Transforming the energy system to benefit the economy and environment.

Cities and communities are critical to creating a better energy system because collectively they are big enough to matter and small enough to make changes quickly. GPI’s programs are designed to assist communities in different ways with all the elements needed to drive change.

- Energy Planning Technical Assistance
- GreenStep Cities program partner
- Metro CERT
- SolSmart technical assistance
- Small business energy efficiency
SETTING RENEWABLE ELECTRICITY GOALS

1. Determine priorities and desired benefits
2. Complete an energy and emissions profile
3. Analyze available clean energy resources
4. Understand context of electric utility service
5. Pathways to desired outcome with examples
6. Hear from Rochester and Woodbury
PRIORITIES AND BENEFITS

LOCAL BENEFITS VS. GLOBAL BENEFITS
Existing conditions help communities know where they are. In the case of energy, it is beneficial for communities to know their energy profile: how much energy they use and where it comes from. Compiling an inventory of existing programs, resources, tools, and projects can help a community understand its energy landscape and allows a more comprehensive understanding of these factors to better shape the energy future.

**EXISTING CONDITIONS**

Existing conditions help communities know where they are. In the case of energy, it is beneficial for communities to know their energy profile: how much energy they use and where it comes from. Compiling an inventory of existing programs, resources, tools, and projects can help a community understand its energy landscape and allows a more comprehensive understanding of these factors to better shape the energy future.

<table>
<thead>
<tr>
<th>ENERGY USE PROFILE</th>
<th>CLEAN ENERGY RESOURCE</th>
<th>INVENTORY OF EXISTING PROGRAMS</th>
</tr>
</thead>
</table>
| Assess what kind of energy is used and how it is used within city boundaries. | Determine what clean energy resources are available in your community and how much. Different tools are available to map and calculate solar and wind resources, while energy efficiency can be measured through benchmarking. Understanding these resources and where they exist can help cities set goals and prioritize development opportunities. | Compile an inventory of existing government, community, and utility programs to help navigate the energy landscape. Programs can include:
  • **Incentives** (e.g. Utility Rebate Programs)
  • **Technical Assistance** (e.g. GESP)
  • **Financing Mechanisms** (e.g. PACE)
Also document city efforts to support clean energy in your community. |
| **1. Energy consumption by fuel**
  • Electricity
  • Natural Gas
  • Other fuels
  • Transportation fuels | | |
| **2. Energy consumption by sector**
  • Commercial & Industrial
  • Residential
  • City Operations
  • Transportation | | |
| **3. Carbon intensity of electricity** | | |
COMMUNITY ENERGY USE PROFILE

GHG Breakdown by Sector
(Tons of CO2), 2016

- Commercial: 54%
- Residential: 22%
- Transportation: 24%

GHG Breakdown by Fuel Type
(Tons of CO2), 2016

- Natural Gas: 33%
- Electricity: 43%
- Fuel: 24%
COMMUNITY ENERGY USE PROFILE

Energy profiles of different city types by greenhouse gas emissions

City A: Regional Center, heavy manufacturing
- Commercial: 67%
- Residential: 19%
- Transportation: 14%

City B: Suburban community, primarily residential
- Commercial: 26%
- Residential: 34%
- Transportation: 40%
City Operations Energy Use Profile

City Operations Emissions Summary

**Previous Year** (Tonnes of CO2)

- Buildings and Lighting: 56%
- Water and Wastewater: 27%
- City Fleet: 16%
- Waste: 1%

City Operations Emissions by Energy Type

- **Current Year**
  - Electricity
  - Natural Gas
  - Liquid Fuel
  - Waste

- **Previous Year**
  - Electricity
  - Natural Gas
  - Liquid Fuel
  - Waste
# EXISTING CONDITIONS

## CLEAN ENERGY RESOURCES

<table>
<thead>
<tr>
<th>RESOURCE</th>
<th>WHAT IS IT?</th>
<th>HOW TO FIND IT</th>
<th>HOW TO MEASURE IT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar</td>
<td>A city’s solar resource includes areas with access to sufficient direct sunlight for the production of energy. It can be found on the ground or on rooftops.</td>
<td>In Minnesota, cities have access to the Solar Suitability App developed by the University of Minnesota, which can help identify the solar resource at a 1 meter resolution.</td>
<td>Solar energy is measured megawatt-hours.</td>
</tr>
<tr>
<td>Wind</td>
<td>A city’s wind resource includes areas that have access to sustained wind at sufficient speeds to produce energy. A quality wind resource is typically found at 30 meters and higher.</td>
<td>The Minnesota Department of Commerce has developed wind speed maps at 30, 80, and 100 meter heights, which at 500 meter resolution can give a city a general sense of its wind resource.</td>
<td>Wind speed is measured in meter/second at the various heights. A good wind resource is greater than 5 meter/second.</td>
</tr>
<tr>
<td>Biofuels</td>
<td>Biofuels are the conversion of organic material (biomass) into energy. The resources can include food and yard waste, tree debris, and other organic material generated in urban areas. These can be used to generate electricity, heat, or transportation fuels.</td>
<td>Because bio resources vary, there is not good information available to know the resource in a given location. Cities should measure organic waste generated within their community and in surrounding areas that they could access.</td>
<td>Biomass is measured in tons. If a community has a bioenergy plant, they would measure generation capacity in MW or cubic feet for biogas.</td>
</tr>
<tr>
<td>Efficiency</td>
<td>The existing energy efficiency resource is energy consumption that can be systematically reduced through conservation, more efficient operations and technologies, and systems such as combined heat and power and district energy.</td>
<td>Regional Indicators Initiative provides a community-wide assessment of energy use for electricity, gas, and transportation energy. B3 Benchmarking and Energy Star Portfolio Manager can help public and private buildings benchmark their energy consumption against historical data, national averages, and code-based benchmarks.</td>
<td>Energy efficiency is measured in MMBtu for buildings, and vehicle miles traveled for transportation energy use.</td>
</tr>
</tbody>
</table>
## SOLAR RESOURCE

<table>
<thead>
<tr>
<th>Community</th>
<th>Total Generation Potential</th>
<th>Rooftop Generation Potential</th>
<th>Rooftop Capacity</th>
<th>Top 10 Rooftop Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>City</td>
<td>5,402,574 MWh/year</td>
<td>111,590 MWh/year</td>
<td>86 MW</td>
<td>30,195 MWh/year</td>
</tr>
</tbody>
</table>

PHOTO CREDIT: MINNESOTA CLEAN ENERGY RESOURCE TEAMS VIA FLICKR
SOLAR RESOURCE

SOLAR ENERGY CALCULATOR

City Name: Hopkins
Date: October 16, 2017

<table>
<thead>
<tr>
<th>Electricity Use</th>
<th>MMBtu/year</th>
<th>tCO2e/year</th>
<th>Statewide Electricity Goals</th>
<th>MMBtu/year</th>
<th>MWh/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Electricity Use</td>
<td>686,613</td>
<td>72,809</td>
<td>State Solar Goal of 1.5% by 2020</td>
<td>10,209</td>
<td>2,092</td>
</tr>
<tr>
<td>Xcel, Connexus (need connexus data)</td>
<td></td>
<td></td>
<td>State Solar Goal of 10% by 2030</td>
<td>68,061</td>
<td>19,948</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>25% Renewables by 2025 RES</td>
<td>170,153</td>
<td>49,869</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solar Generation Potential</th>
<th>MW</th>
<th>MWh/year</th>
<th>Local Government Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Generation Potential</td>
<td>4,156</td>
<td>5,402,574</td>
<td>Renewable Energy Share 20%</td>
</tr>
<tr>
<td>Total Rooftop Generation Potential</td>
<td>86</td>
<td>111,590</td>
<td>Renewable Electricity Generation 39,895 MWh/year</td>
</tr>
<tr>
<td>Top 10 Buildings Generation Potential</td>
<td>23</td>
<td>30,195</td>
<td>Renewable Electricity Capacity (Solar) 30.69 MW</td>
</tr>
<tr>
<td>Public Buildings Generation Potential</td>
<td>-</td>
<td>-</td>
<td>Greenhouse Gas Reduction 14,562 tonnes CO2e</td>
</tr>
</tbody>
</table>

**Results**

36% of the total rooftop solar resource is utilized, providing enough local renewable electricity to serve the equivalent of 5,253 households and resulting in a 20% reduction in greenhouse gas emissions from electricity use.

**Instructions**

1. Use Regional Indicators Initiative data to enter electricity consumption and greenhouse gas emissions data under “Electricity Use.”
2. Use the Solar Resource Calculation provided by the Metropolitan Council on your Community Page, the Minnesota Solar Suitability App, or Google Project Sunroof to determine your solar resource and enter this into the “Solar Resources” section. Cities may need to conduct further GIS analysis to determine the solar resource of the top 10 buildings and public buildings.
3. Review Minnesota’s clean electricity goals in the “Statewide Electricity Goals” section in comparison to your city’s solar resource.
4. Set a citywide renewable electricity goal in the “Local Government Goals” section based on your city’s solar resource and the statewide goals.
5. View the results.

**Assumptions**

- MWh / MMBtu Conversion: 0.293 MWh / MMBtu
- MMBtu / MWh Conversion: 3.412 MMBtu / MWh
- Solar MWh/MW Conversion: 1,300 MWh / MW
- Average Electricity Use per Household: 26 MMBtu / year

**Resources**

- Regional Indicators Initiative
- Met Council Community Page
- MN Solar Suitability App
- Google Project Sunroof
WIND RESOURCE

- 6.7-8.9 mph
- 8.9-11.1 mph
- 11.1-13.4 mph
- 13.4-15.6 mph
- +15.6 mph
ENERGY EFFICIENCY

Energy Efficiency Potential

Residential
- Electricity (MMBtu)
- Fuel (MMBtu)

Commercial
- Electricity (MMBtu)
- Fuel (MMBtu)

Transportation
- Fuel (MMBtu)
UTILITY

Investor-owned
- Xcel Energy
- Otter Tail Power
- Minnesota Power
- Regulated by the MNPUC
- Generally, less flexibility on power supply choice for customers

Municipal
- 125 municipal electric utilities in Minnesota
- Municipal electric companies are governed by the city council or by a city utility commission
- More power supply flexibility for customers, limited by long-term G&T contracts

Cooperative
- 45 electric cooperative utilities in Minnesota
- Owned by their members and are regulated by a member-elected board of directors
- More power supply flexibility for members, limited by long-term G&T contracts
GENERATION MIX

Percent of electricity generated from carbon free energy, current and planned

- Xcel Energy
- GRE*
- SMMPA
- Otter Tail

Legend:
- Blue: Carbon-free electricity
- Grey: Carbon-intense electricity
Utility emissions factors, current and planned

Tons CO2/MW-h

2015 2030 2016 2032 2016 2030 2017 2031
Xcel Energy GRE* SMMPA Otter Tail Power

EMISSIONS FACTOR
Emissions comparison of Community B in Xcel Territory, current and planned
(Tons of CO2)

- Natural Gas: 25%
- Transportation: 40%
- Electricity: 35%

- Natural Gas: 36%
- Transportation: 55%
- Electricity: 9%
SETTING GOALS

STATE GOALS
• Reduce carbon 80% below 2005 levels by 2050
• Achieve 25% renewable electricity by 2025
• 1.5% solar by 2020 mandate
• 10% solar by 2030 goal

MINNEAPOLIS CAP
• Reduce carbon 30% by 2025
• Generate 10% of electricity from local, renewable sources

Alternative Goals ($, Jobs impact)
• In boundary solar (wind, efficiency) goal based on resource relative to consumption or rooftop percentage (tie to jobs)
• CSG subscription goal based on population, income, or some other metric

ST. LOUIS PARK CLIMATE ACTION PLAN

100% Renewable electricity by 2025
Carbon neutral by 2040

PLANNED EMISSIONS REDUCTIONS BY SECTOR
OPTIONS FOR RENEWABLE ENERGY

• On-site renewable:
  • Purchase
  • Finance
  • Lease

• Community Solar Gardens

• Purchase renewable energy credits
  • WindSource®
  • Renewable*Connect®
  • REC Market

• Virtual power plant
FALCON HEIGHTS – ROOFTOP PPA

ROOFTOP SOLAR ENERGY SYSTEM ON CITY HALL

• Third-party power purchase agreement
• City leases panels with the option to buy
• Allows city to take advantage of tax credit
• 40kW system
• ~60% of total electricity use
EDINA – ROOFTOP CSG

COMMUNITY SOLAR GARDEN

• 618 kW rooftop community solar garden
• City leases space on rooftop of Public Works and Park Maintenance facility
• 25-year lease
• CSG is fully subscribed with 66 households

PHOTO CREDIT: CITY OF EDINA
## Community Solar Garden

### Xcel Energy vs. Wright-Hennepin

<table>
<thead>
<tr>
<th></th>
<th>Xcel Energy</th>
<th>Wright-Hennepin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects in operation</td>
<td>58</td>
<td>4</td>
</tr>
<tr>
<td>Total capacity</td>
<td>211 MW</td>
<td>370 KW</td>
</tr>
<tr>
<td>Most subscribers</td>
<td>Residents; 10% of</td>
<td>85 member participants</td>
</tr>
<tr>
<td></td>
<td>electricity</td>
<td></td>
</tr>
</tbody>
</table>

### Cologne vs. Woodbury

<table>
<thead>
<tr>
<th></th>
<th>Cologne</th>
<th>Woodbury</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscription</td>
<td>100% of electricity</td>
<td>30% of electricity</td>
</tr>
<tr>
<td>Savings</td>
<td>$44,000</td>
<td>$67,000</td>
</tr>
<tr>
<td>25-year savings</td>
<td>$1.1 million</td>
<td>$1.69 million</td>
</tr>
</tbody>
</table>
RENEWABLE ENERGY CREDITS (RECS)

- Need to own RECs to claim attributes of clean electricity
- Can be purchased through the REC market (TerraPass, clean energy broker)
- Xcel Energy green power purchase:
  - WindSource
  - Renewable*Connect
- Great River Energy
  - WellSpring®
  - Revolt (power your EV with 100% wind energy)
MINNEAPOLIS – PRIVATE SECTOR SOLAR

• GREEN BUSINESS COST-SHARE SOLAR INCENTIVE
  • Funded by the franchise fee
  • Up to $75k available per project
  • $.25 production incentive for one year of estimated annual production
  • $.35 production incentive for businesses located in a Green Zone
  • Priorities given to businesses located in Green Zones

PHOTO CREDIT: MINNESOTA CLEAN ENERGY RESOURCE TEAMS VIA FLICKR
STRATEGIES

Accelerate installation of solar energy systems

ENCOURAGEMENT
- Include information about solar energy on city website
- Host solar bulk-buy events
- Provide educational opportunities in public spaces
- Recognize businesses or groups that have installed solar systems or have set renewable electricity goals
- Promote participation in community solar gardens

INCENTIVES
- Offer production incentive for solar on small commercial buildings (e.g. Green Business Cost Share)
- Solar or solar-ready is an option with the PUD (or other regulatory flexibility) ordinance
- Host CSG, and dictate terms to benefit residents, businesses, and low-income households

REGULATION
- Remove regulatory barriers in zoning ordinance; allow rooftop solar as a permitted use in all zones
- Require solar within PUD ordinance or other optional path to basic zoning
- Provide clear and predictable permitting process
- Regulatory incentives from model ordinance

PUBLIC DEMONSTRATION, LEADERSHIP
- Add solar to publicly-owned facilities
- Participate in a community solar garden for city operations
- Purchase RECs to cover remaining usage
- Achieve SolSmart certification
- Install solar on brownfields
# ENERGY USE PROFILE

**Regional Indicators Initiative:**
Measured energy and emissions data for Minnesota cities
http://www.regionalindicatorsmn.com

**Xcel Community Energy Reports:**
Measured energy, emissions, and program participation data for enrolled cities in Xcel’s service territory
https://www.xcelenergy.com/working_with_us/municipalities/community_energy_reports

**DOE City Energy Profiles:**
Estimated city energy and emissions data for U.S. cities
https://apps1.eere.energy.gov/sled/

# CLEAN ENERGY RESOURCES

**Metropolitan Council Community Pages**
Solar resource data for communities within the metro region
https://lphonline.metc.state.mn.us/commportal

**Solar Suitability App:**
Map of solar potential in Minnesota
https://solarapp.gisdata.mn.gov/solarapp/

**Grow Solar Toolkit:**
Resources to assist communities in addressing barriers to solar energy installations
http://www.betterenergy.org/sites/default/files/MinnesotaToolkitFeb2018_AwardBanner_WebVersion_0.pdf

**Minnesota Wind Speed Maps:**
Maps of Minnesota wind resource
https://mn.gov/commerce/industries/energy/technical-assistance/maps.jsp

# ENERGY PLANNING AND ACTION

**LoGoPEP Energy Planning Tools**
http://www.regionalindicatorsmn.com/energy-planning

- A brief guide on how to incorporate energy and/or climate resilience in a city’s request for proposals
- An energy planning guide and workbook
- An example analysis of energy existing conditions
- A solar energy calculator to assist in setting solar energy development goals
- A wedge diagram tool for energy and greenhouse gas reduction planning with an associated menu of feasible city actions

**GreenStep Cities**
Best practices to help cities achieve their sustainability and quality-of-life goals
https://greenstep.pca.state.mn.us/
Discussion

Abby Finis Great Plains Institute
afinis@gpisd.net
Energy Efficiency and Renewable Energy
City of Rochester – Renewable Energy Goals

1. Mayoral Proclamation – 100% renewable by 2031

2. Energy Action Plan
   1. Goals
      • NextGen Goals
         • 1.5% retail energy savings
         • 25% renewable energy by 2025
         • GHG emissions reduction of 30%-2025 / 80% - 2050

   2. Actions
      • Generate electricity from renewable resources
      • Increase supply side efficiency – utility
      • Reduce electric demand through community education and programs
      • Increase community power generation – district energy generators
      • Expand behind the meter generation – private and public
City of Rochester – Renewable Energy Limitations

1. Rochester is a member of the Southeast Minnesota Municipal Power Association

   • Rochester Public Utility (RPU) – local municipal generator is required to purchase electricity at contracted rate of demand (CROD) until 2030

   • Municipal facilities can generate but are offered a wholesale electric rate (~$0.03 / kWh)
City of Rochester – Progress

1. Measurement
   - B3 Benchmarking
   - Voluntary Energy Benchmarking Program

2. Performance
   - Energy Efficiency Projects
     - Guaranteed Energy Savings Program at Recreation Center and Mayo Civic Center
     - MN BioBusiness Center – EBCx light (2017-18)
     - City Hall Existing Building Commissioning (2018-19)
   - Energy Management Program
     - Past EDF Interns – personnel, projects
     - 2017 – Project identification
     - EDF Interns in 2018 to focus on larger program financing strategy and implementation
1. Renewable Development

- SolSmart Certification
- Solarize Campaign - 2018
  - Partnership with United Solar Neighbors and community entities
- Community Solar – offered through SMMPA / RPU
  - Residential sign-ups in 2017 for almost 1 MW
  - Commercial likely in 2018
  - Other possibilities?
A Practical Approach for Managing Energy Costs

March 29, 2018

Bob Klatt, Parks and Recreation Director
City of Woodbury
Goals for city projects:

• Minimize energy costs, and maximize user comfort

• Maintain consistent electrical and gas use, when adding square footage, staff, and equipment.

• Follow the Minnesota B3 standards

• Utilize the Xcel Energy Design Assistance Program, when applicable

• Utilize the B3 database for recommissioning
Index Ratio – The farther the ratio gets above 1.00, the better potential for energy savings through recommissioning.
City Buildings Recommissioned

City Hall

- Energy Star Certified
- 13,841 square foot addition
- Geothermal system
- Energy management system
- South facing glass façade
- Green roof
- Energy efficient lighting and occupancy sensors
- Energy Efficient Boiler
City Hall Stormwater Features

- Green Roof
- Rain gardens
- Grass pave
- Advanced turf
- Porous paver parking stalls
City Buildings Recommissioned

HealthEast Sports Center

• Integrated energy management system
• Geothermal heating and cooling for building and ice arenas
• Solar Thermal
• LED Sports field lighting
• Stormwater reuse for irrigation
• High efficiency pumps and motors
City staff worked with CERTs to develop an RFP process for evaluating proposals from solar developers.

- City and CERTs staff interviewed five companies
- Finalist selection expected Spring/Summer 2018
City Buildings Recommissioned

Public Safety

• 20,000 square-foot addition to current building
• Parking garage added for up to 57 vehicles
  – Cut down idling time in cold weather
  – First year savings of 7,797 gallons of gasoline with continued annual savings
  – Reduced staff time clearing snow and moving cars
• 35.2 kW solar array installed in 2012
• Annual savings of $3,800/year
• Geothermal heating and cooling system
• Green Roof
City Buildings Recommissioned

Afton and Fox Run Fire Stations

- Energy management system
- LED lights in parking lots and bay areas
- Occupancy sensors
- New VFDs on AHU-1
Community Solar Subscriptions

Geronimo Energy – 7,194,770 kWh (Credits in 2017)
• Estimated annual savings of $67,000/year
  – 25-year savings of approximately $1,690,000

U.S. Solar - 8,500,000 kWh (credits expected in 2018)
• Estimated annual savings of $80,090/year
  – 25-year savings of approximately $2,002,256

Nearly ¾ of electricity from City facilities is subscribed to Community Solar!
Efficient City Fleet

- Two Chevy Volt plug-in hybrids
- Three Ford Fusion hybrids
- Six electric utility carts used by the Parks Department
- Two electric ice re-surfacers
Solar pamphlet sent to all residents in water bill

**Did you know?**

1. Residential solar power has never been more affordable than it is right now.
2. Federal, state and utility incentives can reduce the cost of a system by more than half.
3. Solar systems require minimal maintenance and will usually continue to operate for more than 30 years.
4. Solar currently powers approximately 3,500 homes in Minnesota.
5. Solar power is not the energy of the future, it is the energy of today!

**Financial Resources**

- Federal income tax credit (30 percent of qualified expenditures)
- Made in Minnesota Solar Incentive
- Xcel Energy Solar Rewards Program
- Center for Energy and Environment Solar Financing
- Minnesota solar sales tax exemption
- Woodbury Home Improvement Fund

Woodbury residents are encouraged to check with their homeowners association on rules regarding solar panels.

Find more information and links to the financial resources at [www.woodbrysolar.com](http://www.woodbrysolar.com)
Woodbury Solar Outreach

Woodbury Solar website: www.woodburysolar.com
Woodbury solar events for residents

Unsure what community solar gardens are all about and how one might work for you? Join us at a free workshop to learn more!

**Community Solar Garden Workshop & Developer Fair**

**DATE & LOCATION**
Thu, Oct 27, 7:00-9:00pm
Woodbury City Hall
8391 Valley Creek Rd
Woodbury, MN

**AGENDA OVERVIEW**
- City of Woodbury welcome & intro
- ACE on energy-saving programs
- CEED on community solar gardens
- Network with solar developers

**DETAILS & RSVP**
This free event is open to the public, and friends and family are welcome! RSVP at woodbury-solar.eventbrite.com

**Woodbury Solar Power Hour**
Solar Power Your Home, Business, or Farm.
**January 12, 2016**

**SOLAR POWER HOUR™**
This FREE ONE-HOUR SEMINAR will educate homeowners, small business owners, and farmers on the benefits of solar energy. Solar power has never been more affordable or easier to install. This seminar will help you navigate the process of going solar and help you understand all options.

**HERE’S WHAT WE’LL COVER:**
- Basics of solar (photovoltaics, PV systems)
- Market trends
- Identifying where to install solar panels
- Economic benefits
- Meet with the highest quality local solar installers

**January 12, 2016**
7:00 - 8:00 PM
Woodbury City Hall, Woodbury MN 55125

**SOLAR WORKS! In Woodbury**

- **What:** Solar Works in Woodbury Workshop
- **When:** Thursday, March 1, 2012
  6:30 to 8:00 p.m.
- **Where:** City Council Chambers
  Woodbury City Hall

**Sponsored by:** Metro Clean Energy Resource Team

In partnership with:
The Woodbury Environmental Advisory Commission

For more information, contact:
Diana McKeown, Metro Clean Energy Resource Team
diana@ncerecycling.org, 612-455-9372

**Funding provided by Grow Solar, a Midwest partnership to move markets.**
Solar in Woodbury

Since 2015...

• 15+ commercial installations
• 30+ residential solar installations
• Public Safety building – 35.2 kW solar array
• HealthEast Sports Center – Solar thermal array
Solar production in Woodbury

Total Solar Production within the City boundary, in addition to community solar gardens in Chisago and Dakota Counties, to which the City is a subscriber.

<table>
<thead>
<tr>
<th>User /Generator</th>
<th>Generation (kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commerical Property</td>
<td>321,626</td>
</tr>
<tr>
<td>Residential Property</td>
<td>190,738</td>
</tr>
<tr>
<td>City Rooftop</td>
<td>52,000</td>
</tr>
<tr>
<td>City Community Solar Garden Subscriptions (located in Chisage and Dakots Counties)</td>
<td>7,194,770</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7,759,134</strong></td>
</tr>
<tr>
<td>Electrical Usage (kWh)</td>
<td>502,947,600.94</td>
</tr>
<tr>
<td><strong>Percent of Total</strong></td>
<td><strong>1.54%</strong></td>
</tr>
</tbody>
</table>
Community Solar in Woodbury

GreenMark Solar project in Woodbury

• 3-Megawatt solar garden
• 25-year lease
• 39 acres of property
• Currently zoned R-2, Single Family Estate
• Site will be screened with berming and planting
Questions?

Bob Klatt  
Parks and Recreation Director  
bob.klatt@woodburymn.gov  
(651) 714-3580

Jennifer McLoughlin  
Sustainability Specialist  
jennifer.mcloughlin@woodburymn.gov  
(651) 714-3522