

Heating & Cooling (HVAC) and Electrical options | 2024

Overview

While the usual methods of **heating and cooling** a building remain valid from a cost perspective they are starting to be replaced by more energy efficient technologies.

Some of these “new” methods are really just a modern re-work of older technologies that were not originally cost effective! Now, with modern materials and designs, they are becoming attractive options for mainstream use.

Three examples follow:

(1) **Geothermal Heating/Cooling or Ground-Source Heat Pumps¹**

Geothermal systems use the fairly constant temperature of the ground to transfer heat. During winter, the system takes heat from the ground and transfers it indoors; in the summer, heat is taken from indoors and transferred back to the ground.

A high-tech water boiler/heater heats the water as it circulates through a hydronic coil which then feeds water to the air furnace(s) and then through the building ductwork. The **benefits** are energy efficiency, and durability (25-50 year life span overall).

From a **Replacement Value** perspective these systems have a higher-than-normal initial cost that must be factored into any Replacement Value appraisal. The benefit to the homeowner or commercial property owner is the very low cost of operation annually.

¹ <https://www.facilitiesdive.com/news/geothermal-heat-pumps-commercial-buildings-schools-sustainability/709894/>

<https://www.homecomfortinc.com/geothermal-hvac-for-commercial-properties/>

<https://www.energy.gov/eere/geothermal/geothermal-heating-cooling>

https://www.iaeng.org/publication/WCECS2013/WCECS2013_pp326-331.pdf

<https://www.navienc.com/residential/furnaces>

<https://homeguide.com/costs/geothermal-heat-pump-cost>

The estimated unit and installation construction cost on a 4,500 sq ft dwelling, not necessarily Replacement cost under a claim, would likely be between \$35,000 to \$75,000.

Assuming the same sort of metrics, the cost for an 11,000 sq ft commercial building would be in the range of \$70,000 to \$150,000.

(2) Mini-Split Heat Pumps²

It seems almost anywhere building materials or components are sold, you'll see something advertised about Mini-Split Heat Pumps (also called “ductless mini-splits”). Rebates are often highlighted attracting the attention of buyers.

Single family homes, apartments and condos, offices, retail spaces, restaurants, schools, and libraries are all target markets for Mini-Splits. These units are now being installed as the primary heating/cooling source in place of electric baseboard heaters and electric fan forced furnaces (ideal for heating/cooling individual rooms or specified zones within a building). In short, these units are now in widespread use and form a valid solution to heating and cooling both residential and commercial buildings.

The mini-split comprises an outdoor (compressor/condenser) and indoor unit (evaporator and air handler). Refrigerant is used to transfer heat between these units. In cool mode, the units take hot indoor air and release it outside; for heating, heat is taken from outside and brought inside.

When discussing **Replacement Value** with Insureds, ask if these units are installed! The average cost of installing a single zone Mini-Split Heat Pump is approximately \$7,000 to \$23,000 (unit + install) for a 5-zone system in a home of 4,500 sq ft (but depending on complexity and house size, cost could easily enter the \$45,000 range).

For a 15,000 sq ft commercial building the cost ballpark would likely range between \$30,000 to over \$100,000 for both the units and the installation.

(3) Smart Wire Technology

Only a few years ago the technology to Smart Wire a home was expensive and came with a steep learning curve to use effectively. Most systems that were hard wired had expensive control systems. This meant only higher value homes had the systems installed.

The current state of the Smart Wired/Home Automation³ industry now has a lower entry point with the cost of wireless, or semi-wireless systems, being available at a much lower

² <https://www.carrier.com/residential/en/us/products/ductless-mini-splits/mini-split-pros-and-cons/>
<https://coolwithbowman.com/blog/mini-split-vs-heat-pump>
<https://www.forbes.com/home-improvement/hvac/mini-split-installation-cost/>
<https://yourductlesstech.com/mini-split-installation-cost>

³ <https://advantageelectric.ca/how-much-does-it-cost-to-wire-a-new-house-what-you-can-expect-to-pay/>
<https://conquerallelectrical.ca/how-much-does-it-cost-to-wire-a-house/>
<https://buildit.ca/blog/average-commercial-building-construction-cost-per-square-foot/>

price point than in the past. This has allowed more mainstream users to take advantage of the technology.

While the price point for “Smart Wiring” has come down, the use of such systems can still add thousands of dollars to the **Replacement Cost** of lighting, the electrical system, and HVAC controls.

As a rough idea on building cost, not the higher replacement claims value, the cost to smart wire a 4,500 sq ft home will likely range from approximately \$9,000 up to \$36,000 depending on complexity and extent.

A 12,000 sq ft commercial building under the same sort of parameters would fall within a cost range of \$36,000 to \$144,000 depending on scope, etc.

Conclusion

A range of Heating & Cooling (HVAC) and Electrical options are available to homeowners and commercial building owners.

From an **insurance underwriting perspective**, claims sq ft Replacement Cost has to be factored to its **variable cost nature** on each risk. Real world cost fluctuations⁴ occur throughout the underwriting envelope and are increasing in scope and complexity.

An InspekTech® appraisal includes a site visit that collects live location components/conditions. These critical site details are then factored into claims sq ft insurance Replacement Cost calculations. **An InspekTech® appraisal report is the best way of ensuring supportable & accurate baselines for insurance underwriting results.**

Please contact InspekTech® should you require more information.

Thank you,
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⁴ <https://www2.bchousing.org/research-centre/library/residential-design-construction-guides/bc-energy-step-code-builder-guide>
<https://chbabbc.org/wp-content/uploads/2024/05/Adaptable-and-Earthquake-Design-Backgrounder.pdf>