

# City of Chula Vista

## Existing Home Energy Sustainability Ordinance (EHESO)

### Summary Cost-Effectiveness Results

#### Background

The energy efficiency requirements in Chula Vista’s proposed Existing Home Energy Sustainability Ordinance (EHESO) were derived from a statewide cost –effectiveness study produced by California’s major utility companies. The study evaluated a variety of measures for homes of various ages and each climate zone in the state, estimating the total installation cost and utility bill savings for each. These estimates were based on a prototype single family home and prototype multi-unit building considered typical of California’s older housing stock and standard construction practices during the periods evaluated. From this study, Chula Vista selected the measures that indicated a good payback. The table below shows the basic prototype assumptions. The full study can be accessed at [Localenergycodes.com](http://Localenergycodes.com).<sup>1</sup>

Table 1 – Basic Prototype Characteristics

Prototype	Stories	Square Footage	Bedrooms
Single Family	1	1,665	3
Multi-unit	1	965	2

#### Measuring Cost Effectiveness

There are two common measures of cost effectiveness.

*Simple Payback* divides the up-front installation cost of a measure by the expected utility bill savings each year. The result is a simple measure of the number of years it takes to “pay back” the initial investment. The lower the number, the quicker a measure pays back and the more cost effective it is. *Simple Payback* does not take into account financing costs.

*Benefit-to-Cost Ratio* divides the lifecycle benefits over the one-time costs. Lifecycle benefits are summed over 30 years and discounted at 3%. The costs assume that the owner borrows money to make improvement at common mortgage rates. *Benefit-to-cost ratios* above 1.0 are considered cost effective and the higher the ratio, the better.

#### Results

The table 2 below shows the cost effectiveness for individual measures or packages of measures required by the proposed ordinance. Not every measure was found to be cost effective for all building ages, zip codes and configurations. Accordingly, the requirements differ based on these factors. Note that apartment buildings with five or more units are not covered by this ordinance, unless the units are individually owned condominiums.

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<sup>1</sup> Download link: [https://localenergycodes.com/download/378/file\\_path/fieldList/Residential%20Retrofit%20Cost-Eff%20Report](https://localenergycodes.com/download/378/file_path/fieldList/Residential%20Retrofit%20Cost-Eff%20Report) Under the ‘Toolkit’ tab see ‘Prescriptive Ordinances’, “Existing Low-Rise Residential Remodels”.

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Table 2 - Individual Measure Cost Effectiveness

Measure	Year Built	Cost <sup>2</sup>	Annual Savings <sup>2</sup>	Simple Payback (years)	Benefit / Cost <sup>3</sup>
Single Family: Homes with one to four units (except 91914 zip code)					
Water Heating Package	Before 2006	\$208	\$30	6.9	2.5
LED Lighting <sup>4</sup>	Before 2006	\$26	\$24	1.1	15.6
Duct Sealing	Before 1978	\$240	\$52	4.6	3.8
Attic Insulation	Before 1978	\$2,273	\$168	11.4	1.5
Cool Roof	Before 1978	\$635	\$66	9.6	1.8
Multifamily: Condos in Buildings with five or more units					
Water Heating Package	Before 2006	\$168	\$24	8.0	2.5
LED Lighting <sup>4</sup>	Before 2006	\$26	\$24	1.1	17.7
Duct Sealing	Before 1978	\$120	\$29	4.4	4.4
	1978-1991	\$120	\$15	8.0	2.5
Attic Insulation	Before 1978	\$594	\$47	16.1	1.2
Cool Roof	Before 1978	\$184	\$29	9.2	2.1
	1978-1991	\$184	\$15	12.3	1.6
Single Family: Homes with one to four units (only 91914 zip code)					
Water Heating Package	Before 2006	\$208	\$30	6.9	2.5
LED Lighting <sup>4</sup>	Before 2006	\$26	\$36	0.7	24.0
Attic Insulation, Duct Sealing and Air Sealing <sup>5</sup>	Before 1992	\$3,562	\$359	9.9	1.8
	1992-2005	\$3,562	\$317	11.2	1.5
Cool Roof	Before 1978	\$635	\$272	2.3	7.4
	1978-1991	\$635	\$195	3.3	5.3
	1992-2005	\$635	\$164	3.9	4.5

<sup>2</sup> Unless otherwise noted, figures are from the *Existing Building Efficiency Upgrade Cost-effectiveness Study*, December 2019 version. Some errors in the study have been corrected in consultation with the author.

<sup>3</sup> Calculated using methodology from *Existing Building Efficiency Upgrade Cost-effectiveness Study*, June 2018 version

<sup>4</sup> Assumes 6.6 bulbs replaced with LED bulbs in a home. Assumes replaced bulbs are half CFLs and half incandescent/halogen.

<sup>5</sup> Includes \$350 for BPI Combustion Safety Testing.

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Table 3 assumes that a home in each scenario<sup>6</sup> installs all recommended measures<sup>7</sup> and evaluates the total cost effectiveness of the combined measures. If residents choose to install less measures their costs and savings would be less based on the measures they select. Figures are shown with and without additional permit costs.

Table 3 - Combined Cost Effectiveness<sup>8</sup>

<b>Home Scenario</b>	<b>Total Cost<sup>8</sup></b>	<b>Total Annual Savings</b>	<b>Simple Payback (with additional permit cost)</b>	<b>Simple Payback (without additional permit cost)</b>	<b>Benefit / Cost (with additional Permit Cost)</b>	<b>Benefit / Cost (without additional Permit Cost)</b>
Single Family Pre-1978	\$2,935	\$274	10.7	10.0	1.6	1.7
Single Family 1978-2005	\$422	\$54	7.9	4.4	2.2	4.0
Single Family 1978-1991 (Only 91914 Zip)	\$3,984	\$425	9.4	8.9	1.9	1.9
Single Family 1992-2005 (Only 91914 Zip)	\$3,984	\$383	10.4	9.9	1.7	1.8
Multifamily Pre-1978	\$1,096	\$153	7.2	5.9	2.7	3.3
Multifamily 1978-1991	\$502	\$63	8.0	5.0	2.5	3.9
Multifamily 1992-2005	\$382	\$48	8.0	4.0	2.5	4.9

<sup>6</sup> In the 91914 zip code there are no buildings with five or more units built before 2006.

<sup>7</sup> Since the Cool Roof measure is only required if roofing work is being completed anyway as part of the addition or remodel, it is not included in Table 3 results.

<sup>8</sup> Includes \$188 estimated additional permit costs