



## Project Summary

**Project Name:** *Brookview Senior Housing -102 one & two bedroom apartments in seven two-story buildings.*

**Owner/Developer:** *San Diego Interfaith Housing Foundation*

**Architect:** *Studio E Architects*

**Location:** *Poway, California*

**Energy Analysis:** *Brummitt Energy Associates (BEA)*



**PROJECT BASE CASE** – Title 24, Inland Climate Zone 10, R-30 ceilings, R-13 walls, single pane aluminum frame windows. Heating and cooling from through-the-wall heat pumps serving each unit. Hot water provided by gas boilers via recirculation loop.

**OPPORTUNITY** – *Designed for Comfort* requires participating projects to perform at least 15 percent more efficiently than Title 24. BEA analysis identified the heating and cooling systems, shading and high-performance glazing, and water-heating opportunities for improved energy performance, a substantial comfort improvement and significant operational savings.

**JUSTIFICATION** – The originally specified Room Heat Pumps (RHP) would have been inadequate. They had insufficient capacity for cooling demands and the air distribution would have been uneven, creating hot and cold spots, especially in the two bedroom units. Efficiencies in the water heating system were realized with better controls, control strategies and equipment.

**SOLUTION** – To improve cooling comfort, BEA recommended spectrally selective Low-E glazing, provided by Milgard Manufacturing at introductory prices, to reduce solar heat gain by 75 percent. Air distribution is improved with Split System Heat Pumps (SSHP) sized for apartments, which cost less than the RHPs originally specified. Water heating efficiencies were realized through temperature controls on recirculation loops.

The combined improvements increased the project's first cost by \$6,749, with a projected return of \$9,178 per year in energy cost savings.

**COMPARISON WITH TITLE 24** –

Base Case: 1% better

*Designed for Comfort: 40% better!*

**Annual Energy Savings: \$9,178**

EFFICIENCY COMPARISON OF BASE CASE VS. *Designed for Comfort* MEASURES

COMPONENT	BASE CASE (CZ10)	<i>Designed for Comfort</i>
CEILING	R-30	R-30
WALL	R-13	R-13
FLOOR	SLAB	SLAB
FENESTRATION	U=0.75	U=0.60, SHGC=0.40
SPACE HEAT	ROOM HEAT PUMP, 6.6HPSF	SPLIT SYSTEM, 6.8HPSF
SPACE COOLING	ROOM HEAT PUMP, 9.7HPSF	SPLIT SYSTEM, 10 SEER
DOMESTIC HOT WATER	BOILER, RECIRC. TIME & TEMP	BOILER, RECIRC. TEMP

MEASURE CHARACTERISTICS

**BASE CASE (CZ10)** ***Designed for Comfort***

**ROOM HEAT PUMPS**

- INADEQUATE COOLING, UNEVEN AIR DISTRIBUTION

**SPLIT SYSTEM HEAT PUMPS**

- LOWER COST, ADEQUATE COOLING, IMPROVED AIR FLOW
- COMBINED W/ HIGH PERFORMANCE WINDOWS (SEE BELOW)
  - \$6,449 UPCHARGE OVER BASE CASE\*
- ANNUAL ENERGY SAVINGS - \$6,749

**SINGLE GLAZED, ALUMINUM FRAME WINDOWS**

- POOR WINTER THERMAL PERFORMANCE
- EXCESSIVE SUMMER SOLAR HEAT GAIN
- EXCESSIVE FADE-RELATED UV PENETRATION

**DOUBLE GLAZED, SPECTRALLY SELECTIVE**

**LOW-E, ALUMINUM FRAME**

- IMPROVED THERMAL PERFORMANCE
- REDUCED SOLAR HEAT GAIN
- MINIMIZED UV PENETRATION
- ALLOWS DOWNSIZING OF HVAC
- INCREASED FIRST COST, W/ LIFETIME SAVINGS - (SEE ABOVE)

**BOILER w/ TIME & TEMP CONTROLS ON RECIRC PUMP**

- CIRCULATES WATER IN LOOP EVEN AFTER TEMP IS ACHIEVED DURING TIMER "ON" PERIOD.

**BOILER w/ TEMP CONTROL ON RECIRC PUMP**

- WATER IN LOOP CIRCULATED UNTIL TEMP IS REACHED
- ADDITIONAL COST - \$300
- ANNUAL ENERGY SAVINGS - \$2,429

*Designed for Comfort* OWNER INCENTIVES OF \$60/UNIT SUBSTANTIALLY IMPACTS THIS UPCHARGE.



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