



House of Representatives

General Assembly

File No. 369

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Substitute House Bill No. 5112

House of Representatives, March 31, 2004

The Committee on Government Administration and Elections reported through REP. O'ROURKE of the 32nd Dist., Chairperson of the Committee on the part of the House, that the substitute bill ought to pass.

AN ACT CONCERNING ENERGY EFFICIENCY IN SCHOOL AND STATE BUILDINGS.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

1 Section 1. Section 16a-38 of the general statutes is repealed and the
2 following is substituted in lieu thereof (*Effective October 1, 2004*):

3 (a) As used in this section, subsection (e) of section 4b-23, sections
4 16a-38a, as amended, and 16a-38b, unless the context otherwise
5 requires: (1) "Major capital project" means the construction or
6 renovation of a major facility; (2) "major facility" means any building
7 owned by the state or constructed or renovated wholly or partly with
8 state funds, including a state-financed housing project, which is used
9 or intended to be used as a school or which has ten thousand or more
10 gross square feet, or any other building so owned, constructed or
11 renovated which is designated a major facility by the Commissioner of
12 Public Works; (3) "renovation" means additions, alterations or repairs

13 to a major facility which the Commissioner of Public Works finds will
14 have a substantial effect upon the energy consumption of the facility;
15 (4) "life-cycle cost" means the cost, as determined by the methodology
16 identified in the National Institute of Standards and Technology's
17 special publication 544 and interagency report 80-2040, available as set
18 forth in the Code of Federal Regulations, Title 15, Part 230, of a major
19 facility including the initial cost of its construction or renovation, the
20 marginal cost of future energy capacity, the cost of the energy
21 consumed by the facility over its expected useful life or, in the case of a
22 leased facility, over the remaining term of the lease, and the cost of
23 operating and maintaining the facility as such cost affects energy
24 consumption; (5) "energy performance standard" means a rate of
25 energy consumption which is the minimum practically achievable, on
26 a life-cycle cost basis, by adjusting maintenance or operating
27 procedures, modifying a building's equipment or structure and
28 utilizing renewable sources of energy; (6) "energy audit" means an
29 evaluation of, recommendations for and improvements of the energy
30 consumption characteristics of all passive, active and operational
31 energy systems and components by demand and type of energy used
32 including the internal energy load imposed on a building by its
33 occupants, equipment and components, and the external energy load
34 imposed on a building by the climatic conditions at its location; (7)
35 "renewable sources of energy" means energy from direct solar
36 radiation, wind, water, geothermal sources, wood and other forms of
37 biomass; (8) "cost effective" means that savings exceed cost over a ten-
38 year period; (9) "state agency" means any department, board,
39 commission, institution, or other agency of this state; and (10) "covered
40 products" means the consumer products set forth as covered products
41 in the Energy Policy and Conservation Act, 42 USC 6292.

42 (b) (1) Except as provided in subsection (f) of this section, the
43 Commissioner of Public Works and the Secretary of the Office of
44 Policy and Management shall jointly establish and publish standards
45 for life-cycle cost analyses required by this section for buildings owned
46 or leased by the state. Such life-cycle cost analyses for buildings shall
47 provide, but shall not be limited to, information on the estimated

48 initial cost of each energy-consuming system being compared and
49 evaluated, annual operating and maintenance costs of all energy-
50 consuming systems over the useful life of the building, cost of energy,
51 salvage value and the estimated replacement cost for each energy-
52 consuming system or component expressed in annual terms for the
53 useful life of the building.

54 (2) Except as provided in subsection (f) of this section, the
55 Commissioner of Administrative Services and the Secretary of the
56 Office of Policy and Management may jointly establish and publish
57 standards for life-cycle cost analyses required by this section for
58 equipment and appliances owned or leased by the state which are not
59 covered products, and for such equipment and appliances which are
60 covered products. In establishing such standards, the commissioner
61 and secretary shall consider the criteria set forth in subsection (j) of this
62 section.

63 (c) No state agency shall obtain preliminary design approval for a
64 major capital project unless the Commissioner of Public Works makes
65 a written determination that the design is cost effective on a life-cycle
66 cost basis. To make such a determination, the commissioner (1) shall
67 require documentation that the design meets or exceeds the standards
68 set forth in the National Bureau of Standards Handbook 135, or
69 subsequent corresponding handbook of the United States Department
70 of Commerce and the State Building Code, and (2) may require
71 additional documentation, including, but not limited to, a life-cycle
72 cost analysis that complies with the standards established pursuant to
73 subdivision (1) of subsection (b) of this section.

74 (d) All design proposals for major capital projects shall include at
75 least two differing energy systems for space heating, cooling and hot
76 water to supplement the passive features designed into the building.
77 Such proposals may include computer or other analytical modeling or
78 simulation but shall not be construed to require the development of
79 architectural or mechanical design plans for each such system. All cost
80 evaluations of the competing energy systems shall be based on life-

81 cycle costs. A life-cycle cost analysis for each competing energy system
82 determined by the Commissioner of Public Works to meet the
83 standards of subsection (b) of this section shall be included as part of
84 the design proposal for all projects. All design proposals for major
85 capital projects shall comply with the American Society of Heating,
86 Refrigerating and Air Conditioning Engineers Standard 90.1-1999,
87 shall contain a certification by a licensed professional engineer or
88 architect that the commissioning requirements have been successfully
89 executed or will be provided under existing contracts to ensure that
90 fundamental building elements and systems are designed, installed
91 and calibrated to operate as intended, and shall obtain eight points
92 pursuant to the measures described in subsection (l) of this section. No
93 major capital project shall be approved by the Commissioner of Public
94 Works or by the State Properties Review Board pursuant to section 4b-
95 23, after June 30, 1980, unless the proposed project achieves to the
96 maximum extent practicable the energy performance standards
97 established in accordance with subsection (b) or (g) of this section.

98 (e) All applications for state funding of major capital projects shall
99 be accompanied by a life-cycle cost analysis which the Commissioner
100 of Public Works has determined complies with the standards
101 established pursuant to subsection (b) of this section. The
102 Commissioner of Public Works or the Secretary of the Office of Policy
103 and Management may require such a life-cycle cost analysis for
104 projects other than major capital projects.

105 (f) The Commissioner of Economic and Community Development
106 and the Secretary of the Office of Policy and Management shall jointly
107 establish and publish energy performance standards for buildings
108 constructed as part of state-owned and state-financed housing projects
109 and establish standards for life-cycle cost analyses for such projects. In
110 establishing such standards, the commissioner and secretary (1)
111 require all projects to comply with the American Society of Heating,
112 Refrigerating and Air Conditioning Engineers Standard 90.1-1999,
113 require the design proposal to contain a certification by a licensed
114 professional engineer or architect that the commissioning requirements

115 have been successfully executed or will be provided under existing
116 contracts to ensure that fundamental building elements and systems
117 are designed, installed and calibrated to operate as intended, and
118 require the design project to obtain eight points pursuant to the
119 measures described in subsection (1) of this section, and (2) shall
120 consider [(1)] (A) the coordination, positioning and solar orientation of
121 the project on its situs, [(2)] (B) the amount of glazing, degree of sun
122 shading and direction of exposure, [(3)] (C) the levels of insulation
123 incorporated into the design, [(4)] (D) the variable occupancy and
124 operating conditions of the facility, [(5)] (E) all architectural features
125 which affect energy consumption, and [(6)] (F) the design and location
126 of all heating, cooling, hot water and electrical systems.

127 (g) Notwithstanding any provision in this section concerning the
128 review of life-cycle cost analyses by the Commissioner of Public
129 Works, a life-cycle cost analysis of a major capital project prepared for
130 the Department of Housing shall be reviewed by the Commissioner of
131 Economic and Community Development and the Secretary of the
132 Office of Policy and Management to determine if such analysis is in
133 compliance with the life-cycle cost analyses standards established for
134 such project under subsection (f) of this section.

135 (h) Each state agency preparing a life-cycle cost analysis under this
136 section shall submit a summary of the analysis to the Secretary of the
137 Office of Policy and Management.

138 (i) Except as provided in subsection (f) of this section, the
139 Commissioner of Public Works and the Secretary of the Office of
140 Policy and Management shall jointly establish and publish energy
141 performance standards for existing and new buildings owned or
142 leased by the state. Such standards shall require maximum efficiency
143 in energy use in all such buildings and maximum practicable use of
144 renewable sources of energy in all such buildings. In establishing such
145 standards, the commissioner and secretary shall (1) require all
146 buildings to comply with the American Society of Heating,
147 Refrigerating and Air Conditioning Engineers Standard 90.1-1999,

148 require the design proposal for a new building to contain a
149 certification by a licensed professional engineer or architect that the
150 commissioning requirements have been successfully executed or will
151 be provided under existing contracts to ensure that fundamental
152 building elements and systems are designed, installed and calibrated
153 to operate as intended, and require the design project to obtain eight
154 points pursuant to the measures described in subsection (l) of this
155 section, and (2) consider [(1)] (A) the coordination, positioning and
156 solar orientation of the project on its situs, [(2)] (B) the amount of
157 glazing, degree of sun shading and direction of exposure, [(3)] (C) the
158 levels of insulation incorporated into the design, [(4)] (D) the variable
159 occupancy and operating conditions of the facility, [(5)] (E) all
160 architectural features which affect energy consumption, and [(6)] (F)
161 the design and location of all heating, cooling, hot water and electrical
162 systems.

163 (j) Except as provided in subsection (f) of this section, the
164 Commissioner of Administrative Services and the Secretary of the
165 Office of Policy and Management may jointly establish and publish
166 energy performance standards for equipment and appliances owned
167 or leased by the state which are not covered products, and for such
168 equipment and appliances which are covered products. Any such
169 standards shall require maximum energy efficiency for all such
170 equipment and appliances and, for equipment and appliances owned
171 or leased by the state which are covered products, shall be more
172 stringent than the corresponding federal energy conservation
173 standards set forth in the Energy Policy and Conservation Act, 42 USC
174 6295, or federal regulations adopted thereunder. In establishing such
175 standards, the commissioner and secretary shall consider, without
176 limitation, (1) the initial cost of the equipment or appliance, (2) the
177 projected useful lifetime of the equipment or appliance, (3) the
178 projected cost of the energy that the equipment or appliance will
179 consume over its projected useful lifetime, (4) the estimated operating
180 costs for maintenance and repair, over the projected useful lifetime of
181 the equipment or appliance, and (5) the positive or negative salvage
182 value of the equipment or appliance upon disposal at the conclusion of

183 its projected useful lifetime.

184 (k) Any life-cycle cost analysis standards established pursuant to
185 subdivision (2) of subsection (b) of this section and any energy
186 performance standards established pursuant to subsection (j) of this
187 section shall be implemented in accordance with the purchasing
188 requirements set forth in chapter 58, and any regulations adopted
189 thereunder, and the provisions of this section and section 16a-38j.

190 (l) Any major capital project, state-owned and state-financed
191 housing projects, and any existing or new building owned or leased by
192 the state shall obtain not less than eight points from the following
193 measures, except where the Secretary of the Office of Policy and
194 Management determines that compliance with this section will
195 increase the initial costs of the subject project or building by not less
196 than five per cent and that the resultant reduction in energy
197 expenditures will not offset such additional expenditures for the first
198 two years: (1) A modification of an existing project or building shall
199 earn one point for each five per cent reduction in design energy cost
200 compared to the energy cost budget for energy systems regulated by
201 the American Society of Heating, Refrigerating and Air Conditioning
202 Engineers Standard 90.1-1999; (2) construction of a new project or
203 building shall earn one point for a fifteen per cent reduction in design
204 energy cost compared to the energy cost budget for energy systems
205 regulated by said standard 90.1-1999 and an additional one point for
206 each additional five per cent reduction in design energy costs; (3) a
207 project or building shall earn one point for obtaining five per cent of
208 the project or building's total energy use, as expressed as a fraction of
209 annual energy cost, through the use of on-site renewable energy
210 systems, two points for obtaining ten per cent of the project or
211 building's total energy use from such systems, and three points for
212 obtaining twenty per cent of the project or building's total energy use
213 from such systems; and (4) a project or building shall earn one point if
214 (A) the owner demonstrates, through a commissioning authority that
215 is independent of the design team, that the entire building is designed,
216 constructed and calibrated to operate as intended, (B) the project or

The following fiscal impact statement and bill analysis are prepared for the benefit of members of the General Assembly, solely for the purpose of information, summarization, and explanation, and do not represent the intent of the General Assembly or either House thereof for any purpose:

OFA Fiscal Note

State Impact:

Agency Affected	Fund-Effect	FY 05 \$	FY 06 \$
Treasurer, Debt Serv.	GF - Cost	Potential Significant	Potential Significant
All agencies with care & control of their buildings; Pub. Works, Dept.; UConn; Judicial Dept.	GF - Savings	None	Potential Significant
Transportation, Dept.	TF - Savings	None	Potential Significant
Treasurer, Debt Serv.	TF - Cost	Potential Significant	Potential Significant

Note: GF=General Fund; TF=Transportation Fund

Municipal Impact:

Municipalities	Effect	FY 05 \$	FY 06 \$
Various Municipalities	STATE MANDATE - Cost	Potential Significant	Potential Significant
Various Municipalities	Savings	None	Potential Significant

Explanation

The bill results in net savings to the state in future years that are potentially significant.

The increases in capital construction costs for new buildings would be offset by savings in energy costs for these buildings over their lifetime. DPW estimates that the costs of construction could increase by up to 2%, while the Department of Transportation estimates that the costs for many of their maintenance facilities could increase by 10% or more. The payback period for new construction is estimated by DPW to be 2 to 4 years.

The cost to retrofit existing buildings would be significant but the

bill allows the Office of Policy and Management (OPM), in consultation with DPW, to exempt any building when the cost of compliance significantly outweighs the benefits. Therefore, it is anticipated that the costs to retrofit a building will only be incurred when they exceed operational savings over the life of the building.

In the case of school construction projects, passage of this bill could substantially increase the state's costs. It should be noted that the operating cost savings for these buildings would accrue to the municipalities. Since school construction projects are financed with General Fund bond funds, this increase in construction costs would result in a potentially significant increase in General Fund debt service costs. (The state normally provides between 20% and 80% of the construction cost for school building projects and magnet schools receive 95% reimbursement.)

Municipal Impact

The secretary of the Office of Policy and Management would be able to exempt any buildings from these new standards when the cost of compliance significantly outweighs the benefits. Therefore, the increases in school construction costs for towns would be offset by potentially significant savings in the operating costs of these buildings over their lifetime. It is a State Mandate since it would increase capital construction costs.

OLR Bill Analysis

sHB 5112

AN ACT CONCERNING ENERGY EFFICIENCY IN SCHOOL AND STATE BUILDINGS**SUMMARY:**

This bill imposes new energy efficiency and related requirements on design proposals for constructing and renovating state-owned or -funded building projects. It imposes similar requirements on the projects themselves and on existing and new state-owned and -financed buildings. However, compliance with some of these requirements is not required if the secretary of the Office of Policy and Management (OPM) determines this would increase the initial cost of the project or building by at least 5% and the reduced energy expenditures would not offset the additional costs within the building or project in the first two years.

EFFECTIVE DATE: October 1, 2004

ENERGY EFFICIENCY STANDARDS***Design Proposals***

The bill requires that all design proposals for major capital projects comply with standard 90.1-1999 of the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE). By law, a major capital project is the construction or renovation of any building or housing project that has at least 10,000 gross square feet and is (1) owned by the state or (2) constructed or renovated wholly or in part using state funds (including state-funded housing and school projects). (In the case of state-funded school projects, the minimum size criterion does not apply.) In addition, the proposal must contain a certification by a licensed architect or professional engineer that fundamental building elements and systems are designed, installed, and calibrated to operate as intended or that these requirements will be met under existing contracts.

Finally, the proposal must earn eight points from specified energy conservation, renewable energy, and related measures. Table 1 describes most of these measures. In addition, the proposal gets one point if:

1. the owner demonstrates, through use of a commissioning authority independent of the design team, that the entire building is designed, built, and calibrated to operate as intended;
2. the heating, ventilation, air conditioning, and fire suppression systems do not contain hydrochlorofluorocarbons or halons;
3. the owner provides for on-going accountability and optimization of energy consumption performance over time; and
4. the owner has a contract that runs for at least two years that provides for obtaining the building's electricity demand from renewable resource

Table 1: Energy Efficiency and Related Measures

Measure	Points
Modification of an existing building- each 5% reduction in energy costs beyond that achieved by complying with ASHRAE 90.1-1999	1
Construction of a new building-15% reduction in energy costs beyond that achieved by complying with ASHRAE 90.1-1999	1
Construction of a new building-5% additional reduction in energy costs beyond that achieved by complying with ASHRAE 90.1-1999	1
Obtaining 5% of a new or existing building's total energy use from the use of on-site renewable energy systems	1
Obtaining 10% of the building's total energy use from the use of on-site renewable energy systems	2
Obtaining 20% of the building's total energy use from the use of on-site renewable energy systems	3

Standards for Projects and Buildings

By law, the OPM secretary and the Public Works commissioner must establish energy performance standards for most existing and new

state-owned or -leased buildings. The secretary and the Economic and Community Development commissioner must establish such standards for construction of state-owned and financed housing projects. Under the bill, the standards must require that all of these buildings and projects:

1. meet the ASRAE 90.1-1999 standards,
2. have design proposals that contain the architect or engineer certification described above, and
3. obtain eight points as described above.

Major capital projects that do not fall within the above categories, e.g. state funded school projects, must meet the certification and eight points requirements. However, in all of these cases the requirement for the eight points does not apply if the secretary determines that compliance with this requirement will increase the initial building or project cost by at least 5% and that the lower energy costs will not offset this added cost within two years.

BACKGROUND

Current Practice

In practice, building construction and renovation projects under the Department of Public Works' supervision are already subject to the ASHRAE 90.1-1999 standard; projects supervised by other agencies are subject to an earlier version of the standard.

COMMITTEE ACTION

Energy and Technology Committee

Joint Favorable Substitute Change of Reference

Yea 16 Nay 1

Government Administration and Elections Committee

Joint Favorable Report

Yea 17 Nay 0