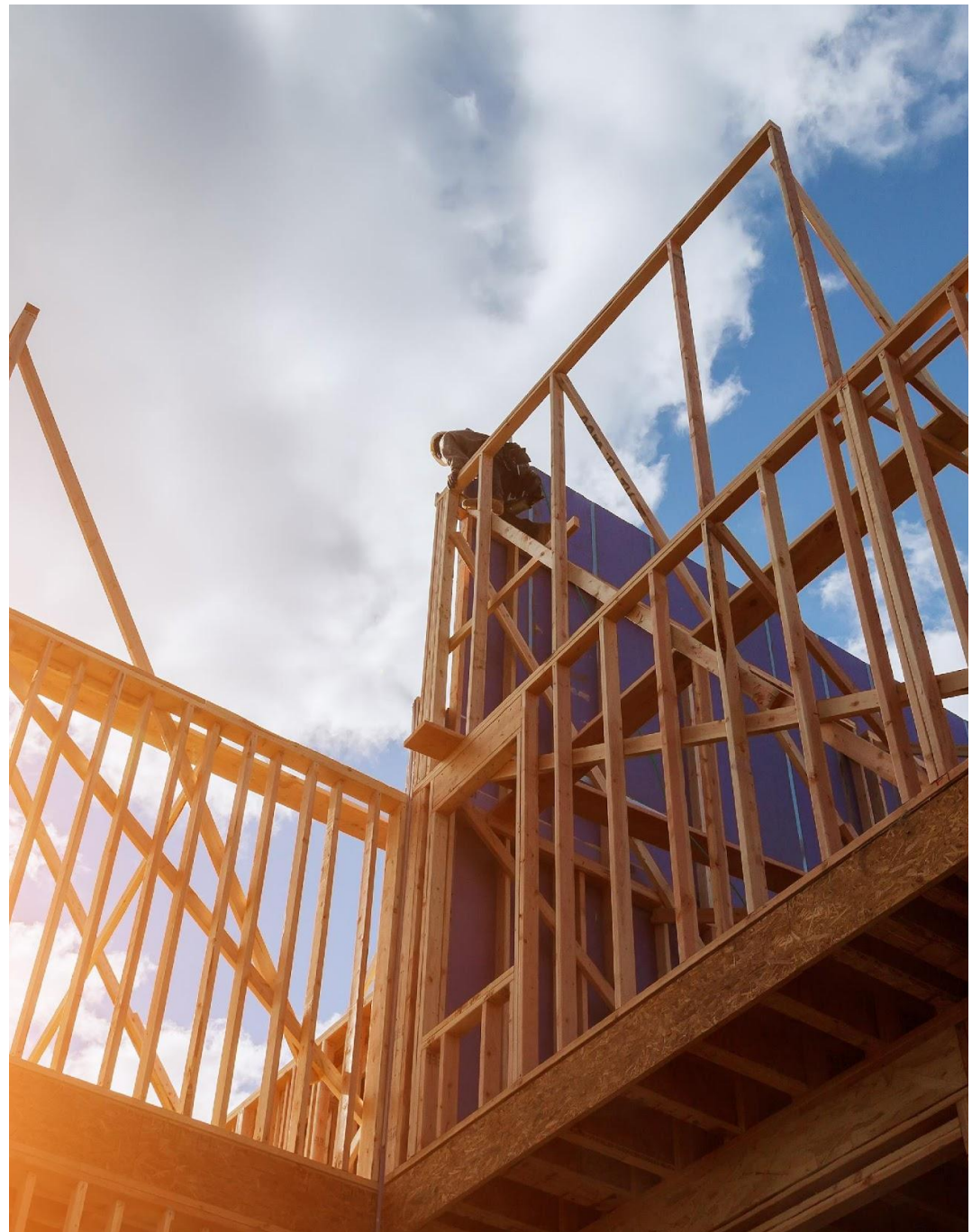


Jan 2025

HERS_{H2O} in Ekotrope

Paul Kintner



Overview

- Water Conservation matters
- $HERS_{H_2O}$ and WaterSense
- How to model $HERS_{H_2O}$ in Ekotrope
- Why Ekotrope?
- What's next?



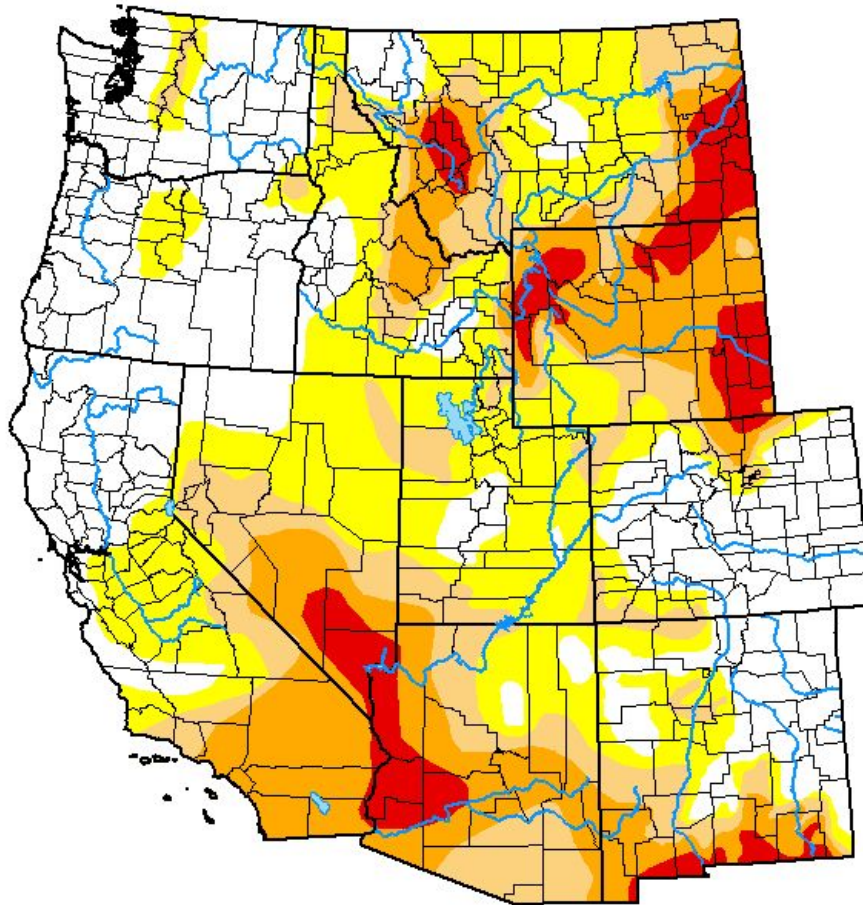
Water matters

- Water is essential for life.
 - 2.8% of water on Earth is freshwater, and only 0.5% is available for use.
- New Construction needs Water!
 - Arizona limits construction around Phoenix as the water supply dwindles.
 - But small towns need water too.









U.S. Drought Monitor West

January 14, 2025
(Released Thursday, Jan. 16, 2025)
Valid 7 a.m. EST



Intensity:

-  None
-  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. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Brad Pugh
CPC/NOAA



droughtmonitor.unl.edu



Water matters

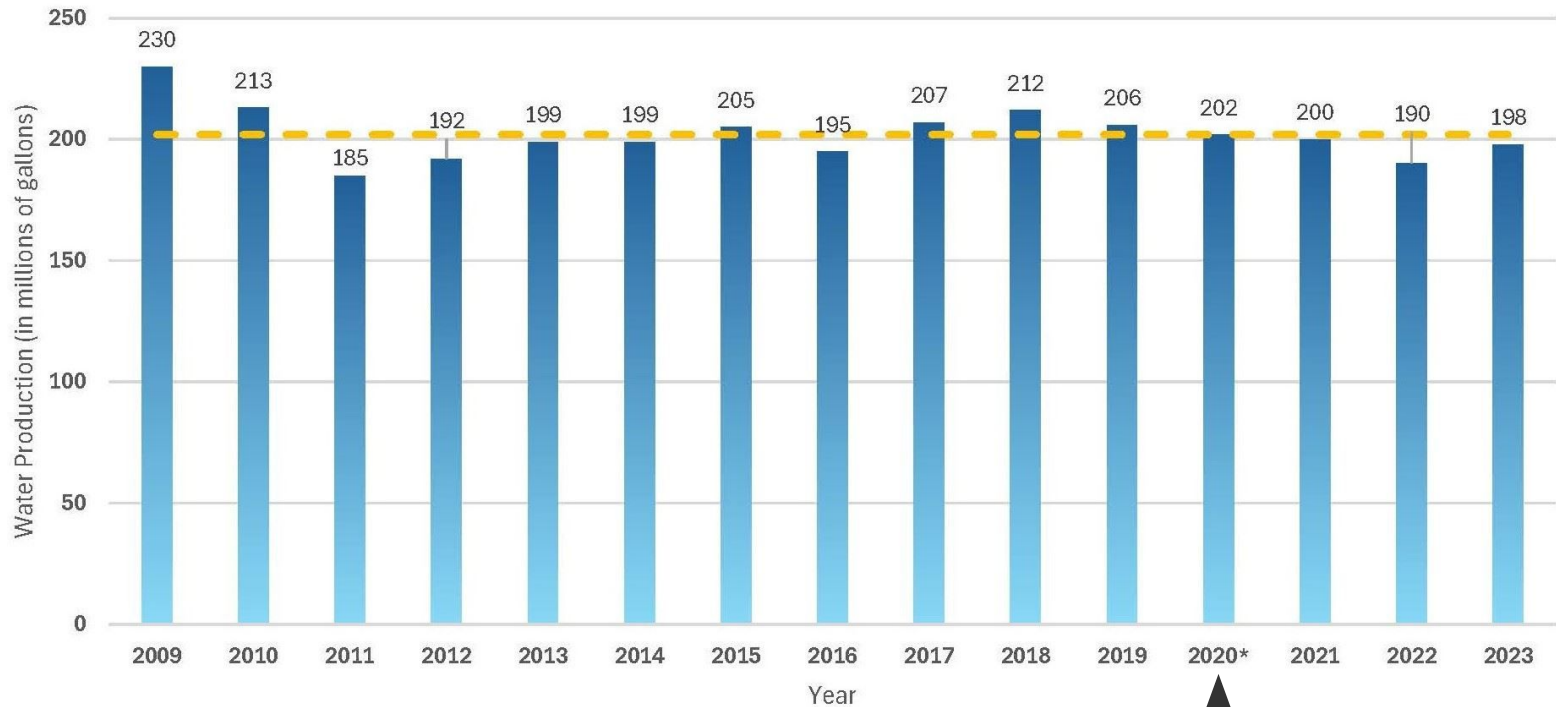
- North Bend, WA had decade long building moratorium for water lack of rights ending in 2008.
- Beyond the residences the city is also required to provide water mitigation for the local Snoqualmie River at low levels. (This is fed by the snowpack!)
- Water rights to support growth and existing permits finally secured in 2023.
 - Now North Bend pumps more water from its sources, but purchases water from Seattle Public Utilities to provide mitigation water to the Snoqualmie River



Water matters

- To promote conservation North Bend has issued annual Water Conservation Ordinance and partnered with organizations provide rebates and services for water efficiency.

City of North Bend Water Production



* first year of Water Conservation Ordinance

— Average (202 million gallons)



HERS_{H2O} and WaterSense



RESNET
HERSH2O[®]

- Standard ANSI/RESNET/ICC 850, released in 2020, defines a water efficiency rating index (WRI) procedure
- HERS_{H2O} is the RESNET program based on Standard 850.
 - Need to be a HERS_{H2O} Rater or HERS_{H2O} Rating Field Inspector
 - Working with a HERS_{H2O} Provider.
- WaterSense Approved Certification Method (WACM)



- Optional program similar relationship to HERS_{H2O} as ENERGY STAR to HERS.
 - Water efficiency and flexibility in meeting it.
 - Faster hot water with less waste.
- For this Raters need to be a certified WaterSense Home Verifier.
- And Builders need to be a partner with EPA WaterSense Program.



What goes into HERS_{H2O} Ratings

Basics

- Geography
- House size
- Bedrooms



Inside the Home

- Fixtures
- Toilets
- Hot water distribution
- Water Pressure
- Water softener
- Appliances

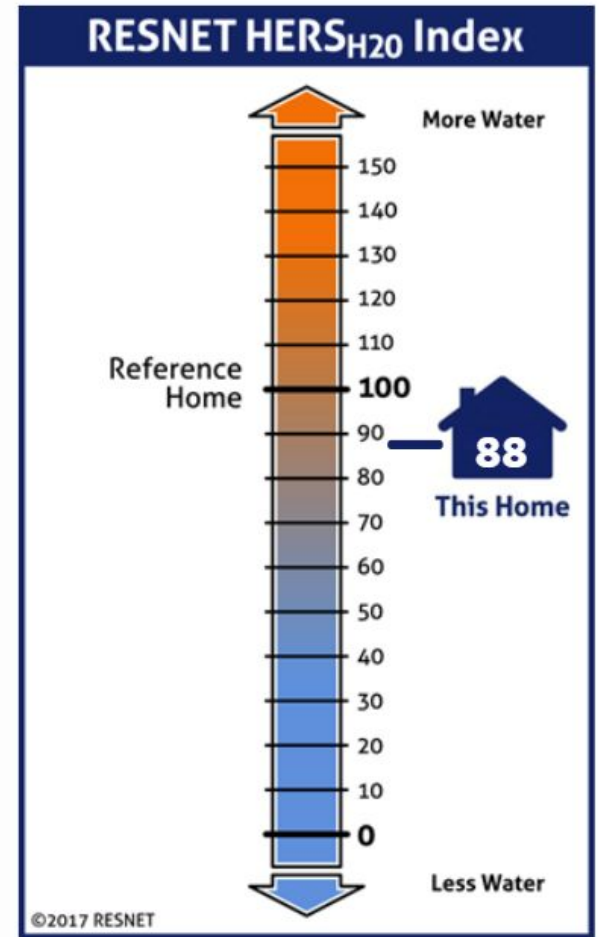
Outside the home

- Lot Size
- Irrigation
- Pool



What goes into HERS_{H2O} Ratings

- Water Rating Index (WRI) compares the proposed home to the reference home similar to a HERS rating.
 - Can also be broken down into:
 - Indoor Water Rating Index
 - Outdoor Water Rating Index
- Reference home water use is derived from the Proposed home.
 - Will have WRI at ~100



HERS_{H2O} And EPA WaterSense

EPA WaterSense

- HERS_{H2O} index of 70 or less
- Mandatory Requirements require extra inspection points:



Pressure loss test

Leak free connections

And WaterSense fixtures



Performing a $\text{HERS}_{\text{H}_2\text{O}}$ Rating in Ekotrope

Getting going

- General Info
- Envelope
- Fenestration
- Mechanical
- Water
- Lighting & Appliances
- Infiltration
- Onsite Generation
- Codes & Programs
- Usage

Water Distribution

Water Fixture Type i ▼

Use Default Hot Water Pipe Length (83.25 ft)

At Least R3 Pipe Insulation? i

Recirculation System

Hot Water Recirculation System?

Drain Water Heat Recovery

Drain Water Heat Recovery?

Fire Sprinkler System

Has Fire Sprinkler System? ▼

Water Use for Water Rating Index (HERS H2O) i

Selected Codes and Programs

Select codes and programs to show in Quick Results for all projects. Quick results load faster with fewer codes selected.

HERS

HERS

Water Codes

HERS H2O (Beta)

EPA WaterSense (Beta)

ASHRAE

ASHRAE 62.2 2016

ASHRAE 62.2 2013

ASHRAE 62.2 2010

National Programs

IECC 2018 ERI

IECC 2018 Prescriptive

IECC 2018 Performance

IECC 2015

IECC 2015 ERI

IECC 2015 Prescriptive



Water Use Checkbox

- Signals intent to do a $HERS_{H_2O}$ Rating.
- Adds Water Rating Index to Quick Results.
- Enables $HERS_{H_2O}$ and EPA WaterSense analyses.

Water Use for Water Rating Index (HERS H2O) i

Water System

Water Service Pressure Static Pressure Reading ▼

Measured Pressure [PSI]	i	<input type="text" value="90"/>
Water Softener Effectiveness [gal/1000 grains]	i	<input type="text" value="5"/>
Average Shower Head Flow Rate [gal/min]	i	<input type="text" value="2"/>
Average Kitchen Sink Faucet Flow Rate [gal/min]	i	<input type="text" value="2"/>
Water Price [\$/ccf]	i	<input type="text" value="5"/>

Toilets

Is Toilet Flush Volume Marked?	i	<input type="checkbox"/>
Number of Single-Flush Toilets		<input type="text" value="3"/>
Single-Flush Volume [gpf]	i	<input type="text" value="1.28"/>
Number of Double-Flush Toilets		<input type="text" value="0"/>
Number of Non-Water Consuming Toilets		<input type="text" value="0"/>

Landscape Design

Lot Area [ft ²]	i	<input type="text" value="6,000"/>
Pad Footprint Area [ft ²]	i	<input type="text" value="1,000"/>
Front Area [ft ²]	i	<input type="text" value="2,000"/>
Front Irrigation Area [ft ²]		<input type="text" value="500"/>
Is Back Area Improved?	i	<input type="checkbox"/>

Outdoor Water Features

Is Pool or Spa Present?	<input type="checkbox"/>
Is Automatic Irrigation System Installed?	<input type="checkbox"/>

Performing a HERS_{H2O} Rating in Ekotrope

Water Distribution

Water Fixture Type

i ▼

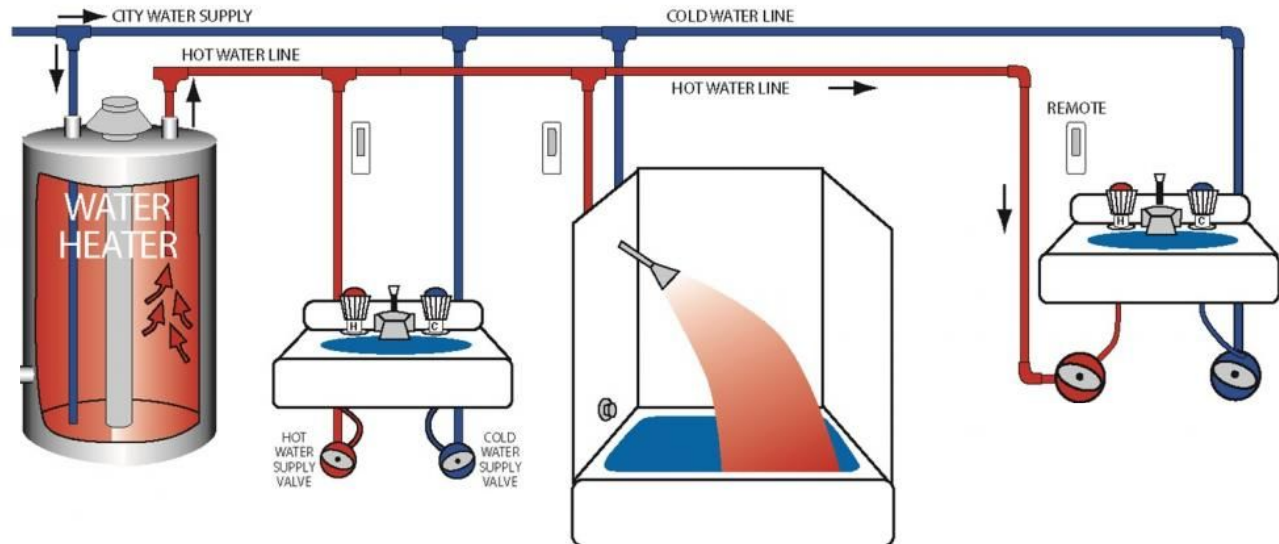
Use Default Hot Water Pipe Length (83.25 ft)

Hot Water Pipe Length [ft]

i

At Least R3 Pipe Insulation?

i



Performing a HERS_{H2O} Rating in Ekotrope

Recirculation System

Hot Water Recirculation System?

Hot Water Branch Length [ft]

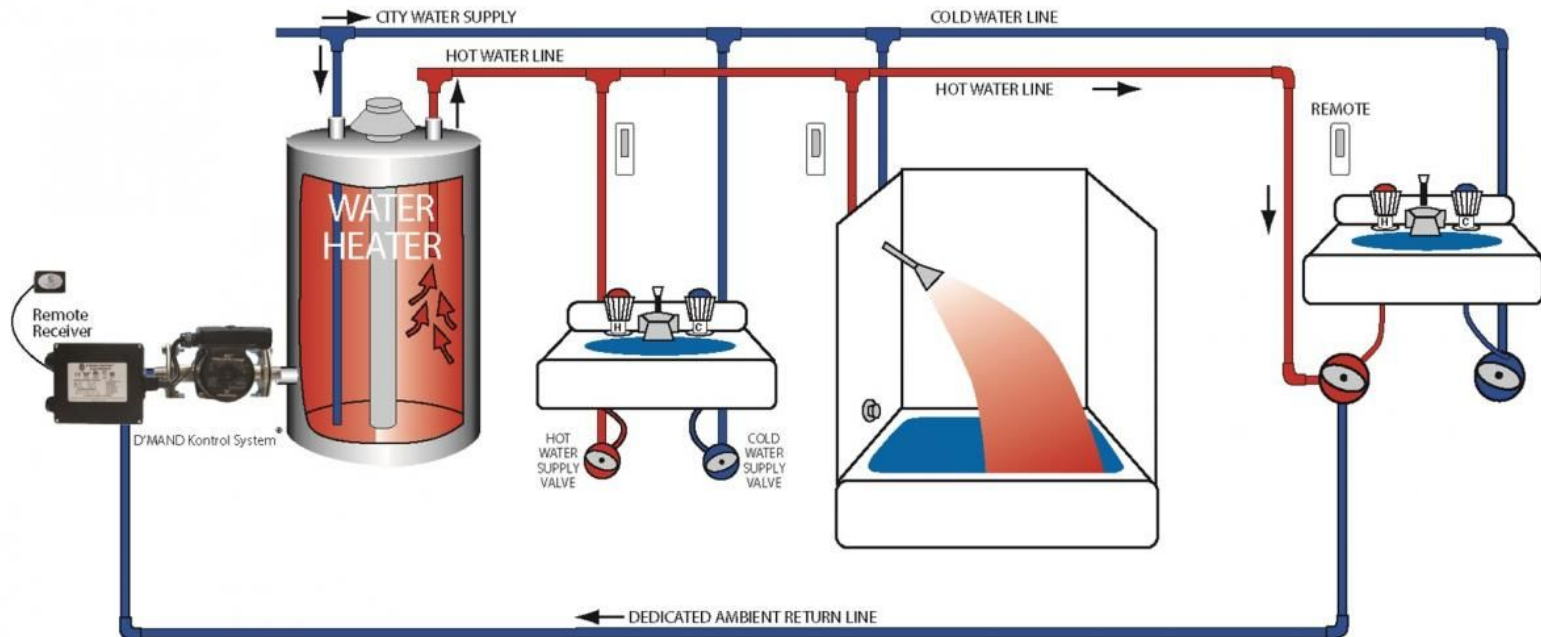
Recirculation System Pipe Loop Length [ft]

Recirculation System Control

Manual Demand Control

Recirculation Pump Power [Watts]

Shared?



Performing a HERS_{H2O} Rating in Ekotrope

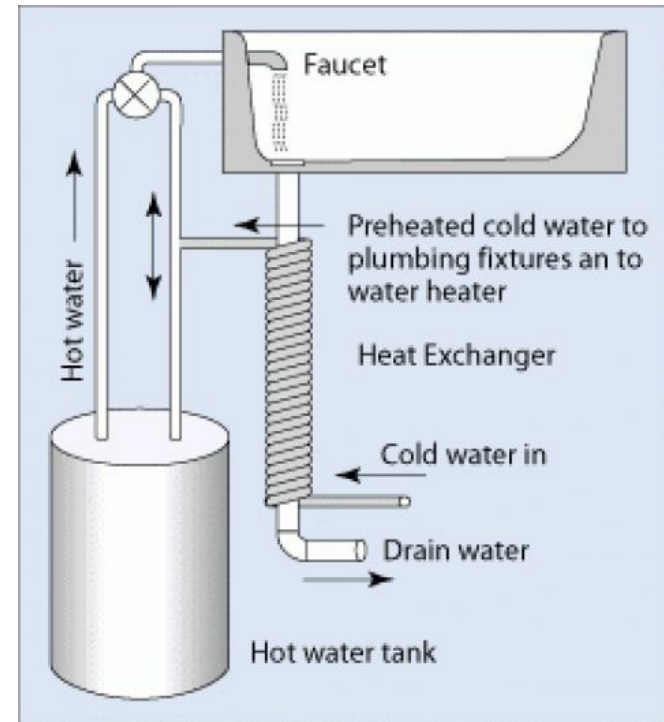
Drain Water Heat Recovery

Drain Water Heat Recovery?

Drain Water Heat Recovery Efficiency

Supplies preheated water to:

Fixture Factor of Drain Water Heat Recovery



<https://www.energy.gov/energysaver/drain-water-heat-recovery>



Performing a HERS_{H2O} Rating in Ekotrope

Water System

Water Service Pressure

Static Pressure Reading



Measured Pressure [PSI]



90

Water Softener Effectiveness [gal/1000 grains]



5

Average Shower Head Flow Rate [gal/min]



2

Average Kitchen Sink Faucet Flow Rate [gal/min]



2

Water Price [\$/ccf]




5



Performing a $HERS_{H_2O}$ Rating in Ekotrope

Toilets	
Is Toilet Flush Volume Marked?	<input checked="" type="checkbox"/>
Number of Single-Flush Toilets	1
Single-Flush Volume [gpf]	1.28
Number of Double-Flush Toilets	1
Double-Flush Volume [gpf]	1.28
Number of Non-Water Consuming Toilets	1


- Number of toilets and average flush volume for all similar toilet types.
- Double flush volume is average of two reduced flushes and one full flush.


look for 

REPLACING INEFFICIENT TOILETS

with **WATERSENSE MODELS** can save **13,000 GALLONS** per year

saving more than **\$170 PER YEAR** in water costs



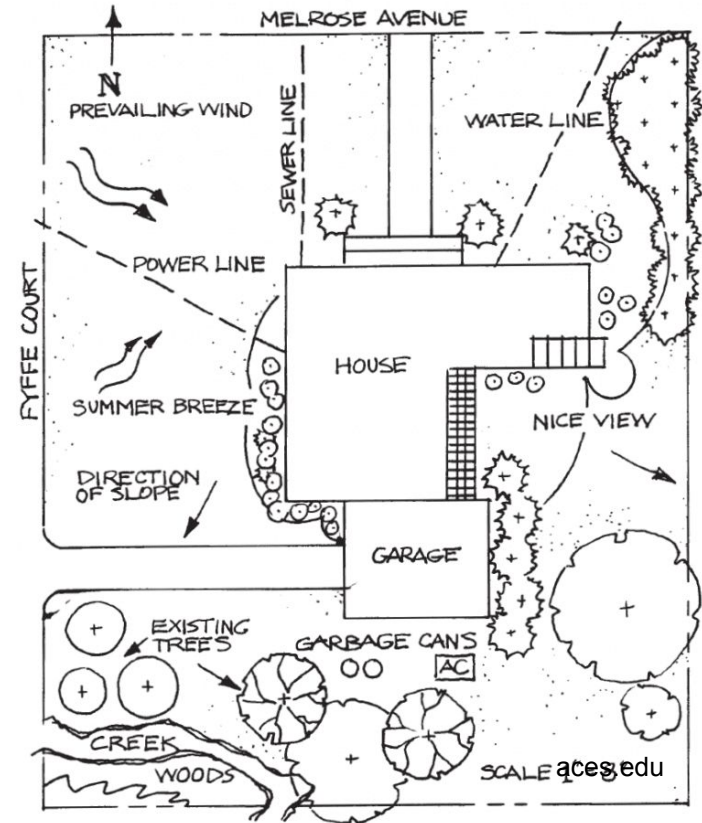


The infographic features a blue silhouette of a toilet on the left. To its right, the text 'REPLACING INEFFICIENT TOILETS' is written in large blue letters. Below this, it states 'with WATERSENSE MODELS can save 13,000 GALLONS per year'. To the right of the toilet, there are four orange dollar signs of varying sizes, and a piggy bank icon with the text '\$170 PER YEAR in water costs'. In the top right corner, there is a 'look for' logo with the WaterSense logo and 'EPA Certified' text.

Performing a HERS_{H2O} Rating in Ekotrope

Landscape Design

Lot Area [ft ²]	i	10,000
Pad Footprint Area [ft ²]	i	1,400
Front Area [ft ²]	i	2000
Front Irrigation Area [ft ²]		400
Is Back Area Improved?	i	<input checked="" type="checkbox"/>
Back Irrigation Area [ft ²]	i	0



Performing a HERS_{H2O} Rating in Ekotrope

Outdoor Water Features

Is Pool or Spa Present?

Is Automatic Irrigation System Installed?

Is Irrigation System Audited? i

Is Irrigation System Weather-Controlled? i

Use Residential Irrigation Capacity Index?

Total Zone Flow Rates [gpm] i

TABLE 4.6.5 APPLYING ADJUSTMENTS TO OUTDOOR WATER USE OF THE RATED HOME

1	4.6.2—Weather-based Controllers	Shall be determined by the presence or absence of a smart controller in the installed portion of the landscape.
2	4.6.3—Commissioning of an Automatic Irrigation System	Shall be determined by the presence or absence of commissioning in the installed portion of the landscape.
3	4.6.4—Residential Irrigation Capacity Index (RICI)	<p>Shall be calculated in accordance with Section 4.6.4 and adjusted in partially finished landscapes to be calculated as:</p> $RICI_{rat} = \frac{\text{sum of flow (gpm) of all irrigation valves} + (0.005 \times \text{predicted } Back_irr)}{\text{square feet irrigated area}} \times 1,000$ <p>(Predicted <i>Back_irr</i> is defined in Section 5.3.)</p>

Performing a HERS_{H2O} Rating in Ekotrope

Dishwasher i

Manufacturer	<input type="text" value="Ekotrope"/>
Model	<input type="text" value="12345"/>
Dishwasher Default: i	<input type="text" value="Custom"/> ▼
Efficiency Type i	<input type="text" value="kWh/yr"/> ▼
Labeled Energy Rating [kWh] i	<input type="text" value="467"/>
Dishwasher Size	<input type="text" value="Standard"/> ▼
Natural Gas Operating Cost [\$] i	<input type="text" value="33.12"/>
Gas Rate [\$/therm] i	<input type="text" value="1.09"/>
Electric Rate [\$/kWh] i	<input type="text" value="0.12"/>
Outside Conditioned Space?	<input type="checkbox"/>

Clothes Washer i

Manufacturer	<input type="text" value="Ekotrope"/>
Model	<input type="text" value="54321"/>
Integrated Water Factor i	<input type="text" value="11.4"/>
Set Washer Properties: i	<input type="text" value="Custom"/> ▼
Washer Labeled Energy Rating[kWh] i	<input type="text" value="400"/>
Washer IMEF i	<input type="text" value="1"/>
Natural Gas Operating Cost [\$] i	<input type="text" value="27"/>
Washer Capacity [ft ³] i	<input type="text" value="3"/>
Gas Rate [\$/therm] i	<input type="text" value="1.09"/>
Electric Rate [\$/kWh] i	<input type="text" value="0.12"/>
Washer Labeled Loads Per Week i	<input type="text" value="6"/>
Load Type	<input type="text" value="Front-load"/> ▼
Outside Conditioned Space?	<input type="checkbox"/>



Performing a WaterSense Rating in Ekotrope

- General Info
- Envelope
- Fenestration
- Mechanical
- Water
- Lighting & Appliances
- Infiltration
- Onsite Generation
- Codes & Programs
- Usage

EPA WaterSense Program

- Pressure Loss Tests
- Leak Free Hot Water Distribution System
- Leak Free Toilets
- Leak Free Bathroom Faucets
- Leak Free Showerheads
- Leak Free Bathroom Tubs
- Leak Free Kitchen Faucets
- Leak Free Other Fixtures/Appliances
- WaterSense Labeled Toilets
- WaterSense Labeled Bathroom Sink Faucets
- WaterSense Labeled Showerheads

DOE Zero Energy Ready Home Program

Builder ID #

Version 1

- High-Performance Windows
- Insulation
- Optimized Duct Location
- Water Efficiency
- ENERGY STAR Appliances
- Lighting – 80% LEDs
- ENERGY STAR Fans
- Renewable Ready - PV
- Override Basement SAF Exclusion
- Basement Area Excluded [ft²]













QA Checks

- Reviewing outputs and scores.

HERS H2O (Beta)  

Beta HERS H2O is in beta. Please do not rely on these results as they are subject to change.	
Water Rating Index 68	
Rating Date	
Water System Inspection	
Dishwasher information	
Clothes Washer information	
Consistent WaterSense Flow Rates	

EPA WaterSense (Beta)  

Beta EPA WaterSense is in beta. Please do not rely on these results as they are subject to change.	
Water Rating Index Target: 70 Water Consumption Performance	
HERS H2O	
EPA WaterSense Mandatory Requirements Mandatory code requirements that are not checked by Ekotrope must be met.	
Builder is WaterSense partner The builder must be a certified EPA WaterSense Program partner to be eligible for this certification.	
WaterSense Toilet Flush Volume	
WaterSense Shower Head Flow Rate	
WaterSense Low-Flow Water Fixtures	



Performing a HERS_{H2O} Rating in Ekotrope

Site Info | Rating Info | Utility Rates | **QA Info**

Version i 4.2.2 ▼

Permit Info/Number

Permit Date i

Rating Date i Wednesday January 1, 2025

Rating Type i Confirmed ▼

Rater of Record ▼

Other Raters/Inspectors ▼

✖ Paul Kintner

Rater | Field Inspector | **Water Rating Field Inspector** | HERS Modeler




✖ Cancel | Save
















Submissions

Automated QA Checks




Information, Warnings, and Errors

 Beta HERS H2O is in beta. Please do not rely on these results as they are subject to change.	 Beta EPA WaterSense is in beta. Please do not rely on these results as they are subject to change.	 Builder is WaterSense partner The builder must be a certified EPA WaterSense Program partner to be eligible for this certification.
--	--	---

 **12 Passing QA Checks** [Hide Passing Checks](#)

 Water Rating Index 68	 Rating Date	 Water System Inspection
 Dishwasher information	 Clothes Washer information	 Consistent WaterSense Flow Rates
 Water Rating Index Target: 70 Water Consumption Performance	 HERS H2O	 EPA WaterSense Mandatory Requirements Mandatory code requirements that are not checked by Ekotrope must be met.
 WaterSense Toilet Flush Volume	 WaterSense Shower Head Flow Rate	 WaterSense Low-Flow Water Fixtures

Registry Information Checks

 Site Details The following Site Details are required for submission: Address, Builder and Construction Year (as 4 digits). <i>One of the required fields is missing.</i>	 Resnet Provider ID 0000-000	 Registry Credentials User: ben
---	---	--

By submitting this rating to the RESNET registry, you give RESNET and the home builder permission to use and share all data associated with this rating, including input data, site data, and calculated results.



Generating Reports

- HERS_{H2O} certificate
- Expect to see:
 - WaterSense Labels and Certificates
 - Water Summary Comparison
 - Home Summary





RESNET
HERS_{H2O}



About this rating:

This rating is a relative performance score. A lower HERS H₂O index means better water efficiency for a home. For more information, see: <https://www.resnet.us/about/hersh2o/>

Home:

, NY

Builder:

ESTIMATED INDOOR WATER USAGE AND SAVINGS

Daily Water Usage	108.38 gal.
Daily Water Savings Compared to Reference Home	24.38 gal.

ESTIMATED OUTDOOR WATER USAGE AND SAVINGS

Daily Water Usage	46.62 gal.
Daily Water Savings Compared to Reference Home	26.13 gal.

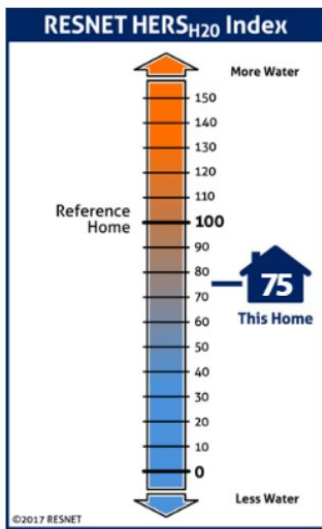
How this Home Compares to the Reference Home:

BETA

25%
More Water Efficient

18,436
Gallons, Annual Water Savings

\$123
Estimated Annual Water Cost Savings



Home Feature Summary:

Conditioned Floor Area:	2,000 ft ²
Number of Bedrooms:	3
Lot Size:	6,000 ft ²
Irrigated Area:	500 ft ²
Automatic Irrigation:	Yes
Average Toilet Flush Volume:	1.28 gpf
Kitchen Faucet Flow Rate:	2.00 gpm
Bathroom Faucet Flow Rate:	Low-flow
Average Shower Flow Rate:	2.00 gpm

Rating Completed by:

Energy Rater: Paul Kintner
RESNET ID:

Rating Company: Ekotrope
2 Avenue De Lafayette, Fourth Floor

Rating Provider: Ekotrope
2 Avenue De Lafayette, Fourth Floor



Paul Kintner, Certified Energy Rater
Date: 1/14/25 at 7:08 AM

Beyond a HERS Rating

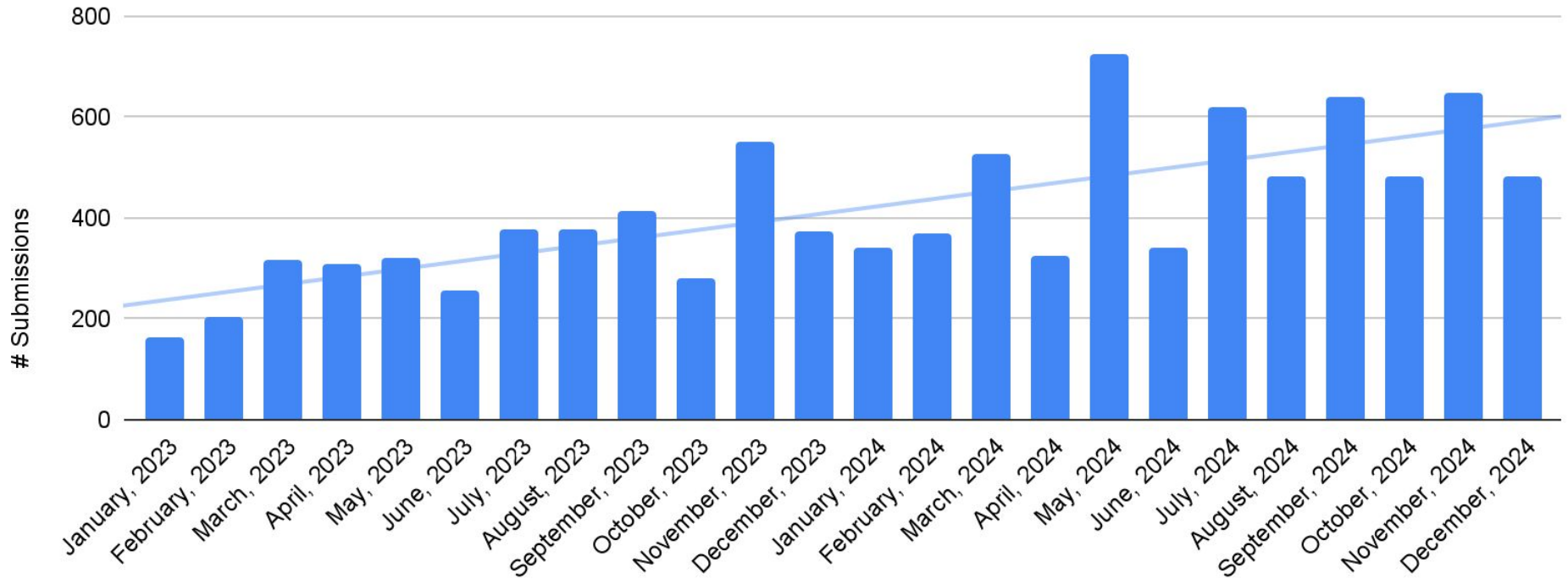
- Additional testing and inspection:
 - Individual fixture lookups and/or flow rate testing
 - Pressure loss testing
 - Leak inspection
 - Lot sizes
 - Irrigation inspections
 - (Optional) Residential Irrigation Capacity Index (RICI) testing
- (Audience) What is the hardest part and takes the longest time with inspections?



Why perform $\text{HERS}_{\text{H}_2\text{O}}$ Ratings in Ekotrope?

Submissions are on the Rise

HERS H2O Submissions



Ekotrope Value

- Data all in one place
 - No duplicate entry
 - Less to manage across different platforms
- Easy version control - Don't have to manage the different excel versions
- Reports / Certifications / Labels on demand and in batch
- Saves time
- Support of Ekotrope (support@ekotrope.com)



Coming Soon

- Additional Reports
 - WaterSense Certificates and Labels
 - Diagnostic Reports
 - Home Summary Reports
- Batch registration
- Integration with DOE ZERH v2 WaterSense requirement
- Final Release



Why do builders do this?

- Goodness of the heart?
- Saving the client on utility bills?
 - WaterSense estimated that labeled homes could save ~\$500 annually
- RESNET and the Alliance for Water Efficiency proposed a federal tax credit to amend 45L
 - Are there other incentives out there?
- Municipalities requiring it?
 - Does it make it easier/possible to get permits in water constrained municipalities?
- Just because it's a DOE ZERH SF v2 requirement?



Thank You!

Paul Kintner

paul@ekotrope.com