

# **HOW THE ENERGY CODE AFFECTS COMMERCIAL BUILDINGS**

As of September 2002, State law required all municipalities in Texas to adopt an energy code. Houston and most other cities have adopted the 2000 International Energy Conservation Code (IECC), plus the 2001 supplements to the IECC.

Energy codes are enforced by the local building authority and are part of the overall plan checking / permitting / field inspection process that accompanies any construction project. Thus the energy code supplements the other codes (Building, Fire, Mechanical, Plumbing and Electrical) that have always been part of the building design and construction process.

## **WHY DO WE HAVE AN ENERGY CODE?**

The purpose of the energy code is to promote more effective use of energy in buildings and thereby reduce the State's consumption of energy and natural resources.

Most other states have energy codes; Texas was one of the last to adopt such codes for most buildings. State-owned or occupied buildings in Texas have been subject to energy codes for a number of years, but private commercial and institutional buildings were exempt prior to last September.

Many building owners have, in the past, recognized the value of energy conservation and voluntarily pursued Energy Star certification, LEEDS certification or other programs. Now, however, law mandates certain types of energy conservation.

## **DOES THE CODE APPLY TO MY BUILDING ?**

The code applies to most, but not all buildings. Historic buildings are exempt from the energy code. Buildings that consume very little energy and those that are neither heated nor cooled are also exempt.

The code does apply to all other residential and commercial buildings that involve:

- New construction
- Renovations (but only the renovated part, not the rest of the building)
- Additions ( but only the addition, not the rest of the building)

Size or cost of the project is not a factor; the energy code applies to all projects, large or small.

The code is not retroactive to existing buildings. Existing buildings are not subject to the energy codes until additions, renovations or alterations are made and, even then, the code applies only to the added or altered portion.

For example, when a lease space is renovated; the new or revised lighting and HVAC in the lease space must comply with the energy code, but electrical and mechanical systems in the rest of the building do not. Assuming the building envelope (wall, windows) is not revised, then no changes to the envelope are required by the energy code.

There is an exception to the above. If the occupancy classification of a building is being changed, then the entire building (not just renovated parts) must comply with the energy code. For example, if an office building were being converted to residential lofts, then the entire building must be brought up to compliance.

The energy code addresses only these specific systems: HVAC, service water heating, lighting and the building envelope (wall, roof, windows, insulation). It does not, for example, address elevators, office equipment (copiers, computers, etc) or general use power receptacles.

The code does not require the use of renewable energy sources such as solar, wind or geothermal; but it does grant certain exceptions when such sources are used.

### **DOES THE CODE APPLY TO THE CONTINUING OPERATION OF MY BUILDING?**

The energy code applies only to construction projects as discussed above; It does not address building operation. There is, for example, no requirement to set thermostats in certain ranges, to limit building operation hours, to use blinds on windows, to install energy management systems or to adopt any other operational energy conserving strategies.

### **WHEN DOES THE CODE AFFECT PROPERTY MANAGERS?**

Property owners and managers are affected when they build a new building, or make additions or renovations to a building or to a portion of a building

Any project requiring a building permit will also require documentation of compliance to the energy code. This is usually handled by the Architect, Engineer or Contractor responsible for the project drawings and specifications. In Houston, a compliance form must be submitted with the permit documents, using a specific form developed by the City of Houston and sealed by an Engineer or Architect.

City of Houston permit fees did go up slightly to cover the costs of additional inspections. Time to process permits does not seem to have been adversely affected by the energy code process.

Most Architect and Engineer's increased their fees to cover the increase work of designing to and documenting compliance with the energy code.

We have not seen significant construction cost differences as a result of the energy code. Architects and Engineers have adapted their designs to meet the code and vendors have responded with appropriate products and materials.

The energy code allows multiple compliance methods, so there are few absolute rules on what a building can or cannot have. The code has both relatively simple methods of compliance, plus sophisticated methods.

In the simple compliance methods, you compare your building's glass type, glass area, wall and roof insulation, HVAC equipment efficiency and controls, pipe and duct insulation, lighting wattages and other factors to benchmarks for your particular climate. If you meet or exceed all the benchmarks, then your project passes. On the projects we have seen, the code benchmark values are 'reasonable' numbers-- values one might expect in a quality, responsible design. The code benchmarks are not onerous, impractical or impossible to attain figures.

If one cannot pass using the benchmark values, then there are other options. For example, one might want to use more glass than allowed by the benchmark case. This is allowed if you construct a mathematical model of both the benchmark building and your proposed building, then demonstrate that your proposed building uses less energy.

We had one project in which the energy code simple method required the use of double pane glass. Our Owner, however, wanted to use single pane glass. Using an alternative compliance method, we demonstrated that the high efficiency HVAC system (geothermal heat pumps) more than offset the energy difference of the window types. The project passed the code with single pane glass.

### **EFFECT ON LEASE SPACE RENOVATIONS**

The most common construction project for building managers is lease space renovations. When a space is renovated or reconfigured for a new leasee, the energy code will apply. Generally no changes are being made to the building envelope (wall and roof), so these elements are not subject to the energy code.

Lease space lighting design is the area most affected by the energy code. Under the simple compliance methods, lights wattage is restricted to certain levels. Our experience shows that it is very difficult to design around incandescent lights (down lights, wall washers, etc). Few lease spaces will pass the lighting budget when incandescent lighting is used. Lighting designs are using low voltage or

fluorescent fixtures for accent and decorative lighting and fluorescent fixtures for general illumination. However, even building-standard type 2x4 fluorescent fixtures can be problem when they are the 4 lamp type.

Certain controls are now required on lighting systems. Areas fewer than 250 square feet require motion sensors or 2 level light switching. Spaces over 250 square feet require an automatic time clock or other method to control lights.

HVAC renovations may or may not be affected by the code. Moving or adding grilles and diffusers generally does not trigger energy code issues. However any new ducts or pipes must have the prescribed insulation; new thermostats must have dead bands between cooling and heating setpoints, new HVAC equipment (say for after-hours or supplemental cooling) must meet minimum efficiencies, and new VAV boxes must have certain controls.

### **SUMMARY**

The adoption of an energy code set beneficial and reasonable energy standards for Texas buildings. There has been a learning curve for owners, managers, design professionals, contractors and code authorities; but that phase is rapidly closing. The design and construction industry has embraced the code and is using it to deliver buildings that are more efficient and more responsive to long term sustainability. There has been minimal cost impact to building owners and managers and they reaping the energy and performance benefits.