

# Oregon Department of Environmental Quality

## Addressing Building Material Consumption through Green Building

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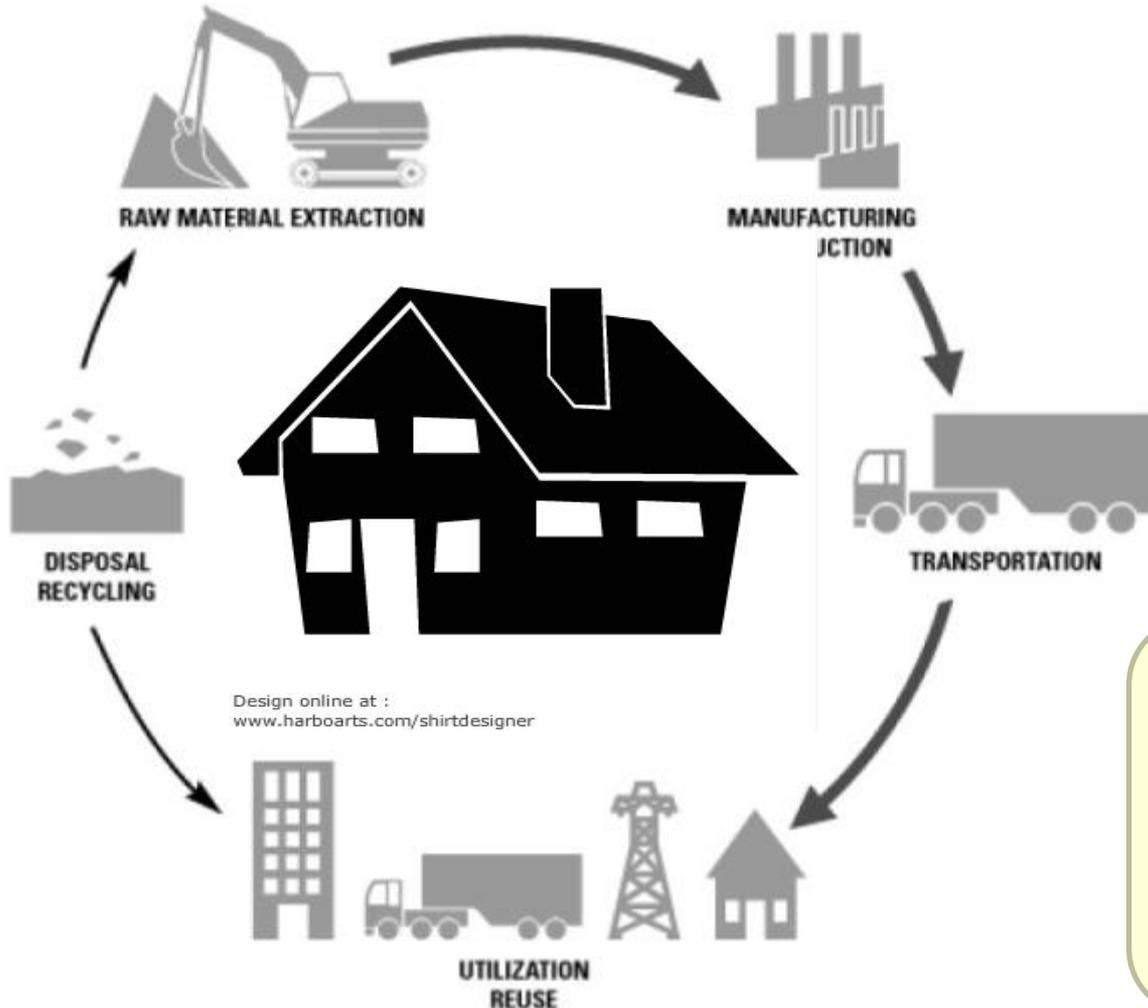
# Overview

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1. Background LCA research
2. What have we accomplished?
3. Where are we going?

# Lifecycle Analysis (process LCA)

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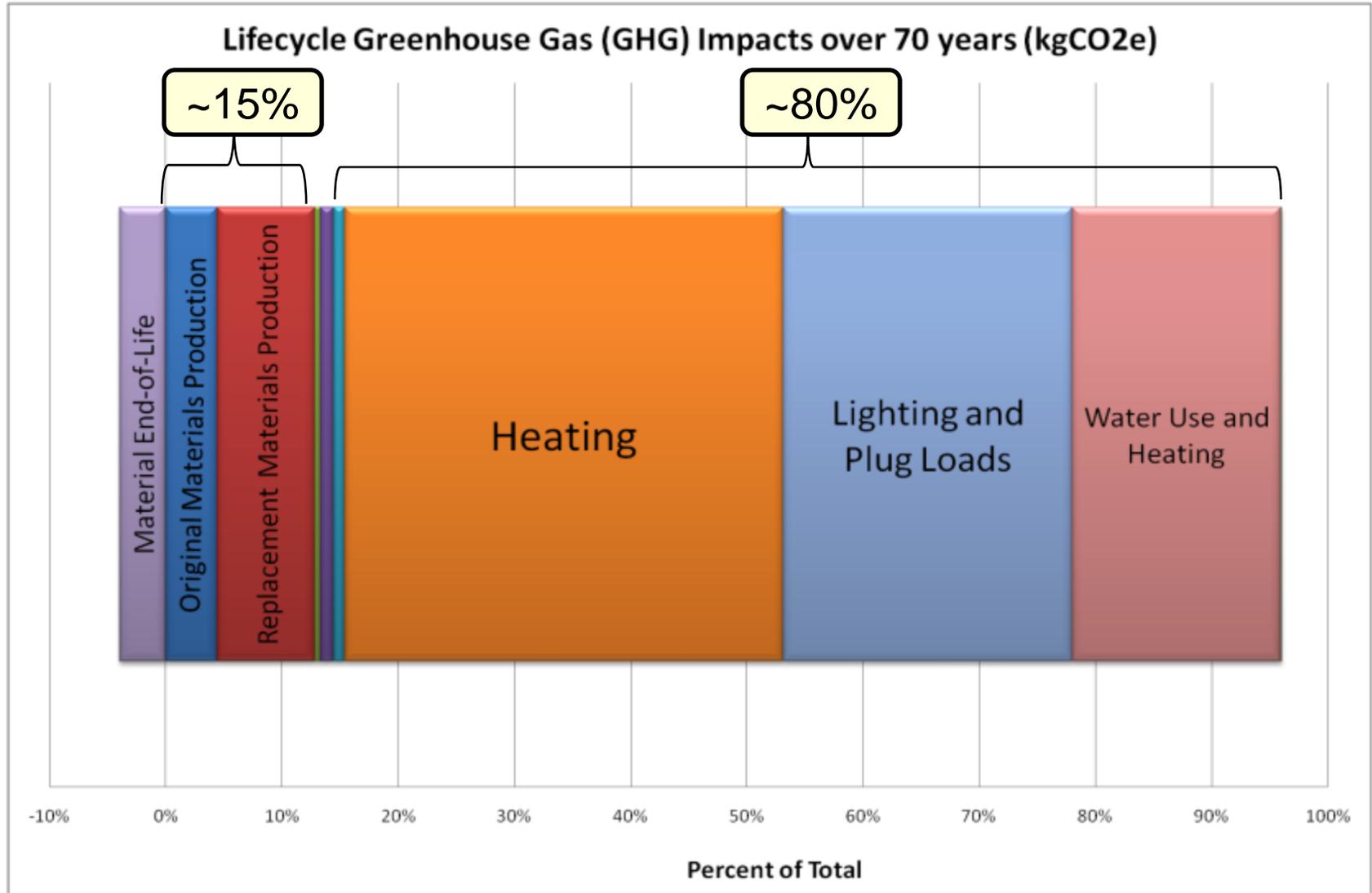
**Climate Change Impacts were used as the prioritizing criterion in this study.**

## Impact categories (selection):

1. Energy used
2. Greenhouse gas emissions
3. Ecotoxicity
4. Human Health
5. Respiratory

# Lifecycle greenhouse gas impacts (GHG) of a standard newly constructed OR home

4



# Material-related GHG impacts of an average Oregon home

5

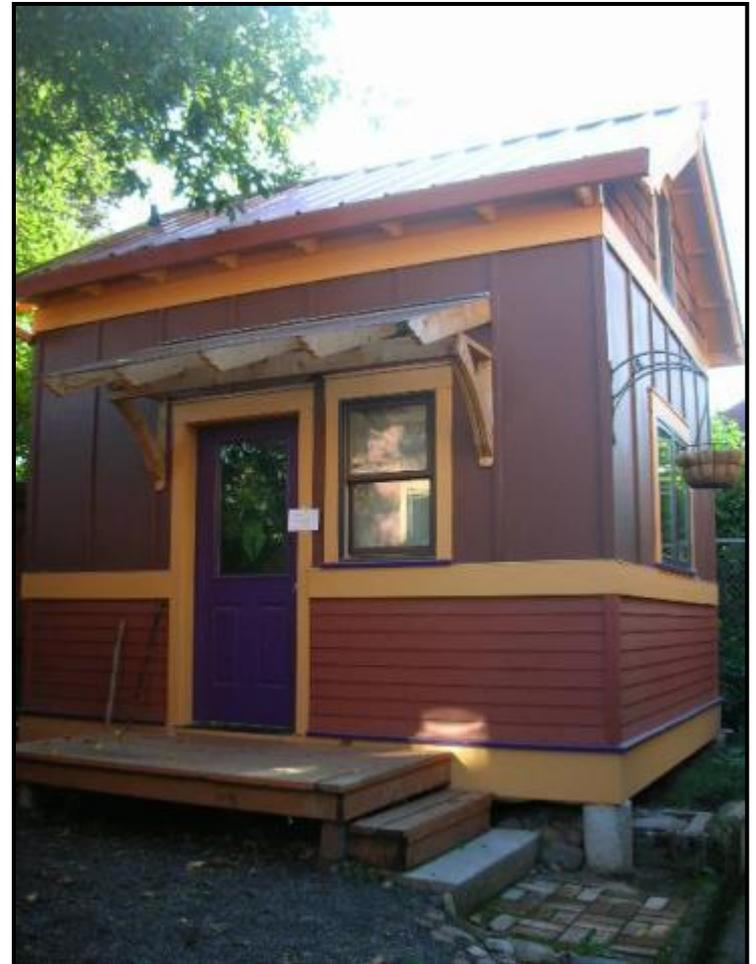
## Climate Change Impact of Materials by Lifecycle Stage (kgCO<sub>2</sub>e)



# Initial Study Question

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Over the life of a home,  
how can you use fewer  
building materials or  
reuse materials?



# Waste Prevention Practices Evaluated

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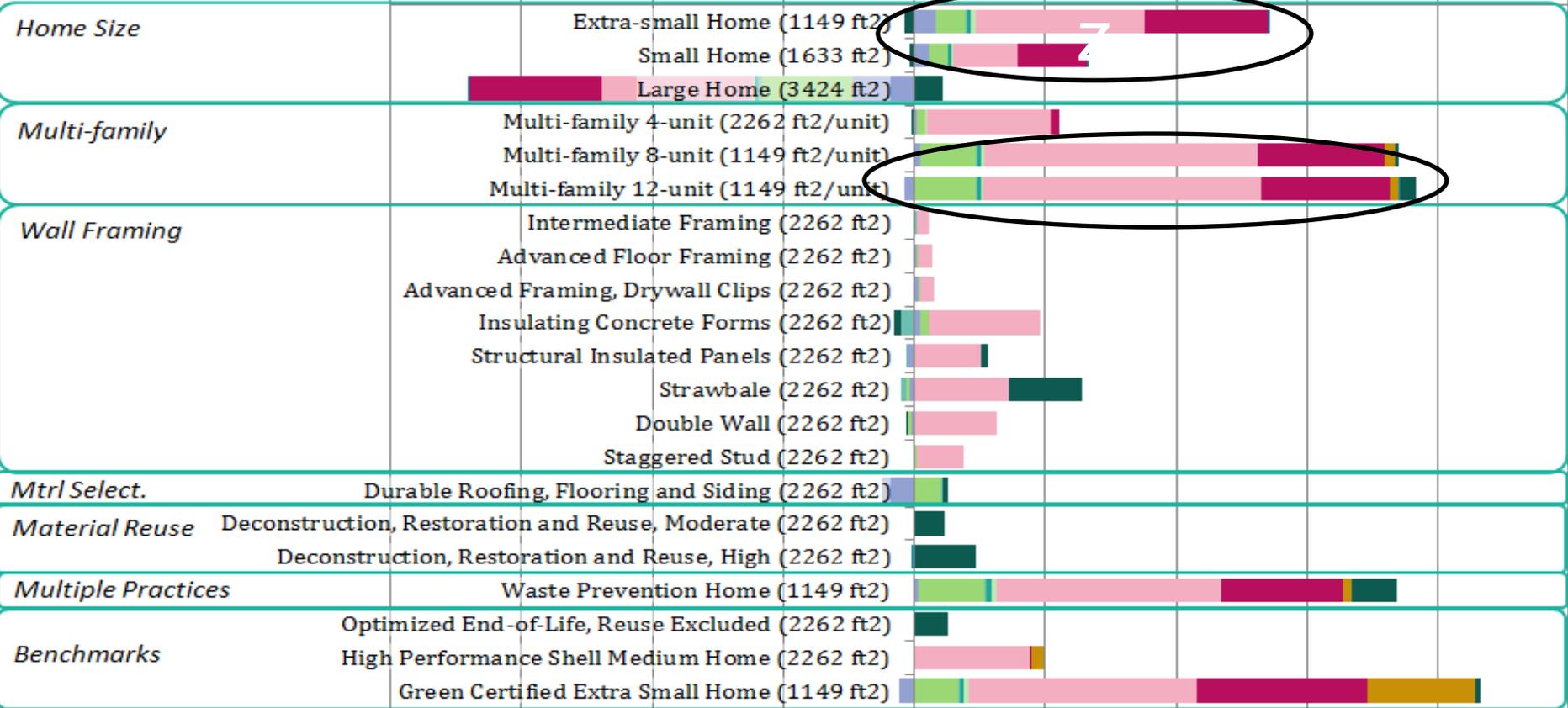
- ❑ Intermediate Framing
- ❑ Advanced Floor Framing
- ❑ Advanced Framing (w/ drywall clips)
- ❑ Smaller Homes
- ❑ Insulating Concrete Forms
- ❑ Structural Insulated Panels
- ❑ Strawbale w/ timber frame
- ❑ Adaptability: Design for Disassembly
- ❑ Adaptability: Utility Chase
- ❑ Dematerializing and Design for Simplicity
- ❑ Design using Salvaged Materials
- ❑ Adaptability: Reduced Remodeling
- ❑ Design using Salvaged Materials
- ❑ Homeowner Maintenance Training
- ❑ Restoration
- ❑ Multifamily Housing
- ❑ Thermal Curtains
- ❑ Reusable Packaging
- ❑ Reduced Packaging
- ❑ Single-story Homes
- ❑ Detailed Framing Cut List
- ❑ Offsite Prefabricated Components
- ❑ Flashing and Rainscreening
- ❑ Deconstruction
- ❑ Durable roofing, siding and flooring

***Purpose of LCA evaluation is to prioritize these practices based on environmental benefit.***

# Greenhouse gas reductions

Impact Climate change (IPCC 2007 GWP100 with forestry land use, Kg CO2e) Benefit

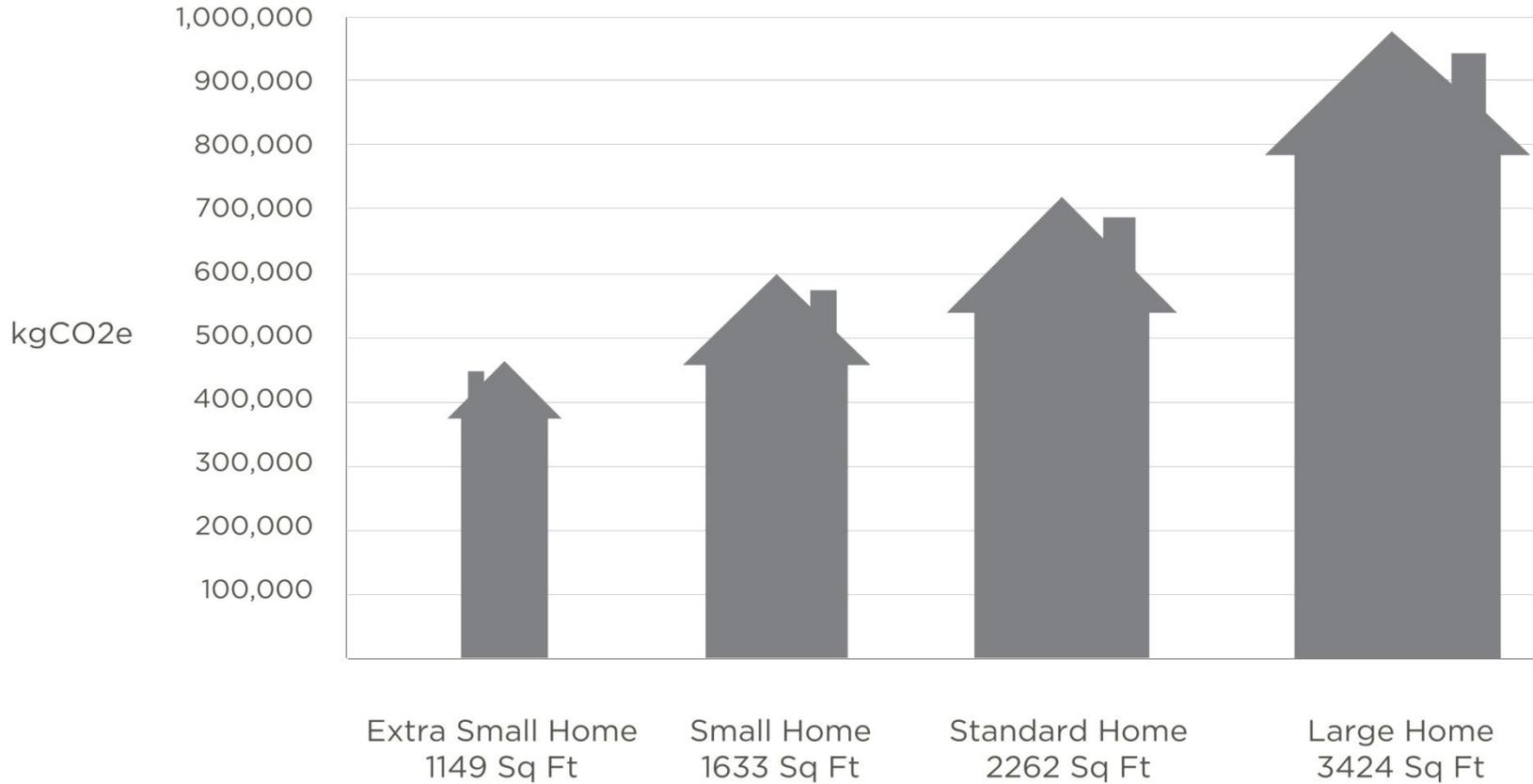
-400,000 -300,000 -200,000 -100,000 0 100,000 200,000 300,000 400,000 500,000



- Original Materials Production
- Replacement Materials Production
- Material Transportation
- Construction
- Maintenance
- Heating and Cooling
- Lighting and Plug Loads
- Water Use, Heating, Treatment
- Demolition
- Material End-of-Life

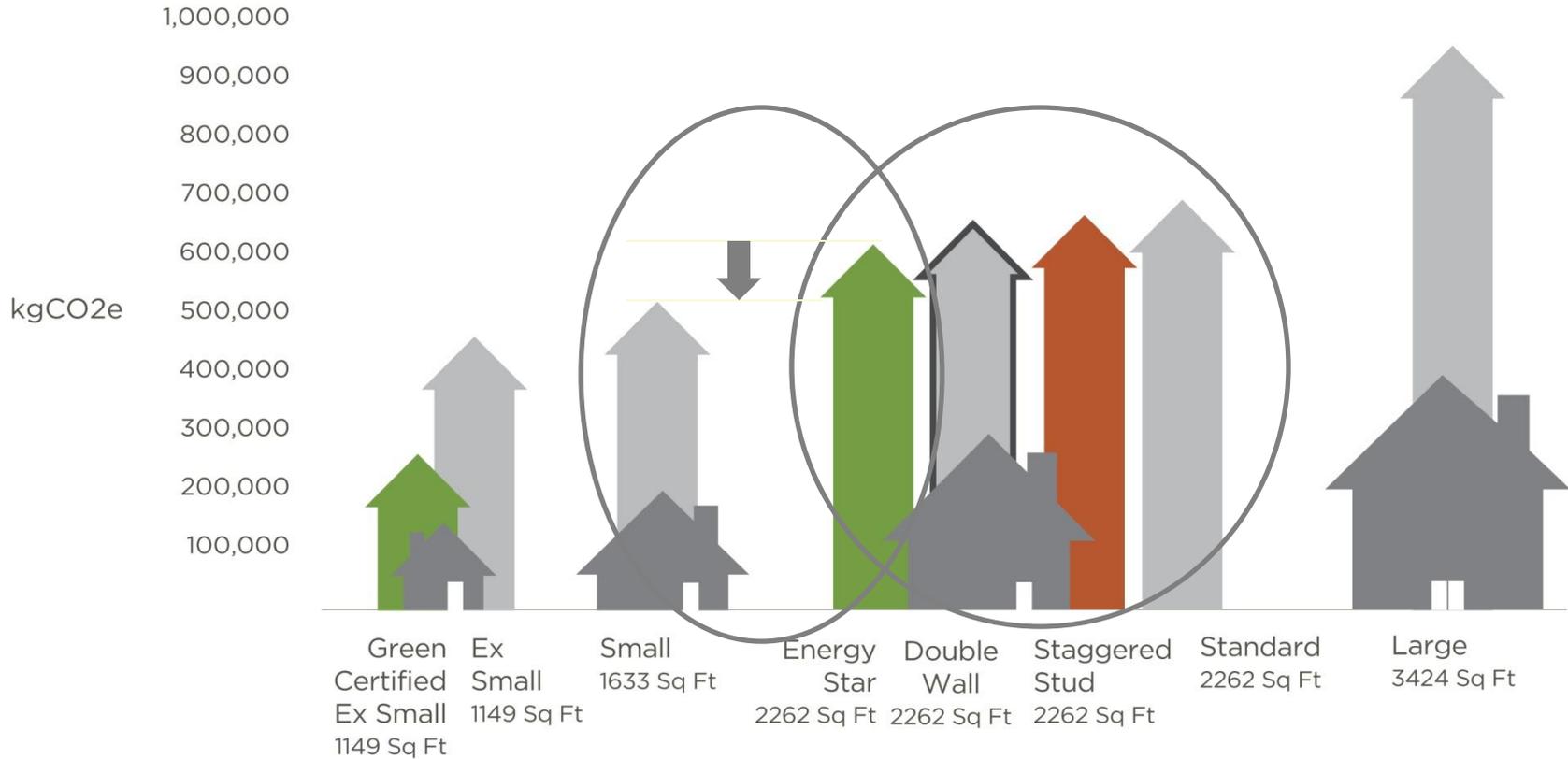


## LIFECYCLE GHG EMISSIONS



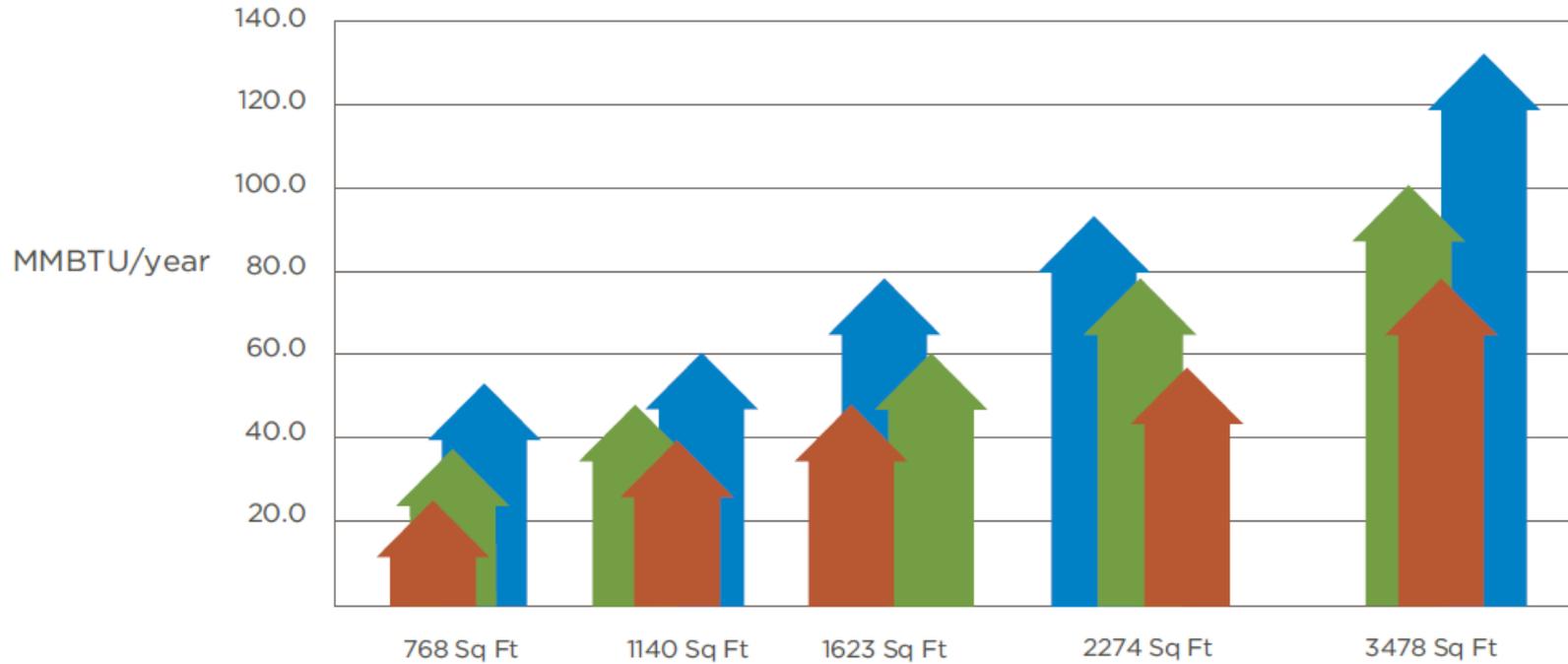
DATA SOURCE: OREGON DEQ  
IMAGE: LIVING FUTURE INSTITUTE

## LIFECYCLE GREENHOUSE GAS EMISSIONS



DATA SOURCE: OREGON DEQ  
 IMAGE: LIVING FUTURE INSTITUTE

## ANNUAL ENERGY USE



DATA SOURCE: OREGON DEQ  
IMAGE: LIVING FUTURE INSTITUTE

# House size has increased

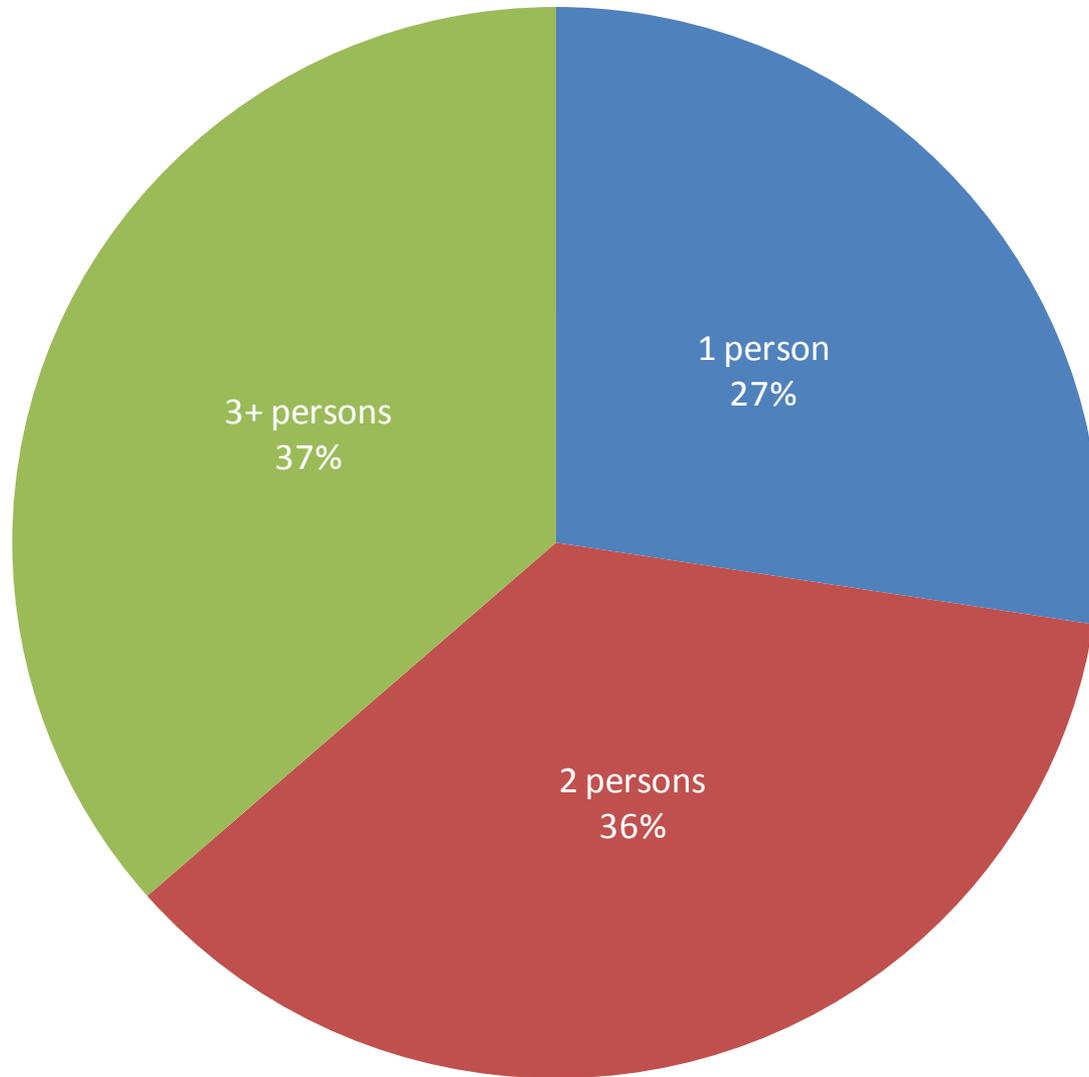


**AVERAGE SIZE OF NEW SINGLE-FAMILY HOME AND  
AVERAGE PERSONS PER HOUSEHOLD  
IN 1950 AND 2005**

US CENSUS AND NATIONAL ASSOCIATION OF HOME BUILDERS



## Share of Households by Size, 2010 *State of Oregon*



# POLICY WORK

# REACH Code

Size-based  
tiers in  
residential  
energy code



Oregon Building Codes Division

<http://www.cbs.state.or.us/bcd/programs/reach.html>

# Earth Advantage

Revised  
points  
allocation  
for small  
homes

Revised  
material  
resource  
points



<http://www.earthadvantage.org/>

# Green Point Rated - California

Accounts for home size and materials used in home in scoring



<http://www.builditgreen.org/greenpoint-rated/>

# Energy Trust of Oregon

Increased the  
incentives for  
Accessory Dwelling  
Units (ADU)



**EnergyTrust**  
*of Oregon, Inc.*

<http://energytrust.org/residential/>

# Accessory Dwelling Unit (ADU) Potential

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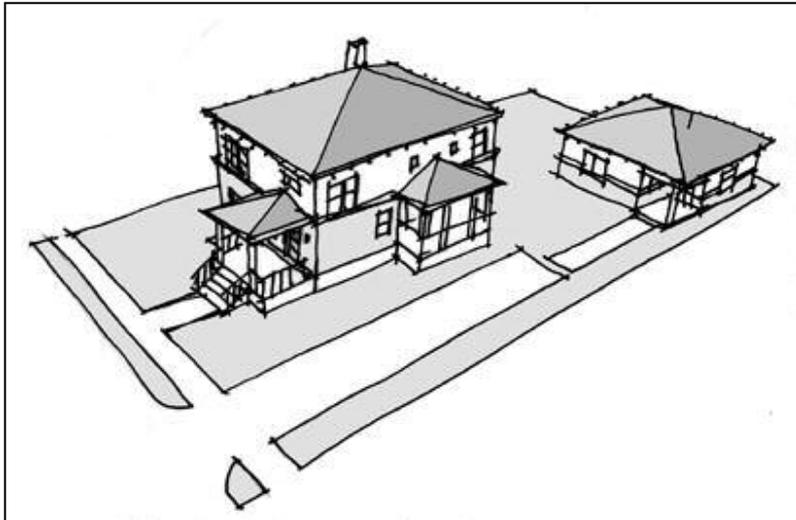
## Accessory Dwelling Units

Infographic by Ryan Sullivan / [www.pasteinplace.com](http://www.pasteinplace.com)

 LIVE  RENT

# Space-efficient housing workgroup

- Oregon DEQ
- Metro
- City of Portland
- City of Eugene
- Earth Advantage
- Builders, Architects, Developers
- Cascadia Green Building Council
- Space-efficient housing advocates
- AARP
- OHBA
- Energy Trust of Oregon
- Others...



# accessorydwellings.org

Firefox

Accessory dwelling units: what they are ...

## Accessory Dwellings

*a one-stop source about ADU's, granny flats, backyard cottages, in-law units, accessory dwelling units...*



Home ADU Basics Projects and Stories Building an ADU Further reading Join Us

### Accessory dwelling units: what they are and why people build them

An accessory dwelling unit is a really simple and old idea: having a second small dwelling right on the same grounds (or attached to) your regular single-family house, such as:

- an apartment over the garage
- a backyard cottage
- a basement apartment

Here are two examples, one above a garage and the other a small cottage.



<http://accessorydwellings.org/>

**Search this site**

**Connect with Others**  
Join the Yahoo group to connect with other homeowners and professionals who are interested in ADUs.

**Upcoming ADU Events**  
December 16 - [Seminar on appraising properties with ADUs](#)  
January 21st - [Building An Accessory Dwelling Unit in Portland, Oregon' class on Saturday, January 21st](#)  
May 1st - [Living Future Conference](#) (a pre-conference will focus on ADUs)

**Recent Posts**

- [Dwelling in the Urban Alleys of DC \(Part II\)](#)
- [Dwelling in the Urban Alleys of DC](#)
- [Detached Bedroom as Tiny Home](#)
- [How appraisals and "GSEs" make financing an](#)

# Past Events

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## Appraising ADUs



Seminar



Bus tour

## Pedalpalooza



Bike tour



# 2012 Build Small LIVE LARGE

A Market Revival for Single-Family Housing

[living-future.org/cascadia/buildsmall](http://living-future.org/cascadia/buildsmall)



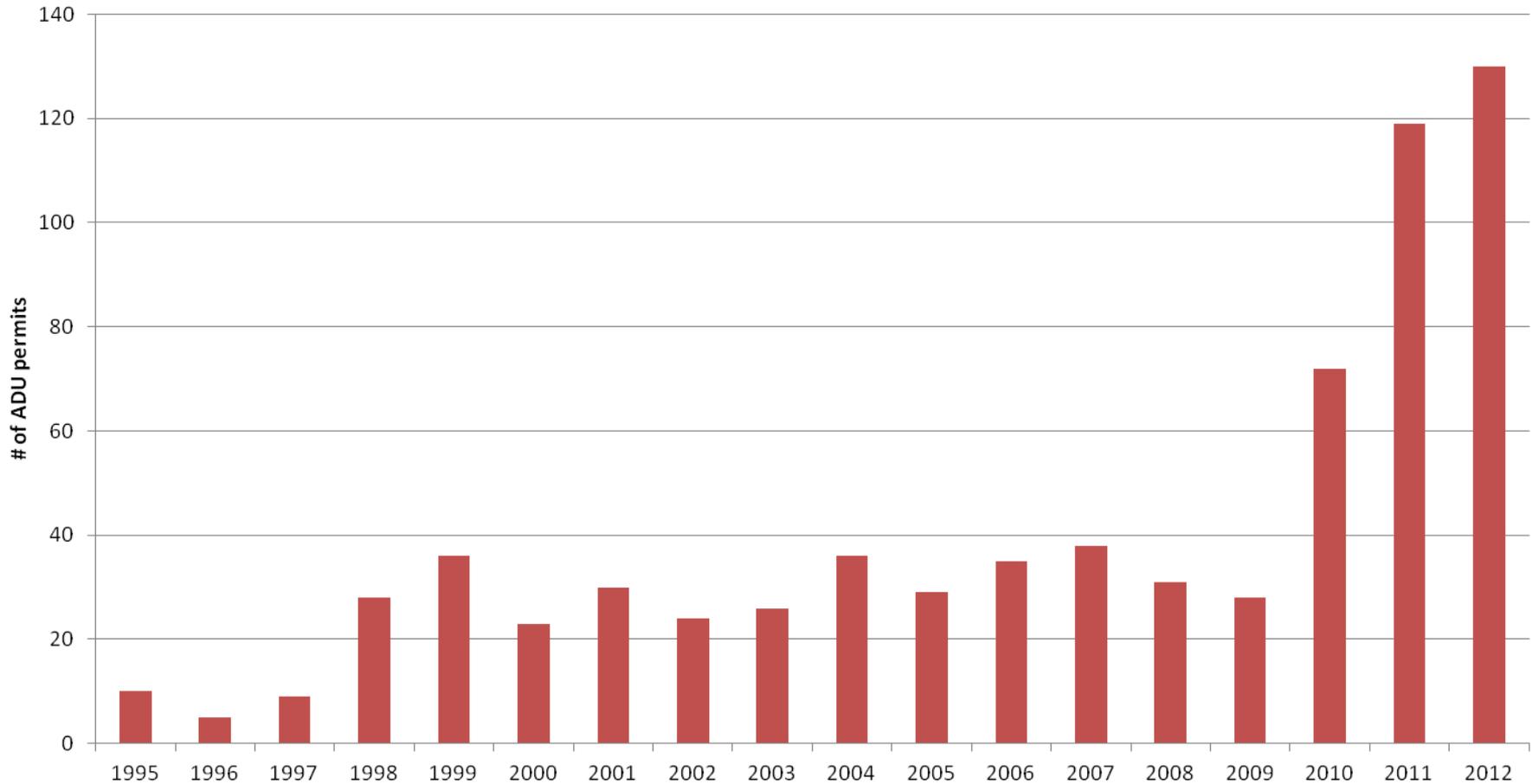
Friday, October 26, 2012

# City of Portland ADU permits



State of Oregon  
Department of  
Environmental  
Quality

## City of Portland ADU Permits 1995-2012



# Big push for small developments

## Granny flats flourish after fee waiver

He  
ar  
New

A local tiny-home industry sprouts in

## Financing still a hurdle for ADUs

New loan opportunities may be on the horizon



## Developers focus on community

Southeast and Northeast Portland housing projects designed to encourage



# ADU Survey Report

Accessory Dwelling Unit Survey  
for Portland, Eugene, and Ashland, Oregon  
Final Methodology and Data Report  
September, 2013

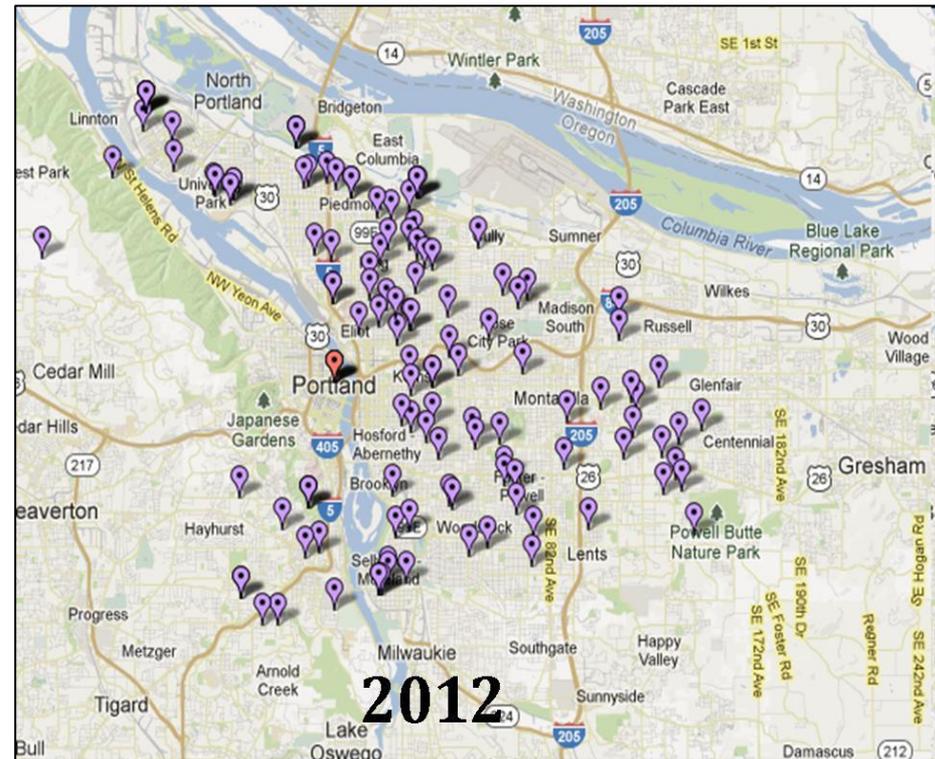


# Additional Green Building work

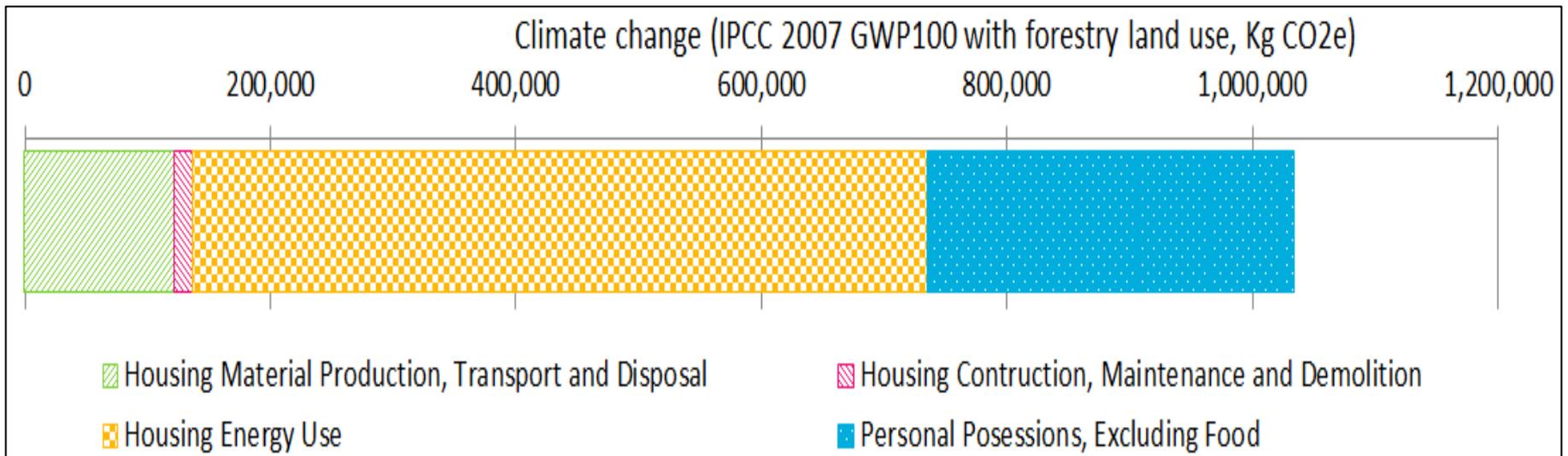
## ADU educational video



## ADU capacity modeling



# How do small homes affect consumption?



# Future program direction

- Continue small housing work
- Material selection guidance



# Thank You!



State of Oregon  
Department of  
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Quality

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  - <http://www.deq.state.or.us/lq/sw/wasteprevention/greenbuilding.htm>