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ENERGY EFFICIENCY STANDARDS IN STATE PUBLIC FACILITIES

PREPARED FOR REPRESENTATIVE LES GARA

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You asked about energy efficiency standards in state public facilities in Alaska. Specifically, you wanted to know of any current statutes regarding energy efficiency audits or minimum standards for public facilities, as well as any related state programs. You also asked about public facility energy efficiency programs in other states, and the cost effectiveness of each program.

ALASKA

No Minimum Energy Efficiency Standards

According to Joel St. Aubin, chief of statewide public facilities, Alaska Department of Transportation and Public Facilities, there are no minimum energy efficiency standards for state facilities.¹ Mr. St. Aubin notes, however, that "in practice, when a new building is constructed, or an existing building is remodeled or repaired, we choose the most energy efficient design that the budget will allow, and will meet the applicable building codes." Applicable commercial building codes in Alaska include the following: the building, mechanical, fuel gas, and fire codes of the International Code Council, the Uniform Plumbing Code, and the National Electric Code.² Alaska has not adopted—for government or commercial buildings—any of the standard energy efficiency codes adopted by many other states. These codes include the International Energy Conservation Code (for residential and smaller commercial buildings), International Existing Buildings Code (for renovations to existing buildings), and the American Society of Heating, Refrigeration, and Air-conditioning Engineers (ASHRAE) code (for larger commercial buildings).³

¹ Mr. St. Aubin can be reached at (907) 269-0823.

² In Alaska, the state fire marshal adopts the building, mechanical, fuel gas, and fire codes and the Department of Labor adopts the plumbing and electric codes.

³ Anchorage, however, has adopted the International Energy Conservation Code, and all new state buildings or major renovations to existing state buildings in Anchorage must follow these codes. The only statewide energy code is a modified version of the residential International Energy Conservation Code that was adopted in 1992. The code applies only to residential buildings financed with underwriting from the Alaska Housing Finance Corporation, and is not applicable to state buildings.

Required Energy Audits of State Facilities Are Not Being Performed

Under Alaska Statute 44.42.065 (Attachment A), the Department of Transportation and Public Facilities (DOT&PF) is directed to perform an energy audit of each public building every seven years. Each audit is to include the following:

recommendations for corrective measures to improve the energy efficiency and to minimize the life-cycle cost of the public building surveyed. These measures may include (1) energy conservation measures, (2) measures involving solar technology and other alternative energy systems, (3) energy management, and (4) maintenance and operating procedures and energy-related modifications. In recommending the corrective measures, the department shall give priority to changes in maintenance and operating procedures over measures requiring substantial structural modification or installation of equipment.

According to Joel St. Aubin, AS 44.42.065 has not been implemented as a formal program, as the legislature has never funded the program. However, according to Rob Carpenter, fiscal analyst, Alaska State Legislature, this statute is not dependent on legislative appropriation and the department's base funding is designed to cover this type of statutory responsibility.⁴ Alaska Statute 44.42.065 has undergone substantial amendment only once since its 1980 establishment: legislation in 1994 (ch. 126 SLA 1994) removed an annual requirement that the building audits completed in the previous year be submitted to the legislature each spring.

Performance Contracting Used by DOT&PF to Complete Energy Efficiency Upgrades

Beginning in the late 1990's, the DOT&PF initiated an energy performance contracting program to complete energy upgrades of state facilities.⁵ Under the program, a contractor (called an energy service company or ESCO) performs energy audits, recommends measures to improve a building's operating performance, completes the building upgrades, and reimburses the state if realized savings are less than an agreed-upon cost savings guarantee. The voluntary program relies on the interest of building managers, and does not specifically attempt to identify, or compel the participation of, the most inefficient state facilities.

Twenty-four state facilities have participated in the DOT&PF's performance contracting program. Improvements to the first round of eight buildings were completed in 2006, with guaranteed utility cost savings of \$277,446 annually and an additional, projected annual savings of \$43,300. Subsequently, eight additional buildings have completed energy upgrades through the program and eight others (the participating facilities of the Department of Health and Social Services) have completed the audit portion of the program and will implement any efficiency upgrades through their own budgets when feasible.⁶

⁴ Mr. Carpenter can be reached at (907) 465-5413.

⁵ The program is not specifically addressed in statute, but follows general state procurement guidelines covered in AS 36.30. Information on the state performance contracting program was obtained from Joel St. Aubin.

⁶ For a list of the 24 state facilities that have participated in this program, please see Attachment B.

OTHER STATES' EFFICIENCY STANDARDS

ENERGY CONSERVATION BUILDING CODES

According to information compiled by the Building Codes Assistance Project (BCAP), almost all states have adopted basic energy conservation codes applicable to new state buildings.⁷ The most commonly implemented codes are the International Energy Conservation Code (for residential and smaller commercial buildings) and the American Society of Heating, Refrigeration, and Air-conditioning Engineers (ASHRAE) code (applicable to all commercial buildings)—though other comparable standards are used in some states.⁸ As of November 2008, **thirty-nine states** have adopted a 1999 or more recent version of one of these standard codes that applies to new state buildings. In addition, four states (Indiana, Minnesota, Mississippi, and Missouri) have adopted relevant energy efficiency codes that are equivalent to older versions of the standard codes.⁹

⁷ The Building Codes Assistance Project—a joint project of the Alliance to Save Energy, the American Council for an Energy-Efficient Economy, and the Natural Resources Defense Council—provides information and assistance to state and local governments regarding building energy code adoption and implementation.

⁸ These codes are developed by private organizations with input from the U.S. Department of Energy, and are copyrighted documents. A description of the International Energy Conservation Code, which is similar to the ASHRAE code, is provided below, excerpted from an International Energy Agency report on building energy codes (Attachment C):

The International Energy Conservation Code 2004 (IECC 2004) is a model building code or standard for energy efficiency of new buildings. It was devised by the International Code Council (ICC), and is based on US conditions and traditions for energy efficiency regulation. This code IECC 2004 sets rules for residential (with less than 4 floors) and for small and less complicated commercial buildings while it contains a reference for the ASHRAE for large and complex buildings. There is an emphasis on new buildings.

Rules are based on climatic zones, which are set based on cooling degree days CDD and heating degree days HDD and some humidity conditions. In general, the US is split into 8 different zones, based on the level of cooling and heating. Some humidity conditions divide the zones into dry, humid and marine areas.

Rules are set as prescriptive values for building parts, heating and cooling systems, ventilation and lightning. Insulation requirements are set as R-values or U-factor where $U = 1/R$ for each climatic zone separately. These values have to be fulfilled for each building part in the prescriptive model. Some specific regulations are given for pipe and duct insulation, air tightness, sealing, hot water systems, mechanical ventilation and circulation of hot water. Rules for heating and cooling equipment are only given as sizing requirements. IECC also includes a trade-off model where some parts can be made with less energy efficiency as long as the total building still fulfils the same overall requirements which would be the result of fulfilling each single demand. In this model the same values are used for the trade off model as reference values for the model building. The trade-off model is based on energy costs which take into account the different energy costs for gas, oil or electricity. Specific and more detailed values are set for some steel solutions. Finally it contains a frame with an overall assessment where total values have to be obtained. The energy efficiency requirements for residential buildings and those for new commercial buildings are indicated in two separate chapters. The prescriptive model is described as Mandatory Requirements, while the trade-off model is referred to as Performance Based requirements. Finally there are some requirements for the use of software for the Performance based model. Some basic assumptions are set for the reference buildings used in the trade off model such as amount of windows (18 % of floor area) and calculation values.

The IECC apply for major renovation and refurbishment projects too. The values R-values and U-factors (prescriptive) in the regulation have to be fulfilled in some renovation projects, for example a full exchange of windows must comply with the energy efficiency requirements for windows. A special standard is developed for refurbishment of existing buildings, International Existing Building Code (IEBC).

⁹ For a map of which states have adopted which codes, please see Attachment D, a map compiled by the BCAP. More detailed information on each state's codes is available on the BCAP's website, <http://www.bcap-energy.org/node/5>.

GREEN BUILDING STANDARDS

A large and growing number of states have mandated green building standards for new and renovated state buildings. The most common requirement in these states is U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) certification, which addresses a wide range of environmental and human health impacts related to buildings.¹⁰ This certification includes a number of basic requirements in each of the following categories: land use (construction impacts, site selection, etc.); water efficiency; energy and atmosphere (energy efficiency, renewable energy generation, etc.); materials and resources (recycled and reused building materials, etc.); and indoor environmental quality (ventilation, non-toxic materials, etc.). In addition to the basic requirements, there is a total point requirement that can be achieved by excelling in some or all of the categories.

It is important to note that LEED certification does not necessarily guarantee that a building is energy efficient. A recent study funded by the U.S. Green Building Council (Attachment E) sampled a group of recently-constructed LEED certified buildings at all four levels of certification (certified, silver, gold, and platinum, in increasing order of "greenness"), and found an average energy star rating of 67. (An energy star rating of 50 is equal to the median energy efficiency level of all U.S. buildings.) Despite the above average performance of most LEED buildings, a full quarter of the buildings studied fell below an energy star rating of 50, including buildings in all levels of certification. This is a result of the fact that LEED energy efficiency requirements are fairly basic, and a builder can choose to earn the points needed for a certain rating by excelling in one of the non-energy categories described above.¹¹

Currently, at least twenty states require LEED or comparable certification for all new state buildings, or all new state buildings over a minimal size or cost level.¹² Most of these states also apply this requirement to major renovations of existing state buildings, though states vary in how they define which types of renovations apply. In two additional states (Illinois and Ohio), new public schools, but not other state buildings, must obtain LEED certification. Four states—Arkansas, Louisiana, New York, and Wisconsin—have made less aggressive steps in this area, including the adoption of policies encouraging green building by the state, or the creation of a commission to study the issue.

¹⁰ The U.S. Green Building Council is a non-profit organization composed of 15,000 member groups, including building owners, real estate developers, facility managers, architects, designers, engineers, general contractors, subcontractors, product and building system manufacturers, government agencies, and nonprofits.

¹¹ We note that legislation passed in South Carolina partially addresses this issue by requiring state buildings to achieve a minimum of four credits under the LEED Energy and Atmosphere Credit #1 "Optimize Energy Performance." We include this statute, South Carolina Code of Laws § 48-52-830, as Attachment F.

¹² For more information on each state's green building requirements, please see the website of the U.S. Green Building Council, <http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1852#state>. The twenty states that require green building certification are Arizona, California, Colorado, Connecticut, Florida, Hawaii, Indiana, Maine, Maryland, Massachusetts, Michigan, Nevada, New Jersey, New Mexico, Oklahoma, Rhode Island, South Carolina, South Dakota, Virginia, and Washington.

SPECIFIC ENERGY CONSERVATION STANDARDS DIRECTED AT EXISTING BUILDINGS

The energy codes and green building requirements described above generally address only new state buildings or major renovations to existing state buildings. However, a small number of states have implemented specific policy measures to address the energy efficiency of *existing* state facilities. For instance, Arizona Revised Statutes § 34-451 requires that three state agencies reduce energy use per square foot in public buildings they administer by ten percent by 2008 and fifteen percent by 2011.¹³

Glen Anderson, National Conference of State Legislatures, highlights the state of Minnesota as a leading example in this area.¹⁴ A 2005 executive order in this state required all state agencies to reduce energy use in their facilities by ten percent during the following year. A follow-up report (Attachment H) concluded the state saved \$1.5 million as a result of this action, though not all agencies were able to meet the ten percent target.

It appears that most states avoid mandating specific energy efficiency targets in favor of more incremental approaches, such as public and employee education, revolving loan funds, performance contracting programs, and improvements to state procurement guidelines. Numerous states have signed on to the U.S. Environmental Protection Agency's general call to consumers to reduce energy use by ten percent—a program known as the Energy Star Challenge. Brief descriptions of each state's approach can be accessed at the challenge's webpage, <http://www.energystar.gov/index.cfm?fuseaction=challenge.showWelcome&sortBy=org>.

California appears to take a hybrid approach, relying on a broad suite of incremental approaches but also establishing a specific energy efficiency goal for the state. California Executive Order S-20-04 specifically targets a twenty percent reduction in state energy use by 2015. However, the order does not mandate that this level of energy reduction be reached by each state agency. We include this executive order, which also outlines the broad range of energy efficiency strategies to be employed by various state agencies, as Attachment I.

For a list of energy efficiency measures suggested by the Alaska Energy Authority for adoption in our state, please refer to Attachment J, a report titled "Alaska Energy Efficiency Program and Policy Recommendations." This document recommends that Alaska adopt a commercial energy efficiency code, conduct energy audits of public schools, establish a low-interest loan program for energy efficiency upgrades to state facilities, and adopt a policy to reduce energy consumption by state agencies by twenty percent from 2000 levels by 2020, among other recommendations.

We hope you find this information to be useful. Please let us know if you have questions or need additional information.

¹³ The Arizona agencies named in this statute are the Department of Administration, the Arizona Board of Regents, and the Department of Transportation. We include this statute as Attachment G. We were not able to find information on the cost effectiveness of Arizona's program in the time allotted.

¹⁴ Mr. Anderson can be reached at (303) 856-1341.

LIST OF ATTACHMENTS

Attachment A

Alaska Statutes § 44.42.065

Attachment B

Alaska State Facilities Participating in the Energy Savings Performance
Contracting Program
Alaska Department of Transportation and Public Facilities

Attachment C

"Energy Efficiency Requirements in Building Codes, Energy Efficiency Policies
for New Buildings"
International Energy Agency, March 2008

Attachment D

"Commercial State Energy Code Status, As of November 2008"
Building Codes Assistance Project
Available at http://bcap-energy.org/files/commercial_with-legend.pdf

Attachment E

"Energy Performance of LEED for New Construction Buildings"
New Buildings Institute, March 2008

Attachment F

South Carolina Code of Laws § 48-52-830

Attachment G

Arizona Revised Statutes § 34-451

Attachment H

"State Agency Energy Conservation: A Progress Report on Governor's Executive
Order 05-16"
Minnesota Department of Administration

Attachment I

California Executive Order S-20-04

Attachment J

"Alaska Energy Efficiency Program and Policy Recommendations"
Cold Climate Housing Research Center
Prepared by Information Insights, Inc.
Project funded by Alaska Energy Authority and Alaska Housing Finance
Corporation