



ENERGY,
INSTALLATIONS
AND ENVIRONMENT

OFFICE OF THE ASSISTANT SECRETARY OF DEFENSE

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MEMORANDUM FOR ASSISTANT SECRETARY OF DEFENSE (HEALTH AFFAIRS)
ASSISTANT SECRETARY OF THE ARMY (INSTALLATIONS,
ENERGY AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE NAVY (ENERGY,
INSTALLATIONS AND ENVIRONMENT)
ASSISTANT SECRETARY OF THE AIR FORCE
(INSTALLATIONS, ENVIRONMENT AND LOGISTICS)
DIRECTORS OF THE DEFENSE AGENCIES

SUBJECT: Industrial, Landscape, and Agriculture Water Guidance Implementation

The Executive Order (EO) 13693 requires the Federal agencies to improve water use efficiency and to reduce the Industrial, Landscape, and Agriculture (ILA) water consumption by two percent annually through 2025. This memorandum provides guidance to the Defense Components to accurately measure and report ILA water. The purpose of the DoD *ILA Water Use Guidance* is to assist the Defense Components in determining ILA water use. The guidance defines ILA water and provides instructions on baseline development, annual reporting, and estimation techniques.

The Department of Defense (DoD) has long made it a priority to protect the environment on our installations, not only to preserve resources for future generations, but to ensure that we have the land, water, and airspace needed to sustain military readiness. The Department must better understand water use across the DoD as the risk of water scarcity continues to grow, as evidenced by the current drought in California. The DoD is taking steps to plan, prepare, and provide for an adequate water supply necessary to support its mission.

The Defense Components will use the attached guidance to accurately measure and report ILA water, and continue to do so through the DoD Annual Energy Management Report. Please forward any questions to Ms. Laura Montoya, at laura.i.montoya.civ@mail.mil.



John Conger

Performing the Duties of the Assistant Secretary of Defense
(Energy, Installations and Environment)

Attachment:
As stated

Department of Defense
Industrial, Landscaping, and Agricultural (ILA)
Water Use Guidance



Office of the Assistant Secretary of Defense
(Energy, Installations, and Environment)

FINAL

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Purpose

The Department of Defense (DoD) has long made it a priority to protect the environment on our installations, not only to preserve resources for future generations, but to ensure that we have the land, water, and airspace needed to sustain military readiness. The Department must better understand water use across the DoD as the risk of water scarcity continues to grow, as evidenced by the current drought in California. Measurement, conservation and management are the steps DoD is taking to reduce the risks affecting the water supply.

The purpose of the DoD *Industrial, Landscaping, and Agricultural (ILA) Water Use Guidance* is to provide a starting point for determining ILA water use. This guidance specifically defines ILA water and provides instructions on baseline development and annual reporting by providing standard measurement and estimation techniques for water applications—particularly when metering equipment is unavailable. Over the course of gaining a better understanding of ILA water applications throughout DoD, this guidance may be updated to reflect a more accurate and efficient process towards better water management.

Background on Requirement

On March 25, 2015, President Obama signed Executive Order (EO) 13693 *Planning for Federal Sustainability in the Next Decade*. EO 13693 include provisions to require Federal agencies to improve water use efficiency and management of ILA water. The EO requires federal agencies to reduce ILA water consumption 2 percent annually through fiscal year 2025. EO 13693 supersedes EO 13514, however the EO 13514 *Implementation of Water Efficiency and Management Provisions* instructions are still current. Reporting on reductions in ILA water use will be included in the agency’s annual Strategic Sustainability Performance Plans.

Guidance on ILA Water

Definitions

The terms defined in this section are of central importance to complying with this guidance. Examples are provided to further clarify these terms.

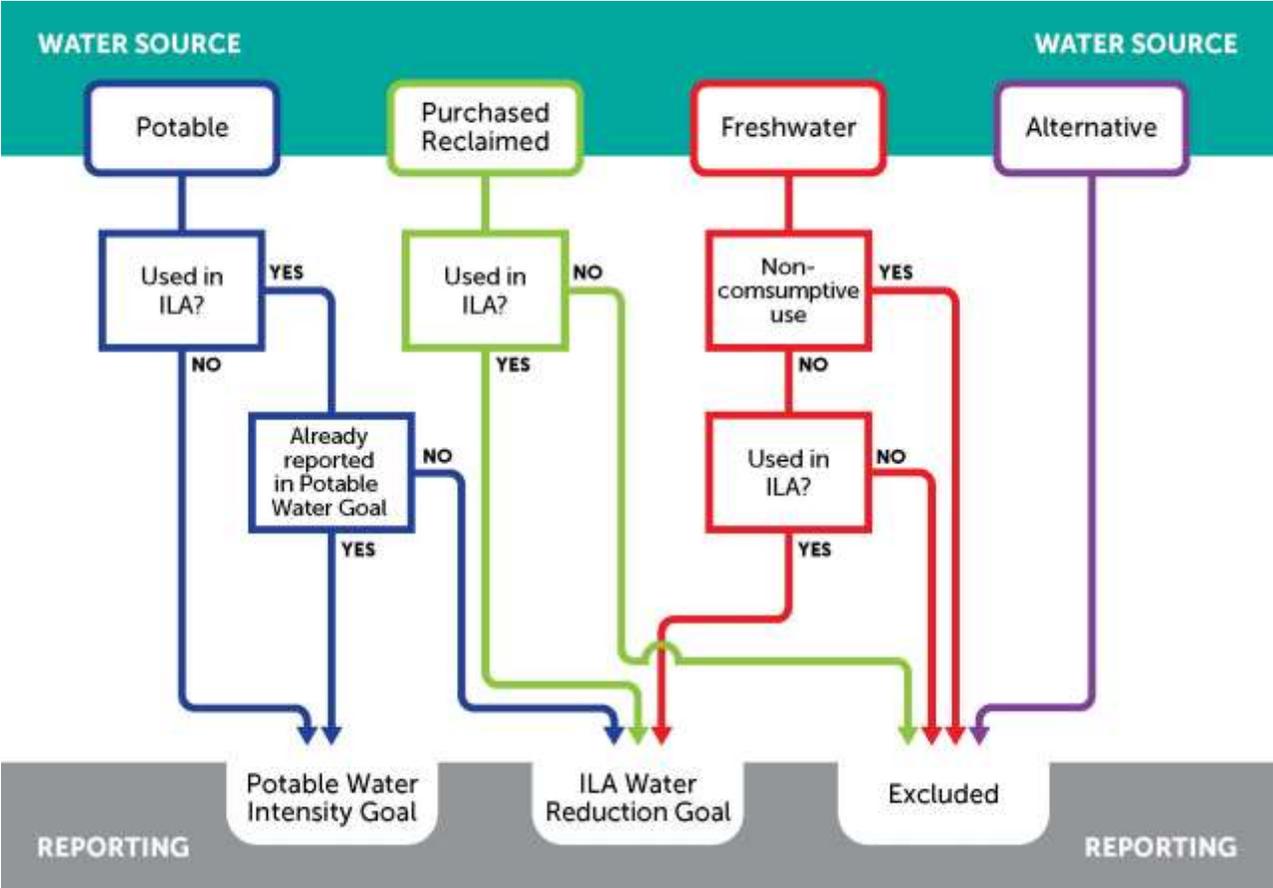
Agricultural water	Water used for irrigation and other uses related to a Federal agency testing and development of agricultural products—including foods and goods ultimately used in farming and forestry—and uses related to research associated with animal livestock operations. <i>Common forms of agricultural water use include:</i> <ul style="list-style-type: none">• Horticulture• Greenhouse operations• Aquaculture, and animal support operations, e.g., livestock water)
Alternative	Water not obtained from a surface or ground water source or purchased

water	reclaimed water from a third party. Alternative water can include: rainwater harvested on-site, sump pump water harvesting, gray water, air cooling condensate, reject water from water purification systems, water reclaimed on-site, or water derived from other water reuse strategies.
Facility	Any building, installation, structure, land, or other property owned or operated by, or constructed or manufactured and leased to, the Federal Government. This includes a group of facilities at a single or multiple location(s) managed as an integrated operation, as well as government-owned contractor-operated facilities.
Freshwater sources	Surface or ground water sources, such as lakes, rivers, streams, on-site storm water/retention ponds, springs, creeks, and wells, that have a total dissolved solids concentration of less than 1,000 milligrams per liter (1,000 ppm).
ILA Water	Water consumed for industrial, landscaping, or agricultural purposes.
Industrial Water	Water used to aid in industrial processes such as cooling, washing, and manufacturing. <i>Common forms of industrial water use include:</i> <ul style="list-style-type: none"> • Process steam production • Process water for industrial manufacturing process • Construction water • Waste water treatment plant uses • Central plant, e.g., heating/cooling plant • Dust suppression • Make-up water for cooling towers • Non-potable use for space cooling facilities • Vehicle wash facilities
Landscaping water	Water used for the controlled application of water to outdoor spaces to supplement water demand not satisfied by natural precipitation. <i>Common forms of landscaping water use include:</i> <ul style="list-style-type: none"> • Golf courses • Dog park • Cemeteries • Building landscaping • Irrigation of turf or landscaped beds • Recreational/athletic fields • Ornamental ponds and fountains
Non-consumptive water use	Water that is diverted from its freshwater source and is returned to the point of diversion in the same quantity and quality as the original diversion. <i>Common forms of non-consumptive water use include:</i> <ul style="list-style-type: none"> • Hydroelectric power • Navigation • Once-through cooling • Water quality improvement • Fish propagation
Non-potable water	Water obtained from a freshwater source that is not of sufficient quality for human consumption and has not been properly treated or has not been permitted and approved for human consumption.

Potable water	Water that is of sufficient quality for human consumption and is obtained from public water systems or from freshwater sources such as lakes or streams.
Purchased reclaimed/ recycled water	Wastewater-treatment plant effluent purchased from a third party that has been diverted for beneficial uses such as irrigation, industry, or thermoelectric cooling instead of being released to a natural waterway or aquifer.
Treated water	Freshwater treated at a water treatment plant that is non-potable. This can either be purchased or produced on-site.

ILA Water Reporting

The following flow chart captures which sources should be reported under the ILA water use goal in units of millions of gallons (mGals):



Reporting Responsibilities

DoD Components are responsible for reporting ILA water use at:

- Owned facilities, installations, and buildings
- Leased spaces where the component pays for the utility

- Facilities located on Federal lands or military installations that are privately leased, such as restaurants, privatized family houses, farmland/agricultural leases, and where the tenant does **NOT** pay utilities separately

ILA water consumed by DoD and Federal tenants shall be reported by the host unless there is a mutual agreement between the host and DoD tenant that the tenant will report consumption. The host and tenant shall ensure that water consumption is not double-counted.

Baseline Development

All components are required to establish a baseline of ILA water use. FY 2016 has been selected as the baseline year for DoD.¹ Components should collect and track each water category so that they have separate accounting of industrial, landscaping, and agricultural water use. They should report separate consumption figures—both metered and estimated—for these three use types in mGals along with associated cost such as including sewage fees incurred directly from ILA water consumption in thousands of dollars.

Determining ILA Water Usage

All metered and unmetered ILA water use meeting the criteria of this guidance should be included in the baseline and subsequent annual reports. Where facilities have multiple meters, it is important to use consistent units when combining data.

If permanent metering is not available, then temporary flow meters are another solution. Temporary ultra-sonic meters can be installed to the outside of a pipe and do not require disruption of the flow. Care must be taken to install the meters so that the water flow is representative of conditions that can be used to establish an annual value for consumption. Components should document assumptions and methods by which these representative conditions were created.

If the water source is from an on-site well, then the pumping records, if reliable, can be used to estimate the water use. This is done by multiplying the pump flow rate at the given well depth by the annual runtime.

If these metering options are not practical or applicable, then an engineering estimate should be used to approximate annual water use. Each component should determine the best method for accurately performing such estimations. As a first step, facilities can inventory all unmetered ILA applications. Based on the inventory, components can develop a strategy for determining how various applications should be accurately estimated. It is important for there to be consistency in how these data are collected. Components should establish procedures to document the assumptions and techniques used so they can be repeated in the future.

¹ EO 13514 originally established FY 2010 as the baseline year. Given the difficulty of estimating ILA water use in previous years, DoD will use FY 2016 as its baseline year to ensure completeness and accuracy of its reporting.

Recommended Methods for Estimating Water Uses

This section provides recommendations suggested by Federal Energy Management Program (FEMP) for calculating unmetered water use for industrial and landscaping applications. No specific recommendations are made for agricultural applications, but general estimation techniques are provided that may apply to some applications.

Industrial Applications

Components should conduct a process audit or develop a water balance for the significant water-using processes in their facilities. This analysis may include a measurement of the water used in each step of a process or a calculation of water inputs and outputs of a system as a whole.

If batching is used within a process, water can be estimated based on the number of units produced and the amount of water used per unit. Additional adjustments should be made if water is recycled or reclaimed during the process.

In addition to the evaluation of industrial processes, components should analyze the water use in mechanical systems, such as evaporative cooling systems, steam heating systems, and washing applications as part of their baseline to ensure that all significant water uses are included.

Department of Energy has published *Guidelines for Estimating Unmetered Industrial Water Use*² to offer standard estimation techniques for the more typical industrial water applications, e.g., evaporative cooling systems, steam heating system, washing applications, and batch process/manufacturing usages, and vehicle wash stations. Components should refer to this guide when developing methods for these applications.

Landscaping Applications

There are two recommended approaches to producing an engineering estimate for unmetered sources of landscaping water use: irrigation audit and evapotranspiration.

- The **irrigation audit method** is a more in-depth process, and therefore provides a more accurate estimation of water use. It consists of performing physical measurement of water applied to landscaped areas through irrigation equipment. Irrigation audits require knowledge on how to perform an audit and the purchase of some minor equipment. Where feasible, components should either use or transition to performing irrigation audits because they offer a method for spot measuring actual landscape water use. General instructions on this method can also be found in FEMP's *Guidelines for Estimating Unmetered Landscaping Water*.³
- The **evapotranspiration (ET) method** is a relatively easy way for components to develop an estimate of annual landscape water use. However, it relies on several general assumptions and therefore is less accurate than the irrigation audit method. ET estimates the amount of water needed to maintain a healthy turf or landscaped area for a given

² https://www1.eere.energy.gov/femp/pdfs/est_unmetered_industrial_wtr.pdf

³ <http://energy.gov/eere/femp/downloads/guidelines-estimating-unmetered-landscaping-water-use>

location based on the water requirements of the plant types, specific site conditions, precipitation levels by the site, and the amount of water transpired and evaporated from the plants. No special training or purchase of equipment is needed, but some basic knowledge of the landscape and the use of specific calculations are required. When using this method, components should refer to FEMP's *Guidelines for Estimating Unmetered Landscaping Water Use*³.

Other Estimation Techniques

Components should consider using the batch or discharge procedure when appropriate. In all cases, careful record keeping is necessary for accurate estimates. Batch, discharge and open channel procedures can be used to estimate irrigation, landscape, or agriculture applications.

- The **batch procedure** can be used when water is transported in a tank truck or container for application. Multiply the volume of the tank or container by the number of times it is filled from the distribution system to yield the total amount of water delivered.
- The **discharge procedure** is useful when water is applied directly from a pipe (e.g., sprinkler system). Multiply the rate of water discharge by the total time during which it flows to get the total volume of water delivered. The calculation must account for variations in the discharge rate as well as the length and frequency of the application period.
- The **open channel flow procedure** is useful for estimating flow rates of water that is discharging freely from an open channel when only the cross sectional area of the channel and discharge distance of the water is known. This procedure uses the Manning equation and various design charts and is a simple and useful procedure for approximating open channel flow rates, both full and partial, in pipes and channels of various cross sections.

References

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Guidelines for Estimating Unmetered Industrial Water Use. Federal Energy Management Program (2010).

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