

Service, the Federal National Mortgage Association, and the Federal Home Loan Mortgage Corporation.

(n) *Federal residential building* means any residential building to be constructed by or for the use of any Federal agency in the Continental U.S., Alaska, or Hawaii that is not legally subject to state or local building codes or similar requirements.

(o) *Life cycle cost* means the minimum life cycle cost calculated by using a methodology specified in subpart A of 10 CFR part 436.

(p) *Point system* means the tables that display the effect of the set of energy conservation measures on the design energy consumption and energy costs of a residential building for a particular location, building type and fuel type.

(q) *Practicable optimum life cycle energy cost* means the energy costs of the set of conservation measures that has the minimum life cycle cost to the Federal government incurred during a 25 year period and including the costs of construction, maintenance, operation, and replacement.

(r) *Project* means the group of one or more Federal residential buildings to be built at a specific geographic location that are included by a Federal agency in specifications issued or used by a Federal agency for design or construction of the buildings.

(s) *Prototype* means a fundamental house design based on typical construction assumptions. The nine prototypes in COSTSAFR are: single-section manufactured house, double-section manufactured house, ranch-style house, two-story house, split-level house, mid-unit apartment, end-unit apartment, mid-unit townhouse, end-unit townhouse.

(t) *Residential building* means a new building that is designed to be constructed and developed for residential occupancy.

(u) *Set of conservation options* means the combination of envelope design and equipment measures that influences the long term energy use in a building designed to maintain a minimum of ventilation level of 0.7 air changes per hour, including the heating and cooling equipment, domestic hot water equipment, glazing, insulation, refrigerators and air infiltration control measures.

(v) *Shading coefficient* means the ratio of the heat gains through windows, with or without integral shading devices, to that occurring through unshaded, 1/8-inch clear glass.

(w) *Total annual coil load* means the energy for space heating and/or cooling with no adjustment for HVAC equipment efficiency.

[56 FR 3772, Jan. 31, 1991]

#### § 435.303 Requirements for the design of a Federal residential building.

(a) The head of each Federal agency responsible for the construction of Federal residential buildings shall establish an energy consumption goal for each building to be designed or constructed by or for the agency.

(b) The energy consumption goal for a Federal residential building shall be a total point score derived by using the micro-computer program and user manual entitled "Conservation Optimization Standard for Savings in Federal Residences (COSTSAFR)," unless the head of the Federal agency shall establish more stringent requirements for that agency.

(c) The head of each Federal agency shall adopt such procedures as may be necessary to ensure that the design of a Federal residential building is not less energy conserving than the energy consumption goal established for the building.

#### § 435.304 The COSTSAFR Program.

(a) The COSTSAFR Program (Version 3.0) provides a computerized calculation procedure to determine the most effective set of energy conservation measures, selected from among the measures included within the Program that will produce the practicable optimum life cycle cost for a type of residential building in a specific geographic location. The most effective set of energy conservation measures is expressed as a total point score that serves as the energy consumption goal.

(b) The COSTSAFR Program (Version 3.0) also prints out a point system that identifies a wide array of different energy conservation measures indicating how many points various levels of each measure would contribute to reaching the total point score of the energy consumption goal.

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This enables a Federal agency to use the energy consumption goal and the point system in the design and procurement procedures so that designers and builders can pick and choose among different combinations of energy conservation measures to meet or exceed the total point score required to meet the energy consumption goal.

(c) The COSTSAFR Program (Version 3.0) operates on a micro-computer system that uses the MS DOS operating system and is equipped with an 8087 co-processor.

(d) The COSTSAFR Program (Version 3.0) may be obtained from:

National Technical Information Service; Department of Commerce; Springfield, Virginia 22161; (202) 487-4600

[53 FR 32545, Aug. 25, 1988, as amended at 56 FR 3772, Jan. 31, 1991]

**§ 435.305 Alternative compliance procedure.**

(a) If a proposed building design includes unusual or innovative energy conservation measures which are not covered by the COSTSAFR program, the Federal agency shall determine whether that design meets or exceeds the applicable energy consumption goal in compliance with the procedures set forth in this section.

(b) The Federal agency shall determine the estimated discounted energy cost for the COSTSAFR prototype building design, which is the most similar of the COSTSAFR prototypes to the proposed building design, by—

(1) Printing out the COSTSAFR compliance forms for the prototype showing the points attributable to levels of various energy conservation measures;

(2) Calculating the estimated unit energy cost on the compliance forms, on the basis of selecting the optimum levels on the compliance forms or otherwise in the User's Manual for each energy conservation measure; and

(3) Multiplying the estimated unit energy cost by 100.

(c) The Federal agency shall determine the estimated discounted energy cost for the proposed building design by—

(1) Estimating the heating and cooling total annual coil loads of the proposed building design with the DOE

2.1C computer program on the basis of input assumptions including—

(i) Shading coefficients of 0.6 for summer and 0.8 for winter;

(ii) Thermostat setpoints of 78 degrees Fahrenheit for cooling, 70 degrees Fahrenheit for heating (6 am to 12 midnight), and 60 degrees Fahrenheit for Night Setback (12 midnight to 6 am, except for houses with heat pumps);

(iii) The infiltration rate measured in air changes per hour as calculated using appendix B of the COSTSAFR User's Manual;

(iv) Natural venting with a constant air change rate of 10 air changes per hour—

(A) When the outdoor temperature is lower than the indoor temperature, but not above 78 degrees Fahrenheit; and

(B) When the enthalpy of the outdoor air is lower than the indoor air.

(v) Internal gains in accordance with the following table for a house with 1540 square feet of floor area, adjusted by 0.35 Btu/ft<sup>2</sup>/hr to account for changes in lighting as the floor area varies from 1540 square feet—

TABLE 1—INTERNAL GAIN SCHEDULE (BTU)

Hour of day	Sensible	Latent
1	1139	247
2	1139	247
3	1139	247
4	1139	247
5	1139	247
6	1903	412
7	2391	518
8	4782	1036
9	2790	604
10	1707	370
11	1707	370
12	2277	493
13	1707	370
14	1424	308
15	1480	321
16	1480	321
17	2164	469
18	2334	506
19	2505	543
20	3928	851
21	3928	851
22	4101	888
23	4101	888
24	3701	802

(vi) Thermal transmittances for building envelope materials measured in accordance with applicable ASTM procedures or from the ASHRAE Handbook;

(vii) Proposed heating and cooling equipment types included in