

CITY OF  
**HAYWARD**  
HEART OF THE BAY

**Research Report on a Hayward  
Residential Energy Conservation  
Ordinance (RECO)**

**September 1, 2010**

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## What is a RECO? Why Develop One?

- A Residential Energy Conservation Ordinance (RECO) is a policy tool local governments can use to improve the energy efficiency of the existing housing stock
- Based on defined eligibility criteria, property owners must demonstrate that they meet specific minimum energy and water efficiency requirements
- Applied to single family, duplex and/or multi-family buildings
- Economic benefits: annual energy cost savings and job creation
- Occupant benefits: improved comfort, indoor air quality (IAQ) and fire/combustion safety with tested air sealing
- Environmental benefits: reduction in greenhouse gas (GHG) emissions, water conservation

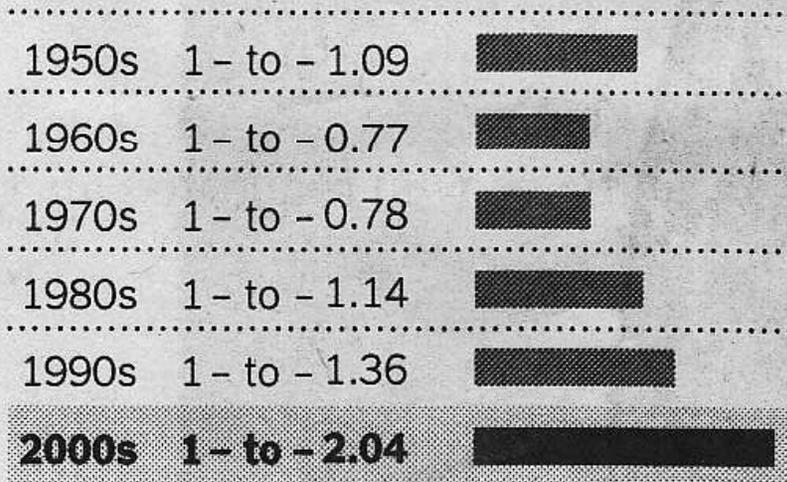


# Global Climate Change

## More and More Highs

In the last decade, about two new high temperature records were set for every low temperature record that was set.

RATIO OF U.S. RECORD  
LOWS TO HIGHS



Source: National Center for Atmospheric Research  
THE NEW YORK TIMES

- Pronounced effects in the past 10 years
- Latest computer models indicate greatest climate disruption and volatility in the Western United States

*from the August 15, 2010  
New York Times*



## Relevance to the Hayward Climate Action Plan

- AB 32, Global Warming Solutions Act, signed in 2006
  - Formalizes 2020 Greenhouse Gas Emissions reductions targets
  - Directs the California Air Resources Board (CARB) to prepare scoping plan and time line approved in 2008
    - By 2020: achieve 1990 CO<sub>2</sub>e levels
    - By 2050: achieve 80% < 1990 CO<sub>2</sub>e levels
- Hayward Climate Action Plan (CAP) approved 2009
- RECO a relatively high priority since > 13% of all GHG emissions derive from residential buildings (from Figure 1, Hayward CAP)





# Retrofit Measures Analyzed for Cost-Effectiveness

- From the California Home Energy Retrofit Coordinating Committee (CA HERCC), a consortium of federal, state and local governmental agencies and other organizations
- Retrofit measures appropriate in the mild Hayward climate:
  - Air Sealing
  - Attic Insulation
  - Duct Sealing (Existing)
  - Wall Insulation
  - Raised Floor Insulation (above crawl space)
  - New Heating System
  - New Water Heater
- For further information on each of these measures, see the RECO Report Section 2, *Energy Efficiency Measures*



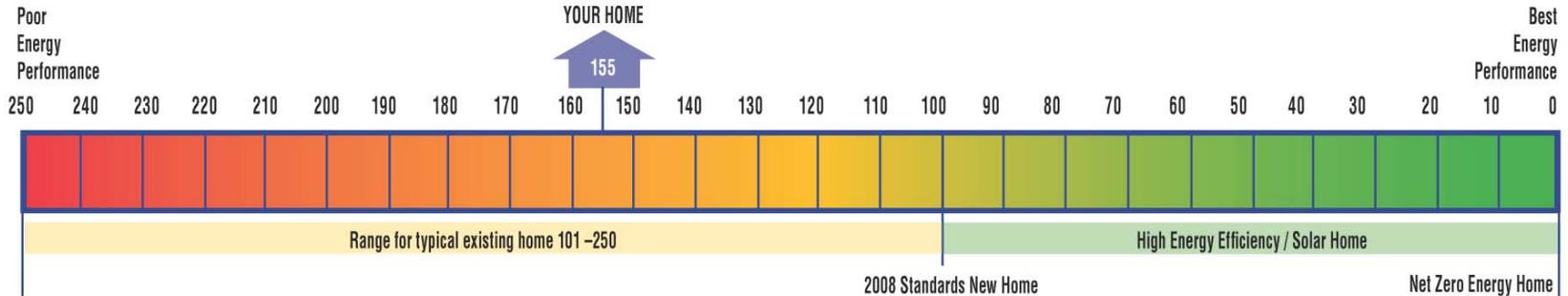
## Home Energy Rating System, Phase II (HERS 2)

- California Home Energy Rating System for Existing Homes (aka “HERS Phase II” or “HERS 2”)
- Goals are **consistent, accurate and uniform rating based on a single statewide rating scale; and estimates of potential utility bill saving and recommendations on cost-effective measures to improve energy efficiency**
- Relevance to RECO: **performance audit, analytic software tool, standardized report, and the basis for performance-based incentives from PG&E and the U.S. Home Star program**
- See the RECO Report Section 3, *HERS Description and Incentives*



# HERS 2 Certificate

## California Home Energy Rating Certificate



<p>Information goes here on compliance with other programs:</p>	<p><b>Energy Impact</b></p> <p><b>Greenhouse Gas Emissions</b> Carbon Dioxide xxx tons/year</p> <p><b>Energy Consumption</b> Electricity (kWh/year) Cooling --- Lights --- Appliances --- Total ---</p> <p>Natural Gas (therms/year) Space Heating --- Water Heating --- Total ---</p> <p><b>Operating Cost (\$/year)</b> Electricity --- Gas --- Total ---</p> <p><b>Renewable Energy Production</b> None</p> <p><b>Ancillary Energy Uses</b> Swimming pool Spa Landscape lighting</p>	<p><b>Site Information</b></p> <p><b>Address</b> 123 Jones Street Anywhere, California 9410x</p> <p><b>General Information</b> Conditioned Floor Area 2,200 ft<sup>2</sup> Bedrooms 4 House Type Single Family Foundation Type Slab-on-Grade</p> <p><b>Energy Efficiency Features</b></p> <p><b>Insulation</b> Ceiling R-19 Wall R-11 Floor over crawlspace None Slab Edge None</p> <p><b>Windows</b> Frame Aluminum Glazing Single</p> <p><b>Heating System</b> Gas furnace, 0.80 AFUE Unsealed air distribution ducts</p> <p><b>Cooling System</b> None</p> <p><b>Water Heating System</b> Gas storage type, 0.52 EF</p>	<p><b>Official Home Energy Rating</b> in conformance with the requirements of the California Energy Commission <a href="http://www.energy.ca.gov">www.energy.ca.gov</a></p>  <p><b>HERS Provider:</b> Acme Energy Rated Homes 934 Energy Efficient Way Power Junction, California <a href="http://www.AcmeEnergyRatedHomes.com">www.AcmeEnergyRatedHomes.com</a></p> <p><b>Rating Information</b> Rating Number xxxx-yyyy Certified Rater EEH, Inc. Stockton, CA Rating Date: January dd, yyyy</p> <p>_____ Rater Signature Date</p>
<p>Qualifying Information Goes Here:</p>			
<p>HERS Provider and/or Sponsor Co-Branding Logos Go Here:</p>			



## Pending Incentives & Rebates

- **Energy Upgrade California**, <http://www.acgreenretrofit.org/>
  - Online clearing house for building energy retrofit programs, incentives, rebates, financing, qualified contractors
- **PG&E incentives** to begin October, 2010
  - \$1,000 Prescriptive Package for attic air sealing, attic insulation, duct sealing, hot water pipe insulation, low-flow showerhead installation, combustion safety testing
  - Up to \$3,500 for any combination of features which improve the existing HERS 2 rating by 20% or more
- Potential U.S. Home Star program incentives if the energy bill passes the Congress and the tax credits are funded; up to \$3,000 for prescriptive, up to \$8,000 for performance



## Simple Paybacks With No Incentives

- Simple paybacks calculated first assuming no incentives or tax credits available
- Other assumptions:
  - Constant dollars
  - No increased cost of energy above inflation
  - No value assigned to non-economic benefits
  - No increased home valuation after retrofit
  - No external costs of climate change included
  - No loan financing costs included
- Net overall effect is a conservative model



# Retrofit Costs and Paybacks

*(RECO Report, Executive Summary, Table 1)*

<u>Energy Retrofit Measures</u>	Average Retrofit Cost (\$)	Average Payback with No Incentives (Years)	Net Retrofit Cost <u>with</u> Incentives (\$)	Average Payback <u>with</u> Incentives (Years)
Duct Sealing	\$1,029	27.8	\$415	11.2
R-30 Attic (from R-0)	\$1,178	24.6	\$1,028	21.5
R-38 Attic (from R-0)	\$1,319	27.0	\$1,169	23.9
Gas Water Heater EF=0.58	\$1,400	58.1	\$1,400	58.1
Air Sealing	\$1,411	33.9	\$706	16.9
Gas Water Heater EF=0.62	\$1,625	41.8	\$1,625	41.8
Air Sealing + Duct Sealing	\$2,440	31.0	\$1,220	15.5
Air Sealing + R-30 Attic (from R-0)	\$2,589	29.1	\$1,589	17.8
Air Sealing + R-30 Attic (from R-11)	\$2,589	43.0	\$1,589	26.4
Air Sealing + R-38 Attic (from R-0)	\$2,828	31.2	\$1,414	15.6
Air Sealing + R-19 Raised Floor	\$3,016	36.2	\$1,508	18.1
Air Sealing + R-30 Attic + Duct Sealing	\$3,617	31.1	\$1,809	15.6
Air Sealing + R-38 Attic + Duct Sealing	\$3,856	32.7	\$928	7.9

*“with Incentives” include the combined PG&E and U.S. Home Star Prescriptive incentives*



# Trigger Options

- **Remodels > \$50,000:** RECO must be met as part of the regular permit process; and certified BPI home performance contractor must sign for certain retrofit measures
- **Point of Sale/Time After Sale:** RECO must be met within a designated grace period (e.g., 1, 2 or 3 years) after building sale
- **Date Certain:** RECO must be met by a fixed deadline (e.g., 10 or 12 or 14 years after effective date) for all single family/duplex , or for a subset of homes (e.g. dwellings built before 1978)



## Potential Number of Homes Affected

- **Remodels > \$50,000:** 60 homes/yr based on recent Hayward data = estimated 600 homes over 10 years assumed representing **2.1%** of all single family/duplex dwellings
- **Point of Sale/Time After Sale:** average of 1,000 homes/yr = estimated 10,000 homes over 10 years representing **34.3%** of all single family/duplex dwellings
- **Date Certain:** RECO must be met by a fixed deadline (e.g., 10 or 12 or 14 years after effective date) for **100%** of dwellings; or for a subset such as older homes built before 1978 = **72%** of dwellings
- Possible exemptions (e.g., based on family income or disabilities) may somewhat alter number of homes affected



# Greenhouse Gas Reductions vs. CAP Goals

*(RECO Report, Executive Summary, Table 2)*

<b>Goal or Trigger(s)</b>	<b>Gross % by 2021</b>	<b>Eligibility X Compliance Rate (%)</b>	<b>Total Metric Tons/Year <sup>(1)</sup></b>	<b>% of 2050 CAP Goal by 2021</b>
<b>2020 CAP Goal</b>	n/a	n/a	639	1.6%
<b>Remodels Only</b>	2.1%	2.1%	240	0.6%
<b>Point-of-Sale Only</b>	34.3%	30.9%	3,600	9.2%
<b>Remodels + Point-of-Sale</b>	35.7%	32.1%	3,740	9.5%
<b>All Dwellings by Date Certain (by 2021)</b>	100.0%	81.0%	9,437	24.0%
<b>Pre-1978 Dwellings by Date Certain (by 2021)</b>	72.0%	58.3%	6,792	17.3%
<b>Remodels + Older Dwellings Date Certain</b>	73.4%	59.4%	6,921	17.6%
<b>2050 CAP Goal</b>	n/a	n/a	39,304	100.0%

*Note 1: Assumes average CO2e reduction per dwelling unit = 882.34 lbs./year based on the retrofit combinations shown in Section 5, Table 4.*



## Criteria for Recommended Measures

- Installed cost around or below \$3,000;
- Simple payback with no incentives  $\leq$  30 to 35 years;
- CO<sub>2</sub>e reduction in the range of 8% to 9%; and
- Improvement of HERS 2 existing rating by more than 10%



## Recommended Retrofit Measures

**Mandatory Features:** low cost items such as low-flow toilets, showerheads and faucets; hot water pipe insulation; fireplace closures

**Compliance Options:** owner chooses any one of the following options in consultation with qualified performance contractor

- Air Sealing + R-30 Attic or Roof Insulation (from no insulation or existing insulation  $\leq$  R-13); or
- Air Sealing + Duct Sealing (existing ducts); or
- Air Sealing + R-19 Raised Floor Insulation (from no insulation) or
- HERS 2 Rating + Improve Existing House Score by  $\geq$  20%
- *If no prescriptive option is feasible, air sealing alone will meet the compliance requirement*



# Cost Cap Recommendations

- Maximum expenditure by homeowner:
  - **Remodels > \$50,000:** None
  - **Point of Sale/Time After Sale:** 1.0% of property sale price
  - **Date Certain:** 1.0% of assessed property value
- If homeowner demonstrates that no compliance option can be completed for  $\leq$  Cost Cap, mandatory features and air sealing only shall meet the requirements



# Trigger Recommendations

- **Remodels > \$50,000 and Date Certain for Pre-1978 Homes** (e.g., 2023 or 2025)
- Will increase public awareness and encourage some owners to use incentives since the retrofit will have to be done eventually
- Will allow plenty of time to get RECO started, do education and outreach, work out administrative procedures starting with Remodels and owners interested in using new incentives
- Will allow for important data collection and a mid-course review by the City (e.g., 2015) for possible revisions



## Trigger Recommendations (continued)

- Will provide extra value for owners who have met RECO requirements and are selling their home (marketing advantage)
- Will create an opening to work with the California Public Utilities Commission (CPUC) and PG&E for a long term commitment to energy retrofit incentives that support a RECO
- Will establish an effective long term strategy by the City to work toward AB32 goals



# Questions for the Committee

Need direction as to:

- Which combinations of retrofit measures are acceptable in terms of cost and paybacks? Cost cap?
- Which trigger(s) should we pursue?
- Next steps:
  - More research?
  - Community Meetings?
  - Draft Ordinance?
  - Working group or subcommittee?

