INTRODUCED BY H BILL NO. 426 Bradley Huennekens

A BILL FOR AN ACT ENTITLED: "AN ACT REQUIRING PERFORMANCE OF A LIFE-CYCLE COST ANALYSIS BEFORE ANY STATE AGENCY MAY LEASE OR CONSTRUCT A FACILITY."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MONTANA:

Section 1. Findings and purpose. (1) Operating and maintenance expenditures associated with energy equipment and with energy consumed in state-financed and leased buildings represent a significant cost over the life of a building. Energy conserved by appropriate building design not only reduces the demand for energy but also reduces costs for building operation. The size, design, orientation, and operability of windows, the ratio of ventilating air to air heated or cooled, the level of lighting consonant with space-use requirements, the handling of occupancy loads, and the ability to zone off areas not requiring equivalent levels of heating or cooling are but a few of the considerations necessary to conserving energy.

(2) It is very important that energy-efficient designs provide energy savings over the life of the building structure. Conversely, energy-inefficient designs cause excess and wasteful energy use and high costs over that life. With buildings lasting many decades and with energy costs escalating rapidly, it is essential that the costs of operation and maintenance for energy-using equipment be included in all design proposals for state buildings.

(3) In order that such energy efficiency considerations become a function of building design and also a model for future application in the private sector, it is the policy of the state that buildings constructed and financed by the state be designed and constructed in a manner which will minimize the consumption of energy used in the operation and maintenance of such buildings.

Section 2. "Facility", "energy performance index", and "life-cycle costs" defined. In [sections 1 through 5] the following definitions apply:

(1) "Facility" means a building or other structure.

(2) "Energy performance index or indices (EPI)" means a number describing the energy requirements at the building boundary of a facility, per square foot of floor space or per cubic foot of occupied volume, as appropriate under defined internal and external ambient conditions over an entire seasonal cycle.

(3) "Life-cycle costs" means the cost of owning, operating, and maintaining the facility over the life of the structure. This may be expressed as an annual cost for each year of the facility's use.

Section 3. Life-cycle cost analysis required. Neither the department of administration nor any other state agency may lease or construct a facility, within limits prescribed in this section, without having secured a proper evaluation of life-cycle costs, as computed by a qualified architect or engineer. Furthermore, construction may proceed only upon disclosing, for the facility chosen, the life-cycle costs as determined in [section 4] and the capitalization of the initial construction costs of the building. The life-cycle costs shall be a primary consideration in the selection of a building design. Such analysis is required only for construction of buildings with an area of 5,000 square feet or greater. For leased areas of 20,000 square feet or greater within a given building boundary, a life-cycle analysis shall be performed, and a lease may be entered only where there is a showing that the life-cycle costs are minimal compared to available like facilities.

Section 4. Rules for conduct of life-cycle cost analysis. (1) The department of administration shall adopt rules and procedures, including energy conservation performance guidelines, for conducting a life-cycle cost analysis of alternative architectural and engineering designs and for developing energy performance indices to evaluate the efficiency of energy utilization for competing designs in the construction of state-financed and leased

facilities. Such rules and procedures shall take effect 270 days after July 1, 1977.

(2) Such life-cycle costs shall be the sum of:

(a) the reasonably expected fuel costs over the life of the building, as determined by the department, that are required to maintain illumination, power, temperature, humidity, ventilation, and all other energy-consuming equipment in a facility; and

(b) the reasonable costs of probable maintenance, including labor and materials, and operation of the building.

(3) The department shall adopt rules for determining life-cycle costs including rules relating to:

(a) the orientation and integration of the facility with respect to its physical site;

(b) the amount and type of glass employed in the facility and the directions of exposure;

(c) the effect of insulation incorporated into the facility design and the effect on solar utilization of the properties of external surfaces;

(d) the variable occupancy and operating conditions of the facility and subportions of the facility; and

(e) an energy consumption analysis of the major equipment of the facility's heating, ventilating, cooling, lighting, and hot water systems and of all other major

energy-consuming equipment and systems as appropriate. This analysis shall include:

(i) the comparison of alternative systems;

(ii) a projection of the annual energy consumption of major energy-consuming equipment and systems for a range of operation of the facility over the life of the facility; and

(iii) the evaluation of the energy consumption of component equipment in each system, considering the operation of such components at other than full or rated outputs.

(4) Such rules shall be based on the best currently available methods of analysis, including those of the national bureau of standards, the department of housing and urban development, and other federal agencies and professional societies and materials developed by the department. Provision shall be made for an annual updating of rules and standards as required.

Section 5. Rules for energy performance indices. The department shall promulgate rules for energy performance indices as defined in [section 2] to audit and evaluate competing design proposals submitted to the state. As experience develops on the energy performance achieved with state building, the indices (EPI) will serve as a measure of building performance with respect to energy consumption.

-End-

STATE OF MONTANA

REQUEST NO. 410-77

FISCAL NOTE

Form BD-15

In compliance with a written request received February 8, 19 77, there is hereby submitted a Fiscal Note for House Bill 426 pursuant to Chapter 53, Laws of Montana, 1965 - Thirty-Ninth Legislative Assembly. Background information used in developing this Fiscal Note is available from the Office of Budget and Program Planning, to members of the Legislature upon request.

DESCRIPTION OF PROPOSED LEGISLATION:

An act requiring performance on a life cycle cost analysis before any state agency may lease or construct a facility.

ASSUMPTIONS:

1. That the provisions of this bill include life-cycle costing and value engineering for the following building considerations - - 1. Mechanical Systems 2. Electrical Systems 3. Exterior Enclosures 4. Structural Systems 5. Materials and Finishes and involving a 20 year analysis of the following cost factors - - 1. Finance 2. Maintenance and Operations 3. Initial Cost 4. Indirect Costs 5. Land 6. Miscellaneous.
2. That an average of 4 alternatives be investigated for each area of consideration.
3. That criteria established by the State of Montana for life-cycle costing and value engineering proposals be based on existing and available computer programs.
4. That the cost of a life-cycle analysis on a potential facility to be leased be borne by the lessor and presented in the proposal submitted to the State.
5. Life-cycle cost analyses would be contracted with architects or engineers as a part of over-all design contract.

FISCAL IMPACT:

The proposed legislation would add $290,000 to the Long—Range Building Program costs for the 1979 biennium. This would be the cost of contracting with designers to perform the analyses. This legislation would lead to increased construction costs which, hopefully, would be offset by decreased operating costs over the life of the project.

TECHNICAL NOTE:

Requiring an analysis for all construction of buildings over 5,000 sq. ft. could result in much duplication of effort as similar buildings would produce similar results which would be recognizable without the mechanics of a repetitious analysis.

Richard L Judy

BUDGET DIRECTOR

Office of Budget and Program Planning

Date: Feb 15, 1977

Approved by Committee
on Natural Resources

HOUSE BILL NO. 426

INTRODUCED BY MELOY, BRADLEY, HUENNEKENS

A BILL FOR AN ACT ENTITLED: "AN ACT REQUIRING PERFORMANCE OF A LIFE-CYCLE COST ANALYSIS BEFORE ANY STATE AGENCY MAY ~~LEASE OR~~ CONSTRUCT A FACILITY."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF MONTANA:

Section 1. Findings and purpose. (1) Operating and maintenance expenditures associated with energy equipment and with energy consumed in state-financed and leased buildings represent a significant cost over the life of a building. Energy conserved by appropriate building design not only reduces the demand for energy but also reduces costs for building operation. The size, design, orientation, and operability of windows, the ratio of ventilating air to air heated or cooled, the level of lighting consonant with space-use requirements, the handling of occupancy loads, and the ability to zone off areas not requiring equivalent levels of heating or cooling are but a few of the considerations necessary to conserving energy.

(2) It is very important that energy-efficient designs provide energy savings over the life of the building structure. Conversely, energy-inefficient designs cause excess and wasteful energy use and high costs over that life. With buildings lasting many decades and with energy costs escalating rapidly, it is essential that the costs of operation and maintenance for energy-using equipment be included in all design proposals for state buildings.

(3) In order that such energy efficiency considerations become a function of building design and also a model for future application in the private sector, it is the policy of the state that buildings constructed and financed by the state be designed and constructed in a manner which will minimize the consumption of energy used in the operation and maintenance of such buildings.

Section 2. "Facility", "energy performance index", and "life-cycle costs" defined. In [sections 1 through 5] the following definitions apply:

(1) "Facility" means a building or other structure.

(2) "Energy performance index or indices (EPI)" means a number describing the energy requirements at the building boundary of a facility, per square foot of floor space or per cubic foot of occupied volume, as appropriate under defined internal and external ambient conditions over an entire seasonal cycle.

(3) "Life-cycle costs" means the cost of owning, operating, and maintaining the facility over the life of the structure. This may be expressed as an annual cost for each year of the facility's use.

SECOND READING

Section 3. Life-cycle cost analysis ~~required~~ SHALL BE CONSIDERED. Neither the department of administration nor any other state agency may lease or construct a facility, within limits prescribed in this section, without having ~~secured~~ CONSIDERED a proper evaluation of life-cycle costs~~,~~ ~~as--computed--by--a---qualified---architect---or---engineer.~~ ~~Furthermore,--construction-may-proceed-only-upon-disclosing,~~ ~~for-the-facility-chosen,-the-life-cycle-costs-as--determined~~ ~~in--[section--4]--and--the--capitalization--of--the--initial~~ ~~construction--costs--of---the---building.~~ ~~The~~ ALTERNATE life-cycle costs shall be a primary consideration in the ~~selection~~ APPROVAL of a building design. Such analysis is required only for construction of buildings with an area of 5,000 square feet or greater. ~~For-leased--areas--of--20,000~~ ~~square--feet--or-greater-within-a-given-building-boundary,-a~~ ~~life-cycle-analysis-shall-be-performed,-and-a-lease--may--be~~ ~~entered--only--where--there-is-a-showing-that-the-life-cycle~~ ~~costs-are-minimal-compared-to-available-like-facilities.~~

Section 4. ~~Rules~~ PROCEDURES for conduct of life-cycle cost analysis. (1) The department of administration shall ~~adopt--rules--and~~ RECOMMEND procedures, including energy conservation performance guidelines, for conducting a life-cycle cost analysis of alternative architectural and engineering designs and for developing energy performance indices to evaluate the efficiency of energy utilization ~~for~~

~~competing-designs-in-the-construction of state-financed--and~~ ~~leased~~ facilities. Such ~~rules--and~~ procedures shall take effect 270 days after July 1, 1977.

~~(2)--Such-life-cycle-costs-shall-be-the-sum-of:~~

~~(a)--the-reasonably-expected-fuel-costs-over--the--life~~ ~~of--the--building,-as-determined-by-the-department,-that-are~~ ~~required--to--maintain--illumination,--power,---temperature,~~ ~~humidity,---ventilation,---and--all--other--energy-consuming~~ ~~equipment-in-a-facility;-and~~

~~(b)--the--reasonable--costs--of--probable--maintenance,~~ ~~including---labor---and--materials,--and--operation--of--the~~ ~~building.~~

~~(3)--The-department-shall-adopt-rules--for--determining~~ ~~life-cycle-costs-including-rules-relating-to:~~

~~(a)--the--orientation--and--integration-of-the-facility~~ ~~with-respect-to-its-physical-site;~~

~~(b)--the-amount-and--type--of--glass--employed--in--the~~ ~~facility-and-the-directions-of-exposure;~~

~~(c)--the--effect--of--insulation--incorporated-into-the~~ ~~facility-design-and-the-effect-on-solar-utilization--of--the~~ ~~properties-of-external-surfaces;~~

~~(d)--the-variable-occupancy-and-operating-conditions-of~~ ~~the-facility-and-subportions-of-the-facility;-and~~

~~(e)--an---energy--consumption--analysis--of--the--major~~ ~~equipment-of-the-facility's-heating,--ventilating,--cooling,~~

~~lighting--and--hot--water--systems--and--of-all-other-major energy-consuming-equipment-and-systems-as-appropriate.--This analysis-shall-include:~~

~~(i)--the-comparison-of-alternative-systems;~~

~~(ii)-a--projection--of-the-annual-energy-consumption-of major-energy-consuming-equipment-and-systems-for-a-range--of operation-of-the-facility-over-the-life-of-the-facility;-and~~

~~(iii)-the--evaluation--of--the--energy--consumption--of component--equipment--in--each---system---considering---the operation--of--such--components--at-other-than-full-or-rated outputs.~~

~~(4)~~(2) Such ~~rules~~ PROCEDURES shall be based on the best currently available methods of analysis~~,-including those-of-the-national-bureau-of-standards,-the-department-of housing-and-urban-development,-and--other--federal--agencies and--professional--societies--and-materials-developed-by-the department.~~ Provision shall be made for an annual updating of ~~rules~~ PROCEDURES and standards as required.

Section 5. ~~Rules~~ STANDARDS for energy performance indices. The department shall promulgate ~~rules~~ STANDARDS for energy performance indices as defined in [section 2] to audit and evaluate ~~competing~~ design proposals submitted to the state. As experience develops on the energy performance achieved with state building, the indices (EPI) will serve as a measure of building performance with respect to energy

consumption.

-End-

HOUSE BILL NO. 426

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(2) It is very important that energy-efficient designs provide energy savings over the life of the building structure. Conversely, energy-inefficient designs cause excess and wasteful energy use and high costs over that life. With buildings lasting many decades and with energy costs escalating rapidly, it is essential that the costs of operation and maintenance for energy-using equipment be included in all design proposals for state buildings.

(3) In order that such energy efficiency considerations become a function of building design and also a model for future application in the private sector, it is the policy of the state that buildings constructed and financed by the state be designed and constructed in a manner which will minimize the consumption of energy used in the operation and maintenance of such buildings.

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(3) "Life-cycle costs" means the cost of owning, operating, and maintaining the facility over the life of the structure. This may be expressed as an annual cost for each year of the facility's use.

THIRD READING

Section 3. Life-cycle cost analysis ~~required~~ ~~SHALL BE CONSIDERED~~. Neither the department of administration nor any other state agency may lease or construct a facility, within limits prescribed in this section, without having ~~secured~~ ~~CONSIDERED~~ a proper evaluation of life-cycle costs. FURTHERMORE, CONSTRUCTION MAY PROCEED ONLY UPON DISCLOSING, FOR THE FACILITY CHOSEN, THE LIFE CYCLE COSTS AS DETERMINED IN (SECTION 4) AND THE CAPITALIZATION OF THE INITIAL CONSTRUCTION COSTS OF THE BUILDING. THE ~~as computed by a qualified architect or engineer. Furthermore, construction may proceed only upon disclosing, for the facility chosen, the life-cycle costs as determined in [section 4] and the capitalization of the initial construction costs of the building.~~ ~~The~~ ALTERNATE life-cycle costs shall be a primary consideration in the ~~selection~~ APPROVAL SELECTION of a building design. Such analysis is required only for construction of buildings with an area of 5,000 square feet or greater. ~~For leased areas of 20,000 square feet or greater within a given building boundary, a life-cycle analysis shall be performed, and a lease may be entered only where there is a showing that the life-cycle costs are minimal compared to available like facilities.~~

Section 4. ~~Rules~~ PROCEDURES RULES for conduct of life-cycle cost analysis. (1) The department of administration shall ~~adopt rules and~~ RECOMMEND ADOPT RULES

AND procedures, including energy conservation performance guidelines, for conducting a life-cycle cost analysis of alternative architectural and engineering designs and for developing energy performance indices to evaluate the efficiency of energy utilization ~~for competing designs in the construction~~ FOR COMPETING DESIGNS IN THE CONSTRUCTION of state ~~financed and leased~~ FINANCED AND LEASED facilities. Such RULES AND ~~rules and~~ procedures shall take effect 270 days after July 1, 1977.

~~(2) Such life-cycle costs shall be the sum of:~~

~~(a) the reasonably expected fuel costs over the life of the building, as determined by the department, that are required to maintain illumination, power, temperature, humidity, ventilation, and all other energy-consuming equipment in a facility; and~~

~~(b) the reasonable costs of probable maintenance, including labor and materials, and operation of the building.~~

~~(3) The department shall adopt rules for determining life-cycle costs including rules relating to:~~

~~(a) the orientation and integration of the facility with respect to its physical site;~~

~~(b) the amount and type of glass employed in the facility and the directions of exposure;~~

~~(c) the effect of insulation incorporated into the~~

~~facility--design--and-the-effect-on-solar-utilization-of-the properties-of-external-surfaces;~~

~~(c)--the-variable-occupancy-and-operating-conditions-of the-facility-and-subportions-of-the-facility;-and~~

(2) SUCH LIFE-CYCLE COSTS SHALL BE THE SUM OF:

(A) THE REASONABLY EXPECTED FUEL COSTS OVER THE LIFE OF THE BUILDING, AS DETERMINED BY THE DEPARTMENT, THAT ARE REQUIRED TO MAINTAIN ILLUMINATION, POWER, TEMPERATURE, HUMIDITY, VENTILATION, AND ALL OTHER ENERGY CONSUMING EQUIPMENT IN A FACILITY; AND

(B) THE REASONABLE COSTS OF PROBABLE MAINTENANCE, INCLUDING LABOR AND MATERIALS, AND OPERATION OF THE BUILDING.

(3) THE DEPARTMENT SHALL ADOPT RULES FOR DETERMINING LIFE-CYCLE COSTS INCLUDING RULES RELATING TO:

(A) THE ORIENTATION AND INTEGRATION OF THE FACILITY WITH RESPECT TO ITS PHYSICAL SITE;

(B) THE AMOUNT AND TYPE OF GLASS EMPLOYED IN THE FACILITY AND THE DIRECTIONS OF EXPOSURE;

(C) THE EFFECT OF INSULATION INCORPORATED INTO THE FACILITY DESIGN AND THE EFFECT ON SOLAR UTILIZATION OF THE PROPERTIES OF EXTERNAL SURFACES; AND

(D) THE VARIABLE OCCUPANCY AND OPERATING CONDITIONS OF THE FACILITY AND SUBPORTIONS OF THE FACILITY.

~~(e)--an---energy--consumption--analysis--of--the--major~~

~~equipment-of-the-facility's-heating,--ventilating,--cooling, lighting,--and--hot--water--systems--and--of-all-other-major energy-consuming-equipment-and-systems-as-appropriate.--This analysis-shall-include:~~

~~(i)--the-comparison-of-alternative-systems;~~

~~(ii)-a--projection--of-the-annual-energy-consumption-of major-energy-consuming-equipment-and-systems-for-a-range--of operation-of-the-facility-over-the-life-of-the-facility;-and~~

~~(iii)-the--evaluation--of--the--energy--consumption--of component--equipment--in--each---system,---considering---the operation--of--such--components--at-other-than-full-or-rated outputs.~~

~~(4)~~(2)(4) Such ~~rules~~ PROCEDURES RULES shall be based on the best currently available methods of analysis, ~~including-those-of-the-national--bureau--of--standards,--the department--of--housing--and--urban--development,--and-other federal-agencies-and-professional--societies--and--materials developed-by-the-department,~~ INCLUDING THOSE OF THE NATIONAL BUREAU OF STANDARDS, THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, AND OTHER FEDERAL AGENCIES AND PROFESSIONAL SOCIETIES AND MATERIALS DEVELOPED BY THE DEPARTMENT. Provision shall be made for an annual updating of ~~rules~~ PROCEDURES RULES and standards as required.

Section 5. ~~Rules~~ STANDARDS RULES for energy performance indices. The department shall promulgate ~~rules~~

~~STANDARDS~~ RULES for energy performance indices as defined in [section 2] to audit and evaluate ~~competing~~ COMPETING design proposals submitted to the state. As experience develops on the energy performance achieved with state building, the indices (EPI) will serve as a measure of building performance with respect to energy consumption.

-End-