

~~2008 Title 24~~

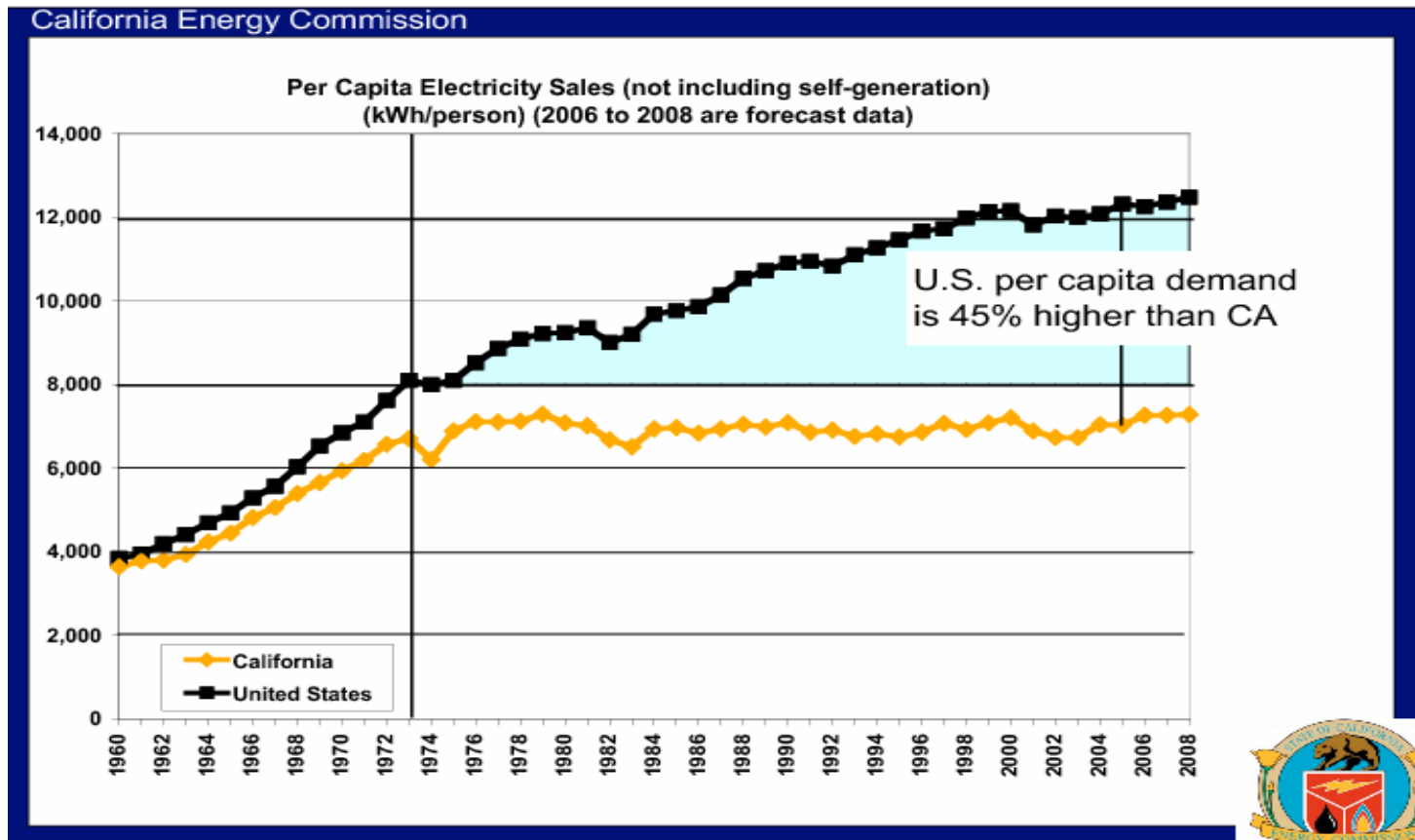
~~2009 Title 24~~

2010 Title 25

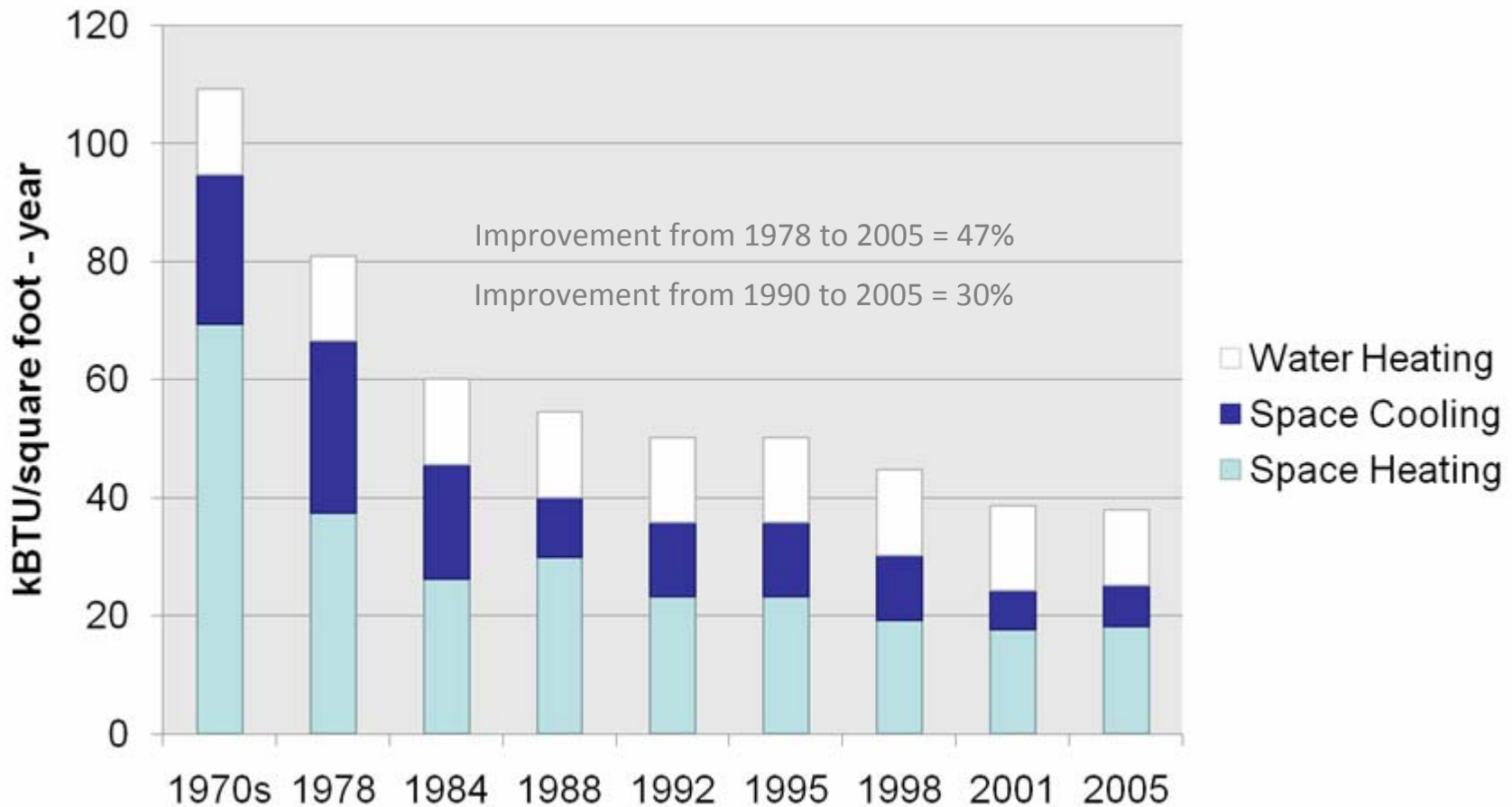
**Justin Dunning**  
**Director of Green Programs**  
**ConSol**  
**7-29-09**



# Title 24

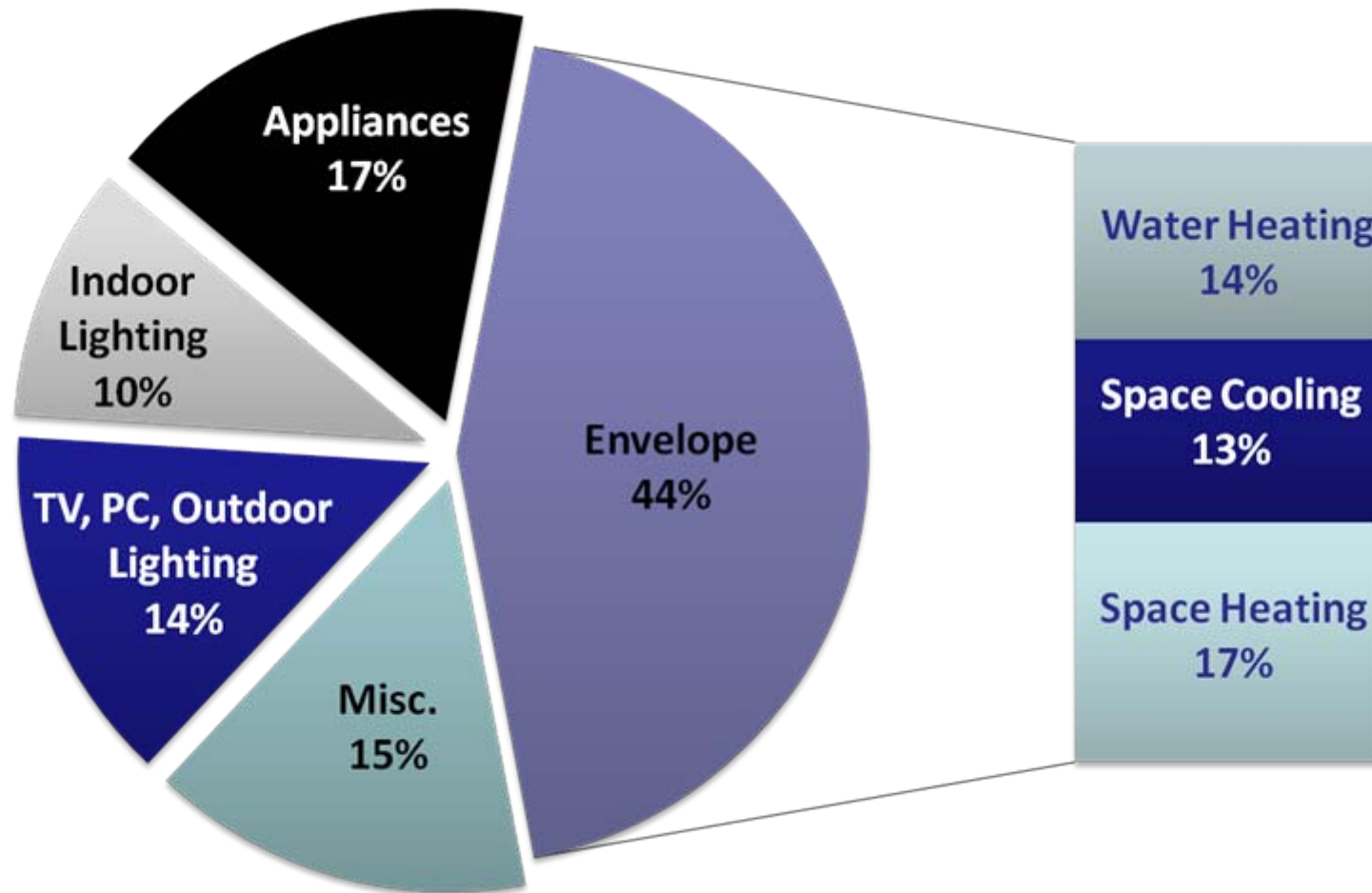


## Effect Of Title-24 (Source Energy)



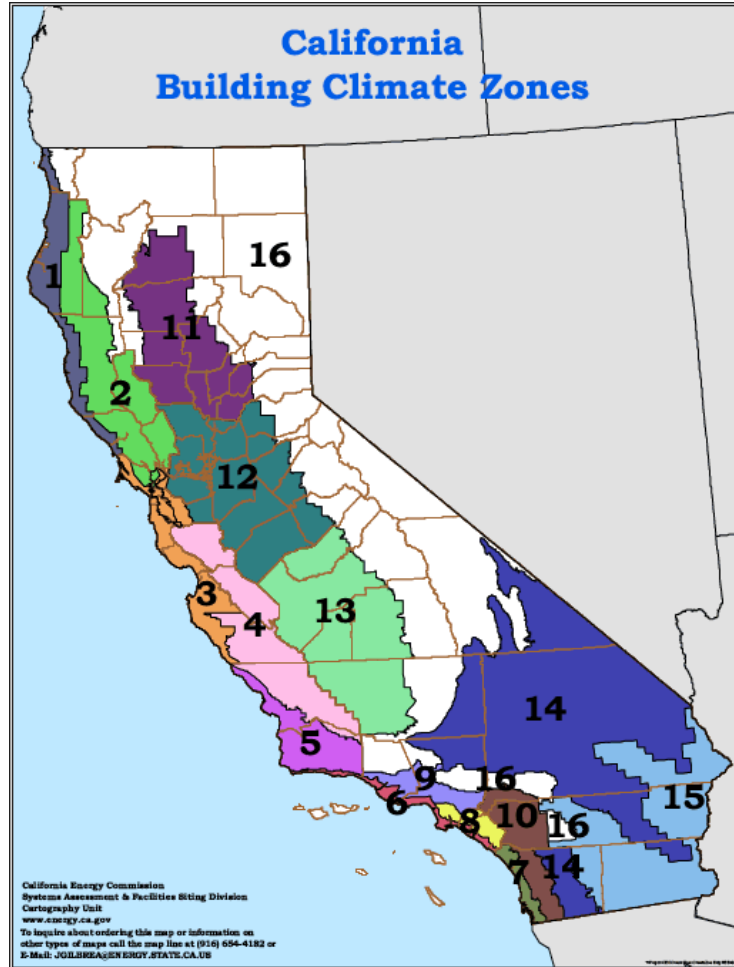
ConSol 2008

## *Typical Energy Use In The Home*



<http://www.energy.ca.gov/appliances/rass/>

# Climate Zones



# Title 24

Micropas 7.3

MICROPAS7 v7.30 File-CSP4 Wth-CTZ02S05 Program-MAIN

**MICROPAS CARDINAL RUN SUMMARY**

Energy Use (kTDV/sf-yr)	Standard Design	Proposed Design	Compliance Margin	Heating (Btu/hr)	Cooling (Btu/hr)
North.....	65.15	64.13	1.02	41,811	29,481
East.....	65.15	61.24	3.91	41,811	26,865
South.....	65.15	61.86	3.29	41,811	29,201
West.....	65.15	61.86	3.34	41,811	27,447

\*\*\* Building complies with Computer Performance \*\*\*  
 \*\*\* HERS Verification Required for Compliance \*\*\*

← -Continue



# *2008 T-24*

## *Current Major Proposed Changes*

### **Window Efficiencies**

Adopted cost effective u-values and SHGC

### **Ventilation for Indoor Air Quality (ASHRAE 62.2)**

Mandatory ventilation requirements

### **Cool Roofs**

Reflectance and emittance

### **Changes to Compliance Documentation Process**

Poor enforcement of regulations, automated process prior to C of O

### **Maximum cooling capacity = HVAC right sizing**

TXV no longer a credit; Charge Indicator Light

# Out With the Old .... In with the new

STANDARDS TABLE 151-C ALTERNATIVE COMPONENT PACKAGE D

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
<b>BUILDING ENVELOPE</b>																
Insulation minimums <sup>1</sup>																
Ceiling	R38	R30	R30	R30	R30	R30	R30	R30	R30	R38	R38	R38	R38	R38	R38	R38
Wood-frame walls	R21	R13	R13	R13	R13	R13	R13	R13	R13	R19	R19	R19	R21	R21	R21	R21
*Heavy mass <sup>2</sup> walls	(R4.76)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R4.76)	(R4.76)	(R4.76)	(R4.76)	(R4.76)	(R4.76)	(R4.76)
*Light mass <sup>2</sup> walls	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Below-grade walls	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R13
Slab floor perimeter	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	R7
Raised floors	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19
Concrete raised floors	R8	R8	R0	R0	R0	R0	R0	R0	R0	R8	R4	R8	R8	R4	R8	R8
Radiant Barrier	NR	REQ	NR	REQ	NR	NR	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	NR
<b>FENESTRATION</b>																
Maximum U-factor <sup>3</sup>	0.57	0.57	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.57	0.57	0.57	0.57	0.57	0.57	0.55
Maximum Solar Heat Gain Coefficient (SHGC) <sup>3</sup>	NR	0.40	NR	0.40	NR	NR	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
Maximum total area	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Maximum West Facing Area	NR	5%	NR	5%	NR	NR	5%	5%	5%	5%	5%	5%	5%	5%	5%	NR
<b>THERMAL MASS<sup>4</sup></b>																
NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
<b>SPACE-HEATING<sup>5</sup></b>																
Electric-resistant allowed	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
If gas, AFUE =	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
If heat pump, HSPF <sup>6</sup> =	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
<b>SPACE-COOLING</b>																
SEER =	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
If split system, Refrigerant charge measurement or Thermostatic Expansion valve	NR	REQ <sup>7</sup>	NR	NR	NR	NR	REQ <sup>7</sup>	REQ <sup>7</sup>	REQ <sup>7</sup>	REQ <sup>7</sup>	REQ <sup>7</sup>	REQ <sup>7</sup>	REQ <sup>7</sup>	REQ <sup>7</sup>	REQ <sup>7</sup>	NR
<b>DUCTS</b>																
Duct sealing	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>	REQ <sup>8</sup>
Duct insulation	R-6	R-6	R-6	R-6	R-6	R-4.2	R-4.2	R-6	R-6	R-6	R-6	R-6	R-6	R-6	R-6	R-6
WATER-HEATING	System shall meet Section 151 (f) 8 or Section 151 b															

2008 Building Energy Efficiency Standards

TABLE 151-C COMPONENT PACKAGE D

		Climate Zone																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Insulation minimums <sup>1</sup>	Ceilings	R38	R30	R30	R30	R30	R30	R30	R30	R30	R38	R38	R38	R38	R38	R38	R38	
	Walls	Wood frame walls	R21	R13	R13	R13	R13	R13	R13	R13	R13	R19	R19	R19	R21	R21	R21	R21
		Heavy mass walls	(R4.76)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R4.76)	(R4.76)	(R4.76)	(R4.76)	(R4.76)	(R4.76)	(R4.76)
		Light mass walls	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Floors	Below-grade walls	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R13
		Slab floor perim.	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	R7
Raised floors		R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	
Radiant Barrier	R8	R8	R0	R0	R0	R0	R0	R0	R0	R8	R4	R8	R8	R4	R8	R8		
Radiant Barrier	NR	REQ	NR	REQ	NR	NR	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	NR	
Roofing Products	Low-sloped	Aged Solar Reflectance	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
		Thermal Emittance	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
	Steep Sloped (less than 5 lb/R <sup>2</sup> )	Aged Solar Reflectance	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.20	0.20	0.20	0.20	0.20	NR	
		Thermal Emittance	NR	NR	NR	NR	NR	NR	NR	NR	NR	0.75	0.75	0.75	0.75	0.75	NR	
Steep Sloped (5 lb/R <sup>2</sup> or more)	Aged Solar Reflectance	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15		
	Thermal Emittance	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75		
Fenestration	Maximum U-factor <sup>3</sup>	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40		
	Maximum Solar Heat Gain Coefficient (SHGC) <sup>3</sup>	NR	0.40	NR	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.35		
	Maximum Total Area	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%		
	Maximum West Facing Area	NR	5%	NR	5%	NR	NR	5%	5%	5%	5%	5%	5%	5%	5%	5%	NR	
THERMAL MASS <sup>4</sup>		NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR		
SPACE-HEATING <sup>5</sup>	Electric-resistant allowed	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No		
	If gas, AFUE =	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN		
	If heat pump, HSPF <sup>6</sup> =	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN		
SPACE-COOLING	SEER =	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN		
	If split system, Refrigerant charge measurement or charge indicator display	NR	REQ	NR	NR	NR	NR	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	NR		
Central Forced Air Handlers	Cooling Airflow and Watt Draw	NR	NR	NR	NR	NR	NR	NR	NR	NR	REQ	REQ	REQ	REQ	REQ	REQ		
	Central Fan Integrated Ventilation System Watt Draw	REQ	REQ	REQ <sup>7</sup>	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ		
DUCTS	Duct sealing	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ		

SECTION 151 – PERFORMANCE AND PRESCRIPTIVE COMPLIANCE APPROACHES





## *Carbon Quiz!*

*A 12 Hour Flight .... How Many Homes?*





*1 Flight = 350 Houses 15% above T-24*





*1 House = 40 CFLs*



## 2008 Analysis: Compliance Cost

CZ	Single Family				Weighted
	Style A	Style B	Style C	Style D	
1	\$1,352	\$2,096	\$2,937	\$10,493	\$2,883
2	\$519	\$614	\$519	\$1,149	\$648
3	\$960	\$1,437	\$1,239	\$1,925	\$1,341
4	\$577	\$708	\$626	\$1,457	\$756
5	\$737	\$1,008	\$1,193	\$1,945	\$1,036
6	\$647	\$1,101	\$647	\$1,653	\$1,018
7	\$617	\$576	\$617	\$576	\$590
8	\$939	\$892	\$832	\$1,339	\$961
9	\$848	\$768	\$802	\$1,181	\$844
10	\$831	\$911	\$974	\$2,925	\$1,130
11	\$1,136	\$1,429	\$4,091	\$5,369	\$1,836
12	\$911	\$1,600	\$2,872	\$4,665	\$1,761
13	\$1,221	\$1,626	\$5,077	\$5,609	\$2,008
14	\$1,092	\$2,071	\$5,177	\$8,774	\$2,596
15	\$1,747	\$3,662	\$8,685	\$8,360	\$3,659
16	\$124	\$688	\$1,308	\$2,896	\$780
<b>Avg.</b>	<b>\$987</b>	<b>\$1,521</b>	<b>\$3,155</b>	<b>\$4,539</b>	<b>\$1,729</b>

Mandatory Features = \$250

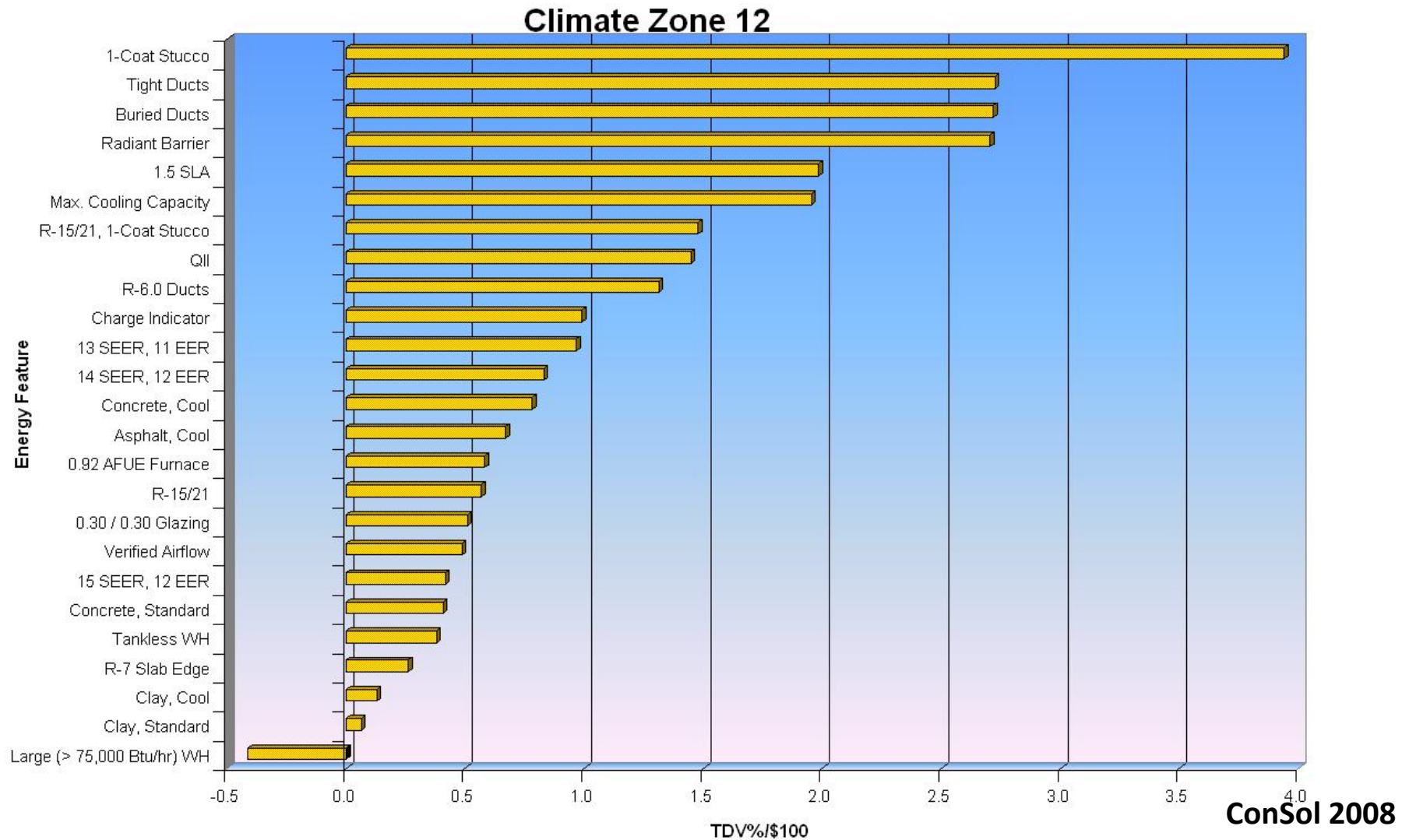
Total SF Estimated Cost = **\$1,979**

CZ	Multi-Family				Weighted
	Style A	Style B	Style C	Style D	
1	\$669	\$1,483	\$1,101	\$4,456	\$1,579
2	\$315	\$427	\$293	\$886	\$445
3	\$301	\$503	\$301	\$941	\$490
4	\$311	\$467	\$311	\$695	\$443
5	\$234	\$436	\$256	\$895	\$425
6	\$188	\$188	\$188	\$188	\$188
7	-\$17	\$85	\$85	\$85	\$52
8	\$380	\$492	\$358	\$500	\$456
9	\$194	\$468	\$229	\$847	\$424
10	\$338	\$688	\$813	\$1,698	\$699
11	\$355	\$1,278	\$2,077	\$3,984	\$1,317
12	\$261	\$1,099	\$1,468	\$2,648	\$1,021
13	\$677	\$1,518	\$2,479	\$3,195	\$1,459
14	\$492	\$1,899	\$2,998	\$3,424	\$1,641
15	\$812	\$2,192	\$3,895	\$3,723	\$1,948
16	\$230	\$802	\$551	\$1,545	\$706
<b>Avg.</b>	<b>\$306</b>	<b>\$669</b>	<b>\$740</b>	<b>\$1,290</b>	<b>\$629</b>

Mandatory Features = \$900

Total MF Estimated Cost = **\$1,529**

# 2008 T-24 Cost Effectiveness





## Resources



### ASSOCIATIONS

**American Institute of Architects**

[www.AIA.org](http://www.AIA.org)

**Building Owners Managers Association**

[www.boma.com.org](http://www.boma.com.org)

**California Air Pollution Control Officers Association**

[www.capcoa.org](http://www.capcoa.org)

**California Building Industry Association**

[www.cbia.org](http://www.cbia.org)

**California Building Officials**

[www.calbo.org](http://www.calbo.org)

**California Building Properties Association**

[www.cbpa.com/eupdates](http://www.cbpa.com/eupdates)

**California Cities**

[www.cacities.org](http://www.cacities.org)

**California Chapter American Planning Association**

[www.calapa.org](http://www.calapa.org)

**International Council for Local Environmental Initiatives**

[www.iclei.org](http://www.iclei.org)

**National Association Industrial and Office Properties**

[www.naiop.org](http://www.naiop.org)

**US Green Building Council**

[www.usgbc.org](http://www.usgbc.org)

# Resources

## ENERGY EFFICIENCY

### **ConSol**

[www.consol.ws](http://www.consol.ws)

## GREEN PROGRAMS

### **California Green Builder**

[www.CAGreenBuilder.org](http://www.CAGreenBuilder.org)

### **Energy Star**

[www.energystar.gov](http://www.energystar.gov)

### **NAHB / ANSI / ICC**

[www.nahbrc.org/technical/standards/greenbuilding.aspx](http://www.nahbrc.org/technical/standards/greenbuilding.aspx)

### **BIG/GPR**

[www.builditgreen.org](http://www.builditgreen.org)

### **LEED**

[www.usgbc.org/LEED](http://www.usgbc.org/LEED)

## GOVERNMENT

### **Air Resources Board**

[www.arb.ca.gov](http://www.arb.ca.gov)

### **California Department of Housing Community Development**

[www.hcd.ca.gov](http://www.hcd.ca.gov)

### **California Energy Commission**

[www.energy.ca.gov](http://www.energy.ca.gov)

### **Collaborative for High-Performance Schools**

[www.chps.net](http://www.chps.net)

### **Institute for Local Government**

[www.ca-ilg.org](http://www.ca-ilg.org)

### **Land Use Subgroup of the Climate Action Team**

<http://www.climatechange.ca.gov/luscat/>

### **Local Government Commission**

[www.lgc.org](http://www.lgc.org)

### **Office of Planning and Research**

[www.opr.ca.gov](http://www.opr.ca.gov)

### **US Department of Energy**

#### **Building America Partner - Building Industry Research Alliance**

[www.bira.ws](http://www.bira.ws)

### **US Department of Energy**

#### **Energy Efficiency & Renewable Energy**

[www.eere.energy.gov/buildings](http://www.eere.energy.gov/buildings)

## INCENTIVES

### **Database of State Incentives for Renewables and Efficiency**

<http://www.dsireusa.org/>

### **New Solar Home Partnership**

[www.gosolarcalifornia.com](http://www.gosolarcalifornia.com)

## LEGISLATION

### **AB32**

[www.climatechange.ca.gov](http://www.climatechange.ca.gov)

### **AB32 – Mitigation Issues**

<http://ag.ca.gov/globalwarming/>

### **Attorney General's global warming website**

<http://ag.ca.gov/globalwarming/>

### **California Climate Change Portal**

<http://www.climatechange.ca.gov/>

### **CEQA Guidelines and Greenhouse Gases**

<http://opr.ca.gov/index.php?a=ceqa/index.html>

# Resources

## UTILITIES

**Imperial Irrigation District**

[www.iid.com](http://www.iid.com)

**Pacific Gas & Electric**

<http://www.pge.com/index.html>

**Southern California Edison**

[www.sce.com](http://www.sce.com)

**SEMPRA**

[www.sempra.com](http://www.sempra.com)

## WATER

[www.bewaterwise.com](http://www.bewaterwise.com)

[www.mwdh2o.com](http://www.mwdh2o.com)

