

Efficiency Education Partnerships In a College Town

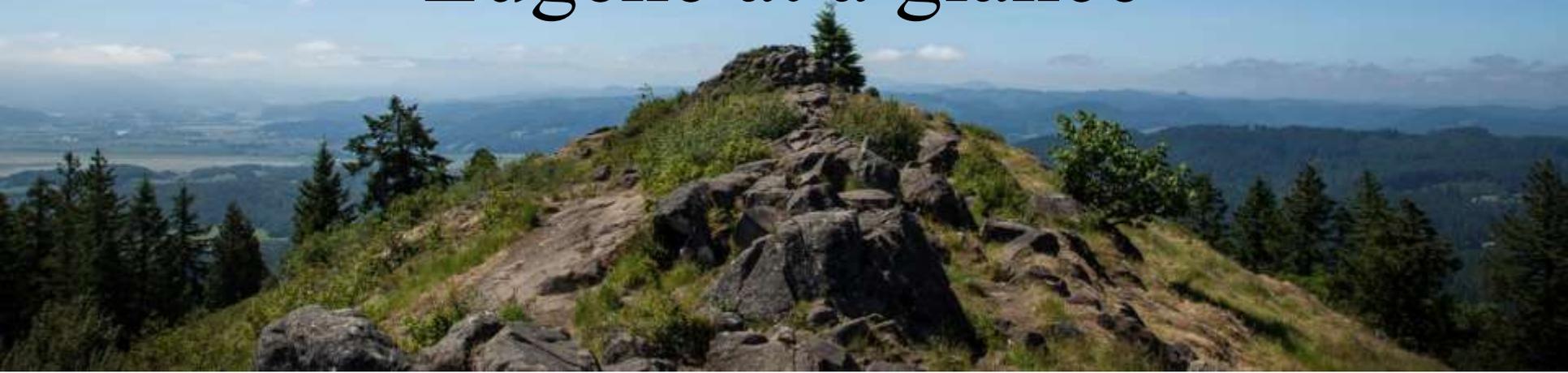
Matt Lutter
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April 27, 2018
PNWS-AWWA Conference

Overview

- Eugene at a glance
- Efficiency education partners
- Program development
- Program results
- Next steps

Eugene at a glance



- Population 166,000
- EWEB: public utility, provides electricity & water from the McKenzie River
- University of Oregon is a big influence, enrollment 23,000
- The Eugene community is relatively progressive, has historically valued conservation & stewardship
- Eugene is facing a housing shortage*

* 2017 article by realtor.com: Eugene is the #2 most-constrained housing market, behind Seattle

Eugene's Rental Housing

- Around half of housing units are rentals
- Thousands of rental properties still in need of energy upgrades*
- Renters often move into a home without any idea of the energy or water costs
- Renters pay for energy & water efficiency in their rates, but often do not receive any benefits or services



Rental Efficiency Education



- Provides consumption education & efficiency programs
- Offers rebates or 0% interest loans for energy & water efficiency improvements in rentals



University of Oregon



- Offers many resources and services for renters
- Engages with broader community while integrating sustainability

City of Eugene



- Rental Housing Code protects health, safety & welfare of tenants
- Funds a variety of services for rentals

Lane County

Rental Owners Association

City of Portland

State of Oregon

Home Energy Score

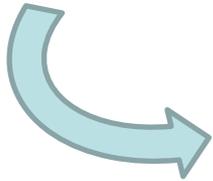
- A scoring system developed by the U.S. Department of Energy
- Like a *miles-per-gallon* rating for vehicles
- Allows comparison of the energy efficiency of homes, *regardless of occupancy & location*
- The score is based on a home's envelope, heating & cooling, and hot water systems



Home Energy Score in Oregon

2012: EWEB became a Home Energy Score Partner with U.S. Department of Energy (1st Partner in Oregon)

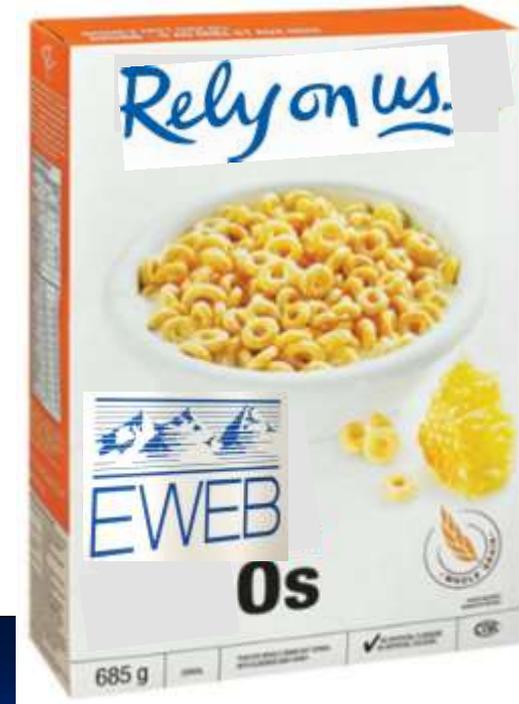
2016: State of Oregon defined how Home Energy Scores are to be used in Oregon



Info on single-page, with utility-specific pricing

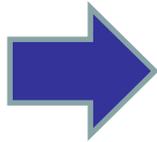
EWEB HOME ENERGY SCORE
 U.S. DEPARTMENT OF ENERGY
 THIS HOME'S ENERGY COSTS
3 THIS HOME'S SCORE OUT OF 10
\$1,718 PER YEAR
Better Buildings Home Energy Score
 Year home's best score: **3**
 Official Assessment ID# 100001
 HOW MUCH ENERGY IS THIS HOME LIKELY TO USE?
 Electric: 8,035 kWh \$956
 Natural Gas: 426 therms \$762
 Other: 0 galtyr \$0
 TOTAL ENERGY COSTS PER YEAR \$1,718
 THIS HOME'S CARBON FOOTPRINT:
 This Home **3.83**
 Worst 8+ Best 0
 * Actual energy use and costs may vary based on occupant behavior and other factors.
 * The carbon footprint is based only on estimated building energy use.
 * Carbon emissions are calculated based on utility and benchmark emissions factors provided by the Oregon Department of Energy.
 * Estimated energy costs are calculated based on current utility prices (\$0.130/kWh for electricity, \$1.03/therm for natural gas).
 * This report meets Oregon's Home Energy Performance Score Standard.

Nutrition Facts	
Serving Size 1/2 cup (115g) Servings Per Container About 4	
Amount Per Serving	
Calories 250	Calories from Fat 130
% Daily Value*	
Total Fat 14g	22%
Saturated Fat 9g	45%
Cholesterol 55mg	18%
Sodium 75mg	3%
Total Carbohydrate 26g	9%
Dietary Fiber 0g	0%
Sugars 26g	
Protein 4g	
Vitamin A 10%	Vitamin C 0%
Calcium 10%	Iron 0%
* Percent Daily Values are based on a 2,000 calorie diet.	



Home Energy Score in Eugene

Score



Energy costs



Carbon footprint



EWEB HOME ENERGY SCORE
Know the score. Outsmart energy waste.

U.S. DEPARTMENT OF ENERGY
THIS HOME'S SCORE 3 OUT OF 10

THIS HOME'S ESTIMATED ENERGY COSTS
\$1,718 PER YEAR

Better Buildings Home Energy Score

Your home's current score **3**

Uses more energy 1 2 3 4 5 6 7 8 9 10 Uses less energy

Official Assessment ID# 100001

The Home Energy Score is a national rating system developed by the U.S. Department of Energy. The Score reflects the energy efficiency of a home based on the home's structure and heating, cooling, and hot water systems. The average score is a 5. Learn more at HomeEnergyScore.gov.
Made possible through a partnership between EWEB, University of Oregon, and the City of Eugene.

HOW MUCH ENERGY IS THIS HOME LIKELY TO USE?

Electric:	8,695 kWh	\$956
Natural Gas:	406 therms/yr	\$762
Other:	0 gal/yr	\$0

TOTAL ENERGY COSTS PER YEAR \$1,718

THIS HOME'S CARBON FOOTPRINT:
as measured in metric tons of CO₂ equivalent per year

This Home **3.83**

tons/year
WORST 8+ BEST 0

What should my home's carbon footprint be? Oregonians should reduce carbon pollution per household to 7.1 tons per year by 2020, and to 1.9 tons per year by 2050 to reach our climate goals.

- Actual energy use and costs may vary based on occupant behavior and other factors.
- The carbon footprint is based only on estimated building energy use.
- Carbon emissions are calculated based on utility- and fuel-specific emissions factors provided by the Oregon Department of Energy.
- Estimated energy costs are calculated based on current utility prices (\$0.11/kWh for electricity; \$1.09/therm for natural gas).

• This report meets Oregon's Home Energy Performance Score Standard

HOME PROFILE
LOCATION:
123 Main St
Eugene, OR, 97405
YEAR BUILT:
1952
HEATED FLOOR AREA:
1250 sq. ft.
NUMBER OF BEDROOMS:
3

ASSESSMENT
ASSESSMENT DATE:
2018-02-04
EXPIRATION DATE:
2026-02-04
ASSESSOR:
Emily Ryba
University of Oregon
PHONE:
541-346-0709
EMAIL:
scoreprogram@uoregon.edu
CCB LICENSE #:
(Public institution, exempt from licensure)

Flip over to learn how to improve this score and use less energy!

Home Energy Score in Eugene

Score with improvements



Score today: 3	Score with improvements:* 8	Estimated energy savings with improvements: \$545 per year	Estimated carbon reduction with improvements: 41%
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TACKLE ENERGY WASTE TODAY!

Enjoy the rewards of a comfortable, energy efficient home that saves you money.

- Get your home energy assessment (Done!)
- Choose which energy upgrades to address first.
- Get a bid. Find an EWEB-participating contractor by visiting our list online at bit.ly/EWEBcontractor.
- Complete energy improvements. For eligible measures, EWEB may be able to offer a rebate or a 0% interest loan. For more details, visit eweb.org/saveenergy or call EWEB at 541-685-7088.

*** PRACTICAL ENERGY IMPROVEMENTS - COMPLETE NOW OR LATER**

To achieve the "score with improvements," all recommended improvements listed below must be completed. Improvements likely will have a simple payback of ten years or less and may be eligible for EWEB funding and possible mortgage financing. For a more detailed explanation of costs and payment, please get a bid from a contractor.

FEATURE	TODAY'S CONDITION	RECOMMENDED IMPROVEMENTS
Attic insulation	R-9	Add insulation to R49 as space allows
Floor insulation	R-0	Insulate floors to R30 or as space allows
Wall insulation	R-7	-
Envelope/Air Sealing	Not professionally air sealed	Have the home professionally air sealed
Windows	Double-pane wood	-
Skylights	None	-
Heating system	Central furnace, Gas	Install an efficient heat pump
Cooling system	No cooling system	-
Duct insulation	Not fully insulated	Insulate exposed ducts to R11
Duct sealing	Ducts not fully sealed	Have ducts tested for leaks & seal if necessary
Water heater	Electric storage	Install a heat pump water heater
Solar PV	None	Visit bit.ly/EWEBsolar for more info

The above energy improvements are recommended by EWEB to improve the score and lower the home's carbon footprint. Some improvements may not be recommended by the U.S. Department of Energy due to cost-effectiveness or fuel conversion reasons. USDOE recommendations may be provided upon request.

WATER EFFICIENCY FEATURES

FEATURE	TODAY'S CONDITION	RECOMMENDED IMPROVEMENTS
Toilet flush rate(s) (gal/flush)	Toilet #1 = 5 gpf; Toilet #2 = 1.6 gpf	Replace toilet(s) with water-efficient low-flow toilet(s) using 1.28 gpf or less.
Water leaks	Number of toilet leaks = 1; Number of non-toilet leaks = 1	Repair water leaks. Consider upgrading your meter to an advanced meter with leak detection.

For more information about how EWEB can help with water efficiency improvements, visit bit.ly/EWEBwater.

Recommended improvements



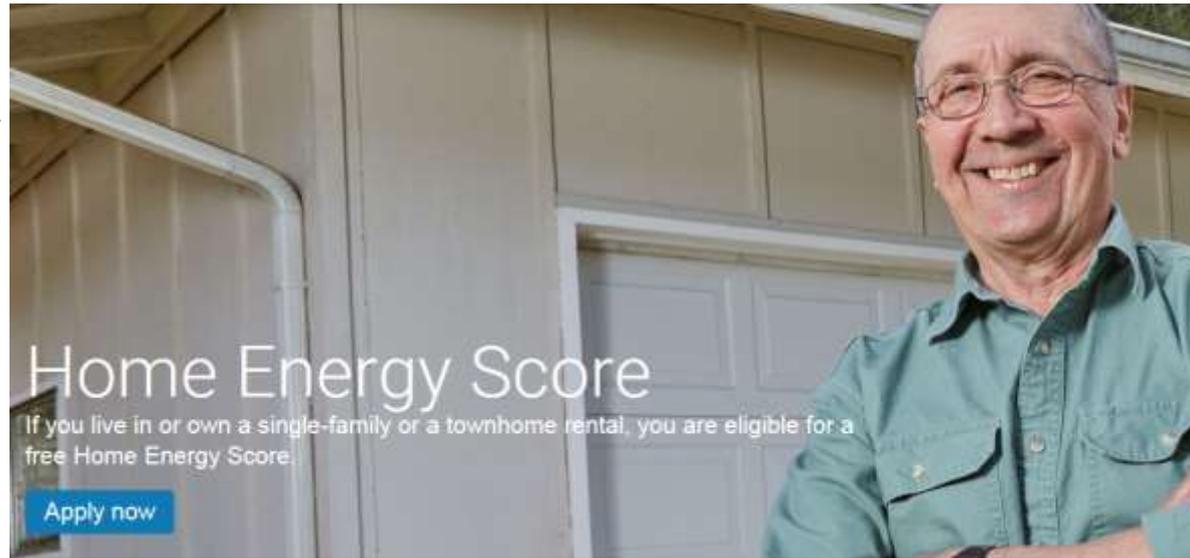
Program Development

- In 2016, EWEB partnered with UO's Office of Sustainability and the City of Eugene
- The City pays student wages
- 9 students trained to be State-approved Home Energy Assessors
- 5 more trained in 2017 (included water training)



Home Energy Score in Eugene

- Currently offering **FREE** Home Energy Scores for rental properties
- Owners or tenants can apply
- ~1-hour assessment
- Tenants and property owners receive a report



HOME ENERGY SCORE
Free for you. Standard energy audit.

U.S. DEPARTMENT OF ENERGY

THIS HOME'S SCORE
3
OUT OF 10

THIS HOME'S ESTIMATED ENERGY COSTS

\$1,718
PER YEAR

HOME PROFILE

LOCATION: 123 Main St, Eugene, OR 97401

YEAR BUILT: 1910

HEATED FLOOR AREA: 1200 sq. ft.

NUMBER OF BEDROOMS: 3

ASSESSMENT DATE: 2018-02-04

EXPIRATION DATE: 2020-02-04

ASSESSOR: Emily Polya, University of Oregon

PHONE: 541-346-6769

EMAIL: s3r@epw.org

CCB LICENSE # 1234567890

Better Buildings Home Energy Score

How much energy does this home use? **3**

Official Assessment ID# 100001

HOW MUCH ENERGY IS THIS HOME LIKELY TO USE?

Electric:	8,885 kWh	\$956	How much renewable energy does this home generate? zero kWh/yr
Natural Gas:	406 therms/yr	\$762	
Other:	0 gal/yr	\$0	

TOTAL ENERGY COSTS PER YEAR: \$1,718

THIS HOME'S CARBON FOOTPRINT: as measured in metric tons of CO2 equivalent per year

This Home: **3.83**

Worst: **94** | Best: **0**

What should my home's carbon footprint be? Disruptive should reduce carbon pollution per household to 7.1 tons per year by 2050, which is 1 ton per year per 100 sq ft of floor area.

- Actual energy use and costs may vary based on occupant behavior and other factors.
- This carbon footprint is based only on estimated building energy use.
- Carbon footprint can be calculated based on utility and fuel specific emissions factors provided by the Oregon Department of Energy.
- Estimated energy costs are calculated based on current utility prices (\$5.11/kWh for electricity; \$1.08/therm for natural gas).
- This report meets Oregon's Home Energy Performance Score Standard.

Score today:	Score with improvements*:	Estimated energy savings with improvements:	Estimated carbon reduction with improvements:
3	8	\$545 per year	41%

TACKLE ENERGY WASTE TODAY!

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Choose which energy upgrades to address first.

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FEATURE	TODAY'S CONDITION	RECOMMENDED IMPROVEMENTS
Attic insulation	R-8	Add insulation to R49 as space allows
Floor insulation	R-0	Insulate floors to R30 or as space allows
Wall insulation	R-7	Have the home professionally air sealed
Envelope/Air Sealing	Not professionally air sealed	Double-pane/acid
Windows	None	Install an efficient heat pump
Swirlights	None	No cooling system
Heating system	Central furnace, Gas	Insulate exposed ducts to R11
Cooling system	No cooling system	Have ducts tested for leaks & seal if necessary
Duct insulation	Not fully insulated	Install a heat pump water heater
Duct sealing	Ducts not fully sealed	Install a heat pump water heater
Water heater	Electric storage	Visit bit.ly/EWEBfor more info
Electric storage	None	
Solar PV	None	

The above energy improvements are recommended by EWEB to improve the score and lower the home's carbon footprint. Some improvements may not be recommended by the U.S. Department of Energy due to cost-effectiveness or fuel conversion reasons. USDOE recommendations may be provided upon request.

WATER EFFICIENCY FEATURES

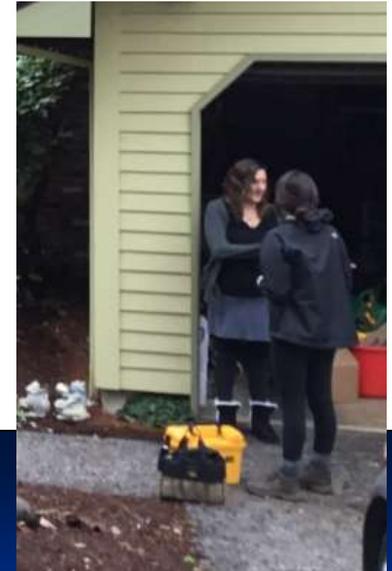
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Water leaks	Number of toilet leaks = 1	Repair water leaks. Consider upgrading your meter to an advanced meter with leak detection.

For more information about how EWEB can help with water efficiency improvements, visit bit.ly/EWEBwater.

Home Energy Score in Eugene



- Students conduct research on each home first
- Students visit homes in 2-person teams
- 5-15 assessments completed per week



Home Energy Score in Eugene



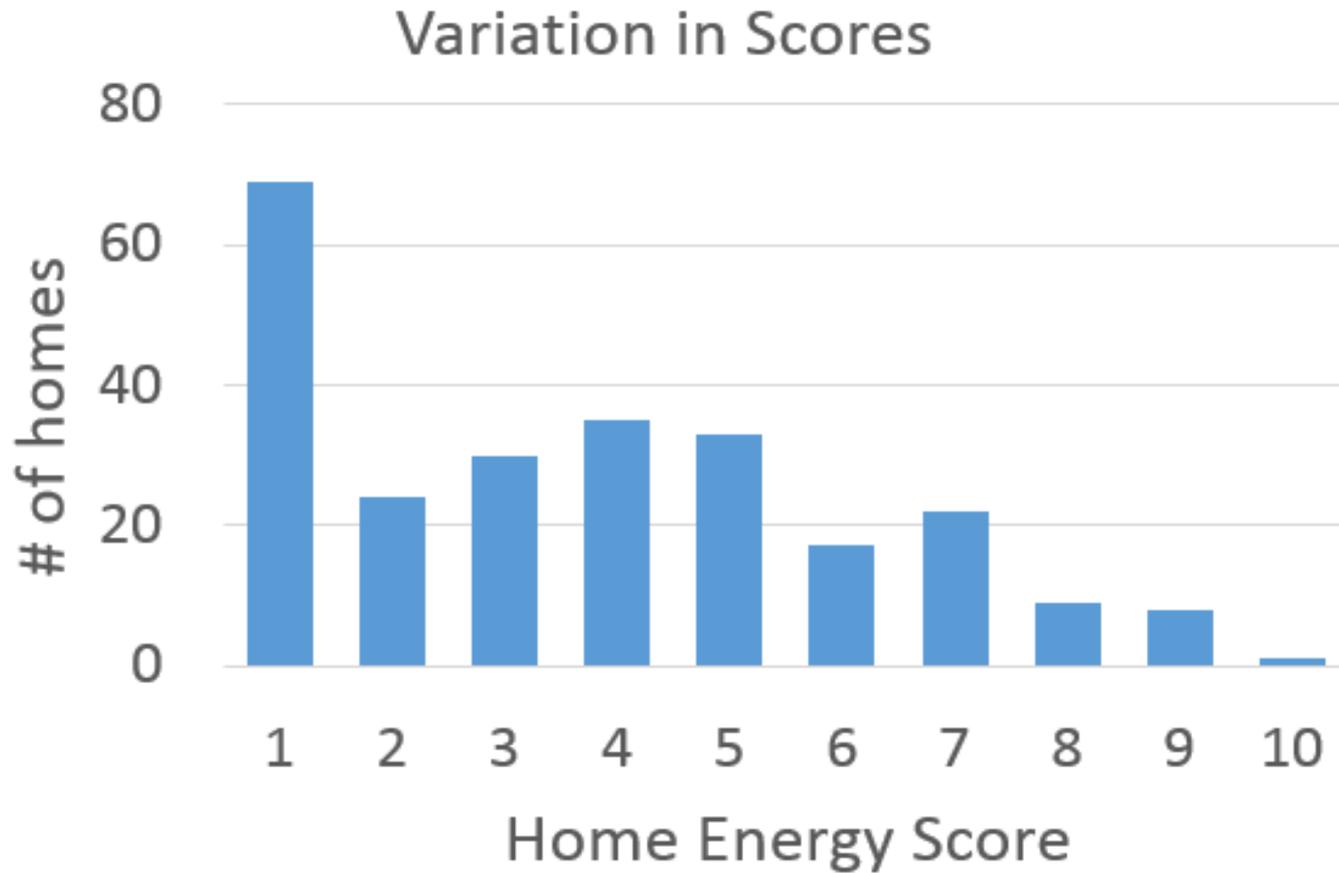
Home Energy Score in Eugene



Results

- 248 homes scored in 2017, 110 homes scored in 2018 so far
- Student assessors find the program beneficial
 - General satisfaction (80%) based on end-of-term surveys
 - 4 students returned again for second year
- Tenants find the program beneficial
 - 89% agreed it “helped me understand my consumption” and “helped me determine the efficiency of my rental”
 - 100% agreed the information would help when choosing a rental
 - Only 33% discussed results with their landlord
- Some rental owners were motivated to take action
 - 10% of rental owners made improvements, invested \$100K+
 - 80% agreed it “helped me determine the efficiency of my rental”
 - Most rental owners could not make upgrades due to timing, cost, etc.

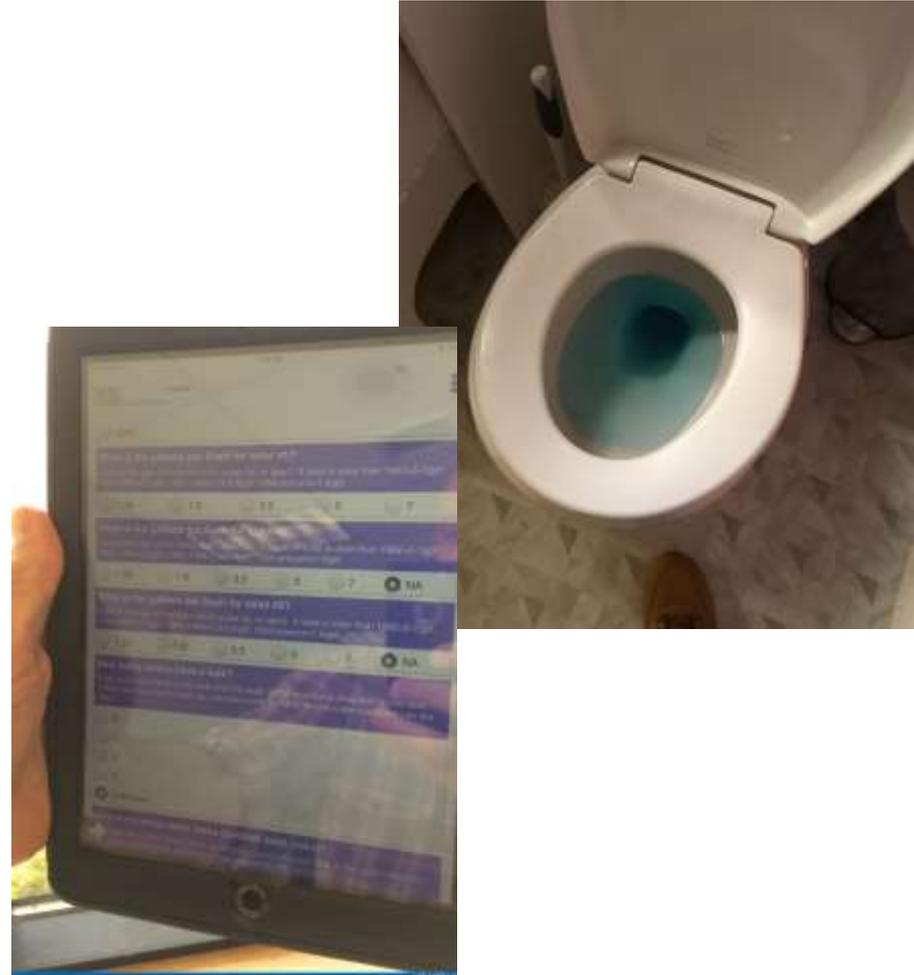
Results



Results

Improvements made to the program in 2018:

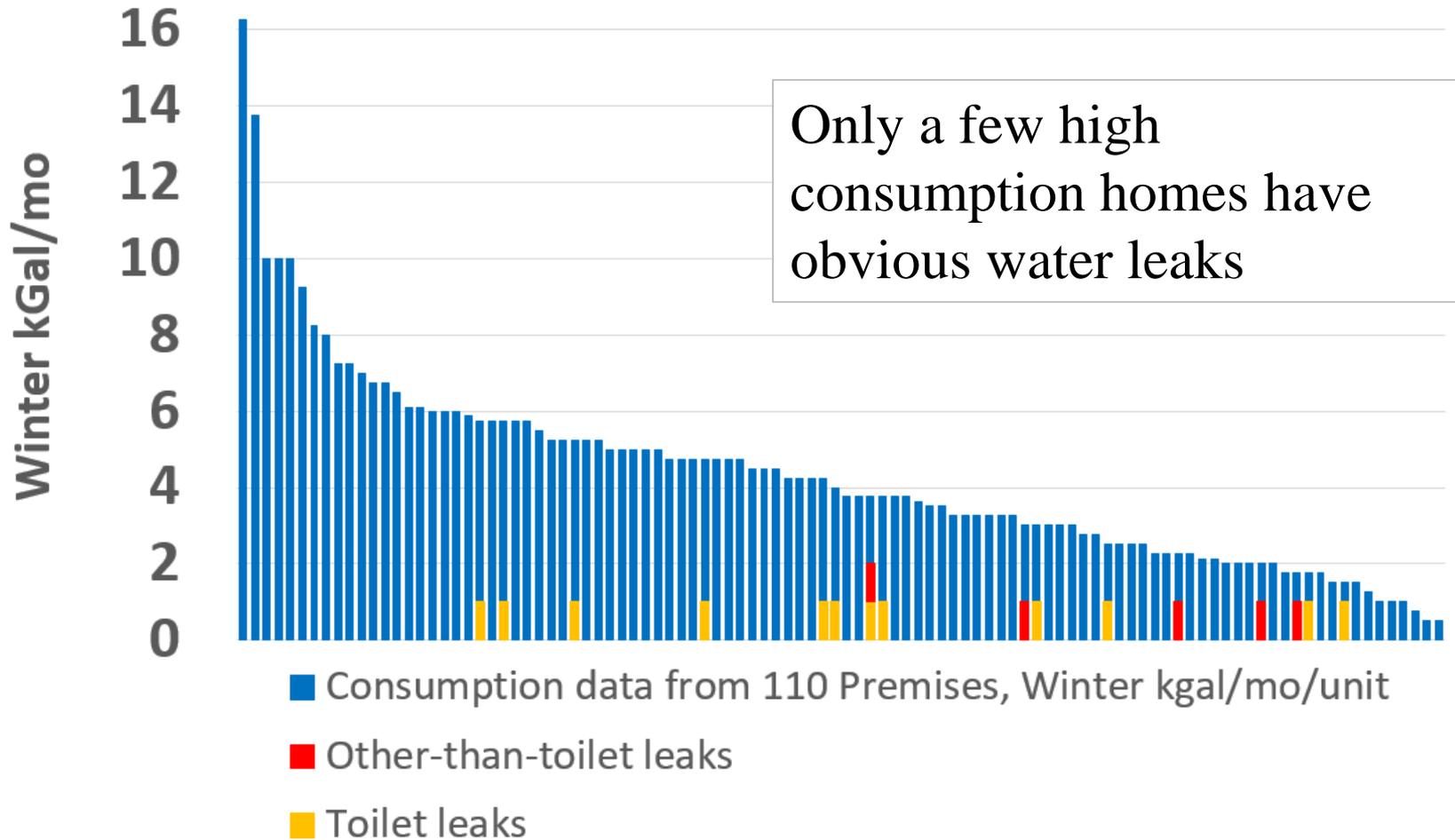
- Water efficiency data collected
 - Toilet leaks
 - Non-toilet leaks
 - Toilet flush rates
 - Interest in smart meters with leak detection
- Using iPads to streamline process, collect photos



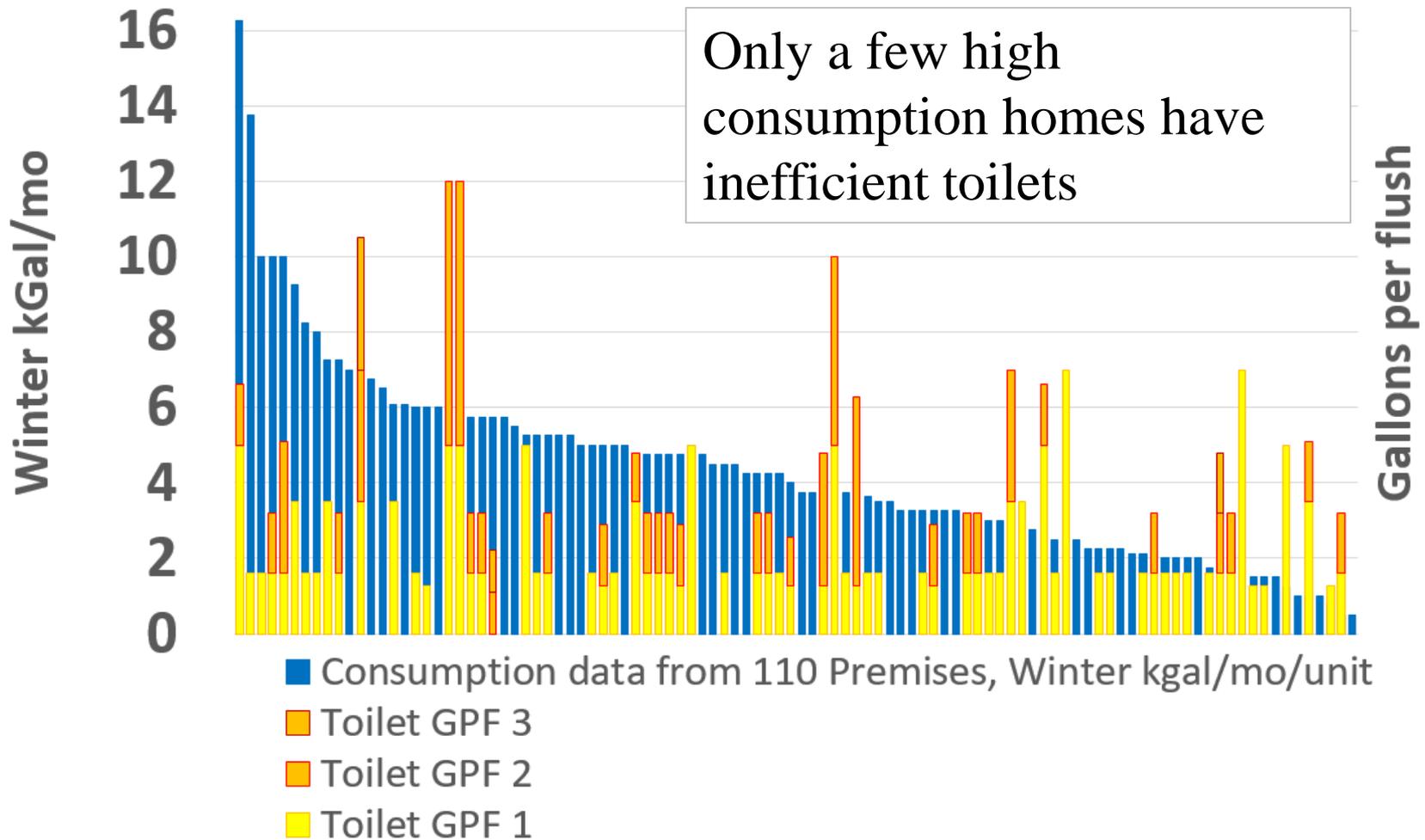
Results

Water Efficiency Data

Water leaks = High Water Consumption?

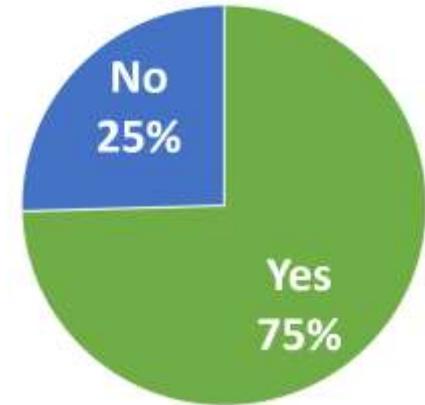


Inefficient Toilets = High Water Consumption?



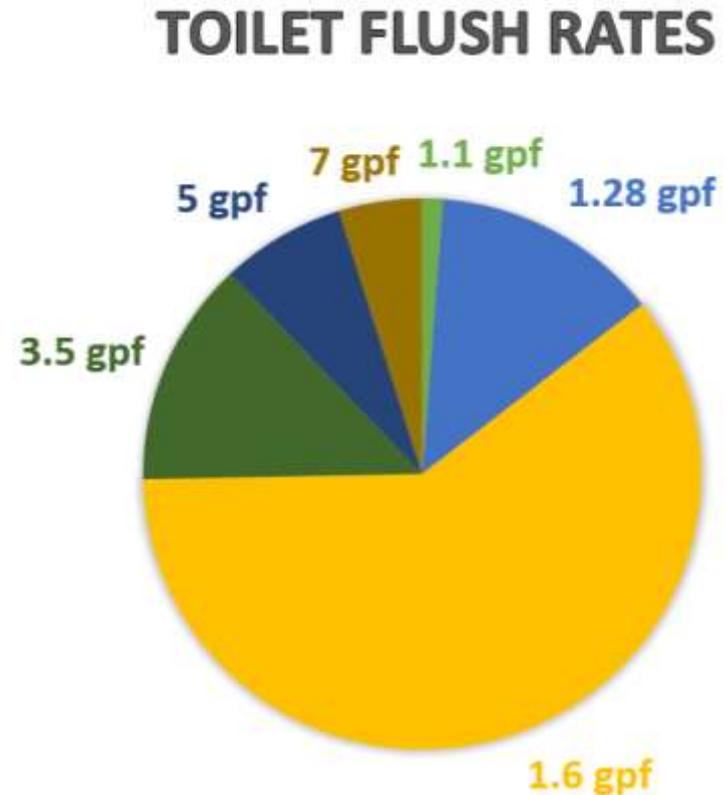
Advanced “Smart” Meters

- EWEB installed an advanced metering communication system in 2017
- Meter installs were opt-in in 2017
- Customers were asked: Are you interested in having a smart meter installed at no cost?
- Yes. Maybe for leak detection, or maybe just because they are free
- In 2018, changed to opt-out policy with an 8-year planned meter roll-out. “Yes” customers will be first to have smart meters installed



Water Conservation Potential

- Replace participant's 142 inefficient toilets (1.6 gpf or higher) w/Water Sense toilets:
 - save 731,000 gal/yr
 - save renters ~\$5000/yr (\$45 per household)
- Expand to all Eugene rentals
 - save 52,000 kgal/yr
 - save renters \$2,300,000/yr

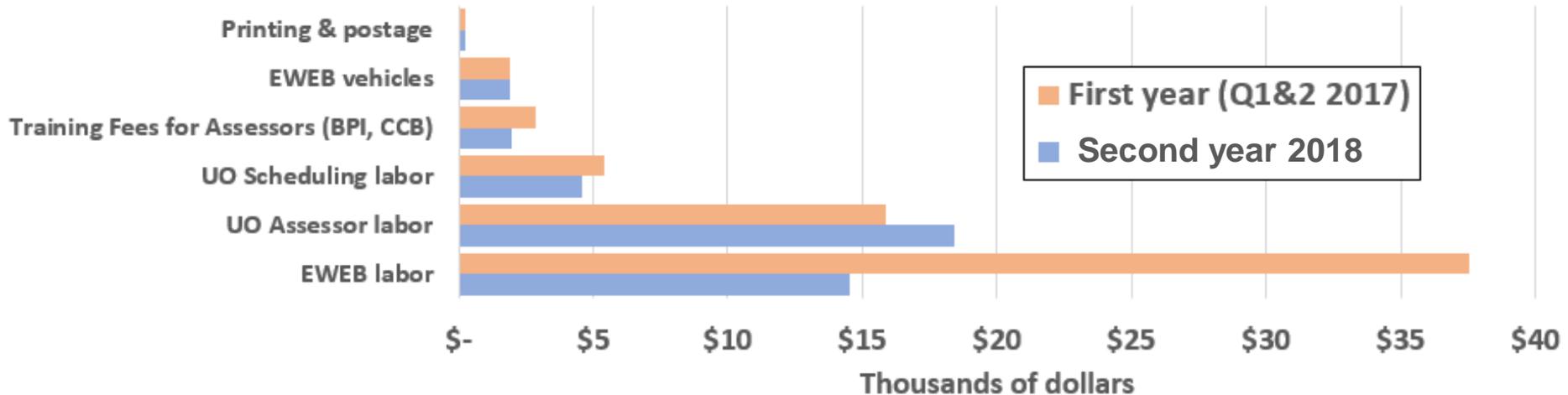


Relatively low cost in 2018, at ~\$168 per home

Approximate Home Energy Score Program Costs

Total ~\$63K at \$258/home

(Estimated 2018: \$42K at \$168/home)



Program Goals

- Provide a valuable learning experience for UO students
- Help tenants and rental owners better understand the energy & water consumption in their rentals
- Encourage rental owners to make improvements
- Recognize improvements already made by rental owners
- Explore how Home Energy Scores can help renters shop for affordable housing

Helping renters shop for affordable housing

Publishing data has been challenging...

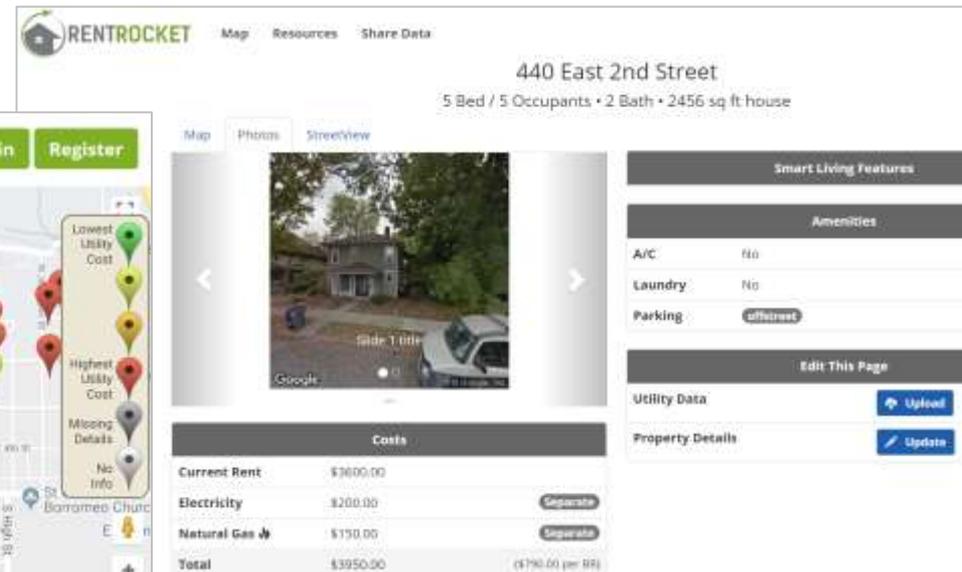
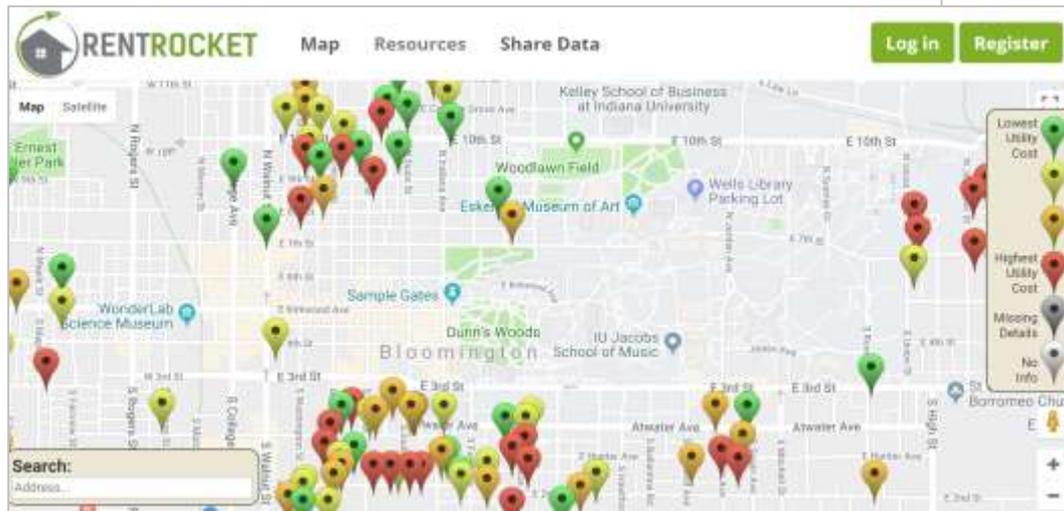
Three options considered:

1. Rent Rocket
2. An EWEB-hosted online reference
3. Earth Advantage's Green Building Registry

Helping renters shop for affordable housing

1. Rent Rocket – a rental search website that shares energy improvements & utility costs

but... platform is undergoing changes, not currently an option



Helping renters shop for affordable housing

2. EWEB-hosted online reference

More costly than initially thought to maintain and not as valuable to renters, not currently an option

EWEB Rental Property Database for Energy Efficiency												
<p>This is a resource that provides energy efficiency information for registered rental properties in EWEB territory. The intent is to provide transparency about energy costs to tenants and those looking for a home to rent. It is also intended to recognize those landlords who have made efficiency upgrades to their rentals using EWEB programs, and encourage further efficiency upgrades. If a rental property is not on this list, it either has no record of participation with EWEB's programs, or it is not participating with the City of Eugene Rental Housing Program.</p> <p>The Department of Energy's Home Energy Score assesses the energy efficiency of a home based on its structure, heating & cooling and hot water systems. Learn more at homeenergyscore.gov.</p>												
												
Address	Home Energy Score			EWEB Energy Efficiency Program Participation								
	Score (1 is poor, 10 is best)	Estimated cost of energy per month	Date of Score	Insulation	Windows	T-stats	Ductless Heat Pump	Ducted Heat Pump	Heat Pump Water Heater	Solar water heater	Solar electric	
1185 W 25th Avenue	9	\$82	2015-11-15	1984	1984		2009				2008	2012
65 W 35th Place	7	\$124	2015-10-30	2016	2016		2016					
2406 Adams Street	5	\$139	2015-10-30									
2774 Alder Street	2	\$160	2015-05-22								1994	
1555 Corum Avenue	2	\$172	2015-03-23					2015				
2583 Donegal Street	4	\$144	2015-11-16	1983								
1905 Hayes Street	3	\$155	2015-04-09				2015					
40282 Storment Lane	1	\$195	2015-04-20				2015					

Helping renters shop for affordable housing

3. Green Building Registry – Used for Portland’s Home Energy Score program

But... more costly than initially thought to configure,
not an option without additional resources



The screenshot shows a web interface for searching City of Portland Home Energy Reports. The background is a cityscape at sunset. The interface includes the following elements:

- Logo:** City of Portland HOME ENERGY SCORE (with a house icon).
- Title:** Search for City of Portland Home Energy Reports
- Input Prompt:** Enter A City of Portland Street Address & Zip Code
- Form Fields:**
 - A text input field for "Street Address".
 - A dropdown menu for "Portland" (with "OR" between it and the next field).
 - A text input field for "Zip Code".
- Instructions:** Make sure you include the whole street address (SW, NW, CT, ST, etc.)
- Buttons:** A green "SEARCH" button and a smaller "About" link below it.
- Footer:** Powered by Green Building Registry™ / a product of Earth Advantage

Next Steps

- Publish rental efficiency data online to help renters shop for affordable housing
- Extend services to additional housing types: multifamily apartments and manufactured homes
- Partnering with City of Eugene on outreach, including sharing their list of rental properties
- Extend services to owner-occupied homes

Conclusions

- Partnerships were critical to get this efficiency education program off the ground
- It is effective at encouraging some rental owners to make upgrades
- It provides a valuable learning experience for UO students
- It helps under-served tenants who may be struggling to afford their bills, strengthening relationships with those customers and with local community partners, at a reasonable cost

Thanks!

Questions?

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