



SEATTLE
2030
DISTRICT

2030 DISTRICT PERFORMANCE METRIC BASELINES

The Seattle 2030 District

is a groundbreaking high-performance building district in downtown Seattle that aims to dramatically reduce the environmental impacts of building construction and operations, while maximizing Seattle's economic viability and profitability for building owners, managers and developers.

2030 DISTRICT PERFORMANCE METRIC BASELINES

SUMMARY

The Seattle 2030 District has adopted the Architecture 2030 Challenge for Planners performance targets as the performance metrics for the District as follows:

NEW BUILDINGS, MAJOR RENOVATIONS, AND NEW INFRASTRUCTURE:

- **Energy Use:** an immediate 60% reduction below the National average, with incremental targets, reaching carbon neutral by 2030.
- **Water Use:** An immediate 50% reduction below the current District average.
- **CO₂e of Auto and Freight:** An immediate 50% reduction below the current District average.

EXISTING BUILDINGS AND INFRASTRUCTURE OPERATIONS:

- **Energy Use:** A minimum 10% reduction below the National average by 2015 with incremental targets, reaching a 50% reduction by 2030.
- **Water Use:** A minimum 10% reduction below the District average by 2015, with incremental targets, reaching a 50% reduction by 2030.
- **CO₂e of Auto and Freight:** A minimum 10% reduction below the current District average by 2015 with incremental targets, reaching a 50% reduction by 2030.



DEFINITIONS

- **Major Renovation:** The renovation of a building where (a) the total cost of the renovation related to the building envelope or the technical building systems is higher than 25 % of the value of the building, excluding the value of the land upon which the building is situated, or (b) more than 25 % of the surface of the building envelope undergoes renovation.
- **Infrastructure:** All constructed elements within the District outside of individual building footprint.
- **Carbon Neutral:** No net contribution of carbon dioxide to the atmosphere on an annual basis.

This document describes the baselines for the energy, water and transportation performance metrics of the Seattle 2030 District.

ENERGY

In accordance with the *Architecture 2030 Challenge* methodology, and jointly agreed upon by major building sector organization, the energy performance baseline will be the national average energy consumption of existing U.S. commercial buildings as reported by the [2003 Commercial Building Energy Consumption Survey \(CBECS\)](#). CBECS data is a set of whole-building energy use measurements gathered by the DOE’s Energy Information Administration, which can be used to determine a national energy use intensity using kBtu/sq. ft.-yr as the metric.

For new construction the Environmental Protection Agency (EPA) has available an online tool, [Target Finder](#), that enables users to determine the national average energy consumption of specific building types in a specific region, as well as to determine energy reduction targets in accordance with the 2030 Challenge. The tool provides the national energy consumption average based on other buildings that share similar parameters that affect energy use, including occupancy and schedule. Target Finder should be the first resource in determining a new project’s energy consumption target. It is recommended not to input information into Section 4, Estimated Design Energy when determining the energy consumption target, to ensure a baseline that is an average building with an average fuel mix.



If a project’s building type is not available in Target Finder it is recommended to use the national average energy consumption from the [Architecture 2030 Target Tables](#), which refer to the CBECS 2003 data and similar EPA tables. The 2030 Target Tables provide national and/or regional averages, as well as the 2030 Challenge energy reduction targets for building types not available in the EPA’s Target Finder.

For existing building the Environmental Protection Agency (EPA) has available an online tool, Portfolio Manager, that enables users to track their energy use via monthly energy bills. Portfolio Manager also provides the national average energy consumption of specific building types in a specific region, based on other buildings that share similar parameters that affect energy use, including occupancy and schedule. 2030 District members that represent properties are also required to track and share their energy and water use information with the 2030 District through Portfolio Manager, which makes this tool multifunctional.



WATER

As outlined in the 2030 District goals the baseline for the water performance metric is based on the current District average. There is currently no national or local building water use database so the 2030 District was tasked with developing the water baseline through the help of their members and partners. Through a Memorandum of Agreement with the Seattle Public Utilities (SPU) - and the help of the District member the Partnership for Water Conservation (PWC) - the Seattle 2030 District was able to generate water use intensity baselines for the major building types within the 2030 District. SPU was able to aggregate water consumption data for selected building parcels based on the predominate building type and provide annual total consumption for the years 2002 through 2010. The 2030 District then calculated a floor space-weighted average water use intensity, based on floor space square footage information in the King county Assessors database. Average water use intensities for each building type were then calculated for each year and the final baseline was established as the average over the 2002 to 2010 period. PWC members reviewed parcel data and water consumption patterns and provided a recommended assimilation of building types based on similar patterns of water use (ie, fast food category was combined with

restaurants, dormitories combined with multi-family residential). This reduced the number of building types from 25 to the 15 shown in the table below.

It is the intention of the 2030 District to continue exploring other metrics and normalize the baseline for inputs such as occupancy, schedule, number of rooms for hotels, and number of licensed beds for hospitals, similar to the methodology used by EPA for energy. Based on 2010 Census Data, the PWC was able to determine that the average resident in multi-family buildings within the District is using approximately 42 gallons per day. Additional research is ongoing to determine appropriate additional metrics. It is understood that the current baselines are approximations based on the best currently available data and that as more information is collected on actual building-level water consumption, the baselines will be refined and normalized. To our knowledge this is first attempt at identifying water use intensity baselines on a square footage basis for 15 unique building types in this region, and potentially the entire United States.

One interesting finding is that K-12, Retail, Office, and Residential building parcels with smaller buildings (<5,000 square feet) used more water per square foot of building than building parcels with larger building of the same type. It is speculated that this increase in water use intensity for smaller buildings can be attributed to economies of scale. There is a minimum amount of water use associated with basic operations of buildings, so larger buildings that can hold more occupants are perceived as using less water on a per square foot or per occupant basis.



PREDOMINANT BUILDING USE	GAL/SF/YR	ADDITIONAL METRICS OF INTEREST
Restaurant	125.99	119 Gal/Employee/Day
Hotel	50.07	70 Gal/Room/Day
Multi-Family Residential	41.14	42 Gal/Resident/Day
Social/meeting	36.95	
Industrial	32.53	
Nursing/Assisted Living	30.11	
Hospital	26.12	53 Gal/Bed/Day
Retail	24.77	41 Gal/Employee/Day
Medical Office	21	32 Gal/Employee/Day
Office	14.21	
Warehouse	13	
Entertainment/culture	12.88	
Service (vehicle repair/service, postal service)	11.74	
House of Worship	11.31	
K-12 School	11.09	

Table 1. Seattle 2030 District Water Use Intensity Baselines

Source: Seattle 2030 District, Seattle public Utilities, and the Partnership for Water Conservation

TRANSPORTATION

As outlined in the 2030 District goals the baseline for the transportation performance metric is based on the current District average. Through the help of the District members Commute Seattle and the City of Seattle’s Seattle Climate Partnership, the Seattle 2030 District was able to establish an average mode split and associated CO₂ emissions for commuter transportation within the 2030 District boundaries. Commute Seattle had recently completed their [2010 Center City Commuter Mode Split Survey](#), which established the average commuter mode split for the area in which the Seattle 2030 District resides. Using existing methodology from the Seattle Climate Partnership’s Carbon Calculator, CO₂ emissions per passenger mile were associated with the given mode resulting in an average CO₂ emission per commuter of roughly 900 kg CO₂ per commuter per year.



COMMUTE SEATTLE



MODE GROUP	MODE	MODE SPLIT	TRIPS	Kg CO ₂ /PM	MILES/TRIP	TOTAL MILES	TOTAL kg CO ₂
DRIVE-ALONE	Drove Alone	33.70%	58,861.77	0.4	14.1	829,950.93	331,980.37
	Ferry w/ Vehicle	0.70%	1,222.65	0.4	23.5	28,732.23	11,492.89
	Motorcycle	0.80%	1,397.31	0.167	11.1	15,510.16	2,590.20
TRANSIT	Bus	35.80%	62,529.71	0.17	14	875,415.97	148,820.71
	Rail	4.30%	7,510.55	0.172	27.5	206,540.18	35,524.91
	Ferry Passenger	2.20%	3,842.61	0.37	26.9	103,366.16	38,245.48
	Other	1.10%	1,921.30	0.17	13.6	26,129.73	4,442.05
RIDESHARE	Carpooled	9.00%	15,719.76	0.145	13.4	210,644.78	30,639.24
	Vanpooled	0.60%	1,047.98	0.05	24.1	25,256.41	1,262.82
BIKE/WALK	Walk	5.90%	10,305.18	0	1.8	18,549.32	0
	Bike	2.80%	4,890.59	0	6.3	30,810.73	0
	Compressed Work Day Off	0.40%	698.66	0	14.7	10,270.24	0
	Telework	2.70%	4,715.93	0	17.7	83,471.93	0

Table 2. Seattle 2030 District Commuter Transportation Baselines

Source: The Gilmore Research Group and Commute Seattle. *2010 Center City Commuter Mode Split Survey Results. March 2011*

Note: Mode-Split, Trips, and Total Miles are based on total weekday trips per mode.