JUDI DANIELSON
CHAIR
Idaho

Jim Kempton
Idaho

Frank L. Cassidy Jr.
"Larry"
Washington

Tom Karier
Washington

Steve Crow
Executive Director

Northwest Power and Conservation Council

MELINDA S. EDEN
VICE-CHAIR
Oregon

Gene Derfler
Oregon

Ed Bartlett
Montana

John Hines
Montana

May 4, 2004

MEMORANDUM

TO: Council Members

FROM: Tom Eckman and Charles Grist

SUBJECT: Model Conservation Standards and Surcharge Recommendation Section for Draft Plan

The accompanying document sets forth the proposed Model Conservation Standards and Surcharge recommendations for the draft plan. The Act requires that the Council adopt "Model Conservation Standards" for new and existing buildings, utility and government programs and other consumer actions. These standards are to be set at levels, which achieve all regionally cost-effective power savings that can be shown to be economically feasible for consumers (taking into account financial assistance that may be provided by Bonneville). The Fourth Plan set forth six Model Conservation Standards. These are the standards for:

1. New Electrically Heated Residential Buildings,
2. Utility Conservation Programs for New Residential Buildings,
3. New Commercial Buildings,
4. Utility Conservation Programs for New Commercial Buildings,
5. Buildings Converting to Electric Space Conditioning or Water Heating Systems; and,
6. Conservation Programs not Covered by Other Model Conservation Standards.

Of these six standards, only the standards for New Electrically Heated Buildings and for New Commercial Buildings set forth specific levels of efficiency to be achieved. The Fourth Plan's finding of regional cost-effectiveness for these levels of efficiency was based on avoided costs that were lower than our current estimates. Similarly, the Fourth Plan's analysis of the economic feasibility of these standards was done using considerably lower retail electric rates and higher mortgage interest rates. Therefore, staff performed an analysis to determine whether the standards set forth in the Fourth Plan would still capture all regionally cost-effective power savings that can be shown to be economically feasible for consumers. Our analysis, which is summarized in the accompany presentation, leads us to conclude that 1) the efficiency levels

851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348

Telephone: 503-222-5161
Toll free: 800-452-5161

Fax: 503-820-2370
Web site: www.nwcouncil.org

called for in the Fourth Plan still capture all regionally cost-effective savings and 2) these levels of efficiency are economically feasible for consumers that should be incorporated in regional energy codes and utility programs.

The Act also requires the Council to determine whether to recommend that the Bonneville Administrator be authorized to surcharge utilities where the savings attributable to the standards have not been achieved. The Council's Fourth Plan does not recommend that the Administrator be so authorized. The staff recommends that the Council retain this policy.

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.[1]

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 ___ cents per kilowatt-hour in real 2000 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 while significant progress has been made toward improving the region's residential and commercial energy codes these revised codes will not capture at least 85 percent of the regionally cost-effective savings in these sectors. The Council's analysis indicates that further improvements in existing residential and commercial energy codes would be both cost-effective to the regional power system and economically feasible for consumers.

The Council is committed to securing all regionally cost-effective electricity savings from new residential and commercial buildings. The Council believes this task can be accomplished best through a combination of continued enhancements and enforcement of state and local building codes and the development and deployment of effective regional market transformation efforts. Bonneville and the region's utilities should support these actions. The Council has established four model conservation standards affecting new buildings. These standards are set forth below:

[1] This chapter supersedes the Council's previous model conservation standards and surcharge methodology.

1.0 The Model Conservation Standard for New Site Built Electrically Heated Residential Buildings and New Electrically Heated Manufactured Homes

The model conservation standard for new single-family and multifamily electrically heated residential buildings is as follows: New site built electrically heated residential buildings are to be constructed to energy-efficiency levels at least equal to those that would be achieved by using the illustrative component performance paths displayed in Table X for each of the Northwest climate zones.[2] New electrically heated manufactured homes regulated under the National Manufactured Housing Construction and Safety Standards Act of 1974. 42 USC §5401 et seq. (1983) 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 XX for each of the Northwest climate zones. The Council finds that measures required to meet these standards are commercially available, reliable and economically feasible for consumers without financial assistance from Bonneville.

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 Tables X and XX.

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 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 site-built residential buildings that captures all regionally cost-effective space heating, water heating and appliance energy savings.
2. Support the revision of the National Manufactured Housing Construction and Safety Standards for new manufactured housing so that this standard captures all regionally cost-effective space heating, water heating and appliance energy savings.
3. 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 sponsored market transformation programs (e.g., Energy Star®), 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.

---

[2] The Council has established climate zones for the region based on the number of heating degree-days as follows: Zone 1: less than 6,000 heating degree days; Zone 2: 6,000-7,500 heating degree days; and Zone 3: over 8,000 heating degree days.

Table X

Illustrative Paths for the Model Conservation Standard

For New Site Built Electrically Heated Residential Buildings

Component	Climate Zone Zone 1	Zone 2	Zone 3
Ceilings			
• Attic	R-38 (U-0.031)[a]	R-38 (U-0.031)[a]	R-49 (U-0.020)[b]
• Vaults	R-38 (U-0.027)	R-38 (U-0.027)	R-38 (U-0.027)
Walls			
• Above Grade[c]	R-21 Advanced (U-0.051)	R-21 Advanced (U-0.051)	R-21 Advanced (U-0.051)
• Below Grade[d]	R-19	R-19	R-19
Floors			
• Crawlspaces and Unheated Basements	R-30 (U-0.029)	R-30 (U-0.029)	R-38 (U-0.022)
• Slab-on-grade - Unheated[e]	R-10 to 4 ft or frost line whichever is greater	R-10 to 4 ft or frost line whichever is greater	R-10 to 4 ft or frost line whichever is greater
• Slab-on-grade - Heated	R-10 Full Under Slab	R-10 Full Under Slab	R-10 Full Under Slab
Glazing[f]	R-2.9 (U-0.35)	R-2.9 (U-0.35)	R-2.9 (U-0.35)
Maximum Glazed Area (% floor area)[g]	15	15	15
Exterior Doors	R-5 (U-0.19)	R-5 (U-0.19)	R-5 (U-0.19)
Assumed Thermal Infiltration Rate[h]	0.35 ach	0.35 ach	0.35 ach
Mechanical Ventilation[i]	See footnote h, below		
Service Water Heater[j]	Energy Factor = 0.93		

[a] 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).

[b] 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).

[c] 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

[d] 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.

[e] 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.

[f] U-factors for glazing shall be determined, certified and labeled in accordance with the National Fenestration Rating Council (NFRC) Product Certification Program (PCP), as authorized by an independent certification and inspection agency licensed by the NFRC. Compliance shall be based on the Residential Model Size. Product samples used for U-factor determinations shall be production line units or representative of units as purchased by the consumer or contractor.

[g] Reference case glazing area limitation for use in thermal envelope component tradeoff calculations. Glazing area is not limited if all building shell components meet reference case maximum U-factors and minimum R-values.

[h] Assumed air changes per hour (ach) used for determination of thermal losses due to air leakage.

[i] 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.

[j] Energy Factor varies by tank capacity. Energy Factor = 0.996 - 0.00132 x rated volume

Table XX Illustrative Paths for the Model Conservation Standard for New Electrically Heated Manufactured Homes[a]			
Component	**Climate Zone** **Zone 1**	**Zone 2**	**Zone 3**
Ceilings			
• Attic	R-38 (U-0.027)	R-38 (U-0.027)	R-49 (U-0.023)
• Vaults	R-30 (U-0.033)	R-38 (U-0.030)	R-38 (U-0.030)
Walls			
• Above Grade	R-21 Advanced (U-0.050)	R-21 Advanced (U-0.050)	R-21 Advanced (U-0.050)
Floors			
• Crawlspaces	R-33 (U-0.032)	R-33 (U-0.032)	R-33 (U-0.032)
Glazing[b]	R-3.3 (U-0.30)	R-3.3 (U-0.30)	R-3.3 (U-0.30)
Maximum Glazed Area (% floor area)[c]	15	15	15
Exterior Doors	R-5 (U-0.19)	R-5 (U-0.19)	R-5 (U-0.19)
Assumed Thermal Infiltration Rate[d]	0.35 ach	0.35 ach	0.35 ach
Overall Conductive Heat Loss Rate (Uo)	0.049	0.048	0.047
Mechanical Ventilation[e]	See footnote e, below		
Service Water Heater[f]	Energy Factor = 0.93		

[a] 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 for Manufactured Homes —*

[b] U-factors for glazing shall be determined, certified and labeled in accordance with the National Fenestration Rating Council (NFRC) Product Certification Program (PCP), as authorized by an independent certification and inspection agency licensed by the NFRC. Compliance shall be based on the Residential Model Size. Product samples used for
U-factor determinations shall be production line units or representative of units as purchased by the consumer or contractor.

[c] Reference case glazing area limitation for use in thermal envelope component tradeoff calculations. Glazing area is not limited if all building shell components meet reference case maximum U-factors and minimum R-values.

[d] Assumed air changes per hour (ach) used for determination of thermal losses due to air leakage.

[e] 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.

[j] Energy Factor varies by tank capacity. Energy Factor = 0.996 - 0.00132 x rated volume

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 capture savings equivalent to those achievable through constructing buildings to the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) Standard 90.1-2001 (I-P Version) -- Energy Standard for Buildings Except Low-Rise Residential Buildings (IESNA cosponsored; ANSI approved; Continuous Maintenance Standard), I-P Edition and addenda published as of XXX Date, 2004.

The Council finds that measures required to meet the ASHRAE Standard 90.1-2001 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 Standard 90.1-2001do 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 existing 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 conditioning 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-efficient manner possible.
4. Conservation acquisitions programs should be targeted at 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 does not recommend that the model conservation standards be subject to surcharge under Section 4(f) (2) of the Act.

The Council expects that Bonneville and the region's utilities will accomplish conservation resource development goals established in this Plan. If Council recommendations on the role of Bonneville are adopted, utility incentives to pursue all cost-effective conservation should improve. Fewer customers would be dependent on Bonneville for load growth and those that are would face wholesale prices that reflect the full marginal cost of meeting load growth. However, while these changes would lessen the rationale for a surcharge, the Council recognizes that they would not eliminate all barriers to utility development of programs to capture all cost-effective conservation.

The Council recognizes that while conservation represents the lowest life cycle cost option for meeting the region's electricity service needs, utilities face real barriers to pursuing its development aggressively. In particular, as a consequence of the West Coast Energy Crisis, many utilities have recently increased their rates significantly. Investments in conservation, like any other resource acquisition, will increase utility cost and place additional upward pressure on rates. Furthermore, it is uncertain when and to what extent Bonneville will implement the Council's recommended role in power supply and whether Bonneville will establish rates that result in all of its customers having at least some portion of their loads exposed to cost of new resources. Therefore, in the near term, Bonneville should structure its conservation programs to address the barriers faced by utilities.

The Council intends to continue to track regional progress toward the Plan's conservation goals and will review this recommendation, should accomplishment of these goals appear to be in jeopardy.

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 load growth. As stated above, 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.[3]

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.

---

[3] 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.

Model Conservation Standards and Recommended Surcharge Policy

Draft Plan Recommendations

May 11, 2004

Northwest Power and Conservation Council

Act Requires Plan set forth Model Conservation Standards (MCS) for:

- New and existing buildings
- Utility and government conservation programs
- Other consumer actions

Northwest Power and Conservation Council

Surcharge Policy

- The Council's Plan must contain a recommendation to the Administrator regarding whether the a utility's failure to achieve MCS savings should be subject to a surcharge on all of a its power purchases from Bonneville
- Surcharges may not be less than 10%, nor greater than 50% of Bonneville's rate.

Northwest Power and Conservation Council

Model Conservation Standards – Decision Criteria

- The Act requires that the MCS be set at levels that:
  - achieve ***all regionally cost-effective power savings*** (i.e., cost less than new generation); and,
  - that are ***economically feasible for consumers***, taking into account financial assistance that may be made available through Bonneville

Northwest Power and Conservation Council

Analytical Approach – Regional Cost Effectiveness

- Used forecast of future market prices and load shape of savings to establish "energy value"
- Included T&D Benefits to establish "capacity value"
- Incorporated "risk" by adjusting future market value (+/-) based on portfolio analysis modeling (i.e., Olivia) results

Northwest Power and Conservation Council

Analytical Approach – Economic Feasibility

- Used region's most stringent energy code as "base case"
- Computed "Net Present Value" life cycle ownership cost of new home with increased levels of efficiency
- Use "Monte Carlo" model to compare "life-cycle" cost results over multiple combinations of values for major input assumptions, e.g. mortgage rates, retail electric rates, marginal tax rates, etc.

Northwest Power and Conservation Council

Findings

- Current MCS performance requirements are regionally cost-effective for electrically heated homes
- Current Codes do not capture all regionally cost-effective energy savings
- Current Codes do not capture all “economically feasible energy savings” – even without consideration of utility/Bonneville financial assistance
- Higher efficiency levels are “economically feasible” for consumers than are cost-effective for the region’s power system
- These higher efficiency levels are “economically feasible” for consumer’s using either electric or natural gas heating systems.

Northwest Power and Conservation Council

Zone 1: Site-Built Cost-Effective Reference Path Comparison*

Component	Regionally Cost-Effective	Base Case
Wall –Above Grade	*R21 Advanced Framing*	R21 STD
Wall –Below Grade	R19	R19
Attic	R38 STD	R38 STD
Vault - Joisted	R30	R30
Vault - Trussed	R38	R38
Floor	R30	R30
Window	*Class 35*	Class 40
Door	R5	R5
Slab	*R10 Full Under Slab*	R10
Wall – Ext. Below grade	R10	R10

*Tradeoffs are permitted so long as they achieve equivalent performance

Zone 2: Site-Built Cost-Effective Reference Path Comparison*

Component	Regionally Cost-Effective	Base Case
Wall –Above Grade	*R21 Advanced Framing*	R21 STD
Wall –Below Grade	R19	R19
Attic	R38 STD	R38 STD
Vault - Joisted	R30	R30
Vault - Trussed	R30	R38
Floor	R30	R30
Window	*Class 35*	Class 40
Door	R5	R5
Slab	*R10 Full Under Slab*	R10
Wall – Ext. Below grade	R10	R10

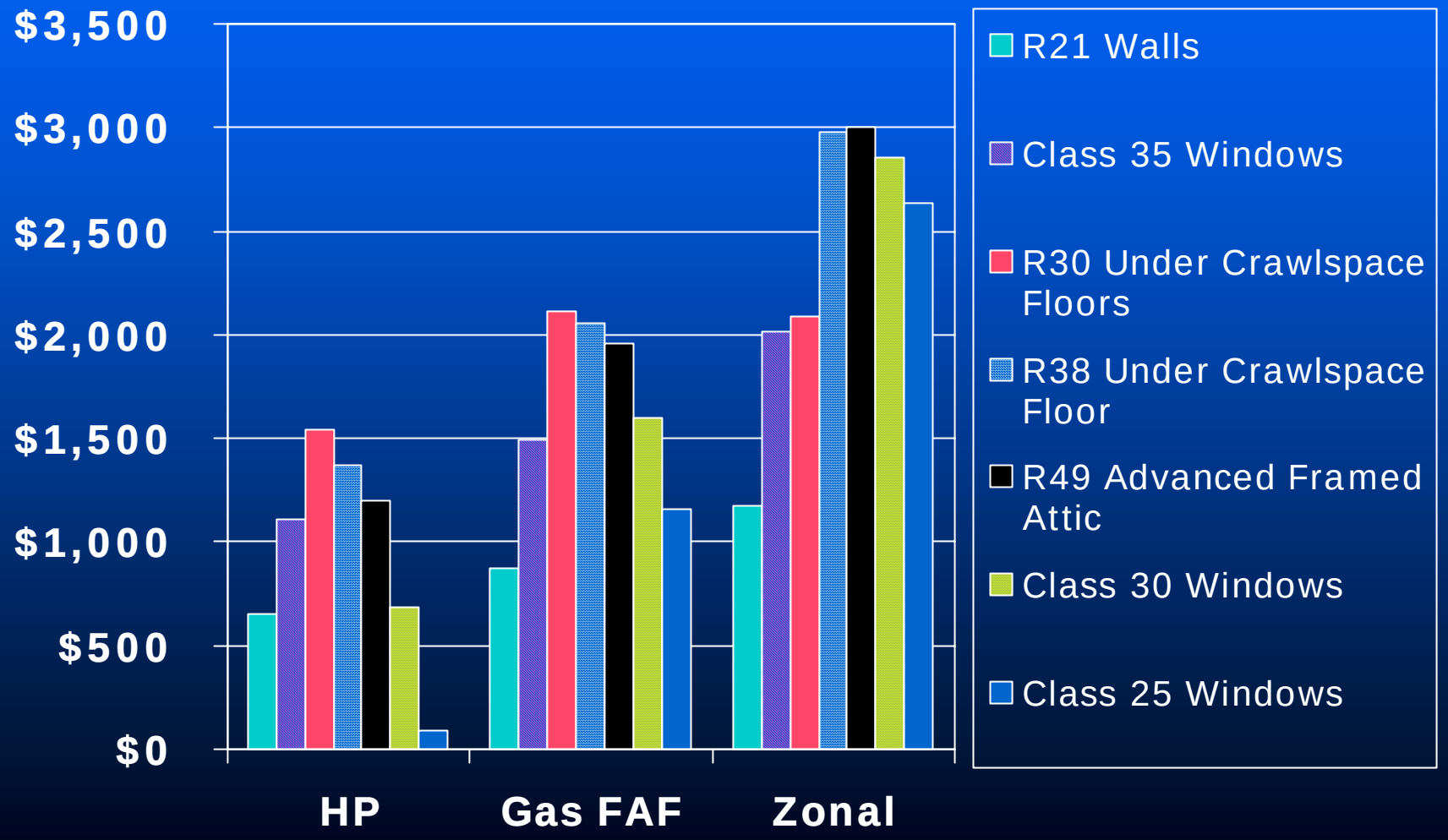
*Tradeoffs are permitted so long as they achieve equivalent performance

Zone 3: Site-Built Cost-Effective Reference Path Comparison*

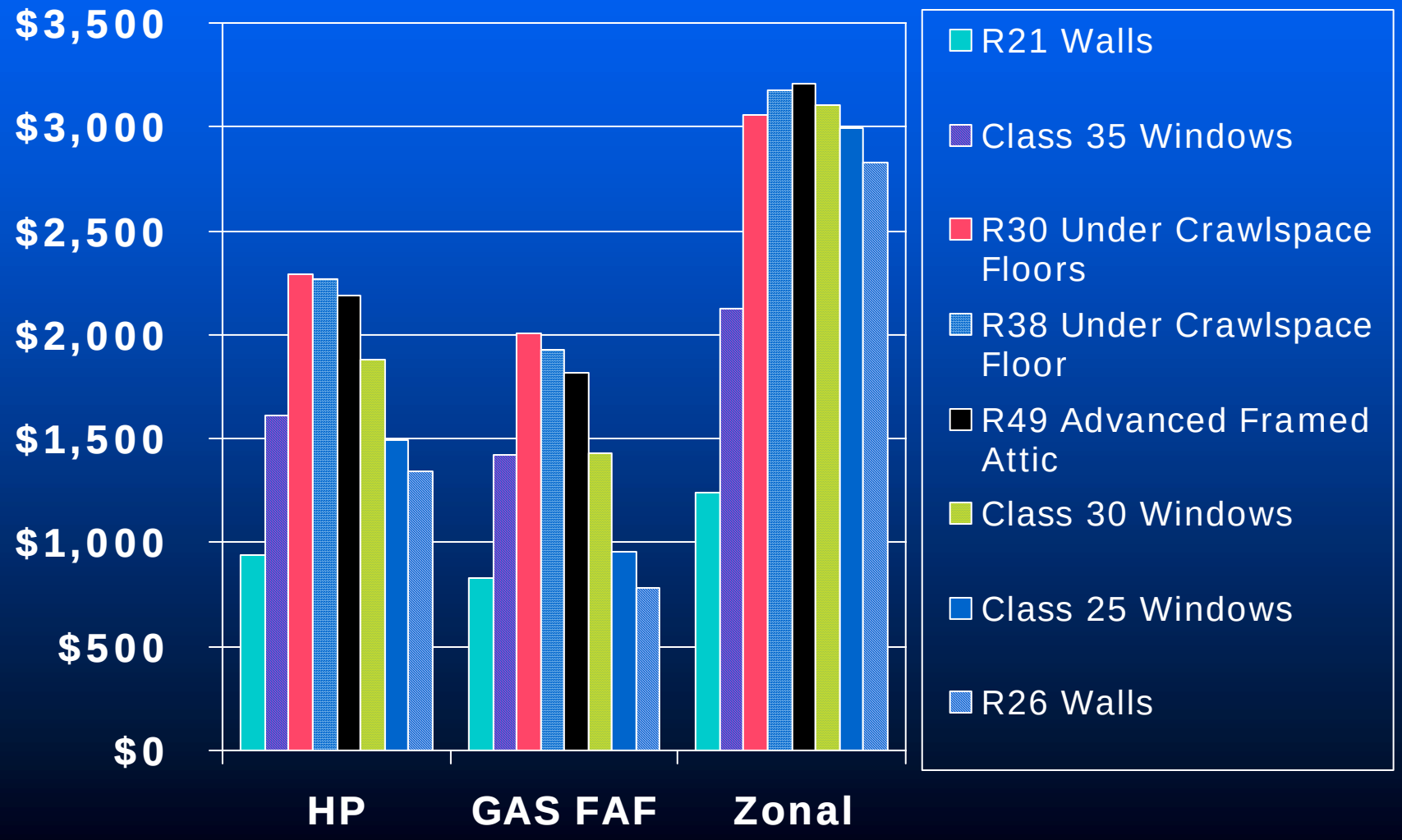
Component	Regionally Cost-Effective	Base Case
Wall –Above Grade	*R21 Advanced Framing*	R21 STD
Wall –Below Grade	R19	R19
Attic	*R49 Advanced Framing*	R38 STD
Vault	R30	R30
Floor	*R38*	R30
Window	*Class 35*	Class 40
Door	R5	R5
Slab	*R10 Full Under Slab*	R10
Wall – Ext. Below grade	R10	R10

*Tradeoffs are permitted so long as they achieve equivalent performance

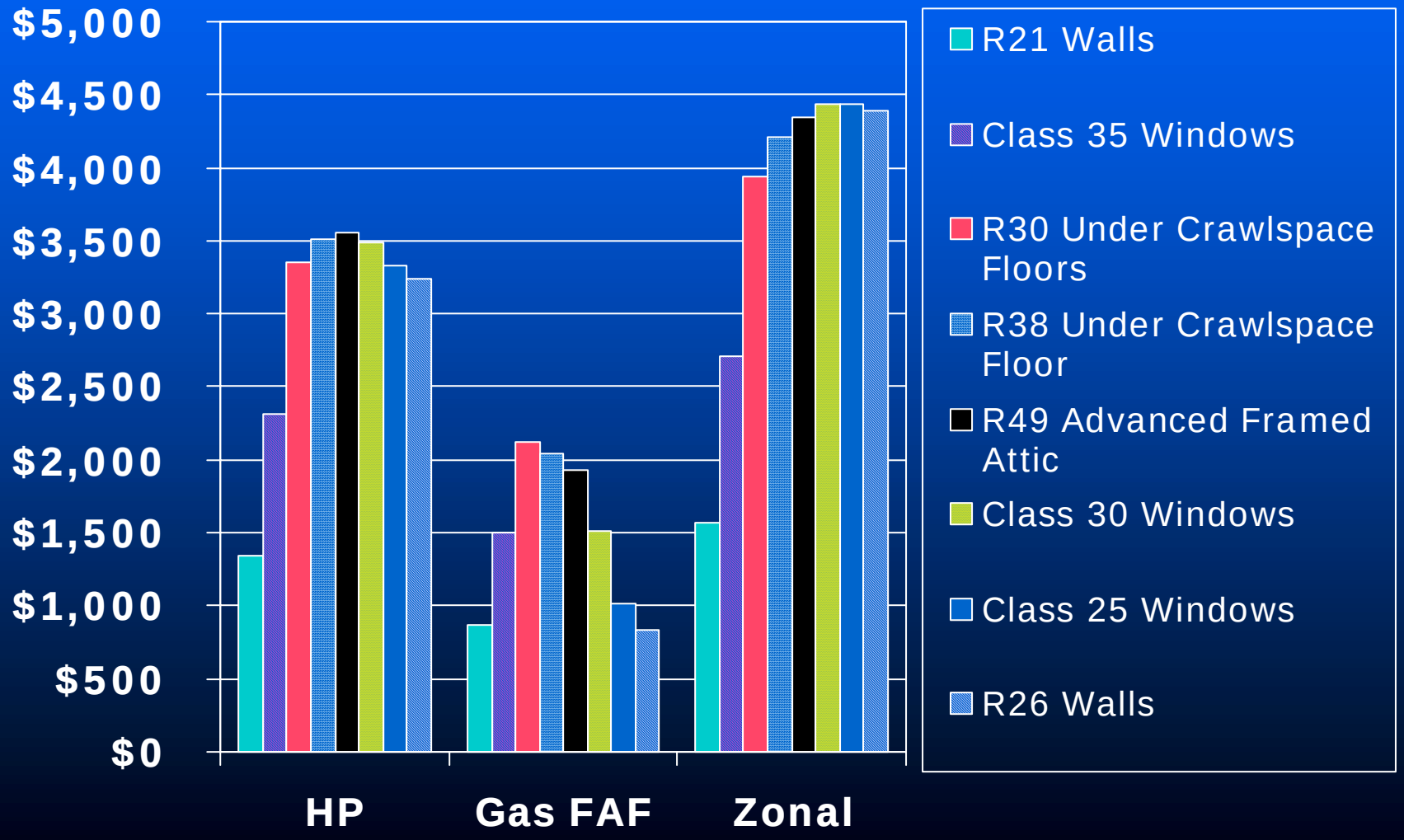
Zone 1: Consumer Economic Feasibility for Site-Built Homes Mean Net Present Value



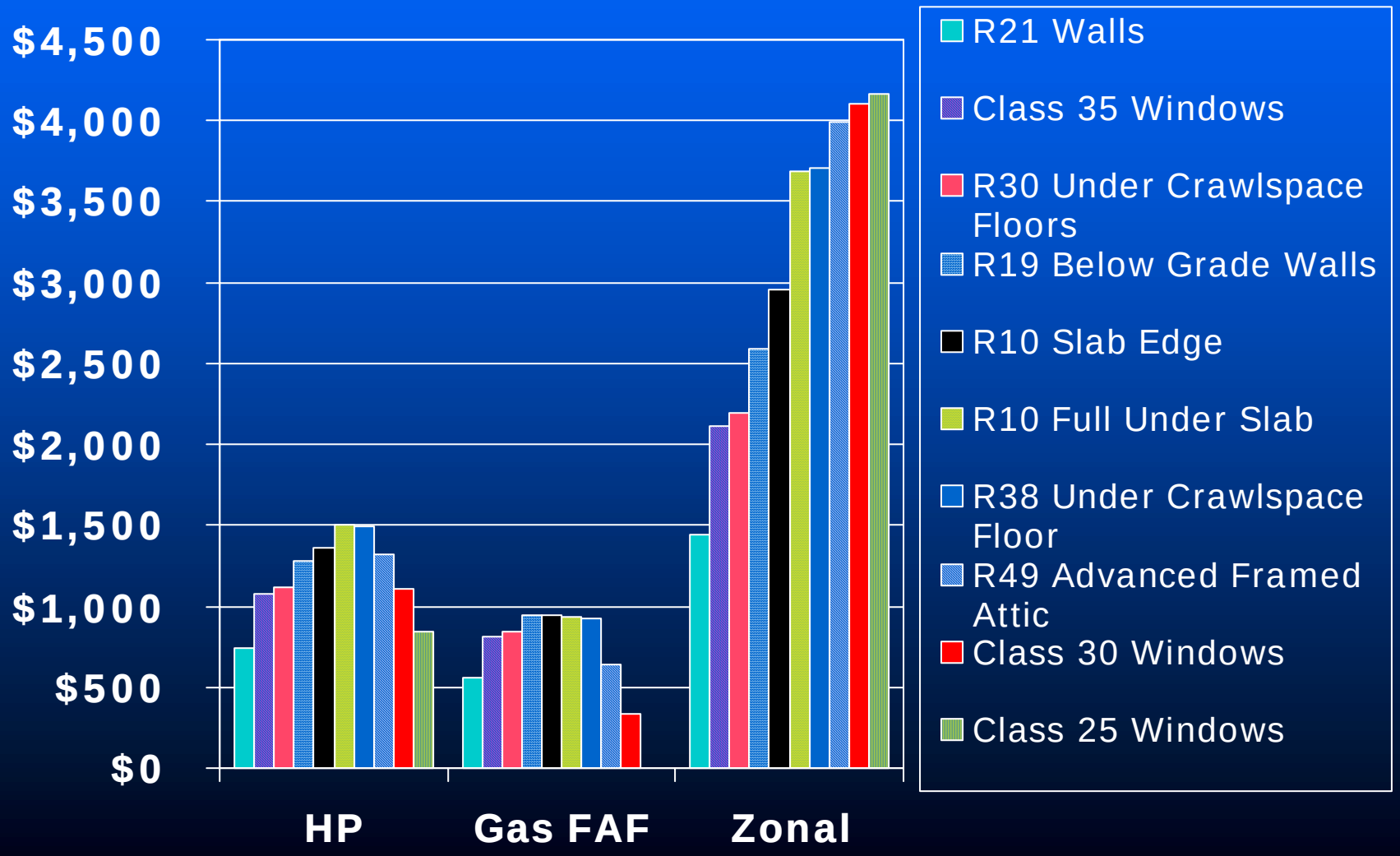
Zone 2: Consumer Economic Feasibility for Site-Built Homes Mean Net Present Value



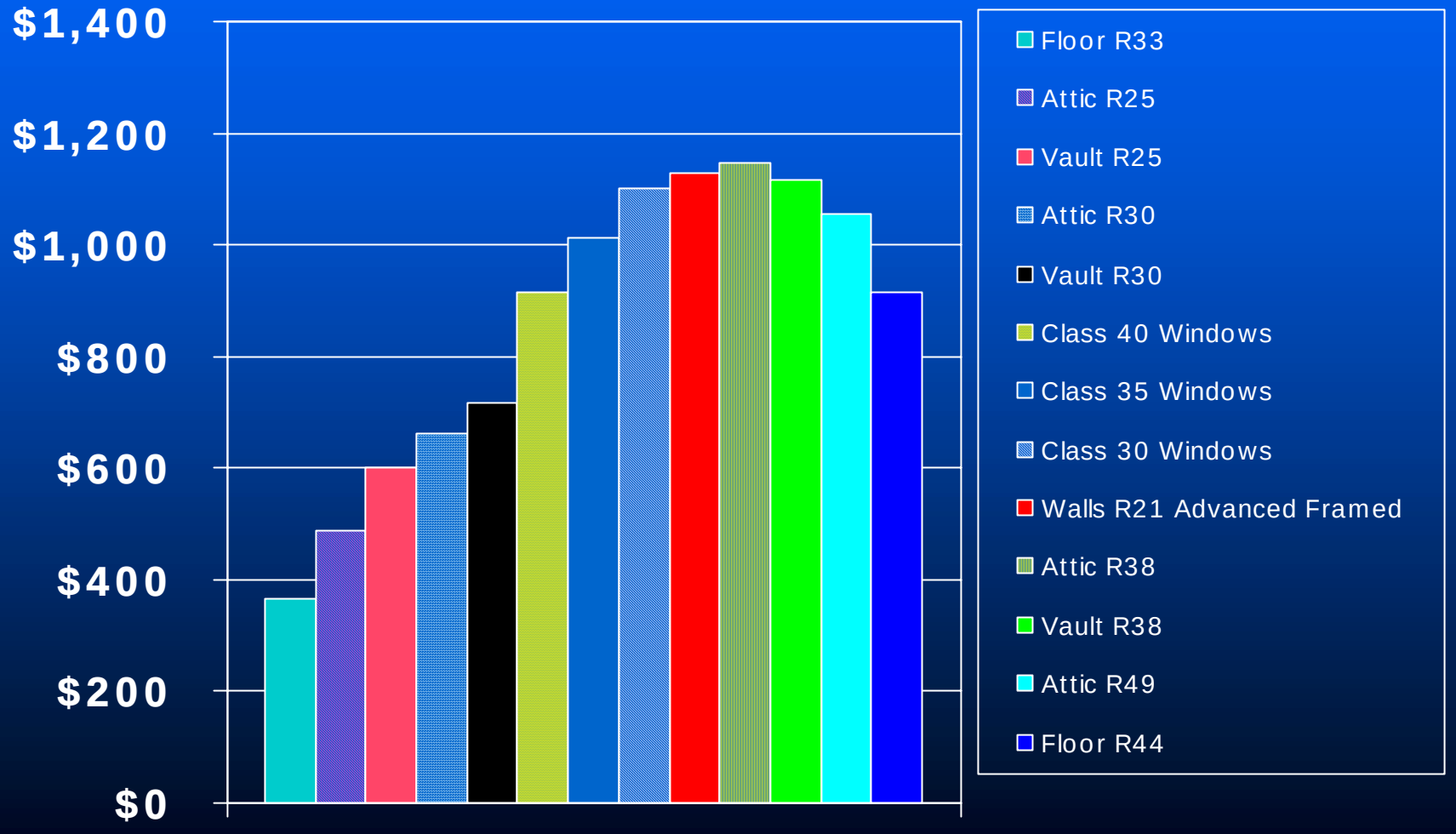
Zone 3: Consumer Economic Feasibility for Site-Built Homes Mean Net Present Value (Crawlspace)



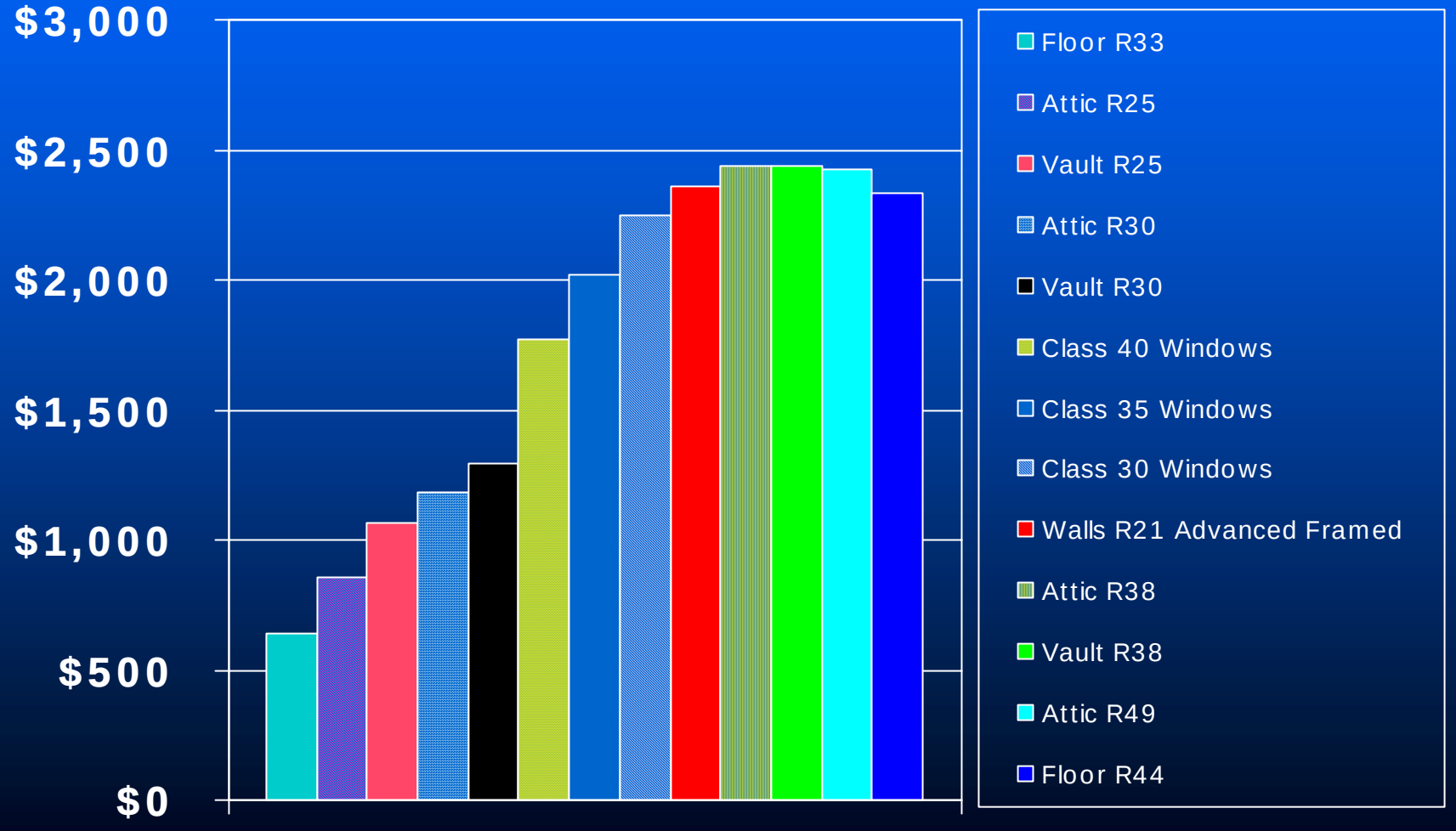
Zone 3: Consumer Economic Feasibility for Site-Built Homes Mean Net Present Value (Basement)



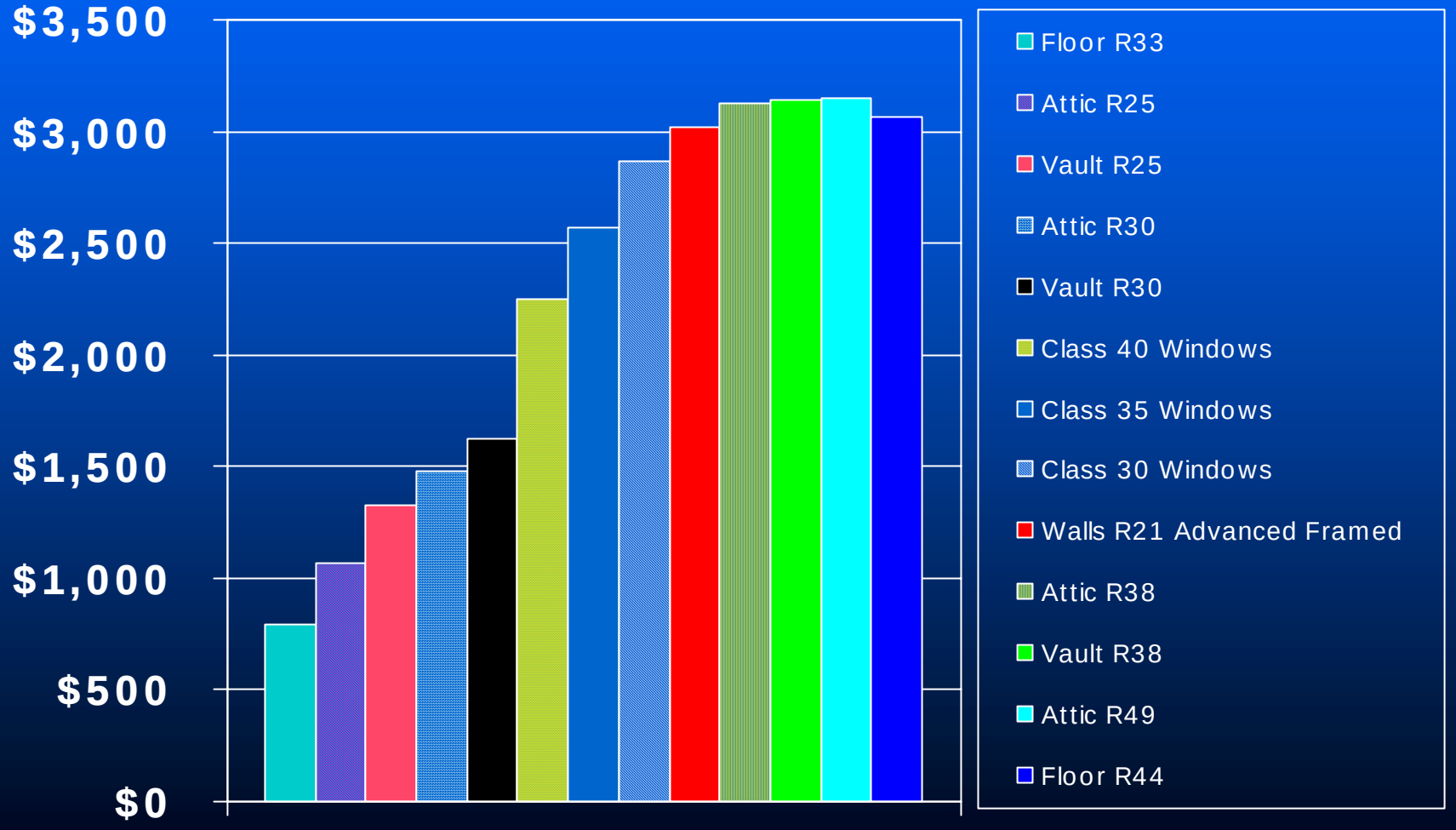
Zone 1: Manufactured Homes
Mean Net Present Value by Measure



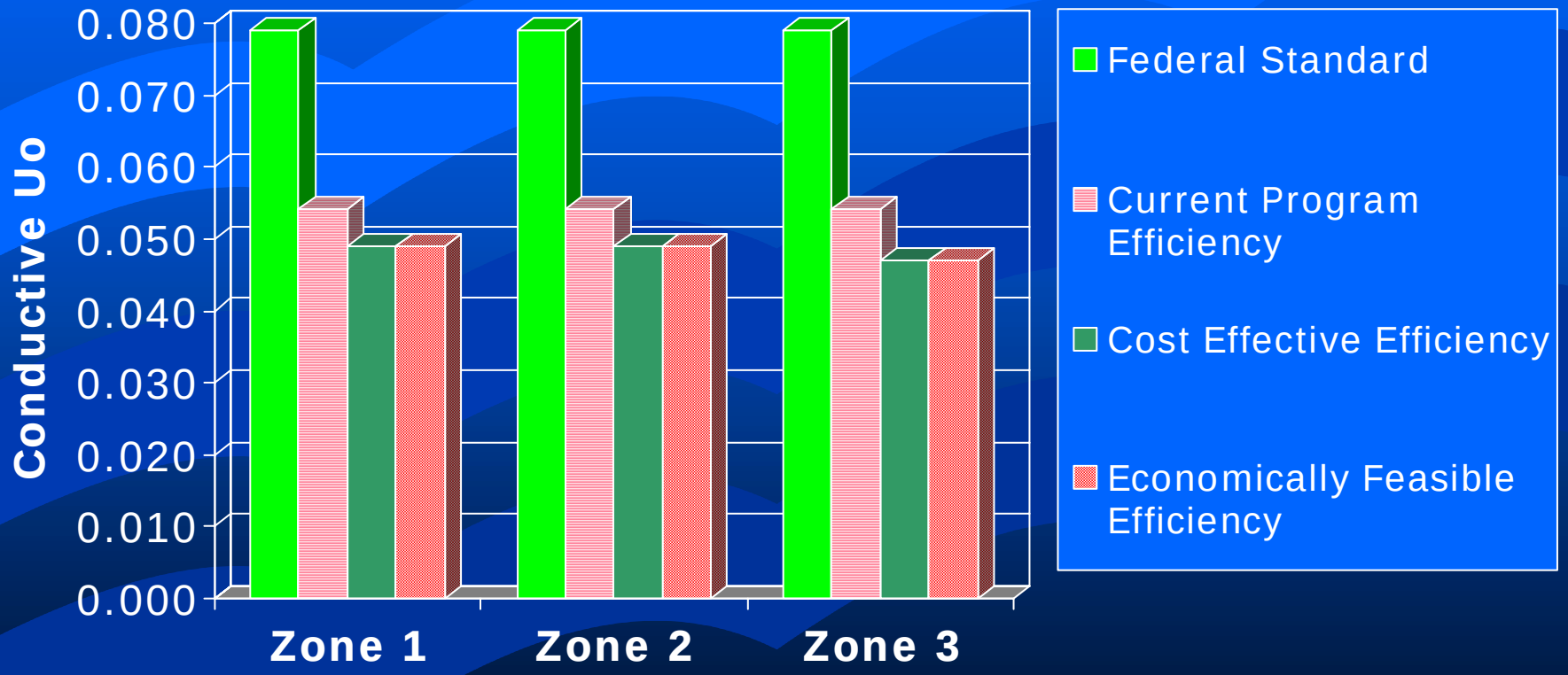
Zone 2: Manufactured Homes
Mean Net Present Value by Measure



Zone 3: Manufactured Homes
Mean Net Present Value by Measure



Regionally Cost-Effective Measures Are Economically Feasible for All Fuel Types and More Efficient Than Current Regional Program Standards



Northwest Power and Conservation Council

Recommendations – Residential MCS

- Retain Fourth Plan's efficiency levels for new site-built electrically heated homes
- Retain Fourth Plan's requirements for utility program offerings targeting all regionally cost-effective savings new residential buildings (site built and manufactured homes)
- Establish efficiency levels for new electrically heated manufactured homes

Commercial Buildings Standards

- Council has historically relied on the American Society of Heating, Refrigerating and Air Conditioning Engineer's (ASHRAE) consensus standard as basis for its commercial building efficiency standards
- Fourth Plan references 1989 version of ASHRAE Standard 90.1 (for new buildings)
- Standard 90.1 was last updated in 2000 and is now under "continuous" (annual) revision

Northwest Power and Conservation Council

Recommendations – Commercial MCS

- Revise Fourth Plan's referenced version of ASHRAE Standard 90.1 (1989) for new commercial buildings to current edition of standard (2000)
- Retain Fourth Plan's standard for utility programs targeting all regionally cost-effective electricity savings in new commercial buildings

Northwest Power and Conservation Council

Recommendation Other MCS

- Retain Fourth Plan's Standard for Conservation Programs not Covered by Other Model Conservation Standards
- Retain Fourth Plan's program design criteria

Northwest Power and Conservation Council

Recommendations – Surcharge Policy

- Retain Fourth Plan's surcharge policy recommendation
  - "None needed at this time"
- Retain Fourth Plan's surcharge calculation methodology

Northwest Power and Conservation Council