§ 434.520 Speculative buildings.

520.1 Lighting. The interior lighting power allowance (ILPA) for calculating the Energy Cost Budget shall be determined from Table 401.3.2a. The Design Energy Consumption may be based on an assumed adjusted lighting power for future lighting improvements.

520.2 The assumption about future lighting power used to calculate the Design Energy Consumption must be documented so that the future installed lighting systems may be in compliance with these standards. Documentation must be provided to enable future lighting systems to use either the Prescriptive method or the Systems Performance method of subsection 401.3.

520.3 Documentation for future lighting systems that use subsection 401.3 shall be stated as a maximum adjusted lighting power for the tenant spaces. The adjusted lighting power allowance for tenant spaces shall account for the lighting power provided for the common areas of the building.

520.4 Documentation for future lighting systems that use subsection 401.3 shall be stated as a required lighting adjustment. The required lighting adjustment is the whole building lighting power assumed in order to calculate the Design Energy Consumption minus the ILPA value from Table 401.3.2c that was used to calculate the Energy Cost Budget. When the required lighting adjustment is less than zero, a complete lighting design must be developed for one or more representative tenant spaces, demonstrating acceptable lighting within the limits of the assumed lighting power allowance.

520.5 HVAC Systems and Equipment. If the HVAC system is not completely specified in the plans, the Design Energy Consumption shall be based on reasonable assumptions about the construction of future HVAC systems and equipment. These assumptions shall be documented so that future HVAC systems and equipment may be in compliance with these standards.

§ 434.521 The simulation tool.

521.1 Annual energy consumption shall be simulated with a multi-zone, 8760 hours per year building energy model. The model shall account for:

521.1.1 The dynamic heat transfer of the building envelope such as solar and internal gains;

521.1.2 Equipment efficiencies as a function of load and climate;

521.1.3 Lighting and HVAC system controls and distribution systems by simulating the whole building;

521.1.4 The operating schedule of the building including night setback during various times of the year; and

521.1.5 Energy consumption information at a level necessary to determine the Energy Cost Budget and Design Energy Cost through the appropriate utility rate schedules.

521.1.6 While the simulation tool should simulate an entire year on an hour by hour basis (8760 hours), programs that approximate this dynamic analysis procedure and provide equivalent results are acceptable.

521.1.7 Simulation tools shall be selected for their ability to simulate accurately the relevant features of the building in question, as shown in the tool's documentation. For example, a single-zone model shall not be used to simulate a large, multi-zone building, and a steady-state model such as the degree-day method shall not be used to simulate buildings when equipment efficiency or performance is significantly affected by the dynamic patterns of weather, solar radiation, and occupancy. Relevant energy-related features shall be addressed by a model such as daylighting, atriums or sunspaces, night ventilation or thermal storage, chilled water storage or heat recovery, active or passive solar systems, zoning and controls of heating and cooling systems, and ground-coupled buildings. In addition, models shall be capable of translating the Design Energy Consumption into energy cost using actual utility rate schedules with the coincidental electrical demand of a building. Examples of public domain models capable of handling such complex building systems and energy cost translations available in the United States are DOE—2.1C and BLAST 3.0 and in Canada, Energy Systems Analysis Series.

521.1.8 All simulation tools shall use scientifically justifiable documented

techniques and procedures for modeling building loads, systems, and equipment. The algorithms used in the program shall have been verified by comparison with experimental measurements, loads, systems, and equipment.

Subpart F—Building Energy Compliance Alternative

§ 434.601 General.

601.1 This subpart provides an alternative path for compliance with the standards that allow for greater flexibility in the design of energy efficient buildings using an annual energy use method. This path provides an opportunity for the use of innovative designs, materials, and equipment such as daylighting, passive solar heating, and heat recovery, that may not be adequately evaluated by methods found in Subpart D.

601.2 The Building Energy Compliance Alternative shall be used with subpart C and subpart D, 401.1, 401.2, 401.3.4 and in conjunction with the minimum requirements found in subsections 402.1, 402.2, and 402.3., 403.1, 403.2.1–7, 403.2.9 and 404.

601.3 Compliance under this section is demonstrated by showing that the calculated annual energy usage for the Proposed Design is less than or equal to a calculated Energy Use Budget. (See Figure 601.3, Building Energy Compliance Alternative). The analytical procedures in this subpart are only for determining design compliance, and are not to be used either to predict, document or verify annual energy consumption.