

LOCAL ENERGY ACTION CASE STUDY

MAPLEWOOD

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MINNESOTA

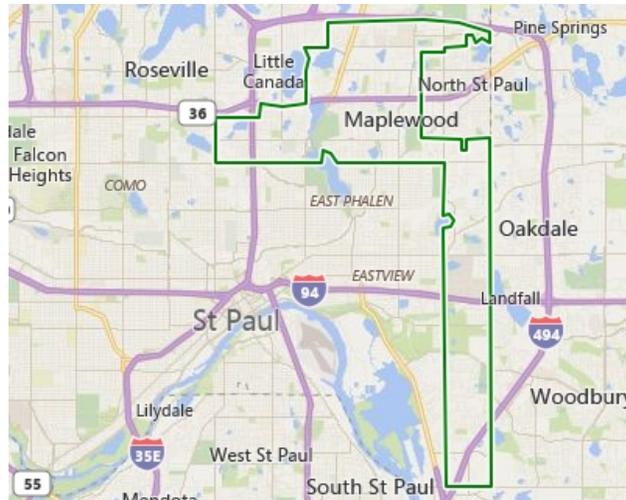


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ABOUT MAPLEWOOD

Maplewood, an urban¹, first-ring suburb of around 40,000 people northeast and east of Saint Paul with a growing population, has been a sustainability leader for decades.² The city has its own Nature Center, whose staff of naturalists have engaged the community since the 1970s. It has taken substantial steps in governmental and community-wide emissions reductions. Two notable accomplishments have been the city's work on a Green Building Code and their community engagement.



MAPLEWOOD LEADERSHIP HIGHLIGHT: SUSTAINABLE BUILDINGS & COMMUNITY ENGAGEMENT

Maplewood is a national leader in sustainable buildings, modeling effective strategic planning, innovative building codes, and groundbreaking design.

- ✓ First city in Minnesota to adopt comprehensive Green Building Code program in collaboration with International Green Construction Code
- ✓ Maplewood's Fire Station No. 1 is the first building in the nation to meet International Green Construction Code (IgCC) specifications
- ✓ Strategic planning with ambitious goals for government and community-wide building energy efficiency

¹ Metropolitan council "Thrive MSP 2040" classification <https://metro council.org/Planning/Projects/Thrive-2040/Thrive-MSP-2040-Plan.aspx>

² "The Greening of Maplewood," *Maplewood Seasons* (City of Maplewood), Summer 2008, 4, <http://www.ci.maplewood.mn.us/DocumentCenter/View/1645>

SUSTAINABLE CITY BUILDINGS

Maplewood has taken steps to improve energy efficiency and conserve energy for over two decades. A major focus of Maplewood's energy efficiency efforts has been on reducing energy use in buildings, including the adoption of a model sustainable building renovation policy based on the International Green Construction Code. Energy efficiency has also been a continuous objective during the construction and throughout the life of the Maplewood public works building, city hall, police department, and community center.³

In 2007, Maplewood began entering energy use data into the Minnesota B3 Benchmarking database and in 2008 completed energy audits of city buildings. Maplewood expanded upon this by participating in the Regional Indicators Initiative, enabling the city to track its progress since 2007, which aligns with GreenStep Cities 29 best practices to improve sustainability.⁴ In 2009, Maplewood used Energy Efficiency and Conservation Block Grant Program (EECBG)⁵ funding to replace boilers and upgrade HVAC at City Hall, install energy efficient lighting at the Community Center and Goodrich Park, and contribute to lighting upgrades at Maplewood Mall. The EECBG funding required Maplewood to develop an Energy Efficiency and Conservation Strategy. This requirement helped the city connect its initial actions with strategic planning for a more sustainable future.⁶

GREEN BUILDING CODE

In 2013, Maplewood became the first city in Minnesota to adopt a comprehensive Green Building Code program.⁷ Maplewood worked directly with the International Code Council to develop the code⁸ and built upon its existing efforts to integrate sustainability goals into strategic planning for city facilities and services.⁹ This ordinance is mandatory for city-owned buildings, a requirement for city-financed buildings, and a model for private building owners.

FIRE STATION

The Fire Department has taken extensive steps to advance building efficiency. Its 2011-2016 strategic plan, led by the Fire Chief, stated that “[s]ustainability was the galvanizing principle that guided all discussions, research and conclusions” and highlighted key benefits that included increased efficiency and environmental sustainability. A key achievement thus far under that strategic plan has been the construction of the new Fire Station No. 1 at 600 McKnight Road in Maplewood, completed in 2014 as the first building in the nation to meet IgCC specifications. The building features high efficiency appliances and plumbing fixtures, LED lighting, a solar reflective roof, a rain garden, utilization of recycled building materials, radiant slab heating, passive solar lighting and other features, which were recognized through a Project Excellence Award for Sustainability by the MN Construction Association.¹⁰ The city has since tracked the building's performance, noting it used 38% less natural gas compared to

³ City of Maplewood, *Energy Efficiency and Conservation Strategy Plan* (2009)
<http://www.ci.maplewood.mn.us/DocumentView.aspx?DID=1411>

⁴ <http://www.regionalindicatorsmn.com/about-regional-indicators-initiative>

⁵ U.S. Department of Energy, “Energy Efficiency and Conservation Block Grant Program,”
<https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program>

⁶ City of Maplewood, *Energy Efficiency and Conservation Strategy Plan* **Error! Bookmark not defined.**

⁷ Xcel Energy, *Energize Maplewood!*, April 22, 2015, <http://maplewoodmn.gov/DocumentCenter/View/12810>

⁸ Nick Reiher, “New Police/Fire Station is the First Minnesota building Constructed Under the IgCC,” *Building Safety Journal*, <http://maplewoodmn.gov/DocumentCenter/View/11801>

⁹ City of Maplewood, <http://maplewoodmn.gov/DocumentCenter/Home/View/2388>

¹⁰ SEH, <http://www.sehinc.com/news/deeper-shade-green-fire-station-recognized-sustainability>

the city's other comparable stations in 2015, a \$5000 savings on that aspect alone.¹¹

COMMUNITY-WIDE STRATEGIES & ENGAGEMENT

In 2012, Maplewood learned of a utility program supporting community engagement. The effort built on its city-organized energy challenge that engaged 98 households. This new program took that a step further by:

- ✓ Developing a community-wide plan to achieve carbon neutrality
- ✓ Fostering business engagement, including an incentive program
- ✓ Targeting residents with simple action steps to increase energy efficiency and renewable energy

Maplewood has taken numerous steps to advance community-wide energy efficiency and conservation. Led by the Green Team, Maplewood's Environmental and Natural Resources Commission developed an Energy Efficiency and Conservation Strategy that the City Council approved in 2009.¹² The Strategy outlined goals and policies for community-wide energy efficiency and conservation efforts. The process for creating the Strategy and its structure allowed for continued progress and iterative improvements over time. To advance energy efficiency in private buildings, Maplewood also collaborated with Xcel Energy on Community Energy Efficiency Sweep, which promotes energy-efficiency programs available to city residents and businesses.¹³ For many years, Maplewood has encouraged residents to participate in the Minnesota Energy Challenge and provided energy saving tips for residents in the *Maplewood Seasons* newsletter. In 2012, these efforts transitioned to a city-managed campaign entitled Energize Maplewood, part of a broader Community Action Plan. This included a local team-based energy challenge, a building tune-up program, and focused efforts with auto-dealerships, restaurants, and congregations.¹⁴ One notable result was that 52 households that participated had never engaged in an energy program prior. 12 teams participated, a total of 98 households with full engagement of the city council.¹⁵

PLANNING AND GOALS

With support from Xcel Energy's Partners in Energy program, Maplewood created a team of representatives from key constituencies, which developed a Community Action Plan for Carbon Neutrality (April 2015). The plan sets goals for May 2015-December 2016, focusing on community engagement, simplifying implementation steps, and providing visionary direction. The goals included:

- Local businesses save 400,000 kWh total, equaling approximately \$1,750 per year for each business.
- Save an additional 208,000 kWh and 12,000 therms by enrolling 4 new businesses in the city's Green Building Code Incentive Program.
- Save 220,000 kWh and 33,250 therms plus increase renewable energy use by 267,000 kWh annually through residential participation in efficiency or renewable actions, saving each resident

¹¹ Minnesota GreenSteps Cities, *Maplewood*, BP1 Action 5, http://greenstep.pca.state.mn.us/cityInfo.cfm?CTU_code=2395846

¹² City of Maplewood, Energy Efficiency and Conservation Strategy

¹³ Yvonne Pfeifer, "Energy Sweep", *Maplewood Seasons* (City of Maplewood), Winter 2010/2011, 1, available at <http://www.ci.maplewood.mn.us/DocumentView.aspx?DID=1795>

¹⁴ City of Maplewood, *Maplewood Energy Programs*, <http://maplewoodmn.gov/1180/Partners-in-Energy>

¹⁵ <http://thenec.org/Energize-Maplewood-Minnesota-Home-Energy-Efficiency>

approximately \$130 per year.¹⁶

MEASURING RESULTS

Maplewood exceeded the original energy goals. Highlights of the City's overall energy conservation programs in 2015 and 2016 include: 1) 2,310 households participated in residential conservation programs. Rebate programs for cooling, heating, and water heating were higher than previous years. In 2016 there were 466 Windsource participants in the City. 2) 277 businesses participated in commercial and industrial conservation programs. Rebates programs for lighting efficiency, business Savers Switch, small business lighting, and energy audits were higher than previous years. 3) The electricity and natural gas saved as a result of all of the conservation programs taken by Maplewood residents and business in 2015 and 2016 totals 6,053,120 kWh of electricity and 221,696 therms of natural gas.

INSTITUTIONAL DEVELOPMENT & NETWORK PARTICIPATION

Maplewood has developed substantial institutional support for its efforts and participates in both national and state-based networks. These include:

- City's Environmental and Natural Resources Commission establishes environmental priorities for the city and advises the City Council and commissions.¹⁷
- Natural Resources Department includes both an Environmental Planner and a Natural Resources Coordinator on staff and publishes a sustainability newsletter.¹⁸
- Joined the U.S. Conference of Mayors Climate Protection Agreement in 2008.
- Internally created a Green Team of employees to establish an institutional framework for meeting its commitments.¹⁹
- Committed to meet or exceed what the U.S. Kyoto Protocol targets and encourages state and federal government to enact supportive policies, including U.S. GHG reduction legislation.²⁰
- Joined Minnesota's GreenStep Cities program. Achieved "Step Five" status, having shown improvement on sustainability metrics including a decrease in greenhouse gas emissions from the city's base year of 2015.²¹
- The Green Team presents an annual Sustainability Report to the city's Environmental and Natural Resources Commission and serves as the steering committee for Maplewood's participation in the GreenStep Cities program.²²
- Partnered with the University of Minnesota on a series of reports for the city addressing sustainability issues, including energy use.²³
- Utilizes the Regional Indicators Initiative to track results and monitor performance.
- City staff also credit their involvement in the Local Government Project for Energy Planning project with their ability to establish energy goals and policies in their 2040 comprehensive

¹⁶ <http://maplewoodmn.gov/DocumentCenter/View/12810>

¹⁷ City of Maplewood, *Environmental & Natural Resource Commission*, <http://www.ci.maplewood.mn.us/index.aspx?nid=256> (last visited Oct. 28, 2011).

¹⁸ City of Maplewood, *Community Development*, <http://www.ci.maplewood.mn.us/Directory.aspx?did=32> (last visited Oct. 28, 2011); "Engaging Attitudes," *Maplewood Seasons* (City of Maplewood), Summer 2008, 1, <http://www.ci.maplewood.mn.us/DocumentView.aspx?DID=1645>.

¹⁹ Shann Finwall, "Take the Energy Challenge", *Maplewood Seasons* (City of Maplewood), Fall 2009, 1, 3, <http://www.ci.maplewood.mn.us/DocumentView.aspx?DID=1257>.

²⁰ The United States Conference of Mayors, <https://www.usmayors.org/climateprotection/agreement.htm>

²¹ Minnesota GreenSteps Cities, *Maplewood*

²² *Ibid.*, BP 24 Action 1

²³ Darian Motamed et al., *Sustainable Maplewood 2050: Green Workplace: Energy 22* (2008), <http://www.ci.maplewood.mn.us/DocumentView.aspx?DID=911>

plan.²⁴

LESSONS LEARNED

- ✓ Lead by example.
- ✓ Partnerships are important.
- ✓ Sustainability must come from all levels of an organization.
- ✓ Don't be afraid to be the first to try something new.
- ✓ Engage the public and tap into their expertise

IN DEPTH: CITY ACTIONS

The city's purchasing policy emphasizes both energy efficiency and renewable energy. In April 2011, Maplewood adopted an environmentally-friendly purchasing policy that addresses energy efficiency in new equipment purchases²⁵ and states that "[w]hen energy is purchased, renewable or green sources are preferred. These include solar power or photovoltaic, wind power, geothermal, and hydroelectric energy sources and do not include fossil fuels."²⁶ Maplewood has also conducted a greenhouse gas assessment that addresses both city operations and citywide emissions.

RENEWABLE ENERGY

Early on, Maplewood began focusing on adding solar to public buildings. The city learned from its initial efforts, allowing them to increase ambition over time.

- ✓ Started with a smaller installation at the nature center, focusing on engaging and educating the public
- ✓ Built two larger installations in its City Hall and community center by developing a private partnership and using incentives and financing programs
- ✓ Tracked utility programs and engaged developers once community solar programs were available, finding a subscription that fit the city's needs.

CITY OPERATIONS

The city has developed several renewable energy projects. In 2011, the city installed a 1.4kW solar electric system at the Maplewood Nature Center, which included a mobile panel and educational signage. That system was largely funded by a Solar Energy Legacy Grant from the Minnesota

²⁴ Reported by staff. Comprehensive plan can be found here: <https://mn-maplewood2.civicplus.com/DocumentCenter/View/19114>

²⁵ City of Maplewood, *Environmental Purchasing Policy*, § 4.4 (April 20, 2011), <http://maplewoodmn.gov/documentcenter/view/2377>.

²⁶ *Ibid.*, § 4.4.3.

Department of Natural Resources.²⁷ The system utilizes Enphase micro inverters that allows for the current and historic daily and hourly generation to be accessible to the public.²⁸

The city installed two more systems, a 39.96 kW system at the Maplewood Community Center and a 38.88 kW system at City Hall soon after. The city funded these projects through a state ARRA grant, the Made-in-MN incentive program, Xcel's Solar*Rewards incentive program, and tax credit financing through the installer.²⁹ Both systems use a product developed by tenKsolar in Bloomington, MN, which consists of solar panels and reflector material and contains eGauge monitors to allow public access to the data. Maplewood estimates that the systems save the city \$700-800 per month.³⁰

Following the passage of Minnesota's community solar policy in 2013, the city began investigating options, which culminated in Maplewood selecting a community solar subscription to cover 33% of the municipal electricity use for 25 years, for 956,290 kWh annually. The city will save an estimated \$201,707.26 over the 25-year contract.³¹

One notable point of progress on Maplewood's renewable energy projects is its shift away from the need for heavy subsidization. To implement the on-site solar installations, the city required grants, rebates and incentives, and third-party financing, as mentioned above. The installations themselves, possibly as a result of this need, cost well above typical solar installations at the time. Maplewood spent \$7.73/W for the community center project and \$8.15/W³² for the systems at City Hall as compared to the median cost at the time of \$5.44-5.79/W.³³ The subscription format of the more recent community solar option required no similar direct subsidy and allowed for a pay-as-you go agreement between the developer and Maplewood. This marked reduction in cost and barriers should encourage other cities to follow suit and potentially stresses the importance of community solar as a broader benefit for municipal subscribers.

COMMUNITY-WIDE

As part of its efforts to reduce energy use, Maplewood has actively promoted community-wide renewable energy development. In October 2011, Maplewood's City Council adopted the Renewable Energy Ordinance, which creates permitting, installation, and operation standards for solar, wind, and geothermal energy installations in the city.³⁴ In October 2017, Maplewood received the Silver SolSmart designation recognizing efforts the City has undertaken to create a solar friendly community including: allowing solar by-right and as an accessory use in all zoning districts; creating an online checklist detailing steps of the community's solar permitting process, and processing solar permits in ten days or less.

²⁷Ann Hutchinson, *Nature Center Solar Photovoltaic Project, Maplewood Seasons* (City of Maplewood), Fall 2011, 3, <http://www.ci.maplewood.mn.us/DocumentView.aspx?DID=2079>;

²⁸ Department of Natural Resources, *Maplewood Nature Center PV Project*, https://webapps8.dnr.state.mn.us/outcomes_reporting/projects/detail?id=3008; Maplewood Nature Center, https://enlighten.enphaseenergy.com/pv/public_systems/qdOg23522/overview

²⁹ Maplewood City Hall and Community Center, *Solar Panel Demonstration Project Information Sheet*, <http://maplewoodmn.gov/DocumentCenter/View/9311>

³⁰ City of Maplewood, *Energy*, <http://maplewoodmn.gov/1006/Energy>

³¹ Data provided by city staff

³² Maplewood City Hall and Community Center, *Solar Panel Demonstration Project Information Sheet*

³³ David Feldman, Galen Barbose, Robert Margolis, Ryan Wiser, Naim Darghouth, and Alan Goodrich, "Photovoltaic (PV) Pricing Trends: Historical, Recent, and Near-Term Projections," *SunShot*, U.S. Department of Energy, November 12, <http://www.nrel.gov/docs/fy13osti/56776.pdf>

³⁴ City of Maplewood, Ordinance No. 914 (2011), <http://www.ci.maplewood.mn.us/DocumentView.aspx?DID=2219>.

TRANSPORTATION

CITY OPERATIONS

Maplewood has taken several steps to decrease emissions from its vehicle fleet. At a municipal level, the City:

- Performed a fleet audit to identify potential efficiency improvements, implemented a vehicle sharing policy, downsized the city fleet, and established bicycle police patrols.³⁵
- The city has monitored and continues to monitor fuel usage, has instituted a no-idling policy, and has transitioned from bio-diesel B2 to B5.³⁶
- Utilizes bio-diesel B10 for its fleet from April 1 to September 30 each year pursuant to Minnesota statutory requirements.³⁷

COMMUNITY-WIDE

At a community-wide level, the City:

- Synchronized traffic signals to minimize idling along White Bear Avenue in the Maplewood Mall area.
- Established a Living Streets policy to calm traffic, make streets more pedestrian and bicycle-friendly, and control runoff.³⁸
- Works with Metro Transit, a regional authority, to expand the Maplewood Mall park-and-ride lot to expand transit use.

QUESTIONS?

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

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³⁵ Scott Schultz, "Sustainable Fleet Operations", *Maplewood Seasons* (City of Maplewood), Spring 2011, 3, <http://www.ci.maplewood.mn.us/DocumentView.aspx?DID=1886>.

³⁶ City of Maplewood

³⁷ Minnesota Department of Agriculture, *About the Minnesota Biodiesel Program*, <http://www.mda.state.mn.us/renewable/biodiesel/aboutbiodiesel.aspx>

³⁸ Michael Thompson, "Living Streets—A Vision for the Future", *Maplewood Seasons* (City of Maplewood), Spring 2011, 2, <http://www.ci.maplewood.mn.us/DocumentView.aspx?DID=1886>.



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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](#).

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