

9.4.3 Case Study, The Visitor Center at Zion National Park, Utah (Service/Retail/Office)

Building Design

Visitors Center (1): 8,800 SF Comfort Station (2): 2,756 SF Fee Station: 170 SF

Shell

Windows

| | <u>Type</u> | <u>U-Factor</u> | <u>SHGC (3)</u> |
|------------------|--|-----------------|-----------------|
| South/East Glass | Double Pane Insulating Glass, Low-e, Aluminum Frames, Thermally Broken | 0.44 | 0.44 |
| North/West Glass | Double Pane Insulating Glass, Heat Mirror, Aluminum Frames, Thermally Broken | 0.37 | 0.37 |

Window/Wall Ratio: 28%

Wall/Roof

| | <u>Materials</u> | <u>Effective R-Value</u> |
|------------------------|---|--------------------------|
| Trombe Walls: | Low-iron Patterned Trombe Wall, CMU (4) | 2.3 |
| Visitor Center Walls: | Wood Siding, Rigid Insulation Board, Gypsum | 16.5 |
| Comfort Station Walls: | Wood Siding, Rigid Insulation Board, CMU (4) | 6.6 |
| Roof: | Wood Shingles; Sheathing; Insulated Roof Panels | 30.9 |

HVAC

Heating

Trombe Walls
Electric Radiant Ceiling Panels

Cooling

Operable Windows
3 Cooling Towers

Lighting Power Densities(W/SF)

Main Area: (5)
Offices: 1.0
Bookstore: 0.9

Energy/Power:

PV System: 7.2 kW grid-tie system
Net Annual Energy Usage (thousand Btu/SF*year): 27.0

Note(s): 1) Includes office, bookstore, and service areas. 2) Restroom complex. 3) Solar heat gain coefficient. 4) Concrete masonry unit. 5) The main visitors center area is handled almost entirely with daylighting. Auxiliary fluorescent lighting is used only occasionally to supplement.

Source(s): NREL, Evaluation of the Low-Energy Design and Energy Performance of the Zion National Park Visitors Center, Feb. 2005, p. 23-37; NREL, Lessons Learned from Case Studies of Six High-Performance Buildings, June 2006, p. 5 Table A-2 p. 130.