

CO_{2e} Emissions

These carbon dioxide equivalent metrics are used to assess your city or tribal government's operation greenhouse gas emissions. These are the metrics in **blue boxes** on the worksheet and highlighted in blue on the reporting tool. Data entered into these boxes are automatically filled in the last tab of the Step 4&5 Worksheet. The "Total Government Operations" number is used for metric 17.5.

METRICS

- **Buildings and Lighting**
 - A. Electricity consumption for all buildings (kWh/year)
 - B. Natural gas consumption for all buildings (Therms/year)
 - C. Electricity consumption for streetlights and traffic signals (kWh/year)

- **Transportation**
 - D. Gallons of diesel consumed (gallons/year)
 - E. Gallons of gasoline consumed (gallons/year)
 - F. Gallons of e85 consumed (gallons/year)

NOTE: Additional fuel types can be added in manually on the "Govt. Operations GHG Inventory" tab of the worksheet. See instructions below.

- **Environmental Management**
 - G. Annual electricity used to treat and distribute water (MWh/year)
 - H. Annual natural gas used to treat and distribute water (Therms/year)
 - I. Annual electricity used to treat water (MWh/year)
 - J. Annual natural gas used to treat water (Therms/year)
 - K. Government operations landfilled each year (tons/year)
 - L. Government operations incinerated each year (tons/year)

- **Economic and Community Development**
 - M. Annual production at Government-owned renewable energy generated sites (MWh/year)

METRIC DEFINITION

- **CO_{2e} (carbon dioxide equivalent)** is a metric to measure the emissions from various greenhouse gases by converting known sources from one unit into metric tons of CO₂. Good news – we do it for you!
- **Government operations** includes anything for which the city or tribal nation manages and operates. This should be for public buildings and facilities, parks and trails, vehicle fleets, streets and sidewalks, etc.
- **Electricity consumption** includes all electric sources, excluding natural gas. [\(Metric A\)](#)
- **All buildings** includes all city or tribal buildings or facilities in which you have B3 data (or other means) data for. [\(Metric A, B\)](#)
- **Communities that do not own and operate water treatment facilities and/or WWTP** should report only energy (electricity and natural gas) data related only to the part of infrastructure that the city or tribal nation operates (i.e. publicly-owned wells, pumps, lift stations). [\(Metrics G-J\)](#)
- **Renewable energy** includes power from wind (turbines) and water (hydroelectric), from the sun (powering photovoltaic panels, hot-air and hot-water panels), from biofuels, from biomass (burning wood, and biogas produced by anaerobic digestion of organic matter such as at a waste water plant), and from trash incineration and landfill gas. [\(Metric M\)](#)

Minnesota GreenStep Cities & Tribal Nations Performance Metrics for Recognition at Steps 4 and 5

- **City and tribal government sites** include renewable energy generation sites inside and outside the local or tribal government limits, such as at a waste water treatment plant, owned or leased by the government. Include sites owned by a municipal utility. (Metric M)

DATA SOURCES

- Government and local utility records for city buildings, facilities, and operations (Metrics A-M)
- Government purchasing data (Metrics A-L)
- **B3 Benchmarking** program data at <https://mn.b3benchmarking.com> (Metrics A, B, C, G, H, I, J, M)
 - Note: Energy bill data through December 31st for all buildings must be put into the B3 system before the system can accurately calculate the GreenStep measures.

Navigate to your account. Go to the “Data” tab and click on “Export to Excel”

The screenshot shows the Shakopee GreenStep Data interface. At the top, it says "All Organizations / City" and "Shakopee" with a user count of "353,805 gross bldg st". The navigation menu includes "Dashboard", "Data", "Metrics", "Visualizations", "Improvements", and "Reports".

Under the "Data" tab, there are three main sections:

- Sites (11)**: A toggle switch is turned on.
- Buildings (9)**: A table with columns: Building Name, Status, Building Type, Address, Square Feet, Occupied, and Site. Two rows are visible: "City Hall" and "Community Center".
- Meters (27)**: A table with columns: Meter Name, Status, Type, Utility, Account #, Meter #, First Reading, Last Reading, Site, and CN. Three rows are visible, all for "Electric" meters at "Shakopee Public Utilities".

At the bottom, there are three action boxes:

- Import**: "Generate an Excel spreadsheet to populate your data offline." with an "Import Wizard" button.
- Export**: "Export buildings, meters, usage and more to Microsoft Excel." with an "Export to Excel" button circled in red.
- Search**: "Search for meters using a variety of properties." with a "Meter Search" button.

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A dashboard will pop up. Select the following and update the timeline to the previous calendar year. I suggest clicking “check all” in the Options section on the upper right – it may include additional details such as onsite solar or water use (Metrics 10.3). Click “Export to Excel”

Export to Excel - Scandia

Standard Exports Custom Export

Choose from common export templates. A Microsoft® Excel® worksheet will be created for each selection.

Organizations

- Summary / Completeness
- Energy Baseline Comparison
- Water Baseline Comparison

Organization Usage

- Monthly Usage
- Annual Usage

Sites

- Summary / Completeness
- Energy Benchmark
- Energy Peer Comparison
- ENERGY STAR®
- Energy Baseline
- Water Benchmark
- Water Peer Comparison
- Water Baseline
- Site Identifiers

Site Usage

- Monthly Usage
- Monthly Usage By End Use
- Monthly Usage Weather Normalization Detail
- Projected Monthly Usage
- Annual Usage

From: 1/1/2023 To: 12/31/2023

Options (When Applicable)

- Energy Total
 - Electric
 - PV Onsite
 - Natural Gas
 - Flow Meter
- Water Total

Normalization

- None
- Per Square Foot
- Per Occupant

Baseline Comparison

Actual: Each Site's recent period

Baseline: Organization's baseline period

- Weather Normalized

Check All | Uncheck All

In the Excel spreadsheet, you will see a list of the sites with information collected in B3. They may be grouped by type (i.e. buildings, waste water treatment, etc.) or they may be in a list. If they are simply listed, I like to color code them by the metric you will use them for:

- Buildings (Metrics A-B)
- Streetlights/Traffic Signals (Metric C)
- Water Treatment (Metrics G-H)
- Wastewater Treatment (Metrics I-J)
- Renewable Sites (Metric M)

	A	B	C	D	E
1	3 BENCHMARKING				
2	City of Scandia				
3					
4	Name	Parent Organization	Start Date	End Date	Building Type
5	Aerator	Scandia	1/1/2023	12/31/2023	Non-Building
6	Annex Building	Scandia	1/1/2023	12/31/2023	Vehicle Storage Building
7	Bliss Collector WWTP	Scandia	1/1/2023	12/31/2023	Wastewater Treatment Plant
8	Cold Storage Building	Scandia	1/1/2023	12/31/2023	Warehouse (Conditioned)
9	Fire Hall/Public Works	Scandia	1/1/2023	12/31/2023	Fire Station
10	Lift Stations/Sewer	Scandia	1/1/2023	12/31/2023	Non-Building
11	Lighting	Scandia	1/1/2023	12/31/2023	Non-Building
12	Scandia Community Center	Scandia	1/1/2023	12/31/2023	Community/Recreation Center
13	Skating Facility	Scandia	1/1/2023	12/31/2023	Park/Recreation
14	Uptown Drain Field	Scandia	1/1/2023	12/31/2023	Non-Building
15					

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Add up the total for each category (i.e. buildings, wastewater treatment, etc.)

A: Electric kWh for buildings (column T)

	Q	R	S	T	U	V	W
1							
2							
3							
4	Benchmark Total kBTu	Benchmark Total kBTu/SF	Total Energy Meters	Electric kWh	Electric kBTu	Electric CO2e (Metric Tons)	Electric Cost
5	0.00	0.00	1	0.00	0.00	0.00	\$156.31
6	347,205.58	106.83	2	5,873.99	20,042.05	2.51	\$1,024.77
7	0.00	0.00	2	4,057.55	13,844.36	1.74	\$747.06
8	138,949.17	46.32	2	1,574.65	5,372.71	0.67	\$385.76
9	1,282,532.57	89.06	3	375.43	1,280.96	0.16	\$4,872.36
10	0.00	0.00	4	6,850.13	23,372.65	2.93	\$1,502.32
11	0.00	0.00	3	27,622.24	94,247.08	11.82	\$4,103.48
12	676,840.84	112.51	2	42,125.64	143,732.68	18.02	\$8,195.18
13	165,863.45	66.35	2	15,973.05	54,500.05	6.83	\$2,515.53
14	0.00	0.00	1	12,951.44	44,190.31	5.54	\$1,604.68
15	2,611,391.61			117,404.12	400,582.85	50.23	\$25,107.45
16							
17				65922.76			

B: Natural Gas Therms for buildings (Column AT)

	Natural Gas Therms	Natural Gas kBTu	Natural Gas CO2e (Metric Tons)	Natural Gas Cost
0	0.00	0.00	0.00	\$0.00
0	1,406.69	140,669.00	7.47	\$1,558.15
0	0.00	0.00	0.00	\$0.00
0	0.00	0.00	0.00	\$0.00
1	6,608.77	660,877.13	35.10	\$7,066.26
0	0.00	0.00	0.00	\$0.00
0	0.00	0.00	0.00	\$0.00
0	2,029.54	202,953.58	10.78	\$2,089.08
0	1,125.35	112,535.00	5.98	\$1,310.77
0	0.00	0.00	0.00	\$0.00
	11,170.35	1,117,034.71	59.33	\$12,024.26
	11170.35			


C: Electric kWh for street lights and traffic signals (Column T)

Electric kWh	Electric kBTu	Electric CO2e (Metric Tons)
0.00	0.00	0.00
5,873.99	20,042.05	2.51
4,057.55	13,844.36	1.74
1,574.65	5,372.71	0.67
375.43	1,280.96	0.16
6,850.13	23,372.65	2.93
27,622.24	94,247.08	11.82
42,125.64	143,732.68	18.02
15,973.05	54,500.05	6.83
12,951.44	44,190.31	5.54
117,404.12	400,582.85	50.23
65922.76		

G. Electric kWh for water treatment (Column T)

Note: you may have lift stations and pump stations used for both drinking water and wastewater listed together. That's ok – just enter it all in under with G/H or I/J (don't duplicate the number).

Electric kWh	Electric kBtu	Electric CO2e (Metric Tons)
0.00	0.00	0.00
5,873.99	20,042.05	2.51
4,057.55	13,844.36	1.74
1,574.65	5,372.71	0.67
375.43	1,280.96	0.16
6,850.13	23,372.65	2.93
27,622.24	94,247.08	11.82
42,125.64	143,732.68	18.02
15,973.05	54,500.05	6.83
12,951.44	44,190.31	5.54
117,404.12	400,582.85	50.23
65922.76		



Convert to MWh/year


This metric request that you convert the number from kWh to MWh. Do so by dividing the total by 1,000.

H. Therms for water treatment (Column AT)

Natural Gas Therms	Natural Gas kBtu	Natural Gas CO2e (Metric Tons)
0.00	0.00	0.00
1,406.69	140,669.00	7.47
0.00	0.00	0.00
0.00	0.00	0.00
6,608.77	660,877.13	35.10
0.00	0.00	0.00
0.00	0.00	0.00
2,029.54	202,953.58	10.78
1,125.35	112,535.00	5.98
0.00	0.00	0.00
11,170.35	1,117,034.71	59.33
11170.35		

I. Electric kWh for water treatment (Column T)

Electric kWh	Electric kBtu	Electric CO2e (Metric Tons)
0.00	0.00	0.00
5,873.99	20,042.05	2.51
4,057.55	13,844.36	1.74
1,574.65	5,372.71	0.67
375.43	1,280.96	0.16
6,850.13	23,372.65	2.93
27,622.24	94,247.08	11.82
42,125.64	143,732.68	18.02
15,973.05	54,500.05	6.83
12,951.44	44,190.31	5.54
117,404.12	400,582.85	50.23
17008.99		



Convert to MWh/year


This metric request that you convert the number from kWh to MWh. Do so by dividing the total by 1,000.

J. Therms for wastewater treatment (Column AT)

	Natural Gas Therms	Natural Gas kBtu	Natural Gas CO2e (Metric Tons)
	0.00	0.00	0.00
	1,406.69	140,669.00	7.47
	0.00	0.00	0.00
	0.00	0.00	0.00
	6,608.77	660,877.13	35.10
	0.00	0.00	0.00
	0.00	0.00	0.00
	2,029.54	202,953.58	10.78
	1,125.35	112,535.00	5.98
	0.00	0.00	0.00
	11,170.35	1,117,034.71	59.33
	11170.35		

M. Electric kWh of owned PV onsite(Column AG)

	PV Onsite (Owned) kWh	PV Onsite (Owned) kBtu	PV On (Owned) (Metric)
	0.00	0.00	
	0.00	0.00	
	0.00	0.00	
	0.00	0.00	
	37,424.78	127,693.35	
	0.00	0.00	
	0.00	0.00	
	0.00	0.00	
	0.00	0.00	
	0.00	0.00	
	37,424.78	127,693.35	



Convert to MWh/year
 This metric request that you convert the number from kWh to MWh. Do so by dividing the total by 1,000.

- Government vehicle maintenance and management tracking systems (Metrics D, E, F)
 - If you have additional fuels tracked, you can manually enter them into the "Govt. Operations GHG Inventory" tab to include emissions in your total calculation.
 - Enter data using the fuel table.
 - Multiply the total number of gallons you have tracked for your fleet by the fuel type's GHG/unit found in Columns G61-73 on the Inventory tab.
 - Add that calculation in for the current year in I21 (update previous year data as needed).
 - Not sure or have additional fuels to add? Let Kristin know.

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Vehicle/ Fuel	CO2	
	CO2 (US kG/gallon e	biomass- GHG / unit (tonnes/gal)
Jet Fuel	9.57	0.00957
Aviation Gasoline	8.32	0.00832
Gasoline/Petrol	8.81	0.00881
On-Road Diesel Fue	10.15	0.01015
Residual Fuel Oil (3:	11.8	0.0118
LPG	5.79	0.00579
CNG	0.054	0.000054
LNG	4.46	0.00446
Ethanol		5.56
100% Biodiesel		9.46
E85 Ethanol/Gasolin	1.3215	4.726
B20 Biodiesel/Diese	8.12	1.892

NOTE - using passenger vehicles

Source: https://ghgprotocol.org/sites/default/files/Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx

1. Identify the fuel used in the chart above. Multiply the total number of gallons you have tracked by that fuel types GHG/unit (Column G 61-73)

Government Fleet		Units	Previous Year Values (CO2)	Current Year Values (CO2)	Difference between Year 2 and Year 1
CO2e	Gallons of diesel consumed	Gallons/Year	420.99	1.52	-419.47
CO2e	Gallons of gasoline consumed	Gallons/Year	476.10	478.48	2.38
CO2e	Gallons of e85 consumed	Gallons/Year	123.74	0.00	-123.74
CO2e	Gallons of other fuel* consumed	Gallons/Year	0.00	392.37	392.37
			Previous Year	Current Year	Difference between

Enter this in yourself. See the calculations below.

- Wastewater and water treatment management tracking systems (Metrics G-J)
- Waste hauler invoices or government contract (Metrics K-L)
- Utility data, invoices, or government contract (Metric M)

METRIC CALCULATION AND PUBLIC REPORTING

- **Annual measurement & reporting** for these metrics is for the calendar year before the reporting year. (Metrics A-M)
- **Government Operations GHG Assessment Tool** – this tool, located on the last tab of the Step 4&5 Worksheet, will automatically calculate the metric ton equivalent to use for metric 17.5. Use the number highlighted in Cell R9.

METRIC RATIONALE

Greenhouse gas inventories offer a valuable way to view and compare over time the effectiveness of multiple energy and sustainability best practice actions. Greenhouse gas emissions (and energy) data gauge changes in the use of electricity, natural gas, liquid fuels, solid fuels (wood and coal), and (to a small extent) solid waste management methods.

The calculation of an annual government operations GHG number is as fundamental to the environmental management and health of a city as its annual budget is to its financial management and health. Like an annual community (city-wide) GHG calculation, the data-gathering and calculation process for a city operations GHG metric brings disparate city staff together and has value in interdepartmental data sharing and discussion. Data elements that a community must use for a government

operations calculation are now collected under other GreenStep metrics: Buildings, Transportation, Drinking Water, Waste Water, Solid Waste, and Renewable Energy. A separate data visualization web page will grab data reported under these data elements and do the calculations to report one city operations GHG number.

STEP 5 METRIC TARGETS

Individual governments are best equipped to set realistic goals for metric improvement, and any improvement of this metric is good. That said, the [State of Minnesota set goals](#) for their enterprise:

1. Greenhouse Gas Emissions: 30% reduction of greenhouse gas emissions by 2025 relative to a 2005 calculated baseline.
2. Energy Consumption: 30% reduction in consumption of energy per square foot by 2027 relative to a 2017 adjusted baseline.
3. Sustainable Procurement: 25% of total spend on Priority Contracts are sustainable purchases by 2025.
4. Reduce Fleet Fossil Fuel Consumption: 30% reduction of State Fleet consumption of fossil fuels by 2027 relative to a 2017 adjusted baseline.
5. Reduce Solid Waste: 75% combined recycling and composting rate of Solid Waste by 2030.
6. Reduce Water Consumption: 15% reduction of water use by 2025 relative to a 2017 adjusted baseline.

LEED FOR CITIES & COMMUNITIES

<https://www.usgbc.org/leed/rating-systems/leed-for-cities-communities>

IP Credit: Green Building Policy and Incentives

- Option 1. Buildings Owned and/or Operated by the Local Government (1-2 points)
 - Existing Buildings: Register and certify existing buildings above 5000 square feet (465 square meter) that are owned and/or operated by the local government to LEED, EDGE or a similar green building rating system.

EN Prerequisite: Energy and Greenhouse Gas Emissions Performance

- Measure the annual energy consumption and Greenhouse Gas (GHG) emissions for the city. The inventory should cover Scope 1 and Scope 2 emissions for one whole calendar year within the last five years. LEED points are based on Energy and GHG performance on Arc scored by Greenhouse Gas emissions per capita (tons CO₂e per capita). Obtain a minimum Energy and GHG Performance Score of 40 on Arc.

EN Credit: Energy Efficiency

- Option 1. Energy Audit and Energy Conservation (1-4 points)
 - 1. Building Performance Disclosure (1 point)
 - Track, benchmark, and report energy consumption data of city owned and operated buildings using a platform or tool such as ENERGY STAR Portfolio Manager, Arc Skoru, or a locally developed and recognized tool.
 - Include a minimum of 50% of the buildings owned or operated by the city that are 10,000 square feet (930 square meters) or greater. Reporting year must be within the most recent 5-year period.
 - 2. Energy Audit (1 point)
 - Identify city owned buildings falling in the top 25% tier of energy consumption. Submit an energy audit report of the identified buildings.
 - The energy audit must meet both the requirements of the ASHRAE preliminary energy use analysis and an ASHRAE Level 1 walk-through assessment identified in the ASHRAE Procedures for Commercial Building Energy Audits or equivalent. Audit must be conducted within the last 10 years.
- Option 2. Street Lighting and Public Area Lighting (1-2 points)

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- Provide efficient street lighting and public area lighting in the city. The lamps should have a minimum Luminous Efficacy of 100 lumens per watt.
- Option 3. Water and Wastewater (1-2 points)
 - Demonstrate reduction in the energy intensity of water and wastewater systems, including water supply pumping, treatment, distribution as well as wastewater pumping, and treatment, from a baseline year no more than five years prior to the most recent reporting year

EN Credit: Renewable Energy

- Option 1. Renewable Energy in Electricity Supply (1-6 points)
 - Cities may choose one or more strategies for procuring renewable energy (such as solar PV, wind, geothermal, micro or small-scale hydro*, or biomass) from the categories below. Points are based on total electricity supply met by renewable energy.
 - Categories for renewable energy:
 - Local renewables
 - Power generated from locally installed renewables (by the city, utility, consumers, or prosumers such as community solar PV, wind, geothermal, micro or small-scale hydro, biomass).
 - Off-site/imported renewables
 - Off-site renewable electricity that is procured or contracted by the city or utility.
 - Green-e Energy certification or equivalent is required for delivery of EACs.
 - Environmental benefits of all procurement must be retained by the city or utility. All off-site qualifying resources must be contracted, owned, or leased for at least 15 years.

RELATED BEST PRACTICE ACTIONS

- [1.1](#) Enter/update government-owned building information and monthly usage data into the **MN B3 Benchmarking database, and utilize building/energy audits** to identify potential improvements.
- [4.1](#) Require energy efficient, Dark-Sky compliant **new or replacement outdoor lighting** fixtures on city-owned/private buildings and facilities.
- [4.3](#) Replace the city's **existing street lighting** with Dark Sky-compliant LEDs, modifying any city franchise/utility agreement and adding smart grid attributes.
- [4.8](#) Replace the city's **existing traffic signal indications** with LEDs.
- [13.1](#) **Efficiently use your existing fleet** of city vehicles by encouraging trip bundling, video conferencing, carpooling, vehicle sharing and incentives/technology.
- [13.2](#) **Right-size/down-size** the city fleet with the most fuel-efficient vehicles that are of an optimal size and capacity for their intended functions.
- [13.3](#) Phase-in **operational changes, equipment changes including electric vehicles**, and no-idling practices for city or local transit fleets.
- [13.6](#) Retrofit **city diesel engines** or install auxiliary power units and/or electrified parking spaces, utilizing Project GreenFleet or the like.
- [20.1](#) Compare the **energy use and financial performance** of your facilities with other peer facilities using standardized, free tools.
- [20.4](#) Optimize **energy and chemical use** at drinking water/wastewater facilities and decrease chloride in wastewater discharges.
- [22.1](#) **Improve city operations and procurement** to prevent and reuse, recycle and compost waste from all public facilities (including libraries, parks, schools, municipal health care facilities), and minimize use of toxics and generation of hazardous waste.

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- [24.3 Measuring Outcomes](#): Engage community members and partners in identifying, measuring, and reporting progress on key sustainability and social indicators/ including energy use/greenhouse gas emissions, social vitality/social inclusion outcome measures.
- [26.5](#) Install a **public sector/municipally-owned renewable energy** technology, such as solar electric (PV), wind, biomass, solar hot water/air, or micro-hydro.

[NEED HELP? CONTACT](#)

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Nov. 2024