Digitalization for energy efficiency in U.S. commercial buildings

What are the energy codes?

Increasing the energy efficiency of building systems is one of the most effective ways to reduce energy costs and greenhouse gas emissions. Energy codes address this challenge and they impact electrical systems supporting lighting, plug loads, heating, ventilation and air conditioning (HVAC), which account for a significant portion of building energy consumption.

The U.S. does not have a national energy code. Instead, it's up to the states and municipalities to adopt codes. Guidelines are based on national model codes, a modified version of the model code, or states develop their own code.

ASHRAE 90.1 is a model energy code that’s designed to provide state and local jurisdictions with a framework for enforceable regulations. It’s the basis for Title 24 and Local Law 97.

The three energy codes

ASHRAE 90.1 – A proven benchmark

For more than 35 years, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1 has guided the energy-efficient design of buildings. This code is a parallel standard to the International Energy Conservation Code (IECC). These codes are updated on staggered 3-year cycles.

CEC Title 24 – Raising the bar for a more sustainable future

First developed in 1976, the California Energy Commission (CEC) Title 24 building standards code is a broad set of requirements for “energy conservation, green design, construction and maintenance, fire and life safety, and accessibility.”

Local Law 97 – Creates carbon emissions limits on commercial buildings

New York City is addressing emissions from existing commercial buildings with Local Law 97, passed in 2019. Affecting most buildings over 25,000 square feet, this law aims to reduce building-based emissions by 40% by 2030 (from a 2005 baseline) and impacts over 57,000 buildings across the city.

What the fundamentals of reducing building emissions and energy costs

Meeting the Code

ASHRAE 90.1 & Title 24

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The fundamentals of reducing building emissions and energy costs

Digitalization and interoperability, so building infrastructure can be activated

Cybersecurity, which is essential in a connected world

Energy monitoring, as you cannot manage what you don’t know

Visualization software that makes it easy to see energy habits that can be modified

Intelligent control for automatic adjustments, creating big savings

A common theme: You can’t manage what you can’t monitor

The latest versions of ASHRAE 90.1 require metering by load category, while Title 24 does not. In any case, the intent is to track building energy usage down to various load types in aggregate—so intelligent decisions and targeted improvements can be made to optimize energy efficiency.

What states are leading the charge?

Energy codes are adopted by state. According to the U.S. Department of Energy, Title 24 in California, along with six states and the District of Columbia, are based on the latest version of ASHRAE 90.1 that requires metering for commercial and multi-tenant buildings.

What’s the upside of energy codes?

According to the DOE, adopting the latest energy codes through 2040 can help U.S. homes and business owners save an estimated:

- $126 billion in energy costs
- 841 million metric tons of carbon emissions

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The fundamentals of reducing building emissions and energy costs

While there are a variety of design approaches to meet energy codes, all will depend on the following building blocks:

1. Digitalization and interoperability, so building infrastructure can be activated
2. Cybersecurity, which is essential in a connected world
3. Energy monitoring, as you cannot manage what you don’t know
4. Visualization software that makes it easy to see energy habits that can be modified
5. Intelligent control for automatic adjustments, creating big savings

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