



Setting the Standards for
Home Energy Efficiency

Update to the RESNET Water Efficiency Rating Index



2016 EEBA Excellence in Building Conference

Steve Baden, RESNET

Jonah Schein, EPA WaterSense Program

Right Time for a Water Efficiency Rating System

“We shall all know the value of water - when the well runs dry.”



HERS Ratings Conducted in 2015



1,735,669

TOTAL Number of HERS-rated Homes to Date

Number of homes
HERS-rated in 2015

190,180

30% increase
from 2014



NEW HOMES
sold in the US
are HERS-rated

HERS Ratings in 2015



Average HERS[®] Index
Score for 2015



More energy efficient
than in 2006



More energy efficient
than in the 1970s



Annual energy bill savings of
\$143 MILLION



Reduction of carbon
dioxide emissions by
851,540 tons

Right Time for a Water Rating System

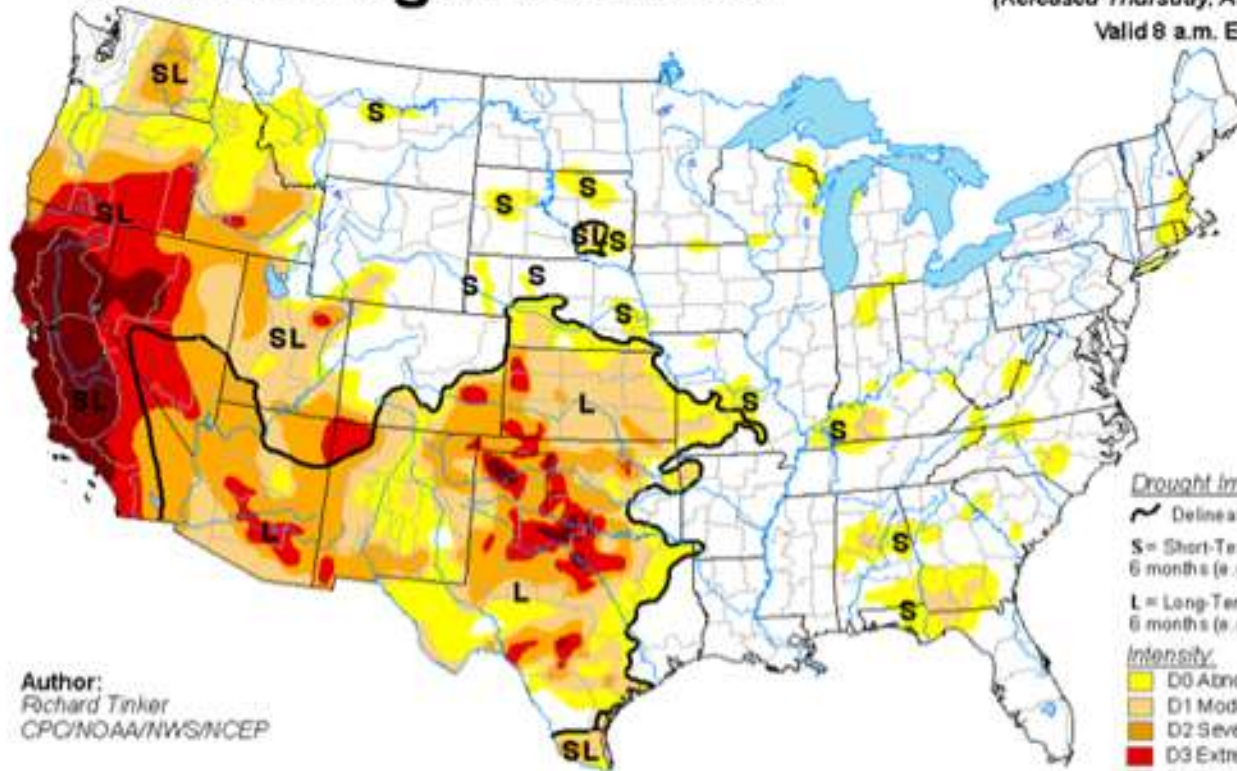
- Dry conditions focus public attention
- Increasing costs of water and wastewater
- Expanding technology for water efficiency
- Existing *energy* rating system reaching is now reaching national scale



USDA - NOAA

U.S. Drought Monitor

August 12, 2014
 (Released Thursday, Aug. 14, 2014)
 Valid 8 a.m. EDT



Author:
 Richard Tinker
 CPC/NOAA/NWS/NCEP

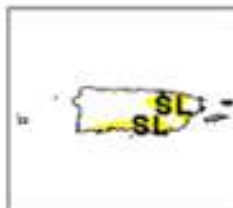
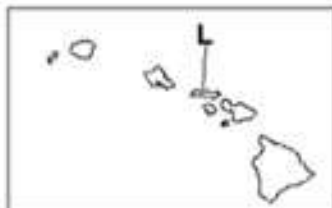
Drought Impact Types:

- ~ Delineates dominant impacts
- S = Short-Term, typically less than 6 months (e.g. agriculture, grasslands)
- L = Long-Term, typically greater than 6 months (e.g. hydrology, ecology)

Intensity:

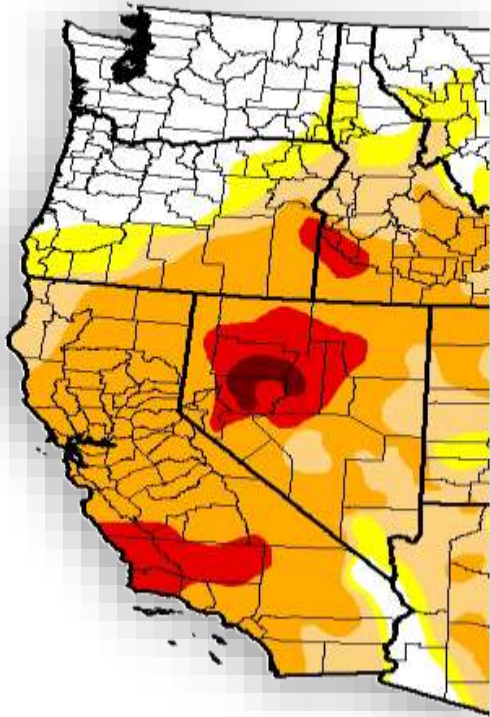
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

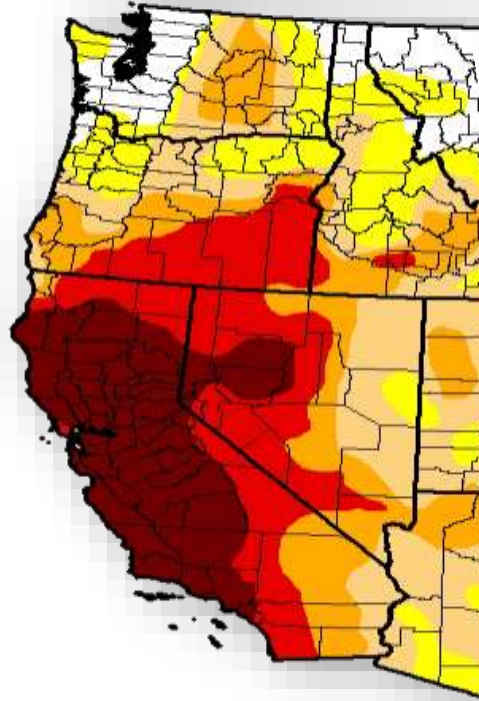


<http://droughtmonitor.unl.edu/>

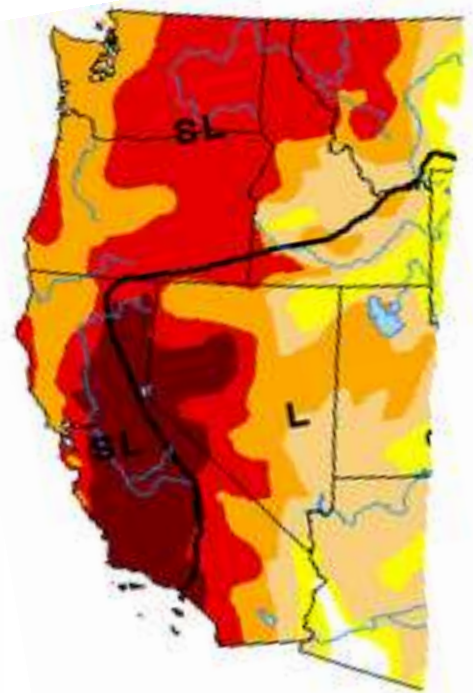
My State - California



2013



2014

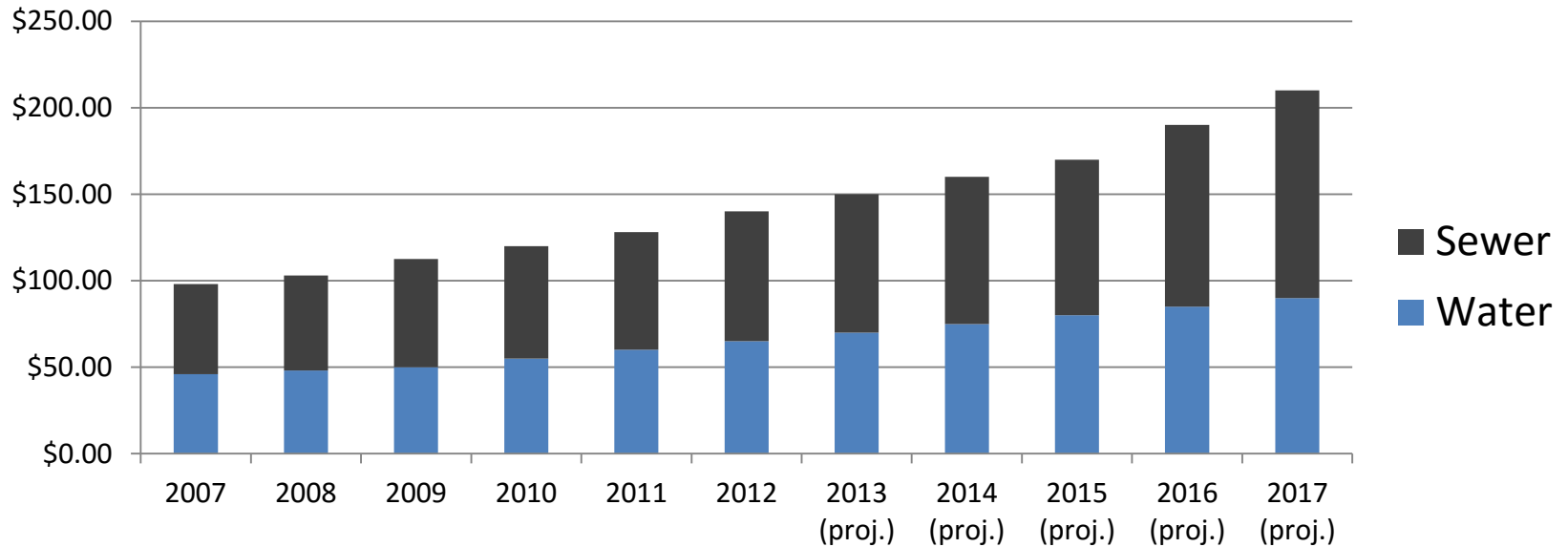


2015

Rising Water & Sewer Rates: Approx. 9% per year

Rising Water & Sewer Rates

(Source: Black & Veatch – Largest 50 metros)



Game Changer for RESNET



**ANSI Adopts RESNET Domestic Hot
Water Systems Amendment to the
ANSI/RESNET/ICC Standard 301**



Steps to Develop RESNET WER Index

Domestic Hot Water Systems Calculations

Add a Few More Indoor and Outdoor Water Usage Calculations

Factor in New Technologies

Compare to a Reference Home

Field Verification

RESNET Water Efficiency Rating System

Why RESNET?

- A national non-profit, multi-stakeholder organization
- Oversees the Home Energy Rating System (HERS) for scoring the *energy* efficiency of homes
- HERS recently amended to better score hot water use
- RESNET works with about 5,000 certified HERS raters nationwide
- Operates at scale: 1/3 of new homes received a HERS rating in 2014



Key Objectives for the WER Index

- Nationwide applicability
- Suitable for both new and existing homes
- Encompasses both indoor and outdoor water efficiency
- Practical and affordable to administer
- Scores usable for quantitative comparison



Key Attributes of the WER Index

- Compares a rated home to a reference home of comparable size
- Reference home has fixed attributes typical of the recent past
- Reference home score = 100
- Software assists in tallying the incremental differences in water consumption resulting from specific features of the home



Policies Guiding the Development of the RESNET WER Index

- The WER Index Reference Home should track with the reference home of the HERS Index (the water use applications that represent standard new home construction in 2006)
- Modeling will produce a WER Index. The reference home will be assigned a WER Index Score of 100. The relative departure of the rated home from the Reference Home will be either added or subtracted from the 100 score. The more efficient the rated home, the lower its score.
- The WER Index score will be based on calculations of potable water use.

Policies Guiding the Development of the RESNET WER Index

- The near term goal is to create a water efficiency rating index that the HERS infrastructure can readily and timely adopt –

(Vision is that the 190,000 new homes that are rated and issued a HERS Index annually can also be cost effectively assigned a WER Index score at affordable cost to builders)

- * Modeled on HERS Index
- * Must be cost effective to inspect and test
- * Be pragmatic
- * In near term built on existing RESNET HERS Rater infrastructure

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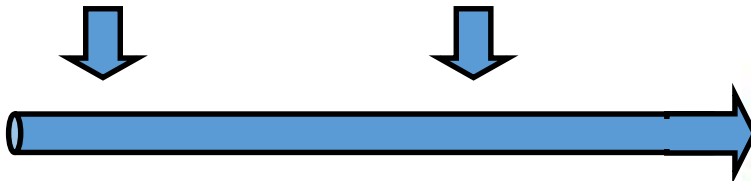
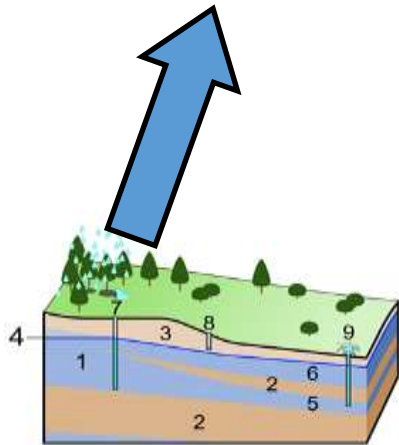
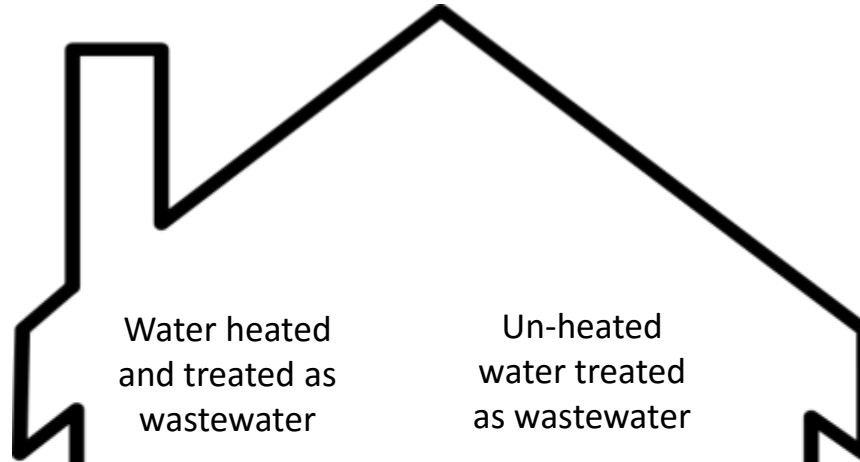
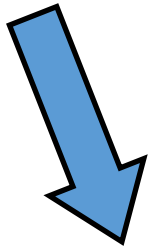
WER Committee Structure

Each balanced with Energy and Water Experts

- WER Index Advisory Council
 - Open call ≈ 75 members
- WER Index Task Force
 - “technical committee”
 - 13 members
 - 3 co-chairs:
 - Jacob Atalla, KB Home
 - Ed Osann, NRDC
 - Jonah Schein, EPA
- WER Index Task Force Technical Subcommittees
 - Modeling & Development of Reference Home
 - Indoor Water Use
 - Outdoor Water Use
 - Rating Inspection & Test Procedures
 - Rater Training & Qualification Requirements

Broad stakeholder participation: Raters, Builders, Suppliers, Trades, Water Utilities, Software Developers, Consultants, Green Building Programs

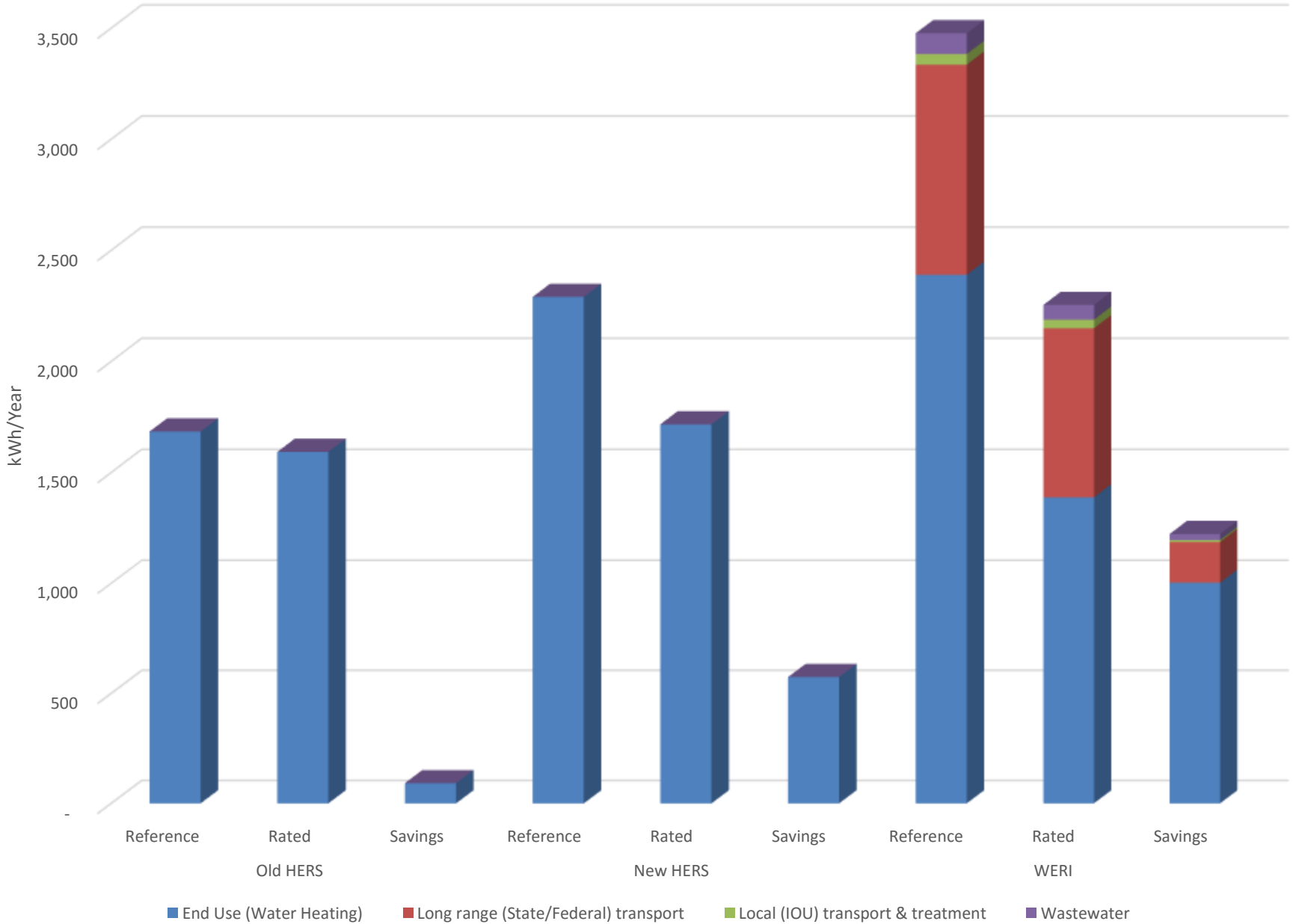
Energy & the Water Use Cycle



Energy & Water

- Energy & Water are inextricably linked
 - Both improvements to the HERS standard as well detailed end use profiles allow HERS and WERI to describe this relationship
- Example: KB Home's Concept at the Greenbuild Expo
 - Meets criteria for a WaterSense Labeled Home
 - Features WaterSense labeled products and other water saving appliances/design features
 - 1,600 ft²
 - 2 bedroom
 - Los Angeles California

Energy Used for Water and Savings



What are our goals?

The charge from the board of directors was to create an index that:

1. Leverages the advances made in the HERS standard (ICC-301-2014)
 - Calculates hot and cold water for all principle fixtures and appliances, requires additional outdoor uses
 - Has compelling technical support
2. Is inline with the general HERS methodology
 - Generates a score by comparing the rated home to a reference
 - Reference home is representative of new construction circa 2006
3. Provides a low bar for participation
 - Can be added to a HERS rating for a reasonable (\$75) incremental

What's the Hold Up?

- The dominant source of data on residential water use is a study published in 1999 from 1998 data (REUWS I) and recently updated with 2013 data (REUWS II)
 - There's no RECS or IECC equivalent for water
 - Building practices (particularly in reference to landscaping and irrigation) were much different
 - EPACK 1992 took effect in 1994
 - can be considered the start of “modern efficiency” in plumbing

Draft Reference

- Indoor (primarily from HERS) includes:
 - Size & location of home
 - Average flow rate of fixtures (separated for faucets and showerheads)
 - Average flush volume of toilets
 - Appliance information (energy and water factors)
- Outdoor (developed based on REUWS II report) includes:
 - Size & location of landscape
 - Presence of irrigation system
 - Presence of pool

Draft Reference

- Both indoor and outdoor reference
 - Have strong statistics background
 - Represent average new construction circa 2006 reasonably well
- Both models have been approved by the reference & modelling committee
 - Have been referred to the indoor and outdoor reference committees respectively

Are we meeting our goals?

1. Leverages HERS?

- Yes!
- Only minor changes and additions had to be made.

2. Follows HERS methodology/uses a 2006 reference?

- Yes!
- In the absence of an IECC equivalent, the straw represents average construction in 2006 well.

3. Allows for easy participation?

- Yes!

What's the Incremental Effort?

For a home that's already receiving a HERS rating, what needs to be added for a home to receive a WERI rating?

At a minimum:

- What is the average flush volume of toilets installed in the house (mandatory product information in the U.S.)
- What is the average flow rate of showerheads and faucets?
- What is the landscaped area?
- Is there an irrigation system?
- Is there a pool?

A Win for All

- Environment
- Homeowners
- Builders
- Raters
- Water Districts
- Municipalities / Government
- Suppliers / Innovators
- Green Building Programs

Projected Time Lines

- October 1, 2016 – Reports from Technical Subcommittees
- November 2016 – RESNET WER Task Force Adopt Draft Guidelines – Public Review Process
- December 2016 – WER Guidelines Adopted
- January 2017 – ANSI Standard Development Process Begins