LOCAL ENERGY ACTION CASE STUDY

ROCHESTER

JULY 2018

Prepared by: Energy Transition Lab & LoGoPEP Team
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ABOUT ROCHESTER

Rochester is the third-largest city in Minnesota; it encompasses roughly fifty-four square miles, and had a population of approximately 114,011 people as of 2016.[1] Its population growth is strong; the city is expecting to add 50,000 more residents and 23,000 more housing units by 2040.[2] The city is located south of the Minneapolis-St. Paul metro area alongside the Zumbro River and is frequently recognized as one of the best places to live in both the Midwest and the United States.[3] Rochester is world renowned for its Mayo Clinic and has a reputation as a national healthcare leader.

ROCHESTER LEADERSHIP HIGHLIGHT:

GUARANTEED ENERGY SAVINGS PROGRAM & 100% RENEWABLE ENERGY GOAL

Rochester is a national and regional leader in its ambitious 100% goals and its energy efficient public buildings.

- ✓ The Mayor signed a proclamation for the City to use 100% renewable energy by 2031, joining 64 other U.S. cities
- ✓ The Energy Action Plan (EAP) creates a roadmap to meet energy and greenhouse reduction goals and will be integrated into Rochester's 2040 Comprehensive Plan
- ✓ Rochester has led low-cost energy efficiency improvements to aging city buildings with Guaranteed Energy Savings Program

[1] United State Census Bureau, *Rochester city*, *Minnesota*; UNITED STATES, https://www.census.gov/quickfacts/fact/table/rochestercityminnesota,US/PST045216 (last visited Mar. 17, 2018).
[2] Wenck Associates, Inc., *City of Rochester, MN Energy Action Plan* (April 2016), 3-1, http://www.rochestermn.gov/home/showdocument?id=14748
[3] City of Rochester Minnesota, *About the City*, http://www.rochestermn.gov/about-the-city (last visited Mar. 17, 2018).

GUARANTEED ENERGY SAVINGS PROGRAM

The first of Rochester's notable sustainability work involves its implementation of the Guaranteed Energy Savings Program (GESP). GESP was created in April 2011 through Executive Order 11-12, entitled "Providing for Job Creation through Energy Efficiency and Renewable Energy Programs for Minnesota's Public Buildings."[4] The program provides "technical, contractual, and financial assistance" to public entities such as state agencies, local government units, school districts, and universities. The program is designed to support the implementation of energy efficiency and renewable energy improvements in public buildings.[5] GESP uses pre-qualified Energy Savings Performance Contracting companies who must offer financial models with no upfront capital costs. The savings to building owners must be guaranteed to "meet or exceed payments for equipment and services over the contract period."[6] GESP's goals include job creation, operational cost savings, and reducing the aggregate energy consumption of all state agency facilities by twenty percent.[7] It is managed by Minnesota's Department of Commerce, Division of Energy Resources.[8]

HOCKEY ARENA & CONVENTION CENTER UPGRADES

Rochester implemented GESP for two aging municipal buildings: the Rochester Recreation Center and the Mayo Civic Center.[9] It contracted with McKinstry, a well-known consulting firm, as its performance contracting company.[10] The Recreation Center, built in 1974, spans 115,000 square feet, containing a gymnasium, two ice arenas, a pool, locker rooms, and offices.[11] This "energy hog" needed improvements in the aging ice plant refrigeration system, inefficient lighting and control systems, and overall building dehumidification and occupant comfort.[12]

The highlight of the project was a new innovative and efficient new hockey rink system with heat recovery and efficient control mechanisms.

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[4] MN Commerce Department, *Guaranteed Energy Savings Program*, https://mn.gov/commerce/industries/energy/technical-assistance/gesp/ (last visited Mar. 18, 2018).
[5] Ibid.
[6] Peter Lindstrom, Clean Energy Resource Teams, *Rochester Recreation Ctr. and Mayo Civic Ctr. make comprehensive energy efficiency improvements using state program*, March 7, 2018, https://www.cleanenergyresourceteams.org/blog/rochester-recreation-center-and-mayo-civic-center-make-comprehensive-energy-efficiency.
[7] MN Commerce Department, *Guaranteed Energy Savings Program*
[8] Ibid.
[9] Peter Lindstrom, Clean Energy Resource Teams, *Rochester Recreation Ctr. and Mayo Civic Ctr. make comprehensive energy efficiency improvements using state program*
[10] McKinstry, https://www.mckinstry.com/about/
[11] Ibid.
[12] Ibid.

Vintage Minnesota Hockey, *Rochester Olmsted Recreation Center,* http://history.vintagemnhockey.com/page/show/813604-rochester-olmsted-recreation-center- (last visited Mar. 18, 2018).

MAYO CIVIC CENTER

Rochester employed McKinstry, under the guidance of GESP, in its recent energy efficiency and renewable energy improvements to the Mayo Civic Center. The Civic Center was first opened in 1938; its outdated lights and controls dated to the 1980s and needed updating.[13] It serves as "Southern Minnesota's premier destination for local, regional, national and international conventions, entertainment, social and sporting opportunities." On average, the Civic Center hosts over 300,000 visitors each year.[14]

MG McGrath, *Mayo Civic Center*, https://mgmcgrath.com/portfolio/mayo-civic-center/ (last visited Mar. 18, 2018).

[13] Mayo Civic Center, *About*, https://mayociviccenter.com/about-us (last visited Mar. 18, 2018).
[14] Peter Lindstrom, Clean Energy Resource Teams, *Rochester Recreation Ctr. and Mayo Civic Ctr. make comprehensive energy efficiency improvements using state program*

The GESP improvements to the Mayo Civic Center "included a comprehensive lighting upgrade to LEDs, improved lighting controls, a retrofit of the audio system, and new building controls."[15] The GESP program was used effectively because aging buildings that are "energy hogs" can realize significant savings from targeted energy efficiency improvements. The GESP program made it possible for the city to realize these guaranteed savings without having to invest upfront capital.

Guaranteed Energy Savings Program Results

Recreation Center:
Project Cost: $2.2 million
Annual Utility Cost Savings: $106,598
Annual operating Cost Savings: $45,566
Reduction in Energy Use: 25%
Energy use: 3.3 kWh reduction = electricity from 360 Minnesota homes

Mayo Civic Center
Project Cost: $2.7 million
Annual Utility Cost Savings: $184,494
Annual Operating Cost Savings: $8,689
Reduction in Energy Use: 21%
Carbon reduction: 1,144 metric tons per year[16] = energy use of 121 U.S. homes in a year or equivalent to eliminating 2,741,278 miles driven

(*See page 11 for detailed cost-benefit breakdown*)

100% RENEWABLE ENERGY GOAL

On October 12, 2016, Mayor Ardell Brede signed a proclamation that committed the city of Rochester to attaining 100% renewable energy by 2031.[17] Although the proclamation is not law, it sets forth a process for achieving 100% renewable energy in the coming years.[18] In making this commitment, Rochester joined 65 cities, more than five countries, and one state in their pursuit of 100% renewable energy.[19] In Minnesota, St. Louis Park and Minneapolis have set similar goals.

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[15] Peter Lindstrom, *Rochester Recreation Ctr. and Mayo Civic Ctr. make comprehensive energy efficiency improvements using state program*
[16] Mayo Civic Center, *About*
[17] Michael Miller, "Rochester aims for 100% renewable energy," *Radish Magazine*, March 12, 2018, http://www.postbulletin.com/magazines/radish/rochester-aims-for-renewable-energy/article_44e7d4e2-22e7-11e8-9ccc-335432ac7efe.html
[18] Paul Huttner, "Rochester eyes 100 percent renewable energy by 2031," *Minnesota Public Radio*, Oct. 31, 2015, https://blogs.mprnews.org/updraft/2015/10/city-of-rochester-100-renewable-energy-goal-by-2031/. The 100% commitment has not been officially endorsed by the Rochester City Council.
[19] Sierra Club, *100% Commitments in Cities, Counties & States*, https://www.sierraclub.org/ready-for-100/commitments (last visited Mar. 18, 2018).

Rochester's proclamation included several key strategies necessary to meeting its 100% renewable energy goal.[20] These include energy efficiency, electrifying the heating/cooling and transport sectors, maximizing opportunities for citizen participation and the development of new business models, educating citizens and businesses, and adopting an integrated approach to fiscal, economic, and energy policy.[21]

Reforming Rochester's electricity mix will be key to meeting its 100% renewable energy goal. The city is served by a municipal utility, Rochester Public Utility (RPU), which currently generates electricity from mostly natural gas and hydro power.[22] RPU purchases a majority of its electricity from Southern Minnesota Municipal Power Agency (SMMPA) and from the regional grid market operated by the Midcontinent Independent System Operator (MISO).[23] Overall the electricity sources mix is approximately 80% fossil fuel (half coal, half natural gas), 7.6% nuclear, and just 11.9% renewables.[24] The Rochester utility is locked into SMMPA's contract until 2030. SMMPA's share of renewable energy is under 20% but is it "on track" to meet the state's renewable energy standard law which requires 25% renewable electricity by 2025.

To improve its electricity mix, RPU "plans to eliminate coal by 2030 and add 18.5 megawatts of solar energy and 150 megawatts of wind energy by 2035."[25] RPU has also begun a community solar program for citizens interested in renting solar garden space to offset their energy bills and has installed three electric vehicle charging stations within the city.[26]

PLANNING AND GOALS

Rochester began its path to energy and climate leadership a decade ago. The city is a signatory to the 2005 US Mayors' Climate Protection Agreement, which was endorsed by the US Conference of Mayors and signed by more than 900 US Mayors and 40 Minnesota cities as of February 2009. Under the agreement, cities committed to the following: (1) urge the federal government and state governments to enact policies and programs to meet or beat the target of reducing greenhouse gas emission levels to 7 percent below 1990 levels by 2012; (2) promote land use and transportation policies that reduce greenhouse gas emissions; (3) increase the use of clean, renewable energy and make energy efficiency a priority; (4) adopt purchasing and building construction and operation practices that reduce greenhouse gas emissions; (5) increase recycling rates and urban forest cover; and (6) support education efforts about how to take actions to reduce greenhouse gas emissions.

An Energy Action Plan (EAP) for the city of Rochester was created in April 2016.[27] The EAP was adopted by resolution of the City Council on July 6, 2017,[28]and will be integrated within Rochester's

[20] *City of Rochester Proclamation*, https://www.rochestermn.gov/Home/ShowDocument?id=9421 (last visited Mar. 18,
[21] Ibid.
[22] Rochester Public Utility website, "About RPU," (last visited June 19, 2018). https://www.rpu.org/about-rpu.php
[23] Ibid.
[24] Frank Jossi, "As Minnesota City Maps its Future, Spotlight turns to Energy," *U.S. Energy News*, June 4, 2015, https://energynews.us/2015/06/04/midwest/as-minnesota-city-maps-its-future-spotlight-turns-to-energy/
[25] Michael Miller, "Rochester Aims for 100% Renewable Energy,"
[26] Ibid.
[27] Wenck Associates, Inc., *City of Rochester, MN Energy Action Plan*
[28] Ibid.

Comprehensive Plan for 2040.[29] The EAP was prepared for the Rochester Energy Commission[30] by Wenck Associates.[31] Several stakeholders helped prepare EAP, including the City Departments of Finance and Public Works, the Rochester Water Reclamation Plant, RPU, and Olmsted Waste to Energy Facility.[32]

The EAP was prepared using the goals of the Minnesota Next Generation Energy Act of 2007, which the plan terms "NextGen" goals.[33] NextGen's three main goals are: 1.5% annual retail energy savings; 25% renewable energy by 2025; and state-wide GHG emissions reductions of 15% by 2015, 30% by 2025, and 80% by 2050.[34] The EAP goals were appropriately set to place Rochester within the larger context of statewide policy goals.[35]

To achieve the EAP's goals, two significant components—energy reduction and greenhouse gas (GHG) reduction—received detailed attention in the EAP.[36] To best reduce energy and GHG, and EAP made numerous recommendations relating to: (i) power generation; (ii) transportation; and (iii) buildings. The EAP chose to focus on these three areas due to the city's high degree of control over them, and because "they present an opportunity for high-impact [GHG] reductions."[37]

The EAP made several recommendations relating to power generation.[38] More specifically, the EAP recommended that the RPU generation portfolio continue shifting away from fossil fuels, and move toward renewable resources.[39] Renewable resources RPU should increase include: distributed solar; hydroelectric; geothermal; biogas, in particular at the Rochester Water Reclamation Plant; and increased solid waste utilization.[40] The EAP also recommended that RPU improve supply-side efficiency by generating "more electricity with the same or less fuel through replacement and upgrading of power generating units and reduction of losses through transmission and distribution, thereby reducing inefficiencies . . . ."[41] Further, the EAP suggested reducing demand through education and incentives[42] increasing RPU incentives of "behind the meter" power generation—such as roof-top or community solar—and converting more waste to low-carbon energy.[43]

In addition, the EAP made various recommendations concerning transportation to reduce energy and GHGs. In particular, the EAP recommended "[d]evelop[ing] transportation corridors and nodes and

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[29] *See* Planning to Succeed: Rochester's Comprehensive Place Update, City of Rochester Minnesota, http://www.rochestermn.gov/departments/planning-and-zoning/planning-2-succeed-rochester-s-comprehensive-plan-update (last visited Mar. 24, 2018).

[30] The Rochester Energy Commission was originally created in 2009 with the objective to create and implement the EAP. Energy Commission, City of Rochester Minnesota, http://www.rochestermn.gov/departments/planning-and-zoning/commissions-and-boards/energy-commission (last visited Mar. 24, 2018).

[31] Wenck Associates, Inc., *City of Rochester, MN Energy Action Plan*

[32] Ibid., 11-1.

[33] Ibid., 1-5 (citing Minn. Stat. § 216B.169 Subd. 2a).

[34] Ibid.

[35] Ibid.

[36] Ibid., 1-1.

[37] Ibid., 1-2.

[38] Ibid., 1-2—1-3.

[39] Ibid., 1-2.

[40] Ibid.

[41] Ibid.

[42] Ibid.

[43] Ibid., 1-3.

parking infrastructure that minimize [vehicle miles traveled] . . . ."[44] It also recommended shifting city fleets to less carbon-intensive fuels, such as electric, dimethyl ether, and compressed/liquid natural gas.[45] Furthermore, the EAP suggested increasing public transit options,[46] creating more charging stations for electric vehicles, increasing greenways—which serve pedestrian and bike traffic only—and expanding transportation sharing programs to reduce since passenger vehicle trips.[47]

Finally, the EAP made suggestions regarding buildings which may reduce energy and GHG.[48] The EAP first suggested reducing GHG by adopting "sustainable building policies that apply to planning, design, construction and commissioning of new and significant modification construction projects . . . ."[49] Additionally, the EAP recommended retro-commissioning city and community-owned buildings, as well as continuing and expanding upon energy conservation programs, and community water consumption conservation measures.[50]

MEASURING RESULTS

DATA

As part of the EAP, the city conducted a greenhouse gas inventory in 2014.[51] The inventory was conducted in accordance with ICLEI- Local Governments for Sustainability *Local Government Operations Protocol.*[52] This analysis will allow for a better means to track GHG and energy consumption in Rochester, and also provide a better way to measure results of the EAP in future years.[53] The Regional Indicators Initiative website data also shows energy and other resource usage trends.[54] The city has also benchmarked public municipal buildings under the state of Minnesota's B3 program.[55] Despite the limited information currently available, Rochester data suggests that the city will see continue to see energy and emissions trends moving downward relative to population.[56] In support of this projection, the EAP noted that the RPU Engineering & Operation Report of 2014[57] indicated that the average megawatts per hour (MWH) per residential customer in Rochester trended down "from just over 7.9 total residential MWHs per total number of residential customers in 2005 to just over 7.4 in 2014."[58] In addition, the "average MWH per small general service customers also trend[ed] down over that same time period."[59] Natural gas consumption data since 2005 also indicates only a slight trend upwards despite a growing population.[60]

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[44] Ibid.
[45] Ibid.
[46] Ibid.
[47] Ibid.,1-4.
[48] Ibid.
[49] Ibid.
[50] Ibid.
[51] Ibid., 6-1.
[52] Ibid., 5-12.
[53] Ibid., 6-2.
[54] Regional Indicators Initiative, https://www.regionalindicatorsmn.com/energy-chart (last visited June 19, 2018)
[55] Minnesota B3 Benchmarking, https://mn.b3benchmarking.com/Default (last visited June 19, 2018)
[56] Wenck Associates, Inc., *City of Rochester, MN Energy Action Plan*, 6-2.
[57] Randy Anderton & Melissa Zamzow, *Rochester Public Utilities Engineering & Operations Report* (Electric System) (2014), https://www.rpu.org/documents/electric_eo_report_2014.pdf.
[58] Wenck Associates, Inc., *City of Rochester, MN Energy Action Plan*, 6-1.
[59] Ibid.
[60] Ibid.

COMPLETED ACTIONS

Because these energy reductions were noted before the EAP's adoption, the EAP attributes these trends to a variety of measures already taken by Rochester, including: a switch from coal to natural gas electric generation; utilizing solar and hydroelectric renewable sources for electric generation; utilizing biogas for electricity and heat energy at the Rochester Water Reclamation Plant; and completing building conservation and retrofits, such as those discussed above.[61] To qualify as a Step 5 GreenSteps City, Rochester has completed 85 different actions in areas from renewable energy to building efficiency to mobility and more.[62]

INSTITUTIONAL DEVELOPMENT & NETWORK PATRICIPATION

Rochester has developed substantial institutional support for its efforts through multiple local partners:

- Rochester Energy Commission.
- Energy Integration Committee, a community group of energy generators and large users, focused on energy efficiency opportunities[63]
- RPU involvement as ex officio member of Energy Commission, member Energy Integration Committee; meeting with stakeholders in developing the EAP, providing the GHG inventory
- The Mayo Clinic is a common partner in Rochester's energy goals, as it attracts many residents to Rochester; the Mayo Clinic is also a member of the Energy Integration Committee.[64] The Mayo Clinic has signed onto the Clinton Global Initiative, committing it to reducing energy use 20% by 2020.
- The Destination Medical Center (DMC), a broad health-focused economic development initiative with Mayo at its heart, has sustainability goals similar to the EAP.[65] The Sustainability Director position is shared between the DMC and the City of Rochester.
- Olmsted County, the county in which Rochester sits, a significant partner for the EAP solid waste-related activities[66]

Rochester participates in both national and state-based networks. These include:

- Rochester is a signatory to the 2005 U.S. Mayors' Climate Protection Agreement
- Minnesota GreenStep Cities (joined 2010); recognized as GreenStep City Step Five[67]
- Participant in Regional Indicators Initiative, which measures annual performance metrics of cities throughout Minnesota that are committed to improving overall efficiency and moving toward sustainability[68]
- Partner with Southeast Minnesota Clean Energy Resource Teams (CERTS)
- Member, Minnesota United States Green Building Chapter
- McKnight Foundation funded Environmental Defense Fund Fellows and Sustainability Director partially grant-funded

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[61] Ibid.
[62] Minnesota GreenSteps Cities, *Rochester,* May 17, 2018, https://greenstep.pca.state.mn.us/cityInfo.cfm?ctu_code=2396395
[63] Ibid., 10-1.
[64] *Ibid.*
[65] Destination Medical Center, https://dmc.mn/.
[66] Ibid., 10-2.
[67] Minnesota GreenSteps Cities, *Rochester*
[68] Wenck Associates, Inc., *City of Rochester, MN Energy Action Plan*

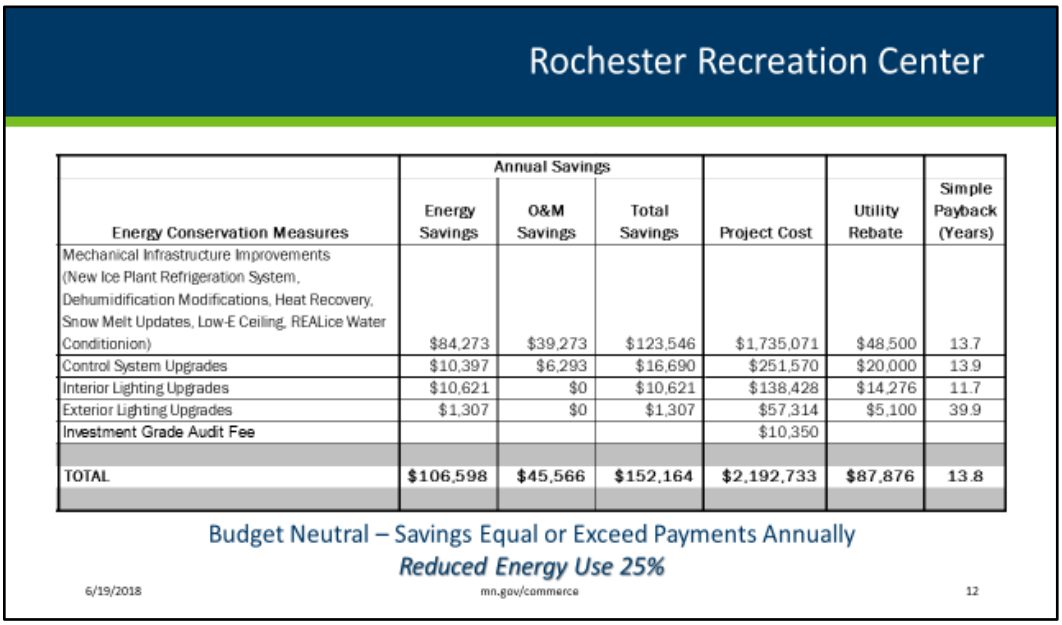
- ClimateSmart Municipalities Program, University of Minnesota: Germany and Minnesota City Sustainability Best Practice Sharing Project
- United States Green Building Council
- Association for the Advancement of Sustainability in Higher Education (AASHE)

LESSONS LEARNED

✓ Setting ambitious, long term targets demonstrates political commitment and provides an opportunity to link future planning efforts to sustainability goals
✓ Stakeholders and populace need to know long-term vision
✓ Make energy efficiency a priority to make achieving other goals easier
✓ Meeting goals requires public participation
✓ Institutional partnerships are necessary for progress

IN DEPTH: CITY ACTIONS

For more details about Rochester's energy actions, refer to the GreenStep Cities Rochester page.[69]



Rochester Recreation Center

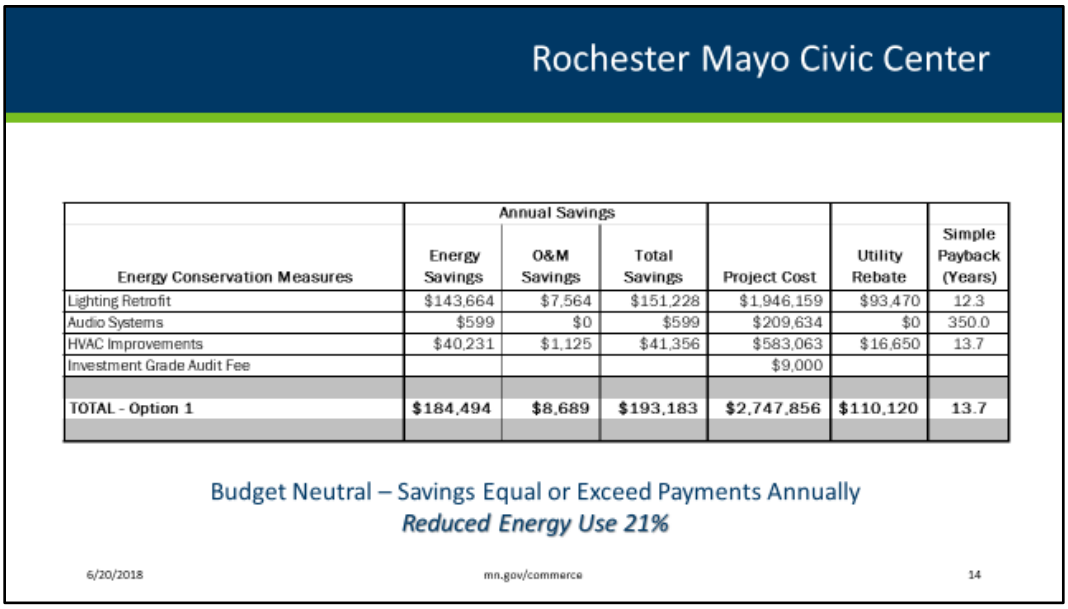
Energy Conservation Measures	Annual Savings: Energy Savings	Annual Savings: O&M Savings	Annual Savings: Total Savings	Project Cost	Utility Rebate	Simple Payback (Years)
Mechanical Infrastructure Improvements (New Ice Plant Refrigeration System, Dehumidification Modifications, Heat Recovery, Snow Melt Updates, Low-E Ceiling, REALice Water Conditionion)	$84,273	$39,273	$123,546	$1,735,071	$48,500	13.7
Control System Upgrades	$10,397	$6,293	$16,690	$251,570	$20,000	13.9
Interior Lighting Upgrades	$10,621	$0	$10,621	$138,428	$14,276	11.7
Exterior Lighting Upgrades	$1,307	$0	$1,307	$57,314	$5,100	39.9
Investment Grade Audit Fee				$10,350		
TOTAL	$106,598	$45,566	$152,164	$2,192,733	$87,876	13.8

Budget Neutral – Savings Equal or Exceed Payments Annually

Reduced Energy Use 25%

6/19/2018 mn.gov/commerce 12

[69] Minnesota GreenSteps Cities, *Rochester*



COMMUNITY-WIDE ACTIONS

Mayo clinic was far ahead of most communities and hospitals in using combined heat and power for 25 downtown buildings and the St. Mary's Hospital campus.[70]
DMC Design guidelines state that DMC-funded buildings must be 70 percent more efficient than an average building, a stipulation that ratchets up by 10 percent every five years.[71]

[70] Frank Jossi, "As Minnesota City Maps its Future, Spotlight turns to Energy"
[71] Michael Miller, "Rochester Aims for 100% Renewable Energy"

QUESTIONS?

For questions on these activities and to learn more, contact the City of Rochester:

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ADDITIONAL RESOURCES

Minnesota's Local Government Project for Energy Planning (LoGoPEP) builds upon existing efforts to engage local governments in committing to actionable strategies for energy and greenhouse gas emission reductions. LoGoPEP provides communities with planning tools and actual results to measure progress toward their goals. Tools developed for communities can be found on the LoGoPEP website.

Energy Transition Lab

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