

Process for the Development of the draft Water Efficiency Rating Index

The RESNET board of directors established five sub-committees tasked with developing the Water Efficiency Rating Index (WERI). They are:

- 1) Reference and Modelling
- 2) Indoor Water Use
- 3) Outdoor Water Use
- 4) Rating and Inspection Procedures
- 5) Rater Training

The draft currently being presented represents the work of the first three technical subcommittees. It is intended that the final two subcommittees will be convened after the technical requirements are approved by the WERI task force.

It is also important to note, that the RESNET board of directors gave three overarching directives to the WERI task force and subcommittees:

- 1) That WERI leverage ANSI/RESNET 301-2014 Addendum A-2015 (Addendum A).
- 2) That WERI be conceptually similar to HERS in as much as it be an asset based rating system comparing a specific (rated) home to new construction circa 2006 (the reference home).
- 3) That WERI be pragmatic in nature and present a low barrier for participation. It is intended that this will allow for more rapid participation in WERI by leveraging the existing HERS rater infrastructure.

Incorporation of ANSI/RESNET 301-2014 Addendum A-2015

The RESNET board had communicated that the basis for the WERI would to a large extent be Addendum A. Pursuant to this directive, all water use assigned to fixtures is taken from Addendum A. Those seeking a full understanding of the model are advised to familiarize themselves with this addendum as well as the research supporting it.

From the core model provided by Addendum A, the following actions have been taken to complete the indoor model water use predications:

- 1) Toilet flushes have been added assuming 5.05 flushes per person per day (based on the Residential End Uses of Water Study, 2016 or REUWS II) and 1.6 gallons per flush in the reference home (based on the Energy Policy Act of 1992).
- 2) Water softeners have been added.
- 3) Fixtures have been separated into lavatory faucets, kitchen faucets, and showerheads based on the original analysis used to compile Addendum A as well as an analysis of the Residential End Uses of Water Study, 1999 (REUWS I).

Development of the Outdoor Model for Water Use

The model for outdoor water use was compiled by modifying models found in the REUWS II report. The REUWS II model includes terms for the cost of water, an operational characteristic which the committee felt violated the directives of the RESNET board that WERI be asset based.

As a result, regression analysis was performed on the REUWS II dataset without the inclusion of cost of water and various techniques were applied to arrive at the final algorithm (the model the committee felt displayed the best statistical strength, stability, and predictive value).

The irrigated area of the reference homes was established based on an analysis of the REUWS II data. The draft WERI establishes the reference home's irrigated area based on the lot size of the home. Since larger irrigated areas have been statistically shown to increase water use (something reflected in the outdoor model), this allows homes to raise their WERI score by reducing the size of the irrigated area. The adjustment achievable by reducing the irrigated area however has been constrained to prevent abuse of this feature.

Research from the EPA WaterSense program and the Southern Nevada Water Authority was used to complete the model for the reference home's outdoor water use.

Areas in Need of Future Improvement and Points of Discussion

While the WERI task force and subcommittees feel that the draft WERI provides sufficient content to rate homes for water use in the near term, there are several areas and questions that arose which the committees discussed at length and felt were worth of specific mention.

- 1) When (if ever) the reference home should include an irrigation system? The draft WERI presented includes an irrigation system in the reference home when an irrigation system is present in the rated home. This was the consensus of both the reference and modelling subcommittee as well as the outdoor water use subcommittee.

However, many subcommittee members felt that an irrigation system should always be included in the reference home. This would allow homes to improve their WERI scores by opting not to include an irrigation system.

- 2) Several features and pieces of equipment were discussed which subcommittee members agreed should ultimately be incorporated into the WERI. However, the consensus was that there was not sufficient data and/or resources to include them at this time. These items are:
 - a. Whole house humidifier systems
 - b. Drinking water treatment systems
 - c. Leak prevention techniques
 - d. Rainwater harvesting systems
 - e. Graywater systems
 - f. Rain sensors
 - g. Soil amendments and improvements
- 3) A topic of extensive discussion among the outdoor subcommittee was the degree to which the WERI accurately represents new construction circa 2006. The core of the outdoor water use model is based on data from REUWS II, which tracked water use in stock housing. After extensive discussion, it was agreed that while the REUWS II data cannot be said to represent new construction 2006 exactly, it is capable of doing so reasonably well and that there is no preferred data source currently available.

- 4) The outdoor subcommittee identified a desire to include more options for adjusting the water use in the rated home in cases where an irrigation system was not present. It was decided however, that sufficient data did not exist to meet this requirement at this time.