CII Task Force
Metrics Subcommittee
GLOSSARY OF TERMS ASSOCIATED WATER USE METRICS

Term	Definition	Comments, Context, and Examples	Cite
Aggregate-level metric	A metric that does not apply to a specific set of conditions, such as system-wide or sector-wide measures.	An aggregate level water use efficiency metric may capture "other-than-efficiency" effects on the calculated unit quantity of water use. These confounding factors must be considered when evaluating the usefulness of an aggregate-level metric as a performance indicator.	Adapted from 1
Benchmark	(1) A particular (numerical) value of a metric that denotes a specific level of performance. (2) A current value or beginning value of a metric.	A value of a metric at a beginning point in time; a target value for water use efficiency; or a standard value. Examples of benchmarks as standards include: Energy Policy Act of 1992 requirement that all residential toilets had to flush using no more than 1.6 gallons per flush; or Energy Star residential clothes washer standard water factor WF ≤ 8.0 gallons per cycle per cubic foot. Here, the values of 1.6 gallons and 8.0 gallons are benchmarks, which are expressed in absolute terms (i.e., quantity of water being used). Sometimes a distinction is made between a *benchmark* (which indicates a current state of achievement, definition 2) and a *target (*which indicates a state of achievement expected at some time in the future).	1
Commercial water user	A water user that provides or distributes a product or service. (CWC §10608.12(d))		5,2
Confounding-factors	Factors affecting the numeric value of a metric that are not related to the purpose of a metric.	Regarding use of a water use efficiency metric to compare water utilities, differences across utilities are caused by two main confounding factors: climate and the composition of water users. Factors reflecting the composition of water users include housing density or average lot size, average number of persons per household, median household income, and other characteristics of the single family or multi-family residential sector. Other confounding factors are the marginal price of water and availability and cost of reclaimed water, Metrics for comparing efficiency of water use across different utilities would have to ensure that all external factors which influence and confound the unit quantity of water used, but are outside the control of water users, are "corrected for." This means that additional data collection and analysis would be required in order to differentiate between the effects of water efficiency improvements and other factors that can affect average rates of water use.	1

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Conservation Index (CI)	Nomenclature denoting a conservation metric.	An example could be ICI^{SF} for designating an indoor conservation index for the single-family sector and OCI^{SF} for designating an outdoor (seasonal) conservation index.	1
Definitional noise	The inaccuracies in both the numerator and denominator of a metric as a result of different, specific or general, definitions used for collecting data.	The water supply and other industries which have not adopted a standard set of customer types and customer classification procedures creating a wide variety of customer classifications, user types, product types and other "coding" systems cause "definitional noise". Total population served is usually defined as total year-round resident population of the retail service area (urban planners sometimes define resident population as the number of people occupying space in the community on a 24 hour per day, seven-day-per-week, 52 weeks per year basis). Different water utilities use different definitions of population served and, regardless of the definition, in most cases the estimates of reported population served represent best guesses of the actual but unknown number. Therefore, the annual per capita per day production metric that is calculated by dividing annual water production by population served is usually inaccurate due to "definitional noise" in both the numerator and denominator of the metric.	1
Economic efficiency	An efficiency measure that incorporates the concept of value, such as including a monetary or resource factor.	The criterion of technical efficiency is useful in comparing various products and processes. However, the technical efficiency concept is not useful in making decisions of investing money (or resources) in water conservation unless the inputs and outputs are measured in *value* terms. This expression of efficiency is referred to as *economic efficiency*.	1
Efficiency	The ratio of output to input or vice versa. Water use metrics and benchmarks are inextricably linked to the concepts of "water conservation" and "water-use efficiency." Therefore, it is also helpful to define these concepts in the context of evaluating water use. The term, efficiency, derives from engineering practice where it is typically used to describe technical efficiency, or the ratio of output to input.	For example, one showerhead would be considered more efficient than another if it could accomplish the same purpose (i.e., of showering) by using less water or other inputs (e.g., lower water pressure and therefore less energy). See "water use efficiency."	1

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Enterprise	A legal entity operating as a business, government, or other organization which may have one or more places of operation or activity.		2
Establishment	A specific water use site (e.g., land parcel or building) at which there may be one or more end-uses of water.		2
Industrial water user	(1) A water user that is primarily a manufacturer or processor of materials as defined by the North American Industry Classification System (NAICS) code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development (CWC §10608.12(h)) (2) A water user that is primarily manufacturer or processor of materials.		5,2
Institutional water user	A water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions. (CWC§10608.12 (i))		5
Metric	A unit of measure (or a parameter being measured) that can be used to assess the rate of water use during a given period of time and at a given level of data aggregation (e.g., system-wide, sector-wide, customer level, or end-use level). Another term for a *metric* is *performance indicator*.	Some examples of water usage metrics include: total water use per capita per day; residential indoor water use per dwelling unit per day; or average volume of water being used for flushing toilets.	1
Metric value	A numerical value either (1) calculated from the mathematical formula for any given metric or (2) assigned to a given metric. A metric is not a benchmark or target.	Adapted from (1) by 2.	2

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North American Industry Classification System (NAICS)	The North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. NAICS is based on a production-oriented concept, meaning that it groups establishments into industries according to similarity in the processes used to produce goods or services.	Use of the NAICS standard provides uniformity and comparability in the presentation of these statistical data. NAICS was developed under the auspices of the U.S. Office of Management and Budget (OMB) and adopted in 1997 to replace the Standard Industrial Classification (SIC) system. It was developed jointly by the U.S. Economic Classification Policy Committee (ECPC), Statistics Canada, and Mexico's Instituto Nacional de Estadistica y Geografia to allow for a high level of comparability in business statistics among the North American countries. The official U.S. Government Web site that provides the latest information on plans for NAICS revisions, as well as access to various NAICS reference files and tools is http://www.census.gov/eos/www/naics/.	3
Performance indicator	The same meaning as “metric.”	Note that while a performance indicator may not rise to the level necessary for technical assessments regarding water-use efficiency, it may act as an *indicator* of water-use efficiency.	2
Process water	"Process water" means water used for producing a product or product content or water used for research and development, including, but not limited to, continuous manufacturing processes, water used for testing and maintaining equipment used in producing a product or product content, and water used in combined heat and power facilities used in producing a product or product content. Process water does not mean incidental water uses not related to the production of a product or product content, including, but not limited to, water used for restrooms, landscaping, air conditioning, heating, kitchens, and laundry. (CWC§10608.12 (l))		5
Productivity	A measure of the efficiency of production. The ratio of production output to what is required to produce it (inputs), total output per one unit of a total input.	Adapted from Wikipedia and accessed at http://en.wikipedia.org/wiki/Productivity on February 23, 2012.	2, 7
Scaling variable	Variable that can be used to standardize or characterize per unit rates of water use. Also called “scaling factor.”	Water use metrics can be expressed as “usage ratios” or “usage rates”. The “ratio” metric designates the quotient obtained by dividing the volume of water sold over a specified period of time (day, month, season or year) by a scaling variable (e.g., number of accounts, population served, or number of employees).	1

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Standard Industrial Classification (SIC):	A classification system for commercial, industrial, and institutional activities that classifies establishments by their primary type of activity and organizes industries in an increasing level of detail ranging from general economic sectors (e.g., manufacturing, services) to specific industry segments (e.g., commercial sports, laundry businesses). This system organizes industries by their output. SIC was replaced by the North American Industry Classification System (NAICS) (see definition) in 1997.	There will be no further revisions of the SIC, which was last updated in 1987. It is possible that non-federal organizations and state and local agencies are continuing to use the SIC for their own purposes, but these non-statistical uses are outside the scope of the federal economic statistical programs. To find the SIC codes and their descriptions, visit the Occupational Safety & Health Administration (OSHA) website, which maintains a SIC Manual. A detailed conversion (concordance) between the SIC and 2002 NAICS is available in Excel format for download at the "Concordances" link on the U.S. Census Bureau website (http://www.census.gov/eos/www/naics/concordances/concordances.html) . There are no plans to develop a concordance between the SIC and 2007 NAICS.	1, 3
Target	A benchmark that indicates a state of achievement expected at some time in the future.	Adapted from 1	1*
UM	A water use metric acronym expressed as “usage ratios” or “usage rates”. The “ratio” metric designates the quotient obtained by dividing the volume of water sold over a specified period of time (day, month, season or year) by a scaling factor (e.g. number of accounts, population served or number of employees). Additional letters, superscripts and subscripts can be added to the UM acronym to designate user sector and the scaling variable being used.	For example, for single family water use, where “A” stands for annual (i.e., average daily), “a” for accounts, the annual average usage rate per customer account per day in single family sector can be designated as AUM_a^{SF}. For water production and deliveries, the term “production quotient,” or PQ, is proposed. It represents the total volume of water produced divided by a scaling factor such as number of connections or population served. For example, the annual average rate of water production per service account would be designated as APQ_a.	1

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Water conservation	A reduction in water loss, waste, or use.	Baumann, Boland and Sims (1984) developed a practical definition of long-term water conservation as "…any beneficial reduction in water use or in water losses." By adding the term "beneficial" the authors proposed a requirement (consistent with the concept of economic efficiency) that the reduction in water use or losses should result in a net increase in social welfare where the resources used have a lesser value than those saved. In other words, the beneficial effects of the reduction in water use (or loss) must be considered greater than the adverse effects associated with the commitment of other resources to the conservation effort. This definition provided important guidance (through benefit-cost analysis) for long-term conservation; however, it could not be easily applied to short-term conservation measures which are usually aimed at curtailing water demand during a drought.	4, 5,1
Water use efficiency	The relation of water-related tasks accomplished with an amount of water, for example, the ratio of input of water to output of a product.	The general term water conservation may include increased water use efficiency, in which more water-related tasks are accomplished with the same or lesser amounts of water. The water efficiency gains of low flushing volume toilets over traditional toilets can be substantial without diminishing the completion of the original purpose for which water is used. Improvements in the efficiency of water use are usually undertaken by water providers and water users. A commonly held expectation is that such improvements can free up significant quantities of water by meeting the existing needs of individual users and various purposes of use with less water.	4
Water Use Metadata	The multitude of agents that may produce or have the capability of producing an effect on whether a metric is appropriate can be termed water metric "metadata", for they are data about the metric. Under further development-DWR.	"Metadata" is generally defined as data about data, and in this case, metadata are the essential information that is part of the definition of any metric and must be maintained or stated with the value of the metric or its components (e.g., numerator, denominator, and scaling factor) to ensure the proper use or prevent the misuse of the metric. This multitude of agents that may produce or have the capability of producing an effect on whether a metric is appropriate can be termed water use metric "metadata", for they are data about the metric.	2

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Water use productivity	The relation of specific or general product, outputs, or economic activity to amount of water associated with those products, outputs, or activities.	Example: An economic based water use productivity indicator defined as gallons of water used per unit of value in dollars added by economic activity in the industrial sector. Water use productivity may give an indication of the intrinsic value being placed on water.	2,6

"*" means adapted from source given

Citations:

1. Dziegielewski, B. and J. C. Kiefer, WATER CONSERVATION MEASUREMENT METRICS GUIDANCE REPORT. 2009, American Water Works Association Guidance Report.
2. DWR staff
3. U.S. Census Bureau, http://www.census.gov/epcd/www/sic.html and http://www.census.gov/eos/www/naics/, 24 October 2011.
4. California Department of Water Resources, et al., 20x2020 Water Conservation Plan, February 2010.
5. State of California Water Code (CWC)
6. Gleick, P, et. al (2011) "Water-use efficiency and productivity: rethinking the basin approach"
7. Taken from Wikipedia and accessed at http://en.wikipedia.org/wiki/Productivity on February 23, 2012.

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