Methodology: Average operations for each aircraft type from 2005 to 2011, times typical fuel burn rates by aircraft type, times estimated time of typical operation, times GHG emission rate for aviation fuel.
	Duluth International Airport; Optional Source (de minimis)	Host city Duluth		
	Twin Cities Reliever Airports; Optional Sources (de minimis)	Host cities: St. Paul (St. Paul Downtown), Eden Prairie (Flying Cloud), Lake Elmo (Lake Elmo)	B, O, P	
Rail Operations; Optional Source		Duluth; the city with the most intense rail concentration	M	Emissions are less than 5% de minimis threshold of city total; therefore, not included [4, 6]
Seaport; Optional Source		Host city Duluth: Duluth Port Authority	M	Emissions are less than 5% de minimis threshold of city total; therefore, not included [4, 6]
Solid Waste Management; Required Activity		All cities	J	County per-ton, waste management methods apply to each city on a per-capita basis to estimate waste amounts by processing methods (combustion, landfilling, recycling)
	Combustion	Hennepin Energy Resources Center (HERC) users	C	Calculate GHG emission rate (tonnes of GHG per ton of waste) times tons of waste for each city
	Byproducts of combustion			Per-ton GHG value of electricity and steam disclosed but not counted in emissions totals
	Shared Source [1]	Host city Minneapolis: HERC facility	C	Subtract 100% natural gas from citywide total to avoid double counting.
	Combustion	Users of Red Wing garbage incinerator	C	Assume same GHG emission rate as for HERC
	Byproducts of combustion			
	Combustion	Users of Washington/Ramsey and Elk River refuse derived fuel (RDF) facilities	C	ICLEI Community Protocol does not yet have a GHG emission rate for RDF. Assume same GHG emission rate as for HERC and same electricity production rate per ton of waste as for HERC.
	Byproducts of combustion			
	Combustion	Users of Olmsted Waste to Energy Facility (OWEF)	K	Calculate GHG emission rate (tonnes of GHG per ton of waste) times tons of waste for city

	Byproducts of combustion			Per-ton GHG value of electricity and steam
	Shared Source [1]	Host city Rochester: OWEF		Subtract 100% natural gas from citywide total to avoid double counting.
	Landfilling	All cities	F	CACP software emission rates for landfilled waste times methane recovery rate times tons landfilled.
	Shared Source [1]	Host city Rochester: Olmsted County/Kalamar Landfill (no methane recovery)	K, R	Disclose non-biogenic emissions.
Wastewater Treatment; Required Activity		All cities		For cities in Twin Cities region, city share of total emissions from the Metro Wastewater Treatment Plant. Since the plants in Rochester and Duluth do not have a GHG assessments, the per-gallon emissions rate for the Metro Plant is a surrogate for both cities.
	Shared Source [1]	Host city St. Paul: Metro Wastewater Treatment Plant	L	Subtract electricity and natural gas consumption from citywide totals. Electricity production for on-site use only.
	Not a shared Source [5]	Host city Duluth: Western Lake Superior Sanitary District Duluth plant	A, R	Subtract consumption of natural gas and fuel oil from citywide totals. Disclose electricity production.
	Not a shared Source. More than 99% of users are within the city.	Host City Rochester: Rochester Public Utility	A, R	Subtract electricity and natural gas consumption from citywide totals. Electricity production for on-site use only.
Greenhouse Gas Emission Forecasts [7]		All	Q	The Minnesota GHG data was used to generate a base case scenario for 2005 for each city and then project business-as-usual forecasts and a target forecasts for 2020 and 2030 for energy, VMT, and municipal solid waste.
Cost estimations: [8]		All cities		
	Electricity		S	Electricity consumption by customer class times the average cost per MWh.
	Natural gas		S	Natural gas consumption by customer class times the average cost per therm.
	Vehicle miles traveled		T	Average fuel prices by type of fuel for 2008 to 2011 times total statewide consumption by fuel type, divided by total VMT yielded an average fuel cost per VMT per year.

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	Solid waste management		U	Statewide average per-ton costs per waste management method times tons managed.
	Potable Water Production and Distribution		V	Gallons of water times the energy cost factor (electricity and natural gas)
Forecasts:		All cities	W, X	The State forecasts include 2 future GHG emission scenarios for energy, travel, and waste: Business as usual and a reduction target based on the Minnesota Next Generation Energy Act. These statewide forecast methods are applied to each city
Excluded emission sources (de minimis): [4]				
	Back-up energy and on-site home heating: Minor users of fuel oil, diesel for back-up generators, propane, compressed natural gas, etc.			
	Rail and marine vessel operations: The baseline assessment prepared for Minneapolis (Source C) calculated the GHG emissions associated with rail and marine operations within Minneapolis to equal less than 1% of total emissions. The same is true for Duluth per source M.			
	Upstream emissions and imbedded energy in materials: This potential source of emissions analysis has yet to be widely accepted for inclusion in GHG assessments and it is not a Required Source according to the ICLEI Community Protocol. Current methodologies result in questions regarding the double counting of emissions.			
Information Sources:				
A	Utility data			
B	*International Local Government Greenhouse Gas Emissions Analysis Protocol*, Version 1.1, May 2010, ICLEI--Local Governments for Sustainability, et al.			
C	*City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory*, City of Minneapolis, 5/11/12.			
D	Fuel oil consumption data for major users, Minnesota Pollution Control Agency, and the USEPA's GHG Mandatory Reporting Rule: http://www.epa.gov/climatechange/emissions/ghgdata/index.html			
E	Minnesota Department of Transportation			
F	Clean Air Climate Protection software from ICLEI--Local Governments for Sustainability, et al.			
G	Federal Energy Information Administration's *2012 Annual Energy Outlook.*			
H	*Greenhouse Gas Report: Metropolitan Airports Commission*, December 2010.			
I	The Metropolitan Council calculated the "percent of city resident, home-based trips, as a percent of MSP total home-based trips" for 2010. Each city's share of vehicle trips was assumed to be relatively stable and therefore used for all study years.			
J	MPCA SCORE Reports and county Waste Certification reports			
K	U.S. EPA's Final Mandatory Reporting of Greenhouse Gases Rule (MRR): http://ghgdata.epa.gov/ghgp/main.do			
L	Metropolitan Council Environmental Services data for the Metro Wastewater Treatment Plant.			
M	*City of Duluth Greenhouse Gas Inventory and Forecast 2008*, Wencke Associates, Inc, March 2011.			
N	US Federal Aviation Administration Air Traffic Activity System (ATADS); ATADS Report - http://aspm.faa.gov/opsnet/sys/opsnet-server-x.asp			

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O	Activity Forecasts Technical Report, Appendix A, HNTB Corporation. http://metroairports.org/MAC/appdocs/meetings/pde/agenda/pde_a_1151/Appendix_A_AviationActivityForecast_072712.pdf
P	Numerous sources were used to estimate the average fuel-burn rates by aircraft type for a typical operation.
Q	*Final Minnesota Greenhouse Gas Inventory and Reference Case Projections 1990-2025*, Center for Climate Strategies, March 2008
R	*U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions*, October 2012
S	Xcel Energy provided average costs for NSP Minnesota customers for 2008 to 2011 for electricity and natural gas. For utilities other than NSP Minnesota, average cost per customer for electricity and natural gas in Minnesota from 2008 to 2011 is from the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm.
T	Fuel consumption by type of fuel and by year came from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory*, City of Minneapolis, 5/11/12 (Source C). Average fuel prices are from the following sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm. Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report. Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a
U	The source for statewide average per-ton costs by waste management method (recycling, combustion, and landfilling) is from “2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota,” Sig Scheurle, Minnesota Pollution Control Agency.
V	Cost estimates for the production and distribution of potable water include the energy costs. The electrical consumption rate is based on the collective experience of numerous US cities as reported in the Climate and Air Pollution Planning Assistant, by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Baseline analyses for other cities indicate that natural gas consumption costs related to the production and distribution of potable water constitute about 8% of total costs. Therefore, the electricity costs are divided by 0.92 to account for the natural gas costs.
W	*Final Minnesota Greenhouse Gas Inventory and Reference Case Projections 1990-2025*, Center for Climate Strategies, March 2008
X	Residential water consumption targets based on the water saving strategies in: Vickers, Amy. 2002. *Handbook of Water Use and Conservation*. WaterPlow Press. Amherst, MA.).
Notes:	
1	Consistent with the *U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions*, October 2012, ICLEI—Local Governments for Sustainability USA (ICLEI Community Protocol), the emissions from certain facilities with region-wide user bases (e.g. power plants, solid waste and wastewater treatment facilities, and airports) are considered shared facilities and their emissions are allocated among the users of the facilities. To avoid double counting, utility-based energy (electricity and natural gas) for these facilities are subtracted from the totals of the host cities.
2	Per the ICLEI Community Protocol, the city totals do not count GHG emissions associated with biomass fuels, i.e. the waste wood burned by St. Paul District Energy and the University of Minnesota’s Southeast Steam Plant.
3	The Duluth and Rochester international airports are located within their respective cities. They are not considered shared facilities that have significant region-wide user bases for this analysis for the following reasons: 1) The majority of the airport users have a direct economic and geographic relationship to their respective host cities. 2) They are small compared to the Minneapolis St. Paul Airport. 3) Emission estimates are de minimis for their respective host cities. This same argument holds for the Twin Cities reliever airports.

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4	According to the *U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions*, October 2012, ICLEI—Local Governments for Sustainability USA, de minimis emissions are "a quantity of GHG emissions from any combination of sources and/or gases, which, when summed, equal less than five percent (5%) of community GHG emissions that are required to be included in the community GHG emissions report." De minimis emissions are not required to be reported.
5	The Western Lake Superior Sanitation District operates a wastewater treatment plant in Duluth. It currently treats wastewater from only one subdivision outside the City limits, Chester Heights with about 90 households (about 0.2% of total City households).
6	The GHG assessment prepared for Duluth in 2008 (Source M) estimated the GHG emissions for rail and marine operations and both were de minimis sources: Rail (1% of total), marine (0.3% of total).
7	The Minnesota data includes actual GHG emissions by major categories (energy, travel, and waste) for the State and 2 future scenarios: Business as usual and a reduction target based on the Minnesota Next Generation Energy Act, which established statewide goals of 15% by 2015, 30% by 2025, and 80% by 2050. It is assumed that each city forecast matches the State's percentage reduction projections.
8	Cost estimations focus on the costs of energy to the consumer. In the case of electricity and natural gas, the estimates include the average retail costs for all of the consumption costs and related fees. For vehicle miles traveled, it includes the average statewide costs for the fuel only, not the full costs of driving. For waste management, the costs are statewide averages of the total retail service costs and fees for the various waste management methods. Excluded are costs associated with household hazardous waste and problem materials ($225 per ton), source-separated organics ($220 per ton), and re-use and reduction efforts (which are assumed to be cost neutral). For potable water production and distribution and wastewater treatment, only the energy costs are included (electricity and natural gas).

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Sensitivity Analysis

Updated: 1/7/13

Assessment Components	Data Sources	Reliability	Maximum Range of Component Accuracy (±%)	Component Percent of Total GHG	Maximum Range of Inventory Accuracy (±%)
Electricity and natural gas	Energy consumption from utilities	Extremely accurate data via individual meters.	5%	65%	3.3%
	GHG emission factors from utilities	Required by law to measure and report accurately.			
	Global warming potentials of GHG emissions	Extremely accurate data via scientific measurements.			
Other fuels (fuel oil, diesel, coal,	MN Pollution Control Agency, University of Minnesota	Extremely accurate data via individual meters as reported to the MPCA and provided by the U of M.	n/a	n/a	negligible
GHG from VMT	MNDOT measured and estimated VMT	State-verified data dating back more than 2 decades.	5%	27%	1.3%
	USDOT Mobile 5 computer model, MN Department of Transportation, and scientifically determined GHG emission factors	Relies on national driving characteristics and fleet mix and the Minnesota fuel mix.	15%		3.9%
GHG from share of airport emissions	Airport data from multiple sources (refer to Methodology Summary)	Reasonable estimates based on actual measurements, extrapolation, and reasonable assumptions.	20%	6%	1.1%

Regional Indicators Initiative Project: City of Edina

Updated 2/18/13

		2008	2009	2010	2011	2012
Population[1]						
Residents		48,169	49,491	47,941	48,262	48,446
Jobs		49,202	47,006	47,676	49,018	49,883
Households		21,285	21,357	20,672	20,848	22,242
Pop. Density (Res/sq. mi.)[2]	15.45	3,118	3,203	3,103	3,124	3,136
Energy[3, 11]						
Cooling Degree Days[4]		859	774	1,088	1,129	0
Electricity (MWh)	Res	200,029	195,768	204,219	205,232	0
	Com/Ind	406,497	391,663	400,521	392,499	0
	Total	**606,526**	**587,431**	**604,740**	**597,731**	**0**
Heating Degree Days[4]		8,264	7,778	7,170	7,357	0
Therms	Res	20,511,175	19,953,060	18,209,218	19,152,383	0
	Com/Ind	18,249,768	17,815,739	16,804,837	17,804,060	0
	Total	**38,760,943**	**37,768,799**	**35,014,055**	**36,956,443**	**0**
Total Energy (MMBtu)	Res	2,733,617	2,663,266	2,517,717	2,615,489	0
	Com/Ind	3,211,945	3,117,927	3,047,062	3,119,612	0
	Total	**5,945,561**	**5,781,193**	**5,564,779**	**5,735,101**	**0**
Res. Energy (kBtu/household/day)		**352**	**342**	**334**	**344**	**0**
Com/Ind Energy (kBtu/job/day)		**179**	**182**	**175**	**174**	**0**
Total Energy (kBtu/person/day)		**338**	**320**	**318**	**326**	**0**
Water[5]						
Precipitation (inches)		24.5	26.7	35.6	28.1	0.0
Potable Water (gallons)	Res	1,789,110,326	1,860,343,660	1,651,793,579	1,685,927,885	0
	Com/Ind	577,517,490	589,620,252	529,013,678	541,999,198	0
	Total	**2,366,627,816**	**2,449,963,912**	**2,180,807,257**	**2,227,927,083**	**0**
Res. Water (gal./household/day)		**230**	**239**	**219**	**222**	**0**
Com/Ind Water (gal./job/day)		**32**	**34**	**30**	**30**	**0**
Total Water (gal./person/day)		**135**	**136**	**125**	**126**	**0**
Travel[6]						
Vehicle Miles Traveled		**508,313,244**	**506,846,665**	**498,974,345**	**498,974,345**	**0**
Travel (VMT/person/day)		**28.9**	**28.1**	**28.5**	**28.3**	**0.0**
Waste (pounds)[7]						
Recycled		49,190,471	48,521,191	46,939,145	46,801,831	0
Combusted		40,161,825	36,329,293	29,290,800	33,735,082	0
Landfill		30,225,460	58,713,860	63,739,180	28,557,128	0
	Total	**119,577,756**	**143,564,344**	**139,969,125**	**109,094,041**	**0**
Waste (pounds/person/day)		**6.8**	**7.9**	**8.0**	**6.2**	**0.0**
Subtotal of Primary Sources Greenhouse Gas Emissions (CO_2e tonnes)[8]						
Energy		564,984	529,694	497,839	518,991	0
VMT		241,703	237,204	229,828	229,528	0
Waste		14,338	15,569	13,249	10,088	0
	Total	**821,025**	**782,467**	**740,916**	**758,608**	**0**
CO_2e (tonnes/person/year)		**17.0**	**15.8**	**15.5**	**15.7**	**0.0**
Total Greenhouse Gas Emissions (CO_2e tonnes)[9]						
	Total	**875,110**	**829,487**	**783,126**	**799,905**	**0**
CO_2e (tonnes/person/year)		**18.2**	**16.8**	**16.3**	**16.6**	**0.0**
Total Costs ($)[10]						
Energy		90,482,396	77,810,250	78,377,690	80,841,342	0
Water		528,504	583,464	521,853	556,013	0
VMT		92,398,021	66,540,129	77,132,679	98,174,546	0
Waste		9,886,696	11,559,869	11,173,863	9,000,367	0
	Total	**193,295,616**	**156,493,713**	**167,206,085**	**188,572,268**	**0**
Cost ($/person/year)		**4,013**	**3,162**	**3,488**	**3,907**	**0**

Regional Indicators Initiative Project: City of Edina

Updated 2/18/13

Keyed Notes on Sources:

1. Resident and household data from Metropolitan Council of the Twin Cities, http://stats.metc.state.mn.us/data_download/DD_start.aspx; Job data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW), http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx

2. Land area (first cell to right) from U.S. Census Bureau, 2010, http://quickfacts.census.gov/qfd/states/27000.html

3. Sum of total energy consumed in city. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas.

4. Heating and Cooling Degree Days from Degree Days.net, Station ID: KMSP, http://www.degreedays.net

5. Precipitation from Minnesota Climatology Working Group, State Climatology Office - DNR Division of Ecological and Water Resources, Zip code: 55436. http://climate.umn.edu/wetland/wetland.asp. Potable water data from city.

6. Vehicle miles traveled from Minnesota Department of Transportation, http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Vehicle fuel consumption by fuel type and GHG emissions rates for Minnesota from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12.

7. Per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. Waste amounts from Minnesota Pollution Control Agency SCORE reports (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html) and county Waste Certification reports. Waste composition from: *Final Report, Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

8. Subtotal of Primary Sources include greenhouse gas emissions from energy consumption, vehicle miles traveled, and solid waste management in units of carbon dioxide equivalents (CO2e). Primary sources for these estimates are as follows:

a) CO_2 emission factors for electricity and natural gas from the utility companies. Emission factors for other greenhouse gases from the *International Local Government Greenhouse Gas Emissions Analysis Protocol,* Version 1.1, May 2010, produced by the United Nations, ICLEI - Local Governments for Sustainability and The Climate Registry.

b) Calculation of emissions from vehicle miles traveled (VMT) involve four primary data sources and calculations that include VMT, national vehicle fleet mix, average fuel economy statistics, and Minnesota fuel characteristics. Data sources include the federal and State departments of transportation, the USEPA, the Minnesota Pollution Control Agency, the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability, and the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

c) Calculations of solid waste emissions from landfilling are based on the waste-in-place estimates from the Clean Air Climate Protection (CACP) software, 2009, developed by ICLEI--Local Governments for Sustainability.

d) Calculations of emissions from the combustion of solid waste are from the *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12.

9. In order to comply with the reporting requirements of the *U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions* , October 2012, "Total Greenhouse Gas Emissions" also include the city's share of emissions from the Minneapolis St. Paul International Airport (MSP) and from the Metro Wastewater Treatment Plant. MSP Airport emissions are from: *Greenhouse Gas Report: Metropolitan Airports Commission* , December 2010. http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx. The city's share of MSP emissions are from the Metropolitan Council of the Twin Cities. Source for the city's share of wastewater treatment emissions is the Metropolitan Council Environmental Services.

10. Total costs include costs associated with the retail cost of delivered energy; the fuel costs for vehicle miles traveled; statewide average costs of solid waste management for combustion (incineration and RDF processing), recycling, and landfilling; and electricity and natural gas costs of producing and distributing potable water. Primary sources not already listed above include the following:

a) Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices

b) Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

c) Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.

d) Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).

11. In September 2012, it was learned that Xcel Energy had instituted a new policy called the "15/15 Rule." The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the wind-based electricial consumption data for the Commercial and Industrial sector in the case of the City. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of Commercial and Industrial consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Detailed Greenhouse Gas Assessment Summary

Updated: 2/18/13

Greenhouse Gas Emission Sources	2008		2009		GHG Change from 2008		2010		GHG Change from 2009		2011		2012	
	Amount	GHG Emissions (tonnes)	Amount	GHG Emissions (tonnes)	Amount	Percent Change	Amount	GHG Emissions (tonnes)	Amount	Percent Change	Amount	GHG Emissions (tonnes)	Amount	GHG Emissions (tonnes)
Energy: *														
Electricity (MWh):	606,526	351,822	587,431	321,989	(29,833)	-8%	604,740	305,283	(16,706)	-5%	597,731	315,753	-	-
Residential (MWh)	200,029	114,861	195,768	106,298	(8,564)	-7%	204,219	102,192	(4,106)	-4%	205,232	107,411	-	-
Commercial & Industrial (MWh)	403,856	235,421	389,145	214,304	(21,118)	-9%	397,925	201,773	(12,530)	-6%	389,962	206,995	-	-
Public street and highway lighting	2,641	1,540	2,517	1,387	(152)	-10%	2,596	1,318	(69)	-5%	2,537	1,347	-	-
Natural gas (therms)	38,760,943	213,162	37,768,799	207,706	(5,456)	-3%	35,014,055	192,556	(15,149)	-7%	36,956,443	203,238	-	-
Residential	20,511,175	112,799	19,953,060	109,730	(3,069)	-3%	18,209,218	100,140	(9,590)	-9%	19,152,383	105,327	-	-
Commercial and industrial	18,249,768	100,363	17,815,739	97,976	(2,387)	-2%	16,804,837	92,417	(5,559)	-6%	17,804,060	97,912	-	-
Subtotal GHG emissions		**564,984**		**529,694**	**(35,290)**	**-6%**		**497,839**	**(31,855)**	**-6%**		**518,991**		**-**
Percent of total Community emissions		65%		64%		-1%		64%		0%		65%		#DIV/0!
Per-capita GHG emissions		11.7		10.7	(1.0)	-9%		10.4	(0.318)	-3%		10.8		0.0
Normalized for weather		562,397		545,954	(16,443)	-3%		497,409	(48,545)	-9%		511,743		#DIV/0!
Weather-normalized per-capita emissions		11.7		11.0	(0.6)	-6%		10.4	(1)	-6%		10.6		#DIV/0!
Transportation:														
Vehicle miles traveled	508,313,244	241,703	506,846,665	237,204	(4,499)	-2%	498,974,345	229,828	(7,377)	-3%	498,974,345	229,528	-	-
Share of MSP Airport emissions		48,933		42,037	(6,896)	-14%		37,735	(4,302)	-10%		36,282		0
Subtotal GHG emissions		**290,636**		**279,241**	**(11,395)**	**-4%**		**267,563**	**(11,679)**	**-4%**		**265,810**		**0**
Percent of total Community emissions		33%		34%		0.5%		34%		0.5%		33%		#DIV/0!
Per-capita GHG emissions		6.0		5.6	(0.4)	-6%		5.6	(0.1)	-1%		5.5		-
Solid Waste Management														
Estimated total MSW managed (US tons)	**59,789**	**14,338**	**71,782**	**15,569**	**1,230.4**	**9%**	**69,985**	**13,249**	**(2,320)**	**-15%**	**54,547**	**10,088**	**-**	**-**
Percent of total Community emissions		1.6%		1.9%		0.2%		1.7%		-0.2%		1.3%		#DIV/0!
Per-capita GHG emissions		0.3		0.3	0.02	6%		0.3	(0.04)	-12%		0.2		#DIV/0!
City share of wastewater treatment emissions		**5,151**		**4,983**	**(169)**	**-3.3%**		**4,474**	**(508)**	**-10%**		**5,015**		
Percent of total Community emissions		0.6%		0.6%		0.01%		0.6%		-0.03%		0.6%		#DIV/0!
Per-capita GHG emissions		0.1		0.1	(0.01)	-6%		0.1	(0.01)	-7%		0.1		0.0
Community Emissions Total:		**875,110**		**829,487**	**(45,623)**	**-5%**		**783,126**	**(46,361)**	**-6%**		**799,905**		**-**
Per-capita emissions		18.2		16.8	(1.4)	-8%		16.3	(0.4)	-3%		16.6		-
Normalized for weather		872,523		845,746	(26,776)	-3%		782,695	(63,052)	-7%		792,657		#DIV/0!
Weather-normalized per-capita emissions		18.1		17.1	(1.0)	-6%		16.3	(1)	-4%		16.4		#DIV/0!
Other factors:														
City population	48,169		49,491		1,322	3%	47,941		(1,550)	-3%	48,262		48,446	
NSP Minnesota GHG emission factor (tonnes GHG/MWh)	0.583		0.551		-0.032	-5%	0.508		(0.044)	-8%	0.531		0.004	
Seasonal cooling degree days	859		774		-85	-10%	1,088		314	41%	1,129		-	
Seasonal heating degree days	8,264		7,778		-486	-6%	7,170		-608	-8%	7,357		-	

Sector Share of GHG, Energy, and Costs, 2010	GHG (tonnes)	Percent of Total GHG	MMBtu	Percent of Total MMBtu	Percent of Total Costs	Percent of GHG from Building Energy		
						Residential	Commercial	Total
Electricity	305,283	39%	2,063,373	23%	31%	21%	41%	61%
Natural Gas	192,556	25%	3,501,406	39%	16%	20%	19%	39%
Vehicle Miles Traveled	229,828	29%	3,363,586	38%	46%			
Airport Share	37,735	5%	not applicable	not applicable	not applicable			
Solid Waste	13,249	2%	not applicable	not applicable	6.7%			
City Share of Wastewater Treatment	4,474	1%	not applicable	not applicable	0.1%			
Potable Water	not applicable	not applicable	not applicable	not applicable	0.3%			
Total	**783,126**	**100%**	**8,928,365**	**100%**	**100%**	**41%**	**59%**	**100%**

Note:

* In September 2012, it was learned that Xcel Energy had instituted a new policy called the "15/15 Rule." The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the wind-based electricial consumption data for the Commercial and Industrial sector in the case of the City. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of Commercial and Industrial consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Costs

Updated: 2/18/13

Greenhouse Gas Emission Activities	2008		2009		2010		2011		2012	
	Amount	Costs	Amount	Costs	Amount	Costs	Amount	Costs	Amount	Costs
Energy:										
Electricity (MWh):	606,526	$ 49,467,882	587,431	$ 47,739,930	604,740	$ 51,352,027	597,731	$ 52,673,837	-	-
Residential (MWh)	200,029	$ 20,673,002	195,768	$ 20,228,703	204,219	$ 22,043,388	205,232	$ 22,959,281	-	-
Commercial & Industrial (MWh)	403,856	$ 28,627,332	389,145	$ 27,351,088	397,925	$ 29,140,033	389,962	$ 29,541,566	-	-
Public street and highway lighting	2,641	$ 167,548	2,517	$ 160,139	2,596	$ 168,606	2,537	$ 172,990	-	-
Natural gas (therms)	38,760,943	$ 41,014,515	37,768,799	$ 30,070,319	35,014,055	$ 27,025,663	36,956,443	$ 28,167,505	-	$ -
Residential	20,511,175	$ 23,157,117	19,953,060	$ 17,937,801	18,209,218	$ 15,951,275	19,152,383	$ 16,585,964	-	-
Commercial and industrial	18,249,768	$ 17,857,398	17,815,739	$ 12,132,518	16,804,837	$ 11,074,388	17,804,060	$ 11,581,541	-	-
Subtotal Energy Costs		**$ 90,482,396**		**$ 77,810,250**		**$ 78,377,690**		**$ 80,841,342**		**-**
Percent of total costs		47%		50%		47%		43%		#DIV/0!
Per-capita costs		$ 1,878		$ 1,572		$ 1,635		$ 1,675		$ -
Residential		$ 910		$ 771		$ 793		$ 819		$ -
Commercial and industrial		$ 969		$ 801		$ 842		$ 856		$ -
Vehicle Miles Traveled:	508,313,244		506,846,665		498,974,345		498,974,345		-	
Total fuel costs		**$ 92,398,021**		**$ 66,540,129**		**$ 77,132,679**		**$ 98,174,546**		
Percent of total costs		48%		42%		46%		43%		#DIV/0!
Per-capita costs		$ 1,918		$ 1,344		$ 1,609		$ 2,034		$ -
Solid Waste Management										
Estimated total MSW managed (US tons)	59,789	**$ 9,886,696**	71,782	**$ 11,559,869**	69,985	**$ 11,173,863**	54,547	**$ 9,000,367**	-	-
Processed via combustion (incineration and RDF processing)	20,081	$ 3,514,160	18,165	$ 3,178,813	14,645	$ 2,562,945	16,868	$ 2,951,820		
Landfilling	15,113	$ 2,191,346	29,357	$ 4,256,755	31,870	$ 4,621,091	14,279	$ 2,070,392		
Recycling	24,595	$ 4,181,190	24,261	$ 4,124,301	23,470	$ 3,989,827	23,401	$ 3,978,156		
Percent of total costs		5.1%		7.4%		6.7%		4.8%		#DIV/0!
Per-capita costs		$ 205		$ 234		$ 233		$ 186		$ -
Water Consumption (gal):										
Residential	1,789,110,326	$ 399,536	1,860,343,660	$ 443,045	1,651,793,579	$ 395,263	1,685,927,885	$ 420,749		
Commercial and Industrial	577,517,490	$ 128,968	589,620,252	$ 140,419	529,013,678	$ 126,590	541,999,198	$ 135,264		
Total	2,366,627,816	**$ 528,504**	2,449,963,912	**$ 583,464**	2,180,807,257	**$ 521,853**	2,227,927,083	**$ 556,013**		
Percent of total costs		0.3%		0.4%		0.3%		0.2%		#DIV/0!
Per-capita costs		$ 11		$ 12		$ 11		$ 12		$ -
Energy Costs of Wastewater Treatment:										
City share of wastewater treatment	2.54%	**$ 254,236**	2.56%	**$ 239,755**	2.48%	**$ 214,666**	2.40%	**$ 218,125**	0.00%	
Percent of total costs		0.1%		0.2%		0.1%		0.1%		#DIV/0!
Per-capita costs		$ 5		$ 5		$ 4		$ 5		$ -
Community Costs Total:		**$ 193,549,853**		**$ 156,733,468**		**$ 167,420,751**		**$ 188,790,393**		**$ -**
Per-capita costs		$ 4,018		$ 3,167		$ 3,492		$ 3,912		-
Other Factors:										
City population	48,169		49,491		47,941		48,262		48,446	

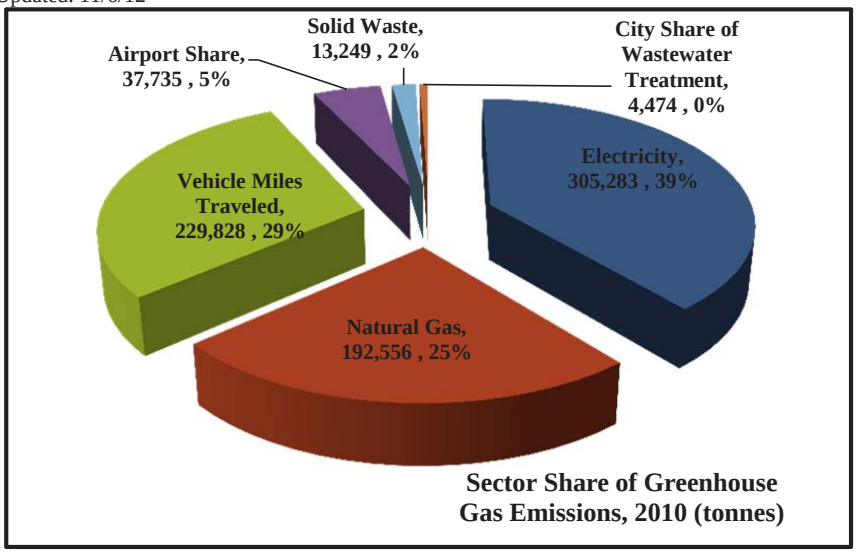
Sector Share of Costs, 2010	Costs	Percent of Total Costs	Percent of Total Costs from Building Energy		
			Residential	Commercial	Total
Electricity	$ 51,352,027	31%	28%	37%	66%
Natural Gas and Fuel Oil	$ 27,025,663	16%	20%	14%	34%
Vehicle Miles Traveled (total fuel costs)	$ 77,132,679	46%			
Solid Waste	$ 11,173,863	7%			
Water Consumption (energy costs)	$ 521,853	0.3%			
Wastewater Treatment (energy costs)	$ 214,666	0.1%			
Total	**$ 167,420,751**	**100%**	**48%**	**52%**	**100%**

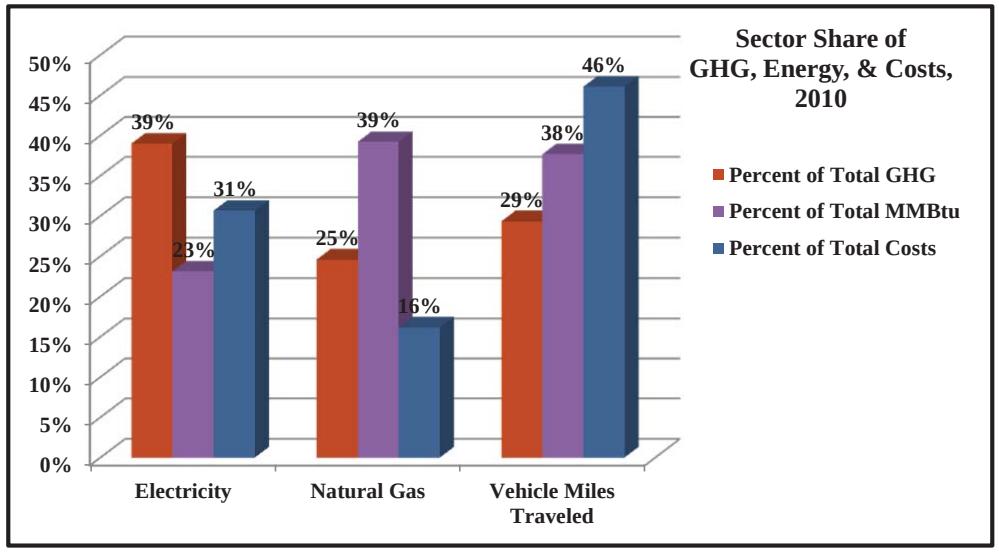
Notes:

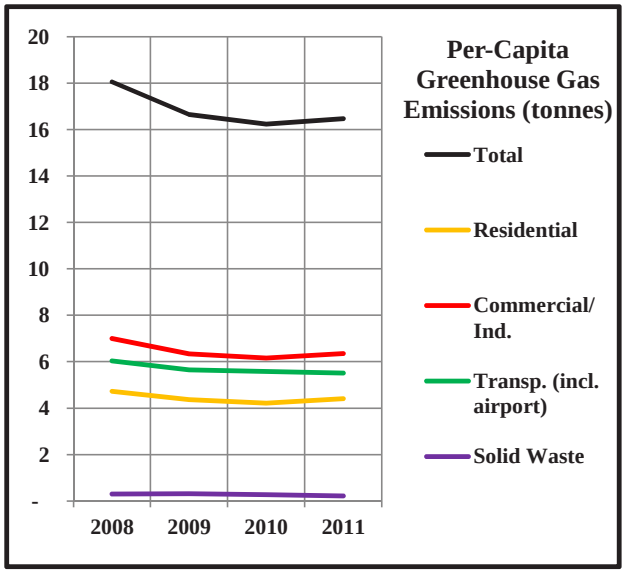
1	Energy costs (electricity, natural gas, fuel oil, coal): Xcel Energy; the US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm; and State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf; "Residual Fuel Oil Prices by Sales Type" Source: US Energy Information Administration: http://www.eia.gov/dnav/pet/PET_PRI_RESID_DCU_R20_M.htm. Prices for sub-bituminous coal from "Table 7.9 Coal Prices, 1949-2011." Source: US Energy Information Administration: http://www.eia.gov/coal/data.cfm#prices
2	Vehicle miles traveled costs: Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet. Primary sources: Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm; Clean Cities Alternative Fuel Price Report, US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report; Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a
3	Solid waste management costs: Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.
4	Potable water costs: Energy consumption rate per gallon is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant*, by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model. Cost per gallon based on the statewide average, commercial/industrial electricity rate (cited above).
5	Wastewater treatment: Source of energy consumption figures: Metropolitan Council Environmental Services. Costs derived using NSP Minnesota cost averages since the Metro Plant is located in St. Paul.

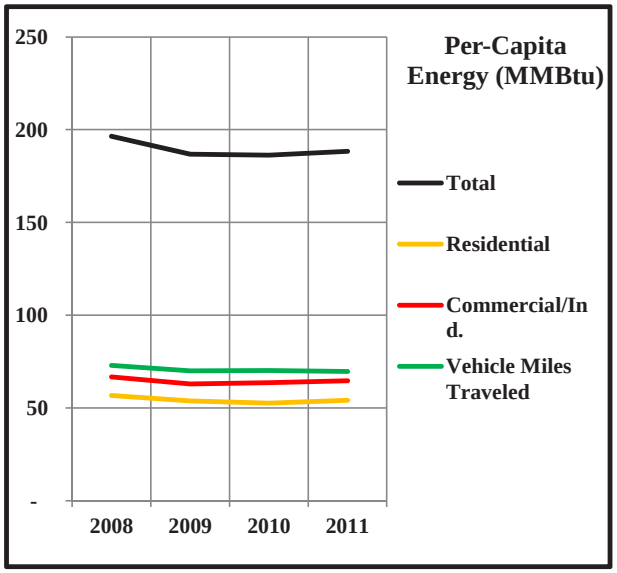
Sector Shares of Greenhouse Gas Emissions and Energy

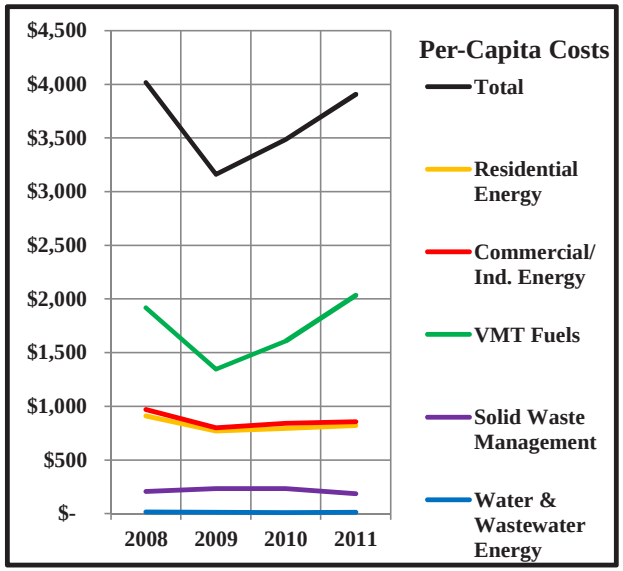
Updated: 11/6/12











Energy Consumption and Associated Greenhouse Gas Emissions

Updated: 2/18/13

Sectors and Fuels	Consumption and Greenhouse Gas Emissions [4]													
	2008		2009		GHG Change from 2008		2010		GHG Change from 2009		2011		2012	
	Amount	GHG	Amount	GHG	Amount	% Change	Amount	GHG	Amount	% Change	Amount	GHG	Amount	GHG
Electricity (MWh) [1]														
Residential														
Wind [2]	3,002	0	2,927	0			2,925	0			2,877	0	-	0
Non-wind-generated power	197,027	114,861	192,841	106,298	(8,564)	-7%	201,294	102,192	(4,106)	-4%	202,354	107,411	-	-
Subtotal	200,029	114,861	195,768	106,298	(8,564)	-7%	204,219	102,192	(4,106)	-4%	205,232	107,411	-	-
Commercial and Industrial														
Wind [2]	27	0	365	0			479	0			0	0	*	0
Non-wind-generated power	403,829	235,421	388,780	214,304	(21,118)	-9%	397,446	201,773	(12,530)	-6%	389,962	206,995	-	-
Subtotal	403,856	235,421	389,145	214,304	(21,118)	-9%	397,925	201,773	(12,530)	-6%	389,962	206,995	-	-
Public street and highway lighting	2,641	1,540	2,517	1,387	(152)	-10%	2,596	1,318	(69)	-5%	2,537	1,347	-	-
Electricity totals	**606,526**	**351,822**	**587,431**	**321,989**	**(29,833)**	**-8%**	**604,740**	**305,283**	**(16,706)**	**-5%**	**597,731**	**315,753**	**-**	**-**
Normalized for weather [3]	**631,592**	**366,362**	**630,501**	**345,597**	**(20,765)**	**-6%**	**592,651**	**299,180**	**(46,417)**	**-13%**	**580,789**	**306,803**	**-**	**#DIV/0!**
Natural gas (therms) [1]														
Residential	20,511,175	112,799	19,953,060	109,730	(3,069)	-3%	18,209,218	100,140	(9,590)	-9%	19,152,383	105,327	0	-
Commercial and Industrial	18,249,768	100,363	17,815,739	97,976	(2,387)	-2%	16,804,837	92,417	(5,559)	-6%	17804060	97,912	0	-
Natural gas totals	**38,760,943**	**213,162**	**37,768,799**	**207,706**	**(5,456)**	**-3%**	**35,014,055**	**192,556**	**(15,149)**	**-7%**	**36,956,443**	**203,238**	**-**	**-**
Normalized for weather [3]	**35,646,559**	**196,035**	**36,432,469**	**200,357**	**4,322**	**2%**	**36,045,431**	**198,228**	**(2,128)**	**-1%**	**37,265,878**	**204,940**	**-**	**#DIV/0!**
Total GHG for electricity, natural gas, and fuel oil		**564,984**		**529,694**	**(35,290)**	**-6%**		**497,839**	**(31,855)**	**-6%**		**518,991**		**-**
Total GHG for electricity and natural gas, normalized for weather		**562,397**		**545,954**	**(16,443)**	**-3%**		**497,409**	**(48,545)**	**-9%**		**511,743**		**#DIV/0!**
Other factors:														
NSP Minnesota GHG emission rates (tonnes GHG/MWh)	0.583		0.551		(0.03)	-5%	0.508		(0.04)	-8%	0.531		0.004	
Population	48,169		49,491		1,322	2.7%	47,941		(1,550)	-3%	48,262		48,446	
Per-capita rates:														
Electricity	12.6	7.3	11.9	6.5	(0.8)	-11%	12.6	6.4	(0.1)	-2%	12.4	6.5	-	-
Natural gas	804.7	4.4	763.1	4.2	(0.2)	-5%	730.4	4.0	(0.2)	-4%	765.7	4.2	0.0	0.0
Total GHG for electricity and natural gas		11.7		10.7	(1.0)	-9%		10.4	(0.3)	-3%		10.8		0.0
Total GHG for electricity and natural gas, normalized for weather		11.7		11.0	(0.6)	-6%		10.4	(0.7)	-6%		10.6		#DIV/0!

Notes:

1. Source: Xcel Energy for electricity and CenterPoint Energy for natural gas
2. The wind turbines that are used for Xcel Energy's "Windsource" program are treated as separate assets. They are not part of the regular system supply and they do not count toward Xcel Energy's target under Minnesota's renewable energy standards.
3. Normalized Standard Heating/Cooling Degree Days predicts the energy consumption based on the average HDD/CDD, not the actual amounts. For electricity, it is assumed 25% of electricity consumption is for air conditioning. For natural gas, it is assumed 80% is for heating buildings.
4. Electricity in MWh, natural gas in therms. Carbon dioxide equivalents (CO_2e) are expressed in metric tonnes, which equal 1,000 kilograms, 2,204.6 pounds, or 1.102 US tons.

Xcel Energy Data

Updated: 11/7/12

Source: Xcel Energy

Year	Class of Service	Electric Only Premise Count	Total Energy Consumed (MWh)	Electric Energy Generated by Wind (MWh) *	Xcel Energy's Minnesota Electric Emission Factor (US tons CO2/MWh)
2008	Residential	20,519	194,118	-	0.638
	Res Windsource	550	5,911	3,002	0.638
	Commercial & Industrial	2,162	403,856	27	0.638
	Pub St & Hwy Ltg	-	2,641	-	0.638
Total		**23,231**	**606,526**	**3,028**	
2009	Residential	20,692	190,169	-	0.603
	Res Windsource	538	5,599	2,927	0.603
	Commercial & Industrial	2,145	389,145	365	0.603
	Pub St & Hwy Ltg	-	2,517	-	0.603
Total		**23,375**	**587,431**	**3,292**	
2010	Residential	20,698	198,609	-	0.555
	Res Windsource	528	5,610	2,925	0.555
	Commercial & Industrial	2,188	397,925	479	0.555
	Pub St & Hwy Ltg	-	2,596	-	0.555
Total		**23,414**	**604,740**	**3,404**	
2011	Residential	20,765	199,698	-	0.581
	Res Windsource	564	5,534	2,877	0.581
	Commercial & Industrial	2,276	389,962	*	0.581
	Pub St & Hwy Ltg	-	2,537	-	0.581
Total		**23,605**	**597,731**	**2,877**	
2012	Residential				
	Res Windsource				
	Commercial & Industrial				
	Pub St & Hwy Ltg				
Total		**-**	**-**	**-**	

Notes:

* In September 2012, it was learned that Xcel Energy had instituted a new policy called the “15/15 Rule.” The new rule applies when there are less than 15 premises (customers) in a particular batch of information (i.e. Windsource customers) or if the usage for any one particular customer is more than 15% of the sample. In order to protect the data privacy of those customers, that data is excluded. The rule applies to the consumption data for Commercial and Industrial wind in the case of the City. The extent of the excluded data and for which years the rule was applied is not known. However, the wind-based consumption is not likely to comprise a significant portion of Commercial and Industrial consumption (probably less than 1%) and its exclusion has no effect on GHG emissions.

Notes (from Xcel Energy):

1. An Xcel Energy 'customer' may receive electric, gas or both electric and gas service at a given location. To provide the clearest breakout of customers, this information has been prepared using a 'premise' as a proxy for a customer. A premise is a physical location where electricity, gas or both may be supplied. Typically there is only one meter for electricity and/or one for gas at each location.

Xcel Energy Data					
Updated: 11/7/12					
Source: Xcel Energy					
2. Only premises showing energy consumption during the reporting period are included.					
3. The reports include all retail energy consumed within the specified local government's boundaries. Consumption, including streetlights, traffic signals and other non-metered premises, by all types of government is incorporated. Also included is the use of energy by the company, excluding only the gas to fuel power plants (which is accounted for in the electric emission factor) and gas to fuel the compressors on the gas pipeline system.					
4. Premises are assigned to a class of service based on the electric and gas rates used at the premise. If a premise has more than one class of service, the service with the highest priority is assigned. Priorities are Residential=1, Residential Windsource=2, Commercial=3, Commercial Windsource=4, Industrial=5 and Industrial Windsource=6.					
5. Windsource is a voluntary wind energy program offered by Xcel Energy to its electric customers in Colorado. Customers have the option of purchasing 100 - kilowatt-hour (kWh) blocks of Windsource or the 100% Windsource option. (1000 kWh equals one Megawatt-hour or MWh). For Windsource rows, 'Total Electric Energy Consumed (MWh)' column includes all energy consumed by Windsource premises whether from renewable Windsource generation or from traditional non-renewable sources.					
6. Windsource energy is included in the calculation of Xcel Energy's Colorado Electric Emission Factor. The total emissions for the community, or 'Total Tons of CO2 From CONS' column, is calculated with Windsource emissions assigned a zero emissions factor. This may not reflect current or future carbon reporting protocols or the Company's position on them; check your carbon reporting protocols to determine how green pricing programs are handled.					
7. By definition, commercial electric service is delivered at secondary voltage (typically 120, 208, 240 or 480 volts). Industrial electric service is delivered at primary voltage (typically 13 Kilovolts) or transmission voltage (typically 115 or 230 Kilovolts).					
8. Apartment buildings often have individual electric meters for each unit, which are served on a residential rate and are included in the electric Residential class of service. They usually have another electric meter for laundry rooms and for common area lighting and cooling, served on a commercial electric rate and included in the Commercial class. These same apartment buildings often have one gas meter connected to a boiler and a water heater providing heat and hot water to all of the individual units. These meters are served on a commercial gas rate and are included in the gas Commercial class. However, if each unit has an individual gas meter serving only that unit's individual furnace and/or water heater, then it is served on a residential gas rate and included in the gas Residential class.					
9. For gas transportation customers, where gas is purchased from a third party supplier and Xcel Energy only delivers the gas to the end customer, premises and consumption are included in the gas Commercial class of service rows.					
10. Gas transportation customers are set up by contract rather than as traditional premises. The 12-month median of the number of gas transportation service and facilities charges paid in the jurisdiction is used as a proxy.					
11. No premise counts are provided for Public Street & Highway Lighting since these are set up by contract rather than as traditional premises. The identified local government is the major or only customer.					
This report was prepared by Marketing - Information Services. Consumption data is from Xcel Energy's internal databases used for reporting to regulatory agencies. It is based on information available on 6/20/2011. It should be consistent with various reports prepared for those agencies.					

Natural Gas Usage	
Source: CenterPoint Energy	
Fiscal year: 2008	**Total (therms)**
Residential Service Gas	20,511,175
Commercial/Industrial Gas	18,249,768
Total	**38,760,943**
Fiscal Year: 2009	**Total (therms)**
Residential Service Gas	19,953,060
Commercial/Industrial Gas	17,815,739
Total	**37,768,799**
Fiscal Year: 2010	**Total (therms)**
Residential Service Gas	18,209,218
Commercial/Industrial Gas	16,804,837
Total	**35,014,055**
Fiscal Year: 2011	**Total (therms)**
Residential Service Gas	19,152,383
Commercial/Industrial Gas	17,804,060
Total	**36,956,443**
Fiscal Year: 2012	**Total (therms)**
Residential Service Gas	
Commercial/Industrial Gas	

Conversion Factors

Updated: 12/29/12

Table 1: Conversion Factors for Utilities	2008			2009			2010			2011			2012		
	GHG Emission Factors	Global Warming Potential	GHG	GHG Emission Factors	Global Warming Potential	GHG	GHG Emission Factors	Global Warming Potential	GHG	GHG Emission Factors	Global Warming Potential	GHG	GHG Emission Factors	Global Warming Potential	GHG
Xcel Energy/NSP															
CO_2 (lbs/MWh) [1]	1,276.0	1	1,276	1,206.0	1	1,206.0	1,110.0	1	1,110.0	1,161.0	1	1,161.0		1	-
N_2O (lbs/MWh) [2]	0.02779	310	8.6	0.02779	310	8.6	0.02779	310	8.6	0.02779	310	8.6	0.02779	310	8.6
CH_4 (lbs/MWh) [2]	0.02880	21	0.6	0.02880	21	0.6	0.02880	21	0.6	0.02880	21	0.6	0.02880	21	0.6
Total CO2e (lbs/MWh)			1,285.2			1,215.2			1,119.2			1,170.2			9.2
Total CO2e (tonnes/MWh) [3]			**0.583**			**0.551**			**0.508**			**0.531**			**0.004**
CenterPoint Energy [4]															
CO_2 (kg/therm)	5.302	1	5.3	5.302	1	5.3	5.302	1	5.3	5.302	1	5.3	5.302	1	5.3
N_2O (kg/therm)	0.00042	310	0.1	0.00042	310	0.1	0.00042	310	0.1	0.00042	310	0.1	0.00042	310	0.1
CH_4 (kg/therm)	0.00320	21	0.1	0.00320	21	0.1	0.00320	21	0.1	0.00320	21	0.1	0.00320	21	0.1
Total CO_2e (kg/therm)			5.5			5.5			5.5			5.5			5.5
Total CO_2e (tonnes/therm)			**0.005**			**0.005**			**0.005**			**0.005**			**0.005**

Notes:

1. Xcel Energy emission factor for CO_2 is for Xcel's wholly owned generating company, NSP Minnesota.
2. Emission factors for CH_4 and N_2O are from the USEPA eGRID for Midwest Regional Organization West. Factors do not include emissions from transmission and distribution losses. Latest data is for 2009. Source: http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html
3. Carbon dioxide equivalents (CO_2e) are expressed in metric tonnes, which equal 1,000 kilograms, or 2,204.6 pounds.
4. Source: Table G.1 and G3, Local Government Operations Protocol, for the Quantification and Reporting of Greenhouse Gas Emissions Inventories, Version 1.1, May 2010. The therm (symbol thm) is a unit of heat energy equal to 100,000 British thermal units (BTU). It is approximately the energy equivalent of burning 100 cubic feet (often referred to as 1 hcf) of natural gas. A million BTUs (MMBtu) equals a decatherm (10 therms). Natural gas emission factors do not vary substantially over time.

Table 2: Greenhouse Gas Emission Sources	Unit	Data Source	kBtu	GHG (tonnes)	GHG Per kBtu (tonnes)
Electricity (NSP MN 2010)	1 kWh	1	3,412.0	0.0005	0.0001
Natural gas	Therms	1	100.0	0.0055	0.0550
E-10 gasoline	US gallon	2	120.1	0.0089	0.0743
B-5 diesel	US gallon	2	126.8	0.0105	0.0829
Gasoline	US gallon	3	125.0	0.0092	0.0739
Diesel	US gallon	3	129.5	0.0107	0.0830
Ethanol	US gallon	3	76.1	0.0061	0.0795
Fuel oil (average of #5 and #6)	US gallon	4	145.0	0.0113	0.0780
Distillate fuel oil (average. of #1, #2, & #4)	US gallon	4	141.0	0.0110	0.0780
Propane	US gallon	4	91.0	0.0059	0.0647
Biodiesel (B100)	US gallon	4	128.0	0.0099	0.0777

Data source:

1. Minnesota Public Building Enhanced Energy Efficiency Program (PBEEEP)
2. The State of Minnesota requires gasoline and diesel fuels sold in the state be oxygenated by 10% and 5% ethanol respectively.
3. "Fuel Economy Impact Analysis of RFG". US Environmental Protection Agency. 2007-08-14. http://www.epa.gov/oms/rfgecon.htm.
4. Table G.11 *International Local Government Greenhouse Gas Emissions Analysis Protocol, Version 1.1* , May 2010.

Table 3: Greenhouse Gas Emissions for Liquid Fuels	GHG Emission Factors			National Fleet Share [4]	Minnesota Fuel Blends [5]		Fuel Oil (average. of #5 & #6) [1]	Distillate fuel oil (average. of #1, #2, & #4) [1]	Propane
	E-100 (Ethanol) [3]	Gasoline	Diesel		E-10 Gasoline	B-5 Diesel			
CO_2 (g/gal) [1]	5,750	8,780	10,210	9,025	8,477	9,987	10,740	10,450	5,590
CO_2e (g/gal) [2]	6,053	9,242	10,747	9,500	8,923	10,513	11,305	11,000	5,884
CO_2e (tonnes per 1,000 gal)	6.05	9.24	10.75	9.50	8.92	10.51	11.31	11.00	5.88
National fleet share [4]	2%	76%	22%						

Notes:

1. Table G.11 and G.13, *International Local Government Greenhouse Gas Emissions Analysis Protocol* , Version 1.1, May 2010.
2. Source: http://www.epa.gov/oms/climate/420f05004.htm. "In addition to carbon dioxide, automobiles produce methane (CH4) and nitrous oxide (N2O) from the tailpipe, as well as HFC emissions from leaking air conditioners. The emissions of CH4 and N2O are related to vehicle miles traveled rather than fuel consumption, and the emissions of CH4, N2O, and HFCs are not as easily estimated from a vehicle as for CO2.[3.] On average, CH4, N2O, and HFC emissions represent roughly 5 - 6 percent of the GHG emissions from passenger vehicles, while CO2 emissions account for 94-95 percent, accounting for the global warming potential of each greenhouse gas. (These percentages are estimated from the EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2001.)" To simplify this estimate, it is assumed that CH4, N2O, and HFCs account for 5 percent of emissions, and the CO2 estimate was multiplied by 100/95 to incorporate the contribution of the other greenhouse gases.
3. Source: Table G.12, *International Local Government Greenhouse Gas Emissions Analysis Protocol* provides the E-100 emission factor. Emission factors for E-85 and E-10 are derived as proportionate mixtures of E-100 and gasoline.
4. The national fleet share refers to the percentage share of the main transportation fuels used in the US fleet. Source (2005 data): http://needtoknow.nas.edu/energy/energy-sources/emerging-technologies/biofuels.php
5. Transportation fuels sold in Minnesota have blends of ethanol that are higher than the national average, thus, per-gallon GHG emissions will be relatively lower. From 2001 to 2005, the state required 10% ethanol in gasoline. From 2006 to the present, the state added the requirement of 5% ethanol in diesel fuels.

Conversion Factors

Updated: 12/29/12

Table 4a: Derivation of MMBtu Associated with Vehicle Miles Traveled[1]	Gasoline		Ethanol		Diesel		Biodiesel		Total MMBtu	Total VMT	MMBtu per Million VMT
	Gallons	MMBtu	Gallons	MMBtu	Gallons	MMBtu	Gallons	MMBtu			
Year: 2006	103,021,426	12,877,678	11,446,825	871,103	24,957,074	3,231,941	509,328	65,242	17,045,965	2,407,535,255	7,080
2007	106,606,651	13,325,831	11,845,183	901,418	26,045,742	3,372,924	531,546	68,088	17,668,262	2,524,701,350	6,998
2008	101,502,106	12,687,763	11,278,012	858,257	25,010,186	3,238,819	510,412	65,381	16,850,220	2,436,024,630	6,917
2009	98,071,149	12,258,894	10,896,794	829,246	23,873,759	3,091,652	994,740	127,421	16,307,213	2,385,221,345	6,837
2010	97,036,508	12,129,564	10,781,834	820,498	23,743,262	3,074,752	1,249,645	160,074	16,184,887	2,400,983,870	6,741
2011	96,168,052	12,021,007	10,685,339	813,154	23,663,739	3,064,454	1,245,460	159,419	16,058,034	2,385,924,781	6,730

Notes:

1 Fuel consumption is for the City of Minneapolis from 2006 to 2010. Data are from the City of Minneapolis Greenhouse Gas Inventories: A Geographic Assessment, City of Minneapolis, 5/11/12. Data for other years are based on linear regression using the actual data and kBtu estimates from the Clean Air Climate Protection software developed by ICLEI—Local Governments for Sustainability.

Table 4b: Derivation of Costs Associated with Vehicle Miles Traveled[1]	Gasoline[2]			Ethanol[3]			Diesel[4]			Biodiesel[3]			Total Fuel Costs	Total VMT	Fuel Costs per VMT
	Gallons	Cost/Gallon	Total Costs	Gallons	Cost/Gallon	Total Costs	Gallons	Cost/Gallon	Total Costs	Gallons	Cost/Gallon	Total Costs			
Year: 2006	103,021,426	$ 2.52	$ 259,510,972	11,446,825	$ 1.97	$ 22,550,245	24,957,074	$ 2.67	$ 66,610,431	509,328	$ 3.31	$ 1,685,876	$ 350,357,524	2,407,535,255	$ 0.15
2007	106,606,651	$ 2.77	$ 295,620,243	11,845,183	$ 2.29	$ 27,125,469	26,045,742	$ 2.86	$ 74,542,914	531,546	$ 3.07	$ 1,631,846	$ 398,920,472	2,524,701,350	$ 0.16
2008	101,502,106	$ 3.13	$ 317,498,588	11,278,012	$ 2.60	$ 29,322,831	25,010,186	$ 3.76	$ 93,988,279	510,412	$ 3.91	$ 1,995,711	$ 442,805,409	2,436,024,630	$ 0.18
2009	98,071,149	$ 2.32	$ 227,917,350	10,896,794	$ 2.21	$ 24,081,915	23,873,759	$ 2.43	$ 58,084,856	994,740	$ 3.07	$ 3,053,852	$ 313,137,972	2,385,221,345	$ 0.13
2010	97,036,508	$ 2.79	$ 270,246,675	10,781,834	$ 2.42	$ 26,092,038	23,743,262	$ 2.96	$ 70,375,029	1,249,645	$ 3.55	$ 4,436,240	$ 371,149,981	2,400,983,870	$ 0.15
2011	96,168,052	$ 3.55	$ 341,396,586	10,685,339	$ 3.12	$ 33,338,258	23,663,739	$ 3.80	$ 89,969,536	1,245,460	$ 3.80	$ 4,732,748	$ 469,437,128	2,385,924,781	$ 0.20

Notes:

1 Fuel consumption is for the City of Minneapolis from 2006 to 2010. Data are from the City of Minneapolis Greenhouse Gas Inventories: A Geographic Assessment, City of Minneapolis, 5/11/12. Data for other years are based on linear regression using the actual data and kBtu estimates from the Clean Air Climate Protection software developed by ICLEI—Local Governments for Sustainability.

2 Weekly Retail Gasoline and Diesel Prices, Minnesota (all grades). Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_smn_a.htm

3 Source: *Clean Cities Alternative Fuel Price Report* , US Department of Energy, http://www.afdc.energy.gov/publications/search/keyword/?q=alternative%20fuel%20price%20report

4 Midwest #2 Diesel Retail Prices: Source: US Energy Information Agency, http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=emd_epd2d_pte_r20_dpg&f=a

Table 5: Emission Factors and Byproducts for the Combustion of Municipal Solid Waste (MSW)	2006	2007	2008	2009	2010	2011	2012
Hennepin Energy Resources Center (HERC) mass burn garbage incinerator [1]							
GHG emissions (tonnes):							
Fossil	133,191	134,057	133,972	129,883	131,292	140,341	
Biogenic	225,765	227,890	228,264	219,170	218,699	193,804	
Total waste (US tons)	365,000	346,676	348,979	338,337	363,350	364,575	
Fossil GHG emission rate (tonnes per ton of MSW)	0.365	0.387	0.384	0.384	0.361	0.385	
Biogenic GHG emission rate (tonnes per ton of MSW)	0.619	0.657	0.654	0.648	0.602	0.532	
Byproducts of combustion:							
Exported electricity (MWh)	221,001	223,487	215,402	187,053	206,178	209,117	
Energy value of exported electricity (MMBtu)	754,055,412	762,537,644	734,951,624	638,224,836	703,479,336	713,507,204	
Steam sales (1,000 lbs) [2]				101,507	82,504	89,584	
Energy value of exported steam (MMBtu)[2]				101,507	82,504	89,584	
Subtotal of energy value (MMBtu)	754,055,412	762,537,644	734,951,624	638,326,343	703,561,840	713,596,788	
GHG equivalent of exported electricity (tonnes)[1]	131,686	136,005	125,614	103,142	104,710	110,132	
GHG equivalent of exported steam (tonnes)[3]				6	5	5	
Total GHG equivalent of exported electricity and steam	131,686	136,005	125,614	103,148	104,715	110,137	
Per ton of MSW total GHG equivalent of exported electricity and steam (tonnes)	0.36	0.39	0.36	0.30	0.29	0.30	
Ramsey/Washington County (Newport) and Elk River RDF facilities [4]							
Fossil GHG emission rate (tonnes per ton of MSW)	0.365	0.387	0.384	0.384	0.361	0.385	
Biogenic GHG emission rate (tonnes per ton of MSW)	0.619	0.657	0.654	0.648	0.602	0.532	
GHG emission equivalent for electricity produced by RDF combustion (tonnes per ton of MSW processed)	0.36	0.39	0.36	0.30	0.29	0.30	

Notes:

1 Data for 2006 to 2010 from *City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis* , 5/11/12. The inventory includes data for the Hennepin Energy Resource Center (HERC) from Hennepin County, which owns the mass-burn, waste-to-energy garbage incinerator. 2010 data available per the US EPA's GHG Mandatory Reporting Rule: http://ghgdata.epa.gov/ghgp/main.do. According to the ICLEI Community Protocol (Appendix E), "The combustion of MSW components originally manufactured from fossil fuels (e.g., plastics, certain textiles, rubber, liquid solvents, and waste oil) results in fossil based CO_2. The CO_2 emissions from combusting the biomass portion of MSW (e.g., yard waste, paper products) are biologic in origin and are reported separately. Only the fossil-based emissions are counted for the purposes of carbon baseline assessments per the Protocol (Appendix E, p. 15). The fossil-based emissions also include all of the CH_4 and N_2O emissions.

2 Source for steam sales: Hennepin County. Steam energy content varies with pressure and feed water temperature. Energy value represents industry accepted estimate used when exact steam conditions are not known: 1 kBtu/lb. Source: Natural Resources, Canada, http://oee.nrcan.gc.ca/commercial/technical-info/tools/2531

3 Steam sales offset natural gas consumption in the downtown district energy systems. Since a therm of natural gas equals 100 kBtu, the energy value of the exported steam is divided by 100 times the natural gas emission factor to yield GHG emissions.

4 These refuse derived fuel (RDF) facilities process municipal solid waste into fuel pellets that are burned in certified Xcel Energy power plants in Minnesota. According to the EPA's Waste Reduction Model (WARM), processing MSW into RDF yields a more uniform fuel that has a higher heating value than that used for a mass burn facility (such as HERC). The EPA and ICLEI-USA have yet to derive a GHG emission rate that applies to MSW that has been processed and burned in this manner. As a default until an acceptable rate is available, the GHG emission rate for the HERC facility is used. The per-ton GHG equivalent of the electricity byproduct is assumed to be the same as for exported electricity for the HERC facility.

Cost Factors

Updated: 10/24/12

Cost Factors	2008	2009	2010	2011
Electricity:				
NSP Minnesota electricity rates (dollars per MWh) [1]				
Residential	$ 103.35	$ 103.33	$ 107.94	$ 111.87
Commercial	$ 78.33	$ 76.95	$ 81.52	$ 83.32
Industrial	$ 63.44	$ 63.62	$ 64.94	$ 68.19
Retail	$ 81.08	$ 80.94	$ 84.61	$ 87.45
Average of Commercial and Industrial Rates	$ 70.89	$ 70.29	$ 73.23	$ 75.76
Average Retail Price of Electricity, Minnesota (dollars per MWh): [2]				
Residential	$ 97.40	$ 100.40	$ 105.90	$ 109.73
Commercial	$ 78.80	$ 79.20	$ 83.80	$ 85.60
Industrial	$ 58.70	$ 62.60	$ 62.90	$ 65.60
Average of Commercial and Industrial Rates	$ 68.75	$ 70.90	$ 73.35	$ 75.60
Natural Gas:				
NSP Minnesota natural gas rates (dollars per therm) [1]				
Residential	$ 1.132	$ 0.897	$ 0.894	$ 0.879
C & I Firm	$ 1.070	$ 0.832	$ 0.814	$ 0.806
C & I Interruptible	$ 0.897	$ 0.540	$ 0.533	$ 0.540
Average of Commercial and Industrial Rates	$ 0.983	$ 0.686	$ 0.673	$ 0.673
Average Retail Price of Natural Gas, Minnesota (dollars per therm): [3]				
Residential	$ 1.129	$ 0.899	$ 0.876	$ 0.866
Commercial	$ 1.052	$ 0.796	$ 0.760	$ 0.743
Industrial	$ 0.905	$ 0.566	$ 0.558	$ 0.558
Average of Commercial and Industrial Rates	$ 0.979	$ 0.681	$ 0.659	$ 0.651
Vehicle Miles Traveled:				
Cost per vehicle mile traveled (dollars per mile)				
Total fuel costs [4]	$ 0.18	$ 0.13	$ 0.15	$ 0.20
Solid waste management (dollars per ton) [5]				
Processed via combustion (incineration and RDF processing)	$ 175	$ 175	$ 175	$ 175
Landfilling	$ 145	$ 145	$ 145	$ 145
Recycling	$ 170	$ 170	$ 170	$ 170
Potable Water Production and Distribution				
Electricity consumption per gallon produced and distributed (kWh per gallon) [6]	0.0035	0.0035	0.0035	0.0035
Cost per gallon [7]	$ 0.00022	$ 0.00024	$ 0.00024	$ 0.00025
Metro Wastewater Treatment Plant [8]				
Electricity consumption (MWh)	144,693	138,685	126,149	124,925
Cost of electricity	$ 9,179,324	$ 8,823,140	$ 8,192,116	$ 8,518,636
Natural gas consumption (therms)	843,914	790,100	688,632	846,982
Cost of natural gas	$ 829,977	$ 542,293	$ 463,780	$ 569,888
Total energy costs	$ 10,009,301	$ 9,365,433	$ 8,655,896	$ 9,088,523
Fuel oil ($ per gallon) [9]	$ 1.70	$ 1.16	$ 1.64	$ 1.87

Notes:

1	Source: Xcel Energy
2	US Energy Information Administration, http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_smn_a.htm
3	Data for 2011 are forecasted based on actual 2008-2010 data. Source: State Electricity Profiles 2010, January 2012, U.S. Energy Information Administration, http://www.eia.gov/electricity/state/pdf/sep2010.pdf
4	Total fuel costs are derived in Table 4b in the Conversion Factors spreadsheet.
5	Figures are highly variable averages based on 2008 data. Since data is not available for subsequent years, the averages are assumed to be relatively stable and applicable for 2009-2011. The data exclude external costs associated with transportation; air, water, and land pollution; greenhouse gases; resource depletion; etc. They also exclude the external values associated with profits, economic activity, employment, resource & energy conservation, reduced long term liability, etc. Not shown are average costs for household hazardous waste and problem materials ($225 per ton), source-separated organics ($220 per ton), and re-use and reduction efforts (which are assumed to be cost neutral). Source: "2008 Payments and Spending for Integrated Solid Waste Management (ISWM) in Minnesota," Sig Scheurle, Minnesota Pollution Control Agency.
6	Electrical consumption rate is based on the collective experience of numerous US cities as reported in the *Climate and Air Pollution Planning Assistant* , by ICLEI Local Governments for Sustainability USA, "Low maintenance landscaping" model.
7	Cost per gallon equals electricity per gallon times the statewide average, commercial/industrial electricity rate. Baseline analyses for other cities indicate that natural gas consumption costs related to the production and distribution of potable water constitute about 8% of total costs. Therefore, the electricity costs are divided by 0.92 to account for the natural gas costs.
8	Source of energy consumption figures: Metropolitan Council Environmental Services. Costs derived using NSP Minnesota cost averages since the Metro Plant is located in St. Paul.

Seasonal Cooling and Heating Degree Days

Updated: 11/12/12

Year	HDD [1, 2]	CDD [1]	Normalizing Factor [3]	
			HDD	CDD
2008	8,264	859	90%	117%
2009	7,778	774	96%	129%
2010	7,170	1,088	104%	92%
2011	7,357	1,129	101%	89%
2012				
2020				
2030				
Base [3]	7,434	1,001	100%	100%

Notes:

1	Heating degree days (HDD), are a measure of how much (in degrees), and for how long (in days), outside air temperature was lower than a specific base temperature (or balance point). They are used for calculations relating to the energy consumption required to heat buildings. Cooling degree days (CDD) are a measure of how much (in degrees), and for how long (in days), outside air temperature was higher than a specific base temperature. They are used for calculations relating to the energy consumption required to cool buildings. Source: Degree Days.net, Station ID: KMSP, http://www.degreedays.net
2	Heating degree day data includes the winter months prior to the listed year.
3	Because temperature has an effect on building energy consumption, this table allows the normalization of the building energy consumption data to better assess year-to-year consumption changes and trends. The "Base" figures, which are the 118-year averages of Heating Degree Days and Cooling Degree Days (HDD/CDD) for the Twin Cities, serve as the bases for calculating the "Normalizing Factor" for all cities participating in the Regional Indicators Initiative Project (source: http://climate.umn.edu/text/historical/mspcooldd.txt). For example, if the actual seasonal cooling degree day is 10% higher than the Base, the portion of electricity consumption attributable to air conditioning is decreased by 10% to be normalized. It is assumed that 25% of all electricity consumption is for air conditioning. The remaining 75% is unaffected. Similarly for heating, if the seasonal CDD figure is 10% higher than the Base, the portion of total natural gas consumption associated with heating (which is assumed to be 80%) is reduced by 10% for normalization.

Vehicle Miles Traveled

Updated: 11/19/12

Roadway Classification	Miles of Roadway [1]	Annual Vehicle Miles Traveled [1]											
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
US Trunk Highway (USTH)	3.4	89,172,420	82,518,105	84,003,290	82,960,488	83,561,275	84,336,170	84,336,170	80,907,960	81,009,560	78,561,140		
Minnesota Trunk Highway (MNTH)	8.1	290,272,455	259,774,515	264,450,530	265,612,422	267,535,510	252,891,710	252,891,710	253,137,678	253,456,000	249,501,590		
County State Aid Highway (CSAH)	7.9	63,648,700	68,104,255	51,918,330	53,049,870	53,292,920	53,628,355	49,953,900	50,303,040	50,310,140	49,767,750		
Municipal State Aid Street (MSAS)	40.1	76,153,235	76,989,815	83,539,010	85,057,302	82,356,775	82,765,940	83,118,165	83,655,156	81,871,690	81,194,615		
Municipal Streets (MUN)	162.7	35,814,530	37,426,005	37,398,630	37,118,622	37,035,820	37,035,820	40,059,115	40,309,410	40,199,275	39,949,250		
Total VMT	222.3	555,061,340	524,812,695	521,309,790	523,798,704	523,782,300	510,657,995	510,359,060	508,313,244	506,846,665	498,974,345	498,974,345	
Percent change from previous year			-5%	-1%	0.5%	0.0%	-3%	-0.1%	-0.4%	-0.3%	-1.6%	0.0%	
GHG emission rate (tonnes/million VMT)[2, 3]		482.2	484.2	481.0	481.5	474.0	486.4	480.9	475.5	468.0	460.6	460.0	
GHG emissions (tonnes)		**267,651**	**254,114**	**250,750**	**252,209**	**248,273**	**248,384**	**245,432**	**241,703**	**237,204**	**229,828**	**229,528**	
MMBtu per million VMT[2]							7,080	6,998	6,917	6,837	6,741	6,730	
MMBtu associated with VMT							3,615,459	3,571,493	3,516,003	3,465,311	3,363,586	3,358,097	
Per-capita rates:													
Population		47,465	47,570	48,156	48,050	47,448	46,896	47,090	48,169	49,491	47,941	48,262	47,676
Per-capita VMT		11,694	11,032	10,825	10,901	11,039	10,889	10,838	10,553	10,241	10,408	10,339	
Percent change from previous year			-5.7%	-1.9%	0.7%	1.3%	-1.4%	-0.5%	-2.6%	-3.0%	1.6%	-0.7%	
Per-capita GHG emissions (tonnes)		5.64	5.34	5.21	5.25	5.23	5.30	5.21	5.02	4.79	4.79	4.76	
Percent change from previous year			-5.3%	-2.5%	0.8%	-0.3%	1.2%	-1.6%	-3.7%	-4.5%	0.0%	-0.8%	

Notes:

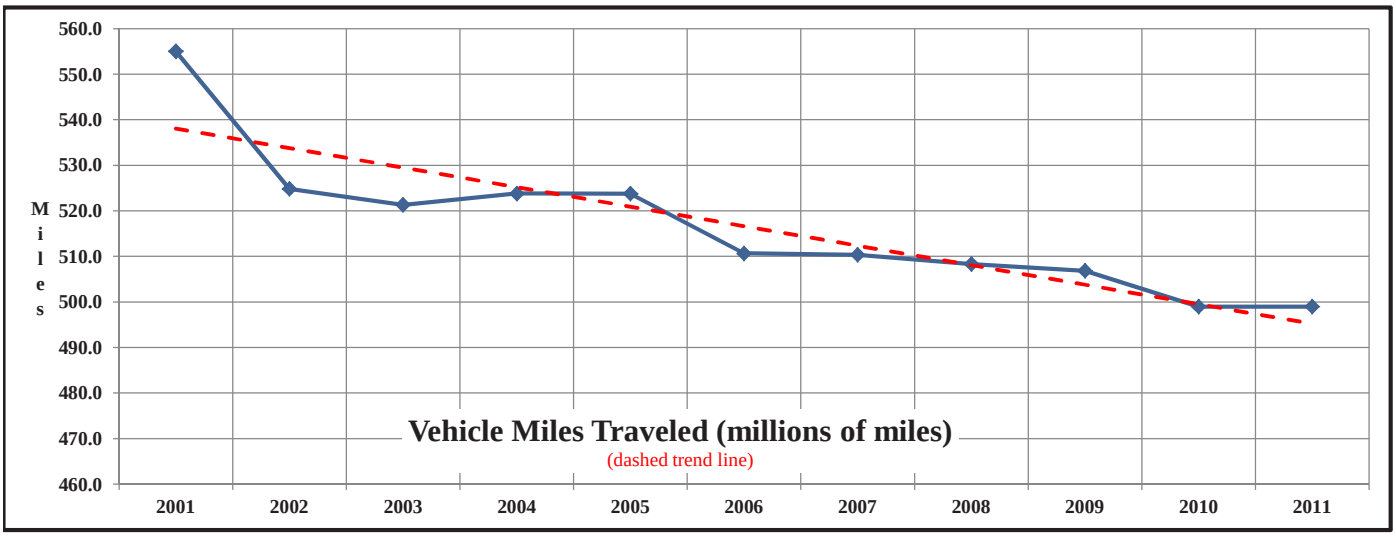
1 Source of data: Minnesota Department of Transportation (MNDOT). http://www.dot.state.mn.us/roadway/data/reports/vmt.html. Data for 2011 is not yet available. Per the advice of MNDOT staff, 2010 data is assumed to be stable for 2011 until actual 2011 data is available. Miles of roadway vary slightly over time as designations of roads change. Figures listed in 2008 mileages.

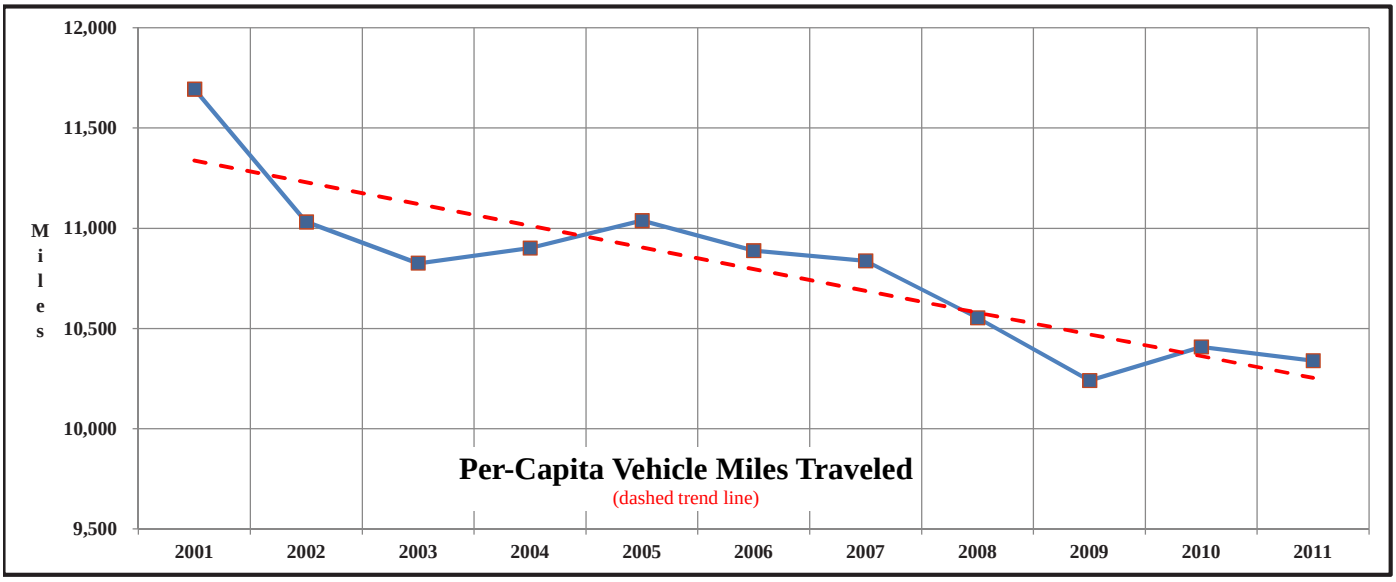
2 The emission rates for 2006 to 2010 are from the City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory, City of Minneapolis, 5/11/12. To develop fuel consumption by type of fuel, the analysis used a combination of national fleet mix from the Clean Air Climate Protection (CACP) software from ICLEI--Local Governments for Sustainability (see: http://www.icleiusa.org/action-center/tools/cacp-software) and national fleet average fuel economy assumptions from the Energy Information Administration's 2012 Annual Energy Outlook. Fuel consumption estimates account for Minnesota's requirement that all gasoline and diesel fuels sold in the state since 2006 include 10% and 5% ethanol respectively, and from 2001-2005 to account for the use of 10% ethanol in gasoline only (B5 diesel was introduced state-wide in late 2005). Emission rates from 2001 to 2005 are derived via linear regression analysis based on the actual data from 2006 to 2010 from the City of Minneapolis Greenhouse Gas Inventories and the GHG emission rate predicted by CACP software (which, as a national rate, is less accurate for Minnesota). The emission rate for 2011 is derived via linear regression using the 2001 to 2010 figures. The MMBtu per 100 million VMT rate for 2006 to 2010 is based on the projected fuel consumption by fuel type in the City of Minneapolis Greenhouse Gas Inventories, Table 2.6. using the kBtu per fuel type listed on the "Conversion Factors" spreadsheet in this Regional Indicators Initiativ Project report. The MMBtu per 100 million VMT rate for 2001 to 2005 are derived via linear regression analysis based on the actual data from 2006 to 2010 from the City of Minneapolis Greenhouse Gas Inventories and the total VMT for those years.

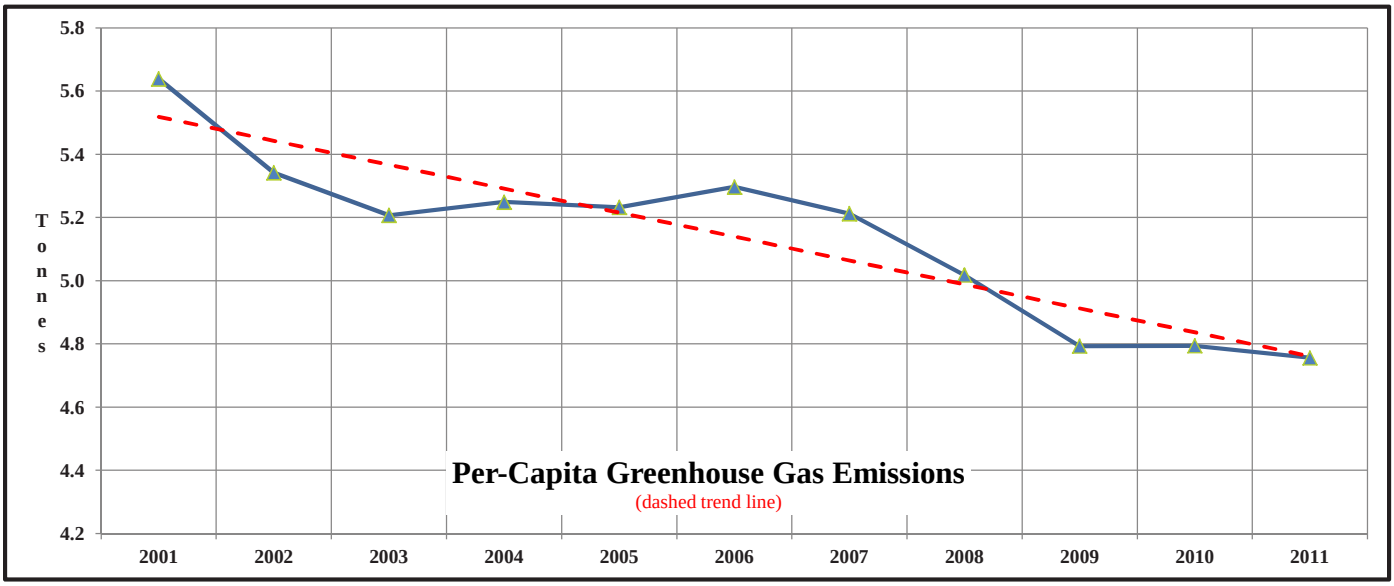
3 GHG emission rates for the national fleet decrease as older less-efficient vehicles are replaced by new, more efficient ones and, to a lesser degree, the production of "cleaner" fuels..

Vehicle Miles Traveled Charts

Updated 8/14/12







Airport Share: Minneapolis Saint Paul International Airport

Updated 8/14/12

	Category	2005	2006	2007	2008	2009	2010	2011	2012
Minneapolis St. Paul International (MSP) Airport: [1, 2]									
	Departing flight and airport CO_2e emissions (tonnes)	4,295,573	4,008,781	3,808,471	3,262,233	2,802,477	2,515,685	2,418,816	
	Aircraft operations [2]	532,239	475,668	452,972	450,044	432,395	437,075	436,506	
	CO_2e per operation (tonnes) [1]	8.1	8.4	8.4	7.2	6.5	5.8	5.5	
City share of MSP Airport emissions [3]									
	Percent of city resident, home-based trips, as a percent of MSP total home-based trips	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
	City allocation of airport emissions (tonnes)	64,434	60,132	57,127	48,933	42,037	37,735	36,282	

Notes:

1	The Metropolitan Airport Commission conducted a greenhouse gas baseline assessment for the Minneapolis St. Paul International (MSP) Airport for the years 2005, 2007, and 2009. (Refer to: *Greenhouse Gas Report: Metropolitan Airports Commission, December 2010*, http://www.mspairport.com/docs/about-msp/sustainability/MSP-2010-GHG-Report-Jan-2011.aspx.) The greenhouse gas inventory prepared for the City of Minneapolis (*City of Minneapolis Greenhouse Gas Inventories: A Geographic Inventory* , City of Minneapolis, 5/11/12) used linear regression to estimate GHG emissions for 2006, 2008, and 2010. The GHG emissions per aircraft operation for 2011 is derived using linear regression based on the 2005 to 2010 data. The 2011 estimate of GHG emissions is the result of the per-operation emission rate times the 2011 total aircraft operations.
2	Source for MSP Airport aircraft operations for 2006 to 2011: http://www.mspairport.com/about-msp/statistics.aspx.
3	Consistent with the ICLEI Community Protocol, the city's share of the MSP Airport's total emissions were assumed to be equal to the percent of home-based vehicle trips associated with the city that had either an origin or destination at the Airport. The Metropolitan Council calculated the "percent of city resident, home-based trips, as a percent of MSP total home-based trips" for 2010. The Airport's total home-based trips equaled 51,506. The city's share of vehicle trips was assumed to be relatively stable and therefore used for all study years.

Solid Waste Management and Wastewater Treatment

Updated: 1/8/13

Solid Waste Management [1]	2008	2009	2010	2011	2012
Hennepin County [2]					
Population (thousands)	1,169.2	1,169.0	1,152.4	1,181.0	1,187.2
Processing/disposal methods: [3]					
MSW processed at resource recovery facilities (thousands of tons):	487.4	429.1	352.1	412.7	
Hennepin Energy Resources Center (mass burn incinerator)	349.0	338.3	351.6	412.7	
Elk River and Ramsey/Washington (Newport) refuse derived fuel (RDF) facilities	138.4	90.7	0.4	-	
Processed via combustion as a % of total MSW managed	34%	25%	21%	31%	
Total recycled (thousands of tons)	597.0	573.0	564.2	572.6	
Recycled as a % of total MSW managed	41%	34%	34%	43%	
Land disposal of MSW (thousands of tons)	366.8	693.4	766.1	349.4	
Land disposal as a % of total MSW managed	25%	41%	46%	26%	
Total MSW managed	1,451.2	1,695.5	1,682.3	1,334.8	
Per-capita MSW managed	1.24	1.45	1.46	1.13	
Methane recovery calculation: [4]					
Land disposal of MSW (thousands of tons)	366.8	693.4	766.1	349.4	
Unprocessed MSW to landfills without methane recovery (thousands of tons) [5]	97.5	46.1	5.9	3.7	
Percent of unprocessed MSW landfilled in landfills with methane recovery	73%	93%	99%	99%	
Methane recovery factor [6]	55%	70%	74%	74%	
Edina [7]					
Population	48,169	49,491	47,941	48,262	48,446
Estimated total MSW managed	59,789	71,782	69,985	54,547	
Per-capita MSW managed	1.24	1.45	1.46	1.13	
Processing/disposal methods:					
Estimated MSW processed via combustion [9]					
Hennepin Energy Resources Center (mass burn incinerator)	20,081	18,165	14,645	16,868	
Elk River and Ramsey/Washington (Newport) refuse derived fuel (RDF) facilities	-	-	-	-	
Estimated processed via combustion as a % of MSW managed	34%	25%	21%	31%	
Estimated MSW recycled	24,595	24,261	23,470	23,401	
Estimated recycled as a % of MSW managed	41%	34%	34%	43%	
Estimated land disposal of MSW	15,113	29,357	31,870	14,279	
Estimated land disposal as a % of MSW managed	25%	41%	46%	26%	
GHG emission estimates (tonnes) [8]					
GHG emissions for combustion (tonnes per ton incinerated) [9]					
Hennepin Energy Resources Center (mass burn incinerator)					
Fossil	7,709	6,973	5,292	6,493	
Biogenic	13,135	11,767	8,815	8,967	
Elk River and Ramsey/Washington (Newport) refuse derived fuel (RDF) facilities	-	-	-	-	-
Total GHG emissions from combusting MSW	7,709	6,973	5,292	6,493	
GHG emission rate for landfilling (tonnes per ton landfilled) [10]	0.439	0.293	0.250	0.252	
GHG emissions from landfilling MSW	6,629	8,596	7,957	3,595	
Total estimated GHG emissions	**14,338**	**15,569**	**13,249**	**10,088**	
Per-capita GHG emissions	0.30	0.31	0.28	0.21	
GHG value of energy exports of MSW combustion (tonnes) [11]	7,228	5,538	4,221	5,096	-

Metro Wastewater Treatment Plant (tonnes of CO_2e) [12]	2008	2009	2010	2011	2012
Fossil Emissions					
Scope 2	120,234	115,241	99,124		
Scope 1	82,569	79,388	81,295		
Total Fossil Emissions	202,803	194,629	180,419	208,968	
Biogenic Emissions	137,302	129,735	163,565		
Total emissions from the Metro Wastewater Treatment Plant (tonnes)	340,105	324,364	343,984	208,968	
Percent of fossil emissions attributable to the City	2.54%	2.56%	2.48%	2.40%	
Emissions attributable to the City	**5,151**	**4,983**	**4,474**	**5,015**	

Notes:

1	Municipal solid waste (MSW) in U.S. tons unless otherwise noted. Greenhouse gas (GHG) emissions are in metric tonnes.
2	Data for 2008 to 2010 from MPCA SCORE reports (from the Governor's Select Committee on Recycling and the Environment): http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html. 2011 data from County Certification report.
3	Based on the MPCA website: The SCORE Report is an annual examination of Minnesota waste management programs and data, as well as providing detailed data by county. The figures are gathered through a formal survey of county solid waste officers. Ambitious goals for recycling and waste reduction were set for Minnesota counties and have typically been met, if not exceeded.
4	To estimate the GHG emissions from landfilled waste, methane recovery must be accounted for because methane is the primary GHG emission from landfills.
5	All waste landfilled in Minnesota went to landfills with methane recovery plus waste that went to the Central Disposal facility in Iowa. The remaining waste went to landfills in Wisconsin that do not have methane recovery.
6	Staff from the MPCA recommended using a 75% methane recovery rate for unprocessed MSW in a landfill with methane recovery. The "Methane recovery factor" is derived by multiplying the percent of the total landfilled waste that is deposited in landfills with methane recovery times the MPCA average recovery rate of 75% for methane.
7	Per-capita amounts by waste management method for the County are used to estimate per-capita amounts for the City.
8	When estimating total recycling, the Minnesota Pollution Control Agency's SCORE reports show a 5% credit for composting waste in the County. Waste collected for composting is not counted in the MSW totals. It is not a factor for estimating GHG emissions because proper composting of organic materials generates a net zero amount of GHG emissions.
9	It is assumed that the city's waste will be sent to the closest processing facility. For MSW combustion, only the fossil-based emissions are counted for the purposes of carbon baseline assessments per the ICLEI Community Protocol (Appendix E, p. 15). The fossil-based emissions also include all of the CH_4 and N_2O emissions. Also refer to the explanatory footnotes dealing with the combustion of MSW in the Conversion Factors spreadsheet.
10	The Clean Air Climate Protection (CACP) software, developed by ICLEI--Local Governments for Sustainability, estimates the GHG emissions resulting from landfilling of the MSW collected for processing. The software incorporates the waste composition percentages from the 2000 MPCA waste composition study and calculates the GHG emissions based on the following: y= -976.3x + 976.3 where y=GHG emissions and x=% Methane Recovery Factor.
11	The HERC facility has two byproducts, electricity which is sold to Xcel Energy, and steam, which is sold to Target Field, NRG (district energy), and the Hennepin Energy Center (district energy). Consistent with the ICLEI Community Protocol, the GHG emissions associated with these byproducts are not treated as "negative" emissions in the calculation of the GHG emission rate. They are disclosed here for informational purposes. The footnotes for Table 5 in the Conversion Factors spreadsheet contain additional information.
12	The emission rate for 2011 is an average of the known rates for 2008 to 2010. Total emissions for 2011 are based on this assumption. Source: Metropolitan Council Environmental Services, Linda Henning, Special Projects Manager.

Community Solid Waste: Waste Composition

Updated: 6/24/10

CACP Category [5]	2000 MPCA Study [1]	2005 Iowa Study [2]	Change
Paper products	34.2%	33.0%	-1.2%
Food waste [3]	12.9%	13.0%	0.1%
Plant debris	2.9%	3.1%	0.2%
Wood/textiles [4]	11.4%	12.9%	1.5%
All other waste	38.6%	38.0%	-0.6%
Total	100.0%	100.0%	

Notes:

(1) Source: Final Report, *Statewide MSW Composition Study: A Study of Discards in the State of Minnesota* , Solid Waste Management Coordinating Board, Minnesota Pollution Control Agency, March 2000.

(2) *Iowa Statewide Waste Characterization Stud* y, Iowa Department of Natural Resources, February 2006, http://www.iowadnr.gov/portals/idnr/uploads/waste/wastechar05.pdf

(3) Includes diapers

(4) Includes "other organic material"

(5) CACP refers to the Clean Air Climate Protection software developed by ICLEI--Local Governments for Sustainability. The 2000 waste composition study by the MPCA is the most recent study of its kind in Minnesota. Since the more recent 2005 Iowa waste composition study did not vary more than 1.5% from the older Minnesota study, the MPCA study was used to estimate GHG emissions.

Population, Households, and Jobs

Updated: 2/1/13

Year	City			Hennepin County Population	7 County Region
	Population	Households	Jobs		
1970	44,046	13,005		960,080	1,874,612
1980	46,073	17,961		941,411	1,985,873
1990	46,070	19,860		1,032,431	2,288,721
2000	47,425	20,996		1,116,206	2,642,062
2001	47,465	21,016		1,123,587	2,674,927
2002	47,570	21,104		1,130,880	2,708,916
2003	48,156	21,149		1,139,887	2,740,985
2004	48,050	21,128		1,144,037	2,771,030
2005	47,448	21,422		1,150,912	2,810,179
2006	46,896	21,100		1,152,508	2,821,779
2007	47,090	21,250		1,157,283	2,849,003
2008	48,169	21,285	49,202	1,169,151	2,870,250
2009	49,491	21,357	47,006	1,168,983	2,881,812
2010	47,941	20,672	47,676	1,152,425	2,849,567
2011	48,262	20,848	49,018	1,180,966	2,873,444
2012	48,446	22,242	49,883	1,187,216	
2020	49,100	22,000	55,000		
2030	50,000	22,500	57,400		

Notes:

1970 to 2012 data:	Source for population and household data: Metropolitan Council of the Twin Cities: http://stats.metc.state.mn.us/data_download/DD_start.aspx. 2012 population and household estimates are forecasts based on actual historical data.
2008 to 2012 jobs data	Source: North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW): (http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx). Data is from "Total of All Ownerships" and "Total, All Industries." The Quarter 2 data was chosen because it tends to be the least affected by seasonal fluctuation. The annual data was not chosen because it is an average of the four quarters and, thus, does not provide for optimal comparison purposes.
2020 & 2030 forecasts	Source: Metropolitan Council of the Twin Cities: http://stats.metc.state.mn.us/data_download/DD_start.aspx.

Precipitation and Potable Water Distribution

Updated: 1/31/13

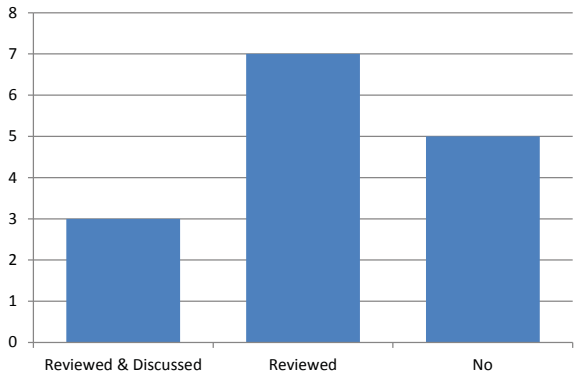
Precipitation [1, 2]			Potable Water Distribution (gallons)[3]		
Period	**Zip Code**	**Inches**	**Residential**	**Commercial**	**Total**
2008	55436	24.52	1,789,110,326	577,517,490	2,366,627,816
2009		26.67	1,860,343,660	589,620,252	2,449,963,912
2010		35.62	1,651,793,579	529,013,678	2,180,807,257
2011		28.09	1,685,927,885	541,999,198	2,227,927,083
2012					
2020					
2030					

Notes:

1	Source: http://climate.umn.edu/wetlands/wetlands.asp
2	Since the City has more than one zip code within its boundaries, one zip code was chosen by the following factors (1) most land area included in city boundaries (2) highest population (3) highest density of population. City boundary maps with overlayed zip code boundaries can be found at the website http://www.city-data.com.
3	The city provided potable water distribution data

Data Collection Survey Results 11.07.2012

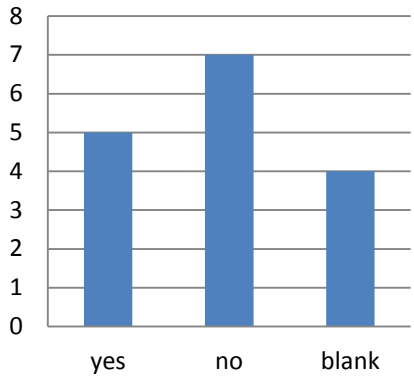
Has your city staff reviewed the data forwarded to us?



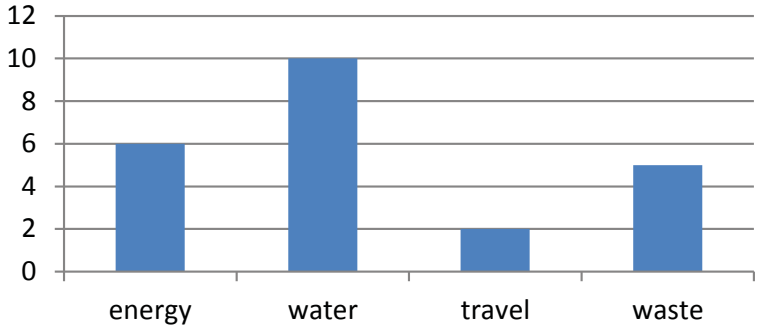
Largest Collection Obstacles:

Xcel time lag, slow internal processes, not more specific than citywide, lack of data collection training, gaining cooperation from private utilities, unsure what is being collected, annexation complications.

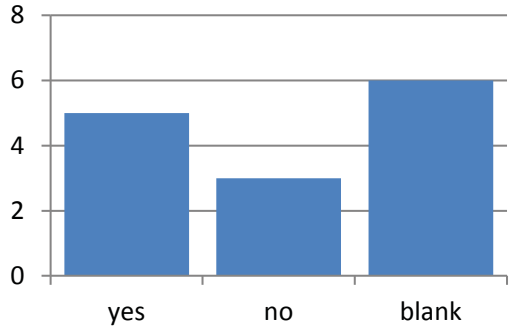
Does your city have citywide solid waste data?



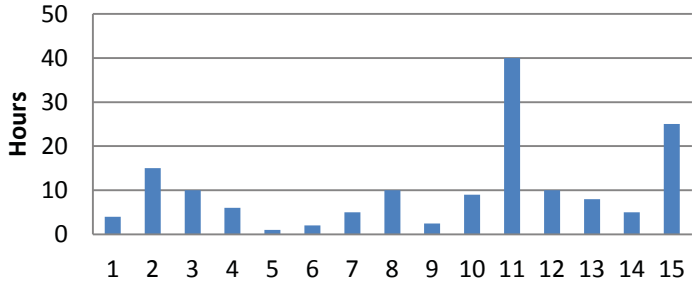
Which 4 metrics does your city have the greatest ability to influence through policy, zoning and land use practices? Pick two.



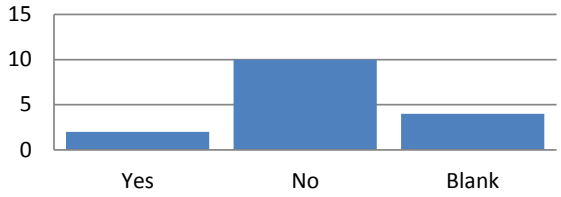
If Yes, is your citywide solid waste data divided into residential and commercial / industrial waste production?



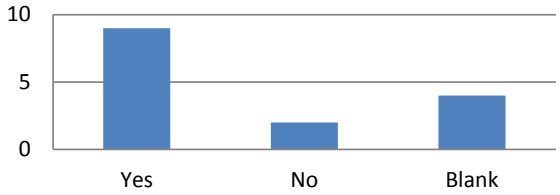
Estimated number of total staff hours spent on the Regional Indicators Initiative per city.



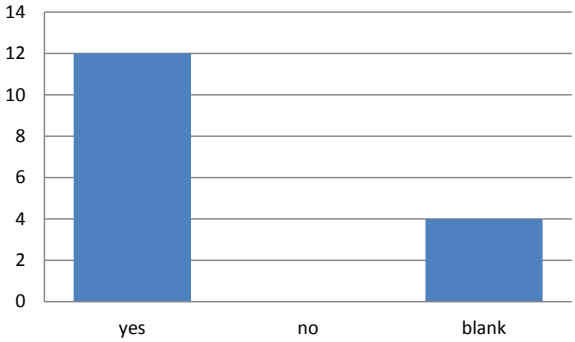
Has your city adopted a sustainability plan / climate action plan?



Has your city adopted a sustainability chapter in your comprehensive plan ?



Are you interested in Collecting Citywide Data for 2012?



WHAT ARE YOU HOPING TO GET OUT OF THE REGIONAL INDICATORS INITIATIVE?

1. Know baseline / benchmark data (4 cities mentioned this)
2. The ability to annually track this data
3. A standardized data collection method
4. A point of comparison between cities
5. Use RII data for educational purposes to facilitate and motivate change
6. Use to set citywide goals
7. Compare our city with other cities
8. Grasp understanding of ground level impact
9. Determine what we can do better
10. Learn where to focus our efforts

WHAT WERE THE LARGEST OBSTACLES YOUR CITY ENCOUNTERED WHEN REQUESTING UTILITY DATA?

1. Xcel Energy's time lag
2. Slow internal processes (utilities and city staff)
3. The data is not more specific than citywide
4. Lack of training on how to collect data
5. Gaining cooperation from private utilities
6. Unsure what is being collected
7. Complications related to annexation

WHAT WOULD BE THE LARGEST BARRIER TO COLLECTING 2012 DATA?

1. Cost & time to do it
2. Gaining cooperation of Private Utilities
3. Asking utilities for data multiple times
4. Utility responsiveness
5. Staff resources to enter and analyze the data
6. Finding funding

PROCESS OF DATA COLLECTION – REGIONAL INDICATORS INITIATIVE

This report has been generated to document the process of data collection used for the Regional Indicators Initiative (Initiative) by describing where and how data was collected. The purpose of this report is to outline a replicable process to serve as a guide for both the Regional Indicators Initiative team as they continue to collect data as well as any other researcher who wishes to follow the RII process in other cities throughout Minnesota or across the country.

Since the Initiative cities are located throughout Minnesota, the goal was to collect city data from statewide sources that have been commonly accepted as a standard for each indicator. When state-wide data was not available, regional-specific data (such as that from the Metropolitan Council) was used in addition to other country-wide data (Census Bureau). For example, population and household data obtained from the Metropolitan Council was considered to be more accurate than data collected on a country-wide scale. In this case, separate data sources were used for Rochester and Duluth, since these two cities are outside of the Metropolitan Council region.

Demographic Data

Residents and Households

For the eighteen cities within the Twin Cities region, population and households data was obtained from the Metropolitan Council of the Twin Cities. The data was accessed through the Metropolitan Council website: (http://stats.metc.state.mn.us/data_download/DD_start.aspx). According to Metropolitan Council website citations, 2008, 2009 and 2011 data is from 'Metropolitan Council Research estimates', while data for 2010 is from the Census Bureau – Decennial Census SF1. For the two outlying cities (Rochester and Duluth), Population and Households data was obtained from the Census Bureau-Decennial Census SF1 exclusively. 2012 population and household estimates are forecasts based on actual historical data.

Jobs

Employment or 'Jobs' data was obtained from the North American Industry Classification System (NAICS) which is collected by the Minnesota Department of Employment and Economic Development as outlined by the NAFTA accords between Canada, the US and Mexico in the mid-1990s. The data was accessed through the Minnesota Department of Employment and Economic Development (DEED) website which houses the Quarterly Census of Employment Wages: (http://www.positivelyminnesota.com/apps/lmi/qcew/ResultsDisp.aspx). The process for collecting data was to select an individual city, select the time period 2008-2012 and then select 'Total of All Ownerships' and 'Total, All Industries'. The resulting data chart reports employment for each quarter of the year in addition to 'Annual' employment. The 'Quarter 2' data was used in this Initiative rather than 'Annual' data because it tends to be the least affected by seasonal fluctuation. The annual data was not chosen because it is an average of the four quarters and thus does not provide for optimal comparison purposes.

Population Density

Population Density is calculated using the land area in square miles divided by the population from each year. Land area data is obtained from the Census Bureau-2010, and is assumed to remain constant through the four-year study-period. Data was accessed through the United States Census Bureau website, 'State and County Quickfacts': (http://quickfacts.census/gov/qfd/states/27000.html).

Weather Factors

Precipitation

Precipitation data was obtained from the Minnesota Climatology Working Group, State Climatology Office – DNR Division of Ecological and Water Resources and accessed through the following website: (http://climate.umn.edu/wetland/wetland.asp). Through the website, a wetland location was selected using a ZIP code rather than city name. For those cities with more than one ZIP code within city boundaries, one ZIP code was chosen by using the following factors: (1) most land area within city boundaries, (2) highest population, (3) highest population density. For many cities, these three criteria overlapped; in all other cases, the ZIP code containing the highest population was chosen. City boundary maps with overlaid ZIP code boundaries can be found at the website (http://www.city-data.com). The ZIP codes chosen for each city are specified in both the 'Initiative Summary' tab and the 'Precipitation and Water' tab in each city's data spreadsheet.

DATA GAPS + POSSIBILITIES FOR IMPROVEMENT:
For a more accurate estimation for cities with multiple ZIP codes, precipitation data for each ZIP code within the boundaries of each city could be averaged as a ratio of their relative population within the city. This method was tested for this Initiative, and it was found to make minimal difference due to the relatively small variation in precipitation data between neighboring ZIP codes.

Heating Degree Days (HDD) & Cooling Degree Days (CDD)
Degree days are a simplified representation of outside air-temperature. They are widely used in the energy industry for calculating the effect of outside air temperature on building energy consumption. The following definition is from DegreeDays.net:

> "*Heating degree days*", or "*HDD*", are a measure of how much (in degrees), and for how long (in days), outside air temperature was *lower* than a specific "*base temperature*" (or "*balance point*"). They are used for calculations relating to the energy consumption required to *heat* buildings.
>
> "*Cooling degree days*", or "*CDD*", are a measure of how much (in degrees), and for how long (in days), outside air temperature was *higher* than a specific base temperature. They are used for calculations relating to the energy consumption required to *cool* buildings.

For the United States, the HDD for a day is calculated as the difference in degrees of the average of the day's high and low temperatures from a base temperature of 65 degrees Fahrenheit. For example, if the day's high temperature is 60 and the low is 40, the average temperature, 50 degrees, minus 65 equals 15 heating degree days. The calculation for CDD is similar using the average high/low temperature above the 65-degree base temperature.

Both Heating Degree Days and Cooling Degree Days data was obtained from the website: DegreeDays.net. Degree Days.net data is based on temperature data from weather stations worldwide. To access the data, the RII team first searched for the ZIP code of the city hall for each city, and then selected the weather stations at the top of the list (the weather station data is sorted by DegreeDays.net so that the most accurate data is listed first). The weather station chosen for each city is listed on the 'HDD & CDD' and 'Initiative Summary' tabs of each city's data spreadsheet.

Energy

Electricity data
Electricity data was obtained with the cooperation of local utility companies. Using a template letter provided by the Regional Indicators Initiative team, each individual city requested annual electricity data from their respective utility and then forwarded it to the RII team. The utility companies providing data vary from city to city; these sources are listed on the individual city's data spreadsheets under both the 'Initiative Summary' tab and the 'Energy' tab.

During the pilot phase of this Initiative, it was found that utility companies can disaggregate electricity data into residential use and commercial/industrial use. For example, electric data received from Xcel Energy was broken down into the following categories: Residential, Residential Windsource, Commercial & Industrial, C&I Windsource, and Public Street and Highway Lighting. Other utilities, such as Rochester Public Utility, provided this data broken down into only two categories Residential and Commercial Industrial. Xcel Energy provides the following definition of 'Residential' and 'Commercial/Industrial' customers:

> "A residential customer is one using electric service for domestic purposes in space occupied as living quarters such as single private residences, duplex units, townhouse units, condominium units, apartment units, mobile homes, fraternity houses, sorority houses, and rooming houses. Domestic purposes or uses are domestic lighting, heating, cooking, and power service." Other consumption is in the Commercial/Industrial category and the small Public Street and Highway Lighting category."

There can be a lot of "cross-over" between the residential and the commercial classifications in a single building. Consider this further clarification of Xcel Energy's methods of classification: "Apartment buildings often have individual electric meters for each unit, which are served on a residential rate and are included in the electric Residential class of service. They usually have another electric meter for laundry rooms and for common area lighting and cooling, served on a commercial electric rate and included in the Commercial class. These same apartment buildings often have one gas meter connected to a boiler and a water heater providing heat and hot

water to all of the individual units. These meters are served on a commercial gas rate and are included in the gas Commercial class. However, if each unit has an individual gas meter serving only that unit's individual furnace and/or water heater, then it is served on a residential gas rate and included in the gas Residential class."

In the case of the Duluth Steam Utility, this district energy system provides approximately 12% of its steam energy to buildings with multifamily units and mixed commercial/residential uses. The rest goes to non-residential uses. The spreadsheet file for the City of Duluth allocates the related emissions, energy, and costs accordingly.

In order to maintain consistency during this RII data collection process, electricity data was classified as either 'Residential' or 'Commercial/Industrial'. The classification 'Residential' is the sum of both Residential and Residential Windsource where applicable. The classification 'Commercial/Industrial' is the sum of Commercial, Commercial Windsource, and Public Street and Highway Lighting where applicable.

Several cities are hosts to major facilities that serve populations outside the city's boundaries (power plants, major airports, garbage incinerators, and wastewater treatment plants). For example, the greenhouse gas emissions associated with electricity consumption within Minneapolis already account for the natural gas consumption required to generate the city's share of electricity production at Xcel Energy's Riverside Generating Station, which is located within the city. To avoid double counting, total natural gas consumption at the plant is subtracted from the Minneapolis citywide total.

Natural Gas data
Natural gas data was also obtained via a request from each city to their local utility companies for annual data. The utility companies providing data vary from city to city and are listed on the individual city's data spreadsheets under the 'Initiative Summary' tab and 'Energy' tab.

As per the request letter, natural gas data was consistently received broken down into 'Residential' and 'Commercial/Industrial' categories from all utility companies. Similar to electricity, any natural gas used by a 'shared' facility (i.e. power plant, wastewater facility, etc.) was subtracted from the commercial/industrial total to avoid double counting of these values and ensure that 'total energy' is defined as the *share* of energy consumed by each city.

Total Energy
The carbon baseline assessment prepared for the cities excludes several emission sources that are sometimes included in other assessments, such as emissions associated with marine and railroad operations, refrigerant and fire suppressants leakage, agricultural and livestock operations, and minor combustors of liquid fuels (e.g. fuel oil, propane, and diesel-powered heaters) because they were found to be less than five percent of the total and therefore 'de minimis'. The Minnesota Pollution Control Agency provided 2001 data for liquid fuel and waste wood combustion for the 17 cities in the Initiative for which the Initiative team had data. Only the data for Duluth was included in the assessments. The GHG emissions associated with consumption levels for the other 16 cities were a fraction of 1% and therefore de minimis amounts. The assessment does include major fuel oil users and portside emissions from the Port of Duluth, which can be seen on the Duluth 'Initiative Summary' tab of the spreadsheet.

Because electric data (MWh) and natural gas data (therms) are measured using different units of energy, it was necessary to convert all energy to a common metric – millions of Btus (MMBtu). This conversion allowed for the data to be aggregated into 'Total Residential Energy', 'Total Commercial/Industrial Energy' and 'Total Energy'. In addition, combined with the annual demographic data previously, the Inititaive team was able to produce the metrics 'Residential Energy/Person/Day', 'Commercial Energy/Person/Day', 'Residential Energy/Household/Day', 'Commercial Industrial Energy/Job/Day' and 'Total Energy/Capita/Day'. Using the Heating Degree Days (HDD) and Cooling Degree Days (CDD) data, total energy was also normalized by weather (as explained above).

DATA GAPS + POSSIBILITIES FOR IMPROVEMENT:
Another obstacle to obtaining the most accurate electricity data was Xcel Energy's "15/15 Rule:" In September 2012, it was learned that Xcel Energy had instituted a new policy in Minnesota called the "15/15 Rule" that applies when the company responds to a request for consumption data. According to Xcel, the "15/15 Rule" has been adopted by Xcel and several utilities across the country to help protect customers' data privacy when it comes to aggregated reports going to a third party. The "15/15 Rule" has two main aspects. It prevents the utility from disclosing consumption data to a third party for any customer group with less than 15 customers. For example, if there are only 14 Commercial & Industrial (C&I) customers in a group, the utility cannot release the aggregate consumption data to a third party. The Rule also prevents the utility from releasing data for a group where an individual customer's data makes up more than 15% of the aggregated

group total. For example, if there were 100 C&I customers on the report with an aggregate total consumption of 1,000 kWh and one of those customer's total was 150 kWh, the utility must remove that customer's data from the report. The utility must then repeat the process to determine if there is a customer with consumption at 127.5 kWh or more (15% of the remaining 850 kWh).

Xcel stated that the consumption data for the following 11 of the project's 20 participating cities have data excluded because of the application of the 15/15 Rule (the four cities with excluded electricity and natural gas data are underlined for emphasis):

- Coon Rapids: Commercial/Industrial wind
- Eagan: Commercial/Industrial gas and electric
- Eden Prairie: Commercial/Industrial wind
- Edina: Commercial/Industrial wind
- Falcon Heights: Commercial/Industrial wind and electric
- Maplewood: Commercial/Industrial gas and electric
- Minnetonka: Commercial/Industrial wind
- Oakdale – Residential wind and Commercial/Industrial wind and gas
- Richfield: Commercial/Industrial wind
- Shoreview: Residential and Commercial/Industrial wind
- St. Louis Park: Commercial/Industrial wind
- White Bear Lake: Residential and Commercial/Industrial wind

The excluded wind-based consumption is not likely to comprise a significant portion of overall consumption (probably less than 1%) and its exclusion has no effect on GHG emissions. The Assessments for these cities disclose the facts of this missing data. For the four cities where Xcel has withheld data for natural gas or non-wind-generated electricity due to the "15/15 Rule," the extent to which the disclosed data undercounts the actual data and for which years the rule was applied is not known. As such, the validity of this reported data is questionable.

Water

Total Annual Potable Water Consumption data was obtained directly through each Initiative city. The Regional Indicators Initiative team requested potable water distribution amounts from each city broken into two main categories: Residential and Commercial/Industrial. Data was received in a variety of formats. Cities that depend primarily on wells sent Minnesota Department of Natural Resources (MN DNR) withdrawal reports with consumption broken down into categories of Residential, Commercial, Industrial, Agricultural and 'Other' (which was designated Institutional in some cases). All other city potable water data, however, was reported with slightly different aggregations and 'Totals'. For example, some cities submitted totals for only 'Residential' and 'Commercial/Industrial', while others submitted data in addition categories (e.g. irrigation, institutional, city use). The RII team categorized Residential potable water as 'Residential', and all other data as 'Commercial/Industrial'.

DATA GAPS + POSSIBILITIES FOR IMPROVEMENT:

Some of the submitted data indicated that 'City Water' had been excluded, creating a possible inconsistency. City water represents water meant for city operations and was added to the Commercial/Industrial category when available.

An additional inconsistency concerned which totals were reported. For some cities, it was unclear whether 'Total potable water' was being defined as 'Total Gallons Sold' (which represented actual consumption) or 'Total Reported Withdrawals' (which represented consumption plus any leakage or losses of water throughout distribution). Where both totals were represented, 'Total Gallons Sold' was chosen to best represent consumption. It is unclear in most cases outside of cities who submitted DNR data whether the data represented 'Total Gallons Sold'.

Because of the possible discrepancies apparent in this process of collecting data from 20 individual sources, the Initiative team is currently working to obtain annual potable water data for all cities across the study period from the Metropolitan Council as well as from Minnesota DNR. Through cross-referencing these data sources, the Initiative team is hoping to reveal any inconsistences and better refine the values.

A future possibility would be to ask cities to report monthly data, which would allow water used for irrigation to be estimated as well.

Travel

Data for vehicle miles traveled (VMT) within the boundaries of each city was obtained from Minnesota Department of Transportation, and accessed through the MN DOT website: (http://www.dot.state.mn.us/roadway/data/reports/vmt.html). This website allows the data to be aggregated in many ways, and the RII team used 'VMT by County/City/Route System' for the years 2008, 2009, and 2010. Data for 2011 is not yet available, per the advice of MNDOT staff, 2010 data is assumed to be stable for 2011 until actual 2011 data is available. Miles of roadway vary slightly over time as designations of roads change. The figures listed for 2008 mileages are used across the study period for the RII calculations.

MN DOT provided data as 'Daily (Average) Vehicle Miles', 'Annual (Total) Vehicle Miles' and 'Centerline Miles'. The RII team used the 'Annual (Total) Vehicle Miles' data set.

Currently, the Regional Indicators Initiative defines annual VMT as the sum of all mileage on routes within the boundaries of a given city. MN DOT VMT data is collected to the detail of each route type and is broken down into the following categories; Interstate Trunk Highway, US Trunk Highway, Minnesota Trunk Highway, County State Aid Highway, Municipal State Aid Highway, County Road and Municipal Street.

DATA GAPS + POSSIBILITIES FOR IMPROVEMENT:

This data has been collected as both a sum of all route types and for each individual route. However, only the total VMT was used for data analysis in the scope of this project. Analyzing the data as it is broken down by route type would help to identify the various factors which contribute to total VMT. For example, cities that have a majority of mileage on freeways could be identified as 'pass-through cities' rather than destination cities. This fine-grained analysis of travel data could help to identify how cities of various types can improve their transportation systems and reduce their annual VMT.

Waste

Annual Municipal Solid Waste (MSW) data was obtained from the Minnesota Pollution Control Agency (MPCA) SCORE reports, and was accessed through the MPCA website found here: (http://www.pca.state.mn.us/index.php/data/score/recycling-and-solid-waste-data.html).

The data set includes Recycling, Solid Waste-Landfilled, Solid Waste-Resource Recovery and Composted values broken down by specific facility for all Minnesota counties dating back to 1991. No cities participating in the RII study included values for composted waste because associated biogenic emissions are not counted as part of the community's carbon 'footprint'. The totals within the three primary waste breakdown categories (Recycled, Landfilled and Incinerated) are obtained by summing all facility totals within each category.

DATA GAPS + POSSIBILITIES FOR IMPROVEMENT:

Unfortunately, comprehensive municipal solid waste data is not currently aggregated by city, but only by county. To accommodate for this discrepancy in aggregation, per-capita amounts by waste management method for the county are used to estimate per-capita amounts for the city. It is assumed through this data aggregation that, on a per-capita basis, city waste will be generated and managed at the same rates as those measured for the county.

Over the course of this study, several cities have indicated that they are working towards collecting and reporting city-specific municipal solid waste data. Updated values for each city could be integrated at a later date.

Carbon Baseline Assessments

In order to compare the Regional Indicators Initiative's four primary indicators (Energy, Water, Travel and Waste) the data has been translated into both greenhouse gas (GHG) emissions as well as total retail cost associated with each indicator. While the focus of this report is to document the data sources, methods, assumptions and possibilities for improved data collection, the process of creating carbon baseline assessments and determining costs associated with consumption is described in detail in a separate document.

RII List of Potential Conferences / Events 2012-2013

Updated: 4 February 2013

Organization	Website/Email	Contact	Conference/Event	Submission Deadline	Event Date	Time	City, State	Submitted/Invited	Accepted	Completed	Other Actions
July-12											
Upper Midwest Basic Economic Development Course			Economic Development	???	July 24, 2012		Duluth, MN	Submitted	Yes	Yes	
August-12											
September-12											
Center for Energy and Environment (CEE)	www.mncee.org		Home Energy Efficiency Rating	???	September 13, 2012	12pm					
USGBC MN	www.usgbcmn.org		IMPACT 2012 Conference	???	September 18, 2012		Minnetonka	Submitted	No	n/a	
APA MN	www.mnapa.com		Annual Conference	???	Sept 26-28, 2012		Alexandria, MN	No	n/a	n/a	
MN Recreation and Park Association	www.mnrpa.org		Annual Conference and Exihibit Hall	???	September 20, 2012		Brainerd, MN	No	n/a	n/a	
MN Association of School Administrators (MNASA)	www.mnasa.org		Fall Conference	???	Sept 30-Oct2, 2012			Submitted	No	n/a	
October-12											
Green Building Certification Institute			Conference Course Qualification	???	October 1, 2012			Submitted	Yes	n/a	
MN Waste Wise	mnwastewise.org		Annual Meeting	???	October 2, 2012	11am-2pm	Chaska, MN	Submitted	Yes	Yes	
MN Dept. of Health	www.health.state.mn.us		Strengthening Public Health	???	Oct 3-5, 2012		Brainerd, MN	No	n/a	n/a	
USGBC MN	www.usgbcmn.org		Building Green Conference	???	October 24, 2012		Duluth, MN	Submitted	Yes	Yes	
November-12											
AIA MN	www.aia-mn.org	christiansen@aia-mn.org	AIA MN Annual	???	Nov 6-9, 2012		Minneapolis, MN	Submitted	Yes	Yes	
December-12											
City of St. Louis Park	www.stlouispark.org		Environment Committee	n/a	December 10, 2012	10:00 AM	St. Louis Park, MN	Invited	Yes	Yes	
January-13											
City of Eden Prairie	edenprairie.org		Conservation Commission Meeting	n/a	January 8, 2013	7:00 PM	Eden Prairie	Invited	Yes	Yes	
GreenStep Cities	greenstep.pca.state.mn.us		Sustainability Indicators Workshop	n/a	January 9, 2013	9:00-11:30	St. Paul	Invited	Yes	Yes	
City of Minneapolis			Environmental Commission	n/a	January 9, 2013	3:00 PM	Minneapolis	Invited	Yes	Yes	
City of Edina	edinamn.gov		Energy and Environment Commission	n/a	January 10, 2013	7:00 PM	Edina	Invited	Yes	Yes	
The US Conference of Mayors	www.usmayors.org		81st Winter Conference of Mayors	???	Jan 17-19, 2013		Washington, DC	No	n/a	n/a	
Economic Development Assoc. of MN (EDAM)	edam.org		Winter Conference	???	Jan 24-25, 2013		Hopkins, MN	Submitted	No	n/a	
City of St. Anthony			City Council Meeting	n/a	January 29, 2013	7:00 PM	St. Anthony	Invited	Yes	Yes	
February-13											
City of Minnetonka			Staff meeting	n/a	February 1, 2013	10:30 AM	Minnetonka	Invited	Yes	Yes	
ULI MN			Presentation	n/a	February 7, 2013	3:30-5:30 PM	Minneapolis	Invited	Yes	Yes	
City of Oakdale			Environmental Commission	n/a	February 11, 2013	7:00 PM	Oakdale	Invited	Yes	Yes	
Clean Energy Resource Team (CERTs)	www.cleanenergyresourceteams.org		2013 Conference	???	Feb 20-21, 2013	11am (20th)-3:30pm(21st)	St. Cloud, MN	No	n/a	n/a	
Energy Design Conference and Expo	www.duluthenergydesign.com		Annual Conference	October 15, 2012	Feb 26-27, 2013		Duluth, MN	Submitted	No	n/a	
Mar-13											
April-13											
APA National	www.planning.org		Annual Conference	deadline passed	April 13-17, 2013		Chicago, IL	No	n/a	n/a	Note: proposals accepted from APA members only
City of Maplewood			Environmental/Natural Resources Commission	n/a	April 15, 2013	TBD	Maplewood, MN	Invited	Yes		
League of MN Cities	lmc.org	joxley@lmc.org	MN Mayors Association Annual Conference	unofficial	April 26-27, 2013		Moorhead, MN	Submitted 1/2/13	???		
May-13											
MN City/County Mgmt. Association (MCMA)	mncma.org		Annual Conference	deadline passed	May 1-3, 2013		Nisswa				
International Living Future Institute	living-future.org		Living Future 13	January 18, 2013	May 15-17, 2013		Seattle, WA	No-RAC busy	n/a	n/a	
USGBC MN			IMPACT 2013	January 25, 2013	May 23, 2013		Bloomington, MN	Yes	???		
June-13											
League of MN Cities	lmc.org		LMC Annual Conference & Marketplace	deadline passed	June 19-21, 2013		St. Paul	No	n/a	n/a	
Future											
APA National	www.planning.org		Annual Conference	emailed to determine	April 26-30, 2014		Atlanta, GA				Note: proposals accepted from APA members only
League of MN Cities	lmc.org		LMC Annual Conference & Marketplace	August 30, 3012	June 18-20, 2014		St. Cloud				
Greening the Heartland	www.buildingchicagoexpo.com		Annual Conference	February 8, 2013	Sept 9-12, 2013		Chicago, IL	Submitted 2/5/13	???		Co-presenter: Debbie Goettel
GreenBuild 2014	greenbuildexpo.org		Annual Conference	Early January	November 8-19, 2014		New Orleans, LA				
Other Potential Organizations											
MN Association of Small Cities											
City Engineers Association of MN											
Metro Cities											
Association of Energy Engineers											
Association of MN Counties											
MPCA											
MN Department of Commerce											
RCM											
ULI MN											
MEI											
Alliance for sustainability											
Minnesota Counties Intergovernmental Trust											
Great Plains Institute											
MN Counties Human Resource Mgmt. Assoc. (MCHRMA)											

Report on:

Regional Indicators Initiative: Objective 1: Evaluation TASK 1B: Establish Targets

Final MPCA Report

Prepared by

LHB, Inc. with ORANGE Environmental, LLC

March 2013

Statement of Task

OBJECTIVE 1: Evaluation

Task 1B: Establish targets for city consumption relative to population and jobs in each of the categories where data is collected

Team members for this objective: LHB, Inc. and ORANGE Environmental, LLC

Work completed to date

Summary: In order to help each city shape their planning and benchmark their progress, the Regional Indicators Initiative (Initiative) team has established both targets and business-as-usual forecasts for city consumption relative to energy, water, travel, waste, and greenhouse gas emissions. These forecasts are intended to provide a common reference point across cities and should be viewed as a tool for each city to use as they see fit.

The targets for energy, travel, and waste have been established based on the change in global greenhouse gas (GHG) emissions required to stabilize the concentration of GHGs in the atmosphere. Climate scientists estimate that a 50-85% reduction below 2000 global GHG emissions is necessary to reach an atmospheric GHG concentration at 445-490 ppm and stabilize the global mean temperature at 2.0-2.4 degrees Celsius above pre-industrial temperatures (Metz et al., 2007). Minnesota's Next Generation Energy Act (NGEA) of 2007 calls for reducing the state's greenhouse gas emissions to 15 percent below 2005 levels by 2015, 30 percent by 2025, and 80 percent by 2050. The RII energy, travel, waste, and greenhouse gas targets for each city have been calculated to correspond with the NGEA, with additional reference points of a 22.5 percent reduction by 2020 and 40 percent reduction by 2030 (**See attachment: 1B.1 Greenhouse Gas Emissions Forecasts (Edina)**). Since potable water consumption targets have not been defined through state or national legislation, the RII team chose to defer to each city to set their own targets. This enables cities to focus on their own priorities, whether limiting consumption to maintain the water level of their aquifers or to reflect current best practices in residential water savings (Vickers).

The first step in calculating the energy, travel, and waste targets involved "backcasting" to establish a 2005 baseline. After testing several methodologies for backcasting, the 2005 baseline for each city was estimated based on per capita statewide trends (Center for Climate Strategies, 2008). Population data for 2005 was then used to translate this per capita estimate into the total consumption baseline which was used to set targets for 2020 and 2030. These 2005 estimates have been made for the sole purpose

of setting a reduction target and they do not meet the degree of accuracy achieved by the rigorously calculated 2008-2011 GHG data.

In order to provide a baseline for comparison, the RII team has also forecasted business-as-usual outcomes for each of the four metrics for the years 2020 and 2030. After testing several methodologies, these business-as-usual estimates were made by creating a best fit linear regression from the 2005 backcast and the actual 2008-2011 data for each city (**See attachments: 1B.2-1B.5 Energy, Travel Waste and Water Forecasts (Edina)**). These forecasts reflect future consumption if the cities continue according to their current per capita trends, but they don't take into account future uncertainties such as climate change, a fluctuating economy, a carbon tax, or technological advancement.

While the targets and business-as-usual forecasts are set based on city-wide GHG emissions, they can also be expressed relative to population and jobs in each city, reflecting the steeper rate of per-capita reduction necessary for growing cities. When looking at all twenty cities combined, in order for total GHG emissions to drop by 40%, each person must reduce their emissions by 49% (**See attachment: 1B.6 Greenhouse Gas Emissions Forecasts: Per Capita vs. Total (All cities)**). These methods of depiction will enable each citizen to see the personal reduction necessary to meet city-wide GHG emissions targets.

Next Steps

Next steps for the cities will be to continue measuring the four indicators and comparing the annual results to the business-as-usual projections and the targets. A future step for the RII team is to collaborate with the DNR and Metropolitan Council to formulate a consistent methodology for establishing meaningful water consumption targets.

Bibliography

Metz, B. et. al. eds. 2007. *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Intergovernmental Panel on Climate Change. Geneva, Switzerland.

Strait, R. et. al. 2008. *FINAL Minnesota Greenhouse Gas Inventory and Reference Case Projections 1990-2025.* Center for Climate Strategies.

Vickers, Amy. 2002. *Handbook of Water Use and Conservation*. WaterPlow Press. Amherst, MA.

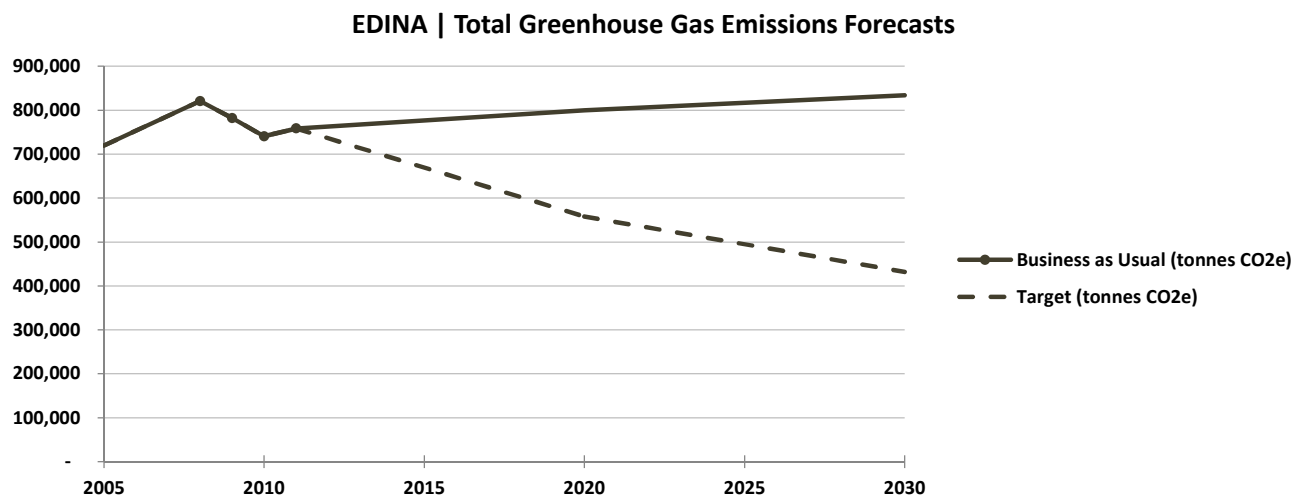
Attachments

- **1B.1 Greenhouse Gas Emissions Forecasts (Edina)**
- **1B.2 Energy Forecasts (Edina)**
- **1B.3 Travel Forecasts (Edina)**
- **1B.4 Waste Forecasts (Edina)**
- **1B.5 Water Forecasts (Edina)**
- **1B.6 Greenhouse Gas Emissions Forecasts: Per Capita vs. Total (All cities)**

Greenhouse Gas Backcasts, Forecasts, and Targets

Updated: 2/18/2013

City Greenhouse Gas Backcasts, Forecasts, and Targets Based on 2008-2011 Data							
	Backcast	Actual Data					
	2005	2008	2009	2010	2011	2020	2030
Statewide Trends[1]							
MN Population	5,174,743	5,220,393	5,262,989	5,303,925	5,344,861	5,900,769	6,306,130
MN GHG Emissions (Total CO2e)[2]	66.0			68.9		74.0	79.1
MN GHG Emissions (CO2e/person)	12.8			13.0		12.5	12.5
% change from 2010 (per person)	98%			100%		97%	97%
City-Specific Trends							
Population	47,448	48,169	49,491	47,941	48,262	49,100	50,000
Business as Usual (tonnes CO2e)	719,963	821,025	782,467	740,916	758,608	799,757	834,062
Target (tonnes CO2e)[3]	719,963	821,025	782,467	740,916	758,608	557,972	431,978
Business as Usual (tonnes CO2e/person)[4]	15	17	16	15	16	16	17
Target (tonnes CO2e/person)	15	17	16	15	16	11	9



Notes:

1 Statewide trends from: *Final Minnesota Greenhouse Gas Inventory and Reference Case Projections 1990-2025*, Center for Climate Strategies, March 2008.

2 Statewide emissions associated with energy, VMT, and solid waste management only.

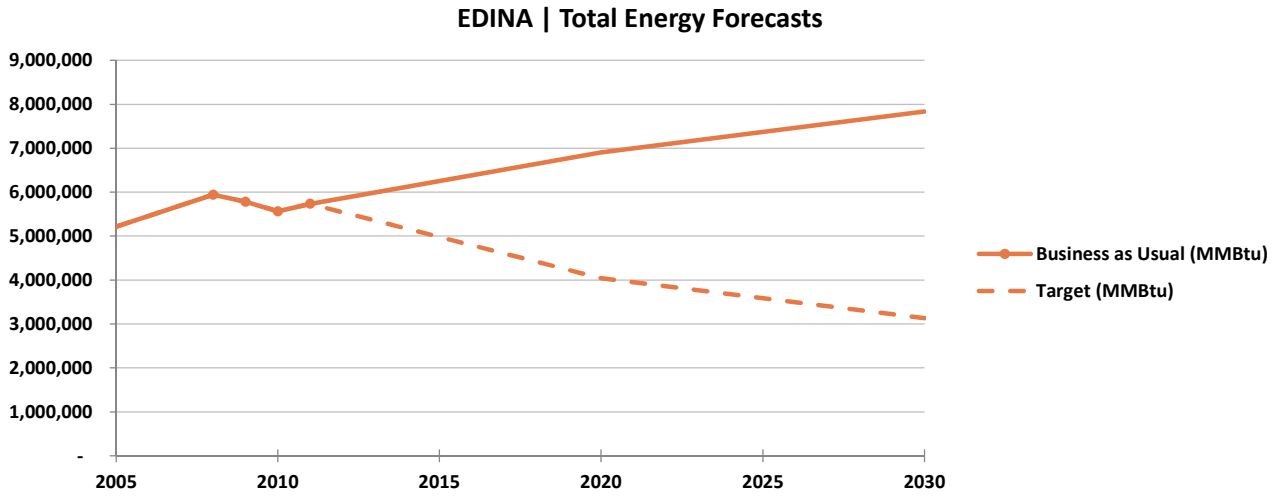
3 Targets are calculated based on the total 2005 consumption, in accordance with the statewide greenhouse gas reduction goals established by the Minnesota Next Generation Energy Act. The NGEA specifies reductions from the 2005 baseline of 15% by 2015, 30% by 2025, and 80% by 2050. This project uses checkpoints of 22.5% by 2020 and 40% by 2030.

4 Business as Usual projections are calculated on a per capita basis. First, the 2005 backcast is established as a percentage of the city's 2010 data based on statewide trends. Then 2020 and 2030 forecasts are made using a best fit regression line through the 2005, 2008-2011 data points. These per capita trends are then multiplied by the population to reflect total consumption forecasts.

Energy Backcasts, Forecasts, and Targets

Updated: 2/18/2013

City Energy Backcasts, Forecasts, and Targets							
	Backcast	Actual Data				Forecasts	
	2005	2008	2009	2010	2011	2020	2030
Statewide Trends[1]							
MN Population	5,174,743	5,220,393	5,262,989	5,303,925	5,344,861	5,900,769	6,306,130
MN GHG from Energy (megatonnes CO2e)	32.0			35.0		38.6	43.1
MN GHG from Energy (tonnes CO2e/person)	6.18			6.60		6.54	6.83
% change from 2010 (per person)	94%			100%		99%	103%
City-Specific Trends							
Population	47,448	48,169	49,491	47,941	48,262	49,100	50,000
Jobs	48,117	49,202	47,006	47,676	49,018	55,000	57,400
Residential							
Business as Usual (MMBtu/year)	2,335,115	2,733,617	2,663,266	2,517,717	2,615,489	2,983,709	3,366,045
Target (MMBtu/year)[2]	2,335,115	2,733,617	2,663,266	2,517,717	2,615,489	1,809,714	1,401,069
Business as Usual (kBtu/person/day)[3]	135	155	147	144	148	166	184
Target (kBtu/person/day)	135	155	147	144	148	101	77
Commercial/Industrial							
Business as Usual (MMBtu/year)	2,881,844	3,211,945	3,117,927	3,047,062	3,119,612	3,922,766	4,472,151
Target (MMBtu/year)[2]	2,881,844	3,211,945	3,117,927	3,047,062	3,119,612	2,233,429	1,729,107
Business as Usual (kBtu/person/day)[3]	164	179	182	175	174	195	213
Target (kBtu/person/day)	164	179	182	175	174	111	83
Total							
Business as Usual (MMBtu)	5,216,959	5,945,561	5,781,193	5,564,779	5,735,101	6,906,475	7,838,197
Target (MMBtu)	5,216,959	5,945,561	5,781,193	5,564,779	5,735,101	4,043,143	3,130,175
Business as Usual (kBtu/person/day)	298	338	320	318	326	362	400
Target (kBtu/person/day)	298	338	320	318	326	226	172



Notes:

1 Statewide trends from: *Final Minnesota Greenhouse Gas Inventory and Reference Case Projections 1990-2025*, Center for Climate Strategies, March 2008.

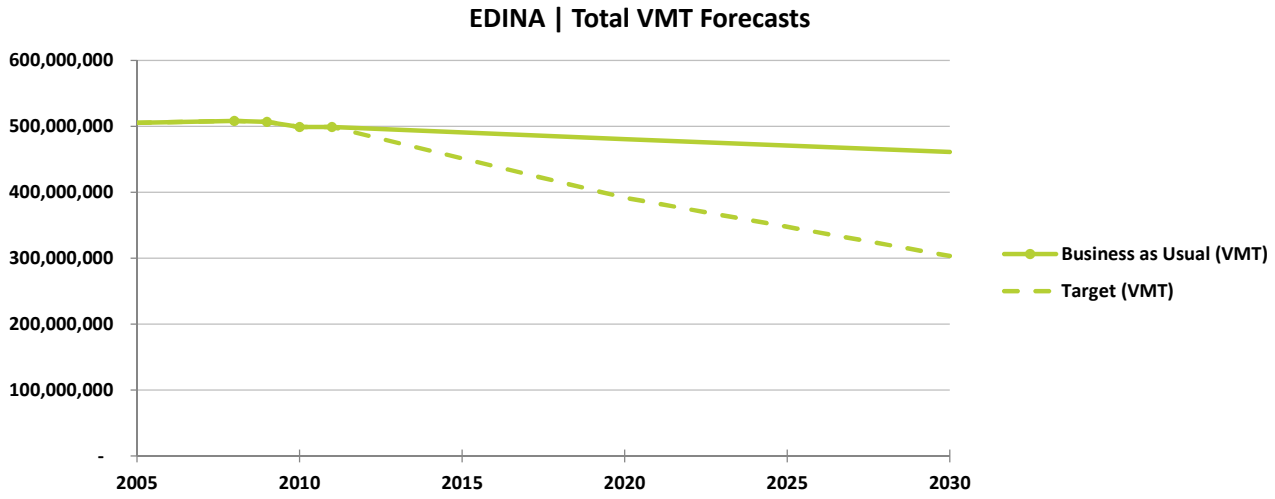
2 Targets are calculated based on the total 2005 consumption, in accordance with the statewide greenhouse gas reduction goals established by the Minnesota Next Generation Energy Act. The NGEA specifies reductions from the 2005 baseline of 15% by 2015, 30% by 2025, and 80% by 2050. This project uses checkpoints of 22.5% by 2020 and 40% by 2030.

3 Business as Usual projections are calculated on a per capita basis. First, the 2005 backcast is established as a percentage of the city's 2010 data based on statewide trends. Then 2020 and 2030 forecasts are made using a best fit regression line through the 2005, 2008-2011 data points. These per capita trends are then multiplied by the population to reflect total consumption forecasts.

Travel Backcasts, Forecasts, and Targets

Updated: 2/18/2013

City VMT Backcasts, Forecasts, and Targets							
	Backcast	Actual Data				Forecasts	
	2005	2008	2009	2010	2011	2020	2030
Statewide Trends[1]							
MN Population	5,174,743	5,220,393	5,262,989	5,303,925	5,344,861	5,900,769	6,306,130
MN GHG from Onroad Gas and Diesel (megato	29.4			29.4		31.2	31.9
MN GHG from Onroad Gas and Diesel (tonnes (	5.68			5.54		5.29	5.06
% change from 2010 (per person)	102%			100%		95%	91%
City-Specific Trends							
Population	47,448	48,169	49,491	47,941	48,262	49,100	50,000
Business as Usual (VMT)	505,482,995	508,313,244	506,846,665	498,974,345	498,974,345	480,789,896	461,234,439
Target (VMT)[2]	505,482,995	508,313,244	506,846,665	498,974,345	498,974,345	391,749,321	303,289,797
Business as Usual (VMT/person/day)[3]	29	29	28	29	28	27	25
Target (VMT/person/day)	29	29	28	29	28	22	17



Notes:

1 Statewide trends from: *Final Minnesota Greenhouse Gas Inventory and Reference Case Projections 1990-2025*, Center for Climate Strategies, March 2008.

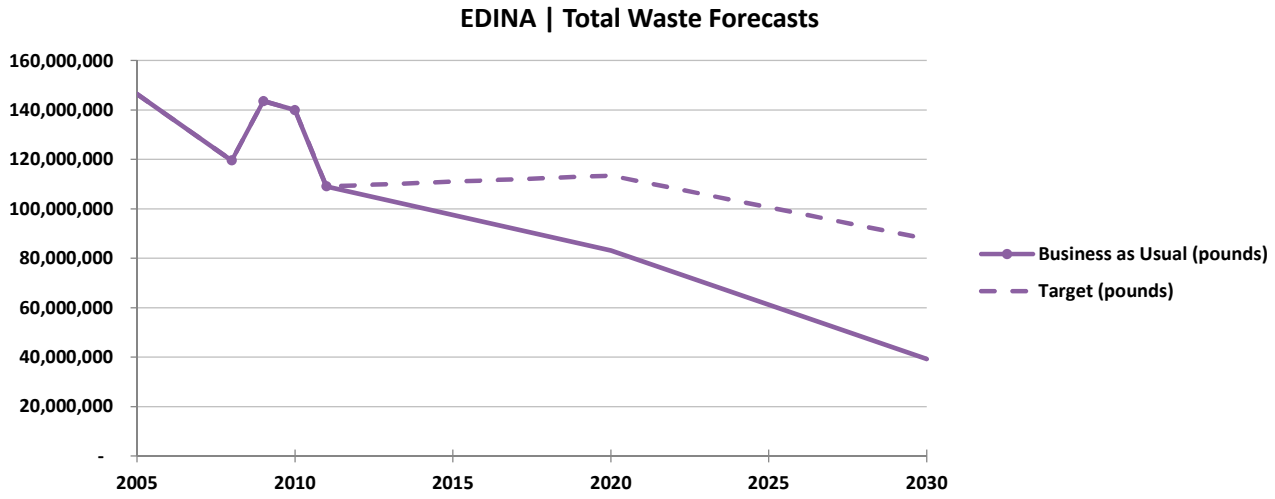
2 Targets are calculated based on the total 2005 consumption, in accordance with the statewide greenhouse gas reduction goals established by the Minnesota Next Generation Energy Act. The NGEA specifies reductions from the 2005 baseline of 15% by 2015, 30% by 2025, and 80% by 2050. This project uses checkpoints of 22.5% by 2020 and 40% by 2030.

3 Business as Usual projections are calculated on a per capita basis. First, the 2005 backcast is established as a percentage of the city's 2010 data based on statewide trends. Then 2020 and 2030 forecasts are made using a best fit regression line through the 2005, 2008-2011 data points. These per capita trends are then multiplied by the population to reflect total consumption forecasts.

Waste Backcasts, Forecasts, and Targets

Updated: 2/18/2013

City Waste Backcasts, Forecasts, and Targets							
	Backcast	Actual Data				Forecasts	
	2005	2008	2009	2010	2011	2020	2030
Statewide Trends[1]							
MN Population	5,174,743	5,220,393	5,262,989	5,303,925	5,344,861	5,900,769	6,306,130
MN GHG from Solid Waste (megatonnes CO2e)	4.6			4.5		4.2	4.1
MN GHG from Solid Waste (tonnes CO2e/perso	0.89			0.84		0.72	0.65
% change from 2010 (per person)	106%			100%		85%	77%
City-Specific Trends							
Population	47,448	48,169	49,491	47,941	48,262	49,100	50,000
Business as Usual (pounds)	146,425,130	119,577,756	143,564,344	139,969,125	109,094,041	83,178,268	39,272,507
Target (pounds)[2]	146,425,130	119,577,756	143,564,344	139,969,125	109,094,041	113,479,476	87,855,078
Business as Usual (pounds/person/day)[3]	8.45	6.80	7.95	8.00	6.19	4.64	2.15
Target (pounds/person/day)	8.45	6.80	7.95	8.00	6.19	6.33	4.81



Notes:

1 Statewide trends from: *Final Minnesota Greenhouse Gas Inventory and Reference Case Projections 1990-2025*, Center for Climate Strategies, March 2008.

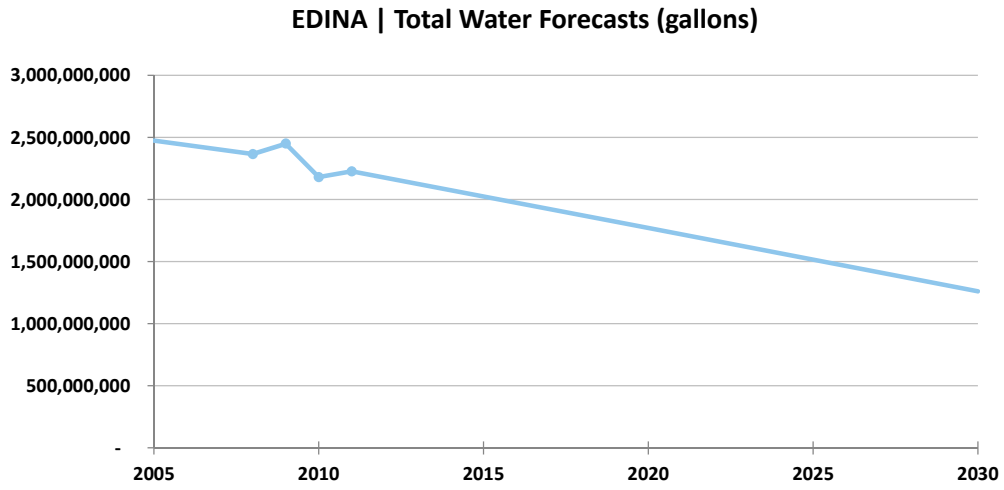
2 Targets are calculated based on the total 2005 consumption, in accordance with the statewide greenhouse gas reduction goals established by the Minnesota Next Generation Energy Act. The NGEA specifies reductions from the 2005 baseline of 15% by 2015, 30% by 2025, and 80% by 2050. This project uses checkpoints of 22.5% by 2020 and 40% by 2030.

3 Business as Usual projections are calculated on a per capita basis. First, the 2005 backcast is established as a percentage of the city's 2010 data based on statewide trends. Then 2020 and 2030 forecasts are made using a best fit regression line through the 2005, 2008-2011 data points. These per capita trends are then multiplied by the population to reflect total consumption forecasts.

Water Forecasts

Updated: 2/18/2013

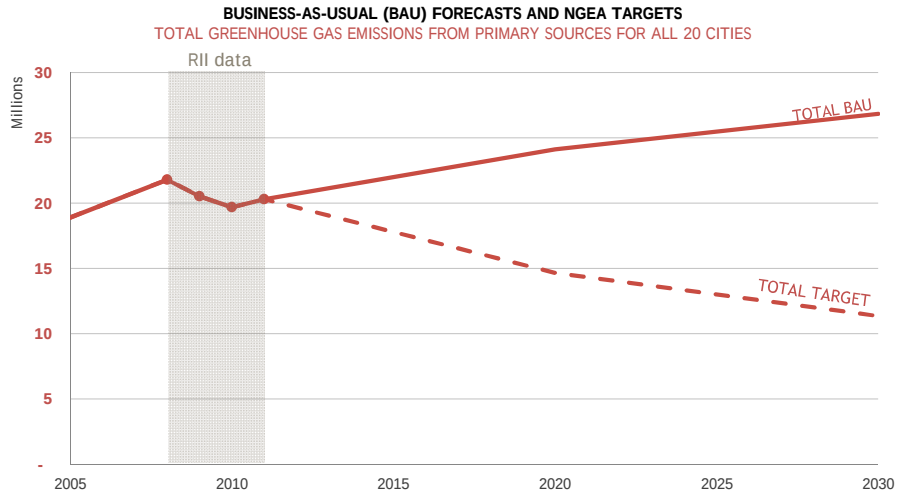
City Water Forecasts							
	Actual Data[1]					Forecasts[2]	
	2005	2008	2009	2010	2011	2020	2030
City-Specific Trends							
Population	47,448	48,169	49,491	47,941	48,262	49,100	50,000
Jobs	48,117	49,202	47,006	47,676	49,018	55,000	57,400
Residential							
Business as Usual (gallons/year)	1,922,356	1,789,110,326	1,860,343,660	1,651,793,579	1,685,927,885	1,257,906	785,014
Business as Usual (gallons/person/day)	111	102	103	94	96	70	43
Commercial/Industrial							
Business as Usual (gallons/year)	561,450,468	577,517,490	589,620,252	529,013,678	541,999,198	8,526,793	13,977,555
Business as Usual (gallons/person/day)	32	179	182	175	174	425	667
Total							
Business as Usual (gallons)	2,476,000,000	2,366,627,816	2,449,963,912	2,180,807,257	2,227,927,083	1,772,179,274	1,260,762,542
Business as Usual (gallons/person/day)	143	135	136	125	126	99	69



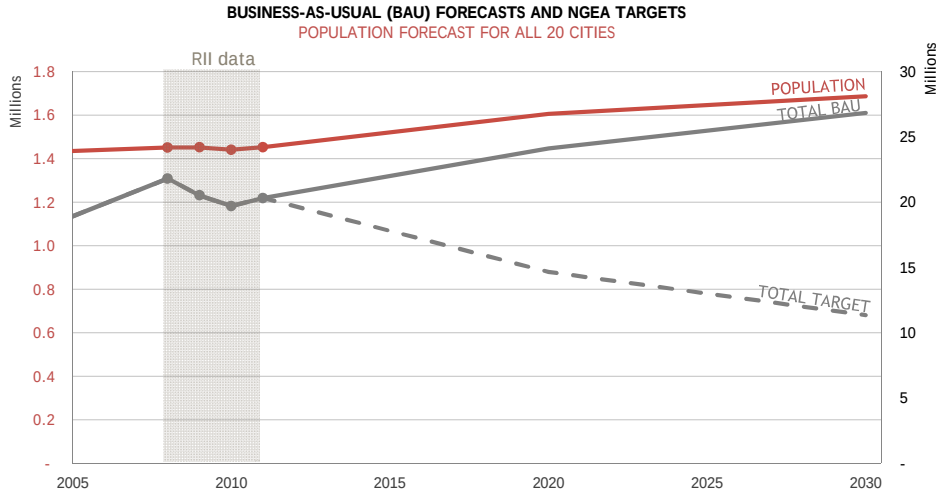
Notes:

1 Actual data for 2005 collected from the Metropolitan Council's *Historical Municipal Water Use*, 2008. http://www.metrocouncil.org/environment/WaterSupply/WSPdata/historic_wateruse.pdf

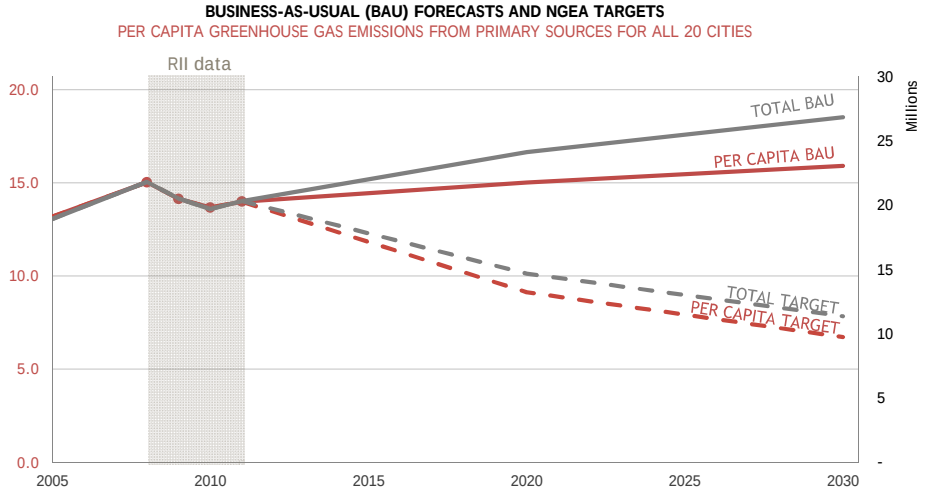
2 Business as Usual projections are calculated on a per capita basis using a best fit regression line through the 2005, 2008-2011 data points. These per capita trends are then multiplied by the population to reflect total consumption forecasts.



40% reduction from 2005 baseline



anticipated population growth



49% reduction from 2005 baseline

Report on:

Regional Indicators Initiative: Objective 1: Evaluation TASK 1C: Compare Metrics with Strategies

Final MPCA Report

Prepared by

LHB, Inc.

March 2013

Statement of Task

<u>OBJECTIVE 1: Evaluation</u>

Task 1C: Compare metrics with strategies to achieve savings in energy, water, vehicle miles traveled, and waste in order to reduce greenhouse gas emissions.

Team members for this objective: LHB, Inc.

Work completed to date

Summary: The Regional Indicators Initiative (Initiative) team has analyzed the potential correlation of the metrics collected by the study with the strategies (Best Management Practices) outlined by the GreenStep Cities Program. Each individual strategy was analyzed to see if the potential impact was measurable within the Regional Indicators Initiative's current data collection. Nineteen of the twenty-eight total categories were found to be measurable within the Initiative's current indicators.

The Regional Indicators Initiative (Initiative) team identified the GreenStep Cities Best Management Practice (BMPs) as an appropriate grouping of strategies to use to correlate with RII metrics. The advantage is that these BMPs are specific to Minnesota cities and 15 of the 20 Regional Indicator Initiative participants are also participants of GreenStep Cities (as of February 22, 2013). This will allow for future correlation between strategies chosen by each city and actual performance results.

In order to effectively identify what correlations exist between data collected for the Regional Indicators Initiative and strategies being adopted by GreenStep Cities, the RII team first took an inventory of which RII cities were participating in GreenStep Cities, which Best Management Practices (BMPs) they had chosen, and what level of completion they had achieved. A chart highlighting BMPs used by cities that are in both the RII and the GreenStep Cities program was developed (**See attachment: 1C.1 GreenStep Cities BMPs**).

There are 28 categories of BMPs with 4-8 individual actions within each category. Within these individual actions, GreenStep Cities offers three levels or 'stars' of completion for each. For example, BMP #4 is 'Efficient Building and Street Lighting and Signaling'. One of the eight possible actions in this category is 'Coordinate traffic signals and or/optimize signal timing so as to minimize car idling at intersections yet maintain safe and publically acceptable vehicle speeds'. As with all actions, cities have three choices for levels of completion. The levels for this action are as follows:

- ★ Report synchronized traffic signals, flashing yellow left turn arrow signals, installation of detectors in at least 10% of city signals (operated under traffic actuated/responsive mode). Report roundabouts under best practice action 11.6

★★ Work with the county/MnDOT to interconnect traffic signals and coordinate them in one corridor.

★★★ Work with the county/MnDOT to interconnect/coordinate among traffic signals and synchronize them along several corridors.

As illustrated in this example, the level of impact or reduced consumption is highest if a city chooses a 'three star' level and lowest with a 'one star' level of completion. In order to accurately capture which cities have taken on which levels of completion, the values '1', '2' and '3' are used to designate a strategy completed and its level on the spreadsheet. For cities that had chosen actions but not yet reached a level of completion, a value of '0' is used to designate the intent but no current impact. A 'total score' found on the bottom of the spreadsheet provides a sum of all of the BMP values and allowed for some comparison between cities. In this way, the 'total score' is a more accurate representation of the impact of each city's actions rather than simply a tally of how many actions were chosen without being weighted by impact.

The cities are organized on the spreadsheet in order of the date they joined GreenStep Cities. This ranges from August 17th, 2010 (shortly after GreenStep Cities was created), to the most recent on January 23rd, 2013. Some correlations with the 'join date' were noticed, as the cities that were first to join most often have higher 'total scores' than those that joined more recently.

One obstacle to this method of evaluation was that most often, cities tend to update the status of their actions at intervals in time. Because it is up to the cities to report what actions were done when, it is possible that many actions have already been completed by cities and just not yet entered on the website.

On the left side of the spreadsheet, each individual action was analyzed to see if the potential impact was measurable within the Regional Indicators Initiative's current data collection. A colored bar correlating with each of the five RII Indicators appears when a specific action is found to be measurable. Of the 28 BMP categories, 19 categories were found to relate to at least one indicator currently measured in the RII. The other 9 categories (Land Use, Conservation Design, Urban Forests, Efficient Storm water Management, Parks and Trails, Surface Water Quality, Septic Systems, Local Air Quality, Benchmarks + Community Engagement, and Local Food) were found to have little to no correlation with the current RII indicators.

The BMP categories which had the highest 'scores' (sum of all values entered for each RII city) were 'Efficient Existing Public Spaces', 'Efficient Existing Private Buildings', 'Efficient Building and Street Lighting and Signaling', 'Mixed Uses', 'Purchasing', and 'Efficient City Fleets'.

Next Steps

The RII team completed an extensive literature review to identify strategies to reduce energy consumption, water use, vehicle miles traveled, and waste produced. A next step is to summarize this research with a list of strategies to be used as a supplement to the GreenStep Cities BMPs to help cities focus their sustainability efforts. Ideally, the cities participating in RII will document which strategies they use, so that when subsequent years of data are collected, the impacts of these strategies can be measured. In the future, this data can guide cities to focus on selecting the BMPs with the greatest impact (**See attachment: 1C.2 Reduction Strategies Annotated Bibliography**).

It was beyond the scope of the Initiative to expand upon the analysis of correlating GreenStep Cities BMPs with RII metrics. However there is great potential for this work to be continued to develop more specific guidance to cities and to GreenStep.

An additional step would be to expand the RII indicators to cover the remaining nine BMP categories which are not currently correlated.

Attachments

- **1C.1 GreenStep Cities BMPs**
- **1C.2 Reduction Strategies Annotated Bibliography**

GreenStep Cities Best Practices Spreadsheet (select BMPs)

Last Updated: 2/22/13

This chart highlights BMPs used by cities that are in both the RII and the GreenStep Cities program

Source: http://greenstep.pca.state.mn.us/allCities.cfm

KEY

Colored bar indicates BMPs which are measurable within the current data collection of the Regional Indicators Initiative.

Energy | Water | Vehicle Miles Travelled | Waste | Carbon

Values below indicate that a city has completed either one star (1), two star (2) or three start (3) completion of any given action. If a city is in the process of completing an action but has not received a star level, the action is designated '0'.

	Eagan	Hopkins	Maplewood	Rochester	Falcon Heights	Edina	St. Anthony	Oakdale	Eden Prairie	White Bear Lake	Richfield	Lake Elmo	St. Louis Park	Shoreview	Woodbury	Total
Date City Joined GreenStep Cities	8/17/2010	11/1/2010	12/13/2010	12/6/2010	1/12/2011	1/18/2011	2/8/2011	3/8/2011	6/14/2011	12/13/2011	1/10/2012	5/14/2012	6/4/2012	1/22/2013	1/23/2013	
1 | EFFICIENT EXISTING PUBLIC BUILDINGS																**30**
(1) Enter baseline information into the Minnesota B3 database and routinely enter monthly energy use data from city-owned buildings.	1	1	1	1	1	1			1							**7**
(2) Make no/low cost facility operations and maintenance changes to city-owned buildings to reduce energy costs.	2	1	1	1	1	1			1				1			**9**
(3) Invest in energy efficiency opportunities through recommissioning/retrofitting city-owned buildings.	2		1		1	1			1							**6**
(4) Implement information technology efforts and city employee engagement to reduce plug loads and building energy use.	0	1	1						1							**3**
(5) Document that the major remodeling of city owned buildings meets or qualifies for a green building framework.	2			1												**3**
(6) Document that the operations and maintenance of city-owned buildings meet or qualify for a green building framework.																**0**
(7) Install in at least one city-owned building at least one of the following energy efficiency measures: a. A ground-source, closed loop geothermal system where net greenhouse gases are less than those generated by the system being replaced. b. A distributed fossil fuel energy technology for full-time combined heat and power energy generation: micro-turbine, fuel cell, reciprocation engine.	1					1										**2**
2 | EFFICIENT EXISTING PRIVATE BUILDINGS																**20**
(1) Create or participate in a marketing and outreach program to promote residential energy use reduction and energy efficiency.			1	1		1										**3**
(2) Integrate green building information into the building permit process.			1													**1**
(3) Develop a (or modify an existing) truth-in-housing inspection program for homes being sold, to include a blower-door test and energy-use rating.																**0**
(4) Document green building construction, practices, and energy/water efficiency at businesses located within/nearby the city.	2		1						1							**4**
(5) Conserve drinking/groundwater resources by adopting a water ordinance, conservation rate structure, model landscaping ordinance, or WaterSense purchasing program.	1		1	1		1	1		1							**6**
(6) Provide a meaningful and significant incentive to private parties (builders, homeowners, businesses, institutions) who renovate using a green building framework.			1	1	1											**3**
(7) Customize a model sustainable building renovation policy and adopt language governing commercial renovation projects that: a. Receive city financial support, and/or b. Require city regulatory approval (conditional use permit, rezoning, PUD status).			1													**1**
(8) Arrange for on-bill financing, using either utility or property tax bills, to make home/building sustainability improvements easier and more affordable.			1	1												**2**
3 | NEW GREEN BUILDINGS																**8**
(1) Require by city council resolution that all new city-owned buildings and substantial remodels use a green building framework.	0		1	1												**2**
(2) Work with the local school to ensure that all new schools are built using a green building framework.				1												**1**
(3) Customize a model sustainable building policy and adopt language governing new private development projects that: a. Receiving city financial support, and/or b. Requiring city regulatory approval (conditional use permit, rezoning, PUD).			1	1												**2**
(4) Provide a meaningful and significant incentive to private parties (residents, builders or developers) who utilize a green building framework:			1	1												**2**
(5) Adopt environmentally preferable covenant guidelines for common interest communities addressing issues such as stormwater, native vegetation, growing food, clothes lines and renewable energy.			1													**1**
(6) Document that at least one a public building was constructed using a green building framework.																**0**
4 | EFFICIENT BUILDING & STREET LIGHTING AND SIGNALING																**26**
(1) Require energy efficient, Dark-Sky compliant new or replacement outdoor lighting fixtures on city-owned/private buildings and facilities.		1							1							**2**
(2) Require all new street lighting and traffic signals to be Dark-Sky compliant, energy efficient lighting technologies.				1			1		1							**3**
(3) Modify any city franchise or other agreement with a utility to facilitate rapid replacement of inefficient street lighting.	0		1	1			1									**3**
(4) Synchronize traffic signals or optimize signal timing as minimize car idling at intersections yet maintain safe and publicly acceptable vehicle speeds.	1	1	1	1			1									**5**
(5) Install LED or solar powered lighting in a street, parking lot or park project.		1		1			1									**3**
(6) Relamp/improve exterior building lighting for at least one-third of city-owned buildings/facilities with energy efficient, Dark-Sky compliant lighting.							1		1							**2**
(7) Replace at least 50% of the city's parking lot lighting with Dark-Sky compliant, energy efficient, automatic dimming lighting technologies.				1												**1**
(8) Replace at least one-third of the city's existing traffic signals with energy efficient LED or equivalent lighting technologies.	3	1		1			1		1							**7**

KEY

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Energy | Water | Vehicle Miles Travelled | Waste | Carbon

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5 | BUILDING REUSE																**13**
(1) Adopt an historic preservation ordinance to encourage adaptive reuse.			1	1					1							**3**
(2) Implement the Minnesota Main Street model for commercial revitalization.			1	1												**2**
(3) Work with a local school to either add on space, or to repurpose space into non-school uses.			1	1			1									**3**
(4) Create/modify a green residential remodeling assistance/financing program to assist homeowners in adding space to their existing homes.				1			1									**2**
(5) Adopt development and design standards that facilitate infill and redevelopment.	1		1	1												**3**
6 | LAND USE																**3**
(1) Adopt/have an adopted comprehensive plan OR, Category B and C cities may simply adopt a land use plan that was adopted by a regional entity or the county.	1															**1**
(2) Demonstrate that regulatory ordinances comply with the comprehensive plan including but not limited to having the zoning ordinance explicitly reference the comprehensive plan as the foundational document for decision making.	1															**1**
(3) Include requirements in comprehensive and/or other plans for intergovernmental coordination addressing land use and watershed impacts, infrastructure, economic development and city/regional services.	1															**1**
(4) Include ecologic provisions in the comprehensive plan that explicitly aim to minimize open space fragmentation and/or establish a growth area with expansion criteria.	0															**0**
7 | EFFICIENT CITY GROWTH																**12**
(1) Limit barriers to higher density housing by including in the city zoning ordinance and zoning map: a. Neighborhood single-family density at seven units per net acre or greater. b. Multi-family housing at a gross density of at least 15 units per acre adjacent to a commercial zoning district or transit center.	1		1	1	1		1									**5**
(2) Encourage higher density housing through at least two of the following strategies: a. Incorporate a flexible lot size/frontage requirement for infill development. b. Use density and floor area ratio (FAR) bonuses in selected residential zoning districts. c. Tie a regulatory standard to comprehensive plan language defining compact city expansion zones that limit low-density development. d. Allowing accessory dwelling units by right in selected zoning districts.	0		1	1			1									**3**
(3) Encourage a higher intensity of commercial land uses through at least one of the following strategies: a. Include in the city zoning ordinance and zoning map a commercial district with reduced lot sizes and zero-lot-line setbacks, or a FAR minimum between .75 and 1. b. Set targets for the minimum number of employees/acre in different commercial zones.			1	1												**2**
(4) Provide incentives for infill projects, or for life-cycle housing at or near jobs or retail centers, or for achieving an average net residential density of seven units per acre.	0						1									**1**
(5) Modify the city zoning ordinance and zoning map to allow, without variance or rezoning in at least one district, developments that meet the prerequisites for LEED-Neighborhood Development certification.									1							**1**
8 | MIXED USES																**20**
(1) Create a main street program or organize a Minnesota Design Team planning charrette.	1					1	1						1			**4**
(2) Locate or lease a government facility that has at least two of these attributes: a. Adjacent to an existing employment or residential center. b. Designed to facilitate and encourage access by walking and biking. c. Accessible by regular transit service.	1		1	1			1									**4**
(3) Modify a planned unit development – PUD - ordinance to emphasize mixed use development or to limit residential PUDs to areas adjacent to commercial development.			1	1		1	1									**4**
(4) Certify a new development as complying with LEED-ND standards, including the mixed-use credits.																**0**
(5) Have a downtown zoning district that allows residential and compatible commercial development.		1	1	1												**3**
(6) Use form-based zoning standards in at least one city-zoning district.			1													**1**
(7) Create incentives for vertical mixed-use development in appropriate locations (downtown, commercial districts near colleges or universities, historic commercial districts).	1	1	1	1												**4**
9 | EFFICIENT HIGHWAY-ORIENTED DEVELOPMENT																**7**
(1) Establish design goals for at least one highway corridor.			1	1												**2**
(2) Participate in regional economic development planning with representatives from surrounding townships, cities, the county and business interests to: a. Estimate commercial/industrial needs among all jurisdictions. b. Jointly implement recommendations to stage highway commercial development in order to avoid overbuilding and expensive low-density development.	1		1	1												**3**
(3) Adopt transportation infrastructure design standards that accomplish at least one of the following: a. Improve the ecologic functions of land adjacent to highway corridors. b. Facilitate clustering of commercial highway development. c. Context-sensitive design.				1												**1**
(4) Adopt at least one corridor management and design ordinance.				1												**1**
(5) Require decommissioning in development agreements for large format developments should they remain vacant for several years.																**0**

KEY

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10 | CONSERVATION DESIGN																**11**
(1) Conduct a Natural Resource Inventory and Assessment (NRI and NRA) and incorporate protection of priority natural systems or resources through the subdivision or development process, as described in Minnesota's 2009 Model Ordinances for Sustainable Development.	1						1		1							**3**
(2) For cities outside or on the fringe of metropolitan areas, conduct a cost of public services study for development outside the city grid and adopt development standards or a concurrency ordinance to ensure staged urban growth that protects natural systems.																**0**
(3) For cities within metropolitan areas, incorporate by policy woodland best management practices into zoning or development review.			1				1		1				1			**4**
(4) For cities with undeveloped natural resource areas use, or adopt as policy the use of, a conservation design scorecard as a tool in negotiating development agreements.																**0**
(5) Develop and fund a conservation easement program, such as a purchase of development rights program, in collaboration with a land trust.	1		1	1					1							**4**
11 | COMPLETE GREEN STREETS																**26**
(1) Adopt a complete streets policy that addresses street trees and stormwater.	1	1	1	1	1	1			1							**7**
(2) Adopt zoning language for a selected area/project that is substantially equivalent to the LEED for Neighborhood Development credits for Walkable Streets or Street Network.							1									**1**
(3) Document the installation of trees, and other green stormwater infrastructure, and utility renovations as needed as part of at least one complete street reconstruction project.		1	1				1									**3**
(4) Identify and remedy non-complete street segments by, for example, adding a bike lane or sidewalk.	0		1	1		1	1									**4**
(5) Identify and remedy street-trail gaps between city streets and trails/bike trails to better facilitate walking and biking.	1		1	1			1									**4**
(6) Implement traffic calming measures in at least one street redevelopment project.	2		1	1	1	1	1									**7**
12 | MOBILITY OPTIONS																**15**
(1) Promote walking, biking and transit use by one or more of the following means: a. Produce/distribute route maps, signage or a web site. b. Document increased bike facilities, such as racks, bike stations, showers. c. Add bus infrastructure, such as signage, benches, shelters, park and ride lots, and real-time arrival data streaming. d. Increase the number of employers who offer qualified transportation fringe benefits instead of only a tax-free parking fringe benefit. e. Be recognized as a Walk Friendly or Bicycle Friendly Community.	1	1	1	1	1	1	1									**7**
(2) Launch an Active Living campaign in concert with your local community health board, such as a Safe Routes to School program.	1			1		1	1									**4**
(3) Prominently identify on the city's web site mobility options for hire: transit services; paratransit/Dial-A-Ride; cab service(s); rental car agency(s).		1														**1**
(4) Promote carpooling or ridesharing among community members, city employees, businesses, high schools and institutions of higher education.		1	1													**2**
(5) Launch an eWorkPlace Minnesota campaign, working with business and transportation management organizations, or help bring telemedicine technology to a local health care provider.																**0**
(6) Add/expand transit service, or promote car/bike sharing.	1															**1**
13 | EFFICIENT CITY FLEETS																**21**
(1) Decrease city fleet or use of city vehicles by means such as trip bundling, video conferencing, carpooling and financial incentives for efficient vehicle use.	1		1				1									**3**
(2) Right-size the city fleet with the most fuel-efficient vehicles that are of an optimal size/capacity for their intended functions.	1		1				1		1							**4**
(3) Document the phase-in of several equipment and operational changes for city or local transit fleets, or for school/park board fleets.	1	1	1	1			1		1							**6**
(4) Phase in bike, foot or horseback police patrols.		1	1	1			1									**4**
(5) Document that the local school bus fleet has optimized routes, start times, boundaries, vehicles, bus fuels, and driver actions to decrease fuel use.	2															**2**
(6) Participate in Project GreenFleet to retrofit or replace diesel engines, or to install auxiliary power units that reduce truck and bus idling.			1	1												**2**
14 | DEMAND-SIDE TRAVEL PLANNING																**6**
(1) In development standards, right-size parking minimum standards and add parking maximums in pedestrian-friendly or transit-served areas.				1												**1**
(2) For cities with regular transit service, require or provide incentives for the siting of retail services at transit/density nodes.							1									**1**
(3) For cities with regular transit service, require or provide incentives for the siting of higher density housing at transit/density nodes.		1		1												**2**
(4) Incorporate transit-oriented development or travel demand management into development regulations.		1		1												**2**
(5) Document that a development project certifies under the LEED for Neighborhood Development program and is awarded at least one of the following credits: b. Housing and Jobs Proximity.																**0**

KEY

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15 | PURCHASING																**21**
(1) Adopt a policy or administrative practice directing that the city purchase at least: a. EnergyStar certified equipment and appliances and b. Paper containing at least 30% post-consumer recycled content.	2	1	1		1	1	1		1							**8**
(2) Purchase 15% of city energy requirements from renewable energy sources.																**0**
(3) Establish a local purchasing preference and, working with a local business association, develop a list of locally-produced products and suppliers for common purchases.		1					1									**2**
(4) Require purchase of U.S. EPA Water Sense-certified products for all product categories covered by the Water Sense program.	2					1										**3**
(5) Set minimum standards for the percentage of recycled-content material in at least 5 products typically purchased by the city, such as asphalt and roadbed aggregate.		1	1	1			1									**4**
(6) Require printing services to be purchased from companies certified by Minnesota Great Printers or by the Sustainable Green Printing Partnership.																**0**
(7) Lower the environmental footprint of meetings and events in the city.			1		1		1									**3**
(8) Use state and national green standards/guidelines for at least 3 categories of purchasing.			1													**1**
16 | URBAN FORESTS																**2**
(1) Certify as a Tree City USA	1															**1**
(2) Adopt a policy MN Tree Trusts' Best Practices and use the guidlines in at least one development project to achieve an excellent or exemplary rating.																**0**
(3) Budget for and achieve urban canopy/tree planting goals.	0															**0**
(4) Maximize tree planting along your main downtown street or throughout the city.																**0**
(5) Adopt a tree preservation or native landscaping ordinance.	1															**1**
(6) Build community capacity to protect existing trees by certifying at least one or more local staff/volunteers.																**0**
17 | EFFICIENT STORMWATER MANAGEMENT																**14**
(1) Complete the Blue Star City stormwater management assessment and achieve a minimum threshold of specific activities detailed in this program.						1						1				**2**
(2) Adopt by ordinance one or more of the following: a. A narrower streets provision that permits construction of 24-foot roads for public, residential access and subcollector streets (with fewer than 500 average daily trips). b. A 1.5 inch rainfall on-site rainwater infiltration design requirement for construction sites. c. A stormwater runoff volume limit to pre-development volumes for the 5-year, 24-hour rainfall maximum event.			1	1												**2**
(3) Maintain less than 12% impermeable surfaces in the watershed in which the city lies.																**0**
(4) Create a stormwater utility that uses variable fees to incentivize enhanced stormwater management and funds community stormwater infrastructure and assistance/education programs.			1	1			1									**3**
(5) Adopt and implement guidelines for, or adopt requirements for at least one of the following stormwater infiltration/reuse techniques: a. Rain gardens or green roofs. b. Cisterns and other stormwater reuse strategies. c. Green alleys or green parking lots. d. Pervious/permeable pavement pavers.			1			1										**2**
(6) Adopt an ordinance with erosion and sediment control provisions as well are requirements for permanent stormwater treatment.	1		1	1			1		1							**5**
18 | PARKS AND TRAILS																**8**
(1) Identify and remedy gaps within your city's system of parks, offroad trails and open spaces.	1															**1**
(2) Plan and budget for a network of parks, green spaces, water features and trails for areas where new development is planned.	1															**1**
(3) Achieve minimum levels of city greenspace.	2															**2**
(4) Adopt low-impact design standards in parks and trails that infiltrate or retain all 2 inch, 24-hour stormwater events on site.																**0**
(5) Create park management standards/practices that maximize at least one of the following: a. Low maintenance turf management/native landscaping b. Organic or integrated pest management c. Sources of non-potable water, or surface/rain water, for irrigation	3															**3**
(6) Certify at least one golf course in the Audubon Cooperative Sanctuary Program																**0**
(7) Document that the operation and maintenance, or construction/remodeling, of at least one park building used a green building framework																**0**
(8) Develop a program to involve community members in hands-on land restoration and stewardship projects.	1															**1**
19 | SURFACE WATER QUALITY																**1**
(1) Assist at least one lake or association to earn or qualify for the Star Lake/River designation for their lake/river.																**0**
(2) Support a multi-party community conversation around improving local water quality																**0**
(3) Adopt and report on measurable, publicaly announced surface water improvement targets for water bodies.																**0**
(4) Adopt a shoreland ordinance for all river and lake shoreland areas.	1															**1**
(5) Adopt goals to revegetate shoreland and create a local program or outreach effort to help property owners with revegetation.																**0**
(6) Implement an existing TMDL implementation plan.																**0**
(7) Create/assist a Lake Improvement District																**0**

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20 | EFFICIENT WATER AND WASTEWATER FACILITIES																**9**
(1) Compare the energy use and performance of your facilities with other peer plants using standardized, free tools.			1													**1**
(2) Plan and budget for motor maintenance and upgrades so as to assure the most energy efficient, durable and appropriate equipment is available when upgrades or break downs occur.	1						1									**2**
(3) Establish an on-going budget and program for decreasing inflow and infiltration into sewer lines, involving at least gutter, foundation drains and sump pump disconnects.	1		1				1									**3**
(4) Assess energy and chemicals use at drinking water facilities and implement one-third of recommendations with a payback of less than 3 years.	0															**0**
(5) Require property owners to have their private sanitary sewer lateral pipe inspected before a property sale or title transfer.							1									**1**
(6) Implement at least one efficiency project/program involving pretreatment, co-generation and water reuse.				1			1									**2**
21 | SEPTIC SYSTEMS																**6**
(1) Report to landowners suspected noncompliant or failing septic systems as part of an educational, informational and financial assistance and outreach program designed to trigger voluntary landowner action to improve septic systems.	1															**1**
(2) Create a program that follows the five-step process for addressing failing septic systems developed by the University of Minnesota's Onsite Sewage Treatment Program.			1													**1**
(3) Clarify/establish one or more responsible management entities for the proper design, siting, installation, operation, monitoring and maintenance of septic systems.	1															**1**
(4) Adopt a Subsurface Sewage Treatment System ordinance based on the Association of Minnesota Counties model ordinance.	1		1													**2**
(5) Create a program to finance septic systems upgrades through, for example, a city revenue bond, repayable through taxpayers' property taxes.				1												**1**
(6) Work with homeowners and businesses in environmentally sensitive areas and areas where standard septic systems are not the least-cost option to promote innovative waste water systems.																**0**
(7) Arrange for assistance to commercial, retail and industrial businesses with water use reduction, pollution prevention and pretreatment prior to discharge to septics.																**0**
22 | SOLID WASTE REDUCTION																**13**
(1) Adopt percentage reduction goals for waste and toxicity generated from city operations (including schools, libraries, parks, municipal health care facilities). Accomplish reduction goals in at least three of the following areas:		1														**1**
a. Overall waste generation																**0**
b. Paper use and junk mail																
c. Pesticide/herbicide use																
d. Water use/waste water generation																
(2) Adopt and meet aggressive goals for the overall percentage diversion of currently disposed waste from city operations into recycling and organics collection.		1	1			1										**3**
(3) Document signing of at least one resource management contract with a waste hauler for one or more of:	1		1													**2**
a. City government operations.																
b. Schools, libraries, parks, or municipal health care facilities.																
c. A commercial or industrial business.																
(4) Publicize, promote and use the varied businesses collecting and marketing used and repaired consumer goods in the city/county.		1	1													**2**
(5) Arrange for a residential or business/institutional organics collection/management program (food-to-people, food-to-animals, composting, anaerobic digestion, and backyard composting).	1	1				1			1							**4**
(6) Implement one of more city-wide solid waste collection/recycling systems.			1			1							1			
a. Mandate collection of recyclables form multi-unit residential buildings.																
b. Mandate collection of 3 or more recyclable materials from commercial entities.																
c. Organize regular, ongoing residential solid waste collection by private and/or public operations to link one (or more) geographic district(s) to only one hauler.																
(7) Offer significant volume-based pricing on residential garbage and/or feebates on recycling.			1													**1**
(8) Adopt a construction and demolition ordinance governing demolition permits that mandates levels of recycling and reuse for materials and soil/land-clearing debris.																**0**
23 | LOCAL AIR QUALITY																**2**
(1) Conduct an education/financial assistance campaign around one of the following wood burning/auto exhaust issues:																**0**
a. Indoor and outdoor wood burning behavior, to ensure that wood burning is only done with seasonsed wood and in a manner that doesn't negetively impact neighbors.																
b. Indoor wood burning technology, to result in community members upgradings from inefficient/more polluting fireplaces and wood stoves to natural gas/biogas stoves and fireplaces or the most efficient certified wood stoves.																
c. Smoker cars - older model/high polluting vehicles, to result in repairs spurred by repair vouchers.																
(2) Regulate outdoor wood burning, using model ordinance language, performance standards and bans as appropriate, for at least one of the following:	1															**1**
a. Recreational burning.																
b. Outdoor wood boilers.																
(3) Conducts one or more policy or education/behavior change campaigns on the topics below and document:	1															**1**
a. Decreased vehicle idling in specific locations.																
b. Increased sales by retail stores of low and no-VOC household products.																
c. Replacement of gasoline-powered equipment with lower polluting equipment.																
d. Adoption of smoking-free policy at one or more multi-unit housing buildings, private or public.																
(4) Document the participation of at least 3 larger businesses in emission/idling reduction programs																**0**
(5) Instal at least two public charging stations for plug-in hybrid and full electric vehicles.																**0**

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24 | BENCHMARKS and COMMUNITY ENGAGEMENT																**5**
(1) Use a committee to lead, coordinate and report to community members on implementation of GreenStep best practices.	2															**2**
(2) Organize goals/outcome measures from all city plans and report to community members data that show progress toward meeting these goals.	1															**1**
(3) Engage community members in a public process that results in city council adoption of and commitment to measure and report on progress toward sustainability indicators.	1															**1**
(4) Conduct or support a broad sustainability education and action campaign involving: a. The entire community b. Homeowners c. Block clubs/neighborhood associations d. Congregations e. Schools and youth	1															**1**
(5) Conduct or support a community education, visioning and planning initative using a sustainability framework such as: a. Strong Towns, Natural Capitalism b. Transition initiatives, Post-Carbon Cities. c. Eco-municipalities/The Natural Step, ecological footprint, permaculture. d. ISO 14001, Genuine Progress e. Healthy communities, multi-generation learning.																**0**
25 | GREEN BUSINESS DEVELOPMENT																**10**
(1) Support new/emerging green businesses and green jobs through targeted assistance.																**0**
(2) Connect businesses with assistance providers, including utilities, who conduct personalized energy, environmental sustainability, or waste audits and assistance.					1	1										**2**
(3) Actively promote green tourism resources to tourism and hospitality businesses in/around the city.																**0**
(4) Support, or support the creation of, a value-added business utilizing local waste products.	1					1	1									**3**
(5) Lower the environmental footprint of a brownfield remediation/redevelopment project.		1														**1**
(6) Promote green businesses that certify under a local, regional or national program.	1															**1**
(7) Conduct or participate in a buy local campaign.		1			1		1									**3**
(8) Promote MN's Small Business Environmental Assistance Program (SBEAP) to help existing and start-up businesses meet and exceed environmental regulations.																**0**
26 | RENEWABLE ENERGY																**8**
(1) Adopt solar energy standards or wind energy ordinance.			1	1		1										**3**
(2) Consistently promote at least one of the following means of increasing renewable generation: a. A local utility's green power purchasing program for homes and businesses. b. Local, state and federal financial incentives for property owners to install renewable energy systems.			1													**1**
(3) Create a renewable energy financing program such as PACE for property owners to install generation capacity/energy equipment.			1			1										**2**
(4) Support or create a program that enables property owners to participate in a community renewable energy project.																**0**
(5) Install a public sector renewable energy technology, such as solar electric (PV), solar hot water or hot air, micro-hydro or wind.			1			1										**2**
(6) Enable a new or demonstrate prior collaboration for installed private sector renewable energy/energy efficient generation capacity with at least one of the following attributes: a. Fueled by flowing water, wind, or biogas. b. Fueled in part or whole by woody biomass, optimized for minimal air and other environmental impacts and for energy efficiency and water conservation. c. Distributing heating/cooling services in a district energy system. d. Producing combined heat and power.																**0**
27 | LOCAL FOOD																**12**
(1) Incorporate working landscapes - agriculture and forestry - into the city by adopting an ordinance for one of more of the following: a. An agriculture and forest protection district. b. A local food production district. c. Performance standards for minor and major agricultural retail.												1				**1**
(2) Facilitate the incorporation of food growing areas/local food access into residential/commercial development.	1		1													**2**
(3) Expand/strengthen or create at least one of the following means of expanding local food access: a. A farmer's market. b. An urban agriculture business or a community-supported agriculture (CSA) arrangement between farmers and community members/employees. c. A community or school garden, orchard or forest. d. A rural grocery store or urban healthy convenience store.	1	1	1	1	1	1	1		1							**8**
(4) Conduct at least one of the following campaigns to measurably increase: a. Purchase of food with at least one of the following attributes -- local, Minnesota-grown, organic, humanely raised, grown by fairly compensated growers. b. Backyard gardening / chickens. c. Institutional buying of local foods by schools, hospitals/nursing homes, restaurants and hotels, or grocery stores d. Sale of local food in markets and restaurants.			1													**1**

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28 | BUSINESS SYNERGIES																**2**
(1) Help businesses register as users of the Minnesota Materials Exchange and document their exchanges/sales of byproducts with other local/regional businesses.																**0**
(2) Document that at least one business uses waste heat or water discharge from another business.																**0**
(3) Require, build or facilitate at least four of the following in a business/industrial project: a. Shared parking/access OR shared recreation/childcare facilities. b. Green product development, manufacturing or sales OR green job training program. c. Buildings located within walking distance of transit and/or residential zoning. d. Renovated buildings OR buildings designed for reuse. e. Green building built to exceed the Minnesota energy code by 20% OR renewable energy generated on-site. f. Combined heat and power (CHP) generation capacity OR shared geothermal heating/cooling. g. Low-impact site development.							1		1							**2**
(4) Use eco-industrial park tools to identify industrial facilities that could achieve economic and environmental benefit by co-locating in the city's industrial park or industrial zone.																**0**
Total	**72**	**28**	**69**	**54**	**13**	**26**	**43**	**0**	**23**	**0**	**0**	**2**	**4**	**0**	**0**	

LITERATURE SEARCH:

The following papers have been read and summarized. Some have high relevance to this topic and others do not:

- Azadeh, A., Neshat, N. and Hamidipour, H. (2011) A Hybrid Fuzzy Regression-Artificial neutral Network for Improvement of Short Term Water Consumption Estimation and Forecasting in Uncertain and Complex Environments: The Case of a Large Metropolitan City, Journal *of Water Resources Planning and Management. doi:10.1061/(ASCE)WR. 1943-5452.0000152.*
- Barbour, E. and Deakin, E., (2012) Smart Growth Planning for Climate Protection, *Journal of the American Planning Association,* 78:1 70-86.
- Boswell, M., Seale, T., and Greve, A. (2010) An Assessment of the Link Between Greenhouse Gas Emissions Inventories and Climate Action Plans, Journal if the American Planning Association, 76:4, 451-462.
- Chavez, A. and Ramaswami, A. (2011) Progress toward low carbon cities: approaches for transboundry GHG emissions' footrpinting, *Future Science Ltd., ISSN 1758-3004.*
- Crane, R. and Landis, J. (2010) Introduction to the Special Issue. *Journal if the American Planning Association, 76:4, 389-401.*
- Campbell, S. (2007) Green Cities, Growing Cities, Just Cities?: Urban Planning and the Contradictions of Sustainable Development, *Journal of the American Planning Association,* 62:3, 296-312
- Do Paco, A. and Varejao, L. (2010) Factors affecting energy saving behavior" a prospective research, *Journal of Environmental Planning and management,* 53:8, 963-976.
- Duduta, N. and Bishins, A. (2010) Citywide Transportation Greenhouse Gas Emissions Inventories: A Review of Selected Methodologies, *World Resources Institute Working Paper, WRI, Washington DC.*
- Fabian, J. and Nadav, A. (2012) Summary of Research Findings to Identify Sustainability Indicators for cities, using the 28 Best Practices of the Green Step Cities Program. 1-23.
- Hillman, T., Janson, B. and Ramaswami, R. (2011) Spatial Allocation of Transportation Greenhouse Gas Emissions at the City Scale, *Journal of Transportation Engineering, June ,2011, 416-425.*
- Hillman, T. and Ramaswami, A.(2010) Greenhouse Gas Emission Footprints and Energy Use Benchmarks for Eight U.S. Cities, *Environmental Science and Technology, Vol. 44, No. 6, 2010*.
- Meyer, M., (2010) Greenhouse Gas and Climate Change Assessment, Journal of the American Planning Association, 76:4, 402-412.
- Neves, A. and Leal, V. (2010) Energy sustainability indicators for local energy planning: Review of current practices and derivation of a new framework, *Renewable and Sustainable Energy Reviews,* 2723-2735.
- Quick, K. and Feldman, M. (2011)? Inclusive Boundary Work in Collaborative Public Management.
- Ramaswami, A., Hillman, T., Janson, B., Reiner, M. and Thomas, G. (2008) A Demand Centered, Hybrid Life-Cycle Methodology for City-Scale Greenhouse Gas Inventories, *Environmental Science and Technology, Vol. 42, No. 17, 2008,*
- Resch, B., Mittlboeck, M., Girardin, F., Britter, R., and Ratti, C. (2009)? Real-time Geo-awareness-Sensor Data Integration for Environmental Monitoring in the City, MIT Press.

Annotated Bibliography of Energy Related Articles

CNT, Chicago Regional Energy Snapshot, 2009.

This article is comprised of two components, the Regional Energy Profile and the Regional Energy Strategies for metropolitan Chicago. The Regional Energy Profile breaks down the region's energy use, with data from 2005. It distinguishes between residential and commercial/industrial uses, and normalizes residential energy by household. It also shows cost per household for residential energy. The Regional Energy Strategies describes potential energy reduction strategies and calculates their associated savings in terms of energy, greenhouse gas emissions, and money. Strategies are also included to reduce VMT, though without calculating savings potential. The strategies are divided into three groups: Reinvest, Preserve, and Innovate. Graphics generally convey the information, but could be stronger. The appendices seem to be missing (one addresses methodology).

Performing green renovations is comparable in cost to performing code renovations.

- "the average premium for all studied green buildings is slightly less than 2 percent or three to five dollars per square foot" (Sustainable Buildings Task Force in California, p. 38)
- National studies have shown 20-year net benefits between $50-65/sf for green buildings (p. 38)
- Residential energy retrofits using existing technologies can reduce energy consumption by an average 30% (from a national evaluations of weatherization programs, not including replacing equipment) (p. 41)
    - Insulation
    - Energy-efficient windows
    - High-efficiency boilers and furnaces
    - Programmable thermostats
    - Solar or tankless hot water systems
    - Compact fluorescent bulbs

CNT, Greenhouse Gas Emissions in Chicago: Emissions Inventories and Reduction Strategies for Chicago and its Metropolitan Region, February 2010.

Greenhouse gas emissions inventory was conducted for Chicago and its metropolitan area for 2000 and 2005. The 1990 GHG emission level was estimated based on historic Chicago area and national trends. 200 and 2005 emissions were calculated from both direct sources within city boundaries (natural gas, transportation, non-energy industrial processes, and GHG use in products) and indirect emissions outside city boundaries (electricity, waste disposal). Emission sequestration was also estimate based on Chicago's trees. This report gives a detailed description of the study's methodology and data sources

- Chicago has target of reducing GHG emissions to 25% below 1990 levels by 2020
- "Climate scientists estimate that a 50-85% reduction below 2000 global GHG emissions by 2050 is required to achieve an atmospheric concentration of GHGs at 445-490 ppm and stabilize the climate at 2.0-2.4 degrees Celsius above pre-industrial temperatures" (4).

CNT & ACEEE, Engaging as Partners in Energy Efficiency: Multifamily Housing and Utilities, January 2012.

This paper focus on how multifamily building owners and other housing industry players can increase energy efficiency by engaging with electricity and natural gas utilities. Affordable and multifamily housing receive a disproportionally small share of available energy efficiency funding. Since states vary in their classification of multifamily housing as residential or commercial, it can be unclear whether it qualifies for energy efficient programs. Public utilities have the power but not the incentives to improve energy efficiency; therefore this paper proposes public policy to make energy efficiency compatible with utility business models. Since utilities are regulated primarily at the state level, this may not be an effective strategy to recommend to cities.

- The State of Minnesota is among the top twenty states in terms of potential energy savings in multifamily buildings (between 265-445 GWh/year with 15% electric efficiency improvement and 18-30 million therms/year with 30% natural gas efficiency improvement).

Annotated Bibliography of Vehicle Miles Traveled Related Articles

Which Reduces VMT more: Jobs-Housing Balance or Retail-Housing Mixing? Autumn 2006
By: Robert Cervero and Michael Duncan

Study of whether job accessibility or retail and service accessibility from the home is more effective at reducing VMT in the San Francisco Bay Area. The study concluded that Housing-Job balance is much more effective. For example, high accessibility due to mixed-use development and growth reduces total travel (time and distance). The article has lots of good maps and tables expressing the data and it shows the formulas that were used. The findings are consistent with other articles (two referenced below). Lastly, the article lays out and discusses some CA polices in place that intend to bring housing, jobs and retail centers closer together. It also makes a point that jobs-housing and retail-housing are complimentary land use strategies, not a substitute for one another.

Critiques & Limitations:

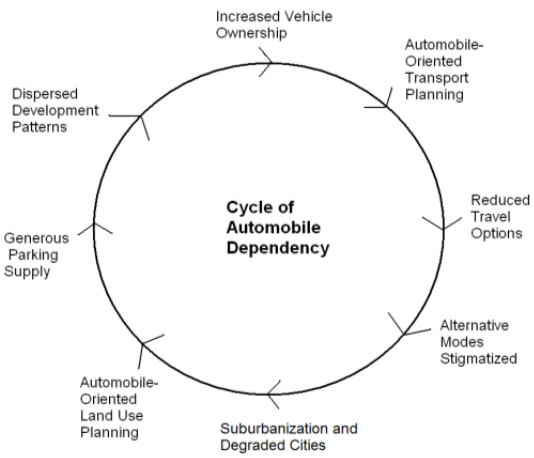
- The study area is small and fairly isolated but the data volume is quite large (16,000 travel diaries).
- Travel diaries may not be very accurate or consistent across participants (may forget to document even one trip, or potentially an entire day or week of travel).
- The study was conducted prior to the economic collapse in 2008.
- Concentric circles used for measuring distance. The actual road network was not analyzed therefore no true travel distance (following the path of specific roads) was utilized in the study.

Win-Win Transportation Emission Reduction Strategies, 27 May 2012
By: Todd Litman

Litman acknowledges that very few motorists will give up driving altogether but many prefer to drive less and have other affordable, comfortable, safe and convenient travel options. This study identifies several different strategies called *Win-Win Transportation Solutions* that help enhance the multimodal infrastructure while achieving both economic and environmental objectives. In an attempt to overcome market and planning distortions that favor automobile travel, Litman clearly outlines the description and transport impacts of 12 different solutions. Each solution is aimed at reducing emissions, congestion, and accidents while increasing access to transit dependent persons and supporting economic development. He cites several sources that add validity to his reduction predictions for each Win-Win solution. Ultimately, he states, strategies that reduce vehicle travel provide more benefits than increasing fuel efficiency because they also reduce traffic congestions, roadway and parking costs, accidents and sprawl.

Are Vehicle Travel Reduction Targets Justified? 27 May 2012
By: Todd Litman

In response to political claims that VMT reductions harm consumers and the economy, and are cost inefficient and unfair, Litman provides sound and justifiable reasons for reforming transportation policies at all levels of government by implementing mobility management objectives (MMOs). A few justifications for MMOs are reduced congestion, increased public health, reduced facility costs, increased transportation equity, they will guide jurisdictional policy and planning decisions, and create a transport system that will be flexible and responsive to future travel demands. Litman also details the difference between mobility (vehicle travel = old paradigm) and accessibility (ability to reach desired goods/services/activities = new paradigm). This a very broad look at several strategies and objectives to reduce costs associated with lots of vehicle travel per capita while increasing consumer and economic benefits. Although the level to which these MMOs affect VMT is not specified, Litman takes care to express both sides of the issue further supporting his stance and credibility.



Text and tables taken from Todd Litman's paper, "Are VMT Reduction Targets Justified?"

Mobility Mgmt: Also called transportation demand mgmt (TDM) and refers to policies and programs that change activity to increase transport system efficiency (provide congestion and road-cost saving benefits, etc.)

Table 1 **Mobility Management Strategies** (VTPI 2008)

Improved Options	Incentives	Land Use Policies	Programs
Transit improvements Walking and cycling improvements Rideshare programs Flextime Telework Carsharing	Congestion pricing Distance-based fees Parking cash out Parking pricing Pay-as-you-drive vehicle insurance Fuel tax increases	Smart growth New urbanism Parking management Transit oriented development Car-free planning Traffic calming	Commute trip reduction programs School and campus transport management Freight transport management TDM marketing

This table lists various mobility management strategies.

Table 5 **Examples of Policy and Planning Decisions That Affect Mobility**

Transport Policies	Land Use Policies
Fuel taxes and prices Road tolls Roadway supply and design Sidewalk and path supply and quality Public transit service supply and quality Mobility management programs	Location of facilities and activities (jobs, housing, services, etc.) Land use density and mix Parking supply and price Building orientation

Many policy and planning decisions affect the amount and type of mobility that occurs in an area.

Table 6 **Mobility Management Strategy Impacts** (VTPI 2008)

Positive Incentives	Mixed	Negative Incentives
Public transit improvements Walking and cycling improvements Rideshare and carshare programs Flextime and telework Pay-As-You-Drive pricing Parking cash out and unbundling	Smart growth New urbanism Parking management Transit oriented development Car-free planning Traffic calming	Road tolls Parking pricing Fuel tax increases

This table categorizes mobility management strategies according to user impacts. Far more provide positive than negative incentives, and even negative incentives, such as road pricing, can benefit users overall if revenues are used to reduce other taxes or provide new valued services.

Table 9 **Impacts of Mobility Management Strategies**

Strategy	Efficiency	Consumer (Users)	Equity
Incentives to Choose Efficient Modes			
Congestion pricing	Positive. Reflects efficient pricing.	Mixed. Increases motorists' costs but reduces congestion.	Mixed. Benefits some people but burdens others.
Cost-recovery road tolls	Positive. Reflects efficient pricing.	Mixed. Increases motorists' costs but provides revenues.	Positive. More equitable than most other funding.
Distance-based registration fees	Positive. Reflects efficient pricing.	Positive. Gives motorists a new way to save money.	Positive. Charges users for the costs they impose.
Cost-recovery parking fees	Positive. Reflects efficient pricing.	Mixed. Increases motorists' costs but provides revenues.	Positive. Charges users for the costs they impose.
Fuel tax increases	Positive if raised gradually and predictably.	Mixed. Increases motorist costs but provides revenues.	Positive if taxes internalize costs.
TDM marketing (information and encouragement campaigns)	Generally positive, since improved user information tends to increase efficiency.	Generally positive, although overly aggressive campaigns can be annoying.	Generally positive.
No-drive days	Generally negative.	Generally negative.	Mixed. May be more equitable than pricing.
Improved Options			
Transit improvements	Mixed. Is cost effective on major urban corridors.	Generally positive, provided it meets consumer demands.	Generally positive. Provides basic mobility.
Walking and cycling improvements	Improvements justified to meet growing demand.	Generally very positive.	Generally positive. Provides basic mobility.
Rideshare programs	Mixed. Is cost effective on major urban corridors.	Generally positive, provided it meets consumer demands.	Generally positive.
Telework and flextime	Generally cost effective and beneficial.	Generally very positive as a user option.	Generally positive.
Carsharing	Generally cost effective and beneficial.	Generally very positive as a user option.	Generally positive.

Land use Policies			
More flexible zoning (more density, mix, housing types, etc.)	Generally reflects market principles and increases efficiency.	Mixed. Benefits some consumers but disadvantages others.	Generally achieves equity objectives
Location-efficient development.	Generally reflects market principles and reduces public service costs.	Mixed. Benefits some consumers but disadvantages others.	Generally achieves equity objectives.
Urban growth boundaries.	Mixed. Restricts development but increases public service efficiency.	Mixed. Benefits some consumers but disadvantages others.	Mixed.

This table summarizes efficiency, consumer and equity impacts of various mobility management strategies.

Text and tables taken from Todd Litman's paper for the Victoria Transport Policy Institute, "Socially Optimal Transport Prices and Markets

Land Use Planning Reforms

Various land use planning reforms can help create more accessible, multi-modal land use development (Levine 2006; Litman 2007; SGN 2004; Binger, et al. 2008):

- Establish integrated transport and land use development goals, objectives and targets.
- Improve planning coordination among various levels of government, such as between state and local transport agencies, and between local governments and school planners.
- Change zoning laws to allow higher densities, more land use mix, and more flexible parking requirements.
- Price utilities and fees to reflect the higher costs of providing public services to lower density, dispersed locations, as well as the savings that result from more compact development.
- Correct tax policies that encourage sprawl, and reward more accessible, compact development.
- Provide targeted infrastructure improvements to roadways, schools, parks, utility lines in smart growth locations.
- Locate and design schools, parks and other public facilities for multi-modal accessibility.
- Support location efficient mortgages which recognize the potential transportation cost savings that households achieve by choosing more accessible, multi-modal housing locations and, as a result, increase their ability to meet higher mortgage payments.
- Use more neutral transportation planning practices to allow more investments in alternative modes and mobility management programs in urban areas.
- Support redevelopment of blighted urban areas through a combination of improved public services and promotion of the benefits of urban living.
- Limit urban expansion, particularly on ecologically valuable lands, with growth controls and greenspace preservation policies.
- Educate decision-makers about smart growth policies and benefits.
- Develop better tools for evaluating land use impacts

Optimal Prices

- Congestion pricing: (also called *value pricing*) consists of tolls structured to reduce traffic volumes to optimal levels on specific roadways, which typically means approximately Level-Of-Service *C* (TTI, 2005; "Congestion Costs," Litman, 2008). Fees can vary based either on a fixed schedule or they can be *dynamic*, meaning that rates change in direct response to congestion levels.
- Roadway prices
    - vehicle users pay directly for traffic services such as policing, traffic lights and emergency services
    - *weight-distance fee* (a fee based on a vehicle's weight multiplied by its mileage) is appropriate for roadway costs, which more accurately reflects such costs than fuel taxes and is cheaper to implement than vehicle location systems (FHWA, 1997).

Report on:

Regional Indicators Initiative:

OBJECTIVE 2: Reporting

TASK 2A: Develop Website

Final MPCA Report

Prepared by

LHB, Inc.

March 2013

Statement of Task

<u>OBJECTIVE 2: Reporting</u>

Task 2A: Develop and use a web display tool. The intent is to use the web tool to enter and display city data, in graphic form.

Team members for this task: LHB, Inc.

Work completed to date

Summary: We are in the final stages of developing a website which will explain the background and intentions of the Regional Indicators Initiative as well as display all city data across the four-year study period in the form of an interactive chart.

In order to understand how the data collected through the Regional Indicators Initiative could be most effectively communicated with the cities involved as well as the general public a survey was distributed to all participating cities. Results from this survey established that a website would provide the most effective mode of communication with residents and businesses (**See attachment: 2A.1 Effectiveness of Communication Methods**). Survey results focused Initiative team's efforts towards developing a website that could both explain the Initiative as well as display the data and findings of this study (**See attachment: 2A.2 RII Website Proofs**).

HOME PAGE:

The home page of the website briefly introduces the project, its four primary indicators (Energy, Water, Travel and Waste) and a correlating indicator (Greenhouse Gas Emissions). A graphic that correlates to each individual indicator visualizes the trend line of consumption per capita for each year (an average of all cities). For example, when 'water' is selected the graphic highlights average total water consumption/capita from 2008-2011. This will allow viewers to see a 'zoomed-out' perspective of consumption trends across the study period before being introduced to more specific data. A brief explanation of what is being represented is found below the graphic.

From the homepage, the website has three main components with corresponding pages: 'About', 'Explore the Data', and 'So What?'.

'ABOUT' PAGE:

The 'About' page includes the sections: Overview, Background, Scope, Purpose and Participant Cities & Contributors.

The Overview section introduces the Regional Indicators Initiative, the four primary indicators (Energy, Water, Travel and Waste) and two additional indicators (Greenhouse Gas Emissions and Cost) which allow for the comparison of the indicators.

The Background section explains the Initiative's origins and original intent as a way to track the progress of cities involved in the Minnesota Pollution Control Agency's GreenStep Cities Program. It also described the pilot study that was done to test out data collection possibilities for three Minnesota cities.

The Scope section highlights that the Initiative's participant cities currently comprise a data sample size that represents over a quarter of Minnesota's population (27%) and lists the twenty cities that are currently involved and the study period of 2008-2011.

The Purpose section explains the value of collecting annually comparable indicators and highlights the value of this type of work as it benefits the individual cities, the state and other regions.

Lastly, the Participating Cities & Contributors section recognizes the twenty cities, public and private utilities, State and Local Government organizations and other major partners (LHB, Inc., ORANGE Environmental, LLC, the Urban Land Institute, the Minnesota Department of Commerce and the Minnesota Pollution Control Agency) who were a part of this study.

'EXPLORE THE DATA' PAGE:

The 'Explore the Data' page is the key component of the website, and includes an interactive graph where visitors can explore the performance metrics data the RII team has collected for all twenty cities across the study period.

Many interactive data visualization techniques were researched and the web developers were contacted to see what might be possible given the timeline and budget. The goal was to have a simple, aesthetically pleasing site that displays data in an intuitive and interactive way. Ultimately, doc4, based in Arkansas, was able to promise an interactive graphic and website within the budget utilizing Google Charts.

Visitors will be able to explore data specific to one city, one city grouping (Central/Stand-Alone cities, Inner-Ring Suburbs, or Outer-Ring Suburbs), or compare all cities. In addition, this data will be able to be viewed for either one year or across all four years. The data can be viewed as a total or can be normalized by factors of number of households, number of jobs, population or weather factors. In this way, the interactive graphic provides many options for viewing the collected data in a relevant way for a wide range of viewers. City staff, for example, may want to explore the data set specific to only their city, while a researcher unattached to a specific city may want to explore the extent of the data and discover key findings and trends. For those viewers who wish to dig into the direct sources of the data collected in this Initiative, a link to a pdf document outlining the process of data collection and all sources is provided on this page.

The data shown in these charts is pulled from Excel spreadsheets and stored in a secure online site. As the RII team collects data for additional years and cities, these additions can be integrated into the web data base.

'SO WHAT' PAGE:

The third page, 'So What?' includes the sections: Making Sense of the Numbers, Next Steps and How to Get Involved.

The Making Sense of the Numbers section highlights key findings from each indicator category. These findings can be displayed as collapsed or expanded to allow for easier viewing (attachment: 21.2: RII Website Proofs illustrates examples of both of these display types for this page).

The 'Next Steps' section proposes reduction strategies and further work to continue the project.

Lastly, the 'Call to Action' section directs city leaders, business owners and individuals to additional resources and organizations which provide specific sustainability strategies for these different groups.

Additionally, the web developer will deliver a content management back end of the site that will allow edits to the text on the descriptive pages of the site.

This attention to future website updates and uses was also considered in a meeting with LHB, doc4, and the MPCA. This meeting ensured that the site will work well with MPCA's future plans, such as adding RII data to a dashboard on the GreenStep Cities website.

While this website is under development, RII has a web presence on the Urban Land Institute of Minnesota's website (http://minnesota.uli.org/initiatives/environment/regional-indicators-initiative/), which was launched in September 2012 (**See attachment: 2A.3 RII Content on the ULI Minnesota Website**). This site will be a "point of entry" to the interactive RII data site by embedding a link to the new website.

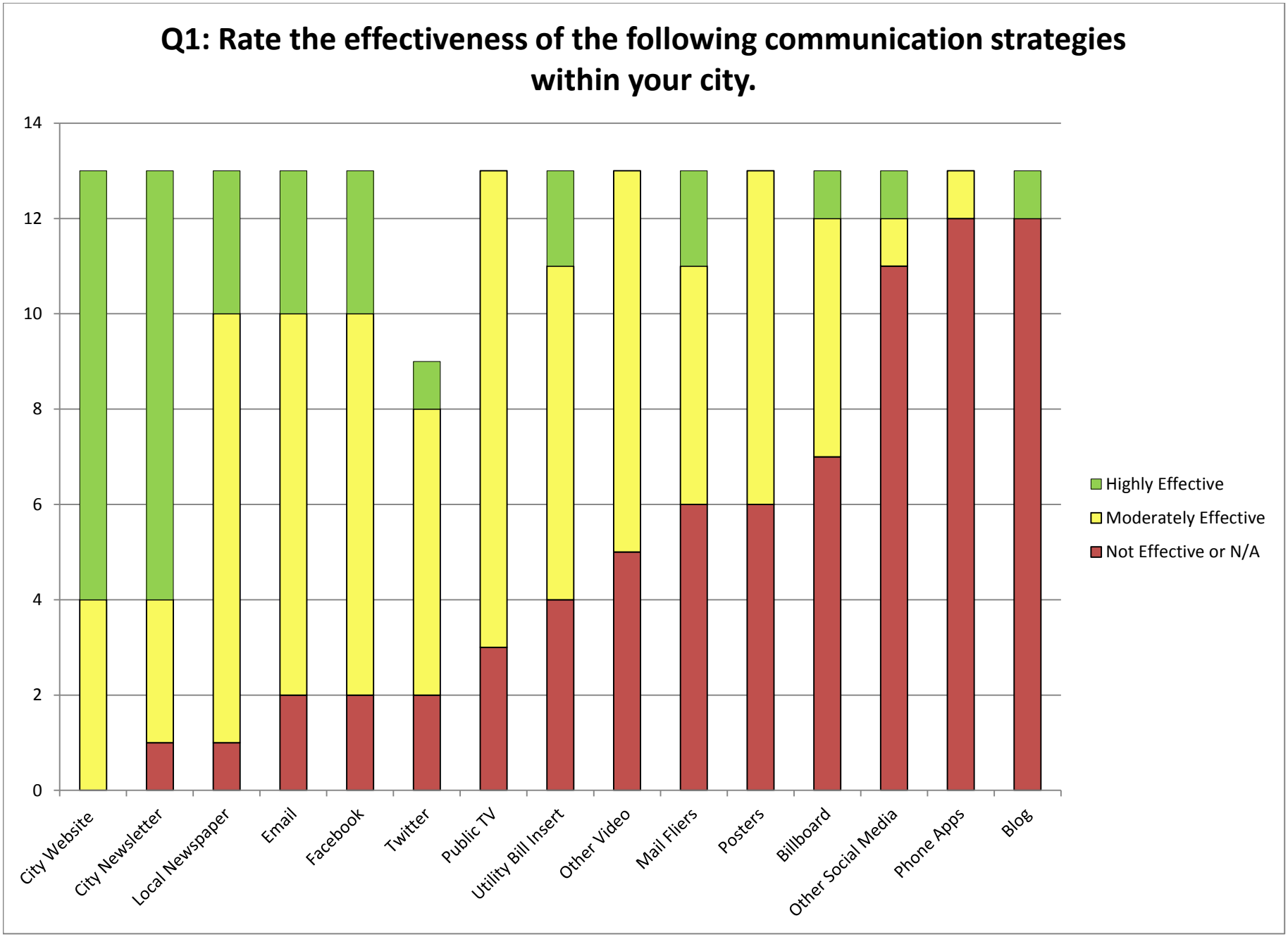
The Regional Indicators has been presented to a number of venues and is in the process of being presented to all participating cities and at conferences (**See attachment: 2A.4 RII PowerPoint Presentation**).

Next Steps

The project team will continue work with doc4 developing the remaining portions of the website, including the interactive data visualization and comparison tool. In the event of receiving data from additional cities or years, the option of adding this data to the website will be explored.

Attachments

- **2A.1 Effectiveness of Communication Methods**
- **2A.2 RII Website Proofs**
- **2A.3 RII content on ULI Minnesota Website**
- **2A.4 RII PowerPoint Presentation**


Q1: Rate the effectiveness of the following communication strategies within your city.
14
12
10
8
6
4
2
0
City Website
City Newsletter
Local Newspaper
Email
Facebook
Twitter
Public TV
Utility Bill Insert
Other Video
Mail Fliers
Posters
Billboard
Other Social Media
Phone Apps
Blog
Highly Effective
Moderately Effective
Not Effective or N/A

REGIONAL INDICATORS INITIATIVE

ABOUT EXPLORE THE DATA SO WHAT?

REGIONAL INDICATORS INITIATIVE
Measuring City-Wide Performance

Tracking the performance of our cities through key indicators is essential to assessing progress and promoting efficiency. Use this website to learn about the Initiative, explore the data, understand the results, and get involved.

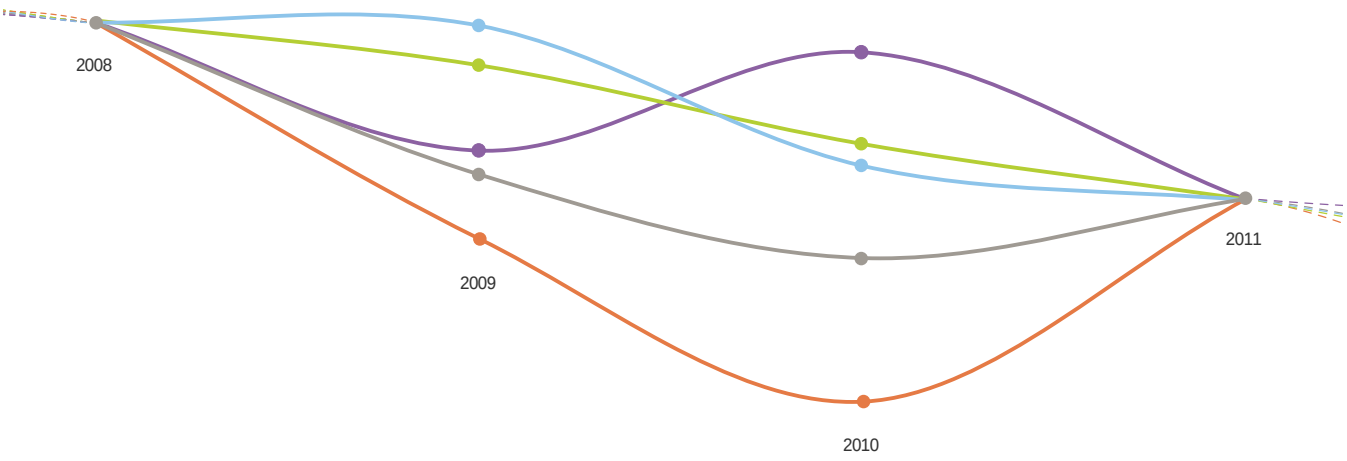
ENERGY BRITISH THERMAL UNITS

WATER GALLONS

TRAVEL VEHICLE MILES TRAVELED

WASTE POUNDS

GHG EMISSIONS CARBON DIOXIDE EQUIVALENTS



Trends for 20 Minnesota cities from 2008-2011 (click each icon for more information)

The above chart compares trends from 2008-2011 for the cities participating in the Regional Indicators Initiative. It includes energy consumption, water use, vehicle miles traveled, municipal solid waste managed, and the associated greenhouse gas emissions. In order to normalize it for the various city populations, it shows per-capita data on an average daily basis.

WANT TO JOIN?

Interested in becoming a participating city? Please download and email the following form to Rick Carter at LHB.

Participation Form

WANT MORE INFORMATION?

Contact Rick Carter 612-752-6923 at LHB for information about the Regional Indicators Initiative.

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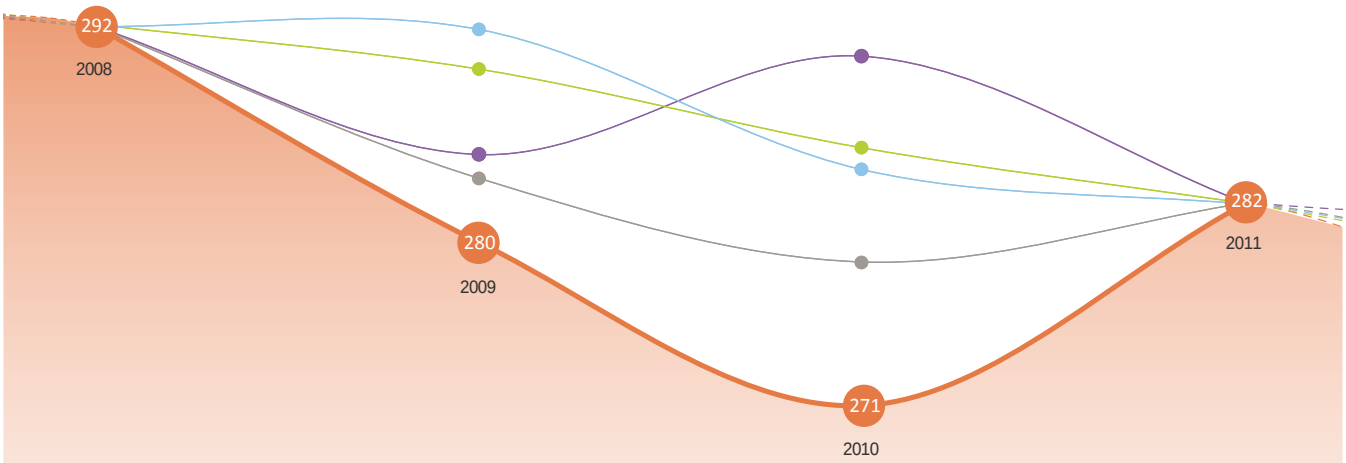

Total energy use (kBtu/capita/day)

Total annual energy data include electricity consumption and stationary fuel combustion for heating and cooling (natural gas, fuel oil, coal, and biomass). Total municipal energy is then converted into kBtu and normalized by population to get kBtu/capita/day.

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Total potable water use (gallons/capita/day)

Total annual water consumption is collected from municipal water data for both residential and commercial/industrial uses. These two uses are then normalized by population to get gallons of water used/capita/day for each of the four years in the study period.

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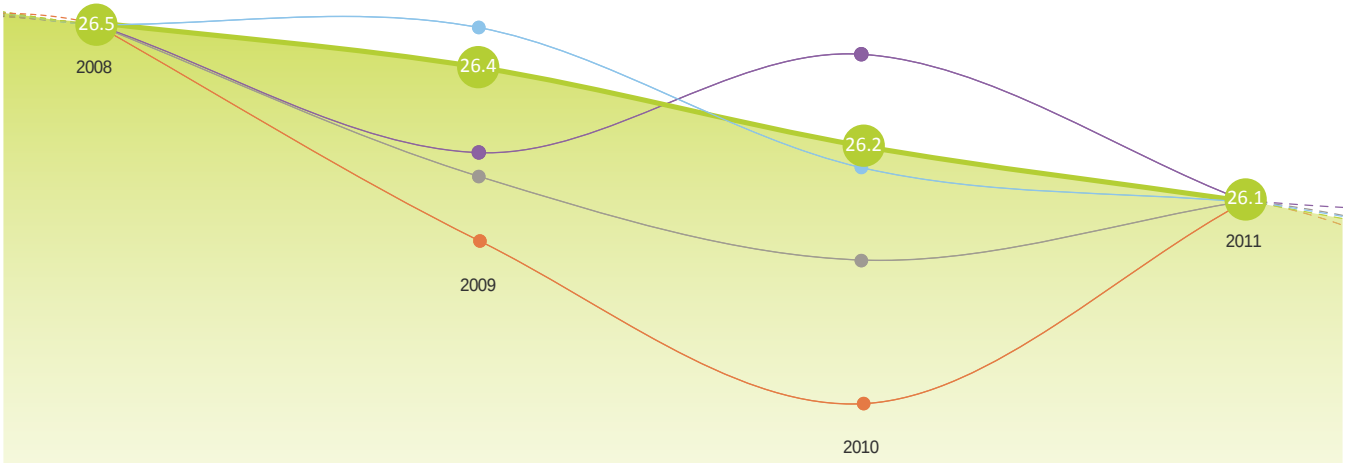

Total vehicle miles traveled (VMT/capita/day)

The Minnesota Department of Transportation compiles annual data by roadway type regarding vehicle miles traveled (VMT) on all roads in the State, and aggregates the data by cities and counties. The data are normalized for each city by population to yield VMT/capita/day.

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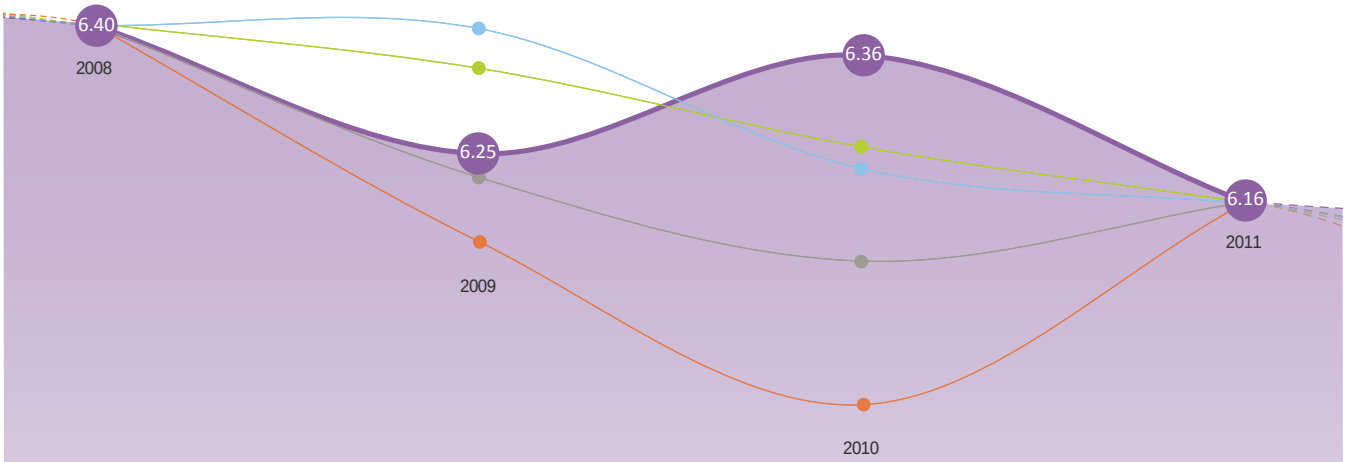

Total waste production (pounds/capita/year)

Total waste data is collected and categorized by each waste processing/disposal method (landfilled, composted, incinerated or recycled) from private and public waste facilities county-wide. These data are not currently aggregated by municipality, consequently, this data set includes data for the seven counties that include Initiative cities. The annual total is normalized by the population of each county to get pounds/capita/year.

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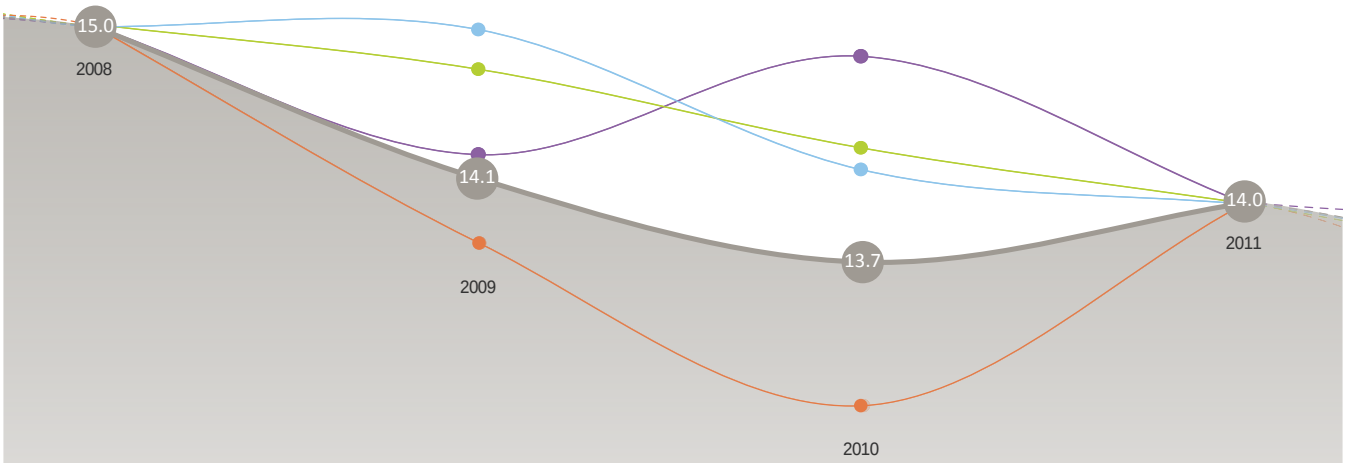

Total greenhouse gas (GHG) emissions (tonnes CO_2e/capita/year)

The sources for greenhouse gas (GHG) emissions represented here include those attributed to each of the four indicators. Primary greenhouse gases—carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4), are aggregated and reported as carbon dioxide equivalents (CO_2e). CO_2e combines greenhouse gases of differing impact on the Earth's climate into one weighted unit. The chart shows CO_2e/capita/year for all Initiative cities.

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ABOUT THE REGIONAL INDICATORS IN

Overview

The Regional Indicators Initiative measures annual performance metrics for 20 Minnesota cities committed to increasing their overall efficiency and level of sustainability. The project collects the following data that reflect the activities of the people who live, work, learn, travel, visit, and play within each city's geographical boundaries:

ENERGY

Electricity, natural gas, fuel oil, coal and biomass, and district energy consumed for both residential and commercial/industrial use.

SOURCE: Utility data
UNIT: Thousand British thermal units (kBtu)

WATER

Potable water consumption for both residential and commercial/industrial use.

SOURCE: Municipal water data
UNIT: Gallons

TRAVEL

On-road distance traveled by all vehicles within the municipality boundaries.

SOURCE: Minnesota Department of Transportation
UNIT: Vehicle miles traveled (VMT)

WASTE

Total municipal solid waste that is landfilled, composted, incinerated or recycled.

SOURCE: MPCA SCORE reports and county Waste Certification reports (data not currently available at a city level)
UNIT: Pounds (lbs)

The Greenhouse Gas (GHG) emissions and costs associated with each of these indicators are also calculated, providing a common metric to compare the economic and environmental impacts of the indicators.

GHG EMISSIONS

The greenhouse gases (GHG) emitted due to: electricity consumption, stationary combustion for heating and cooling (natural gas, fuel oil, coal, and biomass), vehicle and airport use, and management of solid waste and wastewater. The carbon baseline assessments prepared for each participating city have been prepared consistent with the 'U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions', October 2012.

UNIT: Carbon dioxide equivalents (CO_2e)

COST

The retail costs to the consumer. In the case of electricity, natural gas, and other stationary fuels, the estimates include the average retail costs for all of the consumption costs and related fees. For vehicle miles traveled, the assessments include the average statewide costs for the fuel only, not the full costs of driving. For waste management, the costs are statewide averages of the total retail service costs and fees for the various waste management methods.

The indicators are expressed not only as annual totals, but are also broken down into residential and commercial/industrial uses and also presented in terms of per capita, per job and per household normalizations. This enables energy, water, waste, and travel to be compared across cities and across time. Caution should be taken when making direct comparisons between cities, however, as many factors are not included in this simplified normalization. The Initiative supports planning for sustainability by defining a baseline, tracking a business-as-usual trajectory, establishing targets, and measuring outcomes of sustainable strategies at a city-wide scale.

Background

The Initiative was conceived as a way to track the progress of cities involved in the GREENSTEP CITIES Program. To achieve GreenStep certification, a city must meet minimum requirements and choose from 28 best management practices (BMPs) designed to improve the city's sustainability. While the program tracks which practices cities have adopted, it does not currently have a method of tracking how effective these strategies have been at "moving the needle" towards sustainability.

The desire to measure the impacts of sustainable practices led to a collaborative project, managed by LHB for the URBAN LAND INSTITUTE OF MINNESOTA (ULI MN). This team developed a pilot to determine what citywide data can be collected annually to effectively measure progress towards sustainability. Three cities – St. Louis Park, Falcon Heights, and Edina – funded the study and volunteered to release their resource consumption data for the period of 2008-2010. The pilot study proved that the four indicators of city-wide sustainability described above (energy, water, vehicle miles traveled and waste) can be measured, gathered, and analyzed annually in a reasonable period of time and at a relatively low cost. The Regional Indicators Initiative was developed to continue this study at a larger scale, opening up the possibility to compare data across a range of Minnesota cities.

Scope

The Initiative's participant cities currently comprise a data sample size that represents over a quarter of Minnesota's population (27%) and includes municipalities of varying types from the state's four largest cities to inner and outer-ring suburbs of various sizes:

CENTRAL/STAND-ALONE CITIES:
Minneapolis, St. Paul, Rochester, Duluth

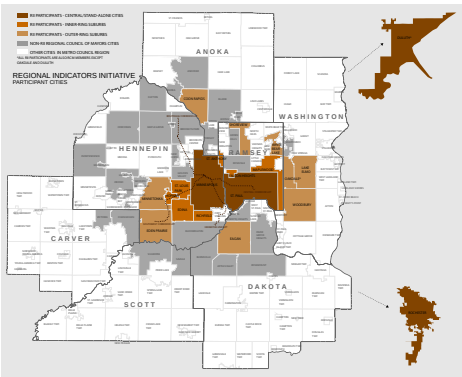
INNER-RING SUBURBS:
Richfield, Hopkins, St. Louis Park, St. Anthony, Edina, Falcon Heights, Maplewood

OUTER-RING SUBURBS:
White Bear Lake, Coon Rapids, Oakdale, Shoreview, Eagan, Eden Prairie, Minnetonka, Woodbury, Lake Elmo

Data has been collected for all indicators from 2008, 2009, 2010 and 2011 (2012 to be added).

The list of participant cities continues to grow along with the awareness that maintaining a continuous database of consumption patterns is an essential task for measuring actual (rather than predicted) progress in sustainability.

CLICK TO ENLARGE



Purpose

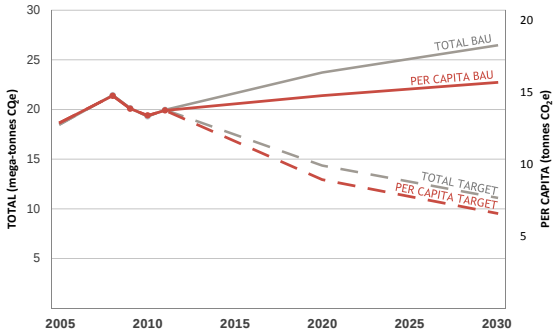
Recording these performance metrics is essential to promoting efficiency and sustainable change. By collecting annually comparable indicators for twenty Minnesota cities, the effectiveness of actions within the State's GreenStep Cities Program can be analyzed, promoted and improved. Additionally, the Initiative will indicate progress toward meeting the State's energy efficiency and GHG reduction goals, as defined by the Minnesota Next Generation Energy Act of 2007. Along with providing state-wide benefits and serving as a model for other regions, the Initiative is valuable to each participating city. Inventorying the resources consumed at the community level will:

- Highlight opportunities to save resources and money.
- Provide a baseline for estimating the effectiveness of sustainability measures.
- Enable comparison with peer cities and different time-frames.
- Inform subsequent analyses, plans, and policy decisions by the cities and others.
- Improve each city's competitiveness for federal and state funding opportunities that are targeted to cities that have taken steps to measure and improve their energy efficiency and reduce their carbon footprints.
- Assist in promoting public understanding of the city's effect on climate change.

CLICK TO ENLARGE

BUSINESS-AS-USUAL (BAU) FORECASTS AND NGEA TARGETS

GREENHOUSE GAS EMISSIONS FROM PRIMARY SOURCES FOR ALL 20 CITIES



The graph above illustrates the importance of tracking progress to meet goals. It shows that if the RII cities continue to follow current trends, their GHG emissions from energy, VMT, and waste will increase. It also shows the rate of change necessary to meet the statewide target established by the Next Generation Energy Act (NGEA) of an 40% reduction of GHG emissions by 2030, using 2005 as a baseline. This target is based on total GHG emissions; therefore, since the population is expected to continue growing, each person must reduce their emissions at the even steeper rate of 49%.

Partners

Participating Cities:

Coon Rapids
Duluth
Eagan
Eden Prairie
Edina
Falcon Heights
Hopkins
Lake Elmo
Maplewood
Minneapolis
Minnetonka
Oakdale
Richfield
Rochester
St. Paul
Shoreview
Saint Anthony
St. Louis Park
White Bear Lake
Woodbury

Primary Funders:

Minnesota Pollution Control Agency
Minnesota Department of Commerce

Team Members:

LHB Inc.
Urban Land Institute MN
ORANGE Environmental, LLC

Contributors

Public and Private Utilities:

Rochester Public Utility
Western Lake Superior Sanitation District
Olmsted County Waste to Energy Facility
Duluth Comfort Systems
Duluth Steam Cooperative
Xcel Energy
Dakota Electric Association
Great River Energy
CenterPoint Energy
Minnesota Power
Minnesota Energy Resources
NRG Energy
Connexus
Minnesota Valley Electric Cooperative
University of Minnesota (Southeast Steam)
St. Paul District Energy
Anoka Municipal Utility

State and Local Government:

Minnesota Department of Transportation
Hennepin County
Metropolitan Council of the Twin Cities
Metropolitan Airports Commission
Rochester International Airport
Duluth Port Authority
ICLEI Local Governments for Sustainability
University of Minnesota

WANT TO JOIN?

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REGIONAL INDICATORS INITIATIVE

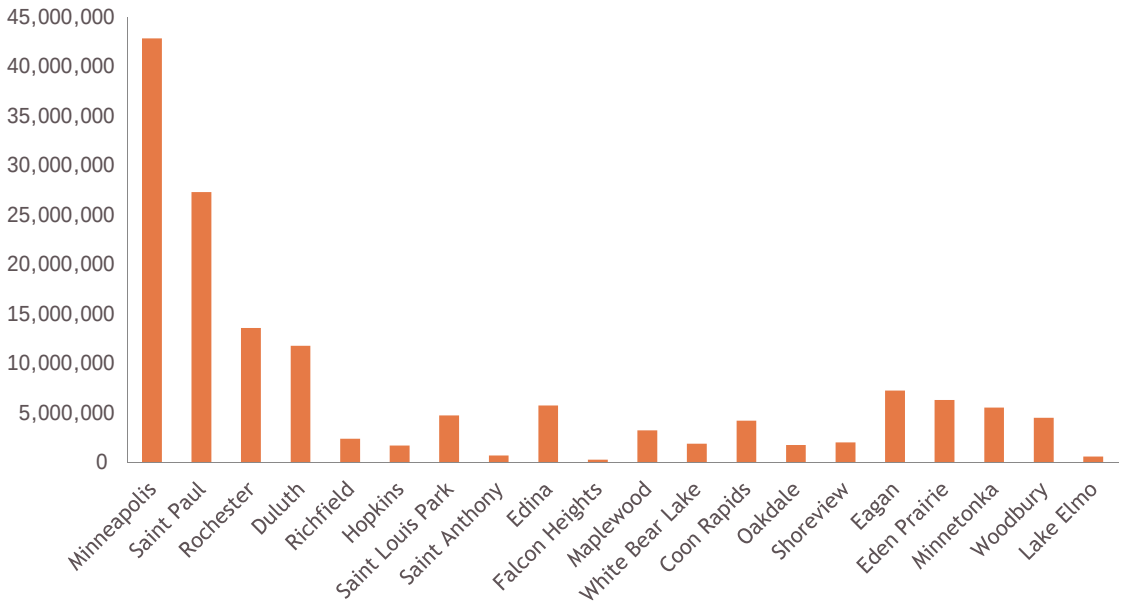
ABOUT | EXPLORE THE DATA | SO WHAT?

ENERGY
WATER
TRAVEL
WASTE
GHG EMISSIONS
COST

ENERGY

The interactive graphic below represents municipal energy data in British Thermal Units (Btu). To begin, choose a data set (right). Check the boxes below to see energy data for individual or multiple cities over a single year or across multiple years. Add average 'trendlines' to compare this data to different geographic sets of cities and normalize the data by weather (Heating Degree Days and Cooling Degree Days), population (per capita), households or jobs. Hover over the graphic to get specific values.

- [x] TOTAL ENERGY
- [ ] TOTAL ENERGY (RESIDENT CIAL/INDUSTRIAL)
- [ ] TOTAL ENERGY BY TYPE (RAL GAS & OTHER)
- [ ] RESIDENTIAL ENERGY
- [ ] COMMERCIAL/INDUSTRIAL ENERGY



TOTAL ENERGY
ALL CITIES | 2011

CITIES (SELECT ANY # OF CITIES)

- [x] ALL CITIES

- [ ] CENTRAL/STAND-ALONE CITIES
  - [ ] Duluth
  - [ ] Minneapolis
  - [ ] Rochester
  - [ ] St. Paul
- [ ] INNER-RING SUBURBS
  - [ ] Richfield
  - [ ] Hopkins
  - [ ] St. Louis Park
  - [ ] St. Anthony
  - [ ] Edina
  - [ ] Falcon Heights
  - [ ] Maplewood
- [ ] OUTER-RING SUBURBS
  - [ ] White Bear Lake
  - [ ] Coon Rapids
  - [ ] Oakdale
  - [ ] Shoreview
  - [ ] Eagan
  - [ ] Eden Prairie
  - [ ] Minnetonka
  - [ ] Woodbury
  - [ ] Lake Elmo

TIMELINE (SELECT ONE)

- [ ] ALL YEARS (2008-2011)
- [ ] 2008
- [ ] 2009
- [ ] 2010
- [x] 2011

NORMALIZE (SELECT ONE)

- [x] None
- [ ] Population - Per capita/day
- [ ] Household - Per houshold/day
- [ ] Employment - Per job/day
- [ ] Weather - Normalized by HDD/CDD

ADD TRENDLINES (OPTIONAL)

- [ ] RII Cities average
- [ ] Central/Stand-Alone Cities
- [ ] Inner-Ring Suburbs
- [ ] Outer-Ring Suburbs
- [ ] MN State average
- [ ] US Average

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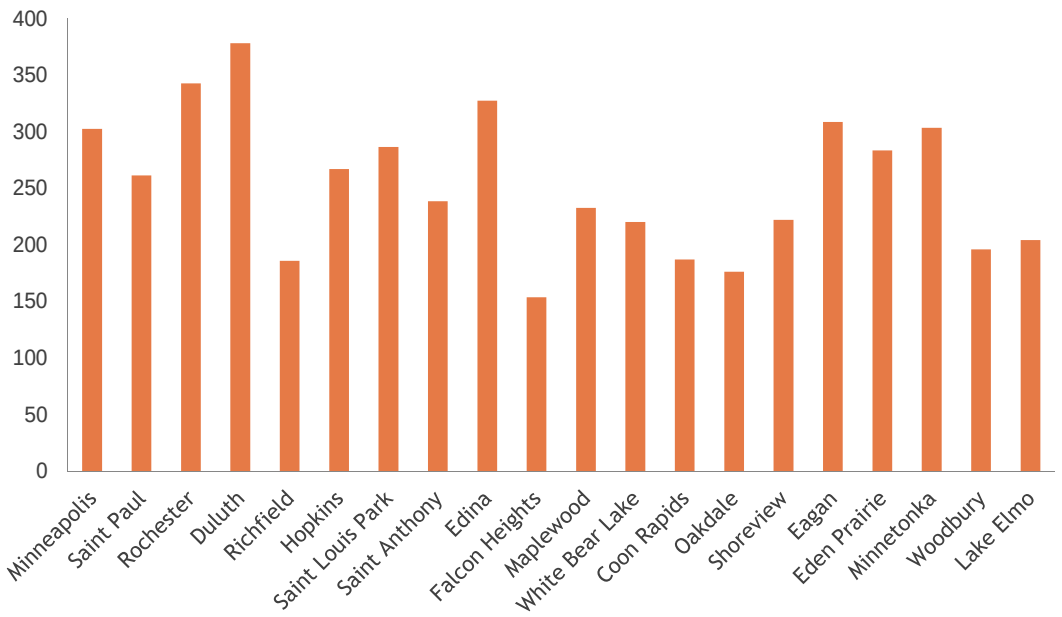
- [ ] TOTAL ENERGY BY TYPE (ELECTRICIY, NATURAL GAS & OTHER)
- [ ] RESIDENTIAL ENERGY
- [ ] COMMERCIAL/INDUSTRIAL ENERGY



TOTAL ENERGY

ALL CITIES | 2011 | PER CAPITA/DAY

CITIES (SELECT ANY # OF CITIES)

- [x] ALL CITIES

- [ ] CENTRAL/STAND-ALONE CITIES
  - [ ] Duluth
  - [ ] Minneapolis
  - [ ] Rochester
  - [ ] St. Paul
- [ ] INNER-RING SUBURBS
  - [ ] RIchfield
  - [ ] Hopkins
  - [ ] St. Louis Park
  - [ ] St. Anthony
  - [ ] Edina
  - [ ] Falcon Heights
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- [ ] OUTER-RING SUBURBS
  - [ ] White Bear Lake
  - [ ] Coon Rapids
  - [ ] Oakdale
  - [ ] Shoreview
  - [ ] Eagan
  - [ ] Eden Prairie
  - [ ] Minnetonka
  - [ ] Woodbury
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TIMELINE (SELECT ONE)

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- [ ] 2008
- [ ] 2009
- [ ] 2010
- [x] 2011

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- [x] Population - Per capita/day
- [ ] Household - Per houshold/day
- [ ] Employment - Per job/day
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ADD TRENDLINES (OPTIONAL)

- [ ] RII Cities average
- [ ] Central/Stand-Alone Cities
- [ ] Inner-Ring Suburbs
- [ ] Outer-RIng Suburbs
- [ ] MN State average
- [ ] US Average

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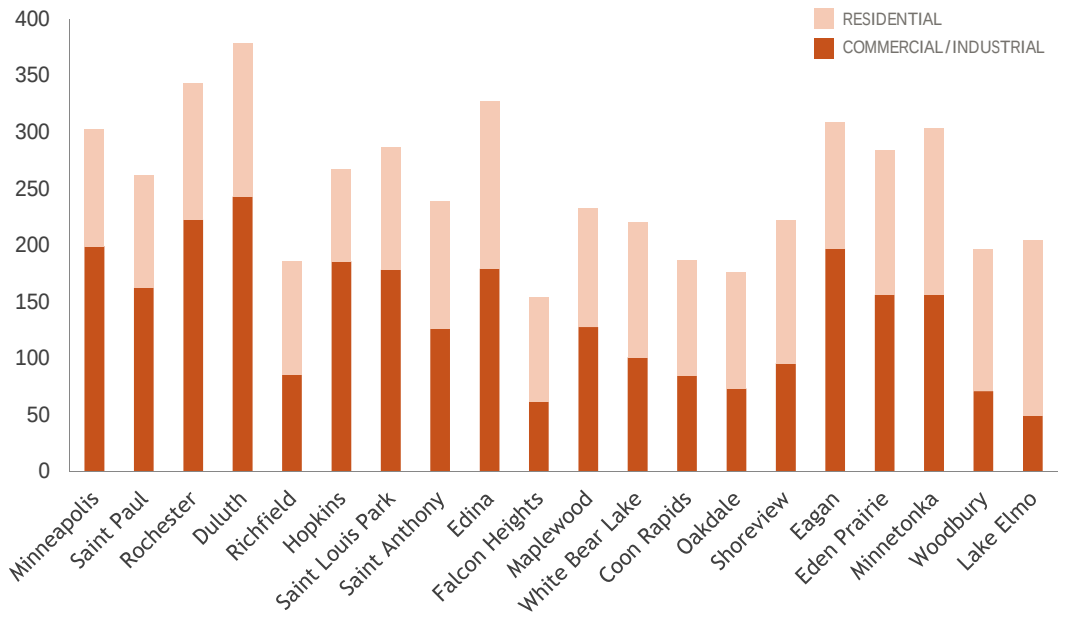
- ☐ TOTAL ENERGY BY TYPE (ELECTRICIY, NATURAL GAS & OTHER)
- ☐ RESIDENTIAL ENERGY
- ☐ COMMERCIAL/INDUSTRIAL ENERGY



TOTAL ENERGY BY USE (RESIDENTIAL & COMMERCIAL/INDUSTRIAL)

ALL CITIES | 2011| PER CAPITA/DAY

CITIES (SELECT ANY # OF CITIES)

- ■ ALL CITIES

- ☐ CENTRAL/STAND-ALONE CITIES
  - ☐ Duluth
  - ☐ Minneapolis
  - ☐ Rochester
  - ☐ St. Paul
- ☐ INNER-RING SUBURBS
  - ☐ RIchfield
  - ☐ Hopkins
  - ☐ St. Louis Park
  - ☐ St. Anthony
  - ☐ Edina
  - ☐ Falcon Heights
  - ☐ Maplewood
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  - ☐ White Bear Lake
  - ☐ Coon Rapids
  - ☐ Oakdale
  - ☐ Shoreview
  - ☐ Eagan
  - ☐ Eden Prairie
  - ☐ Minnetonka
  - ☐ Woodbury
  - ☐ Lake Elmo

TIMELINE (SELECT ONE)

- ☐ ALL YEARS (2008-2011)
- ☐ 2008
- ☐ 2009
- ☐ 2010
- ■ 2011

NORMALIZE (SELECT ONE)

- ☐ None
- ■ Population - Per capita/day
- ☐ Household - Per houshold/day
- ☐ Employment - Per job/day
- ☐ Weather - Normalized by HDD/CDD

ADD TRENDLINES (OPTIONAL)

- ☐ RII Cities average
- ☐ Central/Stand-Alone Cities
- ☐ Inner-Ring Suburbs
- ☐ Outer-RIng Suburbs
- ☐ MN State average
- ☐ US Average

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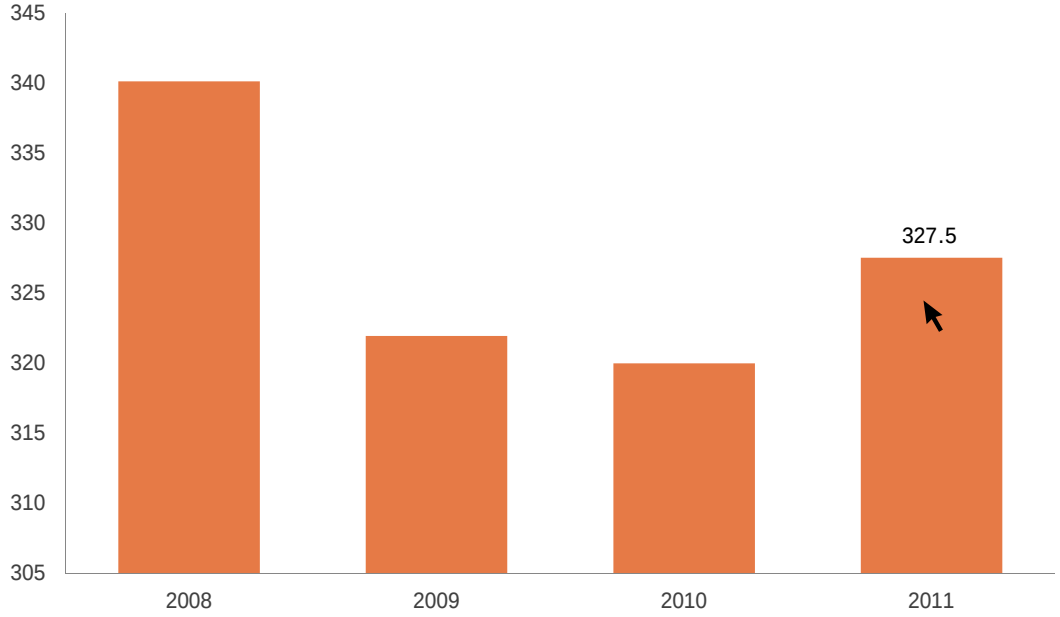
- [x] TOTAL ENERGY
- [ ] TOTAL ENERGY (RESIDENTIAL AND COMMERCIAL/INDUSTRIAL)
- [ ] TOTAL ENERGY BY TYPE (ELECTRICIY, NATURAL GAS & OTHER)
- [ ] RESIDENTIAL ENERGY
- [ ] COMMERCIAL/INDUSTRIAL ENERGY



TOTAL ENERGY

EDINA | 2008-2011| PER CAPITA

CITIES (SELECT ANY # OF CITIES)

- [ ] ALL CITIES
- [ ] CENTRAL/STAND-ALONE CITIES
  - [ ] Duluth
  - [ ] Minneapolis
  - [ ] Rochester
  - [ ] St. Paul
- [ ] INNER-RING SUBURBS
  - [ ] RIchfield
  - [ ] Hopkins
  - [ ] St. Louis Park
  - [ ] St. Anthony
  - [x] Edina
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- [ ] OUTER-RING SUBURBS
  - [ ] White Bear Lake
  - [ ] Coon Rapids
  - [ ] Oakdale
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  - [ ] Eagan
  - [ ] Eden Prairie
  - [ ] Minnetonka
  - [ ] Woodbury
  - [ ] Lake Elmo

TIMELINE (SELECT ONE)

- [x] ALL YEARS (2008-2011)
- [ ] 2008
- [ ] 2009
- [ ] 2010
- [ ] 2011

NORMALIZE (SELECT ONE)

- [ ] None
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- [ ] Household - Per houshold/day
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ADD TRENDLINES (OPTIONAL)

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- [ ] Central/Stand-Alone Cities
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- [ ] Outer-RIng Suburbs
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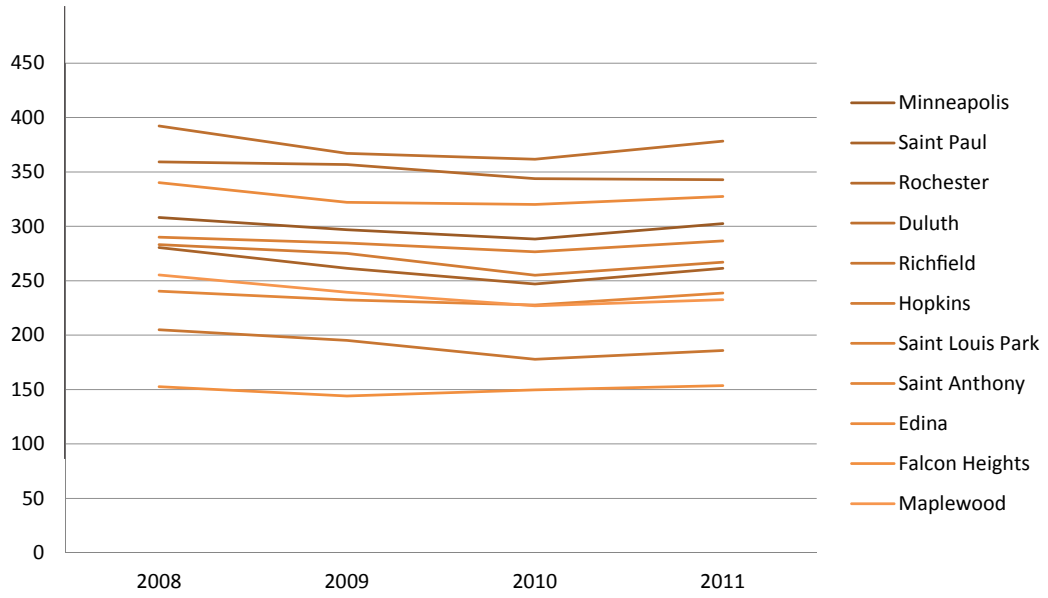
- [ ] TOTAL ENERGY (RESIDENTIAL AND COMMERCIAL/INDUSTRIAL)
- [ ] TOTAL ENERGY BY TYPE (ELECTRICIY, NATURAL GAS & OTHER)
- [ ] RESIDENTIAL ENERGY
- [ ] COMMERCIAL/INDUSTRIAL ENERGY



TOTAL ENERGY

ALL CITIES | 2008-2011 | PER CAPITA

CITIES (SELECT ANY # OF CITIES)

- [ ] ALL CITIES

- [x] CENTRAL/STAND-ALONE CITIES
  - [x] Duluth
  - [x] Minneapolis
  - [x] Rochester
  - [x] St. Paul
- [x] INNER-RING SUBURBS
  - [x] Richfield
  - [x] Hopkins
  - [x] St. Louis Park
  - [x] St. Anthony
  - [x] Edina
  - [x] Falcon Heights
  - [x] Maplewood
- [ ] OUTER-RING SUBURBS
  - [ ] White Bear Lake
  - [ ] Coon Rapids
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- [ ] 2010
- [ ] 2011

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- [ ] Employment - Per job/day
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- [ ] Outer-Ring Suburbs
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- [ ] US Average

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REGIONAL INDICATORS INITIATIVE

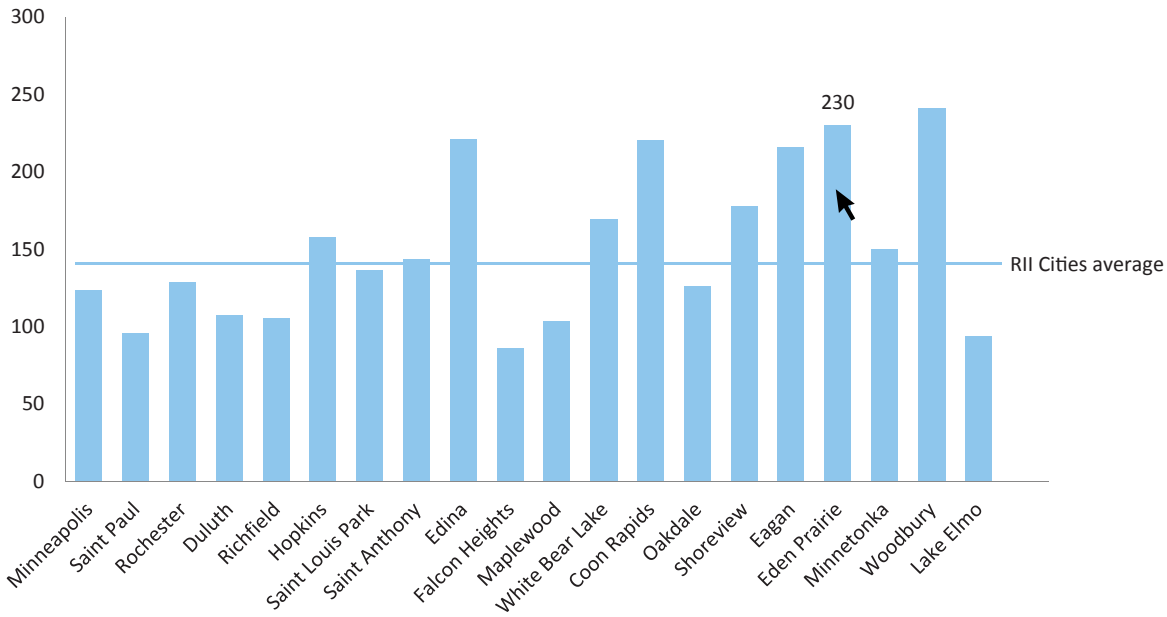
ABOUT | EXPLORE THE DATA | SO WHAT?

ENERGY
WATER
TRAVEL
WASTE
GHG EMISSIONS
COST

WATER

The interactive graphic below represents municipal water data in gallons. To begin, choose a data set (right). Check the boxes below to see water data for individual or multiple cities over a single year or across multiple years. Add average 'trendlines' to compare this data to different geographic sets of cities and normalize the data by population (per capita), households or jobs. Hover over the graphic to get specific values.

- ☐ TOTAL WATER
- ☐ TOTAL WATER (RESIDENTIAL/INDUSTRIAL)
- ■ RESIDENTIAL WATER
- ☐ COMMERCIAL/INDUSTRIAL WATER



TOTAL WATER

ALL CITIES | 2011 | PER HOUSEHOLD/DAY | WITH RII CITIES AVERAGE

CITIES (SELECT ANY # OF CITIES)

- ■ ALL CITIES
- ☐ CENTRAL/STAND-ALONE CITIES
  - ☐ Duluth
  - ☐ Minneapolis
  - ☐ Rochester
  - ☐ St. Paul
- ☐ INNER-RING SUBURBS
  - ☐ Richfield
  - ☐ Hopkins
  - ☐ St. Louis Park
  - ☐ St. Anthony
  - ☐ Edina
  - ☐ Falcon Heights
  - ☐ Maplewood
- ☐ OUTER-RING SUBURBS
  - ☐ White Bear Lake
  - ☐ Coon Rapids
  - ☐ Oakdale
  - ☐ Shoreview
  - ☐ Eagan
  - ☐ Eden Prairie
  - ☐ Minnetonka
  - ☐ Woodbury
  - ☐ Lake Elmo

TIMELINE (SELECT ONE)

- ☐ ALL YEARS (2008-2011)
- ☐ 2008
- ☐ 2009
- ☐ 2010
- ■ 2011

NORMALIZE (SELECT ONE)

- ☐ None
- ■ Population - Per capita/day
- ☐ Household - Per houshold/day
- ☐ Employment - Per job/day
- ☐ Weather - Normalized by HDD/CDD

ADD TRENDLINES (OPTIONAL)

- ■ RII Cities average
- ☐ Central/Stand-Alone Cities
- ☐ Inner-Ring Suburbs
- ☐ Outer-Ring Suburbs
- ☐ MN State average
- ☐ US Average

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REGIONAL INDICATORS INITIATIVE

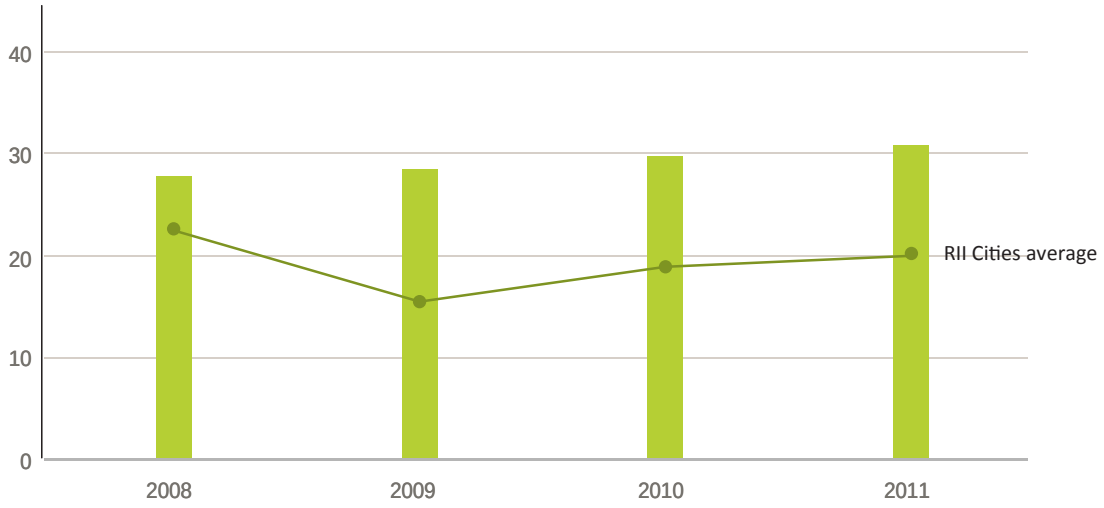
ABOUT | EXPLORE THE DATA | SO WHAT?

ENERGY
WATER
TRAVEL
WASTE
GHG EMISSIONS
COST

TRAVEL

The interactive graphic below represents municipal travel data in Vehicle Miles Traveled (VMT). Check the boxes below to see travel data for individual or multiple cities over a single year or across multiple years. Add average 'trendlines' to compare this data to different geographic sets of cities and normalize the data by population (per capita), households or jobs. Hover over the graphic to get specific values.

TOTAL VEHICLE MILES TRA



VMT PER CAPITA/DAY

EDINA | 2008-2011 | PER CAPITA/DAY | WITH RII CITIES AVERAGE

CITIES (SELECT ANY # OF CITIES)

- [ ] ALL CITIES
- [ ] CENTRAL / STAND-ALONE CITIES
  - [ ] Duluth
  - [ ] Minneapolis
  - [ ] Rochester
  - [ ] St. Paul
- [ ] INNER-RING SUBURBS
  - [ ] RIchfield
  - [ ] Hopkins
  - [ ] St. Louis Park
  - [ ] St. Anthony
  - [x] Edina
  - [ ] Falcon Heights
  - [ ] Maplewood
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TIMELINE (SELECT ONE)

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- [ ] 2010
- [ ] 2011

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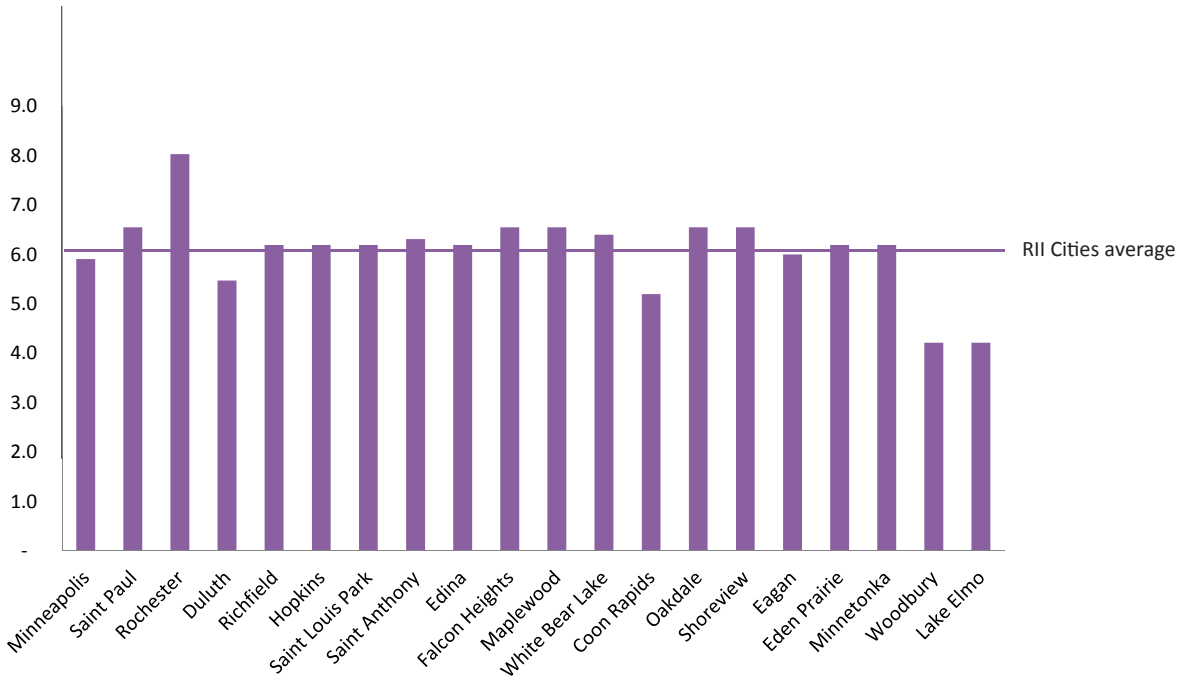
ABOUT | EXPLORE THE DATA | SO WHAT?

ENERGY
WATER
TRAVEL
WASTE
GHG EMISSIONS
COST

WASTE

The interactive graphic below represents municipal solid waste (MSW) data in pounds (lbs). To begin, choose a data set (right). Check the boxes below to see waste data for individual or multiple cities over a single year or across multiple years. Add average 'trendlines' to compare this data to different geographic sets of cities and normalize the data by population (per capita), households or jobs. Hover over the graphic to get specific values.

■ TOTAL MUNICIPAL SOLID W
□ TOTAL MUNICIPAL SOLID W SING DISPOSAL METHOD (RECYCLING, LANDFILL, IN POSTING)



TOTAL MUNICIPAL SOLID WASTE (MSW)

ALL CITIES | 2011| PER CAPITA/DAY | WITH RII CITIES AVERAGE

CITIES (SELECT ANY # OF CITIES)

■ ALL CITIES

□ CENTRAL / STAND-ALONE CITIES
- □ Duluth
- □ Minneapolis
- □ Rochester
- □ St. Paul

□ INNER-RING SUBURBS
- □ Richfield
- □ Hopkins
- □ St. Louis Park
- □ St. Anthony
- □ Edina
- □ Falcon Heights
- □ Maplewood

□ OUTER-RING SUBURBS
- □ White Bear Lake
- □ Coon Rapids
- □ Oakdale
- □ Shoreview
- □ Eagan
- □ Eden Prairie
- □ Minnetonka
- □ Woodbury
- □ Lake Elmo

TIMELINE (SELECT ONE)

□ ALL YEARS (2008-2011)
- □ 2008
- □ 2009
- □ 2010
- ■ 2011

NORMALIZE (SELECT ONE)

□ None
- ■ Population - Per capita / day
- □ Household - Per houshold / day
- □ Employment - Per job / day
- □ Weather - Normalized by HDD / CDD

ADD TRENDLINES (OPTIONAL)

■ RII Cities average
- □ Central / Stand-Alone Cities
- □ Inner-Ring Suburbs
- □ Outer-Ring Suburbs
- □ MN State average
- □ US Average

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SO WHAT?

Making Sense of the Numbers

The Initiative's participant cities currently comprise a data sample size that represents over a quarter of Minnesota's population (27%) and includes municipalities of varying types from the state's four largest cities to inner and outer-ring suburbs of various sizes. Through the process of compiling four years of consumption data for 20 Minnesota cities, certain trends have emerged. Key findings from each indicator category are visualized and explained below.

ENERGY (Click to expand)

TRAVEL (Click to expand)

WATER (Click to expand)

WASTE (Click to expand)

GHG EMISSIONS (Click to expand)

Next Steps

An original and continuous goal of the Regional Indicators Initiative is to correlate metrics with the strategies outlined by the GreenStep Cities program. The Best Management Practices (BMPs) outlined in the GreenStep Cities program provide cities with an expansive list of sustainable strategies but lack a way of measuring progress towards sustainable goals.

Currently, 15 of the 20 RII cities have joined the GreenStep Cities program, providing an opportunity to compare the BMPs each city has adopted with the data collected through the Regional Indicators Initiative. By comparing the strategies adopted with data collected through the RII, the hope is that the impact of each strategy can be measured. In addition, strategies that cities have adopted that are not a part of the GreenStep Cities program can be identified for continued improvement and refinement. In the future, this collaboration can guide cities to focus on selecting the BMPs with the greatest impact.

Out of the 28 Best Management Practice categories, 19 categories are measurable within the Regional Indicators Initiative's four current indicators. Categories that are not currently covered include: Land Use, Urban Forests, Efficient Storm-water Management, Surface Water Quality, Local Air Quality and Local Food. A possible addition could be to expand the RII indicators to cover the remaining nine BMP categories that are not currently correlated.

The Regional Indicators Initiative's purpose, findings, and implications have been presented at several conferences and events throughout Minnesota. The findings of this Initiative are also being shared at public presentations in each participating city.

The Regional Indicators Initiative team is currently in the process of expanding the scope of data by collecting 2012 data for all current Initiative cities as well as adding five additional cities.

Follow the progress of the Regional Indicators Initiative on the RII blog:

www.regionalindicatorsinitiative.wordpress.com

Call to Action

There are many opportunities to contribute to the Regional Indicators Initiative's mission and goals whether you are a city leader, business owner/organization leader or individual:

(continued)

CITY LEADERS

The Regional Indicators Initiative currently includes 20 Minnesota cities and 27% of the State's population. The addition of each city enriches the data sample and provides a more complete picture of current sustainability in Minnesota.

If your city is interested in becoming a participating city, please download and email the following form to Rick Carter at LHB.

Participation Form

For more information about the GreenStep Cities Program:

GreenStep Cities
http://greenstep.pca.state.mn.us/

BUSINESS OWNERS/ORGANIZATIONS

Sustainability in business refers to practices that are designed to keep your company and the environment healthy and prosperous on social, financial and environmental levels.

The Sustainable Business Resource Center (SBRC) is a dynamic tool for Minnesota business professionals of all business sectors to learn the latest tips for greening their business while also increasing the bottom line.

Resources are organized by sector and offer a comprehensive list of strategies and additional resources. For more information about SBRC:

Sustainable Business Resource Center (SBRC)
http://www.sbrcmn.com/

INDIVIDUALS

There are many opportunities for us as individuals to decrease our personal resource consumption related to the indicators outlined by the RII as well as others.

The ThreeACTIONS Project is a resource that provides step-by-step instruction and explanation of 45 actions designed for individuals who are interesting in developing sustainable lifestyle habits. Actions are organized into categories of Waste, Transport, Water, Food and Energy. For more information about the ThreeACTIONS Project

ThreeACTIONS Project > Action List
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Participation Form

WANT MORE INFORMATION?

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LHB PERFORMANCE DRIVEN DESIGN.

ORANGE

Urban Land Institute Minnesota

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SO WHAT?

Making Sense of the Numbers

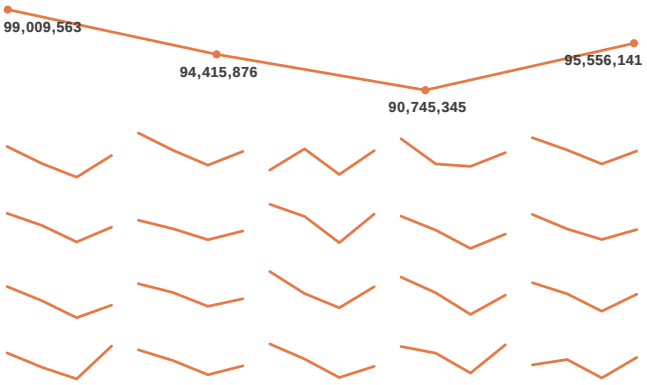
The Initiative's participant cities currently comprise a data sample size that represents over a quarter of Minnesota's population (27%) and includes municipalities of varying types from the state's four largest cities to inner and outer-ring suburbs of various sizes. Through the process of compiling four years of consumption data for 20 Minnesota cities, certain trends have emerged. Key findings from each indicator category are visualized and explained below.

ENERGY

A major discovery of this project was a 'check-mark' trend in energy use over time. Total energy use decreased in every city from 2008 to 2010 and increased from 2010-2011. This trend is consistent across all possible individual data sets—except electricity consumption, including: total energy, total energy normalized by population, total commercial/industrial energy, total residential energy and total natural gas). Another finding that is consistent across all four years is that the majority of energy consumption is commercial/industrial energy, not residential. Overall, average residential energy across all cities is 40% while commercial/industrial is 60%. This varies slightly by geographic location of the cities residential consumption is a smaller percentage in central/stand-alone cities than it is in inner-ring and outer-ring suburbs.

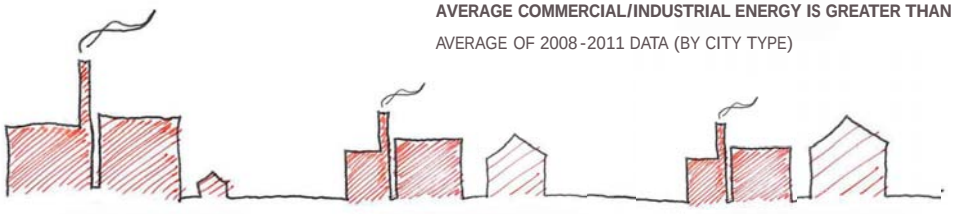
THE 'CHECK MARK' TREND

TOTAL ENERGY USE (OVERALL AND FOR EACH INDIVIDUAL CITY)
2008 - 2011 (MMBtu/year)



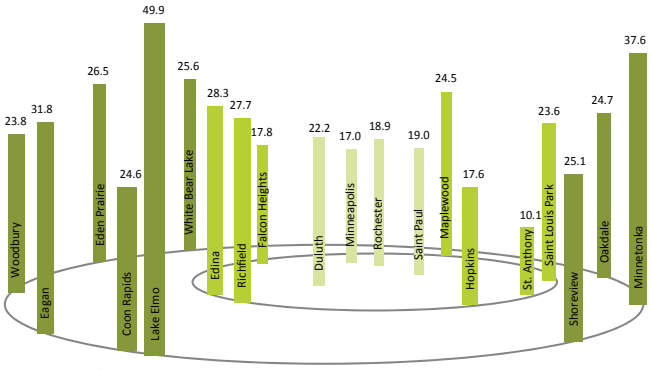
AVERAGE COMMERCIAL/INDUSTRIAL ENERGY IS GREATER THAN RESIDENTIAL

AVERAGE OF 2008-2011 DATA (BY CITY TYPE)



CENTRAL/STAND-ALONE CITIES	INNER-RING SUBURBS	OUTER-RING SUBURBS
64% 36%	58% 42%	50% 50%

TRAVEL



CENTRAL/ STAND-ALONE CITIES	INNER-RING SUBURBS	OUTER-RING SUBURBS
19.5	21.4	30.1

VEHICLE MILES TRAVELED/CAPITA INCREASES AT GREATER DISTANCES FROM CENTRAL CITIES
VMT/CAPITA/DAY (2011)

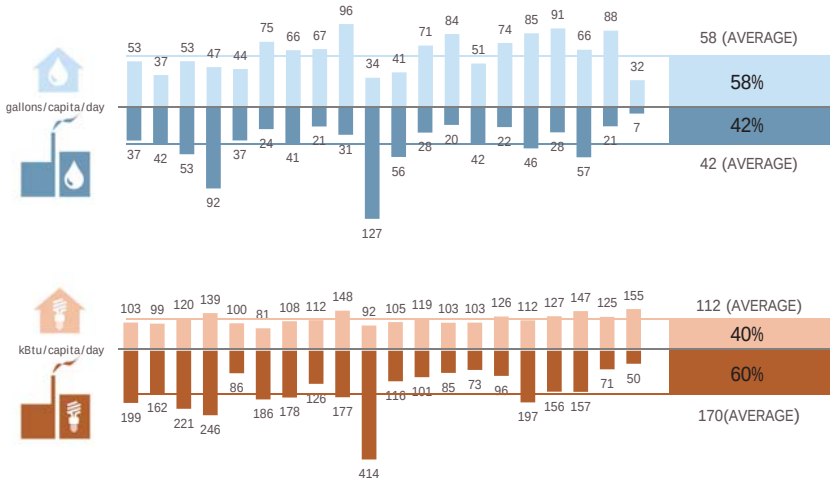
Travel data reveals that the average vehicle miles traveled per capita per day has decreased only minimally over four years. A stronger trend is revealed when comparing VMT per capita, per day for individual cities. In 2011, the average rate is lowest in the central/stand-alone cities (19.5 VMT per capita, per day), slightly higher in the inner-ring sububrs (21.4 VMT per capita, per day), and significantly higher in the outer-ring suburbs (30.1 VMT per capita per day).

WATER

Overall potable water use per capita across the four study years has decreased slightly, although the trend is not as consistent as with the energy indicator. Stronger trends are seen when comparing residential and commercial water use. In addition, unlike energy, residential water consumption is greater than commercial/industrial water use, especially in suburban cities. Additionally, while residential energy per capita is fairly consistent across all cities, residential water per capita reveals significant outliers. This finding presents an opportunity to analyze these outlying cities to determine what factors contributed to more or less water use. Similarly, while commercial/industrial energy per capita shows a trend of higher consumption in central/stand-alone cities than in suburban cities, commercial/industrial water per capita shows no clear trend. Although this data is from 2011, the findings are consistent across all four years.

RESIDENTIAL WATER USE IS INCONSISTENT AMONG CITIES

WATER AND ENERGY CONSUMPTION - 2011 (PER CAPITA/DAY FOR 20 CITIES)

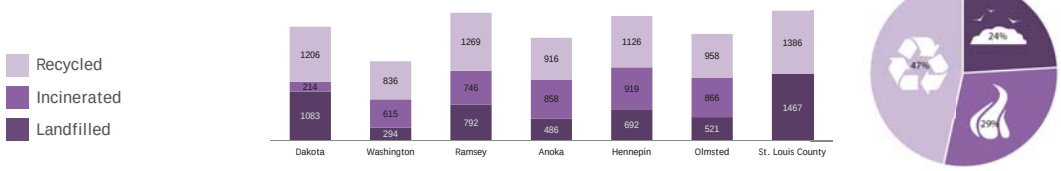


WASTE

Because waste data is collected at a county-wide scale, this metric is not as city-specific as the other indicators. In order to estimate city waste numbers, county data was pro-rated by city population. This provides a general ballpark of city-wide waste data but is not specific enough to reflect the waste trends of an individual city. However, conclusions can be made at a county-wide scale, where over the seven counties involved in RII in 2011, 47% of the waste was recycled, 29% incinerated and 24% landfilled.

ALMOST HALF OF MUNICIPAL SOLID WASTE (MSW) IS RECYCLED

BREAKDOWN OF MSW BY COUNTY - 2011 (POUNDS/CAPITA/YEAR)



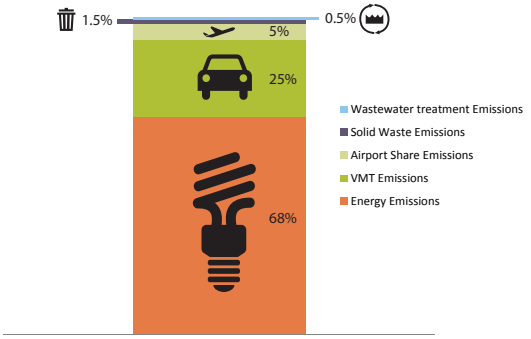
GREENHOUSE GAS EMISSIONS

Greenhouse gas (GHG) emissions associated with each of the four indicators (energy, water, vehicle miles traveled and waste) are converted into carbon dioxide equivalents (CO_2e) to generate a common metric to compare all four indicators. The trend line of GHG emissions follows the energy trend line closely because energy is the dominant contributor to GHG emissions at 68%.

GHG emissions are calculated in this project using the method prescribed in the U.S. ICLEI Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, October 2012 (ICLEI Protocol). The ICLEI Protocol also requires the inclusion of emissions associated with airport operations (when they constitute 5% or more of a community's total) and wastewater treatment. To be fully compliant with the Protocol, the carbon baseline assessments include these emissions as well for all 20 cities. In 2011, airport share equaled about 5% of total emissions and wastewater treatment was only 0.5% of the total. Energy used to pump and clean water is included within the energy sector in this case.

THE LARGEST CONTRIBUTOR TO GREENHOUSE GAS EMISSIONS IS ENERGY

BREAKDOWN OF GREENHOUSE GAS EMISSIONS - 2011 (all 20 cities)



Next Steps

An original and continuous goal of the Regional Indicators Initiative is to correlate metrics with the strategies outlined by the GreenStep Cities program. The Best Management Practices (BMPs) outlined in the GreenStep Cities program provide cities with an expansive list of sustainable strategies but lack a way of measuring progress towards sustainable goals.

Currently, 15 of the 20 RII cities have joined the GreenStep Cities program, providing an opportunity to compare the BMPs each city has adopted with the data collected through the Regional Indicators Initiative. By comparing the strategies adopted with data collected through the RII, the hope is that the impact of each strategy can be measured. In addition, strategies that cities have adopted that are not a part of the GreenStep Cities program can be identified for continued improvement and refinement. In the future, this collaboration can guide cities to focus on selecting the BMPs with the greatest impact.

Out of the 28 Best Management Practice categories, 19 categories are measurable within the Regional Indicators Initiative's four current indicators. Categories that are not currently covered include: Land Use, Urban Forests, Efficient Storm-water Management, Surface Water Quality, Local Air Quality and Local Food. A possible addition could be to expand the RII indicators to cover the remaining nine BMP categories that are not currently correlated.

The Regional Indicators Initiative's purpose, findings, and implications have been presented at several conferences and events throughout Minnesota. The findings of this Initiative are also being shared at public presentations in each participating city.

The Regional Indicators Initiative team is currently in the process of expanding the scope of data by collecting 2012 data for all current Initiative cities as well as adding five additional cities.

Follow the progress of the Regional Indicators Initiative on the RII blog:

www.regionalindicatorsinitiative.wordpress.com

Call to Action

There are many opportunities to contribute to the Regional Indicators Initiative's mission and goals whether you are a city leader, business owner/organization leader or individual:

CITY LEADERS

The Regional Indicators Initiative currently includes 20 Minnesota cities and 27% of the State's population. The addition of each city enriches the data sample and provides a more complete picture of current sustainability in Minnesota.

If your city is interested in becoming a participating city, please download and email the following form to Rick Carter at LHB.

Participation Form

For more information about the GreenStep Cities Program:

GreenStep Cities
http://greenstep.pca.state.mn.us/

BUSINESS OWNERS/ORGANIZATIONS

Sustainability in business refers to practices that are designed to keep your company and the environment healthy and prosperous on social, financial and environmental levels.

The Sustainable Business Resource Center (SBRC) is a dynamic tool for Minnesota business professionals of all business sectors to learn the latest tips for greening their business while also increasing the bottom line.

Resources are organized by sector and offer a comprehensive list of strategies and additional resources. For more information about SBRC:

Sustainable Business Resource Center (SBRC)
http://www.sbrcmn.com/

INDIVIDUALS

There are many opportunities for us as individuals to decrease our personal resource consumption related to the indicators outlined by the RII as well as others.

The ThreeACTIONS Project is a resource that provides step-by-step instruction and explanation of 45 actions designed for individuals who are interesting in developing sustainable lifestyle habits. Actions are organized into categories of Waste, Transport, Water, Food and Energy. For more information about the ThreeACTIONS Project

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Regional Indicators Initiative

Project Overview

The Regional Indicators Initiative measures annual performance metrics for approximately 20 Minnesota cities committed to increasing their overall efficiency and level of sustainability. The project collects the following data generated through the activities of the people who live, work, learn, travel, visit, and recreate within the city's geographical boundaries:

- Energy (in BTUs): electricity, natural gas, and district energy consumed.
- Water (in gallons): potable water consumed.
- Waste (in pounds): municipal solid waste managed via recycling, composting, combustion, and landfilling.
- Travel (in Vehicle Miles Traveled): on-road distance traveled

The greenhouse gas emissions associated with each of these measures is also calculated, providing a common metric to compare the environmental impacts of the indicators. The indicators are expressed not only as annual totals, but are also broken down into residential and commercial/industrial uses, and are presented in terms of per capita and per job, enabling them to be compared over time. The Initiative supports planning for sustainability by defining a baseline, tracking a business-as-usual trajectory, establishing targets, and measuring outcomes of sustainable strategies at a city-wide scale.

Purpose

Recording these performance metrics is essential to promoting efficiency and sustainable change. By producing annually comparable indicators for twenty Minnesota cities – including most of the state's largest cities – the success of the state's **GreenStep Cities Program** and activities in other cities can be measured. Additionally, the Initiative will indicate progress toward meeting the State's energy efficiency and greenhouse gas reduction goals, as defined by the Minnesota Next Generation Energy Act of 2007.

Along with providing state-wide benefits, the Initiative is valuable to participating cities. Taking inventory of the resources consumed at the community level will:

- Highlight opportunities to save resources and money.
- Provide a baseline for estimating the effectiveness of sustainability measures.
- Enable comparison with future inventories and peer cities.
- Inform subsequent analyses, plans, and policy decisions by the cities and others.
- Improve the cities' competitiveness for federal and state funding opportunities that are targeted to cities that have taken steps to measure and improve their energy efficiency and reduce their carbon footprints.
- Assist in promoting public understanding of the cities' effects on climate change.
- Serve as a model for other regions.

Background

The Initiative is an outgrowth of the Minnesota Pollution Control Agency's GreenStep Cities Program. To achieve GreenStep recognition, a city must meet minimum requirements and choose from 28 best management practices (BMPs) designed to improve the city's sustainability. While the program tracks which practices cities have adopted, it does not currently have a method of tracking how effective these strategies have been at "moving the needle" towards sustainability.

The desire to measure the impacts of sustainable practices led to a collaborative project, managed for the **Urban Land Institute Minnesota** by **LHB**, a multi-disciplinary engineering, architecture, and planning firm known for its focus on measurable performance. This team developed a pilot to determine what citywide data can be collected annually to effectively measure progress towards sustainability. Three cities – St. Louis Park, Falcon Heights, and Edina – funded the study and volunteered to release their performance data for the period of 2008-2010. The pilot study proved that these four indicators of city sustainability can be measured, gathered, and analyzed annually in a reasonable period of time and at a relatively low cost: energy, water, vehicle miles traveled, and waste. The Regional Indicators Initiative was developed to continue this study at a larger scale, opening up the possibility to compare data across a range of Minnesota cities.

Partners

Urban Land Institute MN
LHB Inc.; with J. Michael Orange Environmental Consulting
Minnesota Department of Commerce
Minnesota Pollution Control Agency

Participating Cities to Date

Central/Stand-Alone Cities:
Minneapolis, St. Paul, Duluth, & Rochester

Inner-ring Suburbs:
Hopkins, St. Louis Park, St. Anthony, Edina, Falcon Heights, Maplewood, & Richfield

Outer-ring Suburbs:
White Bear Lake, Oakdale, Shoreview, Eagan, Eden Prairie, Minnetonka, Woodbury, Lake Elmo, & Coon Rapids

Want to Join?

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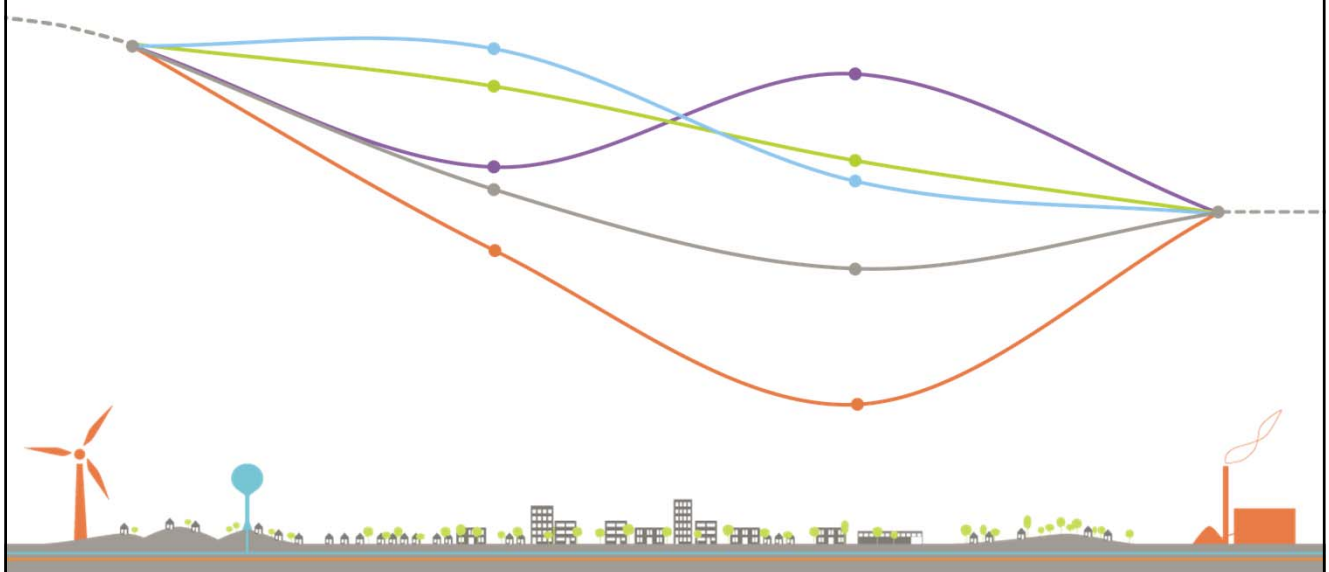
REGIONAL INDICATORS INITIATIVE

Rochester, MN | Energy, Water, Travel and Waste: How are we doing?

Rick Carter, LHB Inc.

An Inventory of Energy, Potable Water, Travel, Waste, and Greenhouse Gas Emissions for Twenty Minnesota Cities from 2008 to 2011.



February 28, 2013

REGIONAL INDICATORS INITIATIVE

WHAT IS THE REGIONAL INDICATORS INITIATIVE?

The Regional Indicators Initiative (RII) measures annual performance metrics for 20 Minnesota cities committed to increasing their overall efficiency and level of sustainability.

The Initiative supports planning for sustainability by defining a baseline, tracking a business-as-usual trajectory, establishing targets, and measuring outcomes of sustainable strategies at a city-wide scale.

OUTLINE

- Background, Purpose, and Scope
- Key Findings
- Explore the Data
- Next Steps

REGIONAL INDICATORS INITIATIVE

BACKGROUND

Minnesota Pollution Control Agency's GreenStep Cities Program:

- Choose from 28 best management practices (BMPs)
- GreenStep Cities tracks which BMPs cities have adopted, but does not currently have a method of tracking the effectiveness of these strategies
- GreenStep Cities Pilot

Regional Indicators Initiative Pilot

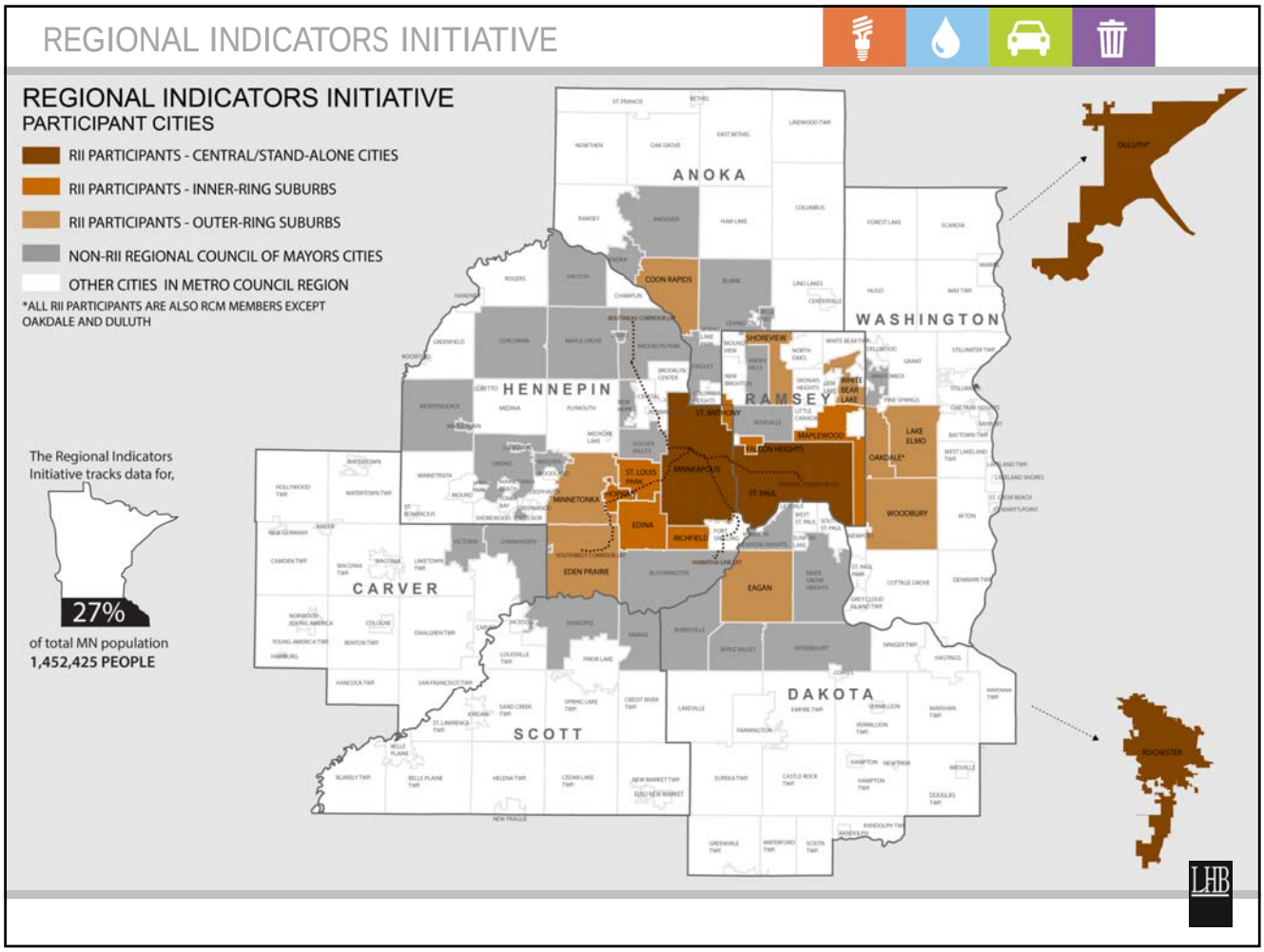
- Edina
- Falcon Heights
- Saint Louis Park

REGIONAL INDICATORS INITIATIVE

PURPOSE/GOALS

Promote efficiency and sustainable change at the scale of the city through the following tasks:

- Collect 4 years of performance metric data for 20 cities
- Evaluate trends within the collected data
- Forecast business-as-usual outcomes based on the data
- Establish targets for reduction based on statewide greenhouse gas reduction goals
- Correlate reduction strategies with performance metrics
- Develop effective communication strategies to convey this information to cities
- Document the process so that the Initiative can serve as a replicable model for other regions


REGIONAL INDICATORS INITIATIVE
REGIONAL INDICATORS INITIATIVE
PARTICIPANT CITIES
RII PARTICIPANTS - CENTRAL/STAND-ALONE CITIES
RII PARTICIPANTS - INNER-RING SUBURBS
RII PARTICIPANTS - OUTER-RING SUBURBS
NON-RII REGIONAL COUNCIL OF MAYORS CITIES
OTHER CITIES IN METRO COUNCIL REGION
*ALL RII PARTICIPANTS ARE ALSO RCM MEMBERS EXCEPT OAKDALE AND DULUTH
The Regional Indicators Initiative tracks data for,
27%
of total MN population
1,452,425 PEOPLE
ANOKA
WASHINGTON
HENNEPIN
RAMSEY
CARVER
SCOTT
DAKOTA
DULUTH*
ROCHESTER
COON RAPIDS
SHOREVIEW
WHITE BEAR LAKE
ST. ANTHONY
MAPLEWOOD
LAKE ELMO
OAKDALE*
ST. LOUIS PARK
MINNEAPOLIS
ST. PAUL
MINNETONKA
EDINA
RICHFIELD
WOODBURY
EDEN PRAIRIE
EAGAN
LHB

REGIONAL INDICATORS INITIATIVE

METRICS

ENERGY (IN BTUS): electricity, natural gas, and district energy consumed citywide (subdivided into residential and commercial/industrial)

WATER (IN GALLONS): potable water consumed citywide (subdivided into residential and commercial/industrial)

TRAVEL (IN VEHICLE MILES TRAVELED): on-road distance traveled within city limits

WASTE (IN POUNDS): citywide municipal solid waste managed via recycling, composting, combustion, and landfilling (prorated from countywide data)

COMMON METRICS

GREENHOUSE GAS EMISSIONS (IN TONNES CO_2E): citywide greenhouse gas emissions associated with each of the four indicators

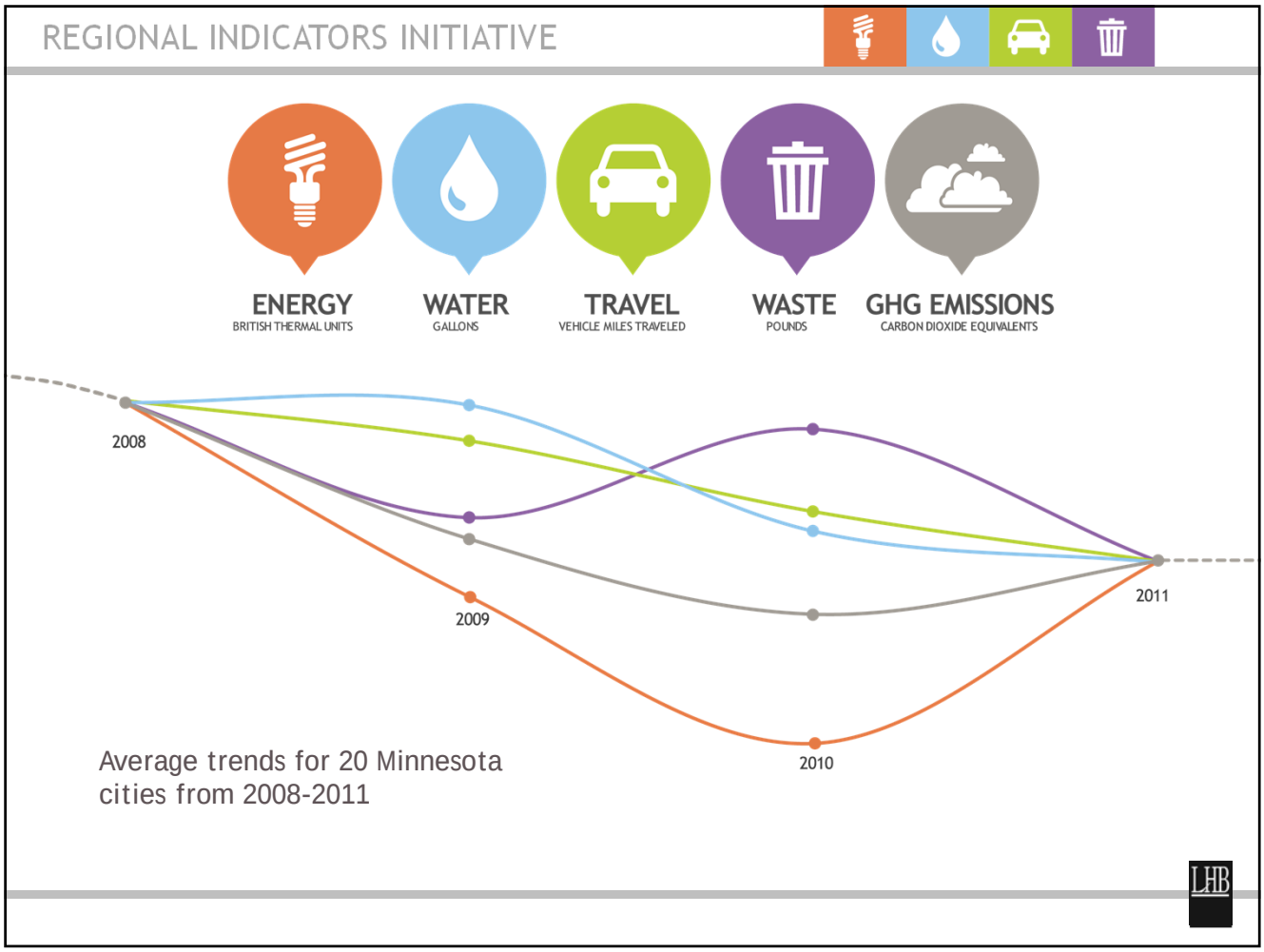
COST (IN DOLLARS): cost estimates associated with each of the four indicators

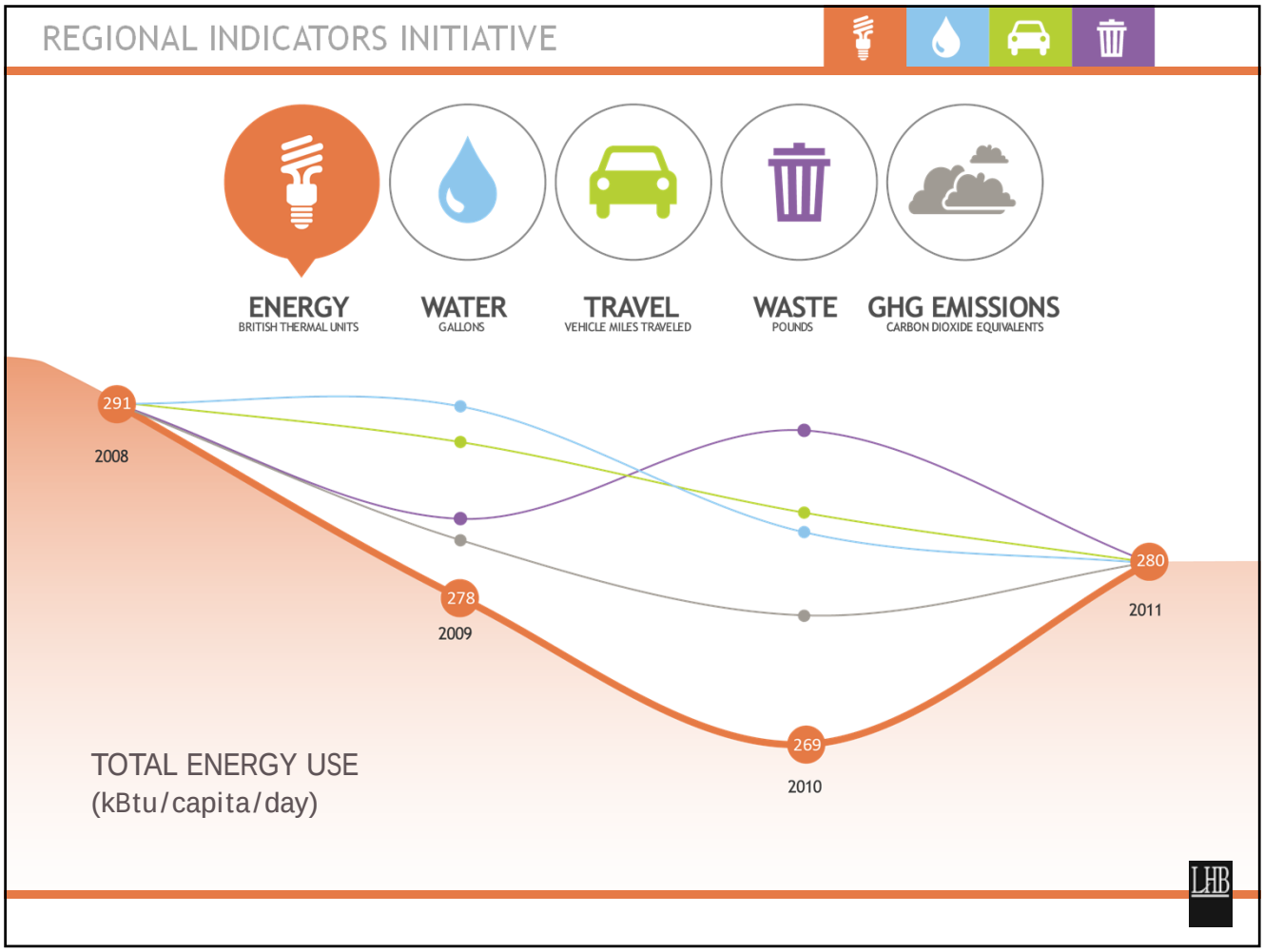
ADDITIONAL DATA

DEMOGRAPHICS
All data is reported both as a total as well as in units/capita. Residential data is reported in units/household, and Commercial/Industrial data is reported in units/job

AREA
City Area (sf)

WEATHER
Heating Degree Days
Cooling Degree Days
Precipitation (in)

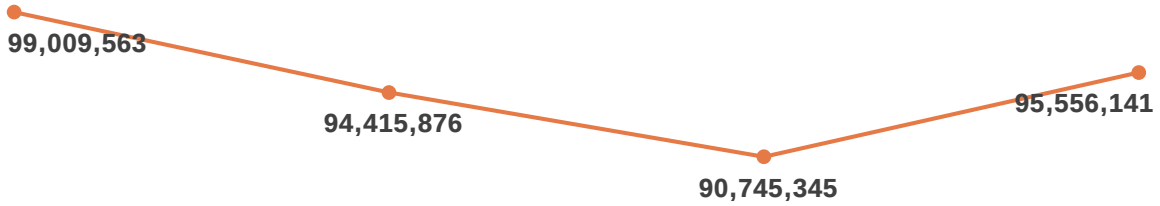

REGIONAL INDICATORS INITIATIVE
ENERGY
BRITISH THERMAL UNITS
WATER
GALLONS
TRAVEL
VEHICLE MILES TRAVELED
WASTE
POUNDS
GHG EMISSIONS
CARBON DIOXIDE EQUIVALENTS
2008
2009
2010
2011
Average trends for 20 Minnesota cities from 2008-2011
LHB

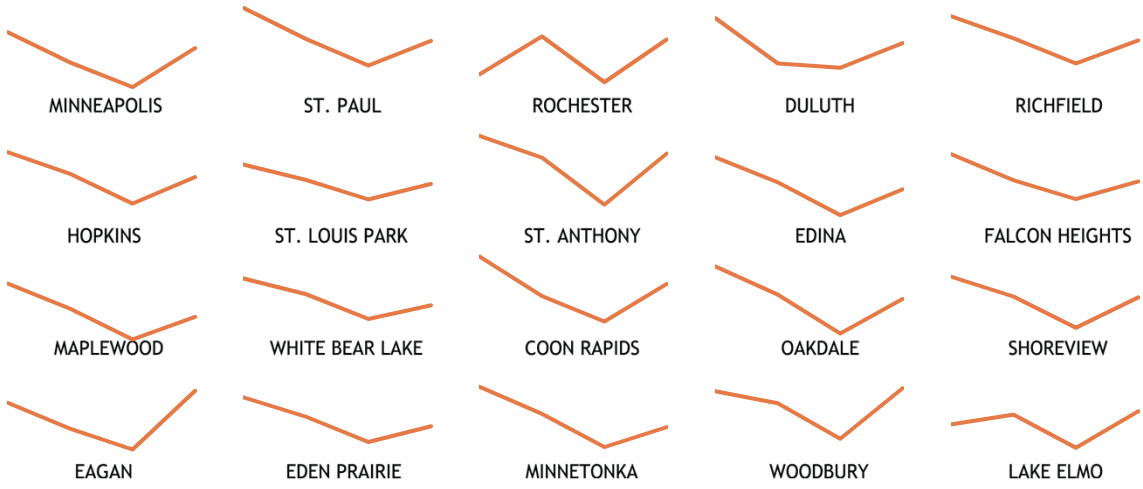

REGIONAL INDICATORS INITIATIVE
ENERGY
BRITISH THERMAL UNITS
WATER
GALLONS
TRAVEL
VEHICLE MILES TRAVELED
WASTE
POUNDS
GHG EMISSIONS
CARBON DIOXIDE EQUIVALENTS
291
2008
278
2009
269
2010
280
2011
TOTAL ENERGY USE
(kBtu/capita/day)
LHB

REGIONAL INDICATORS INITIATIVE

THE 'CHECK MARK' TREND

TOTAL ENERGY USE 2008-2011 (MMBtu/year)

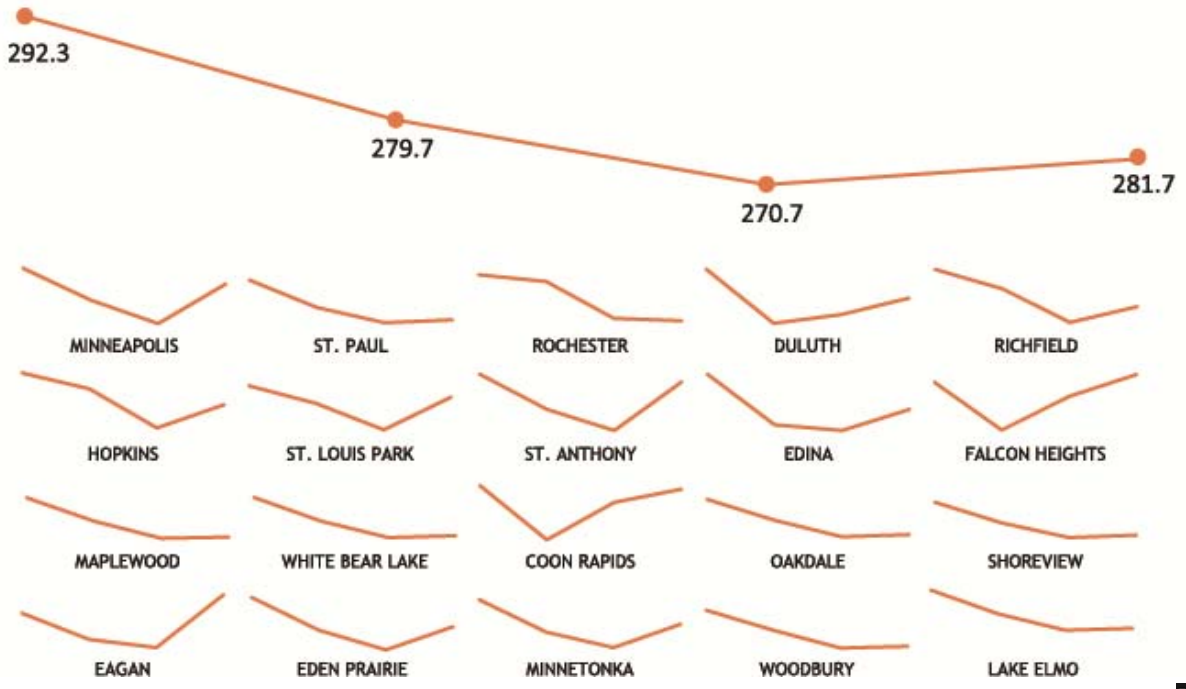




REGIONAL INDICATORS INITIATIVE

THE 'CHECK MARK' TREND

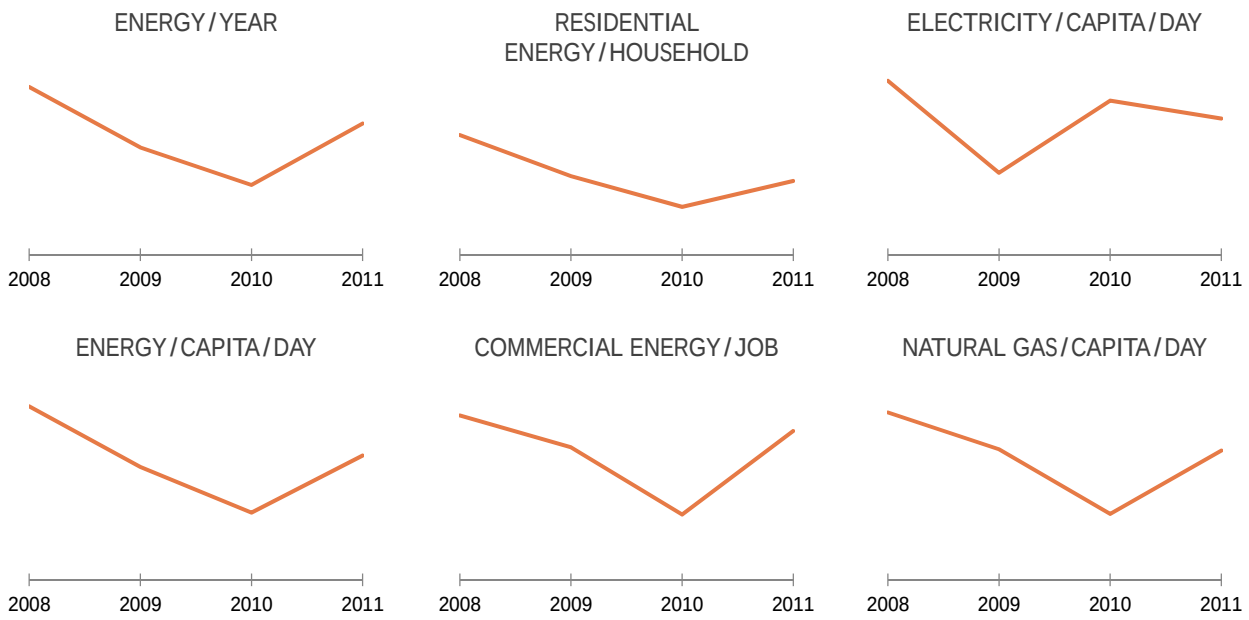
TOTAL ENERGY USE 2008-2011 (kBtu/capita/year)



REGIONAL INDICATORS INITIATIVE

CONSISTENCY ACROSS DATA SETS

THE 'CHECK MARK' TREND



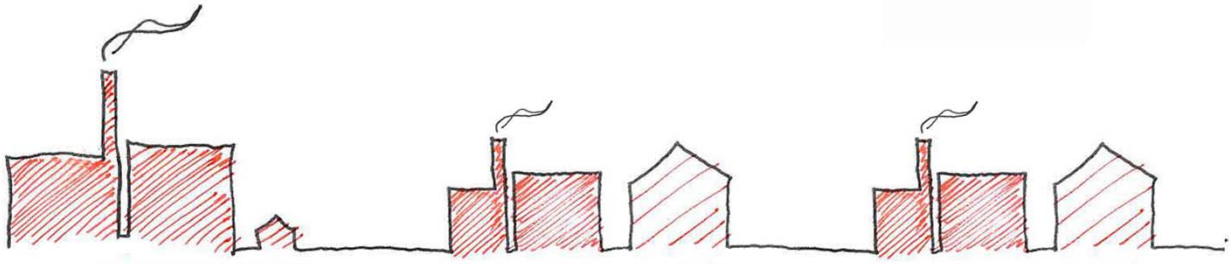
REGIONAL INDICATORS INITIATIVE

COMMERCIAL/INDUSTRIAL ENERGY IS GREATER THAN RESIDENTIAL

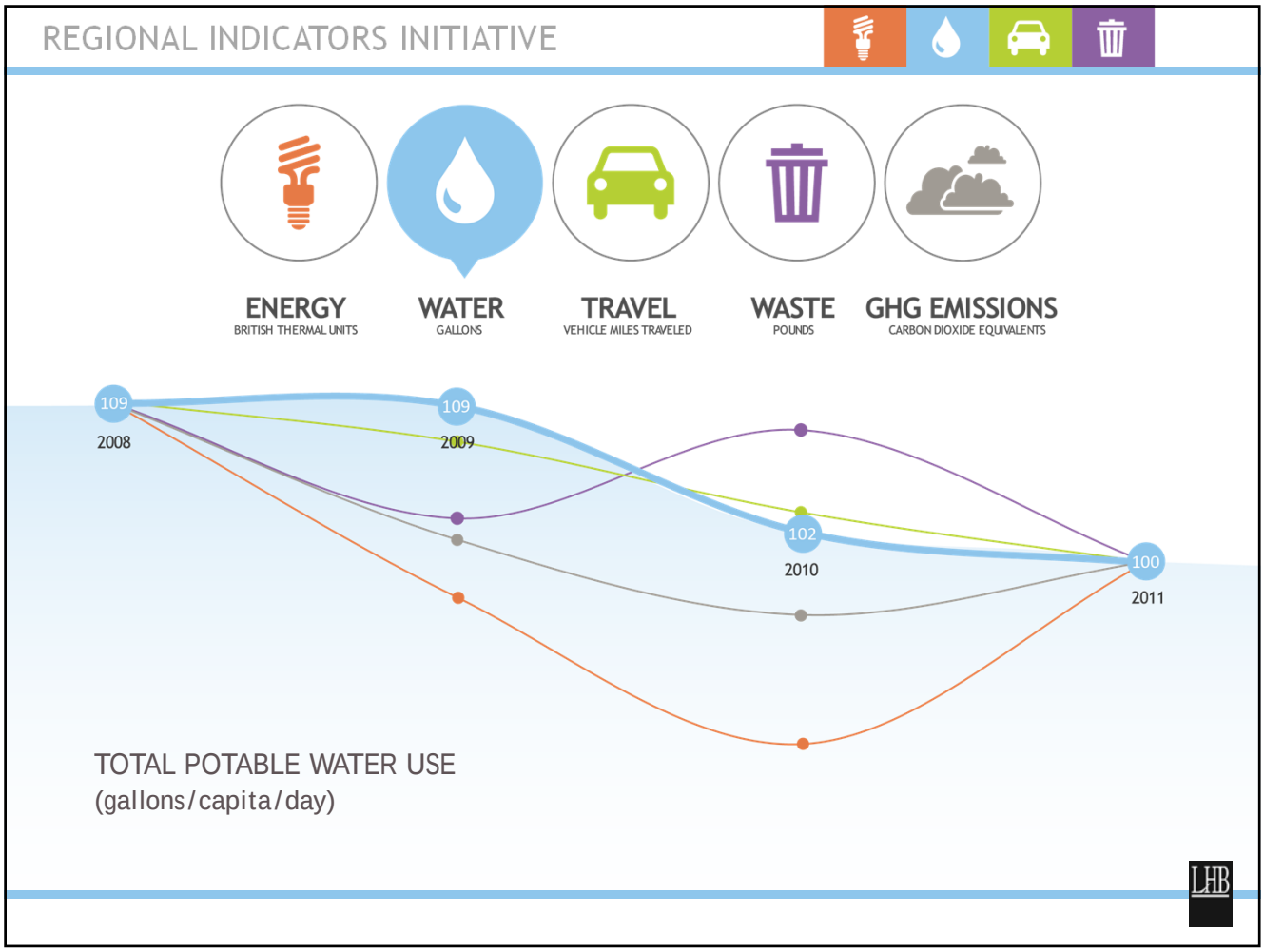
AVERAGE OF 2008-2011 DATA (TOTAL AND BY CITY TYPE)

COMMERCIAL/INDUSTRIAL vs. RESIDENTIAL ENERGY USE

60% 40%



CENTRAL/STAND-ALONE CITIES	INNER-RING SUBURBS	OUTER-RING SUBURBS
64% 36%	57% 43%	50% 50%


REGIONAL INDICATORS INITIATIVE
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BRITISH THERMAL UNITS
WATER
GALLONS
TRAVEL
VEHICLE MILES TRAVELED
WASTE
POUNDS
GHG EMISSIONS
CARBON DIOXIDE EQUIVALENTS
109
2008
109
2009
102
2010
100
2011
TOTAL POTABLE WATER USE
(gallons/capita/day)
LHB

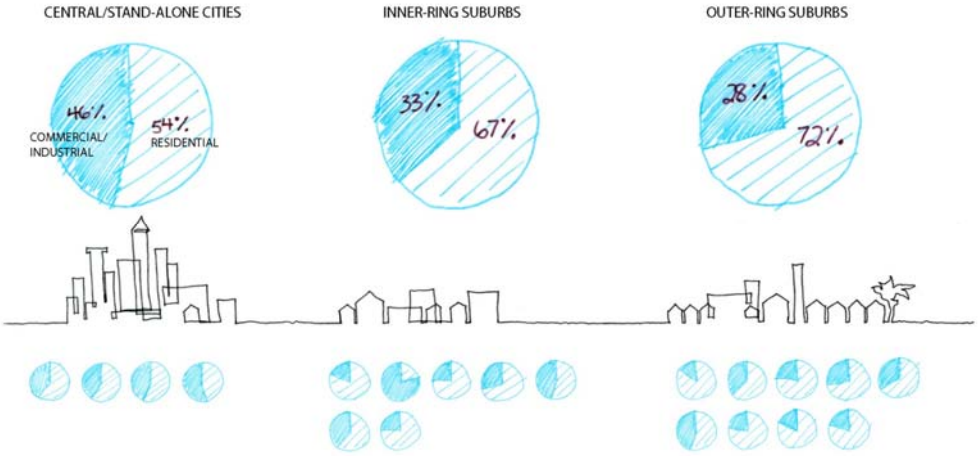
REGIONAL INDICATORS INITIATIVE

RESIDENTIAL WATER USE IS GREATER THAN COMMERCIAL/INDUSTRIAL

WATER CONSUMPTION - 2011

COMMERCIAL/INDUSTRIAL vs. RESIDENTIAL WATER USE

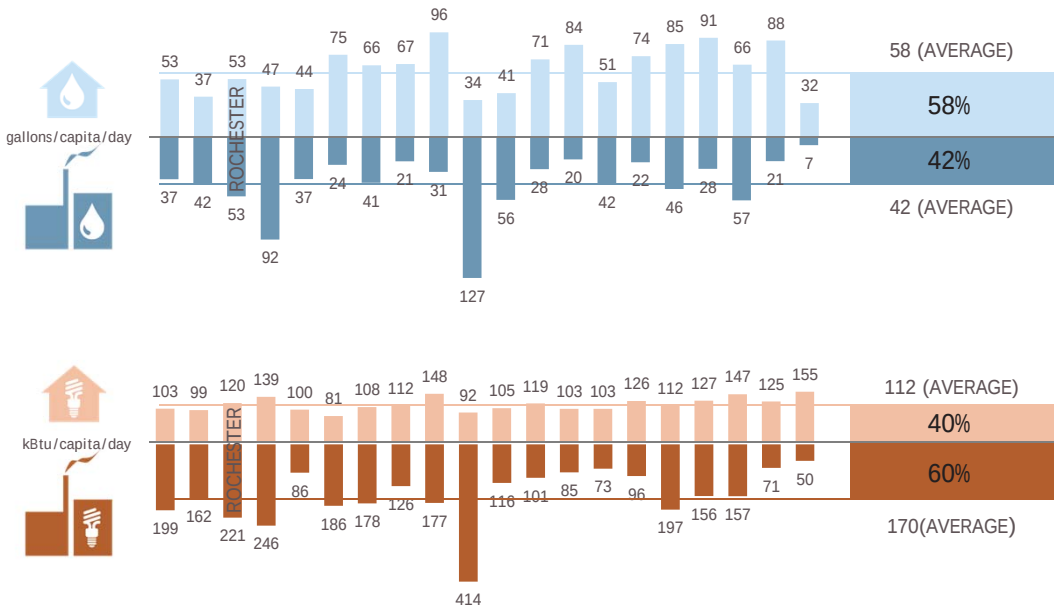
42% 58%

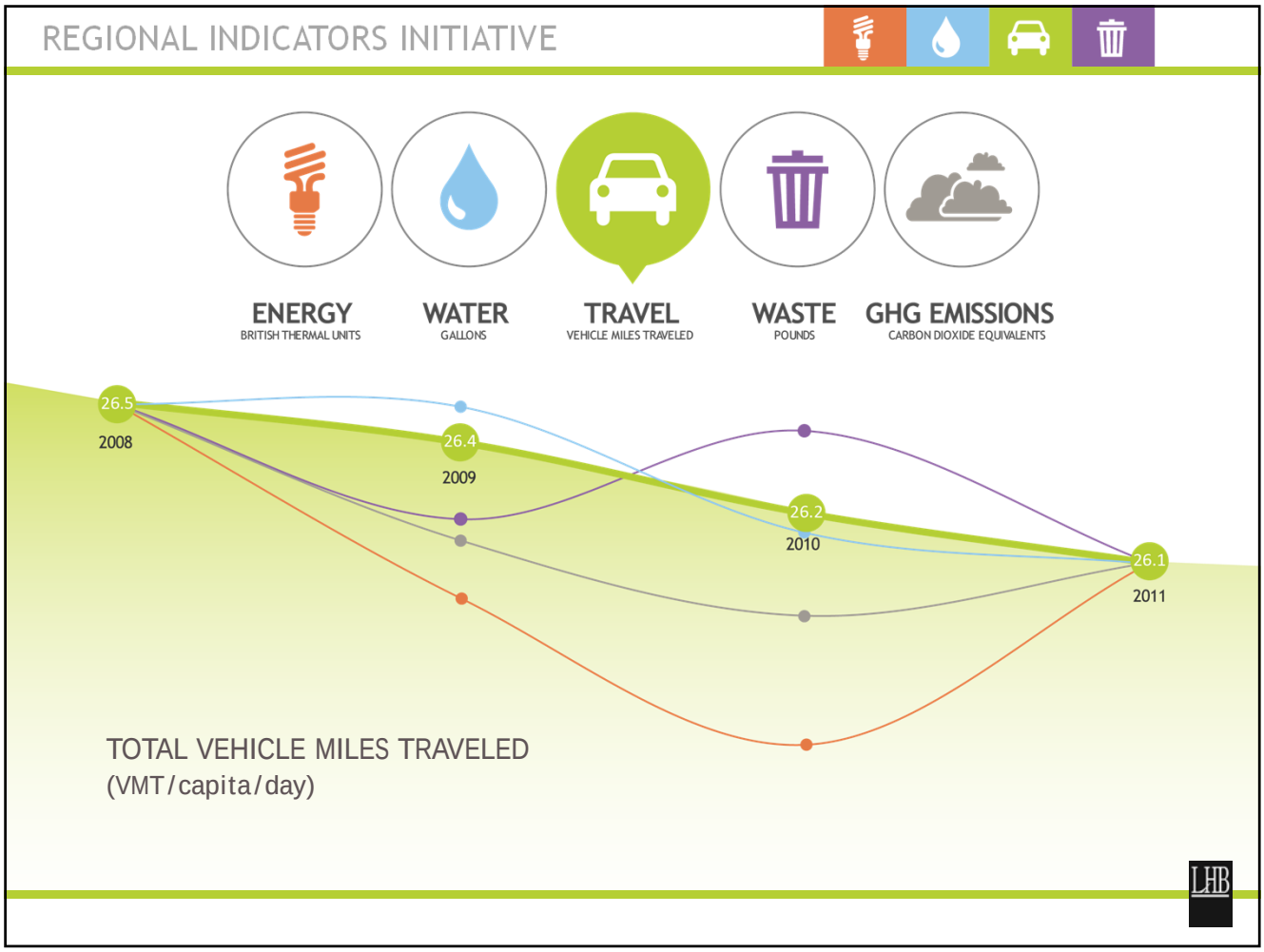


REGIONAL INDICATORS INITIATIVE

RESIDENTIAL WATER USE IS INCONSISTENT BETWEEN CITIES

WATER AND ENERGY CONSUMPTION – 2011 (per capita/day for 20 cities)

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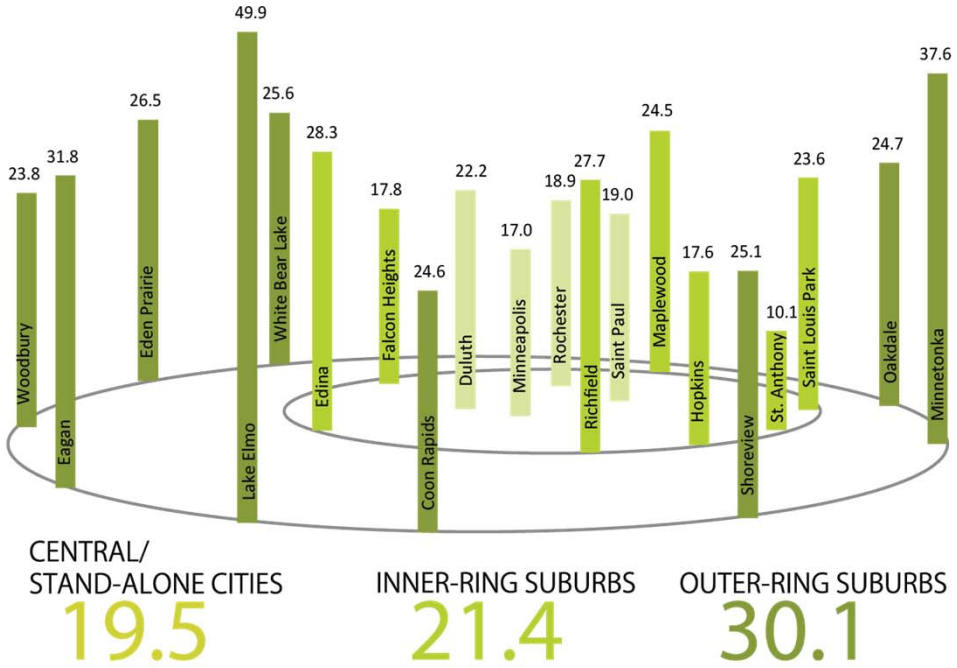
BRITISH THERMAL UNITS
WATER
GALLONS
TRAVEL
VEHICLE MILES TRAVELED
WASTE
POUNDS
GHG EMISSIONS
CARBON DIOXIDE EQUIVALENTS
26.5
2008
26.4
2009
26.2
2010
26.1
2011
TOTAL VEHICLE MILES TRAVELED
(VMT/capita/day)
LHB

REGIONAL INDICATORS INITIATIVE

VEHICLE MILES TRAVELED INCREASES AT GREATER DISTANCES FROM CENTRAL CITIES

VMT/CAPITA/DAY - 2011



CENTRAL/ STAND-ALONE CITIES
19.5

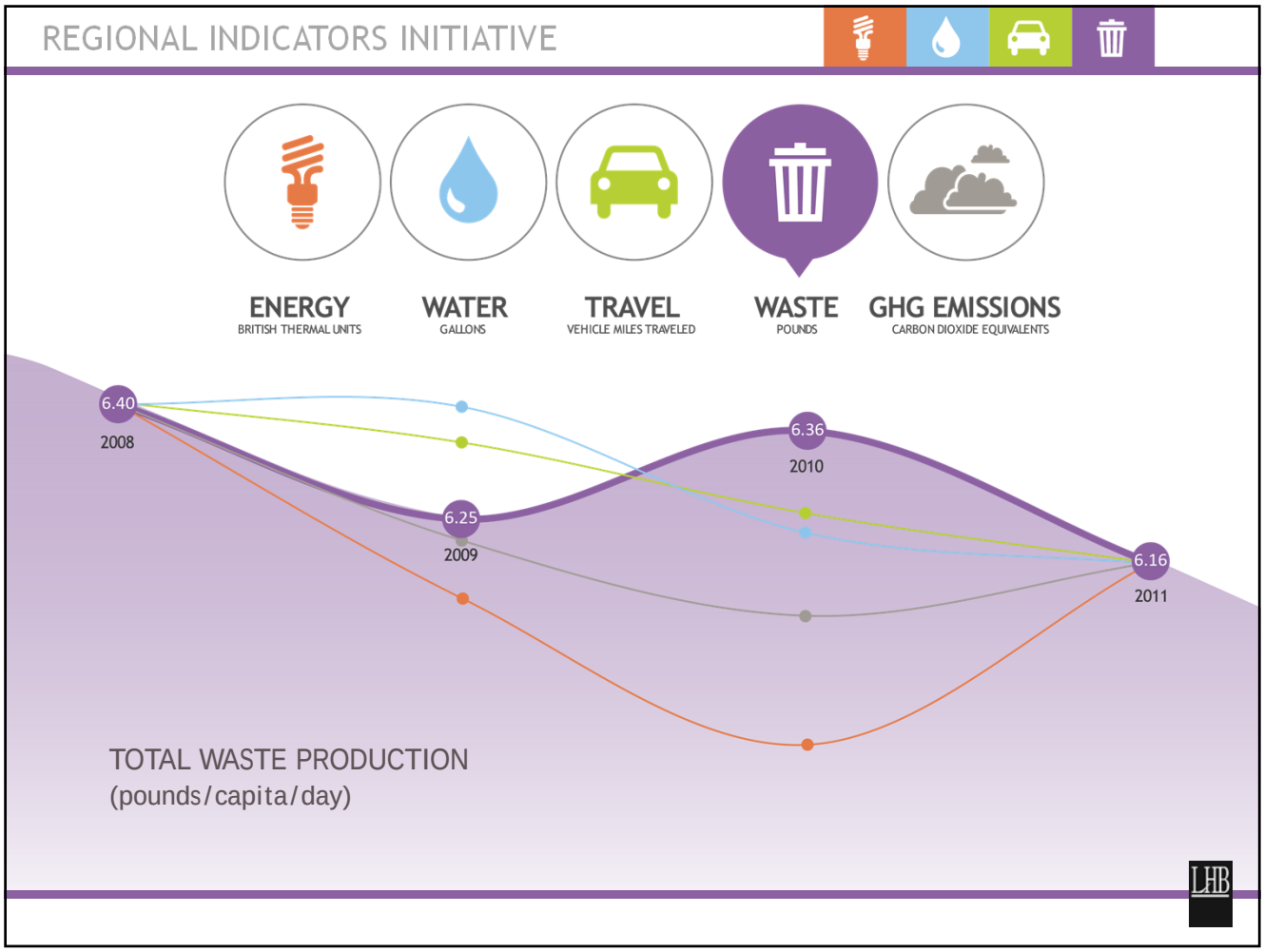
INNER-RING SUBURBS
21.4

OUTER-RING SUBURBS
30.1

REGIONAL INDICATORS INITIATIVE

VEHICLE MILES TRAVELED IS LOWER THAN MN AVERAGE

VMT/CAPITA/DAY - 2011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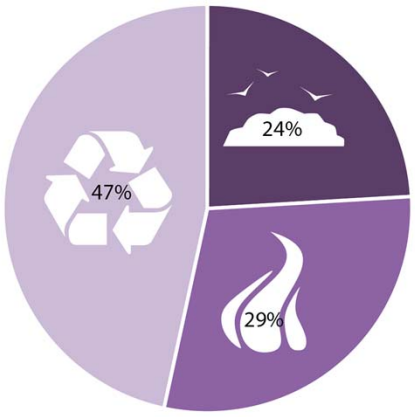
ENERGY
BRITISH THERMAL UNITS
WATER
GALLONS
TRAVEL
VEHICLE MILES TRAVELED
WASTE
POUNDS
GHG EMISSIONS
CARBON DIOXIDE EQUIVALENTS
6.40
2008
6.25
2009
6.36
2010
6.16
2011
TOTAL WASTE PRODUCTION
(pounds/capita/day)
LHB

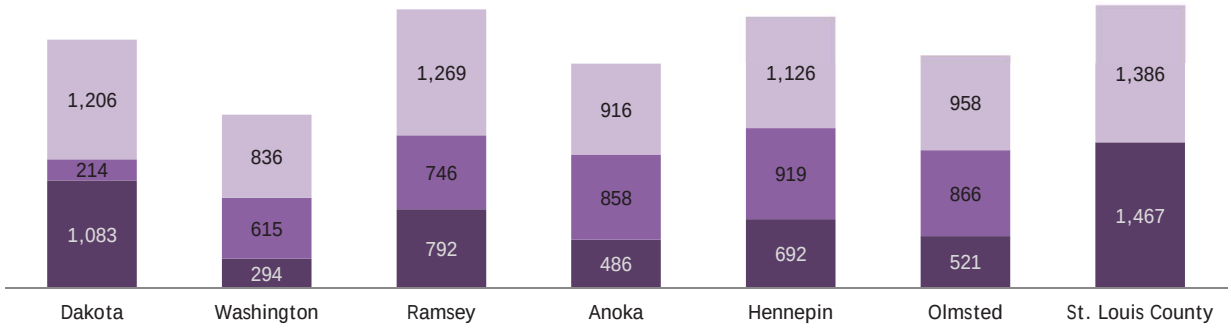
REGIONAL INDICATORS INITIATIVE

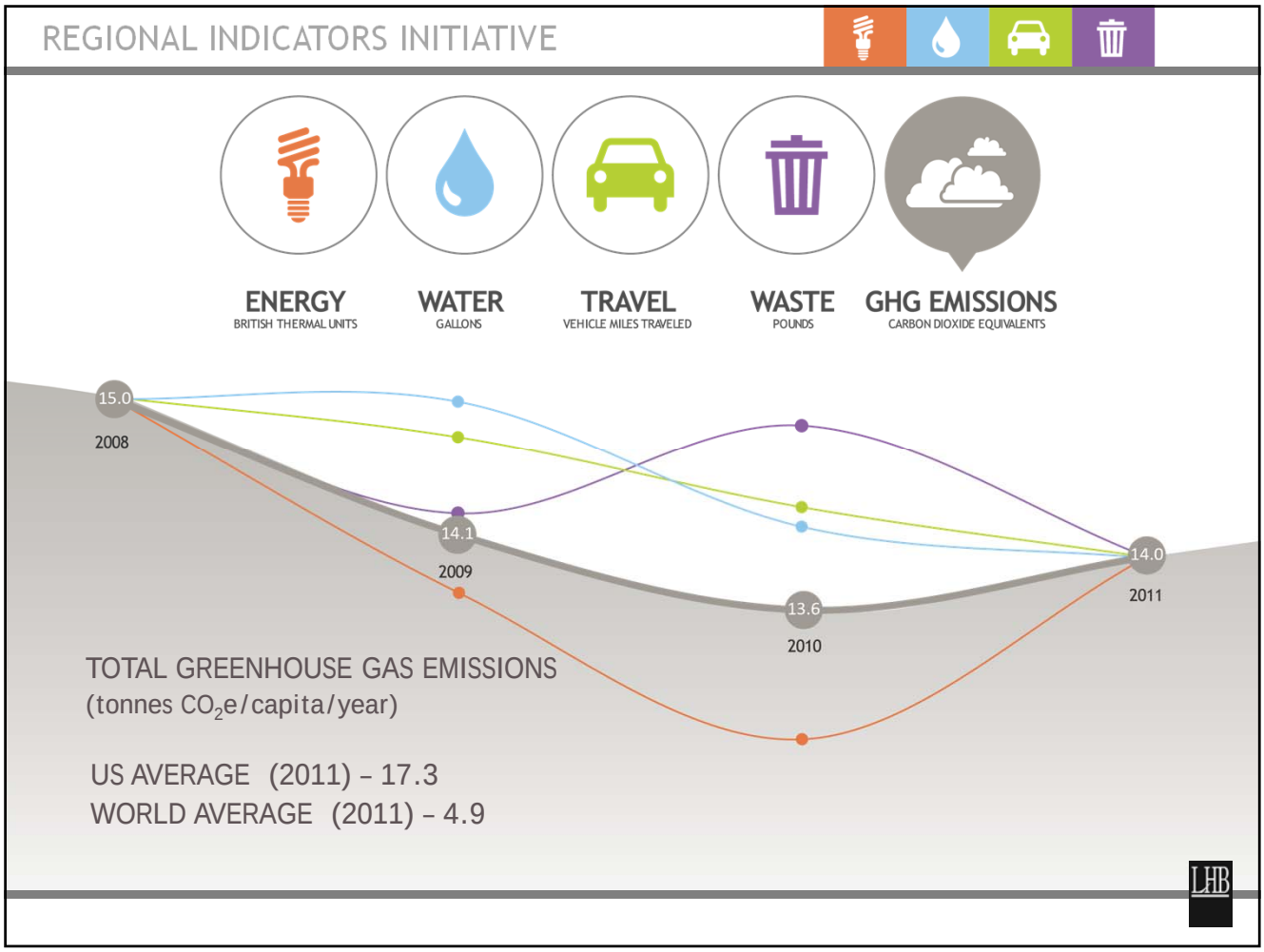
WASTE MANAGEMENT

WASTE MANAGED (POUNDS/CAPITA) - 2011

- Recycled
- Incinerated
- Landfilled





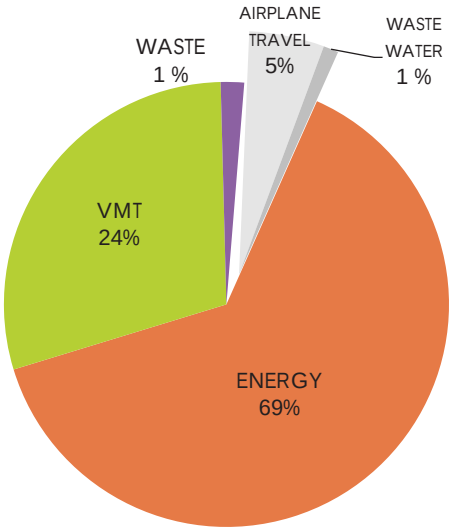

REGIONAL INDICATORS INITIATIVE
ENERGY
BRITISH THERMAL UNITS
WATER
GALLONS
TRAVEL
VEHICLE MILES TRAVELED
WASTE
POUNDS
GHG EMISSIONS
CARBON DIOXIDE EQUIVALENTS
15.0
2008
14.1
2009
13.6
2010
14.0
2011
TOTAL GREENHOUSE GAS EMISSIONS
(tonnes CO_2e/capita/year)
US AVERAGE (2011) – 17.3
WORLD AVERAGE (2011) – 4.9
LHB

REGIONAL INDICATORS INITIATIVE

A COMMON METRIC

BREAKDOWN OF GREENHOUSE GAS EMISSIONS – 2011 (all 20 cities)

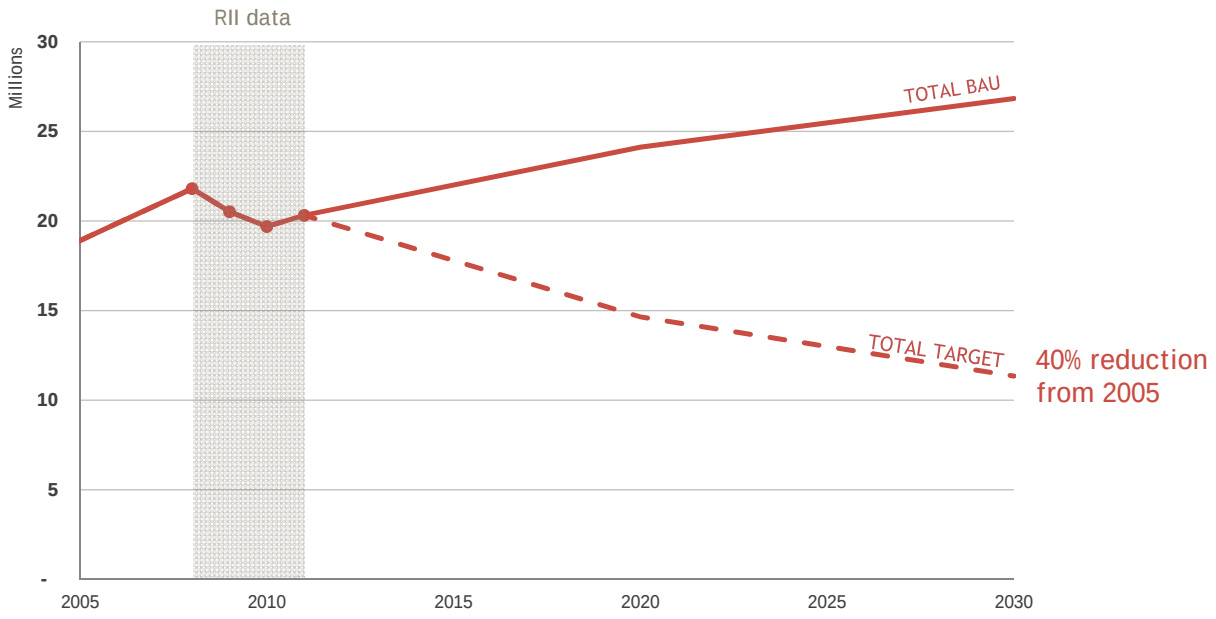
- RII follows the method outlined in the ICLEI Community Protocol
- Many cities have done greenhouse gas inventories, but this is the first state-wide effort of this scale
- For RII cities, energy is the largest contributor to emissions
- RII's primary metrics comprise over 90% of all in-boundary emissions
- Other emission sources were also calculated, including air travel and wastewaster



REGIONAL INDICATORS INITIATIVE

SO WHAT?

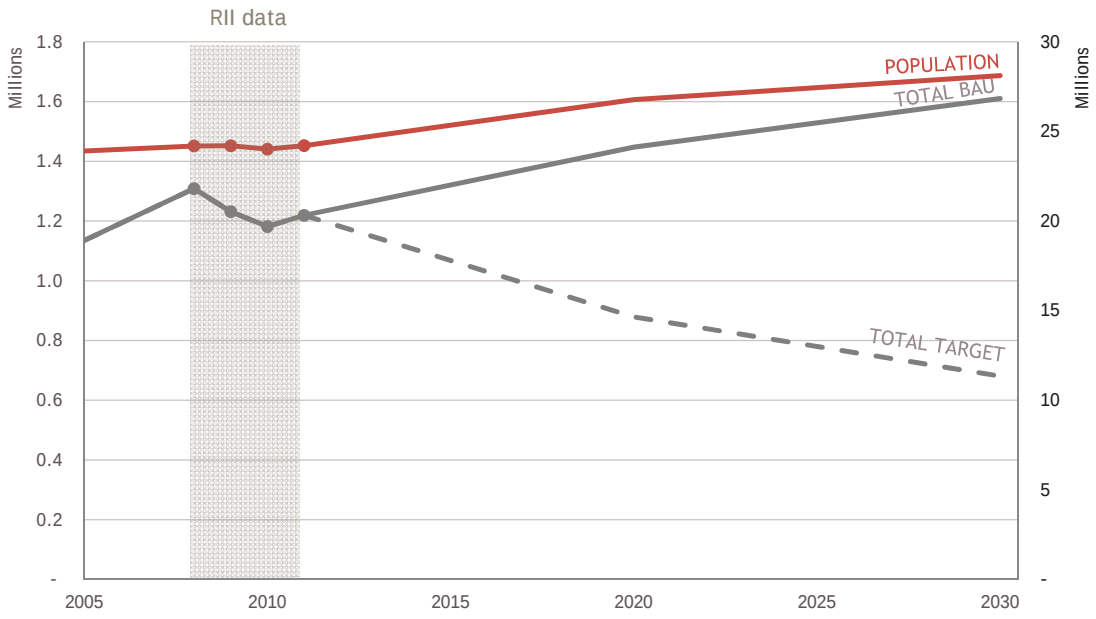
TOTAL GREENHOUSE GAS EMISSIONS FROM PRIMARY SOURCES (tonnes CO_2e/year)



REGIONAL INDICATORS INITIATIVE

SO WHAT?

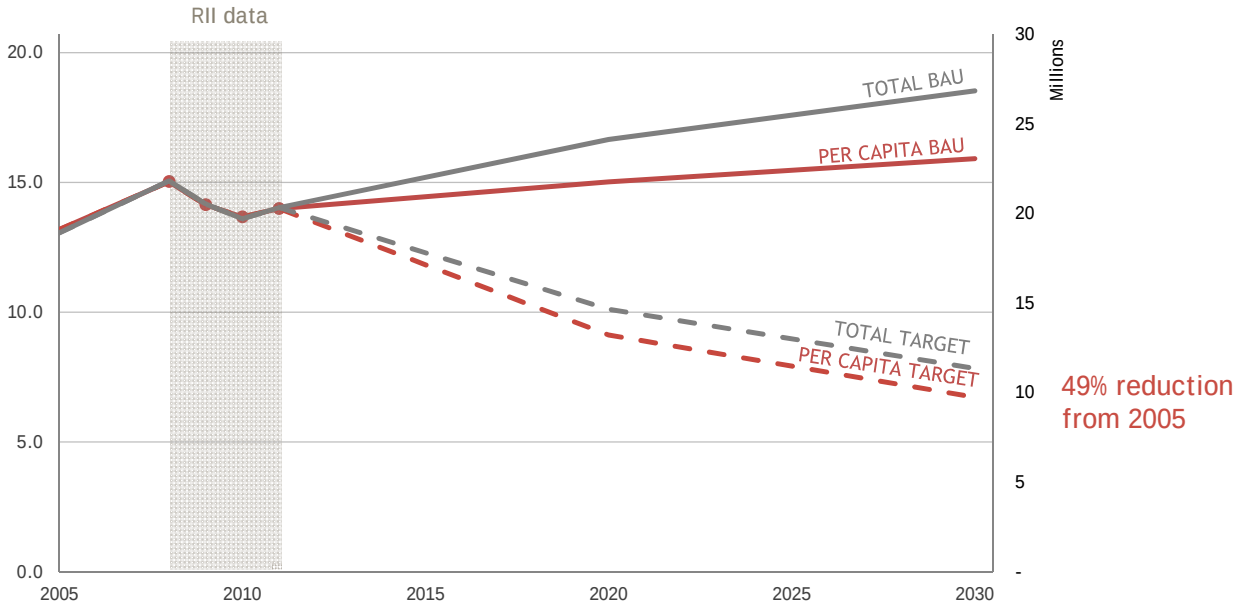
PROJECTED POPULATION GROWTH – ALL RII CITIES



REGIONAL INDICATORS INITIATIVE

SO WHAT?

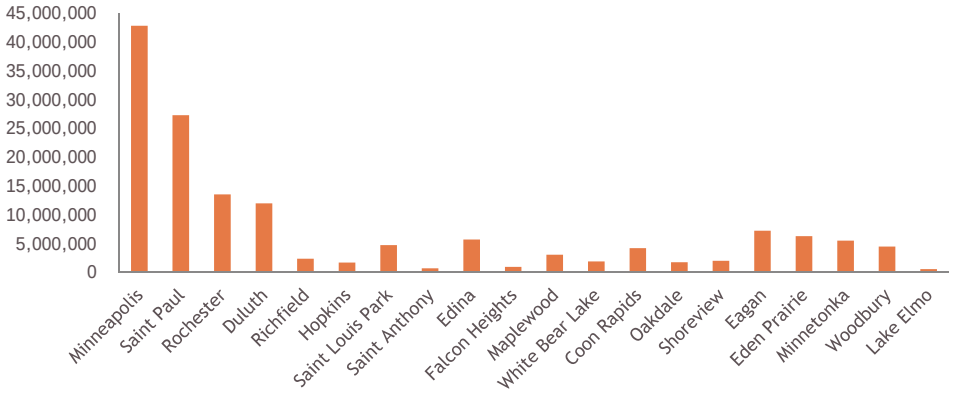
TOTAL GREENHOUSE GAS EMISSIONS FROM PRIMARY SOURCES (tonnes CO_2e/capita/year)



REGIONAL INDICATORS INITIATIVE

EXPLORE THE DATA

TOTAL ENERGY – 2011 (kBtu)



CITIES

- ALL CITIES
- ALL CENTRAL / STAND-ALONE
  - Duluth
  - Minneapolis
  - Rochester
  - St. Paul
- ALL INNER-RING SUBURBS
  - Richfield
  - Hopkins
  - St. Louis Park
  - St. Anthony
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  - Coon Rapids
  - Oakdale
  - Shoreview
  - Eagan
  - Eden Prairie
  - Minnetonka
  - Woodbury
  - Lake Elmo

TIMELINE

- ALL YEARS (2008-2011)
- 2008
- 2009
- 2010
- 2011

ADD AVERAGES

- Central/Stand-Alone Cities
- Inner-Ring Suburbs
- Outer-Ring Suburbs
- MN State average
- US Average

NORMALIZE

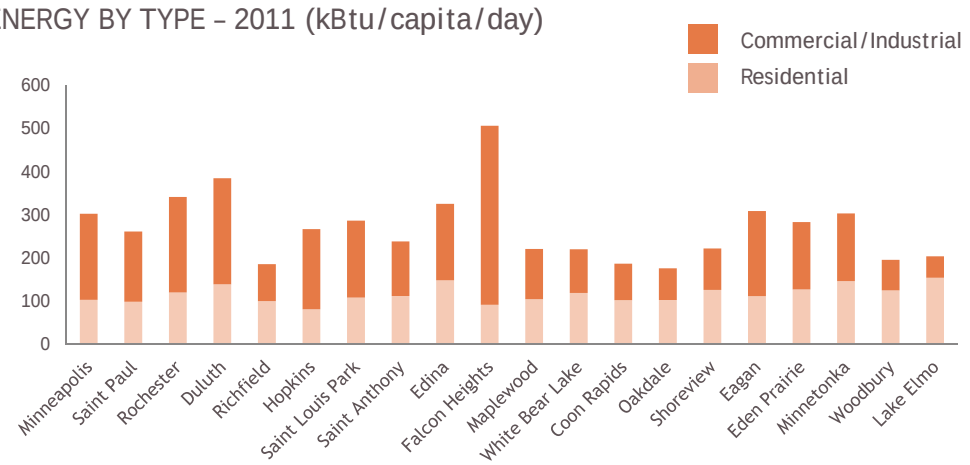
- None
- By Population (per capita)
- By Weather/Rainfall
- By Household
- By Job

LHB

REGIONAL INDICATORS INITIATIVE

EXPLORE THE DATA

TOTAL ENERGY BY TYPE – 2011 (kBtu/capita/day)



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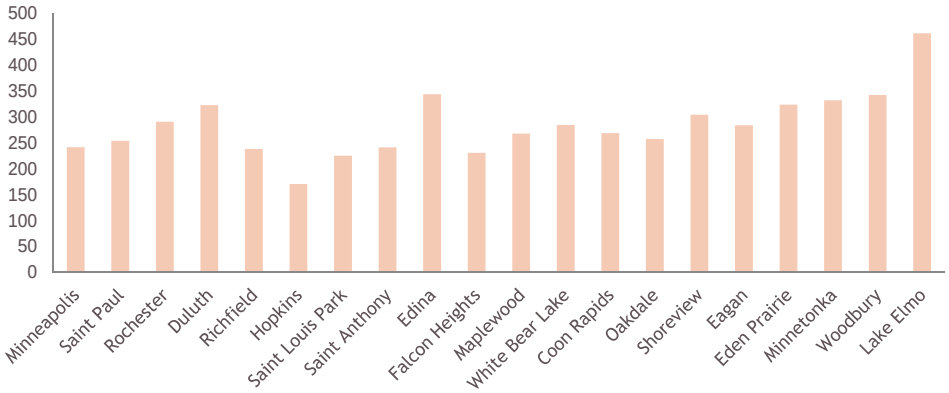
NORMALIZE

- None
- By Population (per capita)
- By Weather/Rainfall
- By Household
- By Job

REGIONAL INDICATORS INITIATIVE

EXPLORE THE DATA

RESIDENTIAL ENERGY – 2011 (kBtu/household/day)



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NORMALIZE

- None
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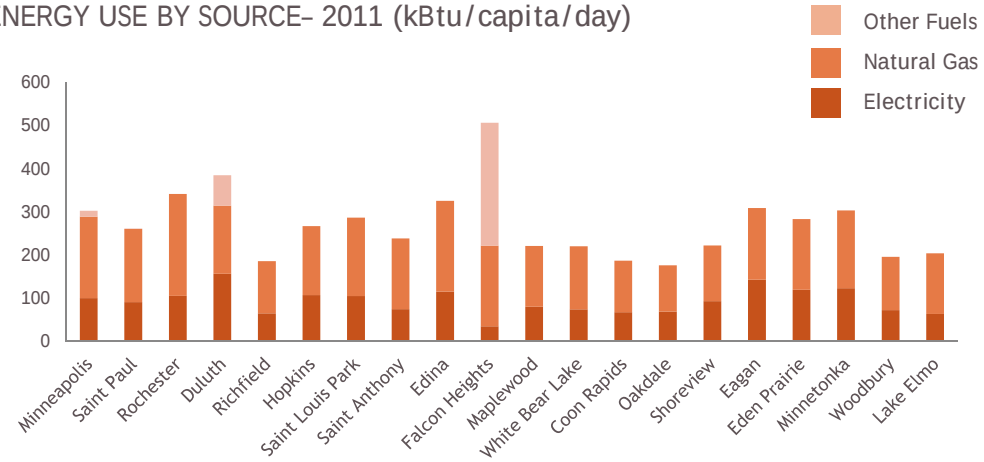
REGIONAL INDICATORS INITIATIVE

EXPLORE THE DATA

TOTAL ENERGY USE BY SOURCE– 2011 (kBtu/capita/day)



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NORMALIZE

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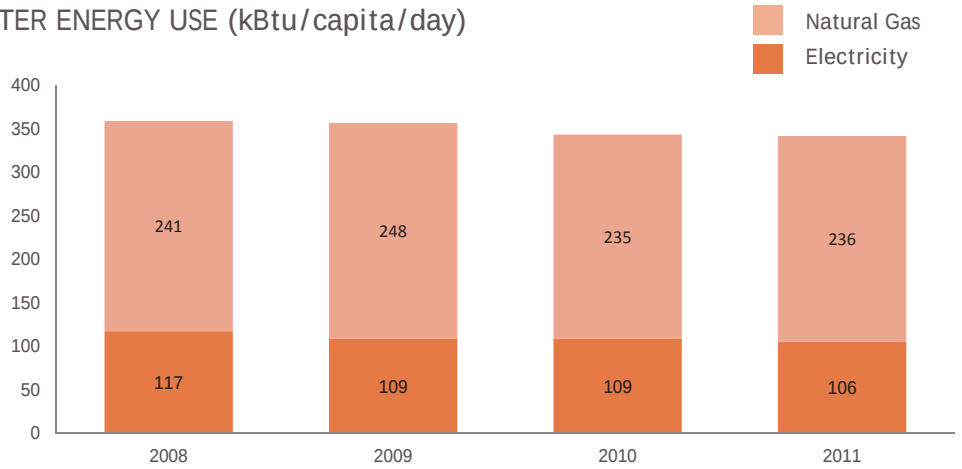
LHB

REGIONAL INDICATORS INITIATIVE

EXPLORE THE DATA

ROCHESTER ENERGY USE (kBtu/capita/day)



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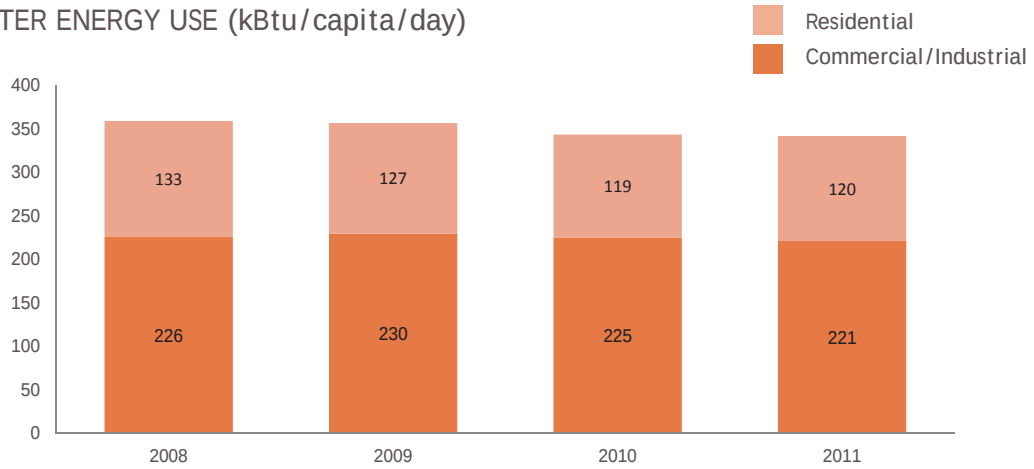

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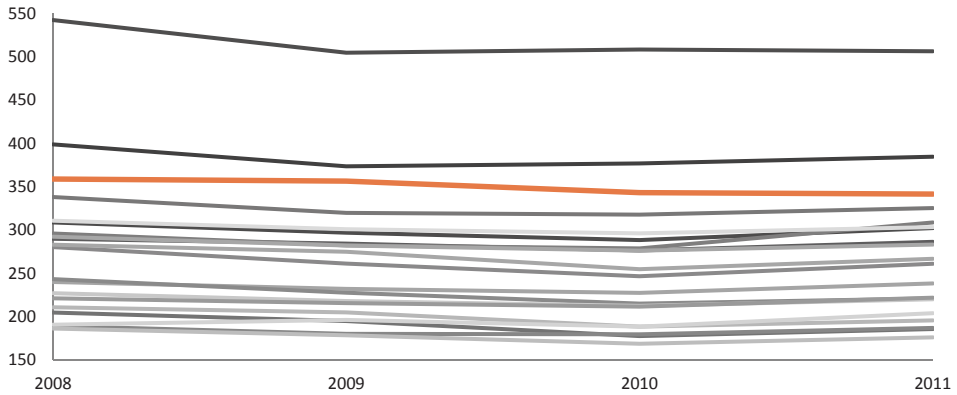
REGIONAL INDICATORS INITIATIVE

EXPLORE THE DATA

TOTAL ENERGY – 2008-2011 (kBtu/capita/day)



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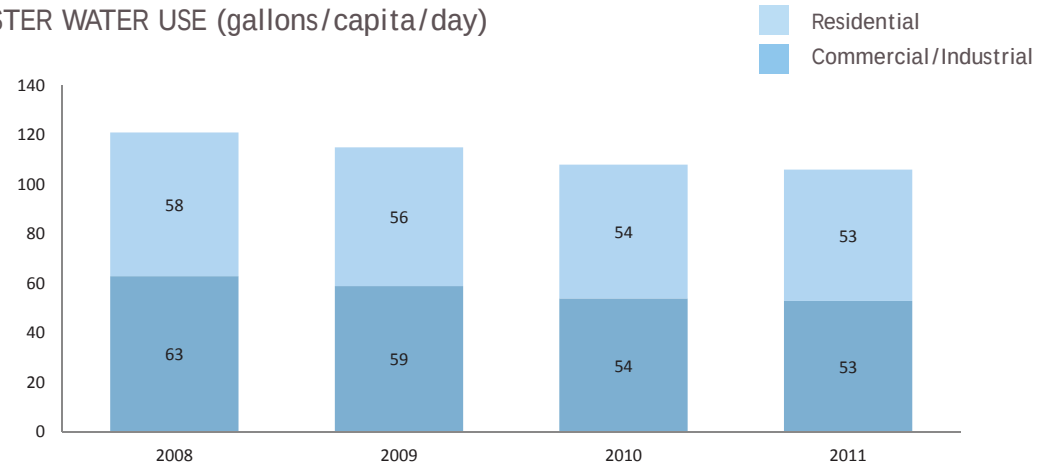
REGIONAL INDICATORS INITIATIVE

EXPLORE THE DATA

ROCHESTER WATER USE (gallons/capita/day)



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- US Average

NORMALIZE

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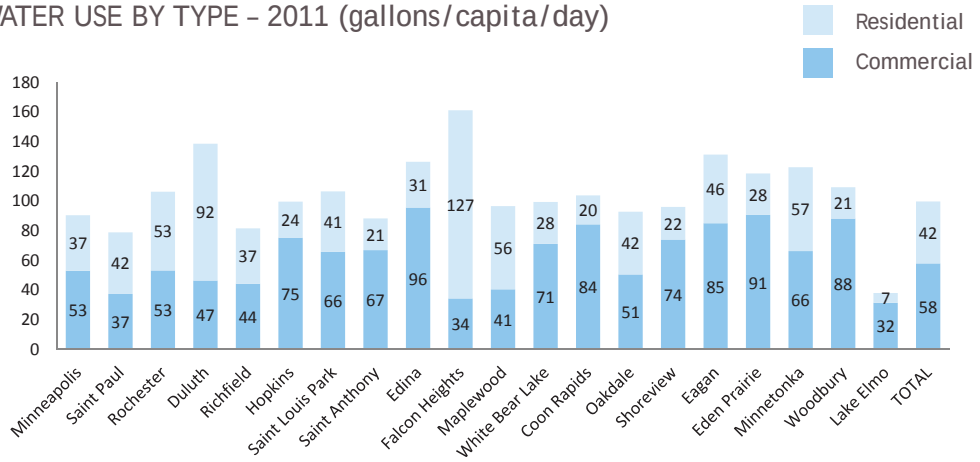
- By Job

REGIONAL INDICATORS INITIATIVE

EXPLORE THE DATA

TOTAL WATER USE BY TYPE – 2011 (gallons/capita/day)

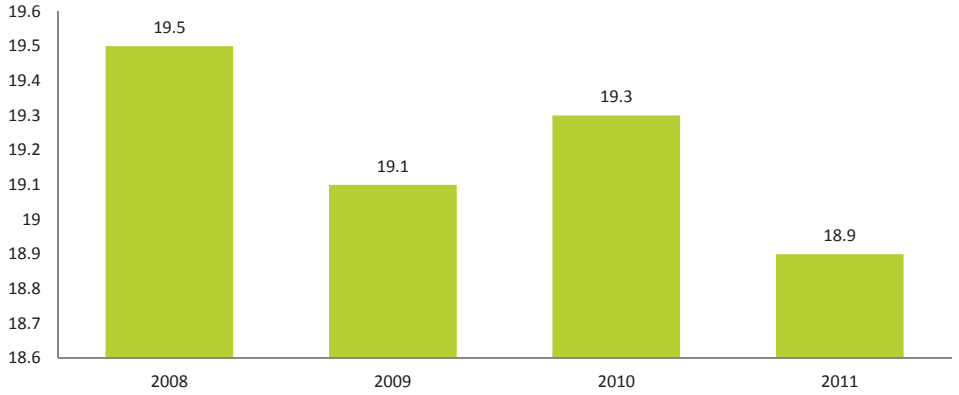


LHB

REGIONAL INDICATORS INITIATIVE

EXPLORE THE DATA

ROCHESTER VMT (miles/capita/day)



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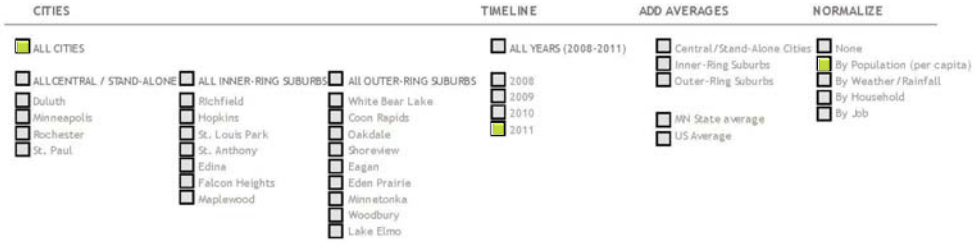
REGIONAL INDICATORS INITIATIVE

EXPLORE THE DATA

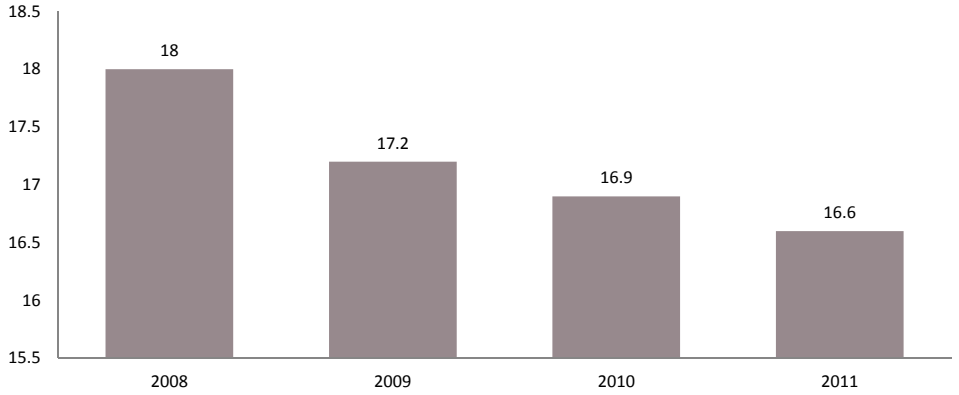
TOTAL VMT – 2011 (miles/capita/day)



REGIONAL INDICATORS INITIATIVE

EXPLORE THE DATA

ROCHESTER GREENHOUSE GAS EMISSIONS (tonnes/capita/day)



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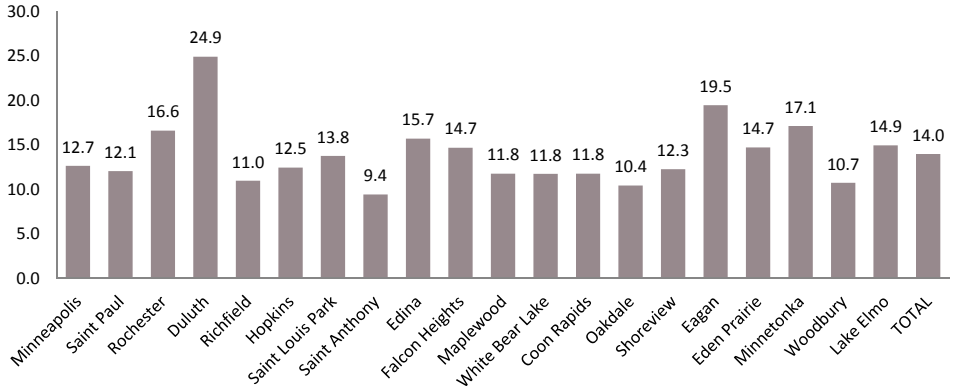
REGIONAL INDICATORS INITIATIVE

EXPLORE THE DATA

TOTAL GREENHOUSE GAS EMISSIONS – 2011 (tonnes/capita/year)



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REGIONAL INDICATORS INITIATIVE

CORRELATIONS WITH GREENSTEP CITIES

ENERGY

1 | Efficient Existing Public Buildings
2 | Efficient Existing Private Buildings
3 | New Green Buildings
4 | Efficient Building and Street Lighting and Signals
5 | Building Reuse
15 | Purchasing
17 | Efficient Water and Wastewater Facilities
25 | Green Business Development
26 | Renewable Energy (will affect GHG emissions)
28 | Business Synergies

TRAVEL

7 | Efficient City Growth
8 | Mixed Uses
9 | Efficient Highway-Oriented Development
11 | Complete Green Streets
12 | Mobility Options
13 | Efficient City Fleets
14 | Demand-Side Travel Planning
15 | Purchasing
27 | Local Food
28 | Business Synergies

WATER

15 | Purchasing
17 | Efficient Stormwater Management
20 | Efficient Water and Wastewater Facilities
21 | Septic Systems

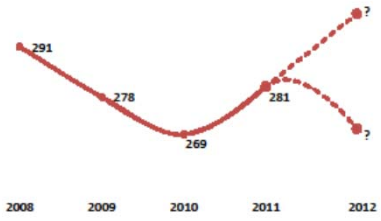
WASTE

5 | Building Reuse
15 | Purchasing
22 | Solid Waste Reduction
25 | Green Business Development

REGIONAL INDICATORS INITIATIVE

NEXT STEPS

- Obtain data for 2012 for all twenty cities
- Measure data in five additional cities including those outside of the metro area
- Establish targets for each metric and include in city comprehensive plans
- Use regional indicators to:
  - Inform BMP choices
  - Establish policy
  - Obtain funding
  - Verify outcomes



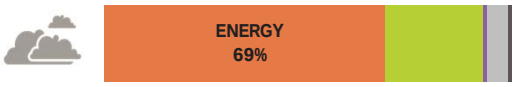
REGIONAL INDICATORS INITIATIVE

CONCLUSIONS

- We can measure community-wide data and normalize by jobs, population, households and weather

- Greenhouse Gas Emissions form a 'check-mark' trend

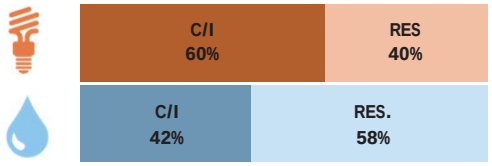
- Energy is the largest part of the CO2 pie



- Commercial/Industrial energy consumption is greater than Residential;

  however…

- Residential water use is greater than Commercial/Industrial



- Energy consumption consistently forms a 'check mark' over the four years

REGIONAL INDICATORS INITIATIVE

CITIES

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UTILITY COMPANIES

Xcel Energy
CenterPoint Energy
Minnesota Power
ComfortSystems — Serving The City of Duluth
Minnesota Energy Resources
rpu — we pledge, we deliver
Peoples Cooperative Power Association

OTHER PARTNERS

Minnesota Department of Commerce
Urban Land Institute Minnesota
Minnesota Pollution Control Agency
Orange Environmental