

Greenhouse Gas Emissions in Rosemount: Analysis and Recommendations

Prepared by

Students in PA 5790: Sustainable Infrastructure and Cities
Humphrey School of Public Affairs | University of Minnesota
Instructor: Anu Ramaswami

On behalf of

The City of Rosemount

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Resilient Communities Project

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Resilient Communities Project

University of Minnesota
330 HHHSPA
301—19th Avenue South
Minneapolis, Minnesota 55455
Phone: (612) 625-7501
E-mail: rcp@umn.edu
Web site: <http://www.rcp.umn.edu>



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MEMORANDUM

TO: Jason Lindahl, City of Rosemount

FROM: PA 5790, University of Minnesota

DATE: May 12, 2015

SUBJECT: Greenhouse Gas Emissions in Rosemount: Analysis and Recommendations

Executive Summary

This analysis provided an inventory of CO₂ emissions in Rosemount taking into account Scope 1, Scope 2, and Scope 3 emissions. The addition of Scope 3 emissions added 7.4 tonnes of CO₂ per capita for a total of 19.1 tonnes of CO₂ per capita in Rosemount. Food and energy are the sectors with the largest share of emissions with 37% and 40%, respectively. Recommendations to reduce carbon emissions are provided for the energy, transportation, water, and food sectors in addition to additional general recommendations. If all recommendations are adopted with voluntary program design, CO₂ emissions would decrease by an estimated 3.8% over the course of 5 years while universal adoption program design would yield an estimated 5.1% reduction over the same time period.

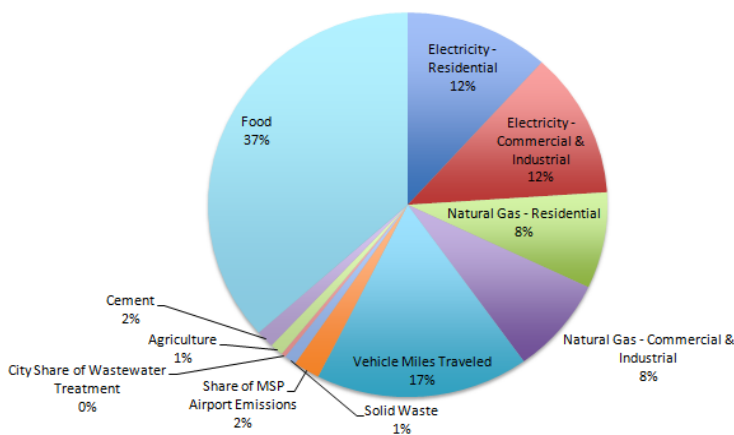
Analysis

The goal of this analysis was to provide an inventory of current greenhouse gas emissions in the city of Rosemount, Minnesota. This inventory began with Scope 1 and Scope 2 emissions. For this, data from the Regional Indicators Initiative (RII) was used, which accounted for electricity, natural gas, vehicle miles traveled (VMT), Rosemount's share of airport emissions, solid waste, and water and wastewater. Then Scope 3 emissions - agriculture, cement, and food emissions - were added using ICLEI Community Protocol standards to provide the Scope 1, Scope 2 and Scope 3 trans-boundary footprint. The in-boundary and trans-boundary methods for assessing VMT were both analyzed as well to ensure that the most complete assessment of VMT in Rosemount was presented.

Scope 1 and 2 per capita emissions in Rosemount are 11.7 tonnes of CO₂. This is slightly lower than the average per capita emissions in the other RII outer-ring suburbs and RII cities overall (13.5 tonnes of CO₂ and 13.6 tonnes of CO₂, respectively). When Scope 3 emissions are added to Rosemount, which provide a more complete picture of the overall emissions in Rosemount, the per capita emission

in Rosemount increase to 19.1 tonnes of CO₂ per capita. An opportunity for further study is to provide an assessment of Scope 3 emissions for all RII cities in order to provide a more complete assessment of CO₂ emissions in all cities and for use in comparison to other RII Cities.

Rosemount's total Scope 1, 2 and 3 emissions were also compared by sector. The emissions by sector in 2013 can be seen in the figure to the left. Food comprised the largest share of emissions with 37% of total emissions. Energy comprised a slightly larger share of emissions overall at 40%, however, this can be broken down into electricity and natural gas and then each into residential and



*Food data from 2009. VMT data from 2010. Cement and Agriculture data from 2012.

commercial/industrial for a more complete picture. Electricity comprises 24% of CO₂ emissions with residential and commercial/industrial 12% each. Natural gas comprises 16% of CO₂ emissions with residential and commercial/industrial 8% each. VMT comprise 17% of total CO₂ emissions. The rest of the sectors comprise 2% or less of total emissions.

Recommendations

For future reductions in emissions, we provide the recommendations in the following sectors. Adopting all of the recommendations with voluntary program design would decrease overall emissions by approximately 3.8% over the course of 5 years. Adopting all of the recommendations with universal adoption program design would decrease overall emissions by approximately 5.1% over the course of 5 years.

- **Energy:**
 - For residential electricity, real-time energy displays have been shown to decrease electricity consumption due to behavioral feedback. In pilot studies, they have been shown to decrease electricity consumption by 6-12%. With a cost of approximately \$100, the payback would likely be received within 1 year. Voluntary adoption of real-time energy displays would reduce total emissions by approximately 0.03% while universal adoption would reduce total emissions by approximately 1.1%.
 - For residential, commercial and industrial electricity, Rosemount can encourage voluntary green electricity purchases through Xcel Energy's Windsource program. The voluntary purchase of additional green energy would decrease overall emissions by approximately 0.6%.
 - The construction of new houses provides a large opportunity for Rosemount to decrease its carbon emissions per capita. If new construction followed the Zero Energy Home program, a 5.77% GHG reduction can be seen over five years.
- **Transportation:** Rosemount has a VMT per capita of 127, which is approximately 4 times the national average. This could include freight; however, transportation recommendations aimed at reducing passenger vehicle miles include providing a free shuttle service for Flint Hills employees, focusing on Bus Rapid Transit, increasing business within Rosemount to decrease commuting and encouraging workplace carpooling. The current local route 420 and express 476 bus service could also receive additional buses. Bus service should also focus on Apple Valley, Lakeville and Farmington since these areas are the top 3 locations where Rosemount travel is going.
- **Water:** Although is a small percentage of the overall emissions, toilets comprise about 30% of indoor water consumption. High efficiency toilets use about 20% less water, and voluntary adoption of high-efficiency toilets would decrease total emissions by approximately 0.006% while universal adoption would decrease total emissions by approximately 0.2%.
- **Food:**
 - A healthy eating campaign focused on decreasing red meat consumption would decrease overall emissions by approximately 3.2%.
 - Planting 500 apple trees would sequester carbon directly, provide heating and cooling savings, and decrease food production emissions by 0.0007% but higher percentage after the trees begin to fruit.

- 10 20 x 20 ft. community garden plots could decrease transportation emissions, increase walkability, and would also decrease food production emissions for a total of 0.0008%.

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