

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



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From:
Patrick Conlon
Director of Office of Energy Management
City of Palm Desert
73510 Fredwaring Drive
Palm Desert, CA 92260
(760) 346-0611 ext. 386
Email: pconlon@ci.palm-desert.ca.us

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

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1.0 Executive Summary

The City of Palm Desert 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 established local energy efficiency criteria contained in the language of Ordinance 1124 (included as Section 5.0 of this document), the City would like to implement its Ordinance at the earliest convenient date following approval by the California Energy Commission.

The City of Palm Desert 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 maximum flexibility for building permit applicants in meeting the Ordinance by one or more design approaches: (a) building and appliance energy conservation measures; and/or, (b) the installation of a solar photovoltaic (PV) system.

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 Palm Desert 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.

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 less than 4000 square feet of conditioned floor area, low-rise multi-family buildings, condominium conversions and residential additions equal to or greater than 500 square feet consume at least 10% less TDV energy than the energy use permitted by the 2005 standards;
- (b) Single family houses of 4000 square feet or more consume 15% less TDV energy than the energy use permitted by the 2005 standards;
- (c) The prescriptive envelope Heat Gain of all nonresidential buildings, except additions less than 500 square feet, must be at least 10% less than the standard prescriptive Heat Gain; or that a performance approach be used to demonstrate that the proposed building uses less TDV energy than the standard design, as defined within the Ordinance.

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

The impacts of the Palm Desert Ordinance have been divided into low-rise residential buildings (e.g., single family homes) in one category, and nonresidential, hotel/motel and high-rise residential buildings in the other category, consistent with the 2005 standards.

2.1 Low-Rise Residential Buildings

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

Prototype Homes. For the purpose of this study, two prototype homes were developed: a smaller home with a total conditioned floor area of 2,500 sf, and a large home with a total conditioned floor area of 5,000 sf. These prototype designs represent the geometry of typical homes in Palm Desert without specifying the energy conservation measures or levels of energy components such as fenestration, insulation or HVAC and domestic hot water system efficiencies.

2,500 SF Home, 25% Glazing. This production home is a 2-story structure, with a raised floor over a crawl space, and 9' ceilings with an attic space; 1,500 sf on the first floor, 1,000 sf on the second floor; and 25% total fenestration area (i.e., 625 sf of glazing): 8.75% on front & rear elevations, 3.75% on left & right elevations; and no skylights. The HVAC systems are two forced air furnaces / split air conditioners, one serving each floor. Ducts are in the crawl space for the 1st floor, and in the attic for the 2nd floor. One 75 gallon storage tank water heater serves the whole house. This house design is typical of new production homes in Palm Desert as confirmed by a leading energy consultant in the area.

2,500 SF Home, 30% Glazing. This custom home is a 2-story structure, with a raised floor over a crawl space, and 9' ceilings with an attic space; 1,500 sf on the first floor, 1,000 sf on the second floor; and 30% total fenestration area (i.e., 750 sf of glazing): 10.5% on front & rear elevations, 4.5% on left & right elevations; and no skylights. The HVAC systems are two forced air furnaces / split air conditioners, one serving each floor. Ducts are in the crawl space for the 1st floor, and in the attic for the 2nd floor. One 75 gallon storage tank water heater serves the whole house. This house design is typical of new custom homes in Palm Desert.

5,000 SF Home, 25% Glazing. This large production home is a 2-story structure, with a raised floor over a crawl space, and 9' ceilings with an attic space; 3,000 sf on the first floor, 2,000 sf on the second floor; and 25% total fenestration area (i.e., 1250 sf of glazing): 8.75% on front & rear elevations, 3.75% on left & right elevations; and no skylights. The HVAC systems are three forced air furnaces / split air conditioners, two serving the first floor and one serving the second floor. Ducts are in the crawl space for the 1st floor, and in the attic for the 2nd floor. Two 50 gallon storage tank water heaters serve the house. This house design is typical of large new production homes in Palm Desert.

5,000 SF Home, 30% Glazing. This large custom home is a 2-story structure, with a raised floor over a crawl space, and 9' ceilings with an attic space; 3,000 sf on the first floor, 2,000 sf on the second floor; and 30% total fenestration area (i.e., 1500 sf of glazing): 10.5% on front & rear elevations, 4.5% on left & right elevations; and no skylights. The HVAC systems are three forced air furnaces / split air conditioners, two serving the first floor and one serving the second floor. Ducts are in the crawl space for the 1st floor, and in the attic for the 2nd floor. Two 50 gallon storage tank water heater serve the house. This house design is typical of large new custom homes in Palm Desert.

Residential Measures Needed to Meet Title 24. For each prototype home, the following energy measures have been used to just meet the 2005 Building Energy Efficiency Standards when the house is located in Climate Zone 15 in the worst-case orientation:

2,500 SF, 25% Glazing: Title 24 Energy Measures

- R-30 roof with radiant barrier
- R-21 exterior walls
- R-19 raised floor over crawl space
- Vinyl Low-E windows, U=0.39, SHGC=0.35
- Tyvek house wrap
- Furnace: 80% AFUE
- Air conditioner: 14.0 SEER , 11.9 EER [HERS], TXV [HERS]
- R-8 ducts in the crawl space (lower floor) and in the attic (upper floor)
- DHW: 75 gallon gas water heater, EF=0.52; pipe insulation to kitchen

2,500 SF, 30% Glazing: Title 24 Energy Measures

- R-30 roof with radiant barrier
- R-21 exterior walls
- R-19 raised floor over crawl space
- Vinyl Low-E windows, U=0.39, SHGC=0.35
- Tyvek house wrap
- Furnace: 80% AFUE
- Air conditioner: 13.0 SEER , 11.4 EER [HERS], TXV [HERS]
- Duct sealing to achieve reduced duct leakage [HERS]
- R-6 ducts in the crawl space (lower floor) and in the attic (upper floor)
- DHW: 75 gallon gas water heater, EF=0.52; no additional pipe insulation

5,000 SF, 25% Glazing: Title 24 Energy Measures

- R-38 roof with radiant barrier
- R-21 exterior walls
- R-30 raised floor over crawl space
- Vinyl Low-E windows, U=0.39, SHGC=0.35
- Tyvek house wrap
- Furnace: 80% AFUE
- Air conditioner: 14.0 SEER , 11.9 EER [HERS], TXV [HERS]
- R-8 ducts in the crawl space (lower floor) and in the attic (upper floor)
- DHW: (2) 50 gallon gas water heaters, EF=0.62; no additional pipe insulation

5,000 SF, 30% Glazing: Title 24 Energy Measures

- R-30 roof with radiant barrier
- R-21 exterior walls
- R-19 raised floor over crawl space
- Vinyl Low-E windows, U=0.39, SHGC=0.35
- Tyvek house wrap
- Furnace: 80% AFUE
- Air conditioner: 13.0 SEER , 11.4 EER [HERS], TXV [HERS]
- Duct sealing to achieve reduced duct leakage [HERS]
- R-8 ducts in the crawl space (lower floor) and in the attic (upper floor)
- DHW: (2) 50 gallon gas water heaters, EF=0.62; ; pipe insulation to kitchen

Residential Energy Measures Needed to Meet the Palm Desert Ordinance

To determine how the prototype homes fare in the worst-case orientation within the framework of the proposed Palm Desert Ordinance, common incremental energy measures have been evaluated. The following energy features have been modified from the Title 24 measures listed above so that **the 2,500 sf homes use 10% less TDV energy than the Title 24 standard design**, and **the 5,000 sf homes use 15% less TDV energy than the standard design**.

2,500 SF, 25% Glazing: Palm Desert Energy Measures Beyond Title 24 Measures

- Duct sealing to achieve reduced duct leakage [HERS]

2,500 SF, 30% Glazing: Palm Desert Energy Measures Beyond Title 24 Measures

- DHW: (1) Instantaneous gas water heater, EF=0.82; no additional pipe insulation
- R-8 duct insulation
- Air conditioner: 14.0 SEER , 11.9 EER [HERS]

5,000 SF, 25% Glazing: Palm Desert Energy Measures Beyond Title 24 Measures

- Duct sealing to achieve reduced duct leakage [HERS]
- DHW: (2) Instantaneous gas water heaters, EF=0.80; no additional pipe insulation

5,000 SF, 30% Glazing: Palm Desert Energy Measures Beyond Title 24 Measures

- DHW: (2) Instantaneous gas water heaters, EF=0.80
- Air conditioner: 14.0 SEER , 11.9 EER [HERS]
- Vinyl Low-E windows, U=0.39, SHGC=0.27

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

- Fixed overhangs and side-fins for glazing which are extraordinarily effective within the Palm Desert climate zone;
- Credit for zonal controls for living and sleeping zones within each home;
- 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;
- Residential ice storage (e.g., Ice Energy system) which shifts on-peak electricity usage to off-peak hours is not considered; and,
- Solar photovoltaic (PV) systems which may be used as credit to exceed Title 24 in meeting the requirements of the Ordinance.

2.2 Nonresidential, Hotel/Motel and High-Rise Residential Buildings

The Ordinance has a Prescriptive Envelope Overall Heat Gain (HG) requirement for all nonresidential, hotel/motel and high-rise residential buildings. Compliance can be demonstrated prescriptively or with any one of several Performance options, including the use of solar PV system credit .

The cost-effectiveness of the Ordinance for these occupancies can be established in a variety of ways. The simplest approach is to consider that the local utility companies, Southern California Edison and The Gas Company, have submitted filings to the California Public Utilities Commission (CPUC) which assert cost-effectiveness of energy measures needed to exceed the Title 24 energy requirements by 10%, the threshold at which the Savings By Design program begins to award incentives for energy-efficient buildings. Information provided in the most recent filing to the CPUC (for the 2006-2008 SBD program) is contained in Appendix C.

It is worthwhile to note that the prescriptive envelope requirements established by the Ordinance relate only to heat gain, and not heat loss; and that the performance equivalent allowed to meet the requirements of the Ordinance – exceeding Title 24 by 5% -- is less stringent than the 10% threshold of the Savings By Design program. Therefore, it is a fairly straightforward and reasonable conclusion that the Ordinance requirements are feasible and cost-effective with respect to meeting the 2005 standards.

To test this, a 2-story office building was modeled to consider the incremental energy improvements needed to exceed Title 24 and just meet the Ordinance requirements.

20,000 SF Office, 40% WWR Glazing. This office building is a 2-story wood-frame structure, with a slab-on-grade, 9' ceilings and an aspect ratio of 5:1 (a typical strip mall configuration, 50' x 200') with 40% of the exterior wall glazed with 6'-0" high windows on all four sides and no skylights. The 10 HVAC systems are split heat pump rooftop units serving perimeter and interior zones, 5 on each floor.

- Just meets Title 24: 3'-0" overhangs, Low-E glazing, SHGC=0.41
Just meets P.D. Ordinance: 3'-0" overhangs, Low-E glazing, SHGC=0.38
- Just meets Title 24: No overhangs, Low-E glazing, SHGC=0.32
Just meets P.D. Ordinance: 3'-0" south overhangs, Low-E glazing, SHGC=0.32

20,000 SF Office, 20% WWR Glazing. The same building but with 20% of the exterior wall glazed with 6'-0" high windows on all four sides and no skylights.

- Just meets Title 24: 3'-0" overhangs, Low-E glazing, SHGC=0.41
Just meets P.D. Ordinance: No changes required to meet Palm Desert Ordinance
- Just meets Title 24: No overhangs, Low-E glazing, SHGC=0.41
Just meets P.D. Ordinance: No overhangs, Low-E glazing, SHGC=0.35

3.0 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 solar photovoltaic (PV) electricity generation which is installed at the building site. The credit for PV systems is established by one of two Commission-approved methodologies converted to Time Dependent Valuation [TDV] energy in KBtu/yr-sf.

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.

A fully reviewed and approved methodology for PV system performance by the California Energy Commission for the New Solar Homes Partnership may not be publicly available by the time this Ordinance takes effect. As a result, the Ordinance allows the use of the Commission's Clean Power Estimator until February 1, 2007 – by which time the newsolarhomes.ca.gov web site will have the newer and more accurate calculation method online for permit applicants to use, if necessary. Therefore, the Ordinance includes this language to make clear which PV credit calculation may be used:

For buildings permitted before February 1, 2007: The methodology used to calculate the PV credit shall be the Clean Power Estimator at: <http://www.clean-power.com/cec/default.asp> using the 92260 zip code. The Annual Total TDV energy, in KBtu/sf-yr, shall be the total annual KWh of the solar PV energy system multiplied by 12.675 (see below for derivation of this value) and divided by the total conditioned floor area of the building. This method of calculating PV credit may be used after February 1, 2007 until the method listed below is posted on that Internet web site.

For buildings permitted on or after February 1, 2007: The amount of PV credit is defined as the annual total TDV KBtu/sf-yr of the solar PV energy system as calculated in accordance with the implementation rules and methodology of the California New Solar Homes Partnership as posted on the Internet web site <http://www.newsolarhomes.ca.gov/>; multiplied by 1000 and divided by the total conditioned floor area of the building. This method of calculating PV credit may be used before February 1, 2007 if it is available on the listed Internet web site prior to that date.

The Clean Power Estimator lists the total annual KWh of the PV system, and that value is converted to TDV energy according to the calculation documented by Gabel Associates previously in the County of Marin County application for its local energy ordinance in 2005. The annual average TDV energy multiplier during daylight hours was determined to be 4.22. Since the New Solar Homes PV calculation uses a 0.88 multiplier to account for dirt and a modest percentage of non-working PV collectors, the annual TDV energy for each KWh of annual PV system energy is calculated as follows:

$$1 \text{ KWh} \times 3.143 \text{ Btu/Wh} \times 4.22 \times 0.88 = 12.675 \text{ TDV kBtu/yr}$$

The value is then divided by the conditioned floor area of the building to calculate the TDV energy in kBtu/sf-yr, the metric used by the ACMs in demonstrating compliance with the performance standards. For example, a 5,000 square foot house receives a PV credit for each 1,000 KWh of annual PV system energy as follows:

$$\frac{12,675 \text{ TDV kBtu/yr}}{5,000 \text{ sf}} = 2.88 \text{ TDV kBtu/sf-yr}$$

The Palm Desert compliance form/spreadsheet includes this PV credit as part of the overall compliance calculation.

4. Cost Effectiveness

4.1 Residential Requirements

The cost effectiveness of meeting the requirements of the Ordinance is calculated for the two prototype homes analyzed above with different glass (fenestration) areas. The incremental total first cost of the measures needed to meet the Palm Desert Ordinance is divided by the incremental annual energy cost saving to establish a Simple Payback for the additional energy features. The study uses an average utility rate price of \$0.16/kWh for electricity and \$0.92/therm for natural gas.

Table 1a: Summary of Energy Savings from Palm Desert Energy Ordinance

Prototype Home	Electricity Saving (KWh/yr)	Gas Saving (therms/yr)	Electricity Cost Saving (\$)	Nat. Gas Cost Saving (\$)	Total Annual Cost Saving (\$)
2,500 SF, 25% Glass	1348	11	\$216	\$10	\$226
2,500 SF, 30% Glass	638	105	\$102	\$97	\$199
5,000 SF, 25% Glass	2454	135	\$393	\$124	\$517
5,000 SF, 30% Glass	3079	108	\$493	\$99	\$592

Table 1b: Summary of Simple Payback for Palm Desert Energy Measures

Prototype Home	Incremental First Cost as Compared w/ Title 24 House (\$)	Incremental Annual Energy Cost Saving (\$)	Simple Payback (Years)
2,500 SF, 25% Glass	\$1886	\$226	8.8
2,500 SF, 30% Glass	\$1012	\$199	5.1
5,000 SF, 25% Glass	\$3981	\$517	7.7
5,000 SF, 30% Glass	\$4681	\$592	7.9

Based on this data, the Palm Desert Ordinance increases the cost of construction by approximately \$0.40 to \$0.95 per square foot, for which the energy cost savings as a simple payback from first cost is in the range of 5 to 9 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 \$350 per square foot, the Ordinance will increase that overall cost by one-sixth to one-third of one percent. At current utility rates, the expected energy savings within the first 9 years of building occupancy will pay for the increased first cost, after which the building owner will make a projected profit of 10% to 20% return-on-investment for the extra energy measures required by the Ordinance.

4.2 Nonresidential Requirements

The cost effectiveness of meeting the prescriptive envelope requirements of the Ordinance is calculated for the office buildings analyzed above with different glass (fenestration) areas. The incremental total first cost of the measures needed to meet the Palm Desert Ordinance is divided by the incremental annual energy cost saving to establish a Simple Payback for the additional energy features. The study uses an average utility rate price of \$0.16/kWh for electricity.

Table 2a: Summary of Prescriptive Energy Savings and Simple Payback, Office

Prototype Buidling	Incremental First Cost as Compared w/ Title 24 Bldg (\$)	Electricity Saving (KWh/yr)	Electricity Cost Saving (\$)	Simple Payback (Years)
Office: 20,000 SF, 40%WWR (A) Better glass SHGC (B) Add 3' OH, south glass	\$8000	10395	\$1663	4.8
	\$16000	3782	\$605	26.4
Office: 20,000 SF, 20%WWR (A) No changes required (B) Better glass SHGC	\$0 **	0 **	\$0 **	n/a **
	\$4000	3050	\$488	8.2

*** This shading/glazing combination meets the Palm Desert Ordinance requirements.*

Based on this data, using the prescriptive path, the Palm Desert Ordinance increases the cost of construction by \$0.00 to \$0.80 per square foot, for which the energy cost savings as a simple payback can range tremendously. However, a performance compliance option can significantly reduce incremental first cost and simple payback.

For example, starting with the 40% WWR office building with no overhangs and the Low-E glass which just meets Title 24, one question is: how does the building designer increase the overall energy efficiency to meet the Palm Desert Ordinance and decrease the first cost and/or significantly reduce the Simple Payback. In this case, one can utilize a combination of no overhangs, better glazing and reduced installed lighting wattage through the use of more efficient lighting fixtures and lighting control credits for occupancy sensors in some rooms to obtain the following:

Table 2b: Summary of Performance Energy Savings and Simple Payback

Prototype Buidling	Incremental First Cost as Compared w/ Title 24 Bldg (\$)	Electricity Saving (KWh/yr)	Electricity Cost Saving (\$)	Simple Payback (Years)
Office: 20,000 SF, 40%WWR Better glass, NFRC-Tested, high-efficiency fixtures, lighting control credits	\$38000	26541	\$4247	8.9

Even though the first cost has increased, the payback period for making these improvements has been reduced from over 25 years to less than 10 years. If the building developer is concerned primarily with first cost, he can choose the lowest first cost illustrated in Table 2a. However, if the building owner is a company which will occupy the building for 10 years, the extra \$22,000 (i.e., \$38,000 - \$16,000) is a worthwhile investment that will reap over \$4,000 per year in energy cost savings after a nine or ten year payback. By incorporating the flexibility of the energy performance approach, the Ordinance provides for a free-market analysis that encourages investment in the most cost-effective energy efficiency strategies.

If the overall cost of nonresidential construction is approximately \$250 to \$300 per square foot, the range of increased first cost as a result of this Ordinance may range from no cost at all (i.e., \$0) up to perhaps \$2.00 per square foot in some cases. This translates to 0% to 0.8% increased construction cost, with an average of perhaps 0.3% to 0.4% increase, depending on the goal and strategy of the designer and building owner.

5.0 Implementation Plan

The implementation of the City of Palm Desert energy ordinance is based on the submittal of a single extra one-page form which is printed out from an Excel spreadsheet available from the City of Palm Desert. Alternatively, a permit applicant can provide the same information on a pre-printed form with calculations listed also provided by the City.

With the exception of a verifying a few additional mandatory measures, the City of Palm Desert 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 the one-page additional form which demonstrates 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.

Gabel Associates will work in conjunction with the City of Palm Desert to plan all aspects of the implementation, including trainings 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.

The City will put out information to all relevant professional building industry groups and the California Association of Building Energy Consultants (CABEC) to assist in the transition to working under the new Ordinance.

6.0 Text of the Palm Desert Ordinance

ORDINANCE NO. 1124

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF PALM DESERT, CALIFORNIA, ADOPTING LOCAL ENERGY EFFICIENCY STANDARDS FOR BUILDINGS COVERED BY THE 2005 CALIFORNIA BUILDING ENERGY EFFICIENCY STANDARDS

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF PALM DESERT, CALIFORNIA, DOES HEREBY ORDAIN AS FOLLOWS:

Section 1. Chapter 24.30 be and the same is hereby added to the Code of the City of Palm Desert, California, as follows:

Section 24.30.010 Title, Purpose and Intent. This Ordinance sets forth minimum energy efficiency standards within the City of Palm Desert for all new construction, including remodels, additions, alterations, condominium conversions and tenant improvements.

(a) Background. All residential and nonresidential development 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 "Standards"). This Ordinance requires the application of the Standards, including but not limited to the definitions, procedures, forms, manuals and alternative calculations methods ("ACMs") associated with the Standards. In addition, this Ordinance amends the Standards as described herein.

(b) Buildings Covered. The provisions of this Ordinance shall apply to all new residential construction, remodels, additions and alterations, and to all new nonresidential construction, remodels, additions, alterations and tenant improvements for which a building permit has been applied for and accepted as complete by the building department on or after the effective date of this Ordinance.

Section 24.30.015 Enforcement. The Building Official for the City of Palm Desert shall be charged with enforcing the provisions of this Ordinance.

Section 24.30.020 Definitions.

CONDOMINIUM CONVERSION is defined in Section 25.112 of the Palm Desert Municipal Code.

PRODUCTION HOME means a dwelling constructed as part of a residential development of at least five homes per project that is intended or offered for sale.

PV CREDIT is the energy credit applicable to the Proposed Design for a solar PV energy system that is capable of generating electricity from sunlight and supplying it directly to the building; and is connected, through a reversible meter, to the utility grid.

For buildings permitted before February 1, 2007: The methodology used to calculate the PV credit shall be the Clean Power Estimator at:

<http://www.clean-power.com/cec/default.asp> using the 92260 zip code. The Annual Total TDV energy, in KBtu/sf-yr, shall be the total annual KWh of the solar PV energy system multiplied by 12,675 and divided by the total conditioned floor area of the building.

For buildings permitted on or after February 1, 2007: The amount of PV credit is defined as the annual total TDV KBtu/sf-yr of the solar PV energy system as calculated in accordance with the implementation rules and methodology of the California New Solar Homes Partnership as posted on the Internet web site

<http://www.newsolarhomes.ca.gov/>; multiplied by 1000 and divided by the total conditioned floor area of the building. Note: this method of calculating PV credit may be used before February 1, 2007 if it is publicly available on the above Internet web site.

RESIDENTIAL DEVELOPMENT is to include but not be limited to attached and detached single-family dwellings, condominiums, apartments and time-share dwellings, and not including hotels and motels as defined in the 2005 California Building Energy Efficiency Standards.

REVISED STANDARD DESIGN TOTAL is the performance energy budget, in TDV KBtu/sf-yr, which this Ordinance establishes for all residential buildings to which it applies. It is defined as the Standard Design Total (TDV KBtu/sf-yr) from any state-approved alternative calculation method (ACM) multiplied times the Standard Design Adjustment Factor listed in Table A.

SOLAR PV ENERGY SYSTEM means 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 PV energy system must meet all installation criteria of the current edition of the California Electrical Code, and must include PV panels and inverters, which are listed by the California Energy Commission.

STANDARD DESIGN ADJUSTMENT FACTOR is the arithmetic factor listed in Table A which, when multiplied by the standard design energy budget from a state-approved ACM, produces the Revised Standard Design Total.

Table A.

<u>Building Type</u>	<u>Standard Design Adjustment Factor</u>
Single Family Homes < 4,000 SF	0.90
Single Family Homes = or > 4,000 SF	0.85
Low-Rise Multi-family Buildings	0.90
Condominium Conversions	0.90
Additions to all the above = or > 500 SF	0.90

Section 24.30.030 Mandatory Requirements. All buildings covered by this Ordinance shall include the following mandatory energy measures as applicable and limited to the permitted scope of work:

1. Lighting. Lighting in all laundry rooms, utility rooms, mechanical rooms, closets and garages shall be fluorescent and controlled by a Manual-ON, Automatic-OFF occupancy sensor. All common area landscape lighting shall be fluorescent.

2. Mechanical. In addition to meeting all the requirements of Section 144 of the 2005 Standards, all fan motors and pump motors which 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 rated motors must be NEMA Premium motors by the National Electrical Manufacturers Association.

3. Swimming Pools and Spas. All Public and Private Swimming pools, spas, fountains and water features shall incorporate the following energy conservation features:

(a) All pool and spa natural gas heaters shall have a minimum AFUE of 90% or higher; and,

(b) All circulating pump motors and filtration pump motors with a nominal rating of 0.75 horsepower (i.e., $\frac{3}{4}$ HP) or greater 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. EXCEPTION: Dedicated pump motors serving only spa jets.

4. Provisions for Future Solar PV Energy Systems. A 1-inch diameter electrical conduit shall be provided for installation of future solar PV energy systems. The 1 inch diameter electrical conduit shall extend from a point on the exterior wall located under the southern roof exposure, to the exterior wall location adjacent to the main electrical service panel. At each location, the conduit shall terminate at a two gang, exterior wet location rated, electric junction box.

Section 24.30.040 General Compliance Requirements. The following General Compliance Requirements shall apply to all new construction and additions which are 500 square feet or larger. Note that other special requirements for single family homes equal to or larger than 4,000 square feet and for production homes are included in Section 22.30.050 of this Ordinance.

A. LOW-RISE RESIDENTIAL BUILDINGS (EXCEPT ADDITIONS < 500 Sq.Ft.)

SINGLE FAMILY HOMES < 4,000 Sq.Ft.), MULTI-FAMILY BUILDINGS, ADDITIONS TO THESE BUILDINGS = OR > 500 Sq.Ft., AND CONDOMINIUM CONVERSIONS

The performance approach must be used to meet and exceed the 2005 Standards as follows: the Proposed Design TDV KBtu/sf must be at least 10.0% less than the Standard Design TDV KBtu/sf-yr. Additions of 500 sq.ft. or greater and condominium conversions may meet this requirement by using the Existing+Addition+Alteration method to demonstrate that the Proposed Design energy use is at least 10% less than the Standard Design energy budget.

SINGLE FAMILY HOMES = or > 4,000 Sq.Ft.

The performance approach must be used to meet and exceed the 2005 Standards as follows: the Proposed Design TDV KBtu/sf must be at least 15.0% less than the Standard Design TDV KBtu/sf-yr.

In modeling buildings to meet this requirement, Domestic Hot Water (DHW) energy use shall always be included. Exception: When there is no change to a building's existing water heater(s), DHW energy use need not be included in the Existing+Addition+Alteration method.

B. NONRESIDENTIAL, HIGH-RISE RESIDENTIAL AND HOTEL/MOTEL OCCUPANCIES (EXCEPT ADDITIONS < 500 Sq.Ft.)

The permit applicant must demonstrate that the general compliance requirement for the building envelope has been met for these occupancies using either the Prescriptive or Performance option defined below.

PRESCRIPTIVE ENVELOPE APPROACH

The Overall Envelope Approach in Section 143(b) of the 2005 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.

PERFORMANCE APPROACH

1. Performance alternatives to meeting the Prescriptive Envelope requirement are to:

(a) Model the building envelope only for compliance using a state-approved nonresidential ACM and demonstrate that the Proposed Design TDV KBtu/sf for the Cooling energy component must be at least 5.0% less than the Standard Design TDV KBtu/sf-yr Cooling energy component; or,

(b) Model the building envelope and mechanical system for compliance and demonstrate that the Proposed Design TDV KBtu/sf for the sum of the Cooling, Fan, Pump and Heat Rejection energy components must be at least 5.0% less than the sum of the Standard Design TDV KBtu/sf-yr Cooling, Fan, Pump and Heat Rejection energy components, or,

(c) Model the building envelope and lighting for compliance using a state-approved nonresidential ACM and demonstrate that the Proposed Design TDV KBtu/sf for the sum of Cooling and Lighting energy components must be at least 5.0% less than the Standard Design TDV KBtu/sf-yr sum of Cooling and Lighting energy components; or,

(d) Model the building envelope, lighting and mechanical system for compliance and demonstrate that the Proposed Design TDV KBtu/sf for the sum of the Cooling, Lighting, Fan, Pump and Heat Rejection energy components must be at least 5.0% less than the sum of the Standard Design TDV KBtu/sf-yr for the sum of Cooling, Lighting, Fan, Pump and Heat Rejection energy components.

2. Additions of 500 sq.ft. or greater may use the Existing+Addition+Alteration method to demonstrate that the sum of the specified Proposed Design energy components (defined in 1a, 1b, 1c or 1d above) are at least 5% less than the sum of the same Standard Design energy components.

D. CREDIT FOR SOLAR PV ENERGY SYSTEMS

1. PV Credit may be used per definition in Section 24.30.020 to reduce the Proposed Design TDV energy.

2. If the performance approach is used to demonstrate compliance with the 2005 Standards, PV Credit may not be used to meet the Standards. However, PV Credit may be used to exceed the Standards for the purposes of meeting the General Compliance Requirements as explained in this section of the Ordinance.

C. DOCUMENTATION

To demonstrate that the General Compliance Requirements of this Ordinance have been met, the permit applicant may, optionally, submit supplementary forms and documentation separate from the building drawings, specifications and standard Title 24 report.

Section 24.30.050 Requirements for Production Homes in Residential Developments. In addition to the requirements specified in Sections 24.30.020 through 24.30.040 of this Ordinance, production homes shall, as applicable, meet the following additional requirements:

1. Model homes as part of a production homes development shall be equipped with a Solar PV Energy System with a minimum nominal output of 2.0 kW.
2. A seller of production homes shall offer a solar PV energy system option to all customers that enter into negotiations to purchase a new production home and disclose the following:
 - (a) The total installed cost of the solar PV energy system option; and,
 - (b) The estimated cost savings associated with the solar energy system option as determined by current and projected future utility costs.
3. Energy Star Appliances Required. If provided by the developer, all the following installed appliances shall be Energy Star rated:
 - (a) Dishwashers
 - (b) Refrigerators
 - (c) Clothes Washers
 - (d) Clothes Dryers (Natural Gas only)
 - (e) Ceiling fans
 - (f) Exhaust fans

Section 24.30.060 Effective Date and Expiration Date. This Ordinance shall be and is hereby declared to be in full force and effect 30 days after the second reading of this Ordinance.

This Ordinance shall expire on the date that the state's 2008 Building Energy Efficiency Standards take effect.

Section 2. Express Findings. Pursuant to California Health and Safety Code section 17958.7, the City Council of The City of Palm Desert makes the following Express Findings that the modifications to the 2005 California Building Energy Efficiency Standards, as detailed in Section 1 of this Ordinance, are reasonably necessary due to local climatic conditions. As a result of very high summer ambient temperatures, including a Summer Design Temperature of 112° F., average load demand and peak load demand of energy used in Palm Desert is an important factor concerning public safety and adverse economic impacts of power outages or power reductions (i.e., “brown-outs”). Utility company studies indicate that homes within The City of Palm Desert use on an average of 50% more energy and average summer peak load demands exceed 120% more energy than other similar utility customers within the utility service territory. 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.

Section 3. The City Clerk shall certify to the passage and adoption of this Ordinance and shall cause the same to be published once in the Desert Sun, a newspaper of general circulation printed and published in the County of Riverside and circulated within the City of Palm Desert.

PASSED, APPROVED, AND ADOPTED by the City Council of the City of Palm Desert, California, at its regular meeting held this ____ day of _____, _____, by the following vote, to wit:

AYES:

NOES:

ABSENT:

ABSTAIN:

JIM FERGUSON, MAYOR

ATTEST:

RACHELLE D. KLASSEN, CITY CLERK
CITY OF PALM DESERT, CALIFORNIA

Appendix A: City of Palm Desert Compliance Forms
Samples of Excel Spreadsheets to be Provided by the City

(Printed forms for hand calculations will also be provided by the City.)

Before 2/1/07

Project Name/Address:	Smith Residence, 1235 Canyon Drive, Palm Desert, CA	
Date of Title 24 Report:	9/26/2006	Conditioned Floor Area (SF): 5,000

1. Calculate Palm Desert Energy Ordinance Standard Design:

Standard Design Total TDV KBtu/sf-yr <div style="border: 1px solid black; padding: 2px; width: 100px; text-align: center;">75.00</div> <i>[from Part 1, CF-1R: see Note 1 below]</i>	x	Adjustment Factor <div style="border: 1px solid black; padding: 2px; width: 100px; text-align: center;">0.85</div> <i>[from Table A]</i>	=	Revised Standard Design Total TDV KBtu/sf-yr <div style="border: 1px solid black; padding: 2px; width: 100px; text-align: center;">63.75</div> <i>[used in Step #4]</i>
--	---	--	---	---

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

If a proposed PV system is receiving credit under this Ordinance.

Total Annual KWh from PV System <div style="border: 1px solid black; padding: 2px; width: 100px; text-align: center;">3000</div> <i>[see Note 2 below]</i>	-	Proposed Design PV System Credit TDV KBtu/sf-yr <div style="border: 1px solid black; padding: 2px; width: 100px; text-align: center;">7.61</div> <i>[used in Step #3]</i>
--	---	---

3. Calculate Palm Desert Energy Ordinance Proposed Design:

Proposed Design Total TDV KBtu/sf-yr <div style="border: 1px solid black; padding: 2px; width: 100px; text-align: center;">70.93</div> <i>[from Part 1, CF-1R; see Note 1 below]</i>	-	7.61	=	Revised Proposed Design Total TDV KBtu/sf-yr <div style="border: 1px solid black; padding: 2px; width: 100px; text-align: center;">63.33</div> <i>[used in Step #4]</i>
--	---	------	---	---

4. Verify Palm Desert General Compliance Requirement:

BUILDING COMPLIES? YES

Table A. Standard Design Adjustment Factor

Building Type	Adjustment Factor
Single Family Homes < 4,000 SF	0.90
Single Family Homes = or > 4,000 SF	0.85
Low-Rise Multi-family Buildings	0.90
Condominium Conversions	0.90
Additions (to Any of the Above) if = or > 500 SF	0.90

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 heater(s).

Note 2: To obtain this value when the permit is to be filed before February 1, 2007, input all relevant data for the solar PV system at the following web site: <http://www.clean-power.com/cec/default.asp>
Be sure to use the 92260 zip code in that calculation.

After 2/1/07

Project Name/Address:	Smith Residence, 1235 Canyon Drive, Palm Desert, CA	
Date of Title 24 Report:	9/26/2006	Conditioned Floor Area (SF): 5,000

1. Calculate Palm Desert Energy Ordinance Standard Design:

Standard Design Total TDV KBtu/sf-yr <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">75.00</div> <i>[from Part 1, CF-1R] see Note 1 below]</i>	x	Adjustment Factor <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">0.85</div> <i>[from Table A]</i>	=	Revised Standard Design Total TDV KBtu/sf-yr <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">63.75</div> <i>[used in Step #4]</i>
--	---	--	---	---

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

If a proposed PV system is receiving credit under this Ordinance.

Annual PV System Credit Total TDV Kbtu <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">38025</div> <i>[see Note 2 below]</i>	-	Proposed Design PV System Credit TDV KBtu/sf-yr <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">7.61</div> <i>[used in Step #3]</i>
--	---	---

3. Calculate Palm Desert Energy Ordinance Proposed Design:

Proposed Design Total TDV KBtu/sf-yr <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">70.93</div> <i>[from Part 1, CF-1R] see Note 1 below]</i>	-	7.61	=	Revised Proposed Design Total TDV KBtu/sf-yr <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 0 auto;">63.33</div> <i>[used in Step #4]</i>
--	---	------	---	---

4. Verify Palm Desert General Compliance Requirement:

BUILDING COMPLIES? YES

Table A. Standard Design Adjustment Factor

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Single Family Homes < 4,000 SF	0.90
Single Family Homes = or > 4,000 SF	0.85
Low-Rise Multi-family Buildings	0.90
Condominium Conversions	0.90
Additions (to Any of the Above) if = or > 500 SF	0.90

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 heater(s).

Note 2: To obtain this value when the permit is to be filed on or after February 1, 2007, input all relevant data for the solar PV system at the following web site: <http://www.newsolarhomes.ca.gov/>

Nonresidential Prescriptive Form: Palm Desert Energy Ordinance**PD-NR**

Project Name/Address:	Mountain Office Building, 9800 Cactus Drive, Palm Desert, CA		
Date of Title 24 Report:	9/26/2006	Conditioned Floor Area (SF):	20,000

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

Standard Overall Total Heat Gain (HG)					Revised Standard Overall Total Heat Gain (HG)
348,914	x	0.90	=		314,023
<i>[from ENV-3-C, Part 6 of 7, Column M]</i>					

2. Verify Compliance With Building Envelope Requirement:

Proposed Overall Total Heat Gain (HG)				BUILDING ENVELOPE COMPLIES?
303,046	= or <	314,023		YES
<i>[from ENV-3-C, Part 6 of 7, Column I]</i>				

Nonresidential Performance Form: Palm Desert Energy Ordinance PD-NR-PERF

Before 2/1/07

Project Name/Address: Mountain Office Building, 9800 Cactus Drive, Palm Desert, CA
Date of Title 24 Report: 9/27/2006 Conditioned Floor Area (SF): 20,000

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

Energy Component	(Partial) Standard Design TDV KBtu/sf-yr	(Partial) Proposed Design TDV KBtu/sf-yr	Instructions
Space Cooling	156.69	133.21	Input Space Cooling for every project.
Indoor Fans	83.87	86.21	Input Indoor Fans if including Mechanical compliance.
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	95.52	92.04	Input Lighting if including Lighting compliance.
TOTALS:	336.08	311.46	

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

If a proposed PV system is receiving credit under this Ordinance.

Total Annual KWh from PV System	Proposed Design PV System Credit TDV KBtu/sf-yr	Comments:
10000	6.34	Based on the PV system's Total Annual KWh, the PV system credit in TDV/KWh/sf-yr equals ((Annual KWh) x 12.675) / (Conditioned Floor Area)
<i>[see Note 1 below]</i>	<i>[used in Step #3]</i>	

3. Verify Compliance With Palm Desert Energy Ordinance:

Revised (Partial) Standard Design TDV KBtu/sf-yr		Revised (Partial) Proposed Design TDV KBtu/sf-yr
319.28	= or >	305.12

BUILDING COMPLIES?	YES
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Note 1: To obtain this value for a permit filed before February 1, 2007, input relevant data for the solar PV system at the following web site: <http://www.clean-power.com/cec/default.asp>
Be sure to use the 92260 zip code in the calculation.

Nonresidential Performance Form: Palm Desert Energy Ordinance PD-NR-PERF

After 2/1/07

Project Name/Address	Mountain Office Building, 9800 Cactus Drive, Palm Desert, CA	
Date of Title 24 Report	9/27/2006	Conditioned Floor Area (SF): 20,000

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

Energy Component	(Partial) Standard Design TDV KBtu/sf-yr	(Partial) Proposed Design TDV KBtu/sf-yr	Instructions
Space Cooling	156.69	133.21	Input Space Cooling for every project.
Indoor Fans	83.87	86.21	Input Indoor Fans if including Mechanical compliance.
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	95.52	92.04	Input Lighting if including Lighting compliance.
TOTALS:	336.08	311.46	

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

If a proposed PV system is receiving credit under this Ordinance.

Annual PV System Credit
Total TDV KBtu/sf-yr
 100000
[see Note 1 below]

Proposed Design PV System Credit
TDV KBtu/sf-yr
 5.00
[used in Step #3]

Comments:
 Based on the PV system's Total Annual KWh, the PV system credit in TDV/KWh/sf-yr equals ((Annual KWh) x 12.675) / (Conditioned Floor Area)

3. Verify Compliance With Palm Desert Energy Ordinance:

Revised (Partial) Standard Design TDV KBtu/sf-yr	= or >	Revised (Partial) Proposed Design TDV KBtu/sf-yr
319.28		306.46

BUILDING COMPLIES?	YES
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Note 1: To obtain this value when the permit is to be filed on or after February 1, 2007, input relevant data for the solar PV system at the following web site: <http://www.newsolarhomes.ca.gov/>

Appendix B: First Cost Data Provided by Don Todd Associates

ENERGY MEASURES
Palm Desert Study
City Of Palm Desert, CA

Opinion of Probable Construction Cost
Unit Costing Estimate

Prepared for : Gabel Associates LLC

September 20, 2006

by:



DON TODD ASSOCIATES, INC.

Project and Construction Management Services
1000 Broadway, Suite 610
Oakland, CA 94607
Telephone: (510) 251-1007 Fax: (510) 251-1008
www.dta.com

**ENERGY MEASURES
CITY OF PALM DESERT
Palm Desert, CA**

ESTIMATE OF PROBABLE CONSTRUCTION COST

EXECUTIVE SUMMARY

Introduction:

This Unit Costing cost estimate represents the probable construction cost of the various items for the construction of track housings in the City of Palm Desert, CA. Considering the drawings are not available, certain components, that may be required as part of this project may not be shown or mentioned in this estimate. Allowances have been made when detail description of equipment, work definition, or quantities are not available. Material pricing and labor costs are obtained from historical data and similar projects. The unit costs include material, labor, and subcontractor's markup, and are based on the design level of documents received.

Documents Received as a Basis of Cost Estimate:

- ◆ List of Energy Measures Used in the Palm Desert Study.
- ◆ Phone Conversation with the Architect.

Exclusions:

The following items are excluded:

- ◆ Hazardous Materials Abatement & Disposal except noted as an allowance in the estimate.
- ◆ Change Order Contingency
- ◆ Cost of money
- ◆ Escalation
- ◆ Professional Consultants' and Construction Management fees
- ◆ Administrative costs
- ◆ Land costs
- ◆ Plan checks and inspection
- ◆ Permits
- ◆ Off-site utilities
- ◆ Legal and financing costs
- ◆ Consultant fees and expenses
- ◆ Contractor off-hours and compressed-time work schedule, if required
- ◆ Construction phasing
- ◆ Furnishings, furniture, and equipment
- ◆ Relocation costs, if required

Possible Additional Cost Items:

Items that may change the Estimate of Probable Construction Cost include, but are not limited to, the following:

- ◆ Modifications to the scope of work, drawings, specifications included in this estimate
- ◆ Unforeseen conditions
- ◆ Construction phasing requirements
- ◆ Excessive contract and general conditions, and restrictive technical specifications
- ◆ Equipment, material, systems or product that cannot be obtained from at least three different sources
- ◆ Delays beyond the projected schedule
- ◆ Any other non-competitive bid situations
- ◆ Any addenda, changes not included in the basis of estimates.

Design Contingency:

A Design/Estimating contingency is included in the summary sheet. This is to allow for items not shown in the drawings or in absence of technical specifications, and any addenda produced during the bidding stage. It is also to allow for items included in the front end document, i.e., special contractual provisions including liquidated damages and minority stipulations, restrictions on working conditions, etc. No design contingency included.

Design/Estimating contingencies include, but are not limited to the following:

1. Items and systems not shown on the plans
2. Systems not fully designed
3. Final specifications
4. Final general and supplementary conditions
5. Code clarifications
6. Final engineering calculations
7. Details not designed or drawn

Note: Unit prices DO NOT include contingencies.

Escalation:

Escalation is not included in the estimate.

ESTIMATING ASSUMPTIONS AND COMMENTS

General:

- a. Material prices are at 3rd Quarter 2006 level; include taxes and contractor's markups.
- b. Labor cost is based on prevailing wages.
- c. Work to be done during normal business hours.
- d. This estimate can vary due to change in scope.
- e. Unit costs are based on historical cost data.
- f. Assume buildings are not occupied during construction.
- g. Quantities are obtained as shown on the drawings.
- h. Installation cost, supervision, and coordination for material and equipment are included in the estimate.
- i. General conditions include insurance, office personnel costs, dust control, and other items not mentioned in General requirements.
- j. Design Contingency is not included in the cost estimate.

ESTIMATE OF PROBABLE CONSTRUCTION COST

The estimated Probable Construction Costs reflect the anticipated unit costs of the **Energy Measures in the Palm Desert Study, in City of Palm Desert CA**. This estimate is based on a competitive open bid process with a recommended six or more bids from reputable general contractors, and a minimum of three bids for all subcontracted items.

Cost of materials, labor, equipment or services furnished by others, and the contractors' or vendors' methods of determining prices are determined by market and/or economic conditions. Hence, the Estimator cannot and does not guarantee that proposals, bids or actual project costs will not vary from this Estimate of Probable Construction Cost.

This Estimate of Probable Construction Cost is exclusive of all costs associated with changes, modifications or addenda to the drawings and/or specifications subsequent to the preparation of this estimate.

ESTIMATE OF PROBABLE CONSTRUCTION COST

**ENERGY MEASURES
CITY OF PALM DESERT
PALM DESERT, CA**

Estimate: Conceptual
DTA Job Number: 10-061-001
Date: 09/20/06
Revised:
Bldg. Area - SF:

Prepared By: DON TODD ASSOCIATES, INC.

Estimator: eev/gag

Div	Description	Qty	Unit	Cost	Extension	Sub Unit Cost	Mark-ups	Total Unit Cost
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17.87%

Note: Total Unit Cost includes General Contractor's General Conditions(8%), OH & P (7%), Bond (2%)

DIVISION 7 - MOISTURE & THERMAL INSULATION

Assemblies With Insulation (Excluded Cost of Wood Studs/Ceiling Joists/Floor Joists)

R-13 Batt Insulation in 2x4 wood studs walls	1	SF	\$	0.67	\$	0.67	\$	0.67	\$0.12	\$	0.79
R-19 Batt Insulation in 2x6 wood studs walls	1	SF	\$	0.73	\$	0.73	\$	0.73	\$0.13	\$	0.86
R-21 Batt Insulation in 2x6 wood studs walls	1	SF	\$	1.03	\$	1.03	\$	1.03	\$0.18	\$	1.21
R-19 Batt Insulation in 2x10 wood floor joists	1	SF	\$	0.73	\$	0.73	\$	0.73	\$0.13	\$	0.86
R-30 Batt Insulation in 2x10 wood floor joists	1	SF	\$	1.20	\$	1.20	\$	1.20	\$0.21	\$	1.41
R-30 Batt Insulation in (attic) ceiling joists	1	SF	\$	1.23	\$	1.23		\$1.23	\$0.22	\$	1.45
R-30 Batt Insulation in (attic) ceiling joists with radiant barrier under roof sheathing	1	SF	\$	1.43	\$	1.43		\$1.43	\$0.26	\$	1.69
R-38 Batt Insulation in (attic) ceiling joists with radiant barrier under roof sheathing	1	SF	\$	1.56	\$	1.56	\$	1.56	\$0.28	\$	1.84

House Wrap

Tyvex on all exterior walls, Installed cost	1	SF	\$	0.34	\$	0.34	\$	0.34	\$0.06	\$	0.40
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DIVISION 8 - DOORS & WINDOWS

Milgard 4520 vinyl casement, 3' x 4', SHGC=0.37 (LoE-172)	1	SF	\$	40.00	\$	40.00	\$	40.00	\$7.15	\$	47.15
Milgard 4520 vinyl casement, 3' x 4', SHGC=0.27 (Super LoE- w/ Cardinal 360)	1	SF	\$	43.00	\$	43.00	\$	43.00	\$7.68	\$	50.68

ESTIMATE OF PROBABLE CONSTRUCTION COST

**ENERGY MEASURES
CITY OF PALM DESERT
PALM DESERT, CA**

Estimate: Conceptual
DTA Job Number: 10-061-001
Date: 09/20/06
Revised:
Bldg. Area - SF:

Prepared By: DON TODD ASSOCIATES, INC.

Estimator: eev/gag

Div	Description	Qty	Unit	Cost	Extension	Sub Unit Cost	Mark-ups	Total Unit Cost
-----	-------------	-----	------	------	-----------	---------------	----------	-----------------

17.87%

DIV 15 - MECHANICAL

Water Heaters

Installation includes piping and fittings

AO Smith FPD-50-251, 50 gal. EF=0.58	1 EA	\$ 818.75	\$ 818.75					
Water Copper piping, fittings, Insul. & valves	1 LS	\$ 688.00	\$ 688.00					
Gas Steel piping, fittings & gas valve, 3/4"	75 LF	\$ 9.61	\$ 720.75					
Vent pipe, fittings & cap	1 LS	\$ 225.00	\$ 225.00					
Installed Cost						\$2,453	\$438	\$ 2,891
Rheem 41-R5N, 50gal. EF=0.62	1 EA	\$ 1,057.14	\$ 1,057.14					
Water Copper piping, fittings, Insul. & valves	1 LS	\$ 688.00	\$ 688.00					
Gas Steel piping, fittings & gas valve, 3/4" Dia.	75 LF	\$ 9.61	\$ 720.75					
Vent pipe, fittings & cap	1 LS	\$ 225.00	\$ 225.00					
Installed Cost						\$2,691	\$481	\$ 3,172
State PRV 75NRVT1, 75 gal. EF=.52	1 EA	\$ 1,235.00	\$ 1,235.00					
Water Copper piping, fittings, Insul. & valves	1 LS	\$ 688.00	\$ 688.00					
Gas Steel pipe fittings & gas valve, 3/4"	75 LF	\$ 9.61	\$ 720.75					
Vent pipe, fittings & cap	1 LS	\$ 265.00	\$ 265.00					
Installed Cost						\$2,909	\$520	\$ 3,429
Noritz America corp. N-063S, Tankless gas water heater, EF=0.802	1 EA	\$ 1,109.00	\$ 1,109.00					
Water Copper piping, fittings & valves	1 EA	\$ 584.00	\$ 584.00					
Gas Steel piping, fittings & gas valve, 1-1/2" dia	75 LF	\$ 14.16	\$ 1,062.00					
Vent pipe, fittings & cap	1 EA	\$ 425.00	\$ 425.00					
Installed Cost						\$3,180	\$568	\$ 3,748

ESTIMATE OF PROBABLE CONSTRUCTION COST

**ENERGY MEASURES
CITY OF PALM DESERT
PALM DESERT, CA**

Estimate: Conceptual
DTA Job Number: 10-061-001
Date: 09/20/06
Revised:
Bldg. Area - SF:

Prepared By: DON TODD ASSOCIATES, INC.

Estimator: eev/gag

Div	Description	Qty	Unit	Cost	Extension	Sub Unit Cost	Mark-ups	Total Unit Cost
							17.87%	
	Takagi T-KD20, Tankless water heater Input 185,000Btuh, EF=.82	1	EA	\$ 1,000.00	\$ 1,000.00			
	Water Copper piping, fittings & valves	1	EA	\$ 584.00	\$ 584.00			
	Gas Steel piping, fittings & gas valve, 1-1/2"	75	LF	\$ 14.16	\$ 1,062.00			
	Vent pipe, fiittings & cap	1	EA	\$ 425.00	\$ 425.00			
	Installed Cost					\$3,071	\$549	\$ 3,620
Water Heater Pipe Insulation								
	1" thick pipe insulation							
	1" pipe	1	LF	\$ 4.85	\$ 4.85	\$ 4.85	\$0.87	\$ 5.71
	3/4" pie	1	LF	\$ 4.68	\$ 4.68	\$ 4.68	\$0.84	\$ 5.52
	1/2" pipe	1	LF	\$ 4.40	\$ 4.40	\$ 4.40	\$0.79	\$ 5.18
Gas furnace								
	AFUE = Annual Fuel Utilization Efficiency							
	Bryant 310AAV036045, AFUE=0.80, 36,000 BTU output	1	EA	\$ 1,297.00	\$ 1,297.00			
	Gas Steel piping, fittings & gas valve	1	EA	\$ 575.00	\$ 575.00			
	Vent pipe, fiittings & cap	1	EA	\$ 638.00	\$ 638.00			
	Installed Cost					\$2,510	\$449	\$ 2,959
	Bryant 311JAV0480070, AFUE=0.80, 48,000 BTU output	1	EA	\$ 1,329.00	\$ 1,329.00			
	Gas Steel piping, fittings & gas valve	1	EA	\$ 575.00	\$ 575.00			
	Vent pipe, fiittings & cap	1	EA	\$ 688.00	\$ 688.00			
	Installed Cost					\$2,592	\$463	\$ 3,055
	Bryant 340MAV036040, AFUE=0.921, 36,000 BTU output	1	EA	\$ 1,445.00	\$ 1,445.00			
	Gas Steel piping, fittings & gas valve	1	EA	\$ 575.00	\$ 575.00			
	Vent pipe, fiittings & cap	1	EA	\$ 638.00	\$ 638.00			
	Installed Cost					\$2,658	\$475	\$ 3,133
	Bryant 340MAV048060, AFUE=0.921, 48,000BTU output	1	EA	\$ 1,470.00	\$ 1,470.00			
	Gas Steel piping, fittings & gas valve	1	EA	\$ 575.00	\$ 575.00			

ESTIMATE OF PROBABLE CONSTRUCTION COST

**ENERGY MEASURES
CITY OF PALM DESERT
PALM DESERT, CA**

Estimate: Conceptual
DTA Job Number: 10-061-001
Date: 09/20/06
Revised:
Bldg. Area - SF:

Prepared By: DON TODD ASSOCIATES, INC.

Estimator: eev/gag

Div	Description	Qty	Unit	Cost	Extension	Sub Unit Cost	Mark-ups	Total Unit Cost
							17.87%	
	Vent pipe, fiittings & cap	1	EA	\$ 688.00	\$ 688.00			
	Installed Cost					\$2,733	\$488	\$ 3,221
Split Air Conditioners								
	SEER =Seasonal Energy efficiency ratio							
	EER = Eney Efficiency Rating							
	TXV = Thermostatic Expansion Valve							
	Bryant 550AN036 w/TXV, SEER=13.0 & EER=11.2	1	EA	\$ 1,079.00	\$ 1,079.00			
	Refrigerant piping	1	EA	\$ 450.00	\$ 450.00			
	Installed Cost					\$1,529	\$273	\$ 1,802
	Bryant 539GN048 w/TXV, SEER=13.0 & EER=11.3	1	EA	\$ 1,390.00	\$ 1,390.00			
		1	EA	\$ 495.00	\$ 495.00			
	Installed Cost					\$1,885	\$337	\$ 2,222
	Bryant 539GN060 w/TXV, SEER=13.0 & EER=11.5	1	EA	\$ 1,490.00	\$ 1,490.00			
		1	EA	\$ 538.00	\$ 538.00			
	Installed Cost					\$2,028	\$362	\$ 2,390
	Bryant 537GN036 w/TXV, SEER=14.0 & EER=11.9	1	EA	\$ 1,281.00	\$ 1,281.00			
		1	EA	\$ 450.00	\$ 450.00			
	Installed Cost					\$1,731	\$309	\$ 2,040
	Bryant 537GN048 w/TXV, SEER=14.0 & EER=11.9	1	EA	\$ 1,593.00	\$ 1,593.00			
		1	EA	\$ 496.00	\$ 496.00			
	Installed Cost					\$2,089	\$373	\$ 2,462
	Bryant 537GN060 w/TXV, SEER=14.0 & EER=11.7	1	EA	\$ 1,830.00	\$ 1,830.00			
		1	EA	\$ 538.00	\$ 538.00			
	Installed Cost					\$2,368	\$423	\$ 2,791

ESTIMATE OF PROBABLE CONSTRUCTION COST

**ENERGY MEASURES
CITY OF PALM DESERT
PALM DESERT, CA**

Estimate: Conceptual
DTA Job Number: 10-061-001
Date: 09/20/06
Revised:
Bldg. Area - SF:

Prepared By: DON TODD ASSOCIATES, INC.

Estimator: eev/gag

Div	Description	Qty	Unit	Cost	Extension	Sub Unit Cost	Mark-ups	Total Unit Cost
-----	-------------	-----	------	------	-----------	---------------	----------	-----------------

17.87%

Duct Insulation

Assume ductwork = 0.4lbs per sf
Total weight = 1,000lbs area = +/- 500 SF of insulation
Material Fiberglass duct Wrap Insulation

R-4.2 on all ducts in a typical 2,500 SF house, Installed cost	500	SF	\$ 2.94	\$ 1,470.00	\$ 1,470.00	\$263	\$	1,733
R-6.0 on all ducts in a typical 2,500 SF house, Installed cost	500	SF	\$ 3.23	\$ 1,615.00	\$ 1,615.00	\$289	\$	1,904
R-8.0 on all ducts in a typical 2,500 SF house, Installed cost	500	SF	\$ 3.81	\$ 1,905.00	\$ 1,905.00	\$340	\$	2,245

HERS measures (installed cost, Not HERS verified)

HERS = Home Energy Rating systems

Based on open letter from California's Energy Commission beginning October 1, 2005, you must have your home's ducts tested for leaks when you have a central air conditioner or furnace installed or replaced. Ducts that leak 15 percent or more must be repaired to reduce the leaks.

Duct Leakage Reduction/Testing for 2 systems, 2500 SF house: Assume 2500 sf house with two Central Air Conditioner & Gas	1	LS	\$ 800.00	\$ 800.00	\$ 800.00	\$143	\$	943
Building Leakage Reduction/Testing, specific Leakage Area =3.8 or less, 2500 house: Assume 2500 sf house with two Central Air Conditioner & Gas Furnace System.	1	LS	\$ 1,200.00	\$ 1,200.00	\$ 1,200.00	\$214	\$	1,414
Duct Leakage Reduction/Testing for 3 systems, 5000 SF house:	1	LS	\$ 1,200.00	\$ 1,200.00	\$ 1,200.00	\$214	\$	1,414

ESTIMATE OF PROBABLE CONSTRUCTION COST

**ENERGY MEASURES
CITY OF PALM DESERT
PALM DESERT, CA**

Estimate: Conceptual
DTA Job Number: 10-061-001
Date: 09/20/06
Revised:
Bldg. Area - SF:

Prepared By: DON TODD ASSOCIATES, INC.

Estimator: eev/gag

Div	Description	Qty	Unit	Cost	Extension	Sub Unit Cost	Mark-ups	Total Unit Cost
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17.87%

Assume 5,000 sf house with three Central Air Conditioner & Gas Furnace System.

Building Leakage Reduction/Testing, specific Leakage Area =3.8 or less, 5000 house:
Assume 5,000 sf house with three Central Air Conditioner & Gas Furnace System.

1	LS			\$ 1,800.00	\$ 1,800.00	\$ 1,800.00	\$322	\$ 2,122
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Fan Motors

Std. 1 HP fan motor in typ. HVAC system supply air handler
NEMA Premium Efficiency 1 Hp fan motor in typical HVAC system supply air handler

1	EA			\$ 1,134.00	\$ 1,134.00	\$ 1,134.00	\$203	\$ 1,337
1	EA			\$ 1,248.00	\$ 1,248.00	\$ 1,248.00	\$223	\$ 1,471

Std. 2.5 HP Fan Motor in typ. HVAC system supply air handler
NEMA Premium Efficiency 2.5 Hp fan motor in typical HVAC system supply air handler

1	EA			\$ 1,236.00	\$ 1,236.00	\$ 1,236.00	\$221	\$ 1,457
1	EA			\$ 1,472.00	\$ 1,472.00	\$ 1,472.00	\$263	\$ 1,735

Std. 5 HP fan motor in typ. HVAC system supply air handler
NEMA Premium Efficiency 5 Hp fan motor in typical HVAC system supply air handler

1	EA			\$ 1,428.00	\$ 1,428.00	\$ 1,428.00	\$255	\$ 1,683
1	EA			\$ 1,603.00	\$ 1,603.00	\$ 1,603.00	\$286	\$ 1,889

DIV 16 - ELECTRICAL

Lighting

Std. Bathroom Light Switch
Wattstopper Manual-On (Vacancy) Light Switch
Std 2-Lamp, 4' T8 Electronic Ballast

1	EA			\$ 39.00	\$ 39.00	\$ 39.00	\$7	\$ 46
1	EA			\$ 147.00	\$ 147.00	\$ 147.00	\$26	\$ 173
1	EA			\$ 212.00	\$ 212.00	\$ 212.00	\$38	\$ 250
1	EA			\$ 269.00	\$ 269.00	\$ 269.00	\$48	\$ 317

Programmable, Rapid Start Eff. 2-Lamp, 4' T8 Electronic Ballast

**Appendix C: Savings By Design Filing for the 2006-2008 Program
to the California Public Utilities Commission**

Savings By Design

1. Projected Program Budget	\$	28,458,461
2. Projected Program Impacts		
MWh		128,617
MW (Summer Peak)		26.32
3. Program Cost Effectiveness		
TRC		2.81
PAC		3.95

4. Program Descriptors

Market Sector: Nonresidential New Construction
Program Classification: Statewide
Program Status: Revised Existing

5. Program Statement

Savings By Design (SBD) will continue to improve upon established successful approaches to overcome customer/market barriers to designing and building high performance facilities. SBD will provide the nonresidential new construction industry with a broad palette of technical and financial resources to aid them in designing new facilities to the most cost-effective energy and resource efficiency standards. SBD will also tailor current marketing and delivery efforts to further penetrate into a wider array of market and customer segments.

SBD will provide the nonresidential new construction industry with a broad spectrum of technical and financial resources to assist the industry in the design of new facilities with the maximization of cost-effective electric energy efficiency integration as a primary consideration, along with water, gas, and other related environmental and sustainability

What's New for 2006-08?

- Innovation
 - A new program element to apply incentives to design efforts only rather than both design and construction efforts
 - Targeting specific customer segments such as hospitals, clean rooms, and fast food
- Integration
 - Program materials and assistance to include connections with demand response and self generation offerings.
 - A revised incentive structure that recognizes the time-dependent valuation basis of the new Title 24 energy standard.
- Other Program Improvements
 - Review of processes and procedures to improve participation

considerations (White Paper, “Energy Efficiency Program Ideas,” NRDC; PAG/PRG Workshop Recommendations; Green Buildings Action Plan).

California’s Title 24 requirements set some of the most stringent energy regulations in the nation. Title 24, for some market actors, can be very confusing. As a result, customers and designers need education and guidance just to comply with the requirements. Exceeding these standard energy performance levels requires an even higher level of intense design, technical assistance, and motivation. SBD provides the tools and expertise necessary to exceed standard energy performance levels and achieve long-term energy and cost savings for the customer.

It’s been firmly established in SBD program evaluations that the integrated design process, when implemented correctly, can lead to highly cost-effective energy savings for most projects.

Yet, many in the design field are unaware of, or prohibited from,

SBD’s integrated design process, combined with financial incentives, can assist customers in moving beyond initial cost considerations and towards the realization of long-term energy cost savings, avoiding “lost opportunities”.

implementing energy efficiency strategies due to a lack of knowledge of the integrated design process and perceived budgetary constraints. As a result, energy efficiency is often a “lost” consideration, abandoned in favor of pursuing the “lower initial cost” option. SBD’s integrated design process, combined with financial incentives, can assist customers in moving beyond initial cost considerations and towards the realization of long-term energy cost savings, avoiding “lost opportunities”.

SCE/SCE PAG, PRG, Public Workshop, and Whitepaper Recommendations

A number of recommendations have been made during the scheduled program planning meetings and submitted as whitepapers by interested parties in the 2006-08 energy efficiency program planning process. Several of the concepts, ideas, and suggestions have been included as useful additions to the Savings By Design program. Below are the individual program recommendations and the corresponding actions to be included in the 2006-08 programs.

Recommendation: “Look at targeting programs to particular areas or sectors.”

Action: Recommendation adopted. SBD plans to continue and expand a variety of approaches to reach specialized areas of the industry. Areas planned for this type of focus include hard-to reach markets, such as leased office and retail spaces with high turnover rates; segments requiring a high level of technical support, such as hospitals and clean room applications; and rapidly designed-and-constructed facilities, such as quick-service restaurants and agricultural cold storage facilities. Other segments with specialized needs will be targeted as they are identified.

Recommendation: “Provide a higher incentive tier for the New Construction program, so that it continues to push the envelope, and ensure it’s consistent with the proposed federal

tax incentives. Consider a green building component for higher incentive tiers.” Also, “Provide a cross-marketing approach with the Governor’s Green Building Initiative.”

Action: Recommendation adopted. The Whole Building Approach in Savings By Design is built around a linearly escalating incentive rate, intended to push designers to aim for the highest levels of energy efficiency. For the 2006-08 program, SBD will work to develop an incentive structure for the Whole Building Approach to reflect the time-dependent valuation basis of the 2005 energy standard and to motivate designers to put a high priority on strategies that save energy during on-peak periods. Including a “green building” tier to support and work with industry trends toward sustainability will also be explored in conjunction with this incentive restructuring.

In addition program incentive structures will be modified across the board to further encourage owners and design teams to expand their inclusion of energy efficient opportunities.

Recommendation: “Allow commercial tenants who are renovating existing spaces (e.g. new HVAC and lighting without touching shell) to participate.”

Action: Recommendation adopted. Savings By Design has always allowed these projects to participate. However, historical participation has been low because of split incentives. For the 2006-08 program, a target component, focused on reducing the barriers found in customers involved in leased office and retail spaces with high turnover rates, will be added to the program.

Recommendation: “Include building commissioning in new construction programs.”

Action: Recommendation partially adopted. While it has been well-established that building commissioning is an effective avenue to ensure savings in new facilities, incorporating such services into a program has been difficult due to high costs and lack of standardization in the services offered in the market today. For the 2006-08 program, mandating prescribed installation standards for lighting and HVAC systems (beyond what the new code requires) will be adopted. Additionally, the program, through its Energy Design Resources component (now included in the Education, Training, and Outreach program), will continue to provide advanced informational resources and tools to support commissioning efforts within the new construction industry.

Recommendation: “Provide incentives for buildings for not installing central air conditioning in new construction.”

Action: Recommendation is already allowed in existing program structure. The Whole Building Approach component of SBD has always recognized and allowed, and will continue to encourage, innovative energy efficiency strategies when they are determined to contribute to real energy savings beyond standard practice.

Recommendation: “Consider the potential building projects associated with seismic upgrades mandated for hospitals throughout California.”

Action: Recommendation adopted. SBD will focus resources to better address the unique concerns within this segment as activity increases due to seismic upgrading.

Recommendation: “Do not over-allocate funds to SBD”.

Action: Recommendation adopted. The overall percentage of funds allocated to the nonresidential new construction area is no greater than allocated in prior program cycles.

6. Program Rationale

SCE's nonresidential new construction program will play an increased role in reducing the electric energy needs of new and expanding commercial, industrial, and agricultural facilities in SCE's service territory. Savings By Design will offer a full spectrum of support to building owners, architects, engineers, and other specialized consultants, providing the tools and information necessary to achieve optimum energy and resource efficiency in their projects.

By providing multi-level design, technical, and financial assistance to influence the basic design of a customer's project, Savings By Design's focused intervention minimizes lost

Savings By Design will offer a full spectrum of support to building owners, architects, engineers, and other specialized consultants, providing the tools and information necessary to achieve optimum energy and resource efficiency in their projects.

opportunities that may result when a building's performance is not a primary consideration in the design of a project. SCE will work to incorporate other existing offerings, internal and external to SCE, to assist projects that reflect a cohesive sense of sustainability that go beyond the traditional aspects of electric energy efficiency. Such offerings may include coordination with LEED™ certification and Energy Star® ratings; connections with demand-response, self-generation, and water conservation programs; partnerships with industry organizations to promote acceptance of new program approaches by design professionals, and others as applicable.

7. Program Outcomes

Savings By Design will:

- Motivate customers and design industry professionals to integrate energy use and environmental considerations into their standard process of design to achieve cost-effective levels of energy and resource efficiency.
- Move customers to design their facilities to achieve long term energy, resource, and cost savings, not just minimal compliance with mandated government regulations.
- Support industry trends and developments, such as the US Green Building Council's Leadership in Energy and Environmental Design (LEED™) building certification program and the California Energy Commission's switch to time-dependent valuation of energy use as the basis of the new Title 24 energy standards.
- Reduce customer confusion through appropriate alignment of SBD marketing materials with other applicable programs such as Education, Training, and Outreach, Codes and Standards, Emerging Technologies, the Business Incentive Program, and the new Sustainable Communities Program.
- Efficiently extend the reach of Savings By Design through support and coordination with utility-sponsored partnership programs such as the UC/CSU Partnership

program, the Collaborative for High Performance Schools, and the various city/county partnership programs.

- Provide customers with a full spectrum of sustainable energy design consulting and resources through active collaboration with a network of other “energy” agencies and programs (water, gas, renewable generation).
- The Business Incentive Program will process and provide resources to the Systems approach. The move will allow for increased participation and access by market players.
- Promote available resources to the new construction market players regarding Title 24 Code changes and how to exceed them cost-effectively. Support the time-dependent valuation of energy used as the basis of the new Title 24 energy standards.
- identify and capture additional gas energy savings that might have been overlooked previously.

SCE will continue to collaborate with the statewide Savings By Design team to share and coordinate program process “best practices” and marketing strategies, and contribute to tools and resources that enhance the overall cost-effectiveness of the statewide program.

8. Program Strategy

Savings By Design will:

- Build on the existing, award-winning statewide program that has been validated and proven successful for over six years in California. SCE will continue to collaborate with the statewide Savings By Design team to share and coordinate program process “best practices” and marketing strategies, and contribute to tools and resources that enhance the overall cost-effectiveness of the statewide program.
- Design and implement several focused efforts to more effectively reach customer and market segments where a traditional design assistance/financial incentive offering has been marginally successful. Areas currently planned for this type of focus include markets that have not been receptive to traditional program delivery approaches such as leased office and retail spaces with high turnover rates; segments requiring a high level of technical support such as hospitals and clean room applications; and rapidly designed-and-constructed facilities such as quick service restaurants and agricultural cold storage facilities. Other segments will be targeted as they are identified.
- Develop a program component that applies incentives to offset increased design costs rather than increased construction costs. It is anticipated that this will take the form of a training/certification process that will prepare design professionals to lead and facilitate an integrated design process with the goal of enhanced energy and resource efficiency into the majority of their projects, such that no additional construction costs are necessary. The results of this effort will be tracked and reported towards program goals.
- Develop and include a full spectrum of energy use and sustainability program offerings by collaboratively working with applicable gas, water, and other industry

groups. Issues such as energy savings associated with water use efficiency and the energy impacts of embodied energies in building materials and transportation will be explored and analyzed to identify potential new sources of energy savings.

- Collaborate with SCG specifically within the SCE service territory, Pacific Gas & Electric (PG&E) and San Diego Gas & Electric (SDG&E) generally, to assist in the identification and development of gas energy savings opportunities that have historically been overlooked.

- Collaborate with demand response and self-generation programs, as appropriate, to

Collaborate with demand response and self-generation programs, as appropriate, to combine program offerings into a customer-friendly and easy to navigate suite of materials.

combine program offerings into a customer-friendly and easy to navigate suite of materials. Technologies, such as building-integrated photovoltaic systems and energy management systems that are flexible enough to respond to new demand response strategies, are obvious strategies that can be integrated into a whole building approach to educate designers in the benefits of their adoption in new construction.

9. Program Objectives

The Savings by Design program will provide cost-effective energy savings and demand reductions as the result of installments which occur from the 2006-08 program. SCE's energy savings and demand reduction goals are provided in the detailed tables included with this Application. In addition, SCE intends to facilitate between 9 and 19 integrated design projects during the 2006-08 program period and between 4 and 7 projects in niche markets (e.g., leased spaces, hospitals, quick-service restaurants) during the 2006-08 program period.

10. Program Implementation

The Savings By Design program will promote two successful components – Whole Building Approach (Integrated Design) and Systems Approach to its customers with new construction or major remodel/renovation projects:

The Whole Building Approach (WBA) is the preferred method of estimating energy savings within SBD because it enables a design team to consider integrated, optimized energy efficiency solutions. This customized approach provides and requires a high level of energy analysis and interactive feedback, which generally leads to much more efficient design decisions. The key to maximizing energy choices, using this type of collaborative effort, is intervention at the earliest phase of building design.

For 2006 – 2008, the statewide Owner's incentives for electrical energy savings offered by the WBA will increase in a straight-line to 25% better than code. The incentive will range from \$.10 to \$.25 per kWh saved. Incentives for therms will range from \$.34 to \$1.00 per therm saved.

The Systems Approach (SA) is a simplified performance-based method utilizing a calculation tool known as CaNCCalc to optimize efficiency choices. It is straightforward and participants may find it the best available option for certain types of projects. The Systems Approach makes it easy for designers to look at the interaction of systems within their project, rather than individual equipment or fixtures. The Systems Approach is provided to address small, simple facilities where integrated opportunities are limited, as well as projects where program intervention may come late in the design phase.

For 2006 – 2008, statewide agreement was established to increase the following incentives:

Interior Lighting and Daylighting Systems - \$.05 per kWh

HVAC* - \$.14 per kWh and \$.60 per therm

Process and Other Systems - \$.08 per kWh and \$.60 per therm

Service Hot Water - \$.60 per therm

Projects participating under the SA, the cap will be increased to match the WBA cap at \$150,000 per project.

* Incentives offering will be dependent on the establishment of a downstream HVAC incentive component.

SBD also offers Design Team Incentives to support the extra effort for integrated energy design and to provide an incentive to reward exceptional design accomplishments within the context of the Whole Building Approach. In addition, SCE will pilot and develop a mechanism by which incentive dollars can be effectively applied to the design phase such that incremental costs are minimal and no financial offsets to the construction costs will be necessary. It is anticipated that this will take the form of a training/certification process that will prepare design professionals to facilitate an integrated design process focused on energy and resource efficiency into the majority of their projects.

For 2006 – 2008 DTI incentives will parallel the Owner's incentive offering by 1/3. Track A DTI will allow 50% of the DTI to be paid upon Agreement acceptance by the Utility, if the project performs at least 25% better than code.

The Track B DTI will continue to require "parametric analysis with life-cycle cost to enhance decision-making requirements. These analyses are contained in a report that is presented to the project owner and accepted by the Utility. Under this option, 50% of the DTI will be paid upon Agreement acceptance by the Utility. The stipend will not be offered.

Savings By Design will continue offering Design Assistance (DA) services. DA services have proven successful over the past years in providing energy calculations, design facilitation, and energy recommendations that provide the guidance and information building owners need to make well-informed design and construction decisions for their facilities. In many cases building owners find that design assistance services is the main influencer in their including energy efficient options in their building, even more

influential than a direct incentive. In these cases, Savings By Design will track and report such results toward its program goals.

Savings By Design will continue to build on the successful Alternative Delivery Method which invites third-party market players to implement program goals in specific hard-to-reach niches such as facilities with dominant refrigeration loads. For 2006-08, the program will explore a similar effort to more effectively extend the reach of the program into the arena of leased commercial spaces with high turnover rates. Other niche markets that may respond to a higher level of technical support will also be considered as they are identified.

SCE will also explore the potential of extending Targeted Approaches to market segments or industries where alternative interventions may be more effective than the traditional design

assistance/incentive example, simplified working with the rapidly designed-and-building types would facilities as quick

The integrated design process embodies the ability to design a facility with energy efficiency included as an objective from the start.

approach. For approaches to segment of constructed consider such service

restaurants. Customized Targeted Approach will focus on market segments such as hospitals and clean room facilities.

The integrated design process embodies the ability to design a facility with energy efficiency included as an objective from the start. When this is done correctly, it is assumed that the overall cost of construction for the energy efficient building will not exceed the cost of the building at minimum code compliance. As such, the focus of this offering is to provide an incentive to a certified design professional that provides an energy efficiency influence at the earliest stages of the design process using the integrated design approach. Therefore it is of utmost importance to insure the integrity of design professional's application of the Integrated Design/Whole Building approach process, to ensure the highest level of cost-effective energy efficiency in the final design.

SCE will fully support the inclusion of other energy sources and sustainability issues in its program delivery to its best ability. The first phase of including sustainability is to educate the field delivery team which is composed of new construction representatives (NCRs) and Business Customer Division Account Management.

SCE will bring in experts to identify energy savings measures for water and gas through technology solutions. In addition, educational opportunities will be provided to enhance the current understanding of self-generation applications, renewables, and the issues that might influence their use by customers.

Materials will be provide for those existing agencies and programs whose current offerings may be leveraged to raise the awareness and adoption of certain measures by

customers in their building design. Existing agencies and programs include Water agencies, SCG, USGBC LEED[®], CHPs, Energy Star[®], and others.

SCE's SBD representatives and staff will work closely with the SCG's SBD team to provide enhanced recommendations that will lead to higher fidelity gas savings in new construction projects and major renovation projects in SCE service territory.

11. Customer Description

Savings By Design specifically targets design and construction industry decision-makers: architects, mechanical engineers, electrical engineers, lighting designers, developers, contractors, energy consultants and, of course, building owners and operators.

SBD is available to the following customer participants: New construction or major renovation projects in nonresidential market segments (commercial, governmental, institutional, agricultural, and industrial).

SCE will explore the potential of developing targeted approaches to market segments or industries where alternative interventions may be more effective than the traditional design assistance/incentive approach. Simplified approaches for rapidly designed-and-constructed

building types such as quick service restaurants and agricultural

SCE will explore the potential of developing targeted approaches to market segments or industries where alternative interventions may be more effective than the traditional design assistance/incentive approach.

cold storage facilities will be considered, as well as others where potential is identified. Customized approaches for complex and specialized facilities, such as hospitals and clean rooms, where informed design assistance can be more persuasive than incentive dollars, will be actively explored.

Applicable program support and targeted efforts involving third-party driven activities will be competitively bid following SCE procurement diversity policy.

12. Customer Interface

Both the Systems Approach and the Whole Building Approach, as described in the "Program Implementation" section, follow the same delivery process. The process begins with initial contact between the customer and/or the customer's design team and an SCE new construction representative. These representatives are technical support staff trained to understand the dynamics and language of the design and construction industry and are focused primarily on the delivery of the Savings By Design program.

SCE will evaluate and explore options enhance access to participating in the program offerings while providing checks and balances to insure the integrity of the process and the results.

The owner completes and submits to the NCR a brief Letter of Interest that documents the specifics of the project, the design team (if known), and the owner's interest in participating in and receiving program benefits.

An initial meeting between all members of the design team, the NCR, and supporting technical staff is then held to discuss the parameters of the project and determine the appropriate approach for the project. Design assistance, matched to the needs and scope of the project, is offered for the project to identify and validate energy savings strategies appropriate to the facility under design.

The NCR and supporting technical staff continue to provide recommendations, feedback, consulting, and energy use analysis, as needed, to the owner and design team as the project proceeds through the various design phases. Such activity can vary in duration from months to years depending on the requirements of the customer's needs. This phase of the process culminates in a list of agreed-upon energy efficiency strategies that will be incorporated into the project.

At this point, an Incentive Agreement between the owner and SCE is executed. The execution of the Agreement generally should take place before the onset of building construction. When applicable, an Incentive Agreement between the design team leader and SCE is executed after the Owner Agreement has been finalized. These agreements can extend up to four years.

When the building construction has been substantially completed, SCE will make an on-site visit to each participating project to confirm compliance with the terms of the Agreement. Once the inclusion of all measures/strategies has been confirmed, the owner is paid the agreed-upon incentive amount. Should the completed construction vary from the Agreement, the available incentive will be recalculated to reflect the actual construction, and resulting energy savings, before the incentive is distributed.

13. Energy Measures and Program Activities

13.1. Measures Information

Measure information is provided in the corresponding cost-effectiveness calculator and portfolio workbook.

Calculation assumptions for eQUEST and CaNCCalc are located in Appendix 1, Section -IV. Calculation Assumptions.

13.2. Energy Savings and Demand Reduction Level Data

Energy savings and demand reduction information is provided in corresponding cost-effectiveness calculator and portfolio workbook.

13.3. Non-energy Activities

- Outreach/marketing activities, including annual Energy Efficiency Design Awards, co-sponsored with the AIA, California Council, to raise the awareness of successful high performance facilities within the design professions.

- Feasibility studies and pilot program components as needed to develop new program approaches to more effectively engage targeted market segments.
- Training and resource enhancements in concert with the Energy Design Resources component (now included in the Education/Training/Outreach program).
- SBD will participate in various conference and workshops to develop tools and concepts that will aid the program expand its education and efforts to encompass sustainability issues, Demand Response, water conservation, and enhanced gas savings into the program.
- SBD will continue to provide scholarships for students to attend the UC/CSU's Sustainability Conferences. The annual conference provides the architectural students with the rare opportunity to "see first-hand" that sustainability issues are growing in importance. The scholarship also provides SBD with a participatory role on a panel that answers questions regarding the SBD program and the compliance characteristics of potential customer projects.

13.4. Subcontractor Activities

SCE recognizes that including other industry experts in certain program implementation processes enhances and extends the value of program benefits that customers can receive. SCE will use competitively bid solicitations to select appropriate consultants for any and all of the following activities:

- Project-specific energy simulation design assistance for Whole Building Approach projects.
- Integrated energy design support, such as charrette facilitation and process training.
- Program marketing and delivery in technically specialized, hard-to-reach industries.

13.5. Quality Assurance and Evaluation Activities

To the extent subcontractors implement portions of the program, quality assurance measures will be put in place to ensure that standards of service and claimed savings have been achieved.

13.5.1. Expected Number/Percent of Inspections

One hundred percent of the participating projects are verified during an on-site visit as soon as a facility is substantially complete.

13.6. Marketing Activities

The primary marketing agent for Savings By Design is SCE's New Construction Services group, working in concert with SCE customer representatives to leverage long-standing relationships with assigned customers. For 2006-08, SBD program information will be included in marketing materials of the Business Incentive Program and other programs/services as appropriate, to extend the reach of the program through that delivery channel and reduce customer confusion as to program availability.

Additionally, individual memberships in pertinent local industry organizations such as American Institute of Architects, American Society of Heating, Refrigeration, and Air-conditioning Engineers, the Illuminating Engineers Society, the US Green Building Council, Construction Specifications Institute, and the International Council of Shopping

Centers are leveraged to build a presence in, and an informational resource for, members of these organizations.

Activity	Quantity
Brochures – one pagers	3- 6 projects/year
SBD Statewide Brochure	1 for program period
SBD Inserts (for program changes)	3 for program period
Targeted Market Fact Sheet	4 – 6 per year
Trade Journal Ads/Articles	1 - 3 per year
Energy Efficiency Design Awards	1 event
Conferences: CEE, AIACC, AIA National, AEE, ASHRAE, USGBC, Urban Marketplace, Green Expo.	4 – 8 per year
AIACC Sponsorship/Design Awards	1 per year

14. Program Changes

Savings By Design (SBD) for 2006 will modify its incentive structure. It will affect the following:

Category	Incentive Rate
Interior Lighting and Daylighting Systems	\$0.05/kWh
HVAC*	\$.014/kWh
Process and Other Systems	\$0.08/kWh

* The HVAC incentive will be offered to all measures not covered by the Comprehensive HVAC program or if a “downstream” incentive component is established.

In addition, the Whole Building Approach incentive structure will be modified. The statewide Owner’s Incentives for electrical energy savings will increase in a straight-line up to 25% better than the Title 24 Code requirement. The incentive rate will range from \$0.10 to \$0.25 per kWh saved. Incentives for therms will range from \$0.34 to \$1.00 per therm saved.

Project caps will be established at 50% of incremental measure costs or \$1,500,000 dollars whichever is lower.

The SBD program will evaluate establishing an incentive structure for the WBA which will reflect the time dependent valuation basis adopted in the 2005 Title 24 energy standard.

For 2006 – 2008 the Design Team Incentives (DTI) will parallel the Owner’s incentive offering by one-third. Track A - DTI – will allow 50% of the incentive to be paid upon acceptance of the Agreement, by the Utility, if the project performs at least 25% better than code. The balance of the incentive is paid at the time the project is completed. If the project does not meet the 25% standard the incentive is paid in full, at the time of project completion.

Track B – DTI – will continue to require “parametric” analysis with life-cycle cost analysis as part of the report. These features have proven to be a beneficial tool in a customer’s decision making process. Under this option 50% of the incentive is paid upon acceptance of the Agreement by the Utility. However, a stipend will no longer be offered.

SBD will continue offering its Design Assistance Services (DAS). DAS, which include energy calculations, design facilitation, training, and energy recommendations, have proven very successful in aiding customers’ decision to implement energy efficiency measures over the past years. In many cases building owners find that DAS is a significant influence in moving forward on energy efficient measures, anecdotally in some cases, more than a direct incentive. In cases such as these, SBD will track and report such results towards its program’s goals.

Although SBD has been very successful in its delivery and influence on the design and new construction market, it will over the next 3 years, evaluate and modify those processes that will help increase customer participation while maintaining the program’s high standards of quality services and energy savings.