Water Use and Stormwater Management Baseline Guidance

Background

Unlike energy, each individual 2030 District develops its own water and transportation emission baselines that reflect regional conditions.

The Philadelphia 2030 District convened working groups to assist with the developing baselines and data tracking methods for both the water and transportation emissions metrics in advance of the June 2019 reporting deadline. The working groups are comprised of both subject matter experts and property partners.

Water Working Group

The 2030 District Water Working Group met quarterly for over a year to address the following action items:

- Define an appropriate baseline and tracking method for measuring progress toward the goal to reduce water use and/or improve stormwater management by 50% by 2030
- Promote strategies that can be executed by building owners and managers to help meet individual building goals for water use and districtwide goal for stormwater management
- Recommend complementary policy solutions that can help support the district meet its aggregate goals in both water use and stormwater management

Water Use

Water Use Baseline

Per the goals of the 2030 District, participating buildings will attempt to reduce water use by 50% from a baseline by the year 2030. The water working group was responsible for determining the baseline from which each building would measure its relative performance.

Unlike energy, water use baselines were calculated using publicly available Philadelphia use data, not a national data set. The best available data set in Philadelphia is the 2016 citywide benchmarking data set. Using this data, the working group calculated a water use intensity (WUI) measure, an average in gallons per square foot for each common building use type in the district. The City of Philadelphia collects and reports data only by primary building type so it does not reflect a building's sub-use types, if applicable.

As a practice, the Philadelphia 2030 District does not ask participating buildings to reduce current water use by 50%, as to not penalize those that have already undertaken conservation measures. Given that the best available data set was recent and encompassed already-executed conservation measure, the group set the baseline average for each building back to a 2010 start date with the assumption that interim water use reduction goals had already been met (2010 to 2016 savings of 12%) before calculating the 50% reduction goal.

Table 1: Baselines for Common Building Use Types in the Philadelphia 2030 District

Building Type	2016 Sample Size (properties)	2016 Mean (gal/sq ft)	2010 Mean (gal/sq ft)	2030 Goal (gal/sq ft)
College/University	84	28.9	32.4	16.2
Data Center*	16,000*	23.9	26.8	13.4
Distribution Center	36	3.4	3.8	1.9
Fast Food*	11,000*	24.9	27.9	14.0
Hospital (General Medical & Surgical)	21	44.6	50.0	25.0
Hotel	38	48.5	54.4	27.2
K-12 School	248	15.2	17.0	8.5
Laboratory	5	66.4	74.4	37.2
Library	5	31.5	35.3	17.6
Manufacturing/Industrial Plant	27	46.8	52.4	26.2
Medical Office	15	41.1	46.0	23.0
Mixed Use Property	30	20.4	22.9	11.4
Multifamily Housing	394	42.6	47.7	23.8
Museum	8	20.3	22.8	11.4
Non-Refrigerated Warehouse	77	2.7	3.0	1.5
Office	194	13.9	15.6	7.8
Other	32	18.6	20.8	10.4
Other - Public Services	11	19.7	22.0	11.0
Other - Specialty Hospitality	5	43.7	49.0	24.5
Parking	28	5.5	6.1	3.0
Refrigerated Warehouse	11	25.5	28.5	14.2
Residence Hall	24	42.4	47.5	23.8
Restaurant*	17,000*	27.6	30.9	15.4
Retail Store	26	5.8	6.5	3.2
Self-Storage Facility	22	1.1	1.2	0.6
Senior Care Community	19	77.9	87.3	43.6
Strip Mall	5	4.9	5.5	2.8
Supermarket/Grocery Store	18	17.1	19.1	9.6
Wholesale Club/Super Center	8	11.0	12.3	6.2
Worship Facility	7	5.0	5.6	2.8

Notes about calculating building use type baselines:

- An individual building's reduction goal is a weighted average of each use type within the property.
  - Example: A 100,000 square foot building that is 90,000 square feet of office space (15.6 gallons per square foot average) and 10,000 square feet of parking (6.1 gallon per square foot average.)
  - Baseline: ((90000*15.6+10000*6.1)/100000) = 14.65 gallons per square foot
  - 2030 Goal: 7.3 gallons per square foot
- Only building use types that had 5 or more samples were included in the table above. Two standard deviations were applied to the data set for each building use type to remove outliers that could shift the average.
- *Data Centers, Fast Food Restaurants, and Restaurants Use Type's 2030 Goals were developed using 2012 CBECS National Median Water Use Intensities, as there was insufficient local use data for these building types.
- Uncommon building types may opt into working with Green Building United to develop a custom baseline.

Water Use Measurement

Participating property partners who are currently benchmarking water use data will not need to track any new data to comply with the 2030 District.

Green Building United will access water use data from ENERGY STAR Portfolio Manager for all participating properties beginning June 30, 2019. Green Building United will use this data to calculate a current water use intensity for each participating building, which will be used to measure progress toward its building use type goal.

Green Building United will also provide a comparison of a building's performance against itself each year to track the efficacy of conservation measures.

Stormwater Management

The Philadelphia 2030 District Water Working Group explored the feasibility of a stormwater management metric in tandem with the 2030 Districts goal to reduce water use in buildings by 50 percent by 2030.

The intent of including stormwater management as part of the 2030 District goals is to align with *Green City, Clean Waters (GCCW)*, the City of Philadelphia's plan to reduce stormwater pollution entering its combined sewer system using green stormwater infrastructure (GSI). The Philadelphia 2030 District will support the goals of GCCW by communicating the value of GSI and sharing and expanding the resources available to owners and managers of the city's largest properties to encourage more GSI projects.

However, the boundaries of the 2030 District encompass the city's largest and densest buildings where the likeliest stormwater management projects within the district boundaries are retrofits on

existing buildings and sites. Retrofit projects can be costly and logistically challenging. As such, the goal must accurately reflect the potential for stormwater management within the 2030 District.

Stormwater Management Baseline

From the outset of the yearlong process, the working group determined that the stormwater baseline should be:
- Calculated at a district scale given that stormwater retrofits are not cost-effective or feasible on every existing site
- Measured in greened acres to align with the City's preferred metric
- Established as an ambitious, but attainable goal

The working group obtained data from the Philadelphia Water Department (PWD) to determine:
- Total impervious area in the district boundary
- Parcel-only impervious area
- Greened acres in the district boundary broken out by project type (public, public street, private regulation, retrofits) and by project phase

Using the above data request, the water working group evaluated several scenarios to determine an appropriate stormwater reduction goal.

In addition, the working group performed an analysis of the feasibility of implementing stormwater management on each of its committed properties. Properties were given points based on roof characteristics, availability of other impervious site area, as well as on the presence of surface parking. The higher the point total, the greater the potential for on-site stormwater management. This information was also used as part of the goal-setting analysis by the working group.

Ultimately, the group decided that **100 greened acres across both public and private projects** is an appropriate goal to meet the ambitious, yet achievable standard for districtwide performance.

As of June 2018, the district has **43.3 verified greened acres** from both public and private projects.

Stormwater Management Measurement

Green Building United will request project data from PWD on an annual basis when compiling the 2030 District Annual Report to update its parcel impervious area totals from participating buildings.

The 2030 District will measure its progress toward meeting its stormwater management goals using total number of greened acres in the district boundaries, from both public and private projects. In addition, the district will track percent reduction of impervious surface within the district boundaries, uptake of stormwater management practices on site and in the right of way by property partners, and complementary policy changes as measures of success.