Best Practices for Managing Water Use

Jonah Schein, WaterSense
Why Water Matters

- The largest proportion of energy consumption associated with water often occurs after water has been delivered to the end user.
  - Water heating account for 8% of total energy use in commercial buildings and nearly 18% in residential buildings.
- Facilities can significantly reduce costs by maximizing efficiency in all systems to reduce water and energy use.
- Water use and availability is increasingly an issue when obtaining entitled, developable land.

EPA’s ENERGY STAR and WaterSense programs collaborate to bring solutions to the market.
How Are You Being Charged for Water?

- **Uniform Rate**
- **Increasing Block Rate**
- **Declining Block Rate**
- **Seasonal**
- **Water Budget Based**
- **Drought**
Be Careful... It Could Change!

Water Rate Structure Over Time

- Decreasing block
- Uniform
- Increasing block

Increasing Block Rate

Uniform Rate

Declining Block Rate
Over 100,000 Properties are Benchmarking Water Use
How Do Property’s Use Water?

- Hospitals
- Offices
- Schools
- Restaurants
- Hospitality

- Medical Equipment
- Pools
- Other
- Laundry
- Kitchen/Dishwashing
- Landscaping
- Cooling and Heating
- Domestic/Restroom
Efficiency in Buildings

Step 1: Track

Step 2: Compare

Step 3: Analyze
EPA’s 1-100 Water Score for Multifamily Buildings

What’s similar to ENERGY STAR score approach?

- Available for existing multifamily buildings with 20 or more units
- Approach consistent with the ENERGY STAR Score
  - Statistical evaluation of measured whole building resource (water) use
  - Normalize for weather and operation
  - Provide a meaningful peer comparison
  - Drive reductions in resource (water) use
EPA’s 1-100 Water Score for Multifamily Buildings

What’s different from ENERGY STAR score approach?

- Inputs Adjusted Appropriately for Water
  - Include all water use (indoor and outdoor)
  - Focus on water intensity:
    - Total water use divided by building square foot
  - Assess normalization factors in the context of water
    - Operation is assessed through inputs like unit density
    - Measures of weather capture outdoor water needs
    - Irrigated Area is important factor (like building square foot)
- No EPA certification based on the Water Score
## How the score works – Example 1

<table>
<thead>
<tr>
<th>Variables</th>
<th>Multifamily A</th>
<th>Multifamily B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>150,000</td>
<td>150,000</td>
</tr>
<tr>
<td>Number of Units</td>
<td>220</td>
<td>200</td>
</tr>
<tr>
<td>Number of Bedrooms</td>
<td>280</td>
<td>200</td>
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<tr>
<td>Irrigated Area</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Climate</td>
<td>Wet &amp; Cool</td>
<td>Wet &amp; Cool</td>
</tr>
<tr>
<td>Expected WUI (gal/ft²)</td>
<td>61</td>
<td>48</td>
</tr>
<tr>
<td>Actual WUI (gal/ft²)</td>
<td>56</td>
<td>56</td>
</tr>
<tr>
<td>EPA Water Score</td>
<td>50</td>
<td>29</td>
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</table>
How the score works – Example 1

What is the Same?
• Size
• Climate
• Irrigated area
• Water Use

What is Different?
• Number of Units
• Number of Bedrooms
• Score

Why? Multifamily A is expected to use more water due to
• Higher unit density
• More bedrooms per unit

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<td>Gal/unit</td>
<td>38k</td>
<td>42k</td>
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How the score works – Example 2

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<td>50,000</td>
<td>300</td>
</tr>
<tr>
<td>Climate</td>
<td>Dry &amp; Hot</td>
<td>Wet &amp; Cool</td>
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<tr>
<td>Expected WUI (gal/ft²)</td>
<td>82</td>
<td>61</td>
</tr>
<tr>
<td>Actual WUI (gal/ft²)</td>
<td>56</td>
<td>56</td>
</tr>
<tr>
<td>EPA Water Score</td>
<td>74</td>
<td>50</td>
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</table>
How the score works – Example 2

What is the Same?

• Size
• Number of Units
• Number of Bedrooms
• Water Use

What is Different?

• Climate
• Irrigated Area
• Score

Why?

Multifamily A is expected to use more water due to

• Climate
• Irrigated Area

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What Do You Need to get the Score?

• Required inputs for a buildings of 20 units or more:
  • 12 months of water use
  • Building location
  • Building size
    • floor area
    • number of units
    • total number of bedrooms
  • Irrigated area
    • Critical field that many people need to add before a score will be calculated
Add Irrigated Area con’t

| Construction Status | 1. Existing
|                     | 2. Design
|                     | 3. Test
| Year Built          | 2014
| Gross Floor Area    | 20,000 Sq. Ft.

Gross Floor Area (GFA) is the total property floor area, measured from the outside surface of the exterior walls of the building(s). Do not include parking. Details on what to include.

| Irrigated Area      |  
|                     |  
| Occupancy           | 100 %

Additional Information

Is this property's data maintained by a Service and Product Provider?
- Yes
- No

Is this a Federal Property (owned by any country?)
- Yes
- No

[Update Property] [Cancel]
What is Irrigated Area?

- Outdoor water use can represent a significant portion of a multifamily property’s overall water use – the irrigated area of a property is the outdoor vegetated area that is regularly supplied water.

- Note - in the water score, this value is capped at a one to one ratio with floor space.

**Include**

- Areas irrigated with in-ground or automatic irrigation system
- Areas regularly watered by hand

**Maybe**

- Areas landscaped to require no supplemental water (e.g. xeriscaped)

**Exclude**

- Patios
- Decks
- Driveways
- Parking lots
- Other hardscapes
How Do I Determine Irrigated Area?

• Review existing designs and installation/service contracts
  • The size of the landscape will often be written into a service contract for maintaining landscape or included in the original design

• Deduct the footprint of the building and hardscape (pavements and parking area) from the total property area
  • Lot size is commonly available from tax records and municipal/county records may also include building footprint

• Use an online mapping tool
  • One free example: [www.freemaptools.com/area-calculator.htm](http://www.freemaptools.com/area-calculator.htm)
WATER SCORECARD

Uptown Lofts

56
out of 100

Primary Function: Multifamily
Gross Floor Area (ft²): 14,800
Built: 1969
For Year Ending: April 30, 2015

Property Address:
123 Main Street
Anytown, CA 12345
Date Generated: June 30, 2017

For the year ending May 2017, this building used 198 gallons of water per square foot. Here’s how that compares to similar buildings nationwide:

Least Efficient
Average
Most Efficient

About this Score
The U.S. Environmental Protection Agency’s (EPA) Water Score is generated by the ENERGY STAR® Portfolio Manager® tool and supported by WaterSense. The Score offers a 1 – 100 measurement of how efficiently this property uses water, compared to similar properties nationwide, when normalized for climate and operational characteristics. Learn more at www.eca.gov/WaterSense.

VERIFICATION (Optional)

I, ____________________________, verify that the information regarding water use and property use details is true and correct to the best of my knowledge.

Signature ________________________ Date ____________________
Best Practices for Managing Water Use

Barry Abramson, Servidyne
Water vs. Energy Tracking

- Monthly/Seasonal Usage Profile
- Long Term Usage Trends
- Savings Verification
- Identification of Leaks
- Billing Anomalies
Portfolio Manager Water Tracking

Water Use Intensity (All Water Sources) (gal/ft²)

Current WUI: 12.1
Baseline WUI: 14.6

Water Use by Calendar Month

1 Water Meters Total
1 - Used to Compute Metrics

Add A Meter
Current Water Date
Aug 31, 2017

Enter Your Bills
Change Meter Selections

Export Data by Calendar Month

Water Meters - Used to Compute Metrics (1)
Portfolio Manager Water Tracking

Water Use by Calendar Month

Water Use by Calendar Month

Water Use by Calendar Month

Water Use by Calendar Month
Interval Data
Swimming Pool Interval Data: What’s Wrong with this Picture?
Irrigation Interval Data: What’s Wrong with this Picture?
Water/Sewer Rate Variation

Water/Sewer Rates

<table>
<thead>
<tr>
<th>City</th>
<th>Water</th>
<th>Sewer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago</td>
<td>$5</td>
<td>$5</td>
</tr>
<tr>
<td>New York</td>
<td>$10</td>
<td>$5</td>
</tr>
<tr>
<td>Los Angeles</td>
<td>$10</td>
<td>$5</td>
</tr>
<tr>
<td>Atlanta</td>
<td>$15</td>
<td>$10</td>
</tr>
</tbody>
</table>

$/HCF
### Example Retrofit Savings per Year

<table>
<thead>
<tr>
<th>Retrofit</th>
<th>Chicago</th>
<th>New York</th>
<th>LA</th>
<th>Atlanta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faucet Aerator</td>
<td>$19</td>
<td>$28</td>
<td>$29</td>
<td>$63</td>
</tr>
<tr>
<td>Urinal Flush Valve</td>
<td>$32</td>
<td>$47</td>
<td>$48</td>
<td>$104</td>
</tr>
<tr>
<td>New Urinal</td>
<td>$87</td>
<td>$130</td>
<td>$131</td>
<td>$287</td>
</tr>
<tr>
<td>New Toilet</td>
<td>$93</td>
<td>$139</td>
<td>$141</td>
<td>$309</td>
</tr>
</tbody>
</table>

- **Faucet Aerator**: 0.5 gpm
- **Urinal Flush Valve**: 1.28 gpf
- **New Urinal**: 1.0 gpf
- **New Toilet**: 0.125 gpf