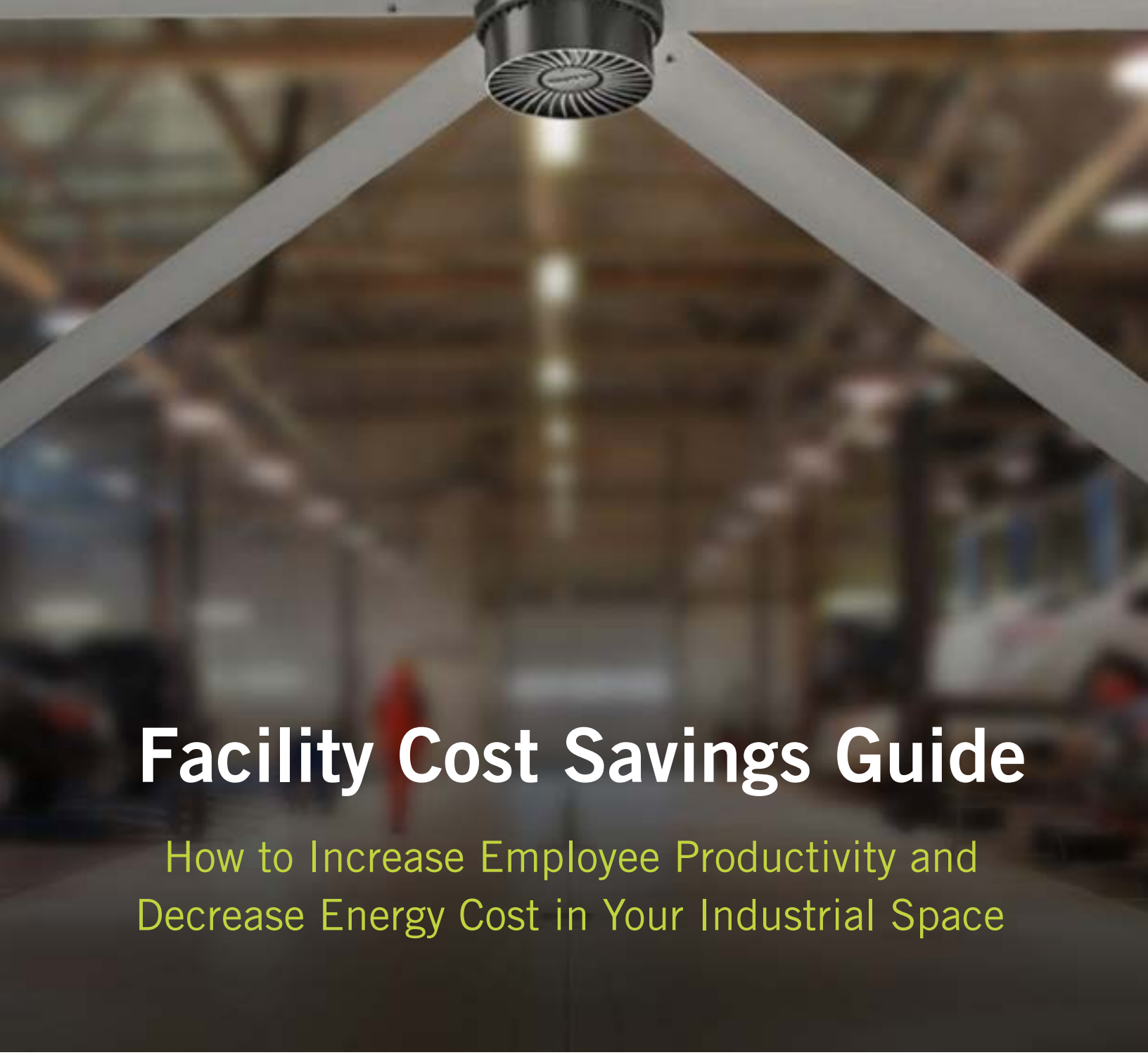

Facility Cost Savings Guide

How to Increase Employee Productivity and Decrease Energy Cost in Your Industrial Space

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INTRODUCTION

Is your warehouse acting like an oven? Does your facility get hot because there is no air circulation? Facility Managers are faced with the challenge of finding an energy efficient solution to reduce energy costs in their buildings and make them operate more efficiently. It's relatively easy to create an environment that is comfortable for employees without the associated high costs or inefficiencies that come with traditional HVAC systems. However, many Facility Managers are unaware of the most recent air movement solutions that exist today.

This document is for the Facility Manager, Designer, or Operator who is looking to increase employee productivity and save money on their facility operation costs. We'll be covering the best options available today for cost savings and increase of workforce productivity, which can be applied to any facility experiencing temperature-related issues.

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3 Major Ways You Can Save on Costs in Your Facility

When indoor temperatures rise above 85°F, worker output drops by 18 percent and accuracy suffers from a 40 percent increase in errors. This causes an increase in workforce dollars along with an increase in energy consumption when facilities use ineffective means to combat the high temperatures. There are three major ways Facility Managers can drastically reduce their energy spending while also increasing comfort levels.

1. Regulate High Temperatures

The first major way to save on cooling costs in your facility is to regulate high temperatures. Having unregulated high temperatures in your facility are a major risk to your business and employees.

In an **interview with warehouse cooling expert, Jason Hornsby**, he notes how unregulated high temperatures cost Facility Managers money in three major areas:

- Increase in health and safety hazards
- Decreased workforce productivity
- Increased energy consumption.

Read our blog post, **6 Easy Tips for Distributing Air in Your Facility More Efficiently**, to learn more about the benefits of regulating high temperatures.

2. Improve Air Movement

The second major way to save on cooling costs is to de-stratify, or mix, the horizontal layers of air in your facility. Stagnant layers of hot air are the foundation of the energy inefficiencies and comfort problems for most warehouse facilities.

Without adequate air movement in your facility, the floor to ceiling temperature differential increases. As the warmer air rises to the top of the facility throughout the day, the temperature at ground level also increases if no air movement occurs. You can release the trapped heat by moving the air within the facility. To learn more about balancing temperature in your facility read our blog post, **5 Steps to Easily Balance Temperature in Your Warehouse or Factory**.

3. Improve Cooling Efficiency

The third major way to save on cooling costs is to increase cooling efficiency. Although some solutions will provide some cooling, not all will provide the increased comfort to each part of the building.

If you've got an HVAC system that reaches parts of your facility, but not others, your cooling efficiency can be improved by getting the cooler air moved to the warmer parts of the facility. Learn more climate control tips in our blog post, **7 Climate Control Tips to Reduce a Factory's AC Bill in the Blink of an Eye**.

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Why Your Facility Should Address Air Movement First

The main cause of most heat and cooling problems in facilities is rarely temperature alone. In fact, most of the time the main issue at hand is air movement.

If a closed facility lacks air movement, it essentially acts like an oven; fresh air can't get in and old air can't get out. The building is holding in all the heat and keeping fresh air from circulating through the entirety of the space. Air is rarely being exchanged, and consequently temperatures inside the facility tend to rise uncontrollably in Summer months.

Why HVAC or High Speed Fans Alone are not a Solution

Many facilities will try to combat the high temperatures through heating ventilation and air conditioning (HVAC) units or through the use of familiar high speed fans. Although in some cases these temporary solutions might be effective in cooling employees there are many pitfalls to using these as regular cooling solutions.

The Fault in HVAC

According to industry expert Jason Hornsby, "HVAC systems can help but the cost is often too high to justify installation." Most industrial facilities are very big and would need multiple massive HVAC system. The units, ducting and running the HVAC system every month are added costs that most businesses cannot easily absorb.

The Inefficiency of High Speed Fans

Trying to cool employees with an average high speed box or pedestal fan is an inefficient and underperforming solution. If you have ever walked into a hot shop in the summer time you have probably seen this fan sitting on a pedestal. The fan is blistering high-speed air strong enough to blow papers all over, dry your eyes out, and create a new element of discomfort in an attempt to achieve comfort. Employees will have to back the fan far enough away to be comfortable but even if they move to the left or the right, they are instantly out of the air stream. As expert Jason Hornsby simply puts it, "high speed fans are just spot coolers."

What are the reasons these options wouldn't work in your particular facility? It depends on the cause. Many areas could be contributing to heating your building, such as:

- **Open bays** – allow the cool air inside to escape when opened and let the hot air from outside draft in.
- **High ceilings** – contribute to the buildup of heat layers.
- **Pallet racks** – act as air flow barriers and block the cool air from circulating.
- **Heat pockets** – large spaces can have climate zones and temperature pockets.
- **Not enough HVAC ducting** – cool air from your air conditioning can't reach all areas of the facility.
- **Seasonal temperature swings** – force your air conditioning to work harder than its tonnage and increase humidity and risk of Sweaty Slab Syndrome in your building.

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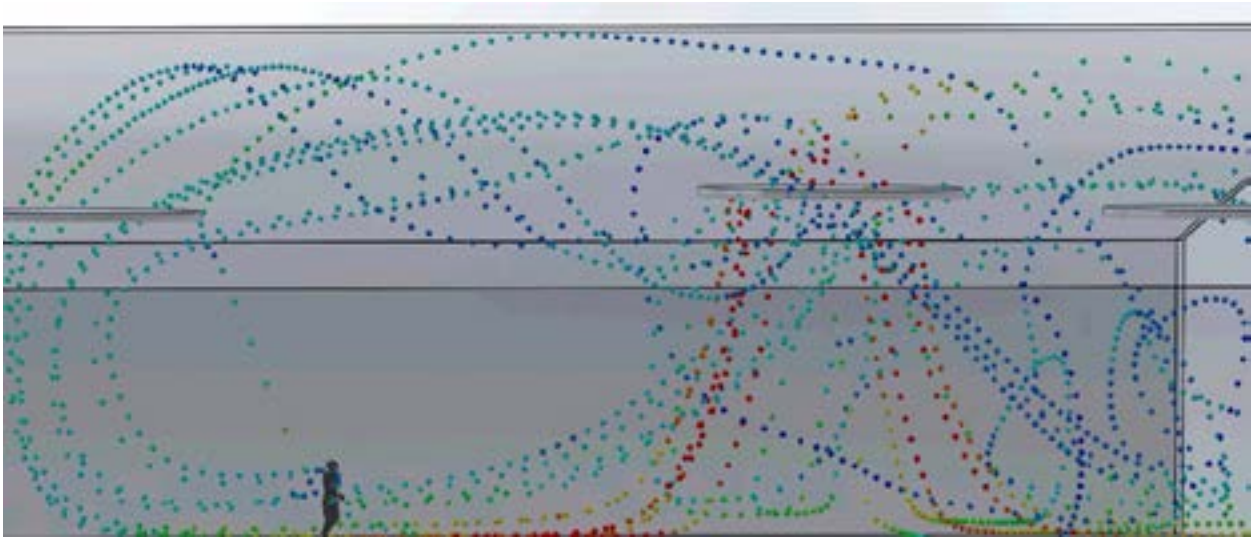
So What's the Solution?

To cool your facility down you need to de-stratify the air. By de-stratifying the air the heat layers never build up. A highly effective solution for warehouse cooling is HVLS (High Volume, Low Speed) fans. HVLS fans de-stratify the air and essentially prevent heat layers from building up.



Using advanced fluid dynamics modeling, the movement of air and de-stratifying effects of HVLS fans are visible.

Industry expert Jason Hornsby has extensive experience with warehouse cooling and has seen first hand how easy it is for HVLS fans to cool a warehouse.

"Once we install the HVLS fan, all they have to do is go in first thing in the morning and turn the HVLS fan on. Generally on low is good enough. Just turn it on."

The fact is, it's not ideal for most facilities to use floor fans or forced-air cooling as standalone solutions. Costs to operate and maintain them are high, and the air movement you need to solve the larger issue doesn't exist in either option.

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Savings Applications that Work for Almost Any Facility

A variety of facilities can all be adversely affected from heat and humidity. There are too many variables to say what the energy savings is for every facility but, on average, HVLS fans can provide 20% savings on cooling costs.

Here are two different solutions that were achieved by specific customers:

HVLS Fans Paired with Existing Forced-Air A/C

Result: $1,800/Month Savings in First Month

A custom bike shop facility, G. Smith Motorsport, is located in Louisiana and covers 20,000 sq ft. of the total facility. The hot, humid climate presents a particular challenge: keeping the vehicles from chrome or aluminum sweating.

Problem: G. Smith Motorsports ceilings are very high with ductwork located at the top of the building, and the cool air couldn't get down to the floor.

Solution: HVLS fans were installed and instantly started mixing the air and breaking up the heat layers. The cool air from the HVAC units that was previously trapped at the ceiling dispersed down to the ground level.

Outcome: The issue of degradation of their product disappeared and they no longer had a moisture issue. Within the first month G. Smith Motorsport saw around $1,800/month savings, with a full return on investment within 18 months. In addition, their HVAC units didn't have to run as hard and their service intervals increased - along with the overall lifespan on their units.

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HVLS Fans Installed to Suppliment HVAC

Result: Reduces AC Tonnage 25% by Incorporating HVLS Fans into HVAC Systems

H.T. Lyons, a full service mechanical contractor in Allentown, PA (and a subsidiary of PPL Corporation) is on the cutting edge of creating "green" HVAC systems that get buildings LEED certified or ENERGY STAR rated. Scott Sine, Director of Energy and Engineering Services, knew about energy efficient HVLS (high volume low speed) fans as he had installed a competitor's fans at a previous job years ago in order to help increase ventilation effectiveness.

Problem: H.T. Lyons designed HVAC systems for a 125,000 rented warehouse for Liberty Property Trust and a 95,000 square foot warehouse for Olympus. The AC systems did not stir the air in the building that well, especially in warehouses that contain closely spaced large storage racks. This means that HVAC engineers would have to add to the system's tonnage and/or duct distribution when selecting equipment.

Solution: By incorporating MacroAir six-blade HVLS fans into the HVAC systems, Sine was able to space AC units further apart – a strategy that required fewer units. H.T. Lyons was able to "decouple" fan distribution from the cooling units.

Outcome: In both projects, H.T. Lyons was able to reduce tonnage by 25% – a significant reduction – by supplementing each system with 24-foot MacroAir Six-Blade HVLS fans. Both warehouses comply for ENERGY STAR performance if the respective owners ever want to list their facilities.

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The Best Cost Saving Solution for Your Facility

When HVLS fans supplement your air conditioning, you are cooling your facility more efficiently and not running your air conditioning unit as hard.

ASHRAE, the American Society of Heating, Refrigeration and Air Conditioning Engineers, have done calculations that show cost savings up to 49% after installing HVLS fans. A number of independent studies also conclude that a few HVLS fans were as effective as 12 high-speed fans, while providing an 86% reduction in electrical consumption.

	High Speed Fans	HVAC	High Speed Fans + HVAC	HVLS Fans + HVAC	HVLS Fans
Reduce temperature		X	X	X	X
Increase efficiency		X	X	X	X
Increase ventilation	X	X	X	X	X
Balance temperatures				X	X
Lower heating costs				X	X
Lower energy costs				X	X
Increase cooling effect				X	X
Improve heating in winter				X	X

The Key Take-Away

Using HVLS fans decreases the cooling load while increasing cost savings.

For the average facility a cost savings associated with a 14% reduction in air-conditioning equipment can be found when HVLS fans are used in conjunction with the HVAC system. Also for the average facility, an annual cost saving associated with 20% less energy usage can be obtained by using HVLS fans. Further savings can be made by reducing ducting since HVLS fans move the cool air to the occupied area very evenly.

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Finding the Best HVLS Fan for Your Facility

Facility Managers looking to incorporate HVLS fan technology into their facility should use the following criteria to determine the vendor that is the best fit:

1. Performance Needs

An HVLS fan is only as good as the proven technology behind it. Look for an HVLS fan manufacturer that has a long history with HVLS technology so that you can ensure the quality and performance of your product.

2. Standard that the HVLS Fan Meets

High quality HVLS fan should always meet or exceed industry standards and performance ratings through affiliation with organizations such as the American Society of Heating, Refrigerating and the Air-Conditioning Engineers (ASHRAE) and Air Movement and Control Association (AMCA).

3. Installation Services

To make sure you get the most out of your HVLS fan, you will want to have it professionally installed. Reputable HVLS manufacturers will provide local support in the form of distributors. These distributors will have one-on-one and face-to-face interaction with you, your facility and the installation.

4. Customer Service and Warranty

When selecting your HVLS fan, you want to ensure you get your money's worth by working with a reputable manufacturer who stands behind their products. When comparing warranties look for the industry's best warranty that will cover replacement parts and repairs regardless of who installed the product.

5. Cost Savings

When selecting your HVLS fan, you want to ensure that the solution provides maximum return on investment. This ROI can be achieved in many ways, such as lowering your energy consumption, extending the life of your HVAC system, reducing the amount of ducting needed, and lowering the set point on your HVAC unit.

Find the Best HVLS Fan Manufacturer for Your Needs

Not all HVLS fans are the same, so picking the one that is the right fit for your facility is critical for cost savings and employee comfort. To learn more about MacroAir HVLS fans and what sets them apart from the competition, **click here**.

Jason Hornsby is the Owner/President of Vector Sales and a Regional Sales Representative for MacroAir Fans in the South Central U.S. An expert with High Volume, Low Speed fans, Jason has spent more than 22 years focused on cooling solutions for industrial facilities that increase employee comfort and decrease energy consumption.

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