#10: DRINKING WATER

OPTIONAL METRIC FOR CATEGORY **A** & **B** & **C** CITIES

Bold, green font indicates metrics that must improve to be recognized at Step 5

METRICS

10.1 **Residential gallons used per person per day**
10.2 **Business gallons used per job per day**
10.3 a **Annual city operations' gallons: summer**
b **Annual city operations' gallons: non-summer**
10.4 Ratio of maximum day use to average daily use
10.5 Annual energy used per million gallons water distributed (MMBtus)
10.6 Annual cost in dollars spent per million gallons of water distributed
10.7 **Percent of annual losses in drinking water system**
10.8 Trend of source water levels: falling, stable, or rising

METRIC DEFINITION

- **Exclude water used by other water withdrawal permit holders within the city**, unless you note in your submittal to GreenStep that your city comprehensively tracks and includes this data. Other permit holders include residences with private wells or commercial, industrial, or agricultural uses with separate use permits. Public data exists only for users withdrawing more than 10,000 gallons of water per day or 1 million gallons per year. (Metric 10.1)
- **Business gallons** include water sold to commercial, industrial, and institutional accounts. (Metric 10.2)
- **For city operations**, use of water during the typical landscape irrigation/city pool months of June through October will dwarf water use for city buildings, and so data for November through May water use is a reasonable proxy for baseline water use by buildings. Cities should feel free to use more precise data if it exists. (Metric 10.3)
- **Peak daily use to average daily use** is a standard ratio reported to the MN DNR in city water supply plans. (Metric 10.4)
- **Include water losses in gallons used** by residences and by commercial/industrial/institutional accounts. Note that Regional Indicators Initiative data on water use do not include water lost to distribution leakage so as to most accurately represent actual consumption/use by people and use by businesses. (Metric 10.7)
- **Include wholesale water volumes** - water sold to users not within city boundaries – only when calculating percent of losses, MMBtu (million Btus) and dollars per million gallons of water distributed, and trend data. (Metrics 10.5 - 10.8)
- **Alternative metrics**: if you have been gathering or want to gather different metrics, report those and explain why they are a better fit for your city.

DATA SOURCES

- City records (Metrics 10.1 – 10.8)
- Regional Indicators Initiative; note the RII commercial/industrial category combines businesses and city operations gallons: https://www.regionalindicatorsmn.com/water-chart (Metric 10.1 and 10.2)
- Jobs data from North American Industry Classification System (NAICS) and the Quarterly Census of Employment Wages (QCEW) – https://apps.deed.state.mn.us/lmi/qcew/ResultsDisp.aspx (Metric 10.2)
- B3 water tab data: https://mn.b3benchmarking.com (Metrics 10.1 - 10.3; 10.5 and 10.6)
- Infrastructure Stress Transparency Tool (MN State Auditor): https://www.auditor.state.mn.us/maps/ (Metrics 10.1, 10.2, 10.6)

- City Water Supply Plan submitted to the MN Dept. of Natural Resources (Metrics 10.4, 10.8)

METRIC CALCULATION AND PUBLIC REPORTING

- **Annual measurement and reporting** for these metrics is for the calendar year before the reporting year. (Metrics 10.1-10.8)
- **If a city purchases all of its water** from another city/water service, do not report source water trends. (Metrics 10.1 – 10.7)
- **For a city that produces only some of its water**, report numbers based on the city utility data only. (Metrics 10.1 - 10.8)
- **Residential and businesses gallons** use the past year of data to average out variation in the data due to seasonal change. Business gallons are normalized by jobs so as to identify whether in aggregate businesses are high or low water users. Exclude wholesale gallons sold to users outside the city. (Metrics 10.1 and 10.2)
- **City operations' gallons** – one number for summer use (June-October) and one for non-summer use (mostly by buildings: November – May) – can be tracked on the water tab of a city's B3 database. Cities should feel free to use more precise data: gallons/year for non-building uses and gallons/year for internal water use in city buildings. Exclude wholesale gallons. (Metric 10.3)
- **Use 10 years of data (or fewer) to calculate ratio of maximum day use to average daily use. (**1) add up the highest daily number of gallons distributed during each of the past 10 years; (2) divide that number by 10, and divide that number (the average peak demand day averaged over 10 years) by (3) total gallons distributed over the past 10 years, divided by 10 and then divided by 365. Exclude wholesale gallons. (Metric 10.4)
- **MMBtu** = millions of British Thermal Units of energy. Water systems using electricity (tracked in kilowatt-hours: kWh) and liquid fuels (generally tracked in BTUs) should convert all energy use to the common metric MMBtus. Include wholesale gallons. For energy conversions use http://www.eia.gov/Energyexplained/index.cfm?page=about_energy_conversion_calculator (Metric 10.5)
- **Annual cost in dollars spent per million gallons of water distributed**: total energy (dollars), divide by total gallons distributed over the past 12 months (include wholesale gallons), and divide by 1,000,000. (Metric 10.6)
- **Dollars per million gallons** = the operating cost to distribute each one million gallons. Use dollars and gallons for the most recent one year period, or set a protocol to use cumulative data from a rolling 3 or 5 year (or greater) time period. Include wholesale gallons. Include depreciation costs but exclude one-time capital costs. Note that the State Auditor's Infrastructure Tools reports 3 data points for a city's drinking water enterprise fund: very useful for fiscal sustainability but different than this GreenStep metric. (Metric 10.6)
- **Percent losses** (percent unaccounted for, or non-revenue water) = last years' gallons of water produced (withdrawals from all sources) minus gallons of water sales, divided by annual gallons of water produced. Include wholesale gallons. Losses are leakage on transmission and distribution mains, leakage and overflows at utility storage tanks, and leakage on service connections up to the point of customer metering. Included also is unbilled metered water (not a good city practice). (Metric 10.7)
- **The trend of all source water levels should be reported as Falling, Stable, or Rising**: a composite indictor for all production wells, observation wells, and source water intakes or reservoirs tracked and reported to the MN DNR in your city's Water Supply Plan. Determine a protocol that makes sense for your unique water supply or supplies. For example, if all your water comes from one aquifer, you may decide to compare water table height changes every 3 years and report the trend as Falling or Rising if the variance is more than 2 inches. Or with multiple surface and groundwater supplies you may factor in percentage of water coming from each and annual variation and then use a 5-yr. rolling average of change to report a long-term trend in water levels. Include wholesale gallons. (Metric 10.8)

METRIC RATIONALE

Potable water use is a growing concern primarily due to the large proportion of cities using groundwater, which often takes decades and centuries to replenish. About 75% of Minnesota's drinking water comes from ground water. In addition, there are increasing risks to both surface and groundwater sources posed by droughts that are exacerbated by climate change. Water use tracking allows more effective water conservation and water reuse efforts by the city, residents and businesses. Conservation efforts importantly "peak-shave:" reduce the highest water use day during each year, which effectively adds capacity to city infrastructure and potentially allows cities to reduce the amount of infrastructure that is required to meet the peak day use. This infrastructure includes new wells and new water towers, which can be costly items.

Water extraction, treatment, and distribution systems can constitute a major portion of energy consumption by city operations and can offer great opportunities for efficiency improvements. For example, the withdrawal, treatment, storage, and distribution of potable water in the City of Burnsville in 2013 resulted in 58% of the electricity consumption and 42% of the greenhouse gas emissions from city operations. Energy efficiency improvements to the city's drinking water treatment plant enabled it to increase its production of potable water in 2011 by 25% over 2009 levels, while reducing electricity consumption 46%.

Drinking water quality is a highly regulated area; under federal law, water utilities are required to routinely send community members a summary of the extensive testing for contaminates that, depending on the part of the state, report on contaminants such as arsenic, lead, chloride (salt), and nitrate. In central Minnesota, for example, up to 60% of drinking water monitoring wells sampled in 2016 were contaminated with nitrate levels well-beyond the safe drinking water standard. Such an affected GreenStep city may wish to track and report nitrates so as to highlight improvement toward lower levels. At this point in time GreenStep has not one index number that would attempt to capture the health status of drinking water that all cities would report.

For groundwater quality, however, GreenStep may add a measure that tracks the irreversible contamination of aquifers by chloride, introduced primarily from the use of road salt. As of 2015 30% of private wells in the Twin Cities metro area were considered impaired by too much chloride.

STEP 5 METRIC TARGETS

Individual cities are best equipped to set realistic goals for metric improvement, and any improvement in the metrics is good. That said, the Minnesota Department of Natural Resources suggests the following metric goals:

Residential gallons used per person per day	**75 or fewer**
Business gallons used per job per day	**15% reduction within 10 years**
Ratio of peak day use to average day use	**2.6 or less**
Percent of losses	**10% or less**

(Much lower percentages are possible: the City of Hugo, for example, reported 2016 losses in their drinking water system of only 2.7%.)

NEED HELP? CONTACT

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