TRILLIUMFS

Your Ultimate Guide to

Commercial HVAC in 2021

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TRILLIUM FACILITY SOLUTIONS

Your business's commercial HVAC is one of the most critical systems in your building.

A fully operating HVAC system helps keep customers and employees comfortable year-round, so unlike certain other systems, there's no way to get out of maintaining, repairing, and replacing the system when the need arises. On the same token, HVAC repair and replacement is one of the most costly line items on a facility manager's budget, so any opportunity to save here is worth looking into.

The purpose of this eBook is to inform business owners, facilities managers, and anyone who may have found themselves in a position where they are responsible for HVAC, to help make better decisions about commercial HVAC maintenance, repair, and replacement. Additionally, we will introduce an innovative alternative to traditional maintenance plans that can significantly reduce your HVAC operating costs.

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HVAC MAINTENANCE STRATEGIES

When it comes to maintaining your commercial HVAC system, there are generally two primary strategies: reactive and proactive. A third strategy, condition-based maintenance, provides the best of both worlds. We'll cover the technology behind condition-based maintenance and how to adopt this strategy later in this E-book.

REACTIVE MAINTENANCE

As the names imply, reactive maintenance is waiting until there is a problem and being forced to react to it. Especially in today's environment, businesses are crunched and trying to save money - so waiting until the need is there is attractive. But the strategy of "waiting" with your HVAC is almost always going to cost more in the long-run. In addition to costly repair or a premature HVAC replacement that results from this strategy, you also run the risk of losing business if staff and customers are uncomfortable or unable to be in the building due to an inoperable unit.

PROACTIVE MAINTENANCE

A proactive strategy aims to keep your HVAC system in tip-top condition with regular, prescheduled inspections and maintenance. These manual inspections typically identify minor issues, which are then repaired before they become major problems that lead to system breakdown. On average, commercial facilities that have comprehensive quarterly preventative maintenance programs in place find their total costs are as much as 50% lower than organizations that continue to maintain their equipment reactively.

But what about all of those quarterly checks when you get the 'all clear,' and you can't help but feel a bit annoyed as costs add up on a perfectly healthy system?

CONDITION-BASED MAINTENANCE

Condition-based maintenance offers the benefits of reactive and proactive strategies, and can significantly lower your HVAC operating costs. This strategy allows you to make decisions about maintenance and repairs based on the actual condition of your HVAC system, rather than waiting for something to break or paying for unnecessary maintenance on a healthy system.

One way to achieve condition-based maintenance is by installing remote sensors that monitor the condition of your HVAC system around the clock and alert you to problems or required maintenance in real-time. We'll discuss this a little later.

Up Next… Seasonal Care

SEASONAL CARE FOR YOUR COMMERCIAL HVAC

Winter and summer are the busiest months for commercial HVAC contractors, usually because HVAC facilities management was put on the back burner and the system inevitably fails during the seasons it's used most. But the saying, "An ounce of prevention is worth a pound of cure" is especially true when it comes to seasonal maintenance. Proactively preparing your HVAC system for summer and winter is almost always more affordable than emergency repair and replacement in the long run.

PROACTIVE SEASONAL CARE SAVES YOU MONEY

Your commercial HVAC technician can be a valuable resource in preparing your system for summer and winter by checking to make sure ducts are sealed and air leakage is minimized, and the system is free of pollutants that could make it sluggish. They can also make additional recommendations for improving the efficiency of your system, such as installing automatic thermostats and using fans to prevent hot air from rising. According to the Department of Energy & Efficiency, you can save 3% on your heating bill for every degree the thermostat is lowered in the winter.

FacilitiesNet has found that businesses that defer seasonal maintenance and wait for something to go wrong could wind up paying 30 times more than if they had a preventative maintenance strategy in place. Meaning, you might spend $500 per year on HVAC facilities maintenance, or $15,000 when something goes terribly wrong.

HOW TO PREPARE YOUR HVAC SYSTEM FOR WINTER

Schedule preventative maintenance in the spring and fall, before HVAC technicians get busy with emergency repairs and replacements at reactive businesses. In general, you can expect a summer/winter checkup to include:

- ○ Filter replacement
- ○ Check and seal ducts
- ○ Inspect and replace belts and pulleys as needed
- ○ Clear pans and drain lines
- ○ Check electrical connections
- ○ Check and adjust fan and blower motor as needed
- ○ Inspect and adjust ignition and burner on gas systems
- ○ Lubricate moving parts such as bearings and motor
- ○ Test thermostats and controls
- ○ Inspect heat exchanger

Up Next… Common HVAC Problems & How To Avoid Them

COMMON PROBLEMS WITH YOUR COMMERCIAL HVAC AND HOW TO AVOID THEM

When something does go wrong with your HVAC, it's usually a common problem that could have been easily avoided with a quarterly preventative maintenance program, or by using a condition-based maintenance strategy with IoT sensors.

COMPRESSOR PROBLEMS

The compressor is critical to the performance of your commercial HVAC system, so when something goes wrong it can cripple the system. There are many common problems that affect the compressor, including dirty coils, leaking or blocked suction lines, incorrect refrigerant levels (too high can be just as bad as too low!), low lubricant levels, and electrical problems.

Minor compressor issues are generally pretty simple and affordable to fix when caught early. When ignored and a compressor fails completely, it can cost thousands to replace. In many cases, a complete HVAC system replacement is the only option when the compressor fails on an aging system.

The solution is simple: don't skip preventative maintenance, which can catch many of these compressor issues and fix them before the component fails.

DIRTY PROBLEMS

Dirt, dust, pollen, mold, and other pollutants are the archenemies of any HVAC system. Dirt can destroy nearly every component of an HVAC system, and yet it's one of the easiest things to control by changing the air filters on the manufacturer's recommended schedule and having the system thoroughly cleaned annually.

While the filter's job is to catch most dirt, accumulation still occurs throughout the ductwork, vents, returns, and evaporator coils. Likewise, economizers and condenser coils located on the outside of the building are naturally exposed to the elements and can become clogged with dirt and mold. The result is that airflow is restricted, the air is not properly filtered and indoor air quality is poor, and the system simply can't cool and heat efficiently.

In addition to higher energy bills and uncomfortable employees and customers, a system that has to work harder is at risk of breaking down or failing completely, ultimately costing more in the long-run than a simple maintenance plan would have.

Up Next… IoT Sensor Technology

HVAC IOT SENSOR TECHNOLOGY

Using proactive or reactive maintenance strategies, you wouldn't find problems until you had your HVAC system inspected or it broke down. Now, you can adopt a condition-based maintenance strategy with IoT remote sensors. Using artificial intelligence (AI) and predictive intelligence, these sensors do the job of an HVAC inspector 24/7, monitoring the condition of your system in real-time and alerting you to any problems or maintenance requirements.

SAVE TIME & MONEY WITH HVAC IOT SENSORS

These HVAC IoT sensors allow you to „proactively react." They detect and predict future conditions based on small performance changes, suggesting maintenance as it is needed. This helps you make data-driven decisions about how you want to handle this alert based on your budget. This also saves you time and money on diagnostic visits and routine maintenance inspections because you already know what the issue is and can plan accordingly.

In addition, the sensor system communicates with your existing work order management system to collect cumulative data on all maintenance and repairs. This allows you to make a more educated decision on HVAC repair versus replacement as your system ages and requires more frequent repairs.

HOW IT WORKS

IoT sensors are connected to web servers, which enables machine learning and allows them to diagnose performance and equipment issues around the clock. The sensors create alerts in three categories: Maintenance, Mechanical Failure, and Energy Savings.

Within 90 seconds of discovering an issue, the sensors create an alert and trigger an automatic work order to correct the problem. A convenient mobile app is installed on the facility manager's phone to receive real-time alerts on the building's individual HVAC units. Once approved, the system will automatically submit the requests to schedule a technician or order parts.

REDUCE HVAC OPERATING COSTS

Customers who have installed IoT HVAC sensors have seen real and measurable results when it comes to reducing their HVAC operating costs, including:

- Up to 25% reduction in maintenance costs
- Up to 70% elimination of breakdowns
- Up to 12% reduction in scheduled repairs
- 50% reduction in downtime
- 3-5% reduction in capital expenditures
- Up to 50% reduction in unplanned outages

Learn more about HVAC IoT sensors.

Up Next… Repair Vs. Replacement

SHOULD I REPAIR OR REPLACE MY HVAC UNIT?

While we always recommend a preventative maintenance schedule as your first line of defense against system failure, we know that replacement is inevitable. If you're trying to decide between repairing or replacing, here are some factors that can help you evaluate the condition of your commercial HVAC.

HOW OLD IS YOUR HVAC SYSTEM?

In general, if your system is less than 10 years old and in good working order, it makes sense to have a preventative maintenance schedule in place and to pay for minor repairs as they arise. If your system is 15-20 years old, start keeping a close eye on repair costs and plan for replacement in the near future.

HOW MUCH MONEY ARE YOU CURRENTLY SPENDING ON MAINTENANCE & REPAIRS?

If you are faced with a major repair that's going to cost more than 50% of a new system, replacement is usually recommended. The same goes for a lot of small repairs throughout the year – if they're adding up to more than half the cost of a new system, it's time to consider replacement.

HOW HAS YOUR SYSTEM BEEN MAINTAINED?

A well-maintained system should last 15-20 years. Businesses that practice reactive maintenance and wait for problems to arise may only get 10 years out of their system. The saying 'hindsight is 20/20' rings true when you consider that tens of thousands of dollars for replacement could have been forestalled for 5-10 more years with simple and affordable preventative maintenance.

WHAT'S IN THE BUDGET?

The reality is that some years are better than others for major expenditures. While you can't always control a complete system failure, if your system is getting toward the end of its useful life, start planning for replacement. It's always ideal if you can control what year you invest in replacement so that you can stagger it with other large capital expenditures.

Up Next… Choosing a New Commercial HVAC Unit

CHOOSING A NEW COMMERCIAL HVAC UNIT

If the time has come for replacing your commercial HVAC, there are a few factors to consider when choosing a new system for your business.

SYSTEM TYPES

The best type of HVAC system for your business depends on the size and configuration of your building and how the system will be used. The most common HVAC system types are:

- Single-Split
- Multi-Split
- VRV & VRF
- CAV & VAV

Find more details about system types in the next section of the e-Book.

INTERNAL TEMPERATURE

How you use your commercial building will significantly impact the type of system you need. For example, warehouses that don't have a lot of temperature fluctuation will require a different system than a large restaurant kitchen or convention hall that gets very hot.

INDOOR AIR QUALITY

Poor air quality can be caused by inadequate ventilation or filtration, chemicals, or mold and mildew. A well-maintained HVAC system that provides adequate heating, cooling, ventilation, filtration, and humidity control can often help Sick Building Syndrome.

EFFICIENCY

A more efficient HVAC will save you money on heating and cooling costs. When shopping for a new HVAC system, it's important to understand some common terms around energy efficiency:

- EER: Energy Efficiency Ratio
- SEER: Seasonal Energy Efficiency Ratio
- HSPF: Heating Seasonal Performance Factor
- AFUE: Annual Fuel Utilization Efficiency
- Energy Star: the Environmental Protection Agency's Energy Star rating verifies that an HVAC system meets strict requirements for energy efficiency

Learn more about energy efficiency terms.

COST

It's a good idea to get estimates from multiple commercial HVAC contractors. The estimate will usually separate labor and equipment, but be sure it also includes a more detailed breakdown of what's included in the equipment, detailed costs about the controls such as thermostats, sensors, or automation software, and the cost of any new or replacement piping or ductwork.

BRANDS

As with any commercial equipment or systems, brand matters. There are a few trusted brands in the industry that have withstood the test of time:

- Lennox – Leader in energy-efficiency and dependability.
- Trane – Unbeatable warranty (10 years) with durability suited to industrial uses.
- Carrier – Sizes and types for every business, reliable and long-lasting.
- Rheem – High-tech systems and controls and excellent warranty.

Up Next… Types of Commercial HVAC Systems

UNDERSTANDING COMMON TYPES OF COMMERCIAL HVAC SYSTEMS

When you're faced with the task of choosing a new or replacement HVAC system for your business, it's essential to understand the different types of commercial systems you'll have to choose from. A system that is adequate for your building and the business you conduct is critical for keeping employees and customers comfortable.

SINGLE SPLIT

A single split commercial HVAC system is composed of an indoor evaporator unit paired with an outdoor condenser unit. It is a smaller, self-contained system that is easily controlled with a standard thermostat panel. It is one of the most affordable types of commercial HVAC systems and is ideal for smaller commercial spaces, such as coffee shops, individual retail stores, small office suites, and professional offices like those for private doctors and dentists or lawyers.

MULTI-SPLIT

A multi-split commercial HVAC system is similar except that it allows you to pair multiple indoor units to one outdoor unit. This allows you to heat and cool multiple spaces using less energy, preserves the aesthetics of the exterior of your building, and uses low-profile refrigeration piping instead of ductwork. Multi-split systems are ideal for larger spaces like doctors offices, large retail stores, restaurants, and office suites.

VRV & VRF

Variable Refrigerant Volume (VRV) or Variable Refrigerant Flow (VRF) are configured similar to multi-split systems. They work by continually varying the level of refrigerant to meet the needs of each indoor evaporator unit, making them more energy-efficient.

VRVs and VRFs come in two types – either heat pump or heat recovery. Both types of systems are ideal for larger commercial spaces, but a heat recovery system is generally preferred when there are many smaller rooms within a large building, as is the case in hospitals or hotels.

CAV & VAV

Constant Air Volume (CAV) and Variable Air Volume (VAV) are commercial HVAC systems that are ideal for very large spaces where a constant temperature and ventilation is needed, such as stadiums, manufacturing facilities, and warehouses. CAV systems operate at full air volume capacity with variable temperature, whereas with VAVs the air volume varies while the temperature is constant.

Up Next… Choosing A Commercial HVAC Technician

CHOOSING THE RIGHT COMMERCIAL HVAC CONTRACTOR

With so many factors that go into maintaining, repairing, and replacing a commercial HVAC system, partnering with a dependable contractor is critical. A quick search for commercial HVAC contractors in your area will likely return countless companies - how do you decide which is the best?

For starters, any HVAC contractor you consider should be licensed, insured, and appropriately trained. Don't hesitate to ask what training and certifications technicians hold and how much experience they have. A good HVAC contractor should also gladly give you referrals and references - call them! Ask whether their project was completed on schedule and within budget.

OR… LEAVE THE GUESSWORK TO US

Trillium Facility Solutions takes the hassle out of handling facilities maintenance. We have a vast national network of vetted, trusted, and dependable commercial HVAC contractors. It's our business to find the best vendors so that you don't have to. We make sure you get the most competitive price on service, and we're here for you 24/7/365 as a single point of contact for all of your facilities maintenance needs.

SAVE TIME & MONEY WITH TRILLIUM FACILITY SOLUTIONS

As a busy facility manager, we know you have better things to do than source and manage multiple vendors. Our 1 vendor-1 call-1 invoice model frees up your time to focus on what matters most: running your business. Let us simplify and streamline the time-consuming and complicated job of managing your business's commercial HVAC maintenance and ultimately save you time and money.

WANT TO SAVE EVEN MORE ON HVAC COSTS?

Trillium Facility Solutions is proud to offer HVAC IoT sensors to help businesses save money on HVAC operating costs through condition-based maintenance. Our HVAC IoT sensors are for any business, big or small. We've made it easy and affordable for any business to leverage this technology to monitor and take control of the health of their HVAC in real-time.

Contact Trillium Facility Solutions to learn more about IoT sensor technology or our commercial HVAC management services. Our team members are standing by ready to serve! Call (844) 818-5713 to learn more.