#1: CITY BUILDINGS & LIGHTING
CORE METRIC FOR CATEGORY **A** & **B** & **C** CITIES
Bold, green font indicates metrics that must improve to be recognized at Step 5

METRICS

City Buildings:
1.1 **kBtu per square foot, per year**
1.2 Dollars spent on energy per square foot, per year
1.3 Ratio of actual energy use to predicted energy use

Percent of LEDs in:
1.4 **Street lights**
1.5 Traffic signals
1.6 City buildings & property

METRIC DEFINITION

- **City buildings** include all city-owned or leased buildings fueled by two or more sources of energy. Excluded are unheated garages, pump houses, and some park buildings. Category C cities may not own or lease such buildings and thus do not report these three data points. **Water use** by city buildings and properties is reported under Metric 10: Drinking Water. (Metrics 1.1-1.3)

- **Ratio of actual energy use to predicted energy use** – This is called the B3 Benchmark Index Ratio – it is an engineering model that predicts how much energy all buildings would use if they were built to and operated under the current State energy code. This ratio divides the actual energy use for the most recent twelve months of data available by the predicted energy use for the same period, and expresses the result as a number. Numbers 1.0 or under mean the city's buildings are performing better than predicted. (Metric 1.3)

- **Street lights** include all street lights owned by the city and all those owned by any utility under a franchise agreement and should be counted as one fixture, regardless of the number of bulbs contained. (Metric 1.4)

- Each **traffic signal,** owned by the city or other unit of government, should be counted as one for purposes of calculating a percentage; thus, as sometimes only one of the three colors is changed out before changing out another color, counts may include 0.33 of a signal. (Metric 1.5)

- **City buildings & property** includes both interior and exterior lighting for buildings (interior includes ambient and task lighting fixtures), garages, other city facilities (e.g. drinking/waste water plant), parking lots and ramps, ball fields, park lighting, trails, and the like. (Metric 1.6)

- **Alternative metrics**: if you have been gathering or want to gather slightly different metrics, report those and explain in the notes section of the GreenStep reporting survey why they are a better fit for your city. For example, you may use Energy Star's Portfolio Manager or a proprietary building program, though GreenStep has not seen the ability of these programs to calculate actual-to-predicted ratios based on Minnesota's changing building code, nor to compare your city's data to other city data by type of building in Minnesota.

DATA SOURCES

- B3 Benchmarking Program Data at https://mn.b3benchmarking.com (Metrics 1.1-1.3)
  - 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.
- Public works data; work orders; city purchasing data. (Metrics 1.4-1.6)
- Utility data reported under franchise agreements. (Metric 1.4)

Minnesota
GreenStep Cities

METRIC CALCULATION AND PUBLIC REPORTING

- **Category C GreenStep cities** that do not own or lease buildings should note that on the Step 4 reporting spreadsheet.

- **kBtu per square foot, per year** in all city buildings is calculated by B3 Benchmarking for the year proceeding the reporting year. When logged into your City's B3 Benchmarking portfolio and at the organization level, click the "Visualizations" tab and select EUI Report in Templates dropdown. Click "Show Report Options" and set the "Duration" section dropdown as Jan to Dec for the reporting calendar year. In the "Consumption Summary By Year" table, report the metric shown under "Actual kBtu/SF." Note, only sites with square footage will be included. (Metric 1.1)

- **Dollars spent on energy per square foot, per year** in all city buildings is calculated in a similar way by B3 Benchmarking for the year proceeding the reporting year. When logged into your City's B3 Benchmarking portfolio and at the organization level, click the "Visualizations" tab, select EUI Report in Templates dropdown. Click "Show Report Options", then under the "Meters & Units" section set the "Units" dropdown to Dollars. Set the "Duration" section dropdown as Jan to Dec for the reporting calendar year. In the "Consumption Summary By Year" table, report the metric shown under "Actual Dollars/SF." Note, only sites with square footage will be included. (Metric 1.2)

- **Ratio of actual energy use to predicted energy use** is also calculated in a similar way by B3 Benchmarking for the year proceeding the reporting year. When logged into your City's B3 Benchmarking portfolio and at the organization level, click the "Visualizations" tab, select Benchmark Report in Templates dropdown. Click "Show Report Options" and set the "Duration" section dropdown as Jan to Dec for the reporting calendar year. In the "Consumption Summary By Year" table, report the metric shown under "Ratio". Note, only sites that are Benchmark complete will be included. (Metric 1.3)

- **Percent of LEDs** can be a calculated number or an estimated number. First, count or estimate the number of installed LED fixtures in street lights on the December 31st before the reporting year. Then, divide this installed number by the count or estimate of total street lights. Repeat this procedure for traffic signals and building/property lights. Express the ratios as percentages. (Metrics 1.4-1.6)

METRIC RATIONALE

In city buildings, the owner is also the tenant and thus all cost savings from short and long-term efficiency investments will accrue to the city and its taxpayers. Additional benefits from such investments include reducing greenhouse gases and lowering exposure to fuel price volatility. Energy efficiency (and other sustainability) opportunities abound in existing buildings, which are in a constant drift toward inefficiency. Many of the opportunities not only reduce operating costs, but improve occupant quality of life, create higher resale value, and improve employee productivity. The B3 database allows cities to compare sq. ft. energy use among all buildings of the same type across Minnesota. This makes it possible to target energy improvements to the lowest-performing buildings, investments which yield the greatest ongoing payback.

LEDs: probably the easiest and most cost-effective measure a city can do to improve energy efficiency is to convert lighting to LED technology. Payback periods can often be measured in months, not years. Utility and other financial incentives exist, and city staff need only assess and choose equipment, vendors and payment options. Therefore this is a simple measure that aims to focus attention on completing a transition to 100% LED fixtures such that savings begin accruing faster.

STEP 5 METRIC TARGETS

Though no state targets exist for cities, a relevant target is a state goal of reducing energy use per sq. foot in state buildings by 30% by 2027 relative to a 2017 baseline. A 3% annual reduction in city operations energy use is consistent with this state agency operations goal.

Minnesota
GreenStep Cities

NEED HELP? CONTACT

Peter Lindstrom, GreenStep best practice advisor for **green buildings**, Clean Energy Resource Teams
612/625-9634 or plindstr@umn.edu

Susan Zarling, GreenStep best practice advisor for **lighting**, MN Dept. of Transportation
651-234-7052, susan.zarling@state.mn.us

December 28, 2018