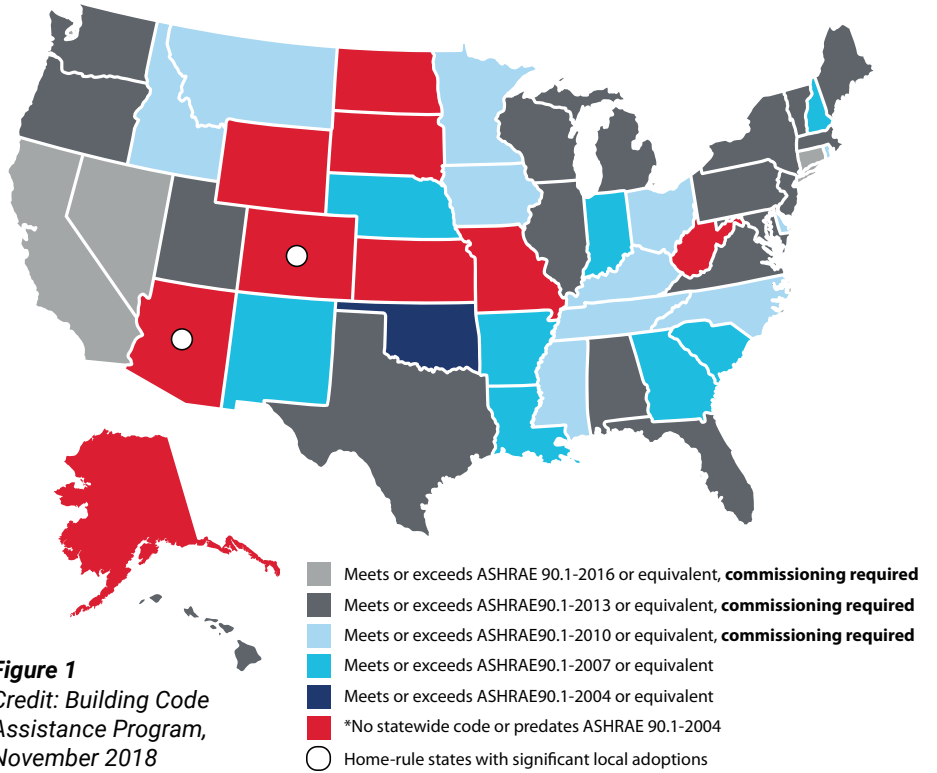


Commissioning for Improved Design Life and Reduced Cost of Ownership

Carefully engineered electrical, HVAC, security and life-safety systems can save facility owners and operators millions of dollars over the 30- to 50-year life of a facility, but only if these systems are built, operated and maintained to design specifications. The primary role of commissioning is to ensure building systems operate as designed, but it brings other benefits as well, such as capturing potential construction oversights or equipment defects prior to warranty expiration. Commissioning also serves to calibrate equipment post occupancy. Commissioning agents evaluate all building systems, holistically, thus confirming the building performs as designed – at optimal efficiency.



Complex building systems are not one-size-fits all, in part because they are location-dependent. Energy codes vary by city, state and year, and new standards are adopted each legislative cycle. Both designers and commissioning agents evaluate current and anticipated energy code adoption at a given location to confirm facilities comply. See Figure 1 for the most recent map of energy-code adoption across the United States. **In many states, commissioning isn't just a good idea, it's required by code.**

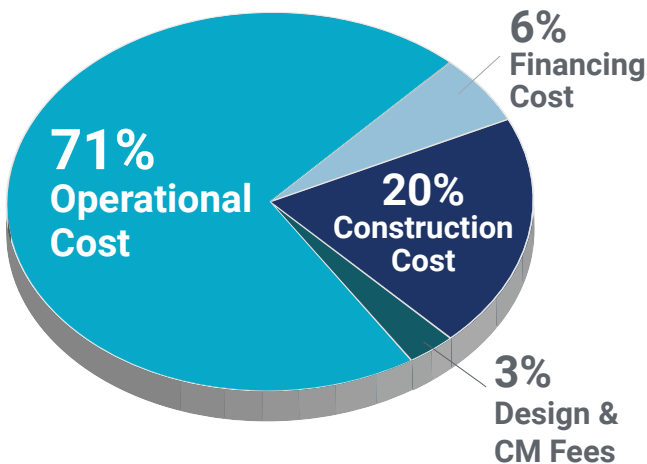


Figure 2
 Credit: The Builders Association

For a sample commissioning scenario, consider construction documents that call for placement of a thermostat on a wall to regulate temperature in a room kept at 60 degrees. Now consider an electrical appliance is placed in front of the thermostat, warming the air around it and giving the thermostat an inaccurate reading. Commissioning's role is to catch simple oversights like this as well as more complex equipment defects or unforeseen situations that may have arisen during construction.

In distribution and manufacturing environments, where building systems often operate in tandem with production, commissioning can do more than extend the useful life of equipment and significantly lower the cost of building ownership. It can prevent major repairs and reduce the



risk of production-halting interruptions. In some industrial construction projects, especially food-manufacturing facilities, refrigeration systems are designed by trusted contractors, but designed independent of other building systems. Commissioning can bring to light a lack of coordination between refrigeration systems and electrical, HVAC and building automation systems (BAS). Food, distribution and manufacturing facilities stand to reap the greatest benefit from thorough commissioning efforts.

A Commissioning Case Study

At the corporate headquarters for Cobalt Credit Union, a building that won multiple design awards, commissioning was needed to bring the building's operations up to its design potential. Manufacturing defects and installation errors can happen to projects of all sizes, but it's especially useful for larger and more complex facilities. "Commissioning was a security blanket for us," Cobalt Chief Operating Officer Robin Larson said. "I work in the financial world, not the design and construction world. Commissioning ensured everything operated as designed, and it kept us from having to babysit." At Cobalt, minor installation errors, manufacturing defects and the need to modify building-system settings generated an "issues log" that included an example like the thermostat placement described above. Several items in the log stemmed simply from light sensors incorrectly masked during installation, which caused lights to stay on in unoccupied rooms.



At Cobalt, commissioning identified many issues that were easily remedied by calibration or setting changes. Nevertheless, had they gone unnoticed, high energy bills, costly repairs or system outages could have resulted. For example, we discovered that server rooms lacked programming connections to the building automation system, which meant that if temperatures spiked within a server room, alarms would have failed to notify maintenance workers. LEO A DALY Senior Commissioning Agent Denise Allacher said BAS programming errors are common. "A lot of times, the BAS programming comes from the factory with settings that need to be modified," she said.

The commissioning process also revealed that an air-handling unit designed to provide 2,100 cubic feet per minute of outside air delivered only 1,350 cfm. The culprit was believed to be a dirty airflow station, but maintenance workers could not access it because the ductwork lacked an access panel – this was a manufacturing defect that was therefore addressed before the 12-month warranty expiration. The same walkthrough led to warranty replacement of faulty lighting fixtures on the fourth-floor balcony.

During construction of the building's sophisticated and less-common geothermal heating and cooling system, a pipe discharging municipal water had inadvertently been installed by contractors into the pre-mixed, glycol-feed tank. Consequently, the glycol mix was too heavily diluted. Maintaining the correct glycol-to-water ratio is critical for cooling and heating systems because glycol keeps the water from potentially freezing, which could burst the pipes.

"Building our new headquarters brought a whole new experience for our maintenance staff, and them being able to walk through the commissioning process gave valuable insights to be aware of," Larson said.



**To learn more about commissioning services,
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