

**Application for a Locally Adopted Energy Standards  
by the City of Santa Barbara In Accordance With  
Section 10-106 of the California Code of Regulations,  
Title 24, Part 1**

October 24, 2007

**From:**  
**Paul Casey, Community Development Director**  
**City of Santa Barbara**  
**630 Garden Street**  
**P.O. Box 1990**  
**Santa Barbara, CA 94928-2486**  
**(805) 564-5503**  
**Email: [PCasey@SantaBarbaraCA.gov](mailto:PCasey@SantaBarbaraCA.gov)**

Report prepared by:  
Michael Gabel  
Gabel Associates, LLC  
1818 Harmon Street, Suite #1  
Berkeley, CA 94703  
(510) 428-0803  
Email: [mike@gabelenergy.com](mailto:mike@gabelenergy.com)

**Table of Contents**

1.0 *Executive Summary* ..... 1

2.0 *Impacts of the New Ordinance* ..... 3

3.0 *Cost Effectiveness* ..... 9

4.0 *Credit for Solar PV Systems.* ..... 14

5.0 *Implementation Plan.* ..... 15

6.0 *Text of the Proposed Santa Barbara Ordinance* ..... 16

*Appendix A: Special Compliance Spreadsheets and Forms* ..... 26

## **1.0 Executive Summary**

The City of Santa Barbara has researched and reviewed the feasibility and cost-effectiveness of building permit applicants exceeding the performance requirements of the 2005 Building Energy Efficiency Standards. Having developed final draft language for the Santa Barbara Energy Efficiency Ordinance (included as Section 6 of this document), and having the final draft Ordinance approved at the Introduction hearing by the Santa Barbara City Council on October 23, 2007, the City would like to implement this Ordinance at the earliest convenient date following approval by the California Energy Commission.

The City of Santa Barbara has retained Gabel Associates, LLC to assist the City in this application to the Commission. As stated in the Ordinance application, the proposed local energy efficiency standards and implementation have been designed with several key criteria in mind. These include:

- Consistency with the structure, format and calculation methods of the 2005 Title 24 Building Energy Efficiency Standards;
- Simplicity and clarity for building department enforcement for both energy plan review and field inspection;
- Meeting the local energy compliance requirements as defined by the Ordinance which exceed the 2005 Title 24 standards; and,
- The provision of flexibility for building permit applicants in meeting the Ordinance by the performance approach using building and appliance energy conservation measures.

This application to the California Energy Commission conforms to the requirements laid out in Section 10-106 of the California Code of Regulations, Title 24, Part 1, *LOCALLY ADOPTED ENERGY STANDARDS*. The proposed Ordinance shall take effect only after the Commission has reviewed and formally approved the proposed local energy standards as meeting all requirements of Section 10-106, and the Ordinance has been filed with the Building Standards Commission.

**Statement per Section 10-106(b)3.** The proposed Ordinance requires that all buildings are designed to consume no more TDV energy than permitted by Title 24, Part 6. The main features of the proposed ordinance are that:

- (a) Single family houses and residential additions greater than 100 square feet consume at least 20% less TDV energy than the energy use permitted by the 2005 standards;
- (b) High-rise residential buildings (i.e., four story or higher residential apartments) and additions to those buildings which are greater than 500 square feet consume at least 15% less TDV energy than the energy use permitted by the 2005 standards;
- (c) Nonresidential indoor lighting be at least 10% below the Allowed LPD permitted by the 2005 standards (with Display Lighting exempted);
- (d) Nonresidential buildings and additions to those buildings which are greater than 500 square feet consume at least 10% less TDV energy than the energy use permitted by the 2005 standards; and,
- (e) A few mandatory measures not a part of the 2005 standards are required.

With respect to any technical questions concerning the development, methodology, descriptions or implementation outlined in this application, please contact Michael Gabel at Gabel Associates, LLC.

## 2.0 Impacts of the New Ordinance

### 2.1 Single Family Homes

The following methodology and assumptions are used in evaluating the impact of the Ordinance on single family homes.

**Home Design.** A 2,500 square foot two-story house with 22% glazing area (total glass area to total conditioned floor area) has been modeled in two ways to determine the cost-effectiveness of the proposed City of Santa Barbara Energy Ordinance. Each base case versions of the design, as summarized below, meets the 2005 Building Energy Efficiency Standards. The second comparative set of energy measures was developed to just meet the City's proposed energy ordinance which requires that low-rise residential buildings exceed Title 24 by 20%. The added (i.e., incremental) energy measures were evaluated to determine a simple payback period which includes their cumulative first cost and their cumulative annual energy cost saving.

#### **(A) 2,500 SF 2-story home, assuming all custom (not NFRC-rated) dual wood windows:**

- R-30 attic roof
- R-13 exterior walls
- ½ footprint slab-on-grade, ½ footprint R-19 raised floor
- Dual pane NFRC-rated Low-E windows: U-factor=0.39, SHGC=0.37; no shading from eaves modeled
- 12 sf dual metal (not NFRC-rated) skylights
- Furnace: 80% AFUE
- Air conditioner: Minimum 13.0 SEER
- R-4.2 ducts in the attic
- Water heater: 50 gallon gas, Energy Factor=0.58; no extra pipe insulation

#### **(B) 2,500 SF 2-story home, assuming all NFRC-rated dual Low-E wood windows:**

- R-30 attic roof
- R-13 exterior walls
- ½ footprint slab-on-grade, ½ footprint R-19 raised floor
- Dual pane generic (not NFRC-rated) wood frame windows w/ exterior overhangs from 2' eaves modeled for approx. 40% of total glazing
- 12 sf of Velux skylights
- Furnace: 80% AFUE
- Air conditioner: Minimum 13.0 SEER
- R-6.0 ducts in the attic
- Water heater: 50 gallon gas, Energy Factor=0.62; pipe insulation to kitchen

**Low-rise Residential Energy Measures Needed to Meet the City's Ordinance.**

Incremental energy measures to meet the Ordinance have been evaluated. The following energy features have been modified from the Title 24 measures so that these home designs use 20% less TDV energy than the Title 24 standard design.

(A) 2,500 SF: No change to Base Case Glazing Performance

- Tankless gas DHW EF=0.80 -- incremental cost from EF=0.58: \$ 750
- Total incremental cost of Ordinance energy measure: \$ 750

(B) 2,500 SF: No change to Base Case Glazing Performance

- Tankless gas DHW EF=0.80 -- incremental cost from EF=0.62: \$ 500
- 92% AFUE furnace -- incremental cost from 80% AFUE: \$ 450
- HERS Verification of Reduced Duct Leakage: \$ 600
- HERS Verification of air conditioner TXV and 10.4 EER: \$ 100
- Total incremental cost of Ordinances energy measures: \$ 1650

Note that the incremental energy design improvements specified above to meet the proposed Ordinance requirements do not include many building or system measures which also can effectively be used within the Title 24 performance method. Depending upon the specific opportunities available for a particular building design and orientation, a building can use additional measures in an enormous variety of combinations to meet the proposed Santa Barbara requirements including:

- Additional HERS measures such as building leakage testing, insulation quality, duct design and proper cooling equipment sizing;
- Thermal mass credit when the sum of all interior masonry surfaces exceed 30% of the conditioned floor area of the house; and,
- Additional fixed overhangs and side-fins for glazing which are effective within the Santa Barbara climate zone; and,
- Credit for zonal controls for living and sleeping zones within a home.

## 2.2 High-rise (Four-Story) Multi-Family Buildings

The following methodology and assumptions are used in evaluating the impact of the Ordinance on four-story multi-family buildings which are defined as “High-rise Residential” buildings under the Title 24 Building Energy Efficiency Standards.

**30 Unit Apartment Building.** A four-story building, with the top three floors containing 30 apartments with a total conditioned floor area of 27,600 square foot has been modeled in two ways to determine the cost-effectiveness of the proposed City of Santa Barbara Energy Ordinance. The total glazing area for this building is a Window Wall Ratio (WWR) of 35.2%, typical of this occupancy type.

The same set of Title 24 energy measures is used as the base case for comparison with two sets of energy measures developed to just meet the City’s proposed energy ordinance which requires that high-rise residential buildings exceed Title 24 by 15%. The added (i.e., incremental) energy measures were evaluated to determine a simple payback period including cumulative first cost and cumulative annual energy cost saving.

### **27,600 SF 4-story building w/ three stories of apartments which just meet Title 24:**

- R-30 attic roof
- R-19 in metal frame exterior walls
- Dual pane NFRC-rated Low-E windows: U-factor=0.39, SHGC=0.37; no exterior shading modeled
- Central domestic hot water boiler, 82.7% AFUE
- Room Heat Pumps: 10.2 SEER, 7.2 HSPF

### **High-rise Residential Energy Measures Needed to Meet the City’s Ordinance.**

Incremental energy measures to meet the Ordinance have been evaluated for the above 4-story apartment building. The following energy features have been modified from the Title 24 measures so that these home designs use 15% less TDV energy than the Title 24 standard design.

#### **(A) 27,600 SF, 30-Unit Apartment Building**

- Dual pane NFRC-rated “Super” Low-E windows: \$ 16,380  
U-factor=0.39, SHGC=0.27 -- incremental cost from  
U-factor=0.39, SHGC=0.37
- Room Heat Pumps: 11.2 SEER, 7.84 HSPF (2/Apartment)  
Incremental cost from 10.2 SEER, 7.2 HSPF \$ 11,250
- Total incremental cost of Ordinances energy measures:** \$ 27,630

#### **(B) 27,600 SF, 30-Unit Apartment Building**

- 72% Net Solar Fraction Hot Water Collector System \$ 45,000
- Total incremental cost of Ordinances energy measures:** \$ 45,000

## 2.3 Nonresidential Lighting Requirements

The following methodology and assumptions are used in evaluating the Nonresidential Lighting requirements of the Ordinance.

**Ground Floor Commercial Space.** The same 9,200 square foot retail space is used to demonstrate the Ordinance's lighting requirements. The general lighting (non-display lighting) includes a total of 222 4' 2-lamp T-8 fluorescent fixtures, with standard T8 electronic ballasts. This translates to 1.496 watts/sf, just at the Title 24 prescriptive Allowed Lighting Power Density (LPD) of 1.5 watts/sf.

### **Nonresidential Lighting Measures Needed to Meet the City's Ordinance.**

Incremental lighting measures to meet the Ordinance have been evaluated for the above first floor retail space. The following energy features have been modified from the Title 24 measures so that the lighting design has an Installed LPD which is at or below 1.35 watts/sf (10% better than Title 24).

#### 9,200 SF, Retail Space

- Incremental cost of going from standard rapid start ballasts  
to super T8 instant start ballasts @ \$7.50 per ballast \$ 1,275

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Total incremental cost of Ordinance energy measure: \$ 1,275

## 2.4 Nonresidential Envelope Requirements

The following methodology and assumptions are used in evaluating the Nonresidential Envelope requirements of the Ordinance.

**Ground Floor Commercial Space.** The ground floor of the same four-story building (above) has a total floor area of 9,200 square foot. The building envelope of this first floor is assumed to have a glazing Window Wall Ratio of 37.0%, with a WWR of 72.7% for the front elevation facing south. All glass is assumed to be 8'-0" high which wraps around the front portion of the building. This is realistic for retail stores which are difficult commercial occupancies to comply with the Envelope energy standards.

A plausible set of energy measures have been designed to show that the Envelope of this commercial space just meets the Title 24 requirements. The comparative design which just meets the City's Ordinance exceeds Title 24 by 10%. The added (i.e., incremental) energy measures were evaluated to determine a simple payback period including cumulative first cost and cumulative annual energy cost saving.

### **9,200 SF retail floor which just meet Title 24:**

- R-19 in metal frame exterior walls
- Slab-on-grade floor
- Un-insulated metal rollup doors
- Dual metal generic (not NFRC-rated) windows: U-factor=0.61, SHGCc=0.58; 4'-0" awnings over all 8' high glazing
- 7.5 ton split heat pumps: 3.1 COP, 10.4 EER, air economizers, premium efficiency supply fan motor and demand control ventilation

### **Nonresidential Envelope Energy Measures Needed to Meet the City's Ordinance.**

Incremental energy measures to meet the Ordinance have been evaluated for the above first floor retail space. The following energy features have been modified from the Title 24 measures so that the Envelope design uses 10% less TDV energy than the Title 24 standard design.

#### (A) 9,200 SF, Retail Space

- |   |          |
|---|----------|
| • <u>Reduce glass SHGC from 0.57 from 0.38</u>      | \$ 6,500 |
| Total incremental cost of Ordinance energy measure: | \$ 6,500 |

#### (B) 9,200 SF, Retail Space

- |  |           |
|--|-----------|
| • <u>Addition of a 4'-0" awning around the front of the building</u> | \$ 18,750 |
| Total incremental cost of Ordinance energy measure:                  | \$ 18,750 |

Note that this example has been designed as a somewhat worse-case scenario: a very high amount of glass facing south and no roof surface to improve the overall performance of the Envelope.

## Envelope and Lighting Combined

If a new building includes, for example, both the envelope and the lighting design as part of the same permit, lighting energy savings can be applied to the envelope requirement using the performance approach. In the following example, the energy measures that are used to just meet the Title 24 requirements are a composite of those listed in Section 2.3 and 2.4, the first scenario (A). Then combining the incremental energy measures needed to meet the City's Ordinance using the performance approach may often result in a lower first cost and faster payback than the prescriptive approach as follows:

### (C) 9,200 SF, Retail Space

- Incremental cost of going from standard rapid start ballasts and
  - Standard T8 lamps to Super T8 lamps and Super T8 instant  
start and programmable start ballasts \$ 2,287
- 
- Total incremental cost of Ordinance energy measures: \$ 2,287

### **3.0 Cost Effectiveness**

#### **3.1 Single Family Houses**

The cost effectiveness of meeting the requirements of the Ordinance is calculated for the home designed analyzed two different ways above. This reflects the different ways that architects, builders and home owners choose to meet the basic Title 24 requirements depending on preferences which often put window selection and constraints first. The total incremental first cost of the measures needed to meet the Santa Barbara Ordinance is divided by the incremental annual energy cost saving to establish the Simple Payback for the additional energy features. The study uses an average utility rate price of **\$0.16/kWh** for electricity and **\$1.25/therm** for natural gas.

*Table 3-1a: Summary of Energy Savings from Santa Barbara Energy Measures*

<b>Home Design</b>	<b>Electricity Saving (kWh/yr)</b>	<b>Gas Saving (therms/yr)</b>	<b>Electricity Cost Saving (\$)</b>	<b>Nat. Gas Cost Saving (\$)</b>	<b>Total Annual Cost Saving (\$)</b>
<b>2,500 sf (A)</b>	29	109	\$5	\$136	<b>\$141</b>
<b>2,500 sf (B)</b>	77	93	\$12	\$116	<b>\$128</b>

*Table 3-1b: Summary of Simple Payback for Santa Barbara Energy Measures*

<b>Home Design</b>	<b>Incremental First Cost Compared w/ Title 24 House (\$)</b>	<b>Incremental Annual Energy Cost Saving (\$)</b>	<b>Simple Payback (Years)</b>
<b>2,500 sf (A)</b>	<b>\$ 750</b>	<b>\$141</b>	<b>5.3</b>
<b>2,500 sf (B)</b>	<b>\$1650</b>	<b>\$128</b>	<b>12.9</b>

Based on this data, the Ordinance increases the cost of construction by approximately \$0.30 to \$0.65 per square foot, for which the energy cost savings as a simple payback from first cost may be in the range of 5 to 15 years.

If the overall cost of new residential construction, including the cost of land and other related permit fees, is in the range of \$300 to \$400 per square foot, the Ordinance will increase that overall cost by approximately one-tenth to two-tenths of one percent.

### 3.2 High-rise (Four-Story) Multi-Family Buildings

Table 3-2a: Summary of Energy Savings from Santa Barbara Energy Measures

Apartment Building Design	Electricity Saving (kWh/yr)	Gas Saving (therms/yr)	Electricity Cost Saving (\$)	Nat. Gas Cost Saving (\$)	Total Annual Cost Saving (\$)
27,600 sf (A)	12667	0	\$2067	\$0	\$2027
27,600 sf (B)	0	2371	\$0	\$2964	\$2964

Table 3-2b: Summary of Simple Payback for Santa Barbara Energy Measures

Apartment Building Design	Incremental First Cost Compared w/ Title 24 Building (\$)	Incremental Annual Energy Cost Saving (\$)	Simple Payback (Years)
27,600 sf (A)	\$27,630	\$2,067	13.4
27,600 sf (B)	\$45,000	\$2,964	15.2

Based on this data, the Ordinance increases the cost of construction by approximately \$1.00 to \$1.80 per square foot, for which the energy cost savings as a simple payback from first cost may be in the range of 13 to 17 years.

If the overall cost of new residential construction, including the cost of land and other related permit fees, is in the range of \$300 to \$400 per square foot, the Ordinance will increase that overall cost by approximately three-tenths to six-tenths of one percent.

### 3.3 Nonresidential Lighting Requirements

Table 3-3a: Summary of Energy Savings from Santa Barbara Lighting Measures

<b>Retail Envelope Design</b>	<b>Electricity Saving (kWh/yr)</b>	<b>Gas Saving (therms/yr)</b>	<b>Electricity Cost Saving (\$)</b>	<b>Nat. Gas Cost Saving (\$)</b>	<b>Total Annual Cost Saving (\$)</b>
<b>9,200 sf</b>	7971	0	\$1275	\$0	<b>\$1275</b>

Table 3-3b: Summary of Simple Payback for Santa Barbara Lighting Measures

<b>Retail Envelope Design</b>	<b>Incremental First Cost Compared w/ Title 24 Building (\$)</b>	<b>Incremental Annual Energy Cost Saving (\$)</b>	<b>Simple Payback (Years)</b>
<b>9,200 sf</b>	<b>\$ 1665</b>	<b>\$1275</b>	<b>1.3</b>

Based on this data, which looks only how lighting measure can be upgraded, the Ordinance increases the cost of construction by approximately \$0.15 per square foot, for which the energy cost savings as a simple payback from first cost may be in the range of 1 to 3 years.

If the overall cost of new construction is in the range of \$300 to \$400 per square foot, the Ordinance may increase that overall cost by generally less than one-tenth percent.

### 3.4 Nonresidential Envelope Requirements

Table 3-4a: Summary of Energy Savings from Santa Barbara Envelope Measures

Retail Envelope Design	Electricity Saving (kWh/yr)	Gas Saving (therms/yr)	Electricity Cost Saving (\$)	Nat. Gas Cost Saving (\$)	Total Annual Cost Saving (\$)
9,200 sf (A)	2747	0	\$440	\$0	\$440
9,200 sf (B)	2553	0	\$408	\$0	\$408

Table 3-4b: Summary of Simple Payback for Santa Barbara Envelope Measures

Retail Envelope Design	Incremental First Cost Compared w/ Title 24 Building (\$)	Incremental Annual Energy Cost Saving (\$)	Simple Payback (Years)
9,200 sf (A)	\$ 6,500	\$ 440	14.8
9,200 sf (B)	\$18,750	\$ 408	46.0

Based on this data, which looks only how Envelope measures alone can be upgraded, the Ordinance increases the cost of construction by approximately \$0.70 to \$2.00 per square foot, for which the energy cost savings as a simple payback from first cost may be in the range of 15 to 45 years.

This example illustrates that the incremental cost depends wholly on choices the designer and building owner makes not only to first meet Title 24, but what options are selected incrementally to meet the City's more stringent requirements. The performance approach affords the means to study the cost-effectiveness of many different energy design measures, including the improvement of mechanical systems and/or lighting to achieve the target of 10% better than Title 24.

If the overall cost of new construction is in the range of \$300 to \$400 per square foot, the Ordinance may increase that overall cost by approximately two-tenths to seven-tenths of one percent.

#### **Envelope & Lighting Combined**

By increasing the lighting system measures alone, the City's energy efficiency requirements for envelope and lighting can be met by upgrading the Title 24 lighting specification to Super T8 lamps with a Super T8 Instant Start and Programmable Start electronic ballast (from 62 watts per 2-lamp 4' T8 fixture to 48 watts for the same fixture).

*Table 3-4c: Summary of Energy Savings from Envelope & Lighting Measures*

<b>Retail Envelope Design</b>	<b>Electricity Saving (kWh/yr)</b>	<b>Gas Saving (therms/yr)</b>	<b>Electricity Cost Saving (\$)</b>	<b>Nat. Gas Cost Saving (\$)</b>	<b>Total Annual Cost Saving (\$)</b>
<b>9,200 sf (A)</b>	18230	0	\$2917	\$0	<b>\$2917</b>

*Table 3-4d: Summary of Simple Payback for Envelope & Lighting Measures*

<b>Retail Envelope Design</b>	<b>Incremental First Cost Compared w/ Title 24 Building (\$)</b>	<b>Incremental Annual Energy Cost Saving (\$)</b>	<b>Simple Payback (Years)</b>
<b>9,200 sf (A)</b>	<b>\$ 2,287</b>	<b>\$2,917</b>	<b>0.8</b>

**Conclusions**

Regardless of the design and occupancy profile of a building, the improvement in overall annual energy performance as a result of the City’s Ordinance will be relatively reliable with respect to that building’s Title 24 TDV energy. However, a building’s specific design and occupancy, and the design choices used to just meet the state’s energy code and then go beyond that to meet the City’s Ordinance can – in conjunction with the compliance approach selected – allow for an enormous range of first cost and payback period. As is the case in meeting the requirements of the state’s Title 24 standards, a permit applicant seeking to meet the requirements of the City’s Ordinance should analyze the building energy performance to reduce the incremental installed cost and reduce the cost payback period for energy measures.

## **4.0 Credit for Solar PV Systems**

To provide another avenue for the building permit applicant to demonstrate the requisite level of overall energy efficiency, the proposed Ordinance offers credit for on-site solar photovoltaic (PV) electricity generation if the building energy efficiency measures alone have already achieved the following levels of performance:

- **Low-rise residential buildings must exceed the Title 24 standards by at least 15% before solar PV credit can be used** to meet the Ordinance requirement of exceeding Title 24 by 20%.
- **High-rise residential buildings must exceed the Title 24 standards by at least 10% before solar PV credit can be used** to meet the Ordinance requirement of exceeding Title 24 by 15%.
- **Using the performance method only, nonresidential buildings must exceed the Title 24 standards by at least 5% before solar PV credit can be used** to meet the Ordinance requirement of exceeding Title 24 by 10%.

The amount of credit for PV systems is established using the Commission-approved CEC PV Calculator, Version 2.1, Upgrade 2 or later available on the state's web site for the New Solar Homes Partnership at:

[http://www.gosolarcalifornia.ca.gov/nshpcalculator/download\\_calculator.html](http://www.gosolarcalifornia.ca.gov/nshpcalculator/download_calculator.html)

The CF-1R-PV form, including all relevant PV system input assumptions and installation criteria, must be printed out and submitted to the building official as part of the Title 24 energy compliance documentation. The installing contractor must meet all applicable installation criteria specified in the latest version of the state's NSHP Guidebook.

*Note: The ordinance and the special permit form (worksheet) make it clear that the house must meet the 2005 Building Energy Efficiency Standards without PV credit. PV credit is applicable only when exceeding Title 24 to meet the requirements of the local energy ordinance.*

## **5.0 Implementation Plan**

The implementation of the City of Santa Barbara energy ordinance for low-rise residential buildings (and no solar PV credit) is a simple verification that the performance CF-1R shows that the proposed building exceeds Title 24 by at least 20%. If a solar PV system is receiving credit, the additional CF-1R-PV form must be included and a one-page additional form available through the City.

For high-rise residential and nonresidential buildings, there will be either one or two pages of additional forms which can be printed out from an Excel spreadsheet available from the City of Santa Barbara, or be filled in on a pre-printed form with calculations provided by the City.

With the exception of a verifying a few additional mandatory measures, the City of Santa Barbara plan review will involve:

- (a) Verifying the occupancy type(s) and scope of work to determine whether and how the Ordinance applies;
- (b) Checking the drawings, specifications and regular Title 24 documentation under the 2005 Building Energy Efficiency Standards; and,
- (c) Checking any additional forms needed to demonstrate compliance with the Ordinance.

Field inspection will be essentially identical to working with the current standards, with the inclusion of the few additional local mandatory measures and the possible inspection of a solar PV system.

Gabel Associates will work in conjunction with the City of Santa Barbara to plan all aspects of the implementation, including training for the building department, local energy consultants and interested parties (e.g., designers and builders) who would like to learn more about how to meet the Ordinance's energy requirements.

## **6.0 Text of the Santa Barbara Ordinance**

COUNCIL INTRODUCTION DRAFT 10/23/07

**ORDINANCE NO. \_\_\_\_\_**

**AN ORDINANCE OF THE CITY COUNCIL OF  
THE CITY OF SANTA BARBARA REPEALING  
CHAPTER 22.82 OF TITLE 22 OF THE SANTA  
BARBARA MUNICIPAL CODE AND ENACTING  
A NEW CHAPTER 22.82 ESTABLISHING LOCAL  
ENERGY EFFICIENCY STANDARDS FOR  
CERTAIN BUILDINGS AND IMPROVEMENTS  
COVERED BY THE 2005 CALIFORNIA  
BUILDING ENERGY EFFICIENCY STANDARDS**

The City Council of the City of Santa Barbara does ordain as follows:

### **SECTION 1. Findings.**

1. The modifications to the 2005 California Building Energy Efficiency Standards required by this ordinance are reasonably necessary due to local climatic conditions. Despite moderate summer ambient temperatures in the local area, the City of Santa Barbara is served by an energy system that experiences power outages or power reductions (i.e., “brown-outs”) during peak demand periods. Reduction of total and peak energy use as a result of incremental energy conservation measures required by this ordinance will have local and regional benefits in the cost-effective reduction of energy costs for the building owner, additional available system energy capacity, and a reduction in greenhouse gas emissions.

2. The proposed ordinance preserves and enhances the environment; in that it would set forth increased minimum energy efficiency standards within the City of Santa Barbara for buildings and improvements covered by the ordinance. In accordance with CEQA Section 15061(b)(3), “[C]EQA applies only to projects, which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA.” Staff has determined that the proposed ordinance is exempt from CEQA review.

3. The modifications to the City’s energy efficiency standards correspond with the first level of the Architecture 2030 Challenge, corresponding to a fifty percent (50%) reduction in fossil fuel use in buildings when compared to regional averages, previously accepted by the City Council and intended to reduce energy consumption over time, achieving “carbon neutrality” by 2030 in new buildings and retrofits.

4. In order to maintain and advance the energy efficiency standards, it is in the best interest of the City to revisit this ordinance prior to expiration, ensuring that local energy standards meet the goals of reducing energy consumption, thereby saving on energy bills and decreasing greenhouse gas emissions.

5. Gabel Associates, LLC has been hired by the City to study the cost-effectiveness of the energy conservation measures contained in this ordinance. This study has concluded that the energy conservation measures contained in this ordinance are cost-effective. The City Council hereby adopts the conclusions of this study and authorizes the inclusion of the Gabel Associates study in an application for consideration by the California Energy Commission in compliance with Public Resources Code 25402.1(h)(2).

**SECTION 2.** Chapter 22.82 of Title 22 of the Santa Barbara Municipal Code, titled “Energy Conservation Standards for New Residential Construction”, is hereby repealed and a new Chapter 22.82 is enacted to read as follows:

## **Chapter 22.82                      Energy Efficiency Standards**

### **22.82.010    Purpose.**

This Chapter (“Energy Efficiency Standards”) sets forth increased minimum energy efficiency standards within the City of Santa Barbara for all new construction of any size, additions to existing buildings or structures over a certain size threshold, and the installation of new heaters or circulation pumps for swimming pools, spas and water features. This Chapter is intended to supplement the 2005 California Building Energy Efficiency Standards, as specified in California Code of Regulations, Title 24, Parts 1 and 6 (Standards). Compliance with the 2005 California Building Energy Efficiency Standards is required even if the increased minimum energy efficiency standards specified in this Chapter do not apply.

### **22.82.020    Definitions.**

For purposes of this Chapter 22.82, words or phrases used in this Chapter that are specifically defined in Parts 1, 2, or 6 of Title 24 of the California Code of Regulations shall have the same meaning as given in the Code of Regulations. In addition, the following words and phrases shall have the meanings indicated, unless context or usage clearly requires a different meaning:

A.     **2005 BUILDING ENERGY EFFICIENCY STANDARDS.** The standards and regulations adopted by the California Energy Commission contained in Parts 1 and 6 of Title 24 of the California Code of Regulations as such standards and regulations may be amended from time to time.

B.     **EXISTING + ADDITION + ALTERATION.** An approach to modeling the time dependent valuation energy use of an addition including the existing building and alterations as specified in the Residential Compliance Manual and Nonresidential Compliance Manual.

C. **NONRESIDENTIAL COMPLIANCE MANUAL.** The manual developed by the California Energy Commission, under Section 25402.1(e) of the Public Resources Code, to aid designers, builders, and contractors in meeting the requirements of the state's 2005 Building Energy Efficiency Standards for nonresidential, high-rise residential, and hotel/motel buildings.

D. **PHOTOVOLTAIC CREDIT.** A TDV Energy credit that may be used under certain conditions to demonstrate compliance with the City's general compliance requirements as specified in Section 22.82.070. This credit is available if the solar photovoltaic energy system is capable of generating electricity from sunlight, supplying the electricity directly to the building, and the system is connected, through a reversible meter, to the utility grid. The methodology used to calculate the time dependent valuation energy equivalent to the photovoltaic credit shall be the CECPV Calculator Version 2.1 or higher which may be found at the following web site: [http://www.gosolarcalifornia.ca.gov/nshpcalculator/download\\_calculator.html](http://www.gosolarcalifornia.ca.gov/nshpcalculator/download_calculator.html)

E. **RESIDENTIAL COMPLIANCE MANUAL.** The manual developed by the California Energy Commission, under Section 25402.1(e) of the Public Resources Code, to aid designers, builders, and contractors in meeting the requirements of the state's 2005 Building Energy Efficiency Standards for low-rise residential buildings.

F. **SOLAR PHOTOVOLTAIC ENERGY SYSTEM.** A photovoltaic solar collector or other photovoltaic solar energy device that has a primary purpose of providing for the collection and distribution of solar energy for the generation of alternating current rated peak electricity. The installation of any solar photovoltaic energy system must meet all installation criteria of the current edition of the California Electrical Code and the California Energy Commission's Guidebook "*Eligibility Criteria and Conditions for Incentives for Solar Energy Systems Senate Bill 1*".

G. **SWIMMING POOL.** Any structure intended to contain water over 18 inches deep.

H. **TIME DEPENDENT VALUATION ENERGY or ("TDV ENERGY").** The time varying energy caused to be used by the building or addition to provide space conditioning and water heating and, for specified buildings, lighting. TDV energy accounts for the energy used at the building site and consumed in producing and in delivering energy to a site, including, but not limited to, power generation, transmission and distribution losses. TDV Energy is expressed in terms of thousands of British thermal units per square foot per year (kBtu/sq.ft.-yr).

I. **WATER FEATURE.** Any structure intended to contain water over 18 inches deep. Examples of water features include, but are not limited to, ponds and fountains.

### **22.82.030 Applicability.**

A. The provisions of this Chapter apply to any of the following buildings or improvements for which a building permit is required by this Code:

1. Any new building or structure of any size,
2. Any addition to an existing building or structure where the addition is greater than 100 square feet of conditioned floor area,
3. Indoor lighting alterations in conditioned spaces greater than 100 square feet of floor area within nonresidential buildings,
4. All new mechanical heating or cooling systems, and
5. All new heaters or circulation pumps for swimming pools, spas, and water features.

B. Subject to the limitations specified in this section 22.82.030, the coverage of this Chapter shall be determined in accordance with the scope and application section of either the Residential Compliance Manual or Nonresidential Compliance Manual, as appropriate for the proposed occupancy.

### **22.82.040 Compliance.**

A building permit application subject to the requirements of this Chapter will not be issued a building permit by the Building Official unless the energy compliance documentation submitted with the permit application complies with the requirements of this Chapter. A final inspection for a building permit subject to the requirements of this Chapter will not be approved unless the work authorized by the building permit has been constructed in accordance with the approved plans, conditions of approvals, and requirements of this Chapter.

### **22.82.050 Mandatory Energy Efficiency Requirements.**

In addition to meeting all requirements of 2005 Building Energy Efficiency Standards, all applications for building permits that include buildings or improvements covered by this Chapter shall include the following mandatory energy efficiency measures as may be applicable to the proposed building or improvement:

A. **RESIDENTIAL BUILDINGS.** Any appliance (excluding HVAC equipment and water heaters) to be installed in a residential building shall be Energy Star rated, if the appliance installed is of a type that is Energy Star rated.

B. **SWIMMING POOL AND SPA HEATERS AND PUMPS.** Any heater or circulation pump to be installed for any swimming pool, spa, or water feature shall incorporate the following energy conservation features:

1. All natural gas heaters shall have an annual fuel utilization efficiency of 90% or higher; and
2. All circulating pump motors and filtration pump motors with a nominal rating of 0.75 horsepower or greater (except pump motors only serving spa jets) shall be two-speed or variable speed motors. The installation of all two-speed and variable speed motors shall include the installation of a controller which shall be time-based and shall be programmed to alternate the speed of the motor between low and high to make effective use of the energy savings potential of the unit's multi-speed capability.

C. **MECHANICAL HEATING OR COOLING SYSTEMS.** All fan motors and pump motors associated with mechanical heating or cooling systems that are single-speed, poly-phase, 1.0 nominal horsepower to 500 nominal horsepower, 2-, 4-, and 6-pole squirrel cage induction, NEMA Design A or B, continuous duty-rated motors must be NEMA Premium motors by the National Electrical Manufacturers Association.

## **22.82.060 General Compliance Requirements.**

In addition to any applicable mandatory requirements specified in Section 22.82.050 and the requirements of the 2005 Building Energy Efficiency Standards, the following general compliance requirements shall apply to permit applications subject to this Chapter as follows:

A. **LOW-RISE RESIDENTIAL BUILDINGS.** Applications for building permits that involve new low-rise residential buildings or additions to existing low-rise residential buildings where the additions are greater than 100 square feet of conditioned floor area shall demonstrate compliance with the general compliance requirements as follows:

1. **New Low-Rise Residential Buildings.** When an application for a building permit involves a new low-rise residential building, the performance approach specified in Section 151 of the 2005 Building Energy Efficiency Standards must be used to demonstrate that the TDV Energy of the proposed building is at least 20.0% less than the TDV Energy of the standard building.

2. **Additions to Low-Rise Residential Buildings.** When an application for a building permit involves an addition to an existing low-rise residential building, this general compliance requirement may be met by either of the following methods:

- a. Using the performance approach specified in Section 151 of the 2005 Building Energy Efficiency Standards to demonstrate that the TDV Energy of the proposed addition is at least 20.0% less than the TDV Energy of the standard design, or

- b. Using the "Existing+Addition +Alteration" calculation methodology to demonstrate that the TDV Energy of the proposed building is at least 20.0% less than the TDV Energy of the standard design, as calculated in accordance with the performance approach specified in Section 151 of the 2005 Building Energy Efficiency Standards. In modeling buildings under the

Existing+Addition+Alteration method, domestic hot water energy use must be included in the calculation model unless the application does not involve a change to the building's existing water heater(s).

**B. HIGH-RISE RESIDENTIAL BUILDINGS.** Applications for building permits that involve new high-rise residential buildings or additions to existing high-rise residential buildings where the additions are greater than 100 square feet of conditioned floor area shall demonstrate compliance with the general compliance requirements as follows:

1. **New High-Rise Residential Buildings.** When an application for a building permit involves a new high-rise residential building, the applicant shall use either the Prescriptive Approach or the Performance Approach to demonstrate compliance as specified below:

a. **Prescriptive Approach.** If the building permit applicant chooses the prescriptive approach, the applicant shall use the Overall Envelope Approach in specified in Section 143(b) of the 2005 Building Energy Efficiency Standards to demonstrate that the Overall Heat Gain of the proposed building is at least 10.0% less than the Overall Heat Gain of the standard building; and the Overall Heat Loss of the proposed building is at least 10.0% less than the Overall Heat Loss of the standard building.

b. **Performance Approach.** If the applicant chooses the performance approach, the applicant shall select one of the following energy budget calculation methodologies to demonstrate compliance with the general compliance requirements:

(1) **Building Envelope Only.** Model the building envelope only using a state-approved energy compliance software program and demonstrate that the TDV Energy of the sum of the Space Heating, Space Cooling and Indoor Fans energy components of the proposed building is at least 15.0% less than the TDV Energy of the sum of the Space Heating, Space Cooling and Indoor Fans energy components of the standard building; or,

(2) **Building Envelope and Mechanical System.** Model the building envelope and mechanical system using a state-approved energy compliance software program and demonstrate that the TDV Energy of the sum of the Space Heating, Space Cooling, Indoor Fans, Pump and Heat Rejection energy components of the proposed building is at least 15.0% less than the TDV Energy of the sum of the Space Heating, Space Cooling, Indoor Fans, Pump and Heat Rejection energy components of the standard building.

2. **Additions to High-Rise Residential Buildings.** When an application for a building permit involves an addition to an existing high-rise residential building, this general compliance requirement may be met by either of the following methods:

a. Using the performance approach specified in Section 151 of the 2005 Building Energy Efficiency Standards to demonstrate that the TDV Energy of the proposed addition is at least 15.0% less than the TDV Energy of the standard design, or

b. Using the “Existing+Addition +Alteration” calculation method to demonstrate that the TDV Energy for the sum of the energy components for the proposed building specified in either b(1) or b(2) above is at least 15.0% less than the TDV Energy for the sum of the same energy components of the standard design.

C. **NONRESIDENTIAL AND HOTEL/MOTEL OCCUPANCIES.** Applications for building permits that involve new nonresidential buildings or hotel/motel occupancies or additions to existing nonresidential buildings or hotel/motel occupancies where the additions are greater than 100 square feet of conditioned floor area shall demonstrate compliance with the general compliance requirements as follows:

1. **New Nonresidential Buildings or Hotel/Motel Occupancies.** When an application for a building permit involves a new nonresidential building or a new building housing a hotel/motel occupancy, compliance with the general compliance requirements established by this Chapter may be demonstrated by using either the prescriptive approach or performance approach as specified below:

a. **Prescriptive Approach.** Subject to the exceptions listed below and the provisions of the 2005 Building Energy Efficiency Standards, the prescriptive approach requires compliance with the prescriptive envelope requirement and/or the prescriptive indoor lighting requirement, depending upon the work proposed in the permit application, as specified below:

(1) **Prescriptive Envelopment Requirement.** The Overall Envelope Approach in Section 143(b) of the 2005 Building Energy Efficiency Standards shall be used to demonstrate that the Overall Heat Gain of the proposed building is at least 10.0% less than the Overall Heat Gain of the standard building; and the Overall Heat Loss of the proposed building is at least 10.0% less than the Overall Heat Loss of the standard building, and

(2) **Prescriptive Indoor Lighting Requirement.** The “Prescriptive Requirements for Indoor Lighting” contained in Section 146 of the 2005 Building Energy Efficiency Standards that apply to conditioned spaces shall be used to demonstrate that the Adjusted Actual (Installed) Watts are at least 10.0% less than the Total Allowed Watts.

(i) **Tailored Method Exception.** When using the Tailored Method in retail stores to determine compliance with the prescriptive requirements for indoor lighting, Display Lighting watts may be omitted from the above calculation.

(ii) **Small Alterations Exception.** Lighting alterations which encompass a gross conditioned floor area equal to or less than 100 square feet are exempt from the prescriptive indoor lighting requirement.

b. **Performance Approach.** When using the performance approach to demonstrate compliance with the general compliance requirements, the permit applicant shall select one of the following calculation methodologies:

(1) **Building Envelope Only.** Model the building envelope only for compliance using a state-approved energy compliance software program and demonstrate that the TDV Energy of the sum of the Space Heating, Space Cooling and Indoor Fans energy components of the proposed building is at least 10.0% less than the TDV Energy of the sum of the Space Heating, Space Cooling and Indoor Fans energy components of the standard building; or,

(2) **Building Envelope and Mechanical System.** Model the building envelope and mechanical system for compliance using a state-approved energy compliance software program and demonstrate that the TDV Energy of the sum of the Space Heating, Space Cooling, Indoor Fans, Pump and Heat Rejection energy components of the proposed building is at least 10.0% less than the TDV Energy of the sum of the Space Heating, Space Cooling, Indoor Fans, Pump and Heat Rejection energy components for the standard building, or,

(3) **Building Envelope and Lighting.** Model the building envelope and lighting for compliance using a state-approved energy compliance software program and demonstrate that the TDV Energy of the sum of the Space Heating, Space Cooling, Indoor Fans and Lighting energy components of the proposed building is at least 10.0% less than the TDV Energy of the sum of the Space Heating, the Space Cooling, Indoor Fans and Lighting energy components of the standard building; or,

(4) **Building Envelope, Lighting, and Mechanical System.** Model the building envelope, lighting and mechanical system for compliance using a state-approved energy compliance software program and demonstrate that the TDV Energy of the sum of the Space Heating, Space Cooling, Lighting, Indoor Fans, Pump and Heat Rejection energy components of the proposed building is at least 10.0% less than the TDV Energy of the sum of the Space Heating, Space Cooling, Lighting, Indoor Fans, Pump and Heat Rejection energy components of the standard building.

2. **Additions to Existing Nonresidential Buildings or Hotel/Motel Occupancies.** When an application for a building permit involves an addition to an

existing nonresidential building or an existing building housing a hotel/motel occupancy, this general compliance requirement may be met by either of the following methods:

a. Using one of the performance approach methodologies specified above in subparagraph 1.b above to demonstrate that the TDV Energy of the sum of the energy components for the proposed addition specified in any one of the paragraphs 1.b(1)-(4) above is at least 10.0% less than the sum of the same energy components of the standard design, or

b. Using the “Existing+Addition +Alteration” calculation method to demonstrate that the TDV Energy of the sum of the energy components for the proposed building specified in any one of the paragraphs 1.b.(1)-(4) above is at least 10.0% less than the sum of the same energy components of the standard design.

D. **DOCUMENTATION.** In order to demonstrate compliance with the requirements of this Section, a permit applicant may be required to submit supplementary forms and documentation in addition to the building drawings, specifications, and standard Title 24 report forms, as deemed appropriate by the Building Official.

## **22.82.070 Credit for Solar Photovoltaic Energy Systems.**

A. **NOT ALLOWED TO DEMONSTRATE COMPLIANCE WITH STATE STANDARDS.** A photovoltaic TDV Energy credit shall not be used to demonstrate compliance with the 2005 Building Energy Efficiency Standards.

B. **CREDIT ALLOWED TO SATISFY A PORTION OF THE GENERAL COMPLIANCE REQUIREMENTS.** A photovoltaic credit may be used to reduce the TDV Energy use of a proposed building or addition in order to satisfy the general compliance requirements of this Chapter as follows:

1. **Low-Rise Residential Buildings.** An application for a new low-rise residential building or an addition to an existing low-rise residential building may use a photovoltaic credit in order to demonstrate compliance with the general compliance requirements of this Chapter only after the TDV Energy of the proposed building or addition, calculated without the photovoltaic credit, is at least 15.0% less than the TDV Energy of the standard building or design.

2. **High-Rise Residential Buildings.** An application for a new high-rise residential building or an addition to an existing high-rise residential building may use a photovoltaic credit in order to demonstrate compliance with the general compliance requirements of this Chapter only after the TDV Energy of the proposed building or addition, calculated without the photovoltaic credit, is at least 10.0% less than the TDV Energy of the standard building or design.

3. **Nonresidential Buildings and Hotel/Motel Occupancies.** An application for a new nonresidential building or a new hotel/motel occupancy or an addition to an

existing nonresidential building or an existing hotel/motel occupancy may use a photovoltaic credit in order to demonstrate compliance with the general compliance requirements of this Chapter only after the TDV Energy of the proposed building or addition, calculated without the photovoltaic credit, is at least 5.0% less than the TDV Energy of the standard building or design.

**C. CALCULATION OF PHOTOVOLTAIC CREDIT.**

1. **Performance Approach Required.** In order to request a photovoltaic credit pursuant to this Section, an applicant for a building permit must use an applicable performance approach methodology specified in Section 22.82.050 to demonstrate compliance with the general compliance requirements of this Chapter.

2. **Calculation Inputs.** When using the CECPV Calculator to calculate a photovoltaic credit, the permit applicant shall input “Site-Specific Detailed Input” including roof pitch (or tilt), the azimuth and the site shading conditions.

3. **Documentation.** In order to receive a photovoltaic credit, an applicant for a building permit must include a copy of the CF-1R-PV form generated by the CECPV Calculator on the plans submitted for a building permit.

**22.82.080 Expiration.**

This Chapter 22.82 shall expire upon the date that the state’s 2008 Building Energy Efficiency Standards take effect.

**Appendix A: City of Santa Barbara Compliance Forms/Spreadsheets**

*(Electronic spreadsheets and printed forms to be provided by the City.)*

Project Name/Address:	<b>Sample House</b>	
Date of Title 24 Report:	<b>9/18/07</b>	Conditioned Floor Area (SF): <b>2,000</b>

**1. Calculate Santa Barbara Energy Ordinance Standard Design:**

<b>Standard Design Total TDV Kbtu/sf-yr</b> <div style="border: 1px solid black; background-color: yellow; padding: 2px; width: 150px; margin: 5px auto;">27.00</div> <i>[from Part 1, CF-1R: see Note 1 below]</i>	x	<b>Adjustment Factor</b> <div style="border: 1px solid black; padding: 2px; width: 100px; margin: 5px auto;">0.80</div>	=	<b>Revised Standard Design Total TDV Kbtu/sf-yr</b> <div style="border: 1px solid black; padding: 2px; width: 100px; margin: 5px auto;">21.60</div> <i>[used in Step #4]</i>
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**2. Calculate Solar Photovoltaic (PV) System Credit in the Proposed Design:**

*When a proposed solar PV system is to receive credit under the Santa Barbara Ordinance.*

<b>Annual TDV Production (TDV Kbtu/year)</b> <div style="border: 1px solid black; background-color: yellow; padding: 2px; width: 150px; margin: 5px auto;">15,000</div> <i>[used in Step #3]</i>	This value is obtained using the CEC PV Calculator, Version 2.1 or higher at: <a href="http://www.gosolarcalifornia.ca.gov/nshpcalculator/download_calculator.html">http://www.gosolarcalifornia.ca.gov/nshpcalculator/download_calculator.html</a>
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**3. Calculate Santa Barbara Energy Ordinance Proposed Design:**

<b>Proposed Design Total TDV Kbtu/sf-yr</b> <div style="border: 1px solid black; background-color: yellow; padding: 2px; width: 150px; margin: 5px auto;">22.41</div> <i>[from Part 1, CF-1R; see Note 1 below]</i>	-	<b>Solar PV Credit (TDV Kbtu/sf-yr)</b> 7.50	=	<b>Revised Proposed Design Total TDV Kbtu/sf-yr</b> <div style="border: 1px solid black; padding: 2px; width: 100px; margin: 5px auto;">14.91</div> <i>[used in Step #4]</i>
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**Proposed Design TDV  
Energy (above) may  
not be greater than:**

22.95	YES
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**4. Verify Santa Barbara General Compliance Requirement:**

**BUILDING COMPLIES?** YES

Note 1: This value must always include DHW energy use, except in the E+A+A method when there is no change in the existing water heater(s).

*Revised 9/18/07*

## Nonresidential Prescriptive Form: Santa Barbara Energy Ordinance SB-NR

Project Name/Address:	<b>Sample Nonresidential Project</b>		
Date of Title 24 Report:	<b>9/18/07</b>	Conditioned Floor Area (SF):	<b>9,000</b>

### ENVELOPE SUMMARY

**1. Calculate Revised Standard Overall Heat Gain (HG)**

<b>Standard Overall Total Heat Gain (HG)</b>					<b>Revised Standard Overall Total Heat Gain (HG)</b>
<b>100,000</b>	x	0.90			<b>90,000</b>
<i>[from ENV-3-C, Part 6 of 7, Column N]</i>					
<b>Proposed Heat Gain must be = or &lt; Revised Standard Heat Gain:</b>					
					<b>85,000</b>
<i>[from ENV-3-C, Part 6 of 7, Column I]</i>					

**2. Calculate Revised Standard Overall Heat Loss (HL)**

<b>Standard Overall Total Heat Gain (HL)</b>					<b>Revised Standard Overall Total Heat Gain (HL)</b>
<b>100</b>	x	0.90			<b>90</b>
<i>[from ENV-3-C, Part 3 of 7, Column H]</i>					
<b>Proposed Heat Loss must be = or &lt; Revised Standard Heat Loss:</b>					
					<b>85</b>
<i>[from ENV-3-C, Part 3 of 7, Column E]</i>					

### LIGHTING SUMMARY

**3. Calculate Revised Standard Allowed Lighting Power (Excluding Unconditioned Spaces)**

<b>Total Allowed Watts</b>					<b>Revised Total Allowed Watts</b>
<b>8,200</b>	x	0.90			<b>7,380</b>
<i>[from LTG-1-C, Part 2 of 4; if using the Tailored Method, Line #1 from LTG-6-C, "Watts for Illuminance Categories"]</i>					
<b>Installed Watts must be = or &lt; Revised Standard Allowed Watts:</b>					
					<b>7,200</b>
<i>[from LTG-1-C, Part 2 of 4, Column I; <u>excludes</u> installed Display Lighting watts]</i>					

*Revised 9/18/07*

**Highrise Residential Prescriptive Form: Santa Barbara Ordinance SB-NR**

Project Name/Address:	<b>Sample Highrise Residential Project</b>		
Date of Title 24 Report:	<b>10/3/07</b>	Conditioned Floor Area (SF):	<b>9,000</b>

**ENVELOPE SUMMARY**

**1. Calculate Revised Standard Overall Heat Gain (HG)**

<b>Standard Overall Total Heat Gain (HG)</b>				<b>Revised Standard Overall Total Heat Gain (HG)</b>
<b>100,000</b>	x	0.85		<b>85,000</b>
<i>[from ENV-3-C, Part 6 of 7, Column N]</i>				

**Proposed Heat Gain must be = or < Revised Standard Heat Gain:** **83,000**  
*[from ENV-3-C,  
Part 6 of 7, Column I]*

**2. Calculate Revised Standard Overall Heat Loss (HL)**

<b>Standard Overall Total Heat Gain (HL)</b>				<b>Revised Standard Overall Total Heat Gain (HL)</b>
<b>100</b>	x	0.85		<b>85</b>
<i>[from ENV-3-C, Part 3 of 7, Column H]</i>				

**Proposed Heat Loss must be = or < Revised Standard Heat Loss:** **80**  
*[from ENV-3-C,  
Part 3 of 7, Column E]*

*Revised 10/3/07*

# Nonresidential Performance Form: Santa Barbara Ordinance SB-NR-PERF

Not to be used for High-rise Residential and Hotel/Motel Occupancies

Project Name/Address:	Sample Nonresidential Project		
Date of T24 Report:	9/18/07	Conditioned Floor Area (SF):	9,000

## 1. Input Data from Part 2 of 3, PERF-1 Form (from an approved Nonresidential ACM)

Energy Component	Partial Standard Design TDV KBtu/sf-yr	Partial Proposed Design TDV KBtu/sf-yr	Instructions
Space Heating	0.27	0.22	Input Space Heating for every project.
Space Cooling	86.49	78.71	Input Space Cooling for every project.
Indoor Fans	54.35	54.13	Input Indoor Fans for every project.
Heat Rejection	0.00	0.00	Input Heat Rejection if including Mechanical compliance.
Pumps & Misc.	0.00	0.00	Input Pumps & Misc. if including Mechanical compliance.
Lighting	165.45	149.09	Input Lighting if including Lighting compliance.
<b>TOTALS:</b>	<b>306.56</b>	<b>282.15</b>	

Partial Proposed Design TDV Energy

(above) may not be greater than:

<b>291.23</b>
<b>YES</b>

## 2. Calculate Solar Photovoltaic (PV) System Credit in the Proposed Design:

When a proposed solar PV system is to receive credit under the Santa Barbara Ordinance.

Annual TDV Production is obtained using the CEC PV Calculator, Version 2.1 or higher at:

[http://www.gosolarcalifornia.ca.gov/nshpcalculator/download\\_calculator.html](http://www.gosolarcalifornia.ca.gov/nshpcalculator/download_calculator.html)

<b>Annual TDV Production (TDV KBtu/year)</b>	<b>Solar PV Credit (TDV KBtu/sf-yr)</b>
100,000	11.11
	<i>[used in Step #3]</i>

## 3. Verify Compliance With Santa Barbara Energy Ordinance:

<b>Revised Partial Standard Design TDV KBtu/sf-yr</b>	<b>= or &gt;</b>	<b>Revised Partial Proposed Design TDV KBtu/sf-yr</b>
275.90		271.04

**BUILDING COMPLIES?** **YES**

Revised 9/18/07

# Highrise Residential Performance Form: Santa Barbara Ordinance SB-NR-PERF

Not to be used for Nonresidential and Hotel/Motel Occupancies

Project Name/Address:	<b>Sample Highrise Residential Project</b>		
Date of T24 Report:	<b>10/3/2007</b>	Conditioned Floor Area (SF):	<b>9,000</b>

## 1. Input Data from Part 2 of 3, PERF-1 Form (from an approved Nonresidential ACM)

Energy Component	Partial Standard Design TDV KBtu/sf-yr	Partial Proposed Design TDV KBtu/sf-yr	Instructions
Space Heating	0.27	0.22	Input Space Heating for every project.
Space Cooling	86.49	78.71	Input Space Cooling for every project.
Indoor Fans	54.35	54.13	Input Indoor Fans for every project.
Heat Rejection	0.00	0.00	Input Heat Rejection if including Mechanical compliance.
Pumps & Misc.	0.00	0.00	Input Pumps & Misc. if including Mechanical compliance.
Lighting	165.45	149.09	Input Lighting if including Lighting compliance.
<b>TOTALS:</b>	<b>306.56</b>	<b>282.15</b>	

Partial Proposed Design TDV Energy  
(above) may not be greater than:

<b>291.23</b>
<b>YES</b>

## 2. Calculate Solar Photovoltaic (PV) System Credit in the Proposed Design:

When a proposed solar PV system is to receive credit under the Santa Barbara Ordinance, Annual TDV Production is obtained using the CEC PV Calculator, Version 2.1 or higher at: [http://www.gosolarcalifornia.ca.gov/nshpcalculator/download\\_calculator.html](http://www.gosolarcalifornia.ca.gov/nshpcalculator/download_calculator.html)

<b>Annual TDV Production (TDV KBtu/year)</b>	<b>Solar PV Credit (TDV KBtu/sf-yr)</b>
<b>200,000</b>	<b>22.22</b>
	<i>[used in Step #3]</i>

## 3. Verify Compliance With Santa Barbara Energy Ordinance:

<b>Revised Partial Standard Design TDV KBtu/sf-yr</b>	<b>= or &gt;</b>	<b>Revised Partial Proposed Design TDV KBtu/sf-yr</b>
<b>260.58</b>		<b>259.93</b>

**BUILDING COMPLIES? YES**

Revised 10/3/07