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Application for:

**City of Sebastopol Locally Adopted Energy Standards**

From:  
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## Ordinance Summary

The City of Sebastopol is adopting the California Code of Regulations T-24 Part 11 *Green Building Standards Code (CAL Green) with the Tier 1 Appendixes A4 and A5 by Ordinance as mandatory measures* to conserve natural resources through sustainable design and construction practices. In the Ordinance, new residential and non-residential construction, as defined in the Ordinance, shall be 15% more energy efficient than required by Title 24, Part 6.

The Ordinance was designed with multiple considerations. These include:

- Consistency with the currently adopted methods of the 2008 Title 24 Building Energy Efficiency Standards:
- Meeting the intent of the Ordinance by demonstrating that the level of energy consumption of new buildings is 15% less than the TDV energy allowed for an equivalent building:
- Enforcement, Support and Training: The City of Sebastopol Building and Safety Division continues staff and general public education of Title 24, Part 6 by utilizing the services of local Certified Energy Plans Examiners, consultants and instructors to provide periodic training.

This application to the California Energy Commission follows the requirements specified in Section 10-106 of the California Code of Regulations, Title 24, Part 1, **LOCALLY ADOPTED ENERGY STANDARDS**. The Ordinance is enforceable only after the Commission has reviewed and formally approved the proposed local energy standards n meeting all requirements of Section 10-1 06.

**Statement per Section 10-106(b)3.** The updated Ordinance will require all new residential buildings and new non-residential buildings be designed to consume 15% less TDV energy than permitted by Title 24, Part 6.

## Development of the Ordinance

The City of Sebastopol has researched and reviewed the feasibility and energy cost- effectiveness of permit applicants exceeding the state's 2008 Building Energy Efficiency Standards in order to meet the minimum energy efficiency requirements of the proposed ordinance using this report for achieving a minimum 15% above the 2008 energy Standards. The City of Sebastopol has been granted approval to use of the information provided in the Application for Locally Adopted Energy Standards by the Sonoma County Report. The full text of the analysis for residential buildings is contained in the Sonoma County report.

## Analysis of Impact on Non Residential Buildings

The following assumptions were used in the determination of the impact on Non Residential Buildings.

### **5,000 Square Foot Retail – Single Story – Base**

- 8.3% Fenestration of total wall area
- 2 HVAC Systems
  - 80% AFUE Packaged Unit
  - 13 SEER
  - R-6 Duct Insulation
- Slab on grade
- R-13 Front and rear walls
- 8" Solid filled CMU side walls
- R-19 Roof/ Ceiling Insulation with cool roofing
- Dual glazed, Metal framed fenestration .71 U-factor and .60 SHGC
- 3,500 Watts of general lighting
- 3,510 Watts of spot lighting
- 1,125 Watts of display lighting
- 74 Watts of restroom lighting
- 20 gallon electric DHW

### **5,000 Square Foot Retail – Single Story – 15% Compliance**

- 8.3% Fenestration of total wall area
- 2 HVAC Systems
  - 80% AFUE Packaged Unit
  - 13 SEER
  - R-6 Duct Insulation
- Slab on grade
- R-13 Front and rear walls
- 8" Solid filled CMU side walls with R-13 Insulation

- R-30 Roof / Ceiling Insulation with cool roofing
- Dual glazed, Metal framed fenestration .71 U-Factor and .60 SHGC
- 2,800 Watts of general lighting
- 2,430 Watts of spot lighting
- 1,125 Watts of display lighting
- 74 Watts of restroom lighting
- 20 gallon electric DHW

#### **5,000 Square Foot Office –2 Story – Base**

- 8% Fenestration of total wall area
- 2 HVAC Systems
  - 80% AFUE Packaged unit
  - 13 SEER
  - R-6 Duct Insulation
- Slab on grade
- R-1 3 Front and rear framed walls
- 8" Solid filled CMU side walls
- R-1 9 Roof Insulation with cool roofing
- Dual Glazed metal framed fenestration .71 U-factor and .60 SHGC
- 2,800 Watts of general lighting
- 1,620 Watts of spot lighting
- 148 Watts of restroom lighting
- 20 gallon electric DHW

#### **5,000 Square Foot Office –2 Story – 15% Compliance**

- 8% Fenestration of total wall area
- 2 HVAC Systems
  - 80% AFUE Packaged unit
  - 13 SEER
  - R-6 Duct Insulation
- Slab on grade
- R-1 3 Front and rear framed walls
- 8" Solid filled CMU side walls with R-13 Insulation
- R-1 9 Roof Insulation with cool roofing
- Dual Glazed metal framed fenestration .71 U-factor and .60 SHGC
- 2,800 Watts of general lighting
- 1,620 Watts of spot lighting
- 148 Watts of restroom lighting
- 20 gallon electric DHW

## Summary of measures and Cost Analysis

*Summary and cost of proposed energy efficient measures assumed for analysis*

*Yearly energy and cost savings from the Ordinance*

### **New Single Family Dwelling<sup>1</sup>**

Building Description	Total Incremental First Cost (\$)	Net Incremental Annual Energy Cost Savings (\$)	Simple Payback (years)
2,025 sf (Opt1-15%)	\$2,011	\$154	13.1
2,025 sf (Opt2-15%)	\$2,104	\$161	13.1
Averages:	\$2,057	\$157	13.1

Building Description	Average Incremental First Cost (\$)	Net Incremental Annual Energy Cost Savings (\$)	Simple Payback (years)
2,682 sf (Opt1-15%)	\$2,072	\$176	11.8
2,682 sf (Opt2-15%)	\$2,549	\$198	12.8
2,682 sf (Opt3-15%)	\$2,327	\$188	12.4
Averages:	\$2,316	\$187	12.3

### **Low-rise Multi-family Building**

Building Description	Average Incremental First Cost (\$)	Net Incremental Annual Energy Cost Savings (\$)	Simple Payback (years)
8,442 sf (Opt1-15%)	\$8,089	\$591	13.7
8,442 sf (Opt2-15%)	\$6,388	\$604	10.6
Averages:	\$7,238	\$598	12.1

*Yearly energy and cost savings from the Ordinance*

### **Non-Residential Building**

Building Size	Energy Efficient Measure	Cost
Non Res. Retail	• Added insulation to CMU	\$1,000
	• Reduced amount of lighting	<\$700>
	• Increased R-value attic insulation	\$1,200
Non Res. Office	• Added insulation to CMU	\$1,000
	• Added Cool Roof requirement	\$750

<sup>1</sup> Sonoma County Application for Locally Adopted Energy Standards

## **Cost Effectiveness**

The cost effectiveness of the increased efficiency required by the Ordinance is calculated for the buildings analyzed above. The total cost of the measures needed to meet the Ordinance is divided by the annual energy cost savings to determine the cost effectiveness of the additional energy efficiency measures. An average residential utility rate of \$0.17 kWh for electricity and \$1.40 for natural gas and an average commercial utility rate of \$0.15 kWh for electricity and \$1.30 for natural gas were used for the purposes of this study.

### *Simple payback for modeled energy efficiency measures for Ordinance compliance*

Building Size	Additional cost of energy efficient measures	Annual energy cost savings	Simple Payback (Years)
Non Res. Retail	\$1,500	\$3,528	0.43
Non Res. Office	\$1,750	\$1,238	1.41

## **Conclusions**

Regardless of the building design, occupancy profile and number of stories, the incremental improvement in overall annual energy performance of buildings under the Sebastopol Ordinance and the 2008 Title 24 Building Energy Efficiency Standards is cost-effective. However, each building's specific design, occupancy type and the design choices may allow for a large range of incremental first cost and payback. As is the case in just meeting the requirements of the Title 24 energy standards, a permit applicant complying with the energy requirements of the Sebastopol Ordinance should carefully analyze building energy performance to reduce incremental first cost and reduce the payback for the required additional energy measures.