

# Rosemount Greenhouse Gas Reduction Plan

*Nicole Anderson, Alex Hotz, Kacey Strandemo, Skyler  
Johnson, Kristin Erhardt*

# Resilient Communities Project Introduction

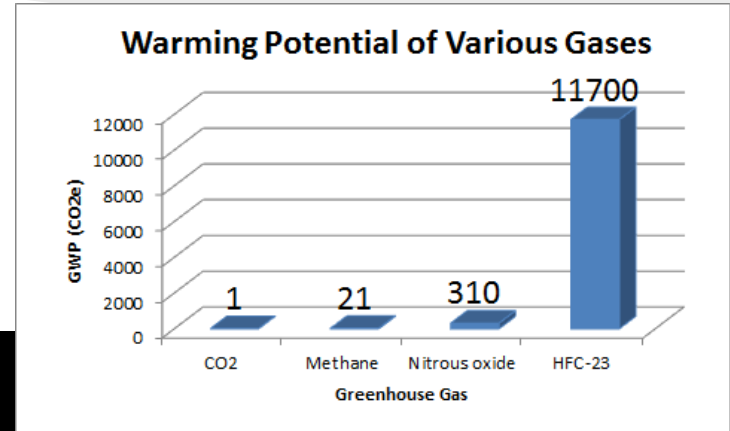
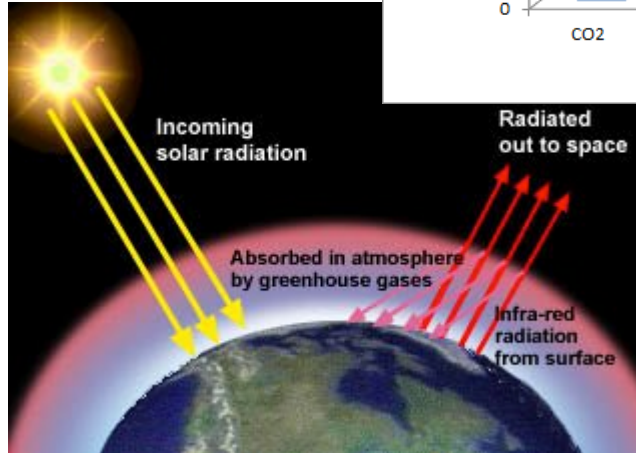
“The goal of the project is help the city make progress toward creating a climate action plan to reduce greenhouse gas emissions by analyzing local data, identifying best practices, and developing recommendations on how to proceed.”

-RCP Scope of Work

Agreement

# Defining Greenhouse Gases

- Absorb infrared solar radiation and capture in the atmosphere
- Carbon Dioxide, Methane, Nitrous Oxide, Ozone, CFCs
- Different warming potentials paired to CO<sub>2</sub>e



# GHG Global Implications

- The concentration of greenhouse gases in the earth's atmosphere is directly linked to the average global temperature on Earth
- The concentration has been rising steadily, and mean global temperatures along with it, since the time of the Industrial Revolution
- The most abundant greenhouse gas, carbon dioxide, is the product of burning fossil fuels.
  - United Nations Framework Convention on Climate Change



“equitable burden-sharing will be necessary if the climate challenge is to be effectively met.”

- International Panel on Climate Change 5th Assessment Report

# GHG Local Implications

- The average temperature of Minnesota increased 1.9°F
- The average rainfall in Minnesota increased 3.1"

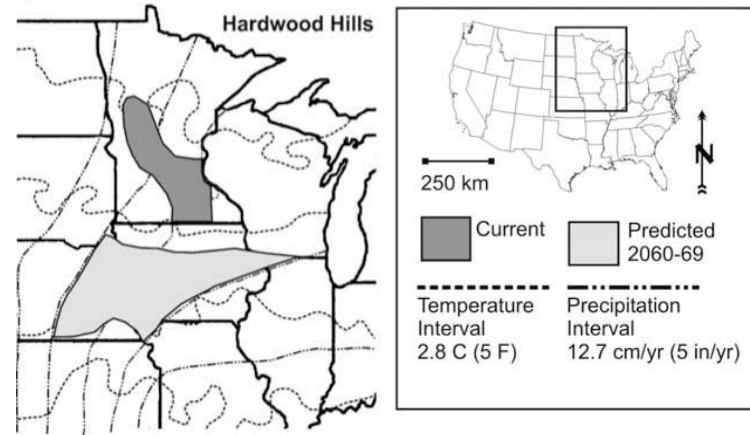
The report projects that:

- By 2100, the average temperature of Minnesota will increase 5-9°F further
- By 2100, the average rainfall in Minnesota will increase 6.8-11.5% further
- By 2169, Dakota County will have a similar climate to Western Iowa
- These changes would put a strain on many of the area's native prairie species.

(Minnesota DNR)

- More frequent extreme precipitation events and due to this increases risks from flooding
- Some benefit to agriculture from warmer climate offset by variability
- Less efficient water infrastructure

(U.S. National Climate Assessment)



# Current Efforts

## B3 Benchmarking

- This is a building energy management system for public buildings in Minnesota including state, local government, and public school buildings, it provides tools to help manage a building portfolio and increase efficiency.

## GreenStep Cities

- This program encourages Minnesota communities to follow 28 “best practices” to improve sustainability as well as overall quality of life. A 3 step ranking system is used to assess each city’s progress throughout the program.
- Rosemount: Step 2



## STAR Communities (Sustainable Tools for Assessing and Rating Communities)

- Provide common framework and certification system for a local community’s sustainable efforts
- Rosemount joined in Jan, 2014.



## US Conference of Mayors Climate Protection Program

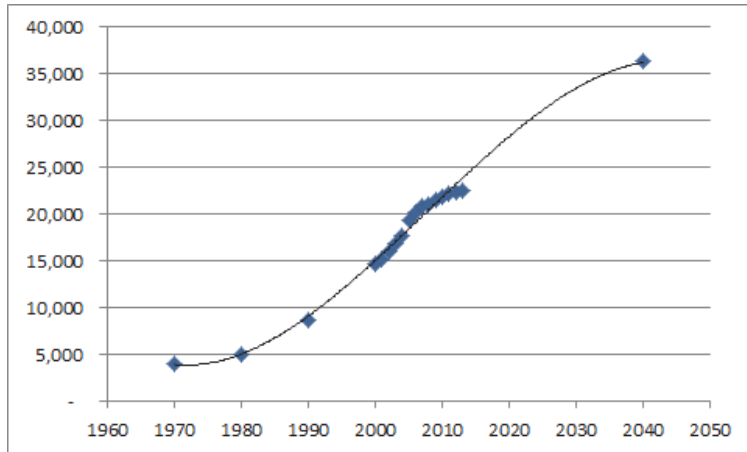
- The Mayor’s Climate Protection agreement binds communities to a 7% reduction from 1990 levels by 2012
- This equates to around a 59% reduction of 2005 levels

## RCP (Resilient Communities Project)

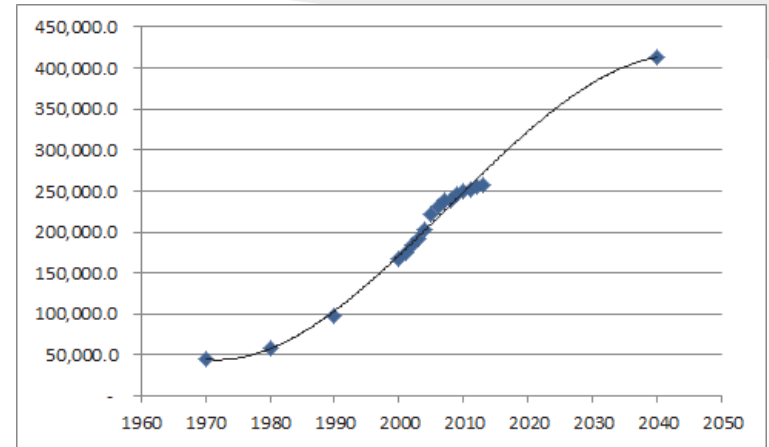
- Partners U courses with local communities on projects to promote sustainability
- Rosemount selected 2014-15



# Population and Emissions Projections

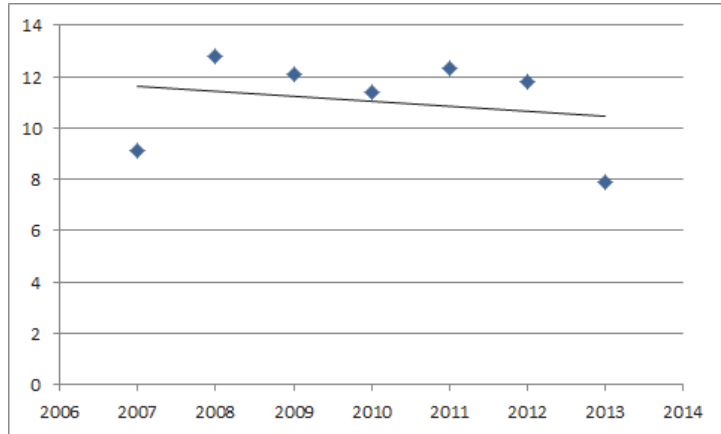


Projected population of  
Rosemount through 2040

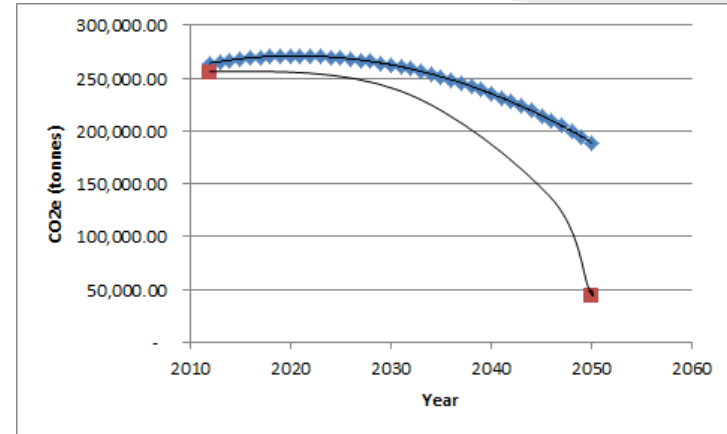


Projected CO2 Emissions/ year @  
11.4 CO2e tonnes/person

# Emissions Projections



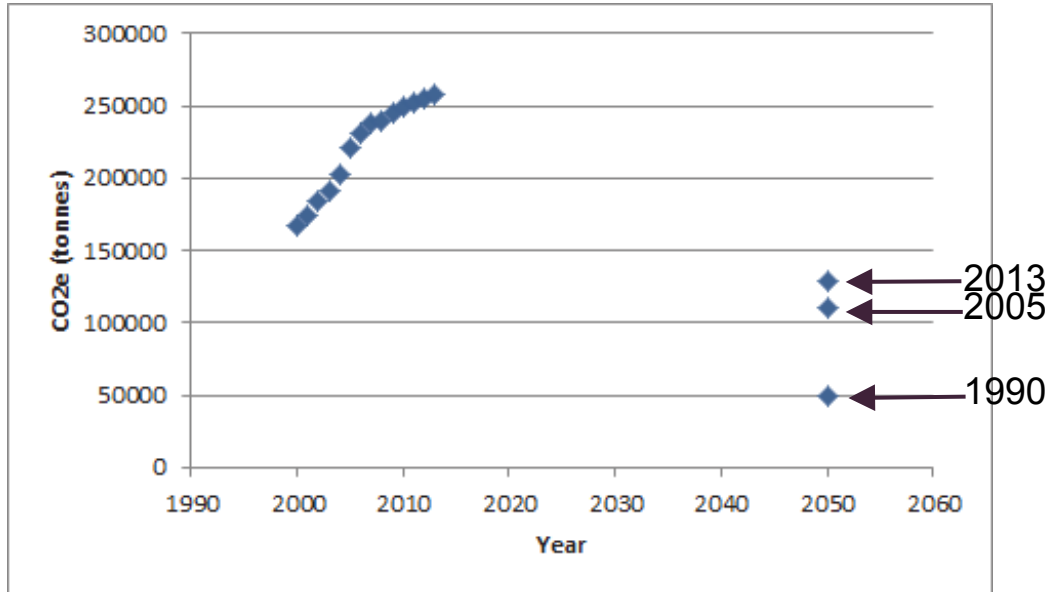
Rosemount's yearly CO2e tonnes/person since 2007. The yearly rate has been decreasing by approximately 0.19 CO2e tonnes/person per year.



A projection of Rosemount's current track of emissions assuming linear population growth and extending the trend of a decrease of 0.19 CO2e tonnes/person per year to 2050, A 13% emissions decrease from 2005 levels



# Impact of Baseline Years



The top projected point shows a 50% reduction from a baseline year of 2013 (The most recently collected data)

The center point shows a 50% reduction from 2005 levels (The baseline chosen in Minnesota Statute 216H.02)

The bottom point shows a 50% reduction from 1990 levels (The baseline chosen in the Mayor's Climate Protection Program)

Choosing 2013 as a baseline year would decrease the amount of reductions by 16% from 2005, while choosing 1990 would increase the amount of reductions by 56%

# B3 Benchmarking

Name	Benchmark	Average Days Overdue	Actual (kBTU/SF/yr)	Benchmark (kBTU/SF/yr)	Index Ratio	Actual (kBTU/yr)	GHG Emissions (tonnes)
Fire Station I	3.07	1	87.55	107.59	.81	1,505,860	220.67
Fire Station II	2.17	0	119.64	103.79	1.15	1,603,176	234.93
Rosemount Community Center	1.93	0	155.59	120.13	1.30	23,338,500	3,420.06
City Hall/ Police	1.75	4	184.79	129.52	1.43	4,593,801	673.18
Rosemount Steeple Center	1.53	0	117.59	71.85	1.64	1,175,900	172.32

Total GHG Emissions produced by City Buildings: 4,721.17

Percent of Total GHG Emissions in Rosemount: 1.9%

Percent of Total Emissions from Energy: 2.7%

# B3 Benchmarking

Name	Pot. Savings (MMBTU/yr)	Pot. Savings (\$/yr)
Fire Station I	0	\$0
Fire Station II	421	\$5,000
Rosemount Community Center	8,022	\$104,000
City Hall/Police Department	1,860	\$24,000
Rosemount Steeple Center	565	\$7,000

Total possible savings of \$140,000 per year

Total possible savings of .0016 tonnes of GHG Emissions per year

# Community-Wide Energy

Overall community-wide reduction in Greenhouse Gas Emissions

## Population

2007: 20,917

2013: 22,605

Increase of 8%

## Population Density

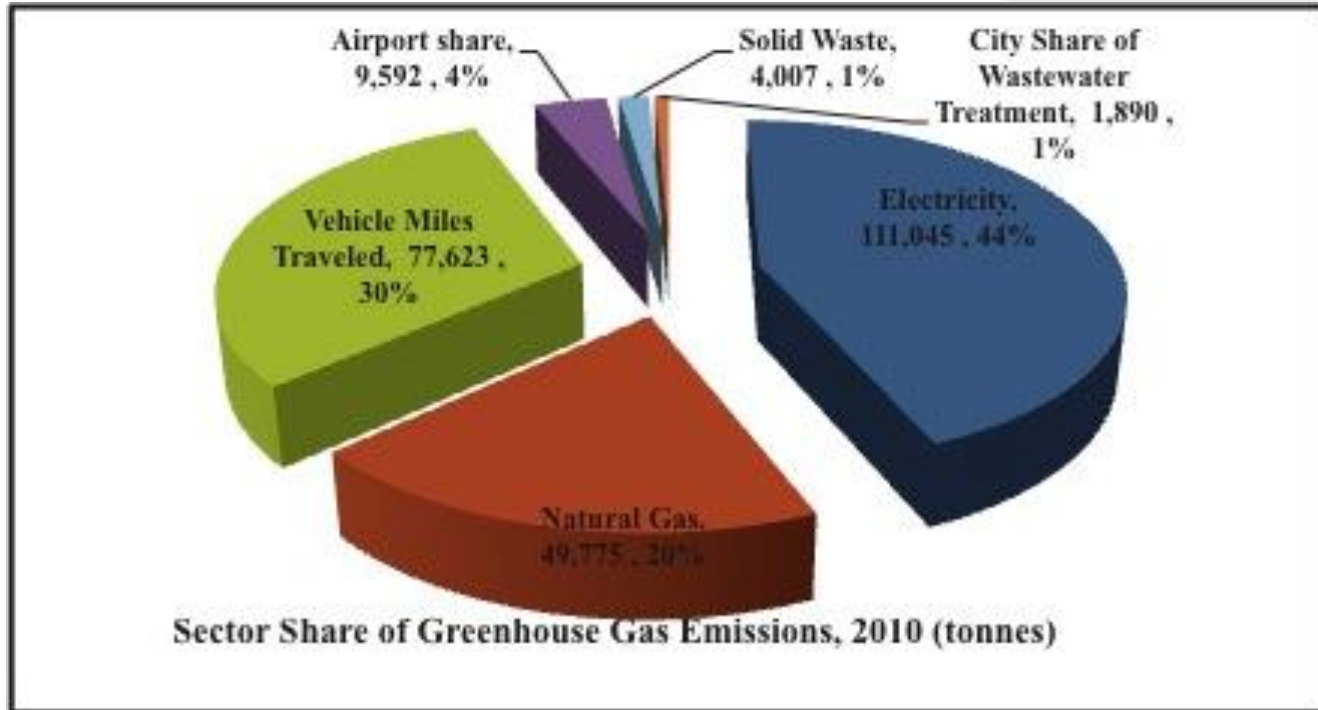
(Res./sq.mi)<sup>2</sup>

2007: 630

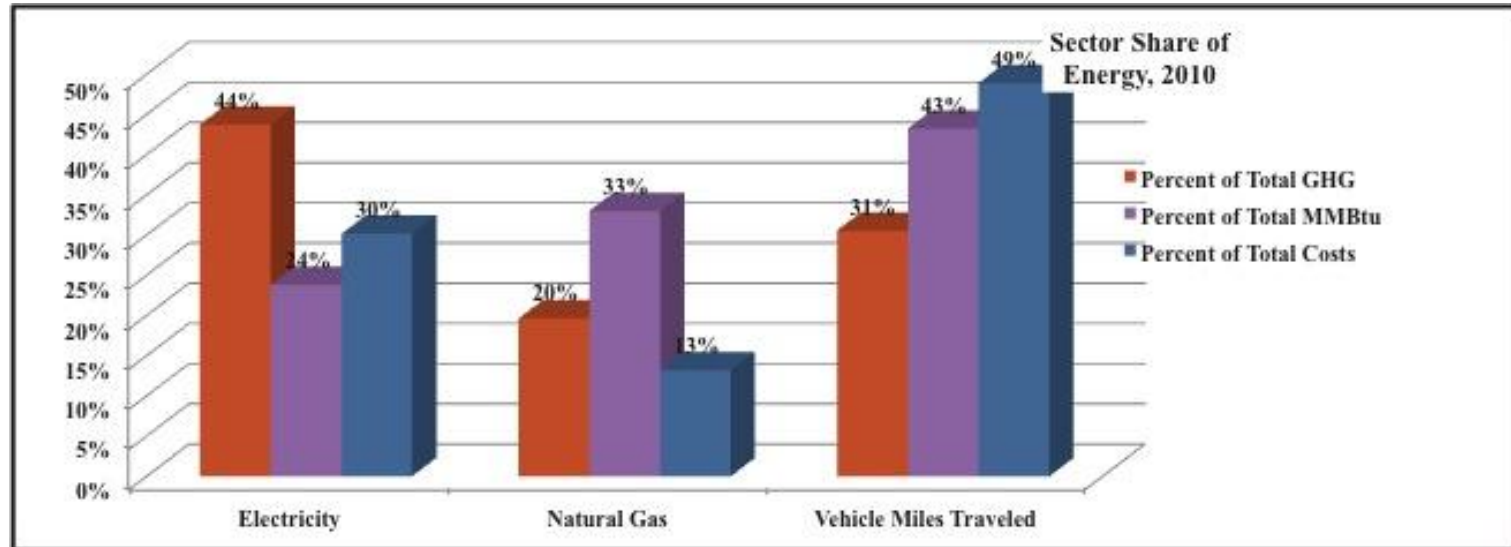
2013: 680

Community-Wide Emissions(tonnes)	2007	2013	Percent Change
<b>Energy:</b>			
Electricity	122,607	91,545	-25%
Natural Gas	48,645	69,203	40%
Subtotal CO <sub>2</sub> Emissions	171,252	160,748	-6%
<b>Transportation</b>	102,391	84,179	-18%
<b>Waste (US tons)</b>	3,593	4,163	16%
<b>CO<sub>2</sub> Emissions Total</b>	<b>279,635</b>	<b>250,562</b>	<b>-10%</b>
<b>Weather Normalized CO<sub>2</sub></b>	270,159	238,672	-12%
<b>Per-Capita CO<sub>2</sub></b>	<b>13.4</b>	<b>11.1</b>	<b>-17%</b>

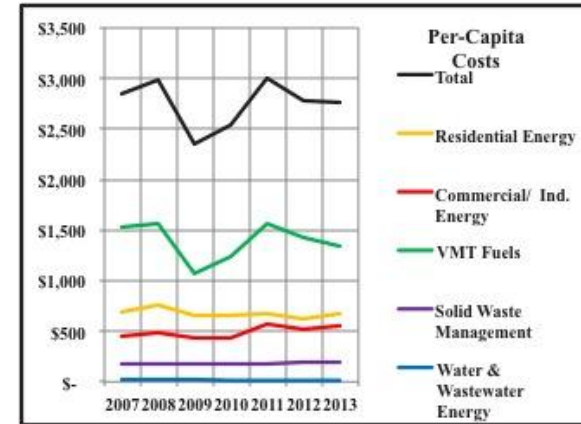
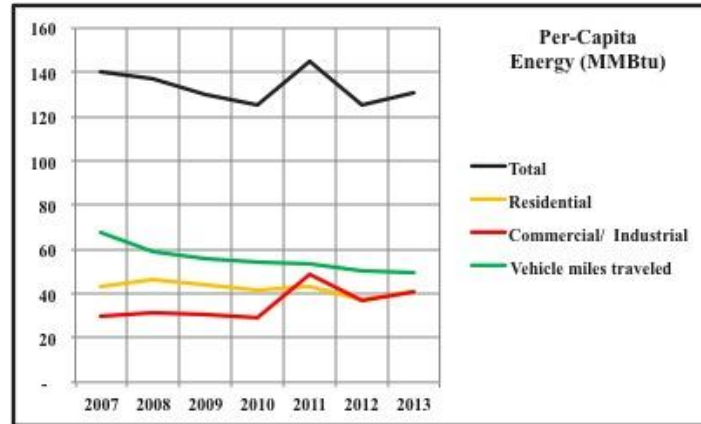
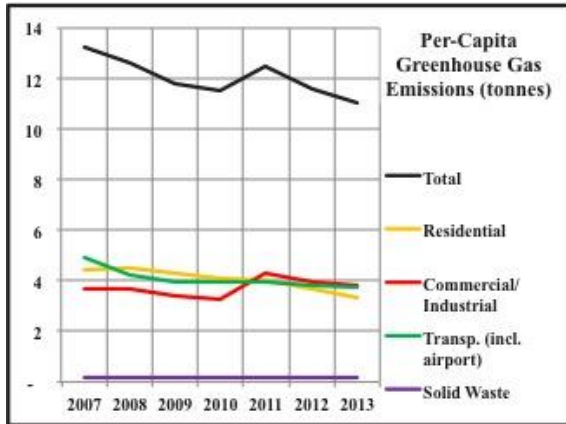
# Total Emissions by Sector



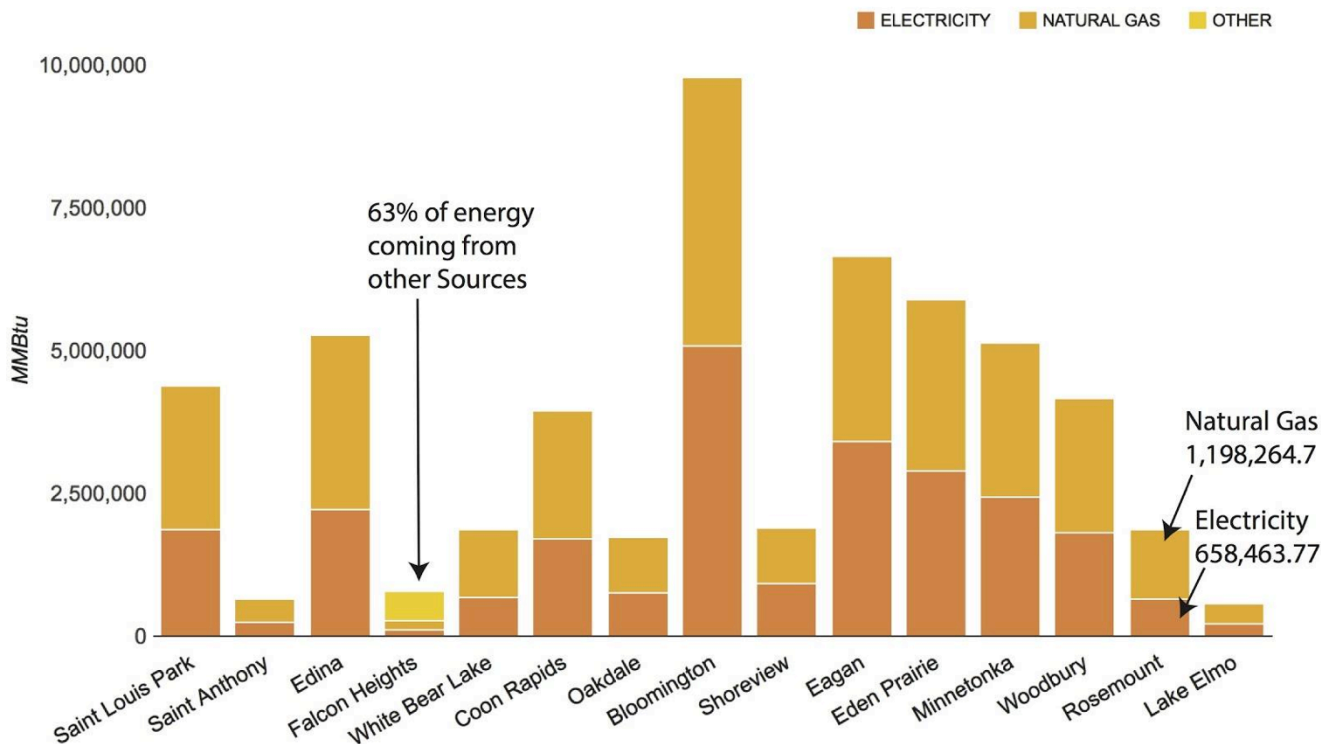
# Total Emissions by Type



# Per Capita



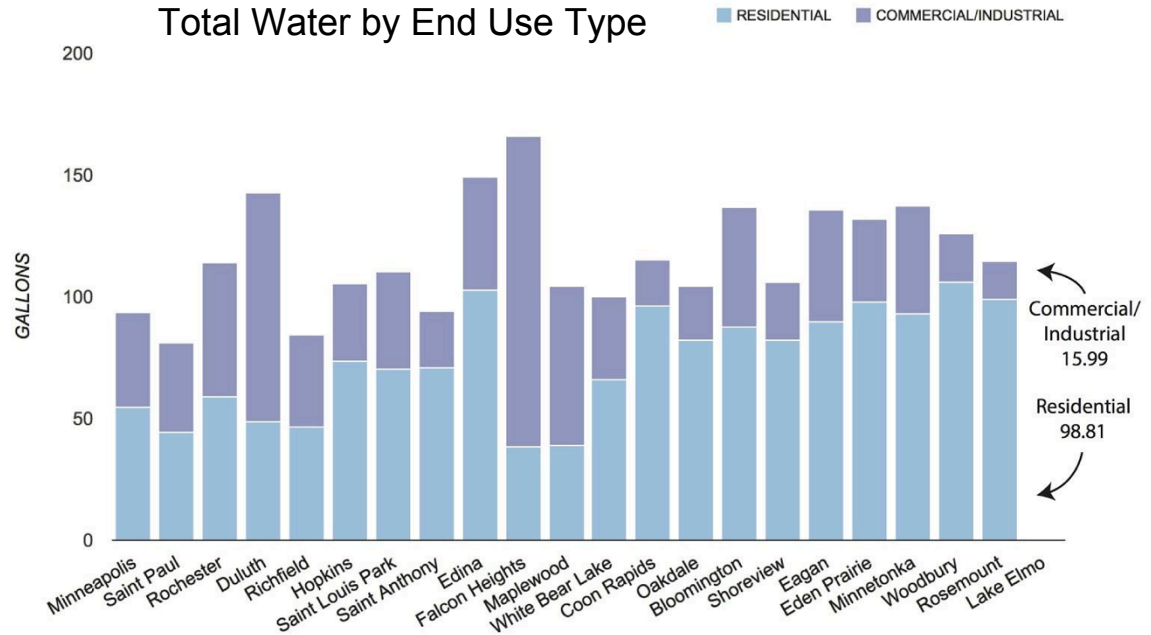
# Comparison to Other Cities: Total Energy Use by Type





# Comparison to Other Cities: Water

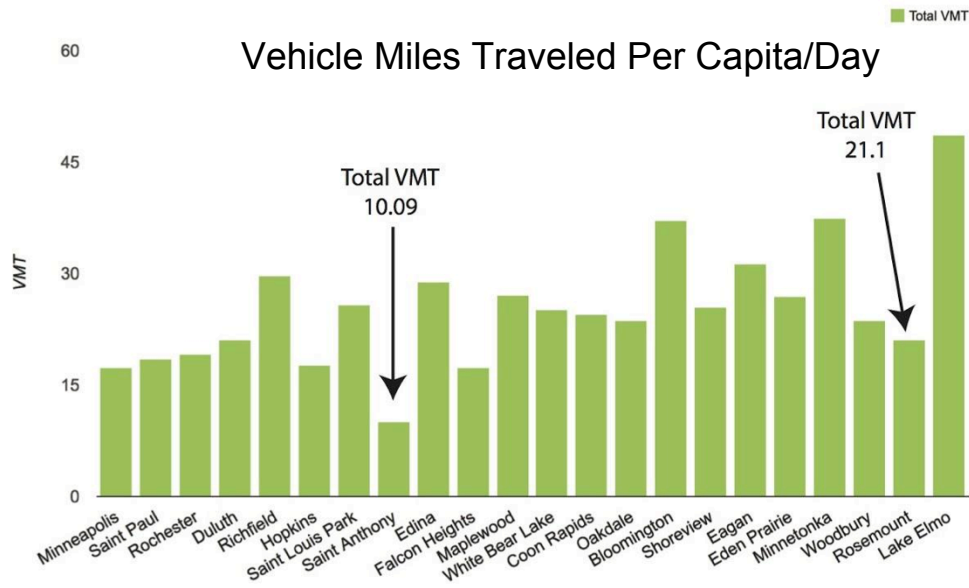
	2007	2013
<b>City Share of Waste Water Treatment Emissions (tonnes)</b>	2,399	1,455
<b>% of total Community emissions</b>	.9%	.6%
<b>Per Capita GHG emissions</b>	.1	.1



	2007	2013
<b>Water<sup>5</sup></b>		
Precipitation (inches)	2,008.0	33.1
Potable Water (gallons)		
Res	755,985,000	719,967,000
Com/Ind	107,046,477	161,472,600
Total	863,031,477	881,439,600
Res. Water (gal./household/day)	292	252
Com/Ind Water (gal./job/day)	39	62
Total Water (gal./person/day)	113	107

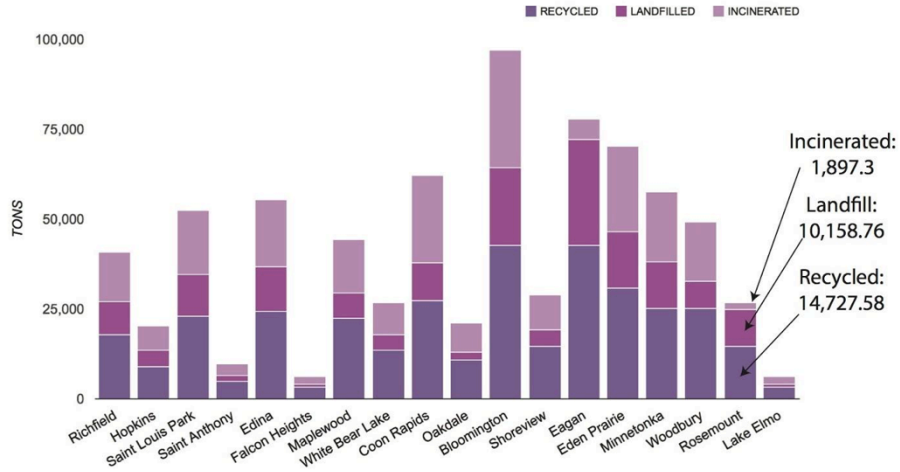
# Comparison to Other Cities: Transportation

	2007	2007	2013	2013
	Amount	GHG Emissions (tonnes)	Amount	GHG Emissions (tonnes)
Transportation				
Vehicle miles traveled	201,617,240	90,966	171,472,255	74,908
Share of MSP Airport emissions		11,424		9,289
Subtotal GHG emissions		<b>102,391</b>		<b>84,197</b>
Percent of total Community emissions		<b>37%</b>		<b>34%</b>
Per-capita GHG emissions/yr.		<b>4.9</b>		<b>3.72</b>

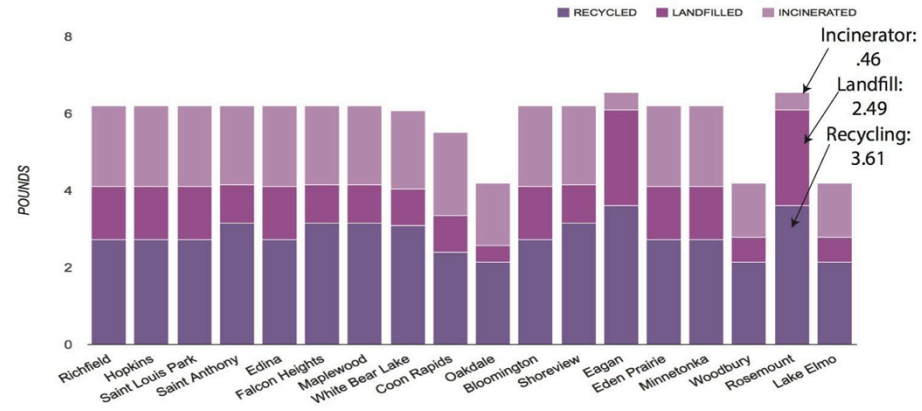


# Comparison to Other Cities: Waste

## Total Municipal Solid Waste by Management Method

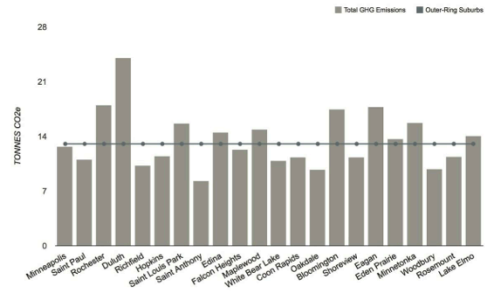


## Total Municipal Solid Waste Per Capita/Day

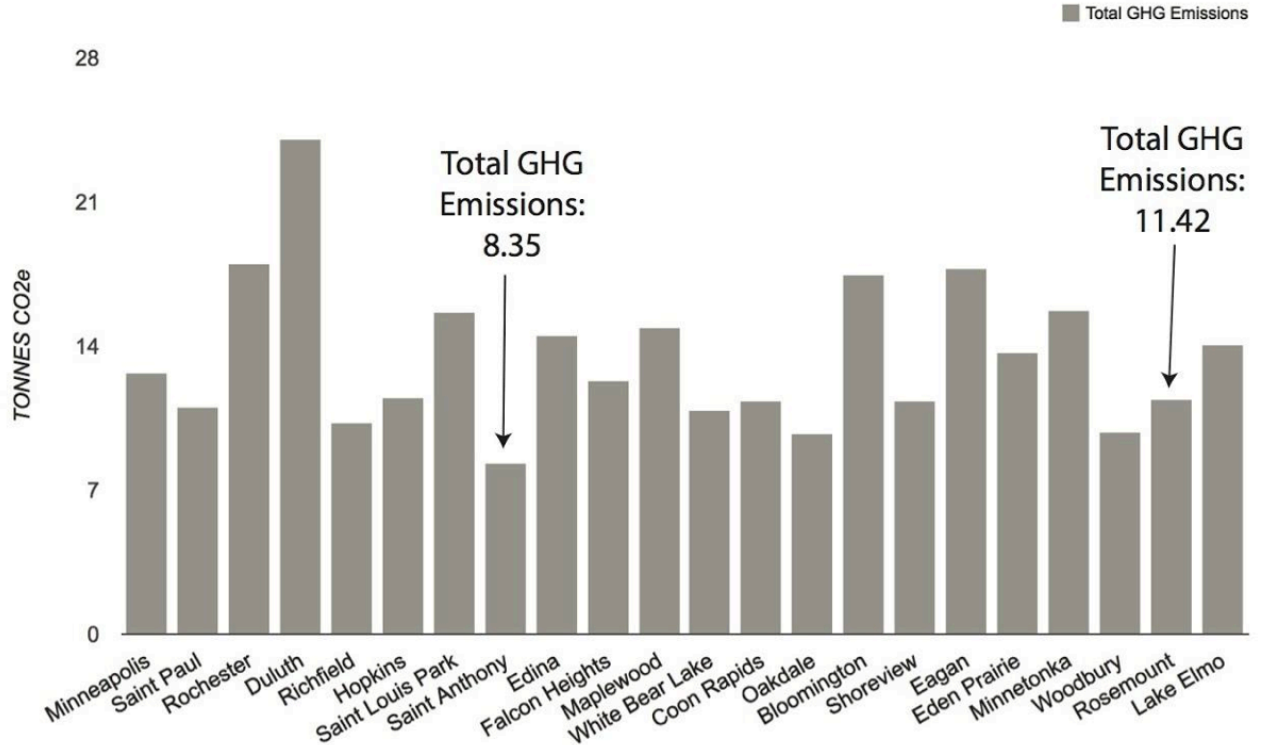
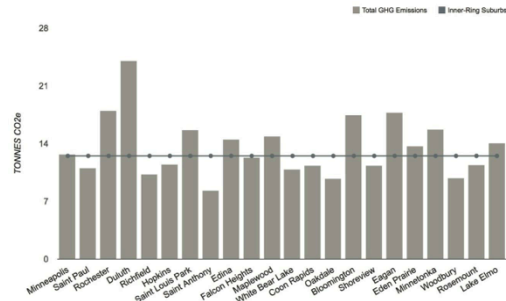


# Comparison to Other Cities: GHG Emissions Per Capita/yr

## Outer-Ring Suburb Trend Line



## Inner-Ring Suburb Trend Line



# What is UMore Park?

- Currently, UMore Park is a 5000 acre, University owned property at the southern edge of Rosemount that has been dedicated to research and will eventually be a sustainable community.
- Historically, it was the Gopher Ordnance Works, an ammunition factory during WWII.
- U of M acquired the land in the late 1940's.



# UMore Park History

## Research

- The Rosemount Agricultural Experiment Station was established on the site to engage the university's researchers in regional agricultural projects.
- The University also conducted different types research over extended periods of time concerning various topics.

## Military

- The U.S. Navy used the university's land to house a satellite positioning system on 18 acres.

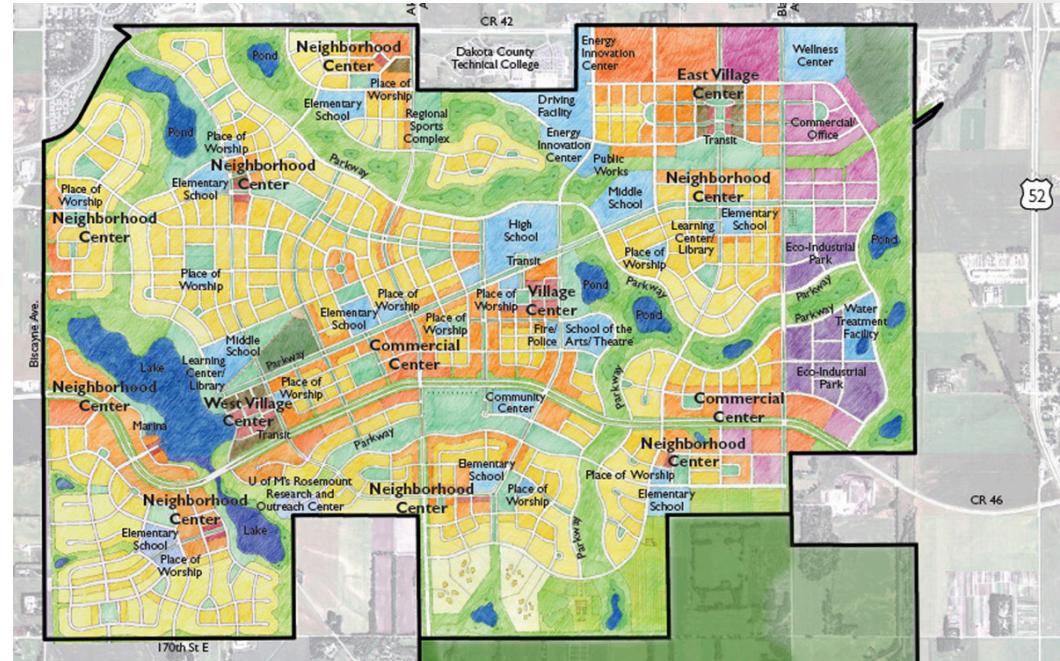
# UMore Park History

- 2001
  - The property receives the title of the University of Minnesota Outreach, Research and Education (UMore) Park
- 2005
  - Idea of using UMore park as a key subject as a whole for research
- 2006
  - Strategic planning of a new sustainable community begins
- 2008
  - Concept master plan created for UMore park development
- 2011
  - Workshop with BioRegional to create goals and a plan to achieve them

# Future of UMore Park

## The Community:

- 13,000 single family homes and additional multi-family housing
- Accommodates 20,000-30,000 Residents
- Multiple small neighborhoods spread throughout community
- Over 1,000 acres of open communal space
- Public amenities and resources are located in the community





# Future of UMore Park

Sustainability: Integrating the 10 principles of *One Planet Communities* in planning

1. Health and Happiness
2. Equity and Economy
3. Culture and Community
4. Land Use and Wildlife
5. Sustainable Water
6. Local and Sustainable Food
7. Sustainable Materials
8. Sustainable Transport
9. Zero Waste
10. Zero Carbon



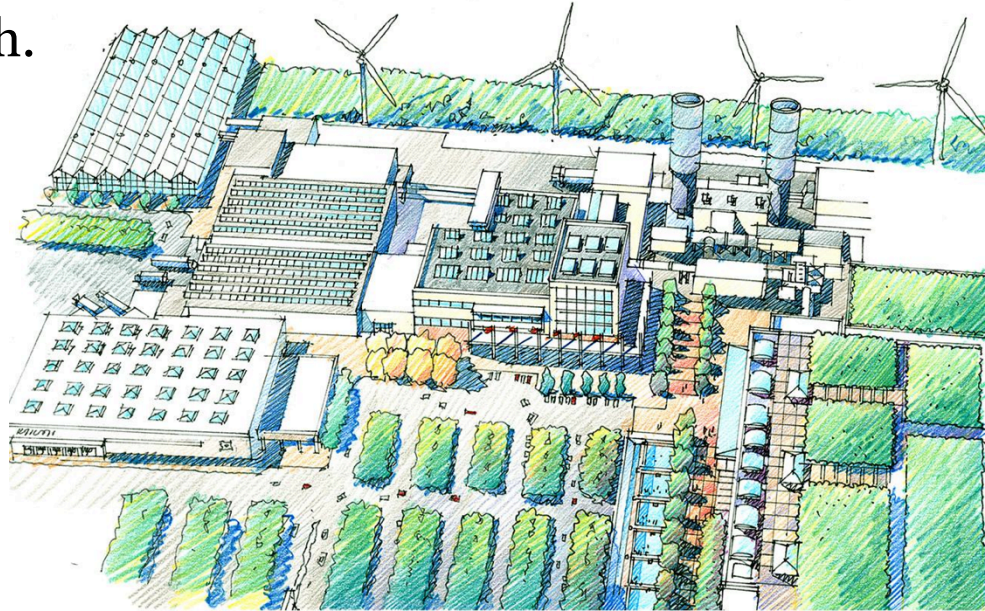
# UMore Park's Energy

## U of M's Wind Turbine

- In 2011, a 2.5MW wind turbine was engaged for wind energy research.
- Incorporating wind energy as a design strategy for UMore's sustainability goals

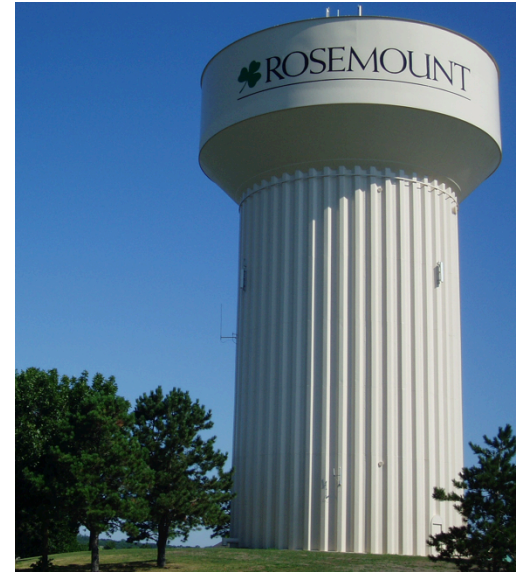
## Solar Energy

- Individual solar pv panels
- Community solar plants
- Increase in quality of living



# Largest Employers in Rosemount

1. Rosemount School District
2. Flint Hills Refinery
3. Wayne Transports
4. Dakota County Technical College
5. Intermediate School District
6. Cub Foods
7. Spectro Alloys Corp
8. Cannon Equipment
9. Greif Brothers Corporation
10. Proto Lab



# Flint Hills Pine Bend Refinery

- Largest taxpayer, second largest employer
- Emitted 3,561,379 tonnes in 2013
  - Rosemount (excluding the refinery) emitted 250,562 tonnes in 2013
- Reduced GHG emissions by 50% between 1999 and 2004
- Voluntarily reduced emission by 71% since 1997
- Emissions per barrel are currently 42% lower than large refinery industry averages
- Received the MN Conservation Award from Xcel Energy in 2006 for saving 8.7 million kilowatt-hours



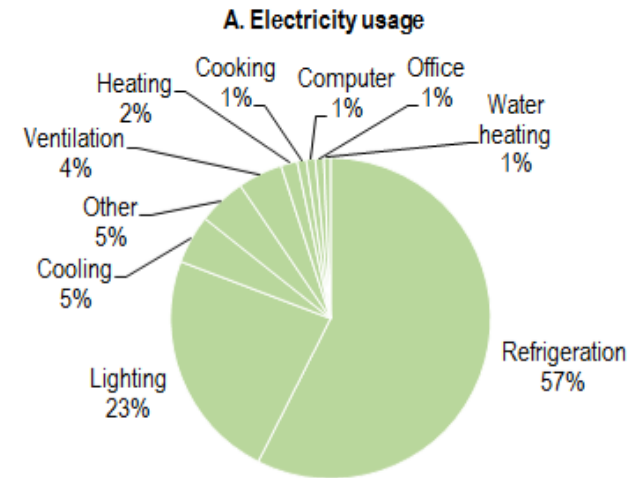
# Pine Bend cont.

- Plans announced in 2013 to make more than \$400 million in improvements to several processing units
  - engaged MN Center for Environmental Advocacy and the Environmental Integrity Project for additional recommendations
- Plans announced in 2014 to construct combined heat and power system, supplying the refinery with ~50 MW of electricity
- Primary sponsor of the Environmental Initiative Clean Air Dialogue and member of Clean Air Minnesota
- Founding sponsor of Project Green Fleet



# Cub Foods

- Last goal reported: reduce emissions by 10% by the end of 2012
- Energy Star certified in 2004 and 2008
- Focus on efficient lighting:
  - in refrigeration cases
  - replacing with LEDs
  - low-wattage technology



# Cub Foods cont.

- SuperValu's EPA GreenChill Partnership
  - help with benchmarking, outreach, assistance with strategies and goals
  - promote green technology for refrigeration
    - reduce refrigerant emissions
    - phasing out harmful refrigerants and reducing amount of refrigerant used
  - Supervalu received Superior Goal Achievement Award in 2011
    - reached emission reduction goals every year since joining in 2008
    - Distinguished Partner of the Year award in 2010



# Spectro Alloys Corporation

- Largest scrap aluminum recycling plant in the Midwest
- Uses 95% less energy and emits roughly 3.7 tonnes less CO<sub>2</sub> for every metal ton produced every year
- Saves roughly 4.8 billion kilowatt-hours of energy and nearly 300,000 tonnes of CO<sub>2</sub> emissions each year





# Greif Brothers Corporation

- Met their first goal in 2010 by reducing energy consumption by 10% in 3 years
- Goal to reduce energy consumption and emissions by 15% by 2015
- By 2020, they plan to reduce energy consumption by 30% per unit of production and greenhouse gas emissions by 30%
- Approved in 2011 for installation of solar panels



# MN Energy Smart

- Program that helps businesses find ways to save energy and connect to financial incentives
- Helps find utility rebates for upgrades
- Funded through state-approved utility conservation programs
  - All services are at no cost
- Work with Xcel Energy to change rebate levels for LED lighting as of May 2014
- Services offered include: utility bill analysis, workshops, etc.
- Success Stories



# Rosemount Businesses' Energy Suppliers

- **Xcel Energy**
  - supplied roughly 96% of Rosemount businesses' electricity and almost no natural gas since 2007
- **Dakota Electric**
  - supplied roughly 4% of Rosemount businesses' electricity since 2007
- **Minnesota Energy Resources**
  - supplied the majority of Rosemount businesses' natural gas since 2007

# Xcel Energy

- Alternative energy solutions for businesses
  - WindSource
    - available in 100 kilowatt-hour blocks
    - average of \$.48 per block for commercial and industrial customers
  - Solar power
    - solar gardens program planned to launch 01/12/15
    - proposed to set bill credit rate at 6 cents per kilowatt-hour for commercial customers
- Energy-saving programs for businesses
  - business new construction energy design assistance, commercial efficiency, energy studies, etc.

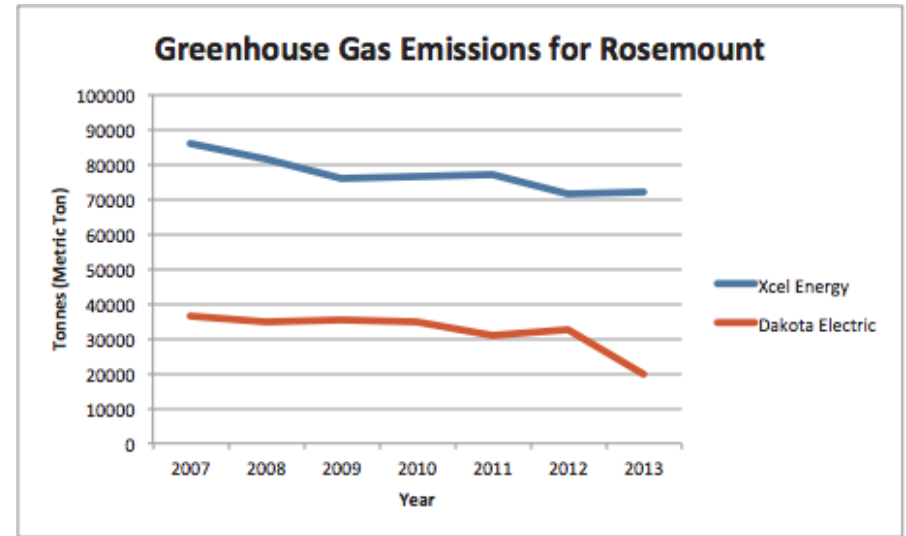
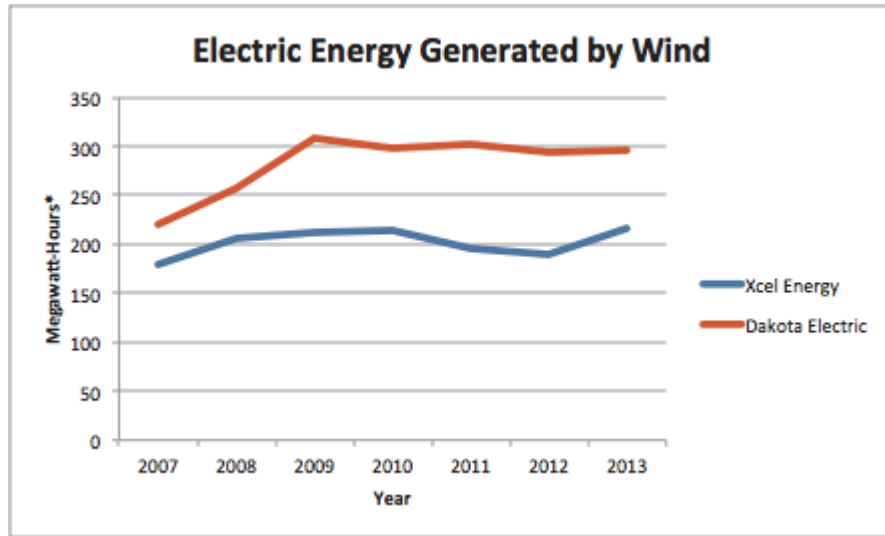


# Dakota Electric

- **Wellspring Renewable Wind Energy**
  - first member-driven, voluntary wind program in Minnesota
  - additional charge of 40 cents for each 100 kW-hour block purchased
  - business incentives
    - window decal, news release, and plaque
  
- **Solar Energy**
  - joint project with wholesale supplier Great River Energy recently installed a 20 kW solar array in Farmington, MN
  - expecting more than 600 kW of solar installations to be in use by fall 2015
  - business incentives
    - rebates for solar energy projects up to \$2,000 per kW with a maximum of \$10,000



# Effects on GHG Emissions



\*1 MWh=1000 kWh

# Energy Usage Standard

## Urbana, Illinois

- Urbana voters approved municipal electric aggregation on March 20, 2012
- Allowed city to bundle residential and small commercial retail electric accounts and seek bids for cheaper power
- 100% of the electricity will be supplied from renewable sources including hydroelectric, wind, and solar energy

## Cleveland, Ohio

- In 2008, the City of Cleveland adopted a voluntary Advanced Energy Portfolio Standard (AEPS) that calls for 15% of Cleveland Public Power's energy to come from advanced or renewable sources by 2015, 20% by 2020, and 25% by 2025
- 2030 Emissions Reduction Potential: 1,200,000 **MTCO<sub>2e</sub>** = 90,000 Cleveland homes

# Advanced & Renewable Energy

Solar Farms→ Goldsboro, Wayne County, NC

- 9,975 MWh of electricity a year = energy used by 771 average homes in North Carolina
- Each year, the solar farm will offset 5,357 tons of CO<sub>2</sub> which is the same as reducing automobile travel by 8 million miles



Wind Energy→ Winona County, MN

- Two 750-kilowatt turbines
- XCEL purchases energy as a 20 year power agreement
- U.S. Treasury Grant: 30% of project cost; federal incentives require private investors for the first 6 years



# Sustainable Transportation

## Sioux Falls

1. Reduce fuel consumption by the City's heavy duty diesel vehicles by 10% by 2015 and light duty vehicles by 20% by 2015
2. Reduce vehicle miles traveled by 10% per person by 2015
3. Decrease GHG emissions from City transportation operations by 15% by 2015
4. Use walkscore and bikescore to help identify areas of the City that most need bicycle and pedestrian infrastructure improvements.



# Waste Reduction, Resource Conservation, & Sustainable Land Use

## Cleveland, Ohio Climate Action Plan

- Reduce amount of waste sent to landfills
- Encourage vibrant downtown and neighborhoods
  - Restore and regenerate the natural environment



# Public Engagement/Education

- Create a community based committee with city members, climate action plan co-chairs, and city council
- Encourage groups to convene with goals of implementing strategies outlined in final climate action plan
- Support efforts to convene a representative from each employer to discuss and gain support
- Support community - based efforts to spread information and resources for the city's climate action plan at community/city sponsored events
- Create and support an annual green orientated event for the city



Any Questions?

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