

# **APPENDIX J**

## **THE MODEL CONSERVATION STANDARDS**

### **INTRODUCTION**

As directed by the Northwest Power Act, the Council has designed model conservation standards to produce all electricity savings that are cost-effective for the region. The standards are also designed to be economically feasible for consumers, taking into account financial assistance from the Bonneville Power Administration and the region's utilities.

In addition to capturing all cost-effective power savings while maintaining consumer economic feasibility, the Council believes the measures used to achieve the model conservation standards should provide reliable savings to the power system. The Council also believes actions taken to achieve the standards should maintain, and possibly improve upon the occupant amenity levels (e.g., indoor air quality, comfort, window areas, architectural styles, and so forth) found in typical buildings constructed before the first standards were adopted in 1983.

The Council has adopted six model conservation standards. These include the standard for new electrically heated residential buildings, the standard for utility residential conservation programs, the standard for all new commercial buildings, the standard for utility commercial conservation programs, the standard for conversions, and the standard for conservation programs not covered explicitly by the other model conservation standards.<sup>1</sup>

### **THE MODEL CONSERVATION STANDARDS FOR NEW ELECTRICALLY HEATED RESIDENTIAL AND COMMERCIAL BUILDINGS**

The region should acquire all electric energy conservation measure savings from new residential and new commercial buildings that are expected to cost less than 2.5 cents per kilowatt-hour in real 1995 dollars. The Council believes that at least 85 percent of all regionally cost-effective savings in new residential and commercial buildings are practically achievable. The Council finds that as a result of a combination of Bonneville and utility programs and existing energy codes, at least 85 percent of the regionally cost-effective savings in the residential sector will be achieved over the next twenty years. The Council also finds that while significant progress has also been made toward accomplishing this same level of savings in the commercial sector, its goal of 85 percent of the regionally cost-effective savings has yet to be attained.

The Council is committed to sustaining the attainment of all regionally cost-effective electricity savings from new residential buildings and to securing the remaining potential from new commercial buildings. The Council believes this task can be accomplished best through a combination of continued enforcement of state and local building codes and effective Bonneville and utility programs. The Council has established four model conservation standards affecting new buildings. These standards are set forth below:

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<sup>1</sup> This chapter supersedes the Council's previous model conservation standards and surcharge methodology.

**Table J-1**  
**Illustrative Paths for the Model Conservation Standard**  
**for New Electrically Heated Residential Buildings**

Component	Climate Zone		
	Zone 1	Zone 2	Zone 3
<b>Ceilings</b>			
• Attic	R-38 (U-0.031) <sup>a</sup>	R-38 (U-0.031) <sup>a</sup>	R-49 (U-0.020) <sup>b</sup>
• Vaults	R-38 (U-0.027)	R-38 (U-0.027)	R-38 (U-0.027)
<b>Walls</b>			
• Above Grade <sup>c</sup>	R-19 (U-0.058)	R-24 (U-0.044)	R-26 (U-0.040)
• Below Grade <sup>d</sup>	R-19	R-19	R-19
<b>Floors</b>			
• Crawlspace and Unheated Basements	R-30 (U-0.029)	R-30 (U-0.029)	R-30 (U-0.029)
• Slab-on-grade Perimeters <sup>e</sup>	R-10	R-10	R-10
Glazing <sup>f</sup>	R-2.5 (U-0.40)	R-2.5 (U-0.40)	R-2.5 (U-0.40)
Maximum Glazed Area (% floor area)	15	15	15
Exterior Doors	R-5 (U-0.19)	R-5 (U-0.19)	R-5 (U-0.19)
Assumed Thermal Infiltration Rate <sup>g</sup>	0.35 ach	0.35 ach	0.35 ach
Mechanical Ventilation <sup>h</sup>	See footnote h, below	See footnote h, below	
Service Water Heater	Energy Factor = 0.95	Energy Factor = 0.95	

<sup>a</sup> R-values listed in this table are for the insulation only. U-factors listed in the table are for the full assembly of the respective component and are based on the methodology defined in the *Super Good Cents Heat Loss Reference—Volume I: Heat Loss Assumptions and Calculations and Super Good Cents Heat Loss Reference—Volume II—Heat Loss Coefficient Tables*, Bonneville Power Administration (October 1988).

<sup>b</sup> Attics in single-family structures in Zone 3 shall be framed using techniques to ensure full insulation depth to the exterior of the wall. Attics in multifamily buildings in Zone 3 shall be insulated to nominal R-38 (U-0.031).

<sup>c</sup> All walls are assumed to be built using advanced framing techniques (e.g., studs on 24-inch centers, insulated headers above doors and windows, and so forth) that minimize unnecessary framing materials and reduce thermal short circuits. Multifamily exterior walls above grade in Zone 3 shall be insulated to a nominal R-24 (U-0.044).

<sup>d</sup> Only the R-value is listed for below-grade wall insulation. The corresponding heat-loss coefficient varies due to differences in local soil conditions and building configuration. Heat-loss coefficients for below-grade insulation should be taken from the Super Good Cents references listed in footnote “a” for the appropriate soil condition and building geometry.

<sup>e</sup> Only the R-value is listed for slab-edge insulation. The corresponding heat-loss coefficient varies due to differences in local soil conditions and building configuration. Heat-loss coefficients for slab-edge insulation should be taken from the Super Good Cents references listed in footnote “a” for the appropriate soil condition and building geometry and assuming a thermally broken slab.

**Table J-1 (cont.)**  
**Illustrative Paths for the Model Conservation Standard**  
**for New Electrically Heated Residential Buildings**

<sup>f</sup> U-factors for glazing shall be the tested values for thermal transmittance due to conduction obtained by use of either the American Architectural Manufacturers Association (AAMA) 1503.1-1988 test procedure or the American Society for Testing and Materials (ASTM) Council 236 or Council 976 test procedures. Testing shall be conducted under established winter horizontal heat-flow test conditions using a 15-mile-per-hour wind speed and product sample sizes specified under AAMA 1503.1-1988. Testing shall be conducted by a certified testing laboratory. When insulating glass is used, it shall be tested and certified under a Society of Insulated Glass Manufacturers of America (SIGMA) approved certification program as class “A,” in accordance with ASTM E-744-81. EXCEPTION: Site-built fixed glazing shall be exempt from the thermal testing requirements, provided that it is installed either in an aluminum frame having a minimum 0.25-inch low-conductance thermal break or in vinyl or wood framing in accordance with SIGMA glazing specifications; and provided further that site-built, double-glazed units with fixed panes shall have a dead air space between panes of not less than 1/2 inch and site-built, triple-glazed units with fixed panes shall have a dead air space between panes of not less than 1/4 inch.

<sup>g</sup> Assumed air changes per hour (ach) used for determination of thermal losses due to air leakage.

<sup>h</sup> Indoor air quality should be comparable to levels found in non-model conservation standards dwellings built in 1983. To ensure that indoor air quality comparable to 1983 practice is achieved, Bonneville’s programs must include pollutant source control (including, but not limited to, combustion by-products, radon and formaldehyde), pollutant monitoring, and mechanical ventilation, that may, but need not, include heat recovery. An example of source control is a requirement that wood stoves and fireplaces be provided with an outside source of combustion air. At a minimum, mechanical ventilation shall have the capability of providing the outdoor air quantities specified in the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) Standard 62-89, *Ventilation for Acceptable Indoor Air Quality*. Natural ventilation through operable exterior openings and infiltration shall not be considered acceptable substitutes for achieving the requirements specified in ASHRAE Standard 62-89.

## **1.0 The Model Conservation Standard for New Electrically Heated Residential Buildings**

The model conservation standard for new single-family and multifamily electrically heated residential buildings is as follows: New electrically heated residential buildings are to be built to energy-efficiency levels at least equal to those that would be achieved by using the illustrative component performance paths displayed in Table J-1 for each of the Northwest climate zones.<sup>2</sup> It is important to remember that these illustrative paths are provided as benchmarks against which other combinations of strategies and measures can be evaluated.

Tradeoffs may be made among the components, as long as the overall efficiency and indoor air quality of the building are at least equivalent to a building containing the measures listed in Table J-1.

## **2.0 The Model Conservation Standard for Utility Conservation Programs for New Residential Buildings**

The model conservation standard for utility conservation programs for new residential buildings is as follows: Utilities should implement programs that are designed to capture all regionally cost-effective space heating, water heating and appliance energy savings. Efforts to achieve and maintain a goal of 85 percent of regionally cost-effective savings should continue as long as the program remains regionally cost-effective. In evaluating the program’s cost-effectiveness, all costs, including utility administrative costs and financial assistance payments, should be taken into account. This standard applies to site-built residences and to

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<sup>2</sup> The Council has established climate zones for the region based on the number of heating degree days as follows: Zone 1: 4,000-6,000 heating degree days; Zone 2 : 6,000-8,000 heating degree days; and Zone 3: over 8,000 heating degree days.

residences that are regulated under the National Manufactured Housing Construction and Safety Standards Act of 1974. 42 USC §5401 et seq. (1983).

There are several ways utilities can satisfy the model conservation standard for utility conservation programs for new residential buildings. These are:

1. Support the adoption and/or continued enforcement of an energy code for residential buildings that captures all regionally cost-effective space heating, water heating and appliance energy savings.
2. Implement a conservation program for new electrically heated residential buildings. Such programs may include, but are not limited to, state or local government or utility marketing programs, financial assistance, codes/utility service standards or fees that achieve all regionally cost-effective savings, or combinations of these and/or other measures to encourage energy-efficient construction of new residential buildings and the installation of energy-efficient water heaters and appliances, or other lost-opportunity conservation resources.

### **3.0 The Model Conservation Standard for New Commercial Buildings**

The model conservation standard for new commercial buildings is as follows: New commercial buildings and existing commercial buildings that undergo major remodels or renovations are to be constructed to achieve savings equivalent to those achievable through constructing buildings to the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) and the Illuminating Engineering Society of North America (IES) *Standard 90.1-1989 Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings* with the following modifications:

1. The lighting requirements for new commercial buildings are those specified in Section 435.103 Lighting of the U.S. Department of Energy's *Energy Conservation Voluntary Performance Standard for New Commercial and Multifamily High Rise Residential Buildings* (10 CFR Part 435, January 30, 1989), except that determination of the Interior Lighting Power Allowance shall be based on the building's gross square footage and include only permanently installed lighting.
2. The minimum efficiencies for electric heating, ventilating, air conditioning, service water heating equipment and electric motors are those specified as applicable on January 1, 1992, in ASHRAE/IES Standard 90.1-1989 for all products not covered by the National Appliance Efficiency Act of 1987. The minimum efficiencies for equipment covered by the National Appliance Efficiency Act of 1987 are those set forth in that statute or developed through rulemaking pursuant to the statute.
3. The application of the "Building Energy Cost Budget Method" (Section 13 of ASHRAE/IES Standard 90.1-1989) shall be limited to the comparison of annual design energy use as an alternative compliance path.
4. The application of this standard to existing buildings shall be consistent with the intent of Section 101.3.2 (Application to Existing Buildings) of the *Northwest Energy Code, Model Conservation Standards Equivalent Code* (December 1990).

The Council finds that measures required to meet the ASHRAE/IES Standard 90.1-1989, as modified by this rule, are commercially available, reliable and economically feasible for consumers without financial assistance from Bonneville. The Council also finds that the measures required to meet the ASHRAE/IES 90.1-1989, as modified by this rule, do not capture all regionally cost-effective savings.

As with the residential model conservation standard, flexibility is encouraged in designing paths to achieve the commercial model conservation standards.

#### **4.0 The Model Conservation Standard for Utility Conservation Programs for New Commercial Buildings**

The model conservation standard for utility conservation programs for new commercial buildings is as follows: Utilities should implement programs that are designed to capture all regionally cost-effective electricity savings in new commercial buildings. Efforts to achieve and maintain a goal of 85 percent of regionally cost-effective savings in new commercial buildings should continue as long as the program remains regionally cost-effective. In evaluating the program's cost-effectiveness all costs, including utility administrative costs and financial assistance payments, should be taken into account.

There are several ways utilities can satisfy the model conservation standard for utility conservation programs for new commercial buildings. These are:

1. Support the adoption and/or continued enforcement of an energy code for new commercial buildings that captures all regionally cost-effective electricity savings.
2. Implement a conservation program that is designed to capture all regionally cost-effective electricity savings in new commercial buildings. Such programs may include, but are not limited to, state or local government or utility marketing programs, financial assistance, codes/utility service standards or fees that capture all the regionally cost-effective savings or combinations of these and/or other measures to encourage energy-efficient construction of new commercial buildings or other lost-opportunity conservation resources.

#### **5.0 The Model Conservation Standard for Buildings Converting to Electric Space Conditioning or Water Heating Systems**

The model conservation standard for residential and commercial buildings converting to electric space conditioning or water heating systems is as follows: State or local governments or utilities should take actions through codes, service standards, user fees or alternative programs or a combination thereof to achieve electric power savings from such buildings. These savings should be comparable to those that would be achieved if each building converting to electric space conditioning or electric water heating were upgraded to include all regionally cost-effective electric space heating and electric water heating conservation measures.

#### **6.0 The Model Conservation Standard for Conservation Programs not Covered by Other Model Conservation Standards**

This model conservation standard applies to all conservation actions except those covered by the model conservation standard for new electrically heated residential buildings, the standard for utility conservation programs for new residential buildings, the standard for all new commercial buildings, the standard for utility conservation programs for new commercial buildings and the standard for electric space conditioning and electric water heating system conversions. This model conservation standard is as follows: All conservation actions or programs should be implemented in a manner consistent with the long-term goals of the region's electrical power system. In order to achieve this goal, the following objectives should be met:

1. Conservation acquisition programs should be designed to capture all regionally cost-effective conservation savings in a manner that does not create lost-opportunity resources. A lost-opportunity resource is a conservation measure that, due to physical or institutional characteristics, will lose its cost-effectiveness unless actions are taken now to develop it or hold it for future use.
2. Conservation acquisition programs should be designed to take advantage of naturally occurring "windows of opportunity" during which conservation potential can be secured by matching the

conservation acquisitions to the schedule of the host facilities. In industrial plants, for example, retrofit activities can match the plant's scheduled downtime or equipment replacement; in the commercial sector, measures can be installed at the time of renovation or remodel.

3. Conservation acquisition programs should be designed to secure all measures in the most cost-effective manner possible.
4. Conservation acquisitions programs in the near term should be targeted at lower-cost conservation opportunities that are not anticipated to be developed by consumers.
5. Conservation acquisition programs should be designed to ensure that regionally cost-effective levels of efficiency are economically feasible for the consumer.
6. Conservation acquisition programs should be designed so that their benefits are distributed equitably.
7. Conservation acquisition programs should be designed to maintain or enhance environmental quality. Acquisition of conservation measures that result in environmental degradation should be avoided or minimized.
8. Conservation acquisition programs should be designed to enhance the region's ability to refine and improve programs as they evolve.

## **SURCHARGE RECOMMENDATION**

The Council believes that in a competitive wholesale power market it is unnecessary to subject utilities to a surcharge for failure to achieve the potential savings. Therefore, the Council does not recommend that the model conservation standards be subject to surcharge under Section 4(f) (2) of the Act. If the competitive wholesale market fails to provide individual utilities with accurate price signals, the Council will review this recommendation.

### **Surcharge Methodology**

Section 4(f)(2) of the Northwest Power Act provides for Council recommendation of a 10-percent to 50-percent surcharge on Bonneville customers for those portions of their regional loads that are within states or political subdivisions that have not, or on customers who have not, implemented conservation measures that achieve savings of electricity comparable to those that would be obtained under the model conservation standards. The purpose of the surcharge is twofold: 1) to recover costs imposed on the region's electric system by failure to adopt the model conservation standards or achieve equivalent electricity savings; and 2) to provide a strong incentive to utilities and state and local jurisdictions to adopt and enforce the standards or comparable alternatives. The surcharge mechanism in the Act was intended to ensure that Bonneville's utility customers were not shielded from paying the full marginal cost of meeting their load growth. The Council anticipates that in the emerging competitive wholesale power market, utilities that fail to achieve the savings that could be captured by implementing these model conservation standards will likely incur higher long-term costs to meet their customers' energy service needs. That is, they will be provided with an accurate price signal. Consequently, the Council does not recommend that the Administrator invoke the surcharge provisions of the Act at this time.

However, the Act requires that the Council's plan set forth a methodology for surcharge calculation for Bonneville's administrator to follow. Should the Council alter its current recommendation to authorize the Bonneville administrator to impose surcharges, the method for calculation is set out below.

### **Identification of Customers Subject to Surcharge**

The administrator should identify those customers, states or political subdivisions that have failed to comply with the model conservation standards for utility residential and commercial conservation programs.

## Calculation of Surcharge

The annual surcharge for non-complying customers or customers in non-complying jurisdictions is to be calculated by the Bonneville administrator as follows:

1. If the customer is purchasing firm power from Bonneville under a power sales contract and is not exchanging under a residential purchase and sales agreement, the surcharge is 10 percent of the cost to the customer of all firm power purchased from Bonneville under the power sales contract for that portion of the customer's load in jurisdictions not implementing the model conservation standards or comparable programs.
2. If the customer is not purchasing firm power from Bonneville under a power sales contract, but is exchanging (or is deemed to be exchanging) under a residential purchase and sales agreement, the surcharge is 10 percent of the cost to the customer of the power purchased (or deemed to be purchased) from Bonneville in the exchange for that portion of the customer's load in jurisdictions not implementing the model conservation standards or comparable programs.

If the customer is purchasing firm power from Bonneville under a power sales contract and also is exchanging (or is deemed to be exchanging) under a residential purchase and sales agreement, the surcharge is: a) 10 percent of the cost to the customer of firm power purchased under the power sales contract; plus b) 10 percent of the cost to the customer of power purchased from Bonneville in the exchange (or deemed to be purchased) multiplied by the fraction of the utility's exchange load originally served by the utility's own resources.<sup>3</sup>

## Evaluation of Alternatives and Electricity Savings

A method of determining the estimated electrical energy savings of an alternative conservation plan should be developed in consultation with the Council and included in Bonneville's policy to implement the surcharge.

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<sup>3</sup> This calculation of the surcharge is designed to eliminate the possibility of surcharging a utility twice on the same load. In the calculation, the portion of a utility's exchange resource purchased from Bonneville and already surcharged under the power sales contract is subtracted from the exchange resources before establishing a surcharge on the exchange load.

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