

Application for:

**Revised Locally Adopted Energy Standards by the
County of Marin Community Development Agency
for Single Family Homes in Accordance With Section 10-106
of the California Code of Regulations, Title 24, Part 1**

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Executive Summary

The County of Marin Community Development Agency developed a *Single Family Dwelling Energy Efficiency Ordinance* to reduce the annual energy consumption and peak electric and natural gas loads of large homes. That Ordinance based on the state's 2005 energy standards and approved by the Commission on September 21, 2005 is now being revised. The revision maintains the increasingly stringent energy efficiency requirements for larger homes, but also requires that all single family homes greater than 1500 square feet exceed the 2005 Title 24 standards by at least 15%.

The Marin County Board of Supervisors approved the new requirements of the revised Ordinance on March 25th, 2008. The County is eager for the revised Ordinance to take effect on July 3rd, 2008. In order to meet that time line, the County requests that the Commission approve the revised Ordinance no later than June 4th.

The County has retained Gabel Associates, LLC to revise the existing ordinance to ensure consistency with the state's energy standards. Implementation of the revised ordinance has been designed with several criteria in mind. These include:

- Consistency with the structure, format and calculation methods of the 2005 Title 24 Building Energy Efficiency Standards;
- Requiring that all homes 1,500 square feet and greater exceed the standards by at least 15%; and that all additions and substantial remodels¹ which utilize the Existing + Addition + Alteration compliance approach in homes 1,500 square feet and greater exceed the standards by at least 15%.
- Meeting the intent of the proposed Ordinance by demonstrating that the level of energy consumption of homes larger than 3,500 sf use no more total TDV energy under the standards than an equivalent 3,500 sf house;
- SimpliCounty and clarity for building department enforcement for both energy plan review and field inspection;

Note 1:

The County of Marin has its own legal definition of "substantial remodel" in Title 16 of the Marin County Code which it has used for many years with respect to the local fire safety, building and environmental health permit process as a reasonable threshold at which specified proportionate public health, safety and welfare measures may be required:

"Substantial Remodel" shall mean the renovation of any structure, which combined with specified additions to the structure, affects a floor area which exceeds fifty percent of the existing floor area of the structure within any 12 month period. When any changes are made in the building, such as walls, columns, beams or girders, floor or ceiling joists and coverings, roof rafters, roof diaphragms, foundations, piles or retaining walls or similar components, the floor area of all rooms affected by such changes shall be included in computing floor areas for the purposes of applying this definition. This definition does not apply to the replacement and upgrading of residential roof or floor coverings, or the installation of earthquake retrofit, energy efficiency, or solar energy measures.

- The provision of maximum flexibility for building permit applicants in meeting the Ordinance by one or more design approaches: (a) energy conservation measures, including glazing properties and glazing orientation; (b) installation of a solar photovoltaic (PV) system or other alternative energy systems; and/or (c) reduction of total conditioned floor area; and,
- A renewed effort by the local building department to properly and consistently enforce the 2005 Building Energy Efficiency Standards, as well as the additional locally adopted requirements.

This Application to the California Energy Commission follows 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 takes effect only after the Commission has reviewed and formally approved the proposed local energy standards in meeting all requirements of Section 10-106.

Statement per Section 10-106(b)3. The proposed Ordinance will require that all residential buildings are designed to consume no more TDV energy than permitted by Title 24, Part 6. Under the proposed ordinance, *residential single-family buildings over 3,500 square feet of total conditioned area will consume less energy than the 2005 Building Energy Efficiency Standards require.*

For any detailed questions concerning the development methodology or the descriptions outlined in this application, please contact Michael Gabel at Gabel Associates, LLC.

2.0 Impacts of the Revised Ordinance

The following methodology and assumptions are used in evaluating the impact of the Ordinance on single family homes less than the new 4,500 square foot threshold. Homes above 4,500 square feet are required to meet the same energy efficiency criteria which have been in force since the local Ordinance took effect on October 1, 2005.

Home Designs. Four actual home designs (1418 SF, 1775 SF, 2682 SF and 3024 SF) submitted to another local building department in the North Bay have been modeled in an effort to determine the cost-effectiveness of the revised Marin County Ordinance. Each design, as summarized below, just meets the 2005 Building Energy Efficiency Standards. Other energy designs were developed to just meet the proposed Marin energy ordinance. The increased energy measures, their first cost and their resulting annual energy cost savings were then evaluated to determine a simple payback period.

1,418 SF (A/B) 2-story home, without duct sealing and testing, **26.83% fenestration** area:

- R-38 roof with radiant barrier
- R-13 exterior walls
- R-30 raised floor
- Vinyl Low-E windows, U=0.35, SHGC=0.35 w/ a few small overhangs
- Furnace: 80% AFUE / No Cooling
- R-6 ducts in the attic
- DHW: 50 gallon gas water heater, EF=0.62; no pipe insulation beyond mandatory

1,418 SF (C/D) 2-story home, with duct sealing and testing, **26.83% fenestration** area:

- R-30 roof with no radiant barrier
- R-13 exterior walls
- R-19 raised floor
- Vinyl Low-E windows, U=0.35, SHGC=0.35 w/ a few small overhangs
- Furnace: 80% AFUE / No Cooling
- R-6 ducts in the attic
- DHW: 50 gallon gas water heater, EF=0.58; no pipe insulation beyond mandatory

1,775 SF 2-story home as designed, **12.96% fenestration** area:

- R-30 roof (attic and vaulted) with no radiant barrier
- R-13 and R-19 exterior walls (approx. 50% each type)
- 31% of house footprint R-19 raised floor
- 69% of house footprint covered slab floor
- Vinyl Low-E windows, U=0.40, SHGC=0.38 w/ one overhang
- Furnace: 90% AFUE
- Air conditioner: 13.0 SEER (minimum efficiency)
- R-6 ducts in the attic
- DHW: 50 gallon gas water heater, EF=0.62; no pipe insulation beyond mandatory

2,682 SF 2-story home as designed, 22.26% fenestration area:

- R-38 roof with no radiant barrier
- R-13 exterior walls
- Covered slab-on-grade floor
- Vinyl Low-E windows: U=0.35, SHGC=0.33 w/ some overhangs and U=0.40, SHGC=0.40 with some overhangs
- Furnace: 80% AFUE
- Air conditioner: 13.0 SEER (minimum efficiency)
- R-6 ducts in the attic
- DHW: 50 gallon gas water heater, EF=0.58; no pipe insulation beyond mandatory

3,024 SF 2-story home as designed, 22.91% fenestration area:

- R-38 roof with no radiant barrier
- R-13 exterior walls
- 78% of footprint is covered slab floor; 22% of footprint is R-19 raised floor
- Vinyl Low-E windows: U=0.35, SHGC=0.33 w/ some overhangs and U=0.40, SHGC=0.40 with some overhangs
- Furnace: 80% AFUE / No Cooling
- R-6 ducts in the attic
- DHW: 50 gallon gas water heater, EF=0.58; no pipe insulation beyond mandatory

Low-rise Residential Energy Measures Needed to Meet the County'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 15% less TDV energy than the Title 24 standard design.

1418 SF (A), No Cooling

• Reduced duct leakage [HERS]: incremental cost =	\$ 500 (no sampling)
• Reduced building leakage, SLA=3.0: incremental cost =	\$ 400 (no sampling)
• <u>Kitchen Pipe Insulation: incremental cost =</u>	<u>\$ 100</u>
Total incremental cost:	\$1000
Incremental cost, \$/SF:	\$ 0.71/sf

With Sampling of HERS Measures (assumes an average of one in five homes verified):

• Reduced duct leakage [HERS]: incremental cost =	\$ 300 (sampling)
• Reduced building leakage, SLA=3.0: incremental cost =	\$ 400 (sampling)
• <u>Kitchen Pipe Insulation: incremental cost =</u>	<u>\$ 100</u>
Total incremental cost:	\$ 800
Incremental cost, \$/SF:	\$ 0.56/sf

1418 SF (B), No Cooling

• Reduced duct leakage [HERS]: incremental cost =	\$ 500 (no sampling)
• Super Low-E windows, SHGC=0.23: incremental cost =	\$ 540
• <u>Kitchen Pipe Insulation: incremental cost =</u>	<u>\$ 100</u>
Total incremental cost:	\$1140
Incremental cost, \$/SF:	\$ 0.80/sf

With Sampling of HERS Measures (assumes an average of one in five homes verified):

• Reduced duct leakage [HERS]: incremental cost =	\$ 300 (sampling)
• Super Low-E windows, SHGC=0.23: incremental cost =	\$ 540
• <u>Kitchen Pipe Insulation: incremental cost =</u>	<u>\$ 100</u>
Total incremental cost:	\$ 940
Incremental cost, \$/SF:	\$ 0.66/sf

1418 SF (C), No Cooling: Base Case includes duct sealing

• Reduced building leakage, SLA=3.0: incremental cost =	\$ 500 (no sampling)
• Super Low-E windows, SHGC=0.23: incremental cost =	\$ 540
• <u>0.62 EF water heater: incremental cost =</u>	<u>\$ 250</u>
Total incremental cost:	\$1290
Incremental cost, \$/SF:	\$ 0.91/sf

With Sampling of HERS Measures (assumes an average of one in five homes verified):

• Reduced building leakage, SLA=3.0: incremental cost =	\$ 300 (sampling)
• Super Low-E windows, SHGC=0.23: incremental cost =	\$ 540
• <u>0.62 EF water heater: incremental cost =</u>	<u>\$ 250</u>
Total incremental cost:	\$1090
Incremental cost, \$/SF:	\$ 0.77/sf

1418 SF (D), No Cooling: Base Case includes duct sealing

• R-38 attic insulation: incremental cost =	\$ 130
• Super Low-E windows, SHGC=0.23: incremental cost =	\$ 540
• <u>0.80 EF water heater: incremental cost =</u>	<u>\$1100</u>
Total incremental cost:	\$1770
Incremental cost, \$/SF:	\$ 1.25/sf

1775 SF, No Cooling

- Roof radiant barrier: incremental cost = \$ 245
 - Reduced duct leakage [HERS]: incremental cost = \$ 550 (no sampling)
 - Reduced building leakage, SLA=3.0: incremental cost = \$ 400 (no sampling)
 - Some R-21 wall and R-30 floor insulation: incremental cost = \$ 70
 - All Pipe Insulation: incremental cost = \$ 200
- Total incremental cost: \$1465
Incremental cost, \$/SF: \$ 0.83/sf

With Sampling of HERS Measures (assumes an average of one in five homes verified):

- Roof radiant barrier: incremental cost = \$ 245
 - Reduced duct leakage [HERS]: incremental cost = \$ 325 (sampling)
 - Reduced building leakage, SLA=3.0: incremental cost = \$ 280 (sampling)
 - Some R-21 wall and R-30 floor insulation: incremental cost = \$ 70
 - All Pipe Insulation: incremental cost = \$ 200
- Total incremental cost: \$1120
Incremental cost, \$/SF: \$ 0.63/sf

1775 SF, w/ Cooling

- Reduced duct leakage [HERS]: incremental cost = \$ 550 (no sampling)
 - Reduced building leakage, SLA=3.0: incremental cost = \$ 400 (no sampling)
 - TXV Verification: incremental cost = \$ 50 (no sampling)
 - EER Verification: incremental cost = \$ 50
- Total incremental cost: \$1050
Incremental cost, \$/SF: \$ 0.59/sf

With Sampling of HERS Measures (assumes an average of one in five homes verified):

- Reduced duct leakage [HERS]: incremental cost = \$ 325 (sampling)
 - Reduced building leakage, SLA=3.0: incremental cost = \$ 280 (sampling)
 - TXV Verification: incremental cost = \$ 50 (sampling)
 - EER Verification: incremental cost = \$ 50
- Total incremental cost: \$ 705
Incremental cost, \$/SF: \$ 0.40/sf

2682 SF, No Cooling

- Reduced duct leakage [HERS]: incremental cost = \$ 650 (no sampling)
 - Reduced building leakage, SLA=3.0: incremental cost = \$ 400 (no sampling)
 - 0.62 EF water heater: incremental cost = \$ 250
- Total incremental cost: \$1300
Incremental cost, \$/SF: \$ 0.48/sf

With Sampling of HERS Measures (assumes an average of one in five homes verified):

- Reduced duct leakage [HERS]: incremental cost = \$ 375 (sampling)
 - Reduced building leakage, SLA=3.0: incremental cost = \$ 300 (sampling)
 - 0.62 EF water heater: incremental cost = \$ 250
- Total incremental cost: \$ 925
Incremental cost, \$/SF: \$ 0.34/sf

2682 SF, w/ Cooling

- Reduced duct leakage [HERS]: incremental cost = \$ 650 (no sampling)
 - TXV Verification: incremental cost = \$ 50 (no sampling)
 - EER Verification: incremental cost = \$ 50
 - 0.62 EF water heater: incremental cost = \$ 250
- Total incremental cost: \$1000
Incremental cost, \$/SF: \$ 0.37/sf

With Sampling of HERS Measures (assumes an average of one in five homes verified):

- Reduced duct leakage [HERS]: incremental cost = \$ 375 (sampling)
 - TXV Verification: incremental cost = \$ 10 (sampling)
 - EER Verification: incremental cost = \$ 50
 - 0.62 EF water heater: incremental cost = \$ 250
- Total incremental cost: \$ 685
Incremental cost, \$/SF: \$ 0.26/sf

3024 SF, No Cooling

- Reduced duct leakage [HERS]: incremental cost = \$ 700 (no sampling)
 - Reduced building leakage, SLA=3.0: incremental cost = \$ 400 (no sampling)
 - 0.62 EF water heater: incremental cost = \$ 250
- Total incremental cost: \$1350
Incremental cost, \$/SF: \$ 0.45/sf

With Sampling of HERS Measures (assumes an average of one in five homes verified):

- Reduced duct leakage [HERS]: incremental cost = \$ 400 (sampling)
 - Reduced building leakage, SLA=3.0: incremental cost = \$ 300 (sampling)
 - 0.62 EF water heater: incremental cost = \$ 250
- Total incremental cost: \$ 950
Incremental cost, \$/SF: \$ 0.31/sf

3024 SF, w/ Cooling

• Reduced duct leakage [HERS]: incremental cost =	\$ 700 (no sampling)
• TXV Verification: incremental cost =	\$ 50 (no sampling)
• EER Verification: incremental cost =	\$ 50
• <u>0.62 EF water heater: incremental cost =</u>	<u>\$ 250</u>
Total incremental cost:	\$1050
Incremental cost, \$/SF:	\$ 0.35/sf

With Sampling of HERS Measures (assumes an average of one in five homes verified):

• Reduced duct leakage [HERS]: incremental cost =	\$ 400 (sampling)
• TXV Verification: incremental cost =	\$ 50 (sampling)
• EER Verification: incremental cost =	\$ 50
• <u>0.62 EF water heater: incremental cost =</u>	<u>\$ 250</u>
Total incremental cost:	\$ 750
Incremental cost, \$/SF:	\$ 0.25/sf

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 Marin requirements including:

- Additional HERS measures such as insulation quality, duct design and proper cooling equipment sizing;
- Thermal mass credit for slab-on-grade construction 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 Marin climate zone; and,
- Credit for zonal controls for living and sleeping zones within a home.

3.0 Cost Effectiveness

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 Marin 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 **\$0.163/kWh** for electric and **\$1.30/therm** for natural gas.

Table 3-1a: Summary of Energy Savings from Marin County Energy Measures

House Design	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Electricity Cost Savings (\$)	Nat. Gas Cost Savings (\$)	Total Annual Cost Savings (\$)
1418sf (A), No Cooling	114	96	\$19	\$125	\$ 144
1418sf (B), No Cooling	468	23	\$76	\$30	\$ 106
1418sf (C), No Cooling	410	31	\$67	\$40	\$ 107
1418sf (D), No Cooling	417	35	\$68	\$46	\$ 114
1775sf, No Cooling	197	83	\$32	\$108	\$ 140
1775sf, w/ Cooling	244	72	\$40	\$94	\$ 134
2682sf, No Cooling	158	166	\$26	\$216	\$ 242
2682sf, w/ Cooling	226	119	\$37	\$155	\$ 192
3024sf, No Cooling	81	172	\$13	\$224	\$ 237
3024sf, w/ Cooling	144	124	\$23	\$187	\$ 210

Table 3-1b: Summary of Simple Payback for Marin County Energy Measures

House Design	Incremental First Cost Compared w/ Title 24 House (\$) ¹	Net Incremental Annual Energy Cost Saving (\$) ²	Simple Payback ^{1,3} (Years)
1,418 sf (A), No Cooling	\$800 - \$1000	\$115 - \$108	7.0 – 9.3
1,418 sf (B), No Cooling	\$940 - \$1140	\$73 - \$66	12.9 – 17.3
1,418 sf (C), No Cooling	\$1090 - \$1290	\$69 - \$62	15.8 – 20.8
1,418 sf (D), No Cooling	\$1770	\$51	34.7
1,775 sf, No Cooling	\$1120 - \$1465	\$101 - \$89	11.1 – 16.6
1,775 sf, w/ Cooling	\$705 - \$1050	\$108 - \$96	6.5 – 10.9
2,682 sf, No Cooling	\$925 - \$1300	\$210 - \$197	4.4 – 6.6
2,682 sf, w/ Cooling	\$685 - \$1000	\$168 - \$157	4.1 – 6.4
3,024 sf, No Cooling	\$950 - \$1350	\$204 - \$190	4.7 – 7.1
3,024 sf, w/ Cooling	\$750 - \$1050	\$185 - \$174	4.1 – 6.0
Simple Averages:	\$1078, \$0.55/SF	\$112	9.6

Note 1: The minimum value assumes a production home scenario in which no more one in five homes is used as a sample in verifying all HERS measures.

Note 2: This value is the Incremental Annual Energy Cost shown in Table 3-1a reduced by the average after-tax interest paid on a 6% APR mortgage loan covering the Incremental First Cost (30-year fixed loan, averaged over the first 20 years of the loan representing the average useful life of the energy measures).

Note 3: Simple Payback assumes that a homeowner pays to build their home, and that the added cost of energy measures will be paid back in utility bill savings. This assumption may not be applicable to builders who may not be able to recapture the extra cost of energy measures in the sale of a home.

Based on this data, the Ordinance increases the cost of construction by approximately \$0.35 to \$0.75 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.

4.0 Implementation Plan

The implementation of the 2005 Marin County energy ordinance has been simple and relatively seamless. Under the revised Ordinance, the procedure for demonstrating compliance of homes under 4,500 square feet is simply a review of the Residential CF-1R form to ensure that the building exceeds the current standards by at least 15.0%.

For homes 4,500 square feet or greater, permit applicants refer to the Compliance Table which lists the percent (%) better than Title 24 that is required. If solar PV systems are installed as a credit in meeting the local Ordinance requirements, the permit applicant uses the special compliance form provided by the County to document:

- (a) The estimated performance of the solar PV system as calculated by the CEC PV calculator which can be downloaded from the Commission's web site;
- (b) The fact that the house exceeds the Title 24 standards by at least 15% without the solar PV system credit; and,
- (c) That the solar PV credit brings the house into compliance with the energy efficiency requirements of the Ordinance.

The Appendix includes a sample of the Marin County compliance form.

5.0 Language of the 2008 Revised Energy Ordinance

ORDINANCE NO. XXXX

ORDINANCE OF THE MARIN COUNTY BOARD OF SUPERVISORS AMENDING SECTION 19.04.100 ADOPTING ENERGY EFFICIENCY STANDARDS FOR SINGLE FAMILY DWELLINGS

THE BOARD OF SUPERVISORS OF THE COUNTY OF MARIN DOES HEREBY ORDAIN AS FOLLOWS:

SECTION I. Background and Purpose.

In October 2002 the Marin County Board of Supervisors amended the County Building Code to establish local energy efficiency requirements for single family dwellings 3,500 square feet and larger (Ordinance 3356; Code Section 19.04.100). In November 2007 the Marin County Board of Supervisors adopted the Marin Countywide Plan which established goals, policies and programs for reducing greenhouse gas emissions in Marin County including increased energy efficiency requirements for single family dwellings. The residential building sector accounts for 24% of Marin's total greenhouse gas emissions, 49% of Marin's electricity use, and 71% of Marin's natural gas use.

All single family dwellings must meet or exceed the energy requirements contained in the 2005 California Building Energy Efficiency Standards including California Code of Regulations, Title 24, Parts 1 and 6 (the "Current Standards"). This ordinance requires the application of the Current Standards, including but not limited to the definitions, procedures, forms, manuals and alternative calculation methods ("ACM's") associated with the Current Standards.

The purpose of this ordinance is to set minimum energy efficiency standards for single family dwellings in Marin County that exceed the State's Current Standards in order to help meet the energy efficiency and greenhouse gas emissions reduction goals of the County. This ordinance requires all new single family dwellings, additions and substantial remodels resulting in a conditioned floor area of 1,500 square feet or greater, unless exempt under specific provisions of this ordinance, to exceed the Current Standards by 15% or greater. Applicable residential projects less than 4,500 square feet are required to verify a minimum 15% greater energy efficiency while applicable residential projects 4500 square feet or greater are required to verify an increasing degree of energy efficiency greater than 15%, as specified in this ordinance, in order to achieve energy efficiency performance comparable to that of a smaller residential project. Single family dwellings less than 1,500 square feet have relatively small energy and other resource requirements and, thus, are not subject to the requirements of this ordinance. Additionally, residential second units up to 750 square feet and affordable housing dwellings approved by the Director are exempted from the requirements of this ordinance.

SECTION II. Energy Efficiency Standards For Single Family Dwellings.

Section 19.04.100 of the Marin County Code is hereby amended to read as follows:

19.04.100 Energy Efficiency Standards For Single Family Dwellings.

A. Definitions

For the purposes of this section, the following definitions shall apply:

Current Standards. The 2005 California Building Energy Efficiency Standards including California Code of Regulations, Title 24, Parts 1 and 6.

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 *Guidebook Eligibility Criteria and Conditions for Incentives for Solar Energy Systems Senate Bill 1*.

Photovoltaic (PV) Credit. A TDV Energy credit that may be used to achieve compliance with the requirements of this section. 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 energy equivalent to the photovoltaic credit shall be the CECPV Calculator, using the most recent version prior to the permit application date, which may be found at the following web site:
http://www.gosolarcalifornia.ca.gov/nshpcalculator/download_calculator.html

Alternative Proposed Design Credit. An energy credit for alternative energy system designs that may be used to achieve compliance with the requirements of this section subject to approval by the Chief Building Official and the Director of the Marin County Community Development Agency. Alternative energy system designs may include, but are not limited to, any renewable energy system which is not a solar photovoltaic system and any energy-efficiency measures not included in the Title 24 performance analysis which significantly exceed current building practice or applicable minimum state or federal efficiency standards. The permit applicant must submit calculations to document, explain and justify the amount of the credit claimed.

B. Covered Projects.

The provisions of this section shall apply to the following types of building projects for which a building permit is applied for and accepted as complete by the Building and Safety Division after the effective date of this section:

1. New single family dwellings resulting in a total dwelling size of 1,500 square feet or greater of total conditioned floor area.
2. Additions to single family dwellings resulting in a total dwelling size of 1,500 square feet or greater of total conditioned floor area and where Title 24 energy performance documentation is submitted which uses the Existing + Addition or Existing + Addition + Alteration calculation method.
3. Substantial remodels, as defined in this code, to single family dwellings resulting in a total dwelling size of 1,500 square feet or greater of total conditioned floor area and where Title 24 energy performance documentation is submitted which uses the Existing + Alteration or Existing + Addition + Alteration calculation method. (For the purposes of this section, the terms “remodel” and “alteration” are synonymous.)

C. Exemptions.

The following types of building projects shall be exempt from this section:

1. Residential second units of 750 square feet or less.
2. Affordable housing dwellings approved by the Agency Director.

D. Compliance.

A building permit subject to the provisions of this section will not be issued by the Building and Safety Division unless the energy compliance documentation submitted with the permit application meets the requirements of this section. A certificate of occupancy will not be granted until a Certificate of Field Verification and Diagnostic Testing (CF-4R) for the permitted project is submitted to the Building and Safety Division when applicable. A certificate of occupancy will not be granted unless the work authorized under a permit has been constructed in accordance with the approved plans, conditions of approvals and requirements of this section.

E. General Requirements.

1. All single family dwellings subject to the provisions of this section shall exceed the Current Standards using the performance approach by the *percentage (%) indicated in the Compliance Table corresponding to the dwelling's resultant total conditioned floor area and applicable Climate Zone.*

Compliance Table		
Dwelling Size ¹ (Total Conditioned Floor Area)	Buildings in Climate Zone 2 Must Exceed the Current Standards by:	Buildings in Climate Zone 3 Must Exceed the Current Standards by:
1,500 - 4,499 SF	15.0%	15.0%
4,500 – 5,499 SF	17.5%	15.0%
5,500 – 6,499 SF	30.0%	27.0%
6,500 – 7,499 SF	37.0%	33.5%
7,500 – 8,499 SF	43.0%	39.5%
8,500 – 9,499 SF	47.5%	44.0%
9,500 – 10,499 SF	51.5%	48.0%
10,500 – 11,499 SF	55.0%	51.5%
11,500+ SF	57.5%	54.0%

Note 1: All additions and/or substantial remodels in dwellings with a total conditioned floor area of 1,500 square feet or greater, and where compliance with the Title 24 Standards uses the Existing + Addition + Alteration performance method, shall meet the requirements of the Compliance Table.

2. New single family dwellings subject to the provisions of this section shall meet both of the following:
 - a. Exceeding the Current Standards as specified in the Compliance Table, using the performance compliance approach; and,
 - b. Meeting all other provisions applicable to low-rise residential buildings contained in the Current Standards.
3. Additions and/or alterations to single family dwellings subject to the provisions of this section shall meet one of the following requirements:
 - a. The addition and /or alteration shall comply with subsection E.2.; or,
 - b. The energy efficiency of the existing building shall be improved so that the existing building plus the addition and/or alteration meet the requirements listed in the Compliance Table.
4. A building project may use the solar PV Credit and/or the Alternative Proposed Design Credit to meet the requirements of subsection E.1. if the proposed building exceeds the Current Standards using the performance compliance approach by at least 15.0%.
5. In addition to the standard Title 24 report and when a permit applicant is applying for Solar PV Credit or an Alternative Proposed Design Credit, a special compliance and calculation form, which shall be available at the Community Development Agency, documenting compliance with the provisions of this section shall be submitted with the building permit application and included on all plan sets with the CF-1R.
6. HERS field verification and diagnostic testing. All buildings, additions, and remodels subject to the provisions of this section shall be field verified, by a certified HERS rater when required by the Current Standards. Verification shall be in accordance with protocols established in the Residential Field Verification and Diagnostic Testing Regulations Manual. A CF-4R, when required by the Current Standards, shall be submitted to the Building and Safety Division to demonstrate compliance prior to issuance of a certificate of occupancy.

F. Modifications.

Whenever there are practical difficulties involved with carrying out the literal provisions of this Section; the Building Official, in consultation with the Community Development Agency Director, shall be authorized to grant modifications for individual cases, upon application by the owner or owner's representative, provided that the Building Official determine the requested modification is in compliance with the intent and purpose of this section.

SECTION III. Findings Pursuant to Public Resources Code section 25402.2 and Health and Safety Code sections 17958.5, 17958.7 and 18941.5.

To the extent the requirements of this ordinance are deemed to constitute changes or modifications to the requirements of the California Building Standards Code and the other regulations adopted pursuant to Health and Safety Code section 17922, this Board of Supervisors expressly finds that the provisions of this ordinance are reasonably necessary because of local climatic, geological, or topographical conditions as follows. Marin County has two Title 24 climate zones and 24 microclimates. During periods when arctic masses dominate the weather, nighttime lows drop into the high twenties with daytime highs in the thirties. In climate zone three, (Coastal and certain bay areas), fog is a consistent weather pattern that creates a demand for heating even during summer months. In addition, climatic conditions in Kentfield (Climate Zone 2), result in 2774 "heating degree days."

The Average Maximum temperature is over 80°F for the months of June, July, August and September, and during the summer it is not uncommon for temperatures to reach 100°F in some parts of Marin. Climatic conditions in Kentfield, (Climate Zone 2) result in 441 "cooling degree days".

The average house size in Marin is getting larger and using more energy. During the 1970s most home construction was approximately 1,500-2,500 square feet. In the years 1998 through 2001 average house size construction continued to rise to approximately 3,000 - 4,000 square feet. These large houses are using more energy and resources.

Due to local climatic conditions and increasing house size, total residential energy consumption increased from 619 million kWh to 734 million kWh from 1995 to 2000. This 18.5% increase in energy use raises the per capita contribution of costly uncertain energy supplies, pollution, and global warming. Due to local climatic conditions, it is reasonably necessary to enhance the State of California energy code requirements for homes 1,500 square feet or greater.

SECTION IV. Efforts to Enhance Local Compliance.

Given that the purpose of this ordinance is to adopt stricter local energy efficiency standards for the construction of residential buildings within Marin County, the Board of Supervisors recognizes that the adoption of new standards without additional education and training for County staff responsible for enforcement of the standards can diminish compliance and potentially undermine the efficacy of this ordinance. Therefore, in order to ensure greater compliance and enforcement of the applicable energy efficiency standards, to better equip building department staff, and to provide a greater resource to the County's building community, the County will seek out additional education and training opportunities for building department staff in the areas of energy standards, building energy technology and energy code implementation.

SECTION V. Severability.

If any section, subsection, subdivision, paragraph, sentence, clause or phrase of this ordinance, or any part thereof is for any reason held to be unconstitutional or invalid or ineffective by any court of competent jurisdiction, such decision shall not affect the validity or effectiveness of the remaining portions of this ordinance or any part thereof. The County Board of Supervisors hereby declares that it would have passed each section, subsection, subdivision, paragraph, sentence, clause or phrase of this ordinance irrespective of the fact that one or more sections, subsections, subdivisions, paragraphs, sentences, clauses or phrases be declared unconstitutional or invalid or effective.

SECTION VI. Effective Date.

This ordinance shall be and is hereby declared to be in full force and effect as of July 3, 2008, or when this ordinance is approved by the California Energy Commission, whichever is later. This ordinance shall be published once before the expiration of fifteen (15) days after its passage, with the names of the supervisors voting for and against the same in the *Marin Independent Journal*, a newspaper of general circulation published in the County of Marin.

PASSED AND ADOPTED at a regular meeting of the Board of Supervisors of the County of Marin held on this ___th day of _____, 2008 by the following vote:

AYES: SUPERVISORS

NOES:

ABSENT:

PRESIDENT, BOARD OF SUPERVISORS

ATTEST:

CLERK

Appendix: Marin County Compliance Form

Project Name/Address:	
Date of Title 24 Report:	Conditioned Floor Area (SF):

1. Calculate Marin County Energy Ordinance Standard Design:

<p>Standard Design ¹ Total TDV KBtu/sf-yr</p> <div style="border: 1px solid black; width: 100%; height: 30px; margin-bottom: 5px;"></div> <p><i>[from Part 1, CF-1R; see Note 1 below]</i></p>	x	<p><i>[Adjustment Factor from Compliance Table below]</i></p> <div style="border: 1px solid black; width: 100%; height: 30px; margin-bottom: 5px;"></div> <p>0.85</p>	=	<p>Adjusted Standard Design Total TDV KBtu/sf-yr</p> <div style="border: 1px solid black; width: 100%; height: 30px; margin-bottom: 5px;"></div> <div style="border: 1px solid black; width: 100%; height: 30px;"></div> <p>Maximum Allowed Proposed Design (TDV Kbtu/sf-yr)</p>	<p><i>[used in Step #4]</i></p> <p><i>[used in Step #2]</i></p>
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Note 1: The Proposed Design and Standard Design values must include DHW energy use, except in the E+A+A method when there is no change in the existing water heater(s).

2. Calculate Solar Photovoltaic (PV) System Credit:

For a solar PV system credit under the Ordinance, Annual Production is obtained using the CEC PV Calculator at: http://www.gosolarcalifornia.ca.gov/nshpcalculator/download_calculator.html

Solar PV Credit may be used only if Proposed Design is = or < the Maximum Allowed Proposed Design.

<p>Annual Production (TDV KWh/yr)</p> <div style="border: 1px solid black; width: 100%; height: 30px; margin-bottom: 5px;"></div>	/ (0.293 x Conditioned Area) =	<p>Solar PV Credit (TDV KBtu/sf-yr)</p> <div style="border: 1px solid black; width: 100%; height: 30px; margin-bottom: 5px;"></div> <p><i>[used in Step #3]</i></p>
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3. Calculate Marin County Energy Ordinance Proposed Design:

<p>Proposed Design ¹ TDV KBtu/sf-yr</p> <div style="border: 1px solid black; width: 100%; height: 30px; margin-bottom: 5px;"></div> <p><i>[from Part 1, CF-1R; see Note 1 below]</i></p>	-	<p>Solar PV Credit (TDV Kbtu/sf-yr)</p> <div style="border: 1px solid black; width: 100%; height: 30px; margin-bottom: 5px;"></div> <p><i>[from Step #2: enter zero if no Solar PV]</i></p>	=	<p>Adjusted Proposed Design TDV KBtu/sf-yr</p> <div style="border: 1px solid black; width: 100%; height: 30px; margin-bottom: 5px;"></div> <p><i>[used in Step #4]</i></p>
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4. Verify Marin County Compliance Requirement:

<p>Adjusted Standard Design TDV KBtu/sf-yr</p> <div style="border: 1px solid black; width: 100%; height: 30px; margin-bottom: 5px;"></div>	<p>must be = or ></p>	<p>Adjusted Proposed Design TDV KBtu/sf-yr</p> <div style="border: 1px solid black; width: 100%; height: 30px; margin-bottom: 5px;"></div>
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Compliance Table: Adjustment Factor Based on House Size and Climate Zone

House Size (Total Conditioned Area)	Buildings Located In Climate Zone 2	Buildings Located In Climate Zone 3
> 1,500 and < 4,500 SF	0.850	0.850
4,500 – 5,499 SF	0.825	0.850
5,500 – 6,499 SF	0.700	0.730
6,500 – 7,499 SF	0.630	0.665
7,500 – 8,499 SF	0.570	0.605
8,500 – 9,499 SF	0.525	0.560
9,500 – 10,499 SF	0.485	0.520
10,500 – 11,499 SF	0.450	0.485
11,500+ SF	0.425	0.460