



Energy and Water Calculator

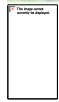
Amy Dryden
Senior Program Manager
Build It Green
February 2015



Build It Green

- A non-profit with mission to achieve healthy & resource efficient homes
 - Establish and promote an attainable and credible green building program
 - Train professionals in green building
 - Work with local governments to create green building policy





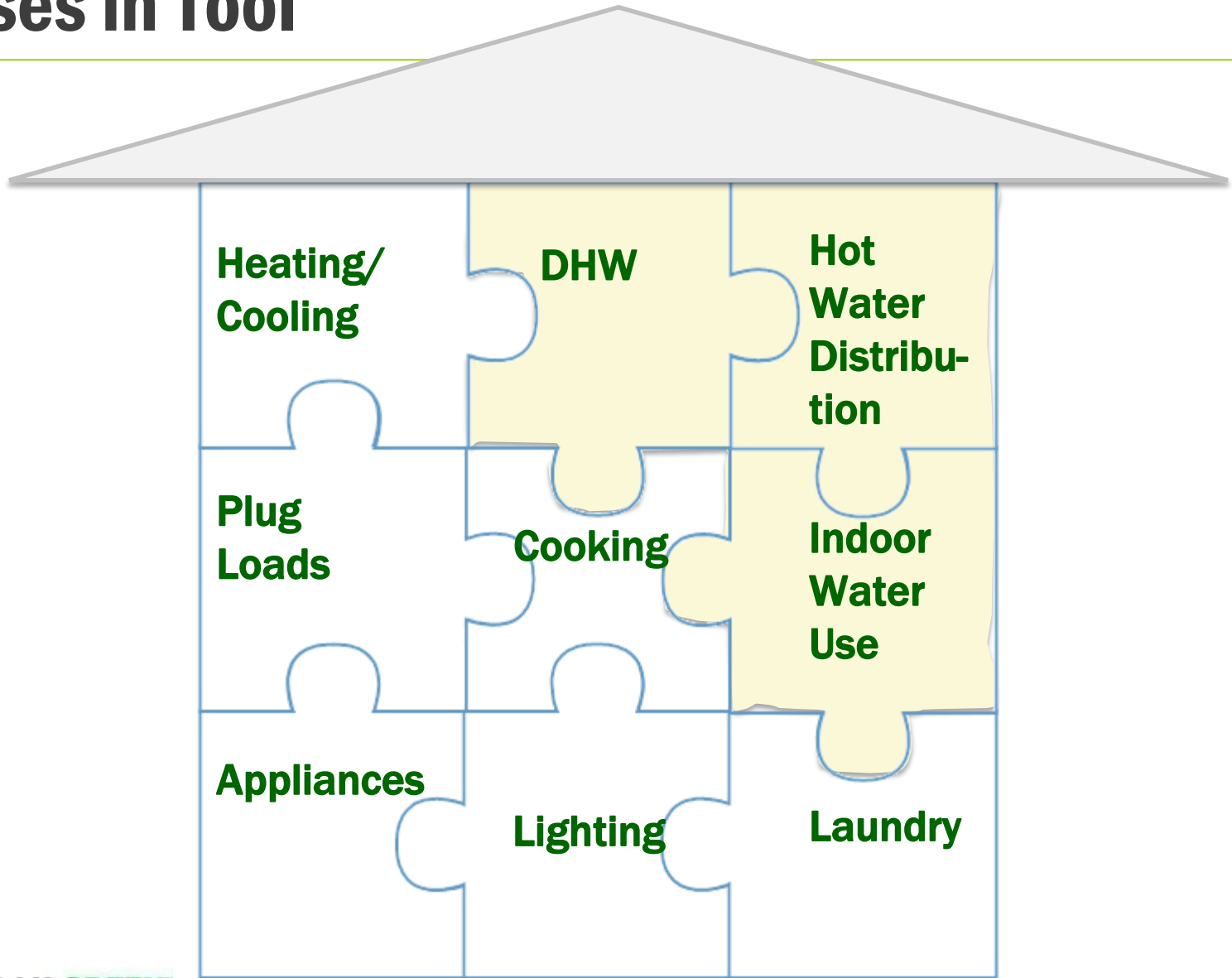
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- Review tool and end uses
 - Summary of Water calculations
 - GHG, energy use, volume of water
 - Demonstration of 2-3 unit types

Energy and Water Calculator

- Create a tool
 - To support Zero Net Energy and Low Carbon Home for GreenPoint Rated- a green building certification program
 - Utility allowances
- Comprehensive end uses
- Create baseline for hot water use & savings opportunities
 - Evolve shower stop, Hands Free faucets
 - Structured plumbing design & on demand recirculation



End Uses in Tool



Calculating impacts of Water use

GHGs

- CA metric

Energy Use

- National
- CA Baseline

Volume

- National
- CA Baseline



Sphere of Influence for GHGs

EBMUD WATER SUPPLY

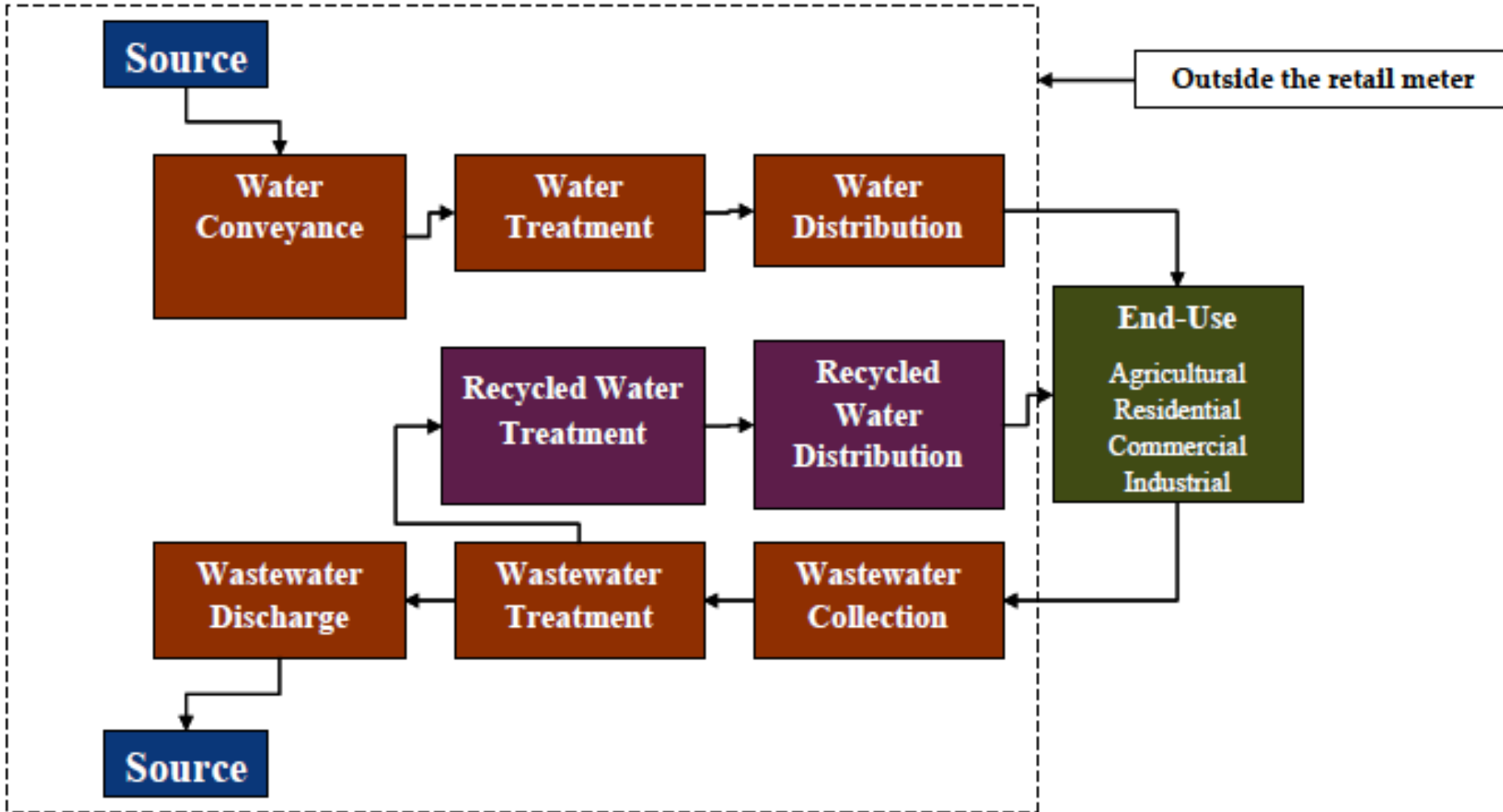
AUBURN

LAKE TAHOE

NEVADA
CALIFORNIA

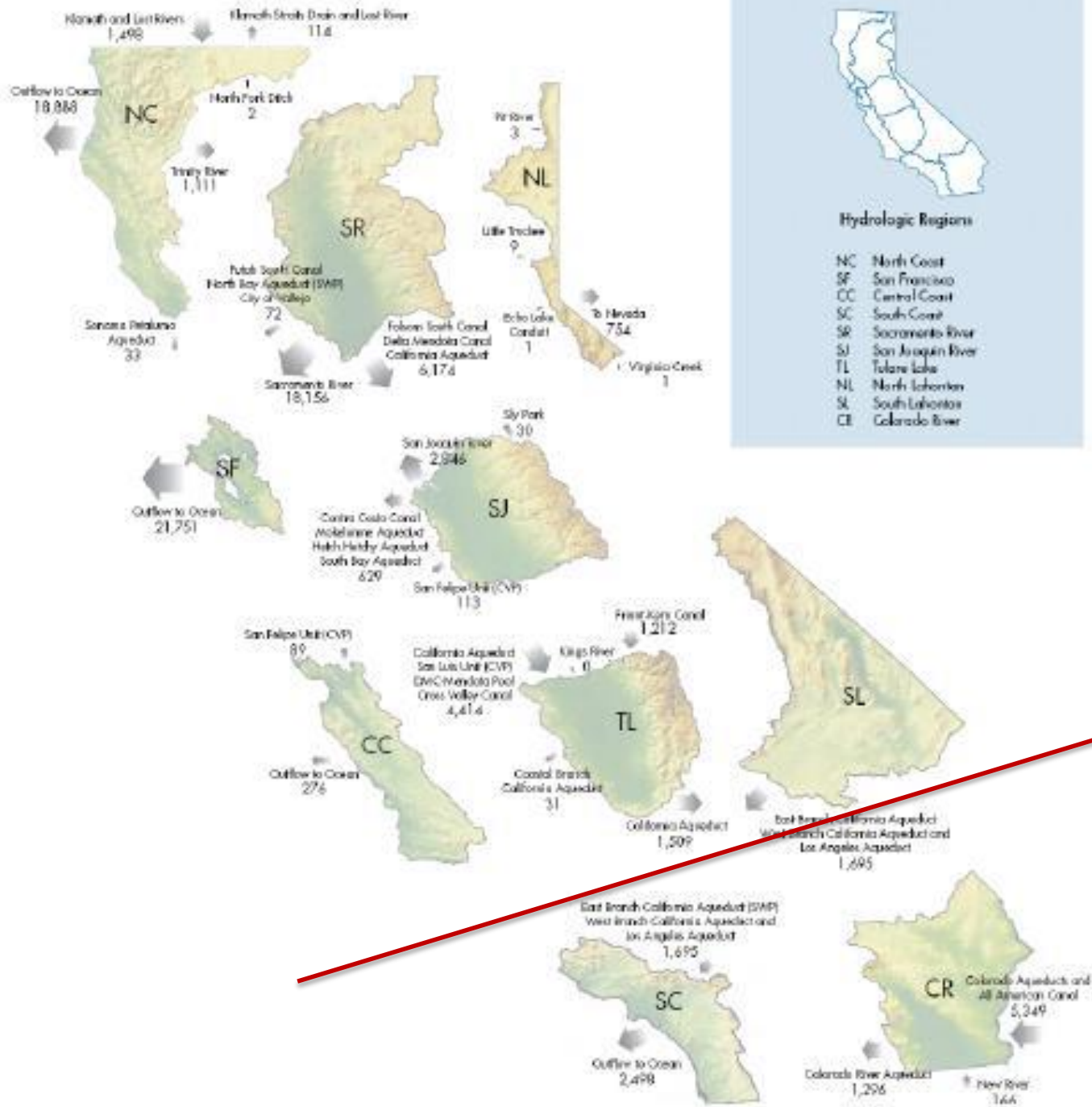


What is included in Sphere?



Hydrologic Zones in CA

10
Regions
vs.
previously
2 regions





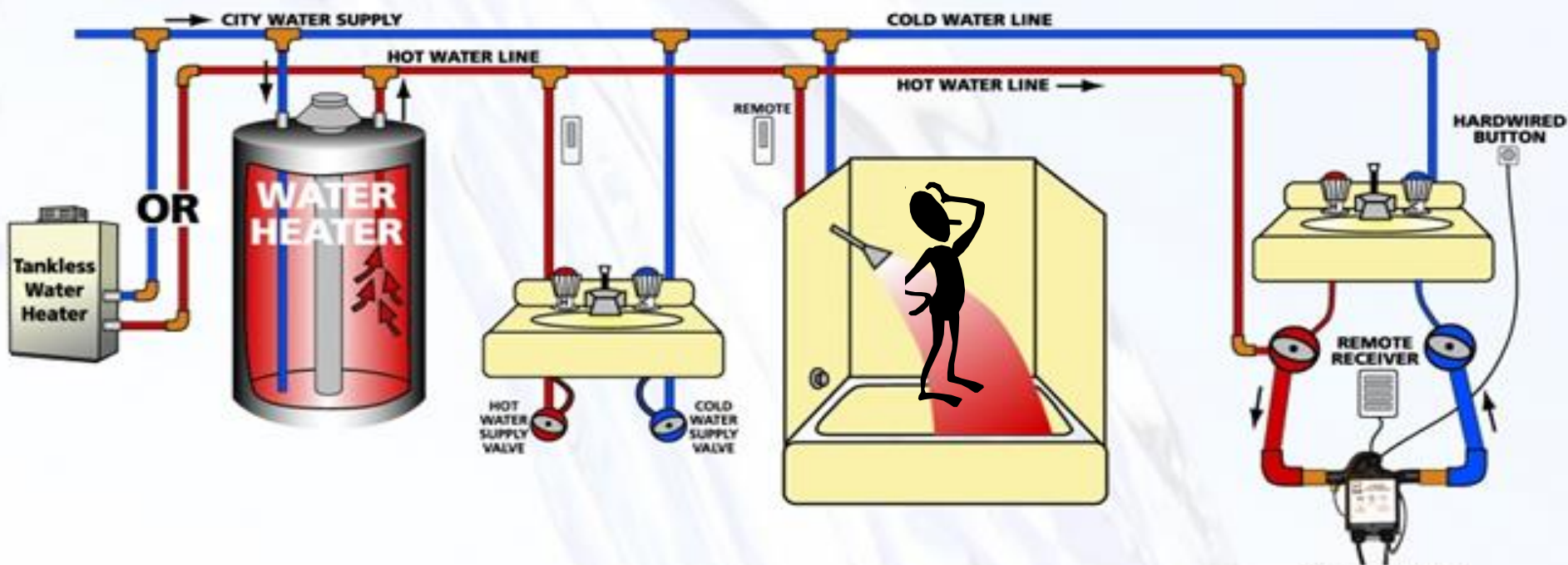
The Accounting

Location	Gallons of Water	Metric Tons of CO2e
Oakland	1,831,020	.51
Los Angeles	1,831,020	2.03

- 20 units – 1 and 2 bedroom
- Variables in pumping due to distribution, conveyance, and treatment 4 times the difference in CO2e

Sphere of influence on Energy Use for Hot Water

- ◆ *Water heater*
- ◆ *Distribution system – structural waste*
- ◆ *Behavioral waste*
- ◆ *Type of Fixture*



Opportunities for Domestic Water Use Savings

Efficient Hot Water Distribution

Option 2 - Measured Volume

16

Choose Plumbing Configuration

There is a Recirculation System & Recirculation with remote sensed demand control

There is a Recirculation System, Pump Power (Watts)

17

Drainwater Heat Recovery

There is a DWH system

Average DWH unit installed efficiency per CSA 355 (Energy Star label)

18

65

60

55

50

45

40

35

30

25

20

15

10

5

0

Shower Stopping Valve/Water Saving Reduction Technology

Is/Are Shower Stop Valve(s) installed on A Showers?

Percent of Total Shower Count in the Residence

19

100

0

The Accounting on Energy Use

- *Water heater*
- *Distribution system – structural waste*
- *Behavioral waste*
- *Type of fixture*
- *Use based on occupancy*
- *Providing additional information for optional water heaters*

4 Bedroom Multifamily home

Configuration	Gallons of Hot	
	Water	kBTU
No Optimization – National	66,656	22,969
Optimization*	50,877	9,273

*On-demand recirculation, DWHR, efficient showers & faucets

The Sphere of Influence on Volume

- *Distribution system – structural waste*
- *Behavioral waste*
- *Type of fixture*
- *Use based on Occupancy*



The Accounting of Volume

- *Water volume for single user and use non linear equation for additional persons in residence*
- *Different equations for different building types*

Configuration	1 Bedroom		4 Bedroom	
	Gallons of Water	Assumed Occupancy	Gallons of Water	Assumed Occupancy
Single Family	69,256	2.18	166,647	3.4
Multifamily	55,723	1.94	151,734	2.85
Multifamily- 100% below poverty level	74,135	2.26	214,897	3.4

**Multifamily
– National**

Proposed/ Actual Residence for all units per type	1 Bed	2 bed	total for project	Improvement over CA baseline	Improvement over National baseline
domestic hot water use (gallons/ year)	186,844.09	277,590.65	464,434.74	20%	23%
domestic hot water use (gallons/ day)	511.90	760.52	1,272.42	20%	75%
total indoor water use (gallons/ year)	544,119.76	808,388.21	1,352,507.97	12%	26%
total indoor water use (gallons/ day)	1,490.74	2,214.76	3,705.50	12%	26%

**Multifamily
– 100%
below
poverty**

Proposed/ Actual Residence for all units per type	1 Bed	2 Bed	total for project	Improvement over CA baseline	Improvement over National baseline
domestic hot water use (gallons/ year)	248,579.37	380,170.86	628,750.23	19%	23%
domestic hot water use (gallons/ day)	681.04	1,041.56	1,722.60	19%	75%
total indoor water use (gallons/ year)	723,902.74	1,107,118.11	1,831,020.86	11%	26%
total indoor water use (gallons/ day)	1,983.30	3,033.20	5,016.50	11%	26%

Monthly Usage	January	February	March	April
Domestic Hot Water	16,840.27	14,982.88	16,556.90	15,428.82

We Are....

- ✦ In Alpha and Ugly...but
- ✦ Refining inputs and outputs and making it work
- ✦ Then put on a pretty face



GreenPoint Rated Energy and Water Calculator

Consultant's Information

Rater Name:

Amy Dryden

Email address:

amy@builditgreen.org

Rater's Phone Number:

123

Credentials

Please check all credentials that apply

- GreenPoint Rater
- HERS Rater
- CEA
- BPI MF BA

Owner Information

Owner's Name:

Bob Owner

Contact Number:

123-456-7890

Email

bob@owner.com





Next Steps for version 2

- Recirculation loop with central domestic hot water
- Correctly recognizing HPWH
- Drainwater Heat Recovery out of Energy Ratio and calculate directly based upon research soon to be available
- Hourly use



Thank you!

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