



A GUIDE TO THE VALLEY-WIDE VOLUNTARY GREEN BUILDING PROGRAM

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Green For Life is an energy-saving program funded by the California Public Utilities Commission through Southern California Edison and administered by the Coachella Valley Association of Governments.

CREDITS

This GUIDE was produced by the collaborative effort of Southern
California Edison,
Coachella Valley Association of Governments,
Terra Nova Planning & Research and
Interactive Design Corporation.

PREFACE

This GUIDE to the Valley-Wide VOLUNTARY GREEN BUILDING PROGRAM introduces the issues of energy efficiency in buildings from the practical perspective of a property owner: “What should I do (to save energy/money)?” This practical introduction is not comprehensive, but rather is a “soft” opening. A knowledgeable person may choose to skip over these few pages. This GUIDE is an introduction to the VOLUNTARY GREEN BUILDING PROGRAM and the GREEN BUILDING MANUAL which is the “meat and potatoes” of the Program. You can find the GREEN BUILDING MANUAL online at www.greenforlifecv.org.

CHAPTER ONE, the next section, addresses the primary “things to do” with more information.

CHAPTER TWO illustrates the principles that underlie the “things to do.” This section is intended to help interested citizens, building owners, contractors and professionals become more fluent in the language of “green building.” If one understands the principles of energy-efficient design, other actions can also be taken to complement and supplement the basic “What should I do?” actions.

(CHAPTER THREE) Finally, because this Voluntary Program and the California Building Code are based upon standards and measurements, the Voluntary Program includes an extensive checklist of specific actions, and how they are counted toward a more energy efficient building.

What follows is the INTRODUCTION to the Valley-wide VOLUNTARY GREEN BUILDING PROGRAM.

PURPOSE AUDIENCE BUILDING

The purpose of the VOLUNTARY GREEN BUILDING PROGRAM is to answer three questions:

“What should I do to make my building more energy efficient?”

“Why do those actions reduce energy usage?”

“How are the effects of doing those actions measured?”

The Voluntary Program is intended for four audiences:

City Staff (Building & Planning Departments)

Owner and interested citizens

Building Contractors

Designers

The Voluntary Program addresses three building types:

Single family homes (new and remodel)

Multi-family (new and remodel)

Commercial (new and remodel)

PRACTICAL INFORMATIVE TECHNICAL

The **GUIDE** is written to assist City staff in understanding the Voluntary Program. It is also intended to explain the principles of energy efficient measures and design so that interested property owners, contractors and designers can communicate with each other about the most appropriate energy efficient measures to implement in their projects.

This **GUIDE** is organized as follows:

INTRODUCTION

The Practical Approach CHAPTER ONE
(What can I do now?)

The Informative Approach CHAPTER TWO
(Why does it save energy?)

The Technical Approach CHAPTER THREE
(How is it measured?)

Financial Analysis CHAPTER FOUR

Financial & Processing Incentive CHAPTER FIVE

Permitting Process CHAPTER SIX

Between the years 2007 and 2012, Southern California Edison's (SCE) energy efficiency programs have saved more than five billion kilowatt-hours—enough energy to power 725,000 homes for an entire year. The programs have reduced greenhouse gas emissions by more than 2 million metric tons—the equivalent of removing 350,000 cars from the road.

- SCE.com

INTRODUCTION

The INTRODUCTION explains why the Valley-wide VOLUNTARY GREEN BUILDING PROGRAM was developed:

Why was the Voluntary Program developed:

- To encourage building owners to exceed the California Energy Code by 15%
- To promote energy efficient design specific to THE COACHELLA & PALO VERDE VALLEY
- To promote energy efficient measures that are not part of the California Energy Code
- To explain the principles that underlie energy efficient design
- To promote practical and low-cost energy-saving measures and design

How does it relate to existing legislature and Codes:

- Make progress toward the 2020/2030 “net zero” State legislature goals
 - By 2020 all new single family homes must be “net zero”
 - By 2030 all new commercial buildings must be “net zero”

“Net zero” means that a building will generate, on site, as much energy as it uses.

- Provide a “soft opening” for upcoming changes to the California Energy Code (2014)
- Provide an extended learning period for City staff, contractors and designers regarding proposed changes to the California Energy Code.

How will it be implemented:

- It is voluntary
- It is customized to each jurisdiction
- It is parallel to the California Energy Code – it does NOT replace Title 24 or the California Energy Code

Harvesting the power of the sun is easy for homeowners and businesses like you who want to generate their own electricity. Incentives from the California Solar Initiative (CSI) program make it possible. Combined with tax credits and energy efficiency measures, CSI incentives can significantly reduce a solar system's cost, which means you get to keep more "green" in your wallet.

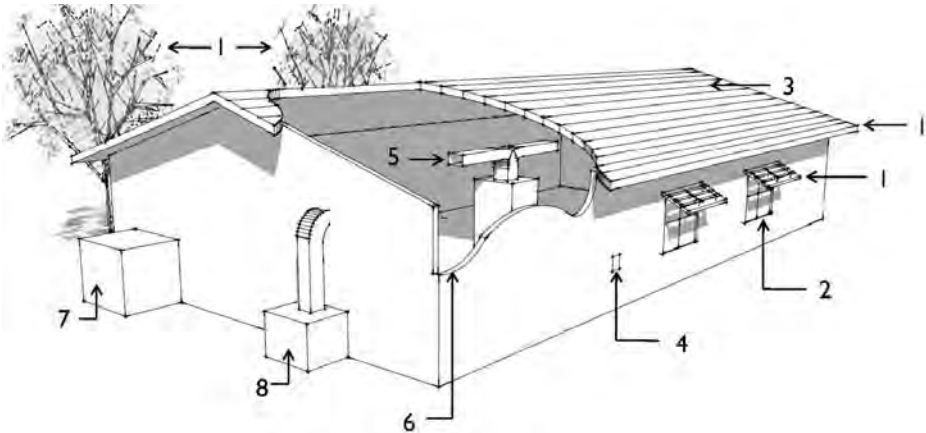
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CHAPTER ONE

The Practical Approach

“What can I do now for my home?”

SINGLE FAMILY



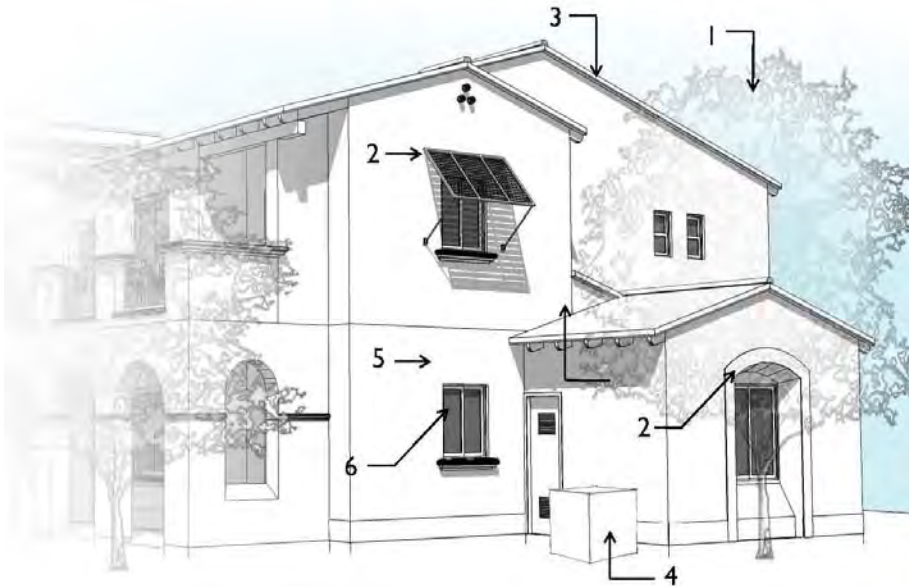
- 1 SHADE**
Add trellis, awnings, trees, lattice/vines
- 2 WINDOWS**
Install high efficiency windows with low U-value $\leq .34$ on new construction or replace/add film to existing
- 3 COOL ROOF**
Add coating on existing or select light colored materials for new
- 4 ENVELOPE AIR SEAL**
Seal gaps at existing wall penetrations
- 5 DUCT SEAL**
Tape leaks in existing pipes and ducts
- 6 ENVELOPE INSULATION**
Add spray foam with higher R-value to existing construction or select high R-value for new
- 7 HEATING VENTILATION & AIR CONDITIONING \geq SEER 13**
Replace unit with higher efficiency rating but proper size the A/C first
- 8 EVAPORATIVE COOLER**
Add cooler to existing or new for energy efficient ventilation

CHAPTER ONE

The Practical Approach

“What can I do now for my apartment building?”

MULTI-FAMILY



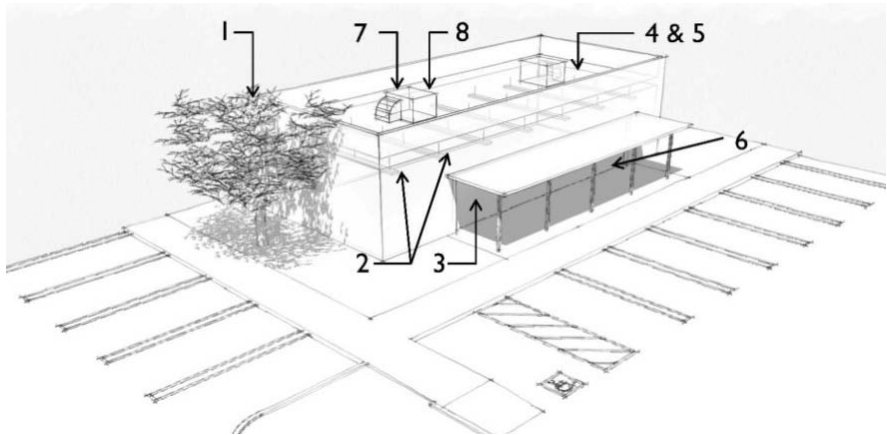
- 1 SHADE TREES
- 2 SHADE WINDOWS (E, S & W)
Add trellis, awnings, trees, lattice/vines
- 3 COOL ROOF
Add coating on existing or select light colored materials for new construction
- 4 HEATING VENTILATION & AIR CONDITIONING \geq SEER 13
Replace unit with higher efficiency rating
- 5 LIGHT COLORS
Paint exterior light colors to reflect the sun and heat
- 6 HIGH PERFORMANCE WINDOWS
Install film on the interior with a low Solar Heat Gain Coefficient.

CHAPTER ONE

The Practical Approach

“What can I do now for my business?”

COMMERCIAL



- 1 TREES ON WEST SIDE**
- 2 UPDATE LIGHTING**
Install compact fluorescent bulbs
- 3 SHADE WINDOWS**
Add trellis, awnings, trees, lattice/vines
- 4 COOL ROOF**
Add coating on existing or select light colored materials for new construction
- 5 ADD INSULATION**
Add spray foam with higher R-value to existing construction or select high R-value for new
- 6 UPDATE WINDOWS**
Install high efficiency windows with low U-value $\leq .34$ on new construction or replace/add film to existing single-glazed windows
- 7 DUCT TEST/SEAL**
Tape leaks in existing pipes and ducts
- 8 HEATING VENTILATION & AIR CONDITIONING \geq SEER 13**
Replace unit with higher efficiency rating

The Residential Multifamily Energy Efficiency Rebate Program offers property owners and managers incentives on a broad list of energy efficiency improvements in lighting, HVAC, insulation and window categories. These improvements are to be used to retrofit existing multifamily properties of two or more units.

- SCE.com

CHAPTER TWO

Informative Approach

"Why does it save energy?"

CHAPTER TWO of the Voluntary Program presents practical energy saving measures and illustrates the principles that underlie those measures.

<p>TYPE OF BUILDING →</p> <p>AREA TO CONSIDER →</p> <p>WHAT IS TO KNOW →</p> <p>GRAPHIC TO DEMONSTRATE THE SOLUTION →</p> <p>PRINCIPLES AND TERMS FOR SOLUTIONS →</p>	<p>VOLUNTARY GREEN BUILDING PROGRAM - MENU OF SUSTAINABLE DESIGN OPTIONS FOR THE HOMEOWNER PLANNING TO UPGRADE, REMODEL AND/OR ADD TO AN EXISTING HOME</p> <p>ROOF & ATTIC</p> <p>ROOF ASSEMBLY</p> <p>ROOF Heat gain through the roof is the largest single load the HVAC system has to counteract. Because the roof is exposed to the sun all day long the whole assembly quickly gets "saturated" with heat, and even during the night it continues to transfer heat inside.</p> <p>Re-roofing should accomplish two objectives: reflect solar radiant heat and resist heat transfer. "Cool roof" systems and radiant barriers reflect heat from radiation. Insulation increases the resistance to heat transfer, and rigid insulation on top of the existing sheathing keeps heat from penetrating the roof structure or attic insulation.</p> <p>A "ventilated" roof system accomplishes all of these objectives.</p> <hr/> <p>ATTIC COOLING</p> <p>ATTIC Most older homes often have minimal insulation installed on the ceiling joists. Adding more insulation is a good investment, but should be combined with improving airflow through the attic.</p> <p>The temperature in closed attics can reach 150 deg. Ventilation requires inlets and outlets, relief vents must be added low and high to take advantage of convection ventilation, and adding a solar powered exhaust fan without adding intake vents will not work. If the home has an evaporative cooler, adding relief vents in the ceiling will exhaust the cooled air up through the attic and out attic vents. The ceiling vents must be insulated.</p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">the envelope</p>
<p>SPECIFIC TOPIC →</p> <p>CLOSING STATEMENT →</p>	<p>DESIGN THE ROOF TO REDUCE HEAT</p>	

See CHAPTER TWO of the GREEN BUILDING MANUAL for full pages.

CHAPTER TWO

The Informative Approach

Let's break it down...

See CHAPTER TWO of the GREEN BUILDING MANUAL for full pages.

site & building form

GRAPHIC DETAIL
OF SUSTAINABLE
DESIGN OPTION

HOW TO ACHIEVE
THE SUSTAINABLE
DESIGN OPTION &
WHAT IT WILL
ACCOMPLISH

CHAPTER TWO

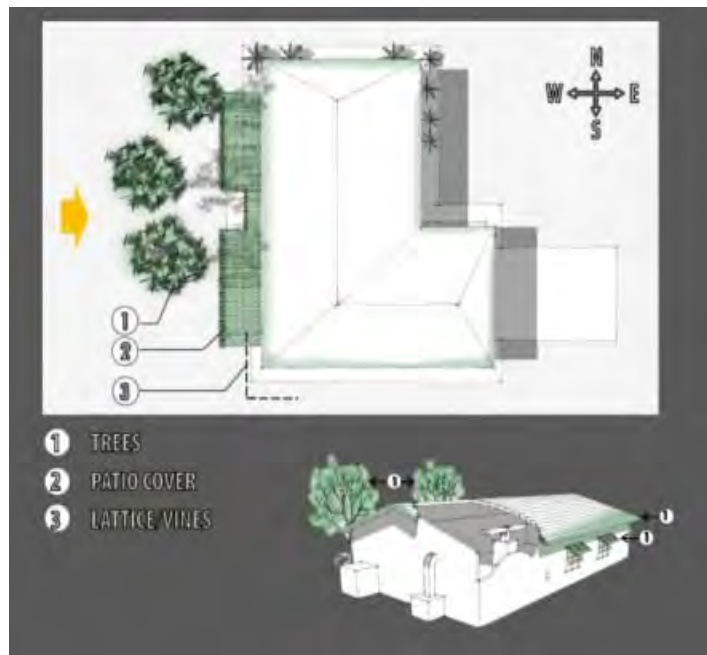
Informative Approach

It all starts with the sun...

Here in the Valley, we want protection from the sun: we park our cars under carports or under trees; we want roofs over our patios; we like the shade from trees. But the sun also feels good part of the year. So controlling exposure to the sun is the trick.

In the desert, cooling our buildings takes a lot more energy than heating them. So a common sense approach to energy saving is to shade the west (and south) sides of our buildings – with trees, patio covers, even “living walls.”

ORIENTATION
SHADE
REFLECTIVITY
EMISSIVITY



CHAPTER TWO

Informative Approach

See CHAPTER TWO of the GREEN BUILDING MANUAL for full pages.

**VOLUNTARY GREEN BUILDING PROGRAM - MENU OF SUSTAINABLE DESIGN OPTIONS
FOR THE HOMEOWNER PLANNING TO BUILD A NEW HOME**

ROOF & ATTIC

ROOF ASSEMBLY

THE ROOF
 Insulation is the principle means of resisting heat transfer, and generally more is better. But the location is also important. If the insulation is on top of the roof sheathing it helps more than the value from batt insulation between rafters – but both together is the best.

A reflective, "cool roof" system intercepts the radiant heat buildup. There are "cool roof" rated tiles, shingles and metal roof systems for sloped roofs. Single-ply "cool roof" systems for nominally flat roofs are very effective, and cumulatively, over the entire city, the heat island effect is reduced by "cool roof" systems. A "cool roof" system also prolongs the life of the roof membrane itself.

A ventilated roof system shades the actual weathertight thus prolonging its life, and circulates air over the membrane which also keeps it about the same temperature as the ambient air. Installing a PV system essentially creates a ventilated roof system.




FIG. 22
ROOF WITH CONVENTIONAL BATT




FIG. 23
ROOF WITH COOL ROOF PAINT

ATTIC COOLING

HOW TO ACHIEVE
THE SUSTAINABLE
DESIGN OPTION &
WHAT IT WILL
ACCOMPLISH

GRAPHIC DETAIL OF
SUSTAINABLE
DESIGN OPTION

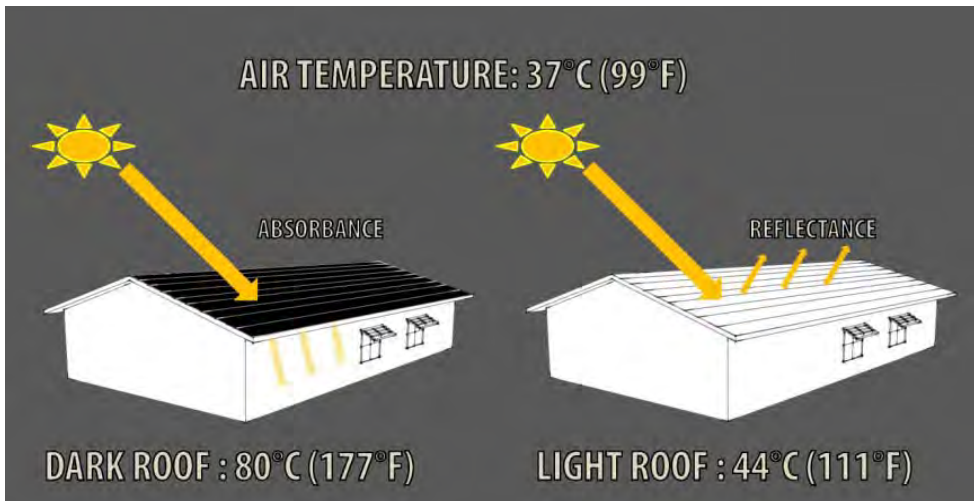
CHAPTER TWO

Informative Approach

The rest of CHAPTER TWO includes explanations and illustrations of the principles that underlie "Why does it save energy?" For example the idea of "cool roofs" is explained in terms of the solar reflectivity and emissivity of a roof.

ROOF: Roofs get hot because they absorb the sun's energy. A "cool roof" is a system that reflects sunlight and doesn't absorb (reflectivity), store and "emit" a lot of heat (emissivity). The minimum values for a "cool roof" are:

Reflectivity > 0.70 (Black tar ~ 0.10; Pure white ~ 0.95)
Emissivity > 0.75 (Aluminum foil ~0.90; Black tar ~ 0.20)



U vs R: The U-factor measures the entire assembly of a window, wall, roof, etc. The R-value is the resistance to thermal transfer of a single component (glass, insulation, stucco, etc.) To get the U-factor, you add up all the R-values and divide into 1 – sort of.

CHAPTER TWO

Informative Approach

See CHAPTER TWO of the GREEN BUILDING MANUAL for full pages.

VOLUNTARY GREEN BUILDING PROGRAM - MENU OF SUSTAINABLE DESIGN OPTIONS
FOR THE HOMEOWNER PLANNING TO BUILD A NEW HOME


WINDOWS & WALLS

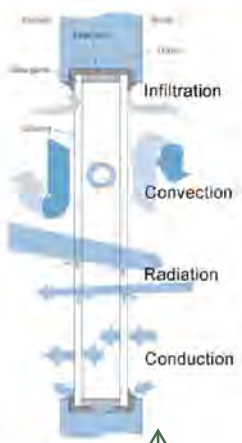
WINDOW ASSEMBLY

KEEP THE SUN OUT

Windows: Direct sunlight heats up the inside of a building the same way it makes a steering wheel too hot to touch. The best way to prevent radiant heat buildup is to shade the window. Additionally, the glass itself should be coated with a low emissivity (Low-e) substance.

This type of coating reflects much of the radiant energy and is measured by Solar Heat Gain Coefficient (SHGC). The lower the number, the better (0.23 is much better than 0.50.) However, the lower values are really only useful on windows that get direct sunlight. North-facing windows can have a higher SHGC.

 WINCHESTER INDUSTRIES HDR-BRISTOL 755 DOUBLE HUNG Vinyl frame, Triple Glazed Low E coating (per 0.03, 0.2 & 0.4) Argon/Krypton gas filled <small>(SHGC=0.23)</small>	
ENERGY PERFORMANCE RATINGS	
U-Factor (U.S.A.P.)	Solar Heat Gain Coefficient
0.21	0.22
ADDITIONAL PERFORMANCE RATINGS	
Visible Transmittance	
0.41	



WALL INSULATION

WALLS
Resisting heat transfer through walls generally is

HOW TO ACHIEVE THE SUSTAINABLE DESIGN OPTION & WHAT IT WILL ACCOMPLISH

GRAPHIC DETAIL OF SUSTAINABLE DESIGN OPTION

WINDOW STICKER INDICATING TYPE, U-VALUE AND SHGC

INCREASE ENERGY RATING TO 0.23 SHGC PER ENERGY STAR

CHAPTER TWO

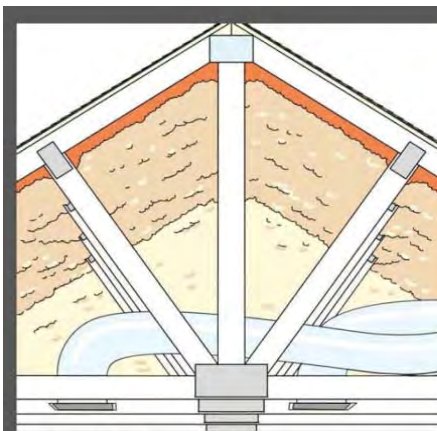
Informative Approach

WINDOW: Windows leak heat from conductance (air temperature) and radiation (sunlight.) Energy efficient windows resist conducting heat by double glazing and insulated frames; this is measured by the “U-value.” Windows resist radiant heat transfer by coatings (low-e) on the glass; this is measured by SHGC (solar heat gain coefficient.) Here in the Valley (Climate Zone 15), the practical minimum values are:

U-factor 0.35 (lower is better)
SHGC 0.30 (lower is better)

INSULATION: Insulation resists heat transfer by creating air pockets. The better the insulation material resists heat transfer the higher the R value (per inch.) Here in the Valley (Climate Zone 15), the practical minimum values are:

Walls R-19 (higher is better)
Roof/ceiling R-38



INSULATED ROOF



INSULATED WALL

Consider unplugging consumer electronics when they are not in use. (Even when turned off, CD players in the U.S. consume enough energy in one year to power the Las Vegas Strip for six months.) Consumer electric products are responsible for approximately 15 percent of household electricity use.

Replace lights and lamps with energy-efficient ENERGY STAR® qualified compact fluorescent (CFL) bulbs, which last up to 10 times longer and use up to 75% less electricity.

- SCE.com

CHAPTER THREE

Technical Approach

How the VOLUNTARY GREEN BUILDING PROGRAM is measured?

CHAPTER THREE of the Voluntary Program is the technical scorecard and point system of the energy saving building measures. The more green principles used in your building, the higher your scorecard will read in this Program.

TYPE OF BUILDING



TECHNICAL BUILDING MEASURES AND POINT SYSTEM						
FOR THE HOMEOWNER PLANNING TO UPGRADE, REMODEL AND/OR ADD TO AN EXISTING HOME						
		Source Code	Points	Check		
M	BASE REQUIREMENT		<ul style="list-style-type: none"> As California continues to grow, the state faces ever-increasing challenges in energy. One way to ensure our future is to improve the energy efficiency of the building envelope. 			
	T24 • Building designed to be at least 15% above California Building Code Title 24		CG	20		
1	EXISTING CONDITION EVALUATION		<ul style="list-style-type: none"> Reuse existing resources instead creating more landfill waste. 			
	1.1	<ul style="list-style-type: none"> Deconstruction: 50% of the weight of Existing buildings on the site are deconstructed and recycled at recycled centers. Documentation is required. 	CGA4.105.1	M	<input type="checkbox"/>	
	1.2	<ul style="list-style-type: none"> Reuse of materials: Materials can be easily reused but must be in compliance with T24 requirements. For example: <ul style="list-style-type: none"> Light fixtures, appliances, and electrical devices. Plumbing fixtures Door and trims Masonry Foundation 	CGA4.105.2	4	<input type="checkbox"/>	
			<ul style="list-style-type: none"> Home Reuse: maintain existing Walls, floors and roof. Maintain the existing building structure (including structural floor and roof decking) and envelope (the building framing, excluding window assemblies and non-structural roofing material). The minimum percentage building reuse for each point threshold is as follows: <ul style="list-style-type: none"> 50% 75% 95% 		CGA4.105.2	<input type="checkbox"/>
Subtotal				2 3 4	<input type="checkbox"/>	
2	SOLAR ORIENTATION		<ul style="list-style-type: none"> Protect east-, south- and west-facing windows from the sun; see also "window" 			
2.1	T24 • Configure new additions minimize west-facing walls and windows. The long axis should be within 30 deg. of south.		CGM 106.1 & AZ (Scott)		<input checked="" type="checkbox"/>	
3	SHADE		<ul style="list-style-type: none"> Shade your home (roof, walls, windows) with trees, overhangs, shutters or awnings 			
3.1	T24 • Use several strategies to provide appropriate shade: for east- and west-facing windows during the summer, and south-facing windows in the winter.		CG A4.205.2		<input type="checkbox"/>	
3.2	T24 • Awnings and overhangs need to be close to top of windows to effectively shade the glass. A good rule of thumb is to cover half the surface of glass at the summer solstice. (e.g. A 3' overhang at the header will cover the top half of a 4' tall window, 4'-0" would cover the top half of a 6'0" sliding glass door.)		CG A4.205.2, A4.407.7, GPR D.7		<input type="checkbox"/>	
3.3	T24 • Install window screens with a shading coefficient of .45 or lower to reduce heat radiation		AZ (Scott)		<input type="checkbox"/>	

SPECIFIC TOPIC



See CHAPTER THREE of the GREEN BUILDING MANUAL for full pages.

CHAPTER THREE

Technical Approach

Like CHAPTERS ONE & TWO, CHAPTER THREE is organized by building type (homes, apartments, and businesses) and progresses from issues outside the building (site conditions, building orientation, drainage, etc.), to the building envelope (roof, windows, etc), to the structural system (framing systems), to equipment selection and finally passive strategies and health considerations.

Each item is also cross referenced to other rating systems (Cal Green, LEED, Green Point) to direct a design professional toward further investigation.

CHAPTER THREE

Technical Approach

See CHAPTER THREE of the GREEN BUILDING MANUAL for full pages.

TECHNICAL BUILDING MEASURES AND POINT SYSTEM FOR THE HOMEOWNER PLANNING TO BUILD A NEW HOME				
15	AIR CONDITIONING:		<ul style="list-style-type: none"> Use high efficiency equipment (higher SEER and EER rating means higher efficiency – lower electrical usage, lower monthly bill). Efficiency is increased by dual-stage compressor and better controls. NOTE: the more choices you make that reduce the overall heat load on your home (more insulation, better windows, more shade) may reduce the size of the condensing unit (e.g. 3-ton vs. 4-ton). 	
	15.1	<ul style="list-style-type: none"> "Right-size" HVAC equipment. Carefully consider the energy efficiency measures selected in this Code that will influence the actual heat load on the air conditioning system. The size of the system (measured in "tons") may be reduced by as much as 30% through careful design and upgraded energy efficient measures. 	CG A4.407, LEED EA 6.1, 6.2, 6.3 & GPR H.5	M
	15.2	T24 • Perform duct leakage testing to verify a total leakage rate of less than 6 percent of the total fan flow.	CG A4.207.8 & LEED EA 5.1	
		T24 • General HVAC equipment verification and correction	CG A4.207 & GPR H.1	
	15.3	T24 • Use condensing units with two-stage compressors (generally on units with SEER 16 or higher.) Use units with a minimum of EER 11.5.	CG A4.207.6, GPR J.2.f AZ (Scott)	
	15.4	T24 • Design and install a whole-house fan system.	AZ (Scott)	
	15.5	T24 • Design and install an evaporative cooling system.	AZ (Scott)	
	15.6	T24 • Install ductwork within the conditioned envelope of building, in an underfloor crawl space, with an R-6 or higher insulation value or buried in the ceiling insulation.	CG A4.207.7	
15.7	<ul style="list-style-type: none"> Design the HVAC system to be zoned such that no more than two enclosed rooms are controlled by one thermostat (does not include bathroom, kitchens, closets, pantries, and laundry rooms). 	AZ (Scott)	4	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

SPECIFIC CATEGORY & BRIEF DESCRIPTION OF UNDERLYING PRINCIPLE

INDIVIDUAL CREDIT WITH DESCRIPTION

REFERENCE TO OTHER RATING SYSTEMS

CHAPTER THREE

The Technical Approach

CHAPTER THREE is the technical part of the Voluntary Green Building Program. All the design and equipment choices are listed and assigned a point value, and a “score card” is created for your building. When the points are totaled you will know whether the building meets or exceeds the minimum goal of the Voluntary Green Building Program: to exceed Title 24 by 15%.

Some of the items listed are mandatory (M) and some are already part of Title 24 energy calculations. These are highlighted in green (naturally) so one could simply select those items in green and they will directly improve Title 24 calculations. You may be able to reach the +15% simply by upping the values of these “green” items.

Items not highlighted in green do not directly relate to Title 24, but are valuable for energy efficient buildings. These items are assigned “points” and when the adjacent “check box” is checked, a running total is started.

CHAPTER THREE

Technical Approach

See CHAPTER THREE of the GREEN BUILDING MANUAL for full pages.

vs. 4-ton).			
size" HVAC equipment. Carefully consider the energy efficiency es selected in this Code that will influence the actual heat load on the litioning system. The size of the system (measured in "tons") may be l by as much as 30% through careful design and upgraded energy : measures.	CG A4.407, LEED EA 6.1, 6.2, 6.3 & GPR H.5	M	
duct leakage testing to verify a total leakage rate of less than 6 of the total fan flow.	CG A4.207.8 & LEED EA 5.1		
HVAC equipment verification and correction	CG A4.207 & GPR H.1		
ondensing units with two-stage compressors (generally on units with 6 or higher.) Use units with a minimum of EER 11.5.	CG A4.207.6, GPR J.2.f AZ (Scott)		
and install a whole-house fan system.	AZ (Scott)		
and install an evaporative cooling system.	AZ (Scott)		
uctwork within the conditioned envelope of building, in an underfloor ace, with an R-6 or higher insulation value or buried in the ceiling on.	CG A4.207.7		
the HVAC system to be zoned such that no more than two enclosed are controlled by one thermostat (does not include bathroom, s, closets, pantries, and laundry rooms).	AZ (Scott)	4	<input checked="" type="checkbox"/>
the furnace as a sealed - combustion unit.	AZ (Scott)	1	<input checked="" type="checkbox"/>

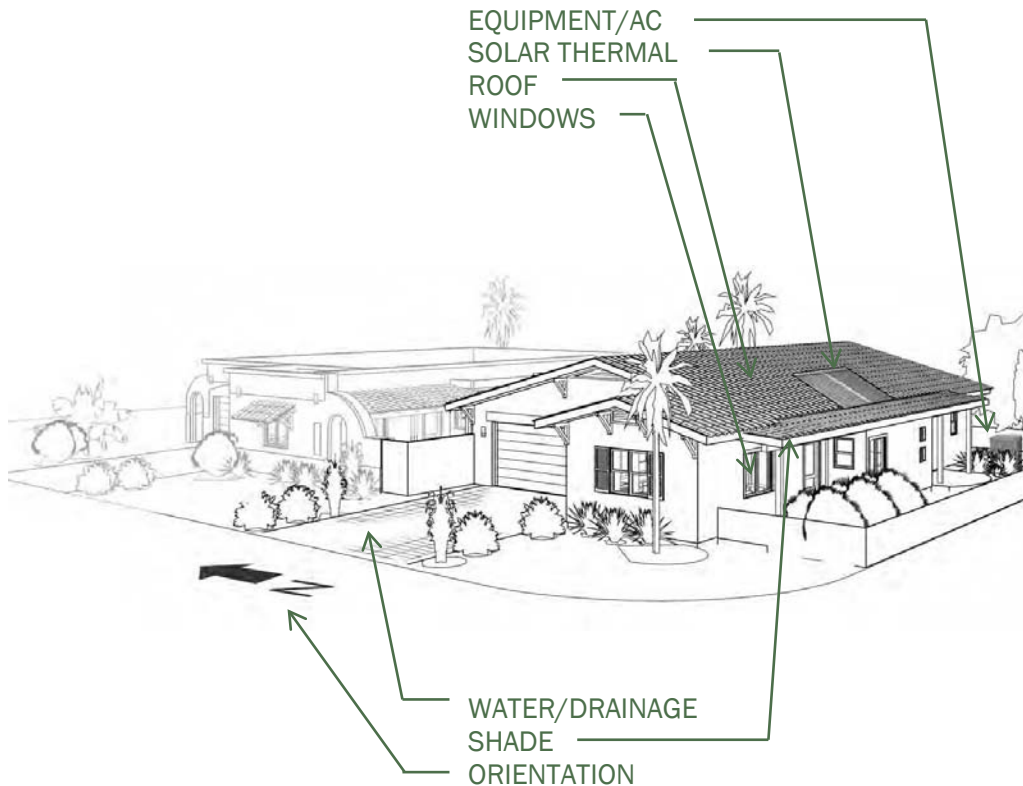
GREEN AREA:
THESE ITEMS
RELATE TO T-24
CALCULATIONS

POINT SYSTEM: RECEIVE
POINTS FOR EACH ITEM
(‘M’ IS MANDATORY)

CHECKBOX:
CHECK THIS IF
YOU COMMIT TO
THIS ITEM

SAMPLE PROJECT

New Home



Now that you have gone through the GUIDE, picture a sample home of 3 bedrooms with 2 bathrooms built in 2010 somewhere in the valley. It was designed, built and scored using credits from the Voluntary Green Building Program.

SAMPLE PROJECT

Credit Selection

The Sample New Home is designed with these energy efficient principles in mind:

ORIENTATION

This sample home is configured to minimize west-facing walls and windows. The long axis is within 30 degrees of south.

SHADE

The roof on the south & east facing sides of the house extends beyond the exterior wall 5' providing a covered porch. 25% of liveable area is outdoors.

WATER/DRAINAGE

Permeable pavers are installed on 20% of site for patios, walkways and driveways/parking.

ROOF

A radiant barrier is installed at the roof level. Roof is made of high durability/low maintenance fiber cement.

WINDOWS

Spectrally selective glazing is used on the east-, south- and west-facing windows.

EQUIPMENT/AC

Condensing units with two-stage compressor units are installed (SEER \geq 16). Use units with a minimum Energy Efficient Ratio (EER) of 11.5.

SOLAR THERMAL

A solar water heating system is installed because the demand for hot water is equivalent to the production of hot water.

On the next pages, we have reproduced the credits related to the items above and then added up the "points" to see how the sample house will score.

Keeping Score SAMPLE PROJECT

See CHAPTER THREE of the GREEN BUILDING MANUAL for full pages.

		Source Code	Points	Check
M	BASE REQUIREMENT	<ul style="list-style-type: none"> As California continues to grow, the state faces ever-increasing challenges in energy. One way to ensure our future is to improve the energy efficiency of the building envelope. 		
	T24 • Building designed to be at least 15% above California Building Code Title 24	CG	20	<input checked="" type="checkbox"/>
3	SOLAR ORIENTATION:	<ul style="list-style-type: none"> Protect east-, south- and west-facing windows from the sun; see also "window" 		
3.1	T24 • Configure new home to minimize west-facing walls and windows. The long axis should be within 30 deg. of south.	CGA4.106.1 & AZ (Scott)		
4	SHADE:	<ul style="list-style-type: none"> Shade your home (roof, walls, windows) with trees, overhangs, shutters or awnings. 		
4.2	T24 • Awnings and overhangs need to be close to top of windows to effectively shade the glass. A good rule of thumb is to cover half the surface of glass at the summer solstice. (e.g. A 30" overhang at the header will cover the top half of a 4' tall window; 4'-6" would cover the top half of a 6'8" sliding glass door.)	CG A4.205.2, A4.407.7, GPR D.7 & AZ (Scott)		<input type="checkbox"/>
4.5	<ul style="list-style-type: none"> Dwelling is designed with shaded outdoor living on north, south and/or east Provide total area of shaded outdoor living equal to at least 25% of total liveable floor area served. 	AZ (Scott)	2	<input checked="" type="checkbox"/>
Subtotal:			2	
6	WATER -RAIN:	<ul style="list-style-type: none"> Keep storm water on your lot with french drains, cisterns, retention basins. Keep water (rain and irrigation) away from the house 		
6.6	<ul style="list-style-type: none"> Use permeable pavers for patios, walkways and driveways/parking Min. 80% of exposed paving is light colored (at least 30% light reflectance value) No less than 20% of total on-site hardscape No less than 30% of total on-site hardscape 	AZ (Scott), CG A4.106.4 & GPR P.A.1	2	<input type="checkbox"/>
			2	<input checked="" type="checkbox"/>
			4	<input type="checkbox"/>
Subtotal:			2	
9	ROOF:	<ul style="list-style-type: none"> Use "cool roof" coating or materials 		
9.3	T24 • Install a radiant barrier at the roof level.	CG A4.205.1		
9.9	<ul style="list-style-type: none"> Use roof with a high durability/low maintenance material such as concrete, slate, clay or fiber cement. 	AZ (Scott)	2	<input checked="" type="checkbox"/>
Subtotal:			2	

When you check this specific box, the Title 24 calculations must show that in fact your building is 15% over T-24 requirements.

Credit 3.1
credit 4.2
credit 9.3
credit 11.1
credit 12.2
help in the calculation of T-24 and do not provide points outside of the credit.

SAMPLE PROJECT **Total Score**

See CHAPTER THREE of the GREEN BUILDING MANUAL for full pages.

Red titles correspond to page 27.

		Source Code	Points	Check
13	WINDOWS: <ul style="list-style-type: none"> Select windows for their frame material (vinyl or fiberglass), dual-glazing, and coatings (low-e) in relation to their orientation. Verify coatings are appropriate to the desert climate. (SHGC < 0.30) 			
12.2	T24 • Use spectrally selective glazing (SHGC of <0.28) on east-, south- and west-facing windows			
15	AIR CONDITIONING: <ul style="list-style-type: none"> Use high efficiency equipment (higher SEER and EER rating means higher efficiency – lower electrical usage, lower monthly bill). Efficiency is increased by dual-stage compressor and better controls. NOTE: the more choices you make that reduce the overall heat load on your home (more insulation, better windows, more shade) may reduce the size of the condensing unit (e.g. 3-ton vs. 4-ton). 			
15.1	* "Right-size" HVAC equipment. Carefully consider the energy efficiency measures selected in this Code that will influence the actual heat load on the air conditioning system. The size of the system (measured in "tons") may be reduced by as much as 30% through careful design and upgraded energy efficient measures.	CG A4.407, LEED EA 6.1, 6.2, 6.3 & GPR H.5	M >	
15.3	T24 • Use condensing units with two-stage compressors (generally on units with SEER 16 or higher). Use units with a minimum of EER 11.5.	CG A4.207.6, GPR J.2.f AZ (Scott)		
32	SOLAR - THERMAL: <ul style="list-style-type: none"> Even though solar thermal water heating is very efficient, for very low demand, it may not be practical. 			
32.1	* Install a solar water heating system when the demand of hot water is equivalent to the production of hot water or provide space on the roof surface (200 SF south-facing), penetrations (stand-offs) through the roof surface, and one-inch conduit for future solar installation. Consult with a structural engineer for additional load requirements to the existing roof structure.	CG A4.211.2 & 3	2	<input checked="" type="checkbox"/>
Subtotal:			2	
Total			28	

'M' is mandatory; this credit is a must for the California Energy Code.

Congratulations!! Your home scored at the Energy Leader Level

These credits are just a few examples. There are additional credits in CHAPTER THREE of the Voluntary Green Building Program but you are not required to select all.

The Southern California Edison (SCE) Resource Guide (PDF), also available in Spanish, helps link customers with community resources that can help, including programs to help income-qualified customers. The California Alternate Rates for Energy (CARE) program offers income-qualified customers a discount of 20% or more off their monthly electric bill. The Energy Savings Assistance Program pays for the cost of purchasing and installing energy efficient appliances and equipment for income-qualified customers.

- SCE.com

CHAPTER FOUR

Financial Analysis

CHAPTER FOUR offers a cost benefit analysis to help determine the most appropriate measures to apply for specific budgets. You can use this tool to determine the cost of the measures you have chosen and how long it will take for these measures to pay for themselves.

UNDER CONSTRUCTION

Incentives of up to \$4,000 are available to SCE and SoCalGas® residential customers with detached single-family homes (including all-electric) who complete qualifying energy-saving home upgrade projects. With a variety of participation options, you can correct your home's energy inefficiencies and reduce your monthly utility bills.

- SCE.com

Financial and Processing Incentive

CHAPTER FIVE

FINANCIAL INCENTIVES

To encourage participation in this Program, financial incentives are available to offset the costs of energy efficient upgrades. Incentives come in the form of private and public subsidies that support a variety of projects, including appliance upgrades and energy efficient building designs. The purpose of this section is to provide resources and information pertaining to current financial incentives for energy efficient upgrades.

The following websites and corresponding links provide incentive information:

Southern California Edison (SCE.com)

[Rebates and Savings](#) - SCE's Rebates and Savings homepage

[Heating and Cooling](#) - Rebates for products, installation and maintenance

[Multifamily Energy Efficient Rebate Program](#) - Offers property owners and managers incentives on a broad list of efficient improvements

ENERGY STAR (ENERGYSTAR.gov)

[ENERGY STAR](#) - Energy Star's homepage

[Special Offers and Rebates](#) - Check for special offers on qualified products

Energy Upgrade California (energyupgradeca.org)

[Homeowners](#) - Incentives offered to residential homeowners

[Contractors](#) - Incentives offered to licensed contractors

U.S. Department of Energy (energy.gov)

[California Appliance Rebates](#) - An application based, mail-in rebate program

[Tax Credits](#) - Federal tax credits for purchasing energy-efficient products

Edison International's subsidiary Southern California Edison (SCE) is the nation's largest purchaser of renewable energy, buying and delivering approximately 12.6 billion kilowatt hours (kWh) from wind, solar, biomass, geothermal and small hydro suppliers—almost 16 percent of the power it delivered to customers.

- SCE.com

CHAPTER SIX

Permitting Process

The VOLUNTARY GREEN BUILDING PROGRAM is designed to allow builders, developers and homeowners to go above and beyond California's Energy Code in terms of energy efficiency. As part of this Program, some Cities have committed to making it easier for those voluntarily participating in the Program to process their plans through the planning and building departments.

The requirements are different for each city. Please check the permitting process of your individual city.

Inspections by the City will continue to be required for the mandatory T24 requirements of the California Energy Code. These inspections are provided by the City's Staff (Building Department Inspector).

INSPECTIONS

The **VOLUNTARY PROGRAM** is self-reporting (except for the Title-24 credits.) It is based upon an honor system: you say you are going to do something to improve the energy efficiency of your building, and we believe that you will. However, there is great value to have third party verification of the actual installation of various measures.

Now, why do we say we will trust you, but not your contractor? Simply because the complexities and idiosyncrasies of every construction project present challenges to contractors. Sometimes they miss something, overlook something or simply make a mistake. It is in your interest to confirm that what the plans and specifications state, and what you pay for, are actually well-executed.

Therefore both the California Energy Code and the **VOLUNTARY PROGRAM** place high value on third party verification of four major elements: insulation, duct leakage, whole house leakage, and HVAC equipment. The first three require careful attention to detail and connections. Insulation and ducting is often installed improperly. HVAC requires proper sizing of the equipment prior to purchase. By inspecting insulation and duct work before walls are closed up (so errors can be corrected), the overall performance of the building is greatly enhanced. Professionals such as Home Energy Rating System (HERS) inspectors, are available to provide these services.

Every process of manufacturing and fabrication requires quality control; you can think of third-party verification as construction quality control.

WHERE TO LOOK

Where else to look for information...

Energy conservation is on everyone's mind, but it isn't always easy to find your way around all the programs and websites.

Below are links to some of these organizations – ones we think are especially relevant to our Desert Climate. By no means is the list comprehensive, but it will get you started looking for more information – or the same information presented differently.

Southern California Edison

<http://www.sce.com>

The California Energy Commission

<http://www.energy.ca.gov/title24/>

California State Energy Code

<http://www.bsc.ca.gov/Home/CALGreen.aspx>

United States Green Building Council

<http://www.usgbc.org>

Build It Green

<http://www.builditgreen.org/greenpoint-rated/>

California Energy Upgrade

<https://energyupgradeca.org/>

The Gas Company

<http://socalgas.com>

Imperial Irrigation District

<http://www.iid.com>

COLLEAGUES

A Word to Our

ARCHITECTS AND DESIGNERS:

The Voluntary Green Building Program and this GUIDE are learning tools. As practioners, we know how overwhelming and intimidating Building Codes are – for us and our clients. So we start with practical questions: “What should I do?” (to save money and energy). We give some simple practical steps, and then we illustrate the principles that underlie energy efficiency.

By starting simple and explaining terms and ideas, we hope everyone who uses this Program will have discussions about what options are available and appropriate for their project. Our goal is to bring “green” into the entire process of imagining, designing and building.

CONTRACTORS:

The Voluntary Green Building Program and this Guide are intended to help everyone who uses this Program understand the principles of energy efficient building. We have organized the Program and this GUIDE around the practical question “What should I do? (to save energy and money)”.

The Program is set up so you and your client can discuss the options available and appropriate for their project. Using the Program to help explain the principles behind energy efficient building, you can be an advisor as well as a builder.

Finally, the California Energy Code and the construction industry will continue to evolve toward the goal of “net zero” buildings. Becoming an advocate and expert now places you as a leader in your industry.

COLLEAGUES

A Word to Our

CITY STAFF:

We all recognize that the California Energy Code continues to evolve. The COACHELLA VALLEY GREEN BUILDING PROGRAM (CVGBP) is voluntary. We see it as a “soft opening” to energy efficient measures that will soon be mandatory.

The Program is also a learning tool to help explain both the “what and why” of energy efficiency building. We start by asking “What should I do? (to save energy and money)”. We then illustrate and explain specific measures (cool roof) so that the owner, the designer, the contractor can all discuss the options that are available and appropriate.

The Program is intended to be a learning tool to help demystify the California Energy Code and other energy efficiency measures. Because the Program is voluntary, it is more an invitation than a mandate for the entire project design team to consider energy efficiency from the initial concept through the entire construction process.



This program is funded by California utility ratepayers and administered by Southern California Edison under the auspices of the California Public Utilities Commission.

www.greenforlifecv.org