



# USING BIG ASS FANS TO IMPROVE ENERGY EFFICIENCY



**BIG ASS FANS**

# COOLING WITH AIR CONDITIONING

## What is thermal comfort?

Thermal comfort is how comfortable an occupant feels in a space. Many factors influence thermal comfort — some are in your control, and some are in ours.

THERMAL COMFORT	
Air Speed/Velocity	Air Temperature
Radiant Temperature	Humidity
Clothing Insulation	Metabolic Rate
Environmental Factors	Personal Factors

*Six equally important factors determine your overall thermal comfort, as defined by Standard 55*

## Why add fans to conditioned spaces?

Air conditioning is great — but it's expensive and can be horribly inefficient. Big Ass fans work with air conditioning systems to make them more effective. The fans use a fraction of the energy of HVAC systems, thereby reducing overall energy consumption.

By incorporating Big Ass fans into building automation systems and using controls, energy savings become easy and automatic.

## How does it work?

To comply with ANSI/ASHRAE Standard 55, you must be within the following ranges:

PMV: -0.5 to +0.5

Predicted Mean Vote: Most people in the room should say that they feel thermally neutral.

PPD: <10%

Predicted Percentage Dissatisfied: Less than 10 percent of occupants should be dissatisfied with the comfort level of the space.

A/C ONLY	A/C AND FANS
Air Dry Bulb Temp = 24°C	Air Dry Bulb Temp = 27°C
Mean Radiant Temp = 24°C	Mean Radiant Temp = 27°C
Humidity Ratio = 0.009	Humidity Ratio = 0.009
Air Speed = 0.1 m/s	Air Speed = 0.76 m/s
Metabolic Rate = 1.1 met	Metabolic Rate = 1.1 met
Clothing Insulation = 0.75 clo	Clothing Insulation = 0.75 clo
PMV: 0.02 PPD: 5%	PMV: 0.02 PPD: 5%

Source: CBE Thermal Comfort Tool

*Combining A/C and fans means increased energy efficiency without sacrificing comfort*

### What does it mean?

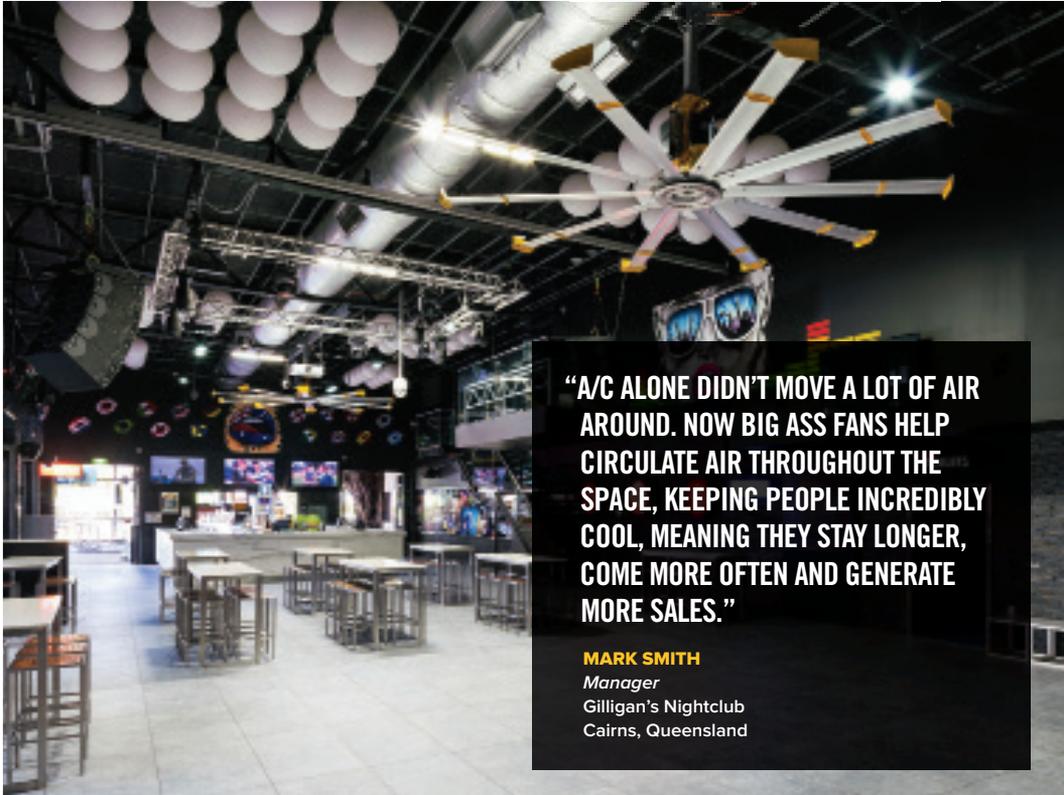
Increased air movement from Big Ass fans makes occupants feel cooler, allowing designers and users to raise thermostat setpoints without sacrificing comfort. Each degree offset reduces HVAC-related energy usage by approximately 9 percent.\* Credit can also be earned for elevated air speed in designs that exceed the minimum requirements of Standards 90.1 and 189.1.\*\*

*\*US EPA & DOE Energy Savings Calculator*

*\*\*ANSI/ASHRAE/IES Standard 90.1 and ANSI/ASHRAE/USGBC/IES Standard 189.1*



Sydney Dance Company  
New South Wales



**"A/C ALONE DIDN'T MOVE A LOT OF AIR AROUND. NOW BIG ASS FANS HELP CIRCULATE AIR THROUGHOUT THE SPACE, KEEPING PEOPLE INCREDIBLY COOL, MEANING THEY STAY LONGER, COME MORE OFTEN AND GENERATE MORE SALES."**

**MARK SMITH**

*Manager*

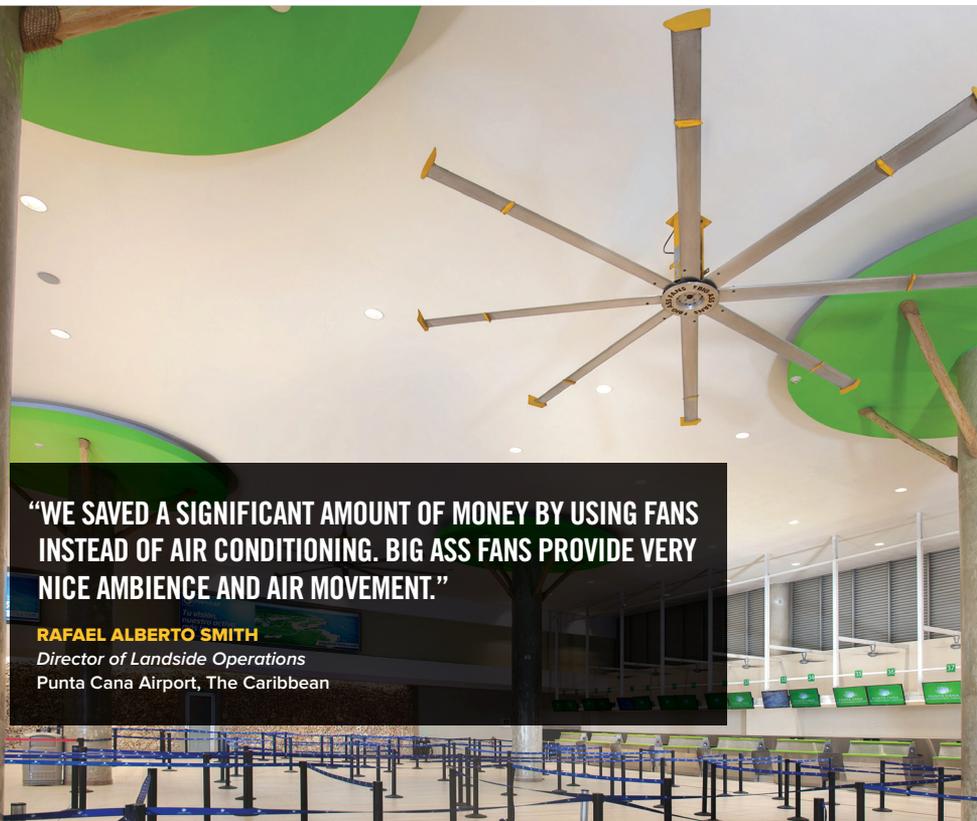
Gilligan's Nightclub  
Cairns, Queensland



Bedarra Island Resort  
North Queensland



The Triffid  
Brisbane, Queensland



**"WE SAVED A SIGNIFICANT AMOUNT OF MONEY BY USING FANS INSTEAD OF AIR CONDITIONING. BIG ASS FANS PROVIDE VERY NICE AMBIENCE AND AIR MOVEMENT."**

**RAFAEL ALBERTO SMITH**  
Director of Landside Operations  
Punta Cana Airport, The Caribbean



# COOLING WITHOUT AIR CONDITIONING

## Why is heat a problem?

In addition to unhappy occupants, it's hard to work when you're too warm – health suffers, and so does productivity. It sounds intuitive, and it's backed up by science.

TEMPERATURE	PRODUCTIVITY LOSS
25°C	0%
27°C	-4%
29°C	-8%
31°C	-12%
33°C	-16%
35°C	-20%
37°C	-24%

Source: Seppänen, O., Fisk, W. J. and Lei, Q. H. (2006)

## Why do fans help?

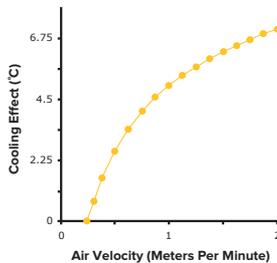
Increased air speed takes advantage of the body's natural cooling process to create a cooling effect.

## Why use Big Ass Fans for this?

Big Ass fans are incredibly effective and efficient. Plus, they don't take up floor space like pedestal fans, and they're not loud like box fans.



## COOLING EFFECT FROM ELEVATED AIR VELOCITY



### Assumptions:

- 29.5°C Air Dry Bulb & Mean Radiant Temp
- 0.1 m/s Air Velocity (Base Conditions)
- 60% Relative Humidity
- 1.3 Met Metabolic Rate
- 0.5 Clo Clothing Level

*Increased airflow can make you feel up to 6°C cooler – without disrupting sensitive environments*

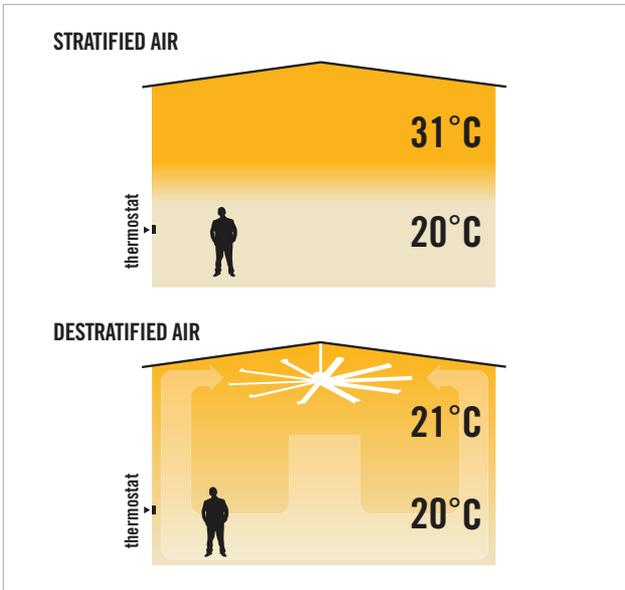
# WINTER ENERGY SAVINGS AND DESTRATIFICATION

## What happens in the winter?

In the winter, heat rises and can get trapped at the ceiling, leading to huge temperature differences and massive heating bills.

## How does it work?

Fans aren't just for cooling. Big Ass fans operate slowly in the forward direction, thoroughly mixing air without creating a draft. Air velocity at the floor does not exceed the limit for draft set in Standard 55 (9 metres per minute or less), so there's no need to reverse the fans. The result is up to 30 percent savings on winter heating bills.



*Winter heating, with and without Big Ass Fans*

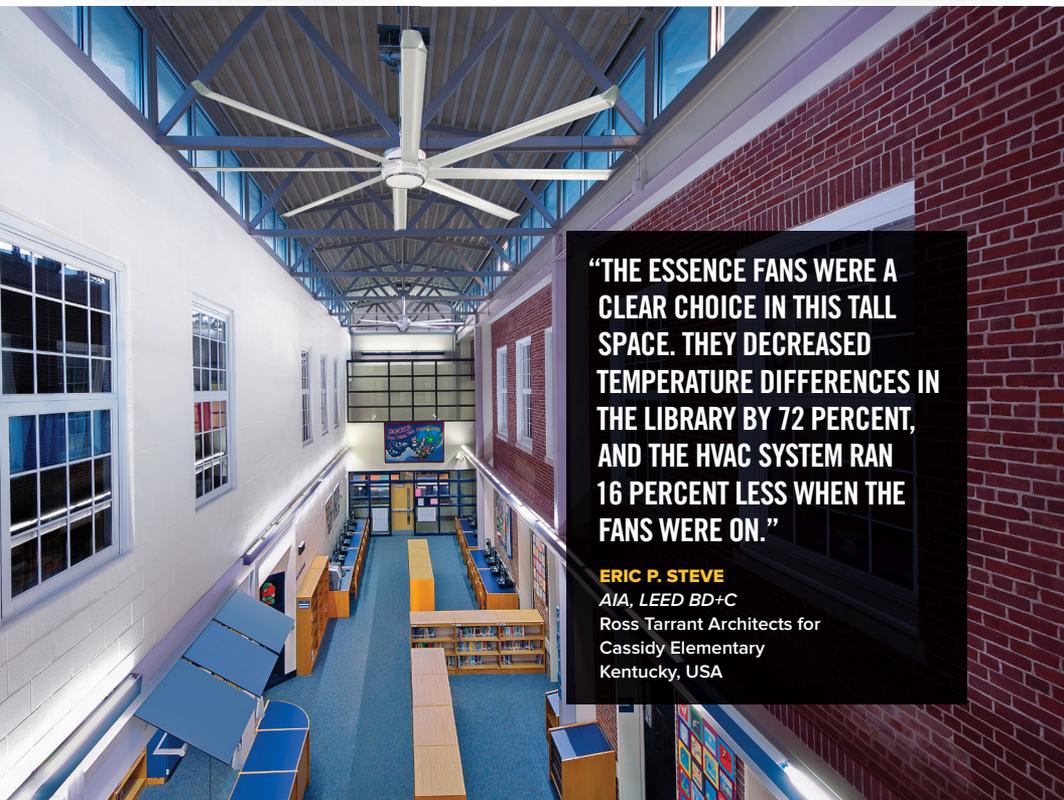




British Airways  
London, United Kingdom



Canadian Tire  
Alberta, Canada



**"THE ESSENCE FANS WERE A CLEAR CHOICE IN THIS TALL SPACE. THEY DECREASED TEMPERATURE DIFFERENCES IN THE LIBRARY BY 72 PERCENT, AND THE HVAC SYSTEM RAN 16 PERCENT LESS WHEN THE FANS WERE ON."**

**ERIC P. STEVE**

AIA, LEED BD+C

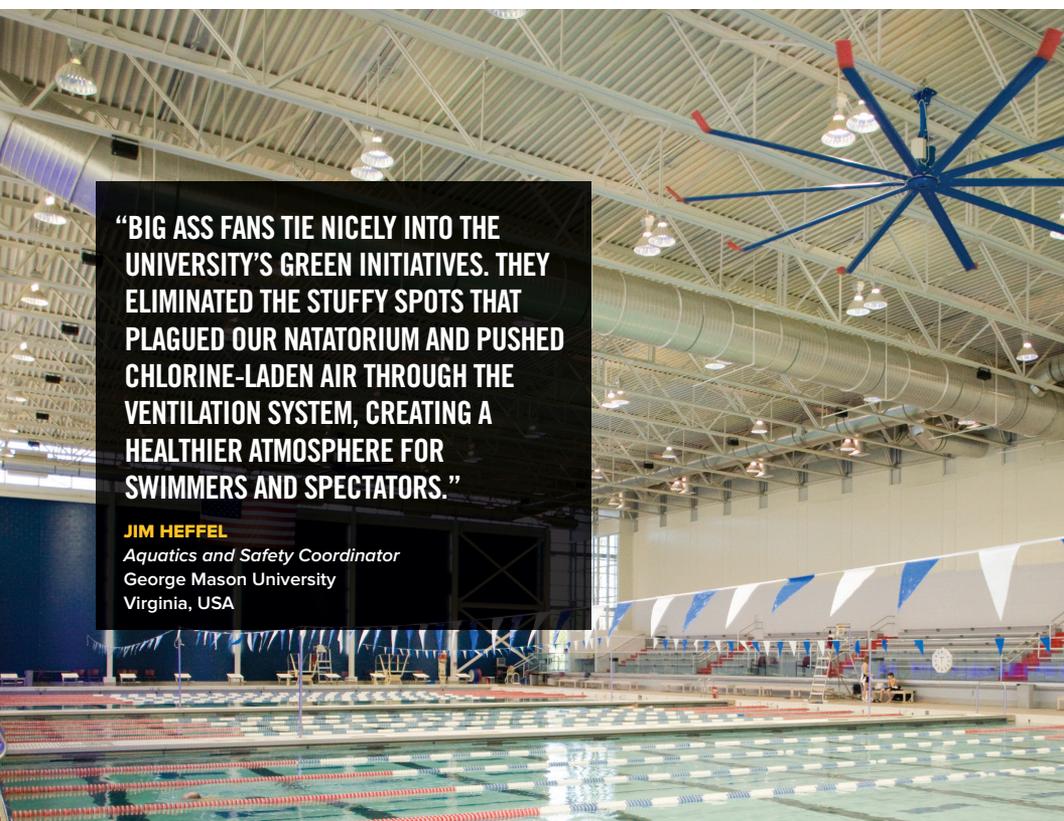
Ross Tarrant Architects for  
Cassidy Elementary  
Kentucky, USA



CrossFit Mayhem  
Tennessee, USA



South Hills High School  
California, USA



“BIG ASS FANS TIE NICELY INTO THE UNIVERSITY’S GREEN INITIATIVES. THEY ELIMINATED THE STUFFY SPOTS THAT PLAGUED OUR NATATORIUM AND PUSHED CHLORINE-LADEN AIR THROUGH THE VENTILATION SYSTEM, CREATING A HEALTHIER ATMOSPHERE FOR SWIMMERS AND SPECTATORS.”

**JIM HEFFEL**  
*Aquatics and Safety Coordinator*  
George Mason University  
Virginia, USA

# IMPROVING VENTILATION AND IAQ

## What's the deal with ventilation?

When supply and return vents are located at the ceiling, it's difficult to distribute heated air throughout a space.

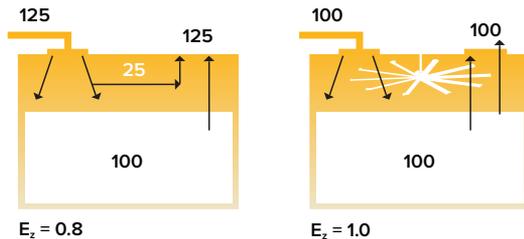
## How do Big Ass Fans help?

Big Ass fans can improve zone air distribution effectiveness by pushing hot or heated air down to occupant level, helping reduce fresh air intake by 20 percent without a negative effect on indoor air quality (IAQ).

### ANSI/ASHRAE STD 62.1 & OVERHEAD HEATING

Zone floor area (m <sup>2</sup> )	200	200
Zone population (people)	16	16
Breathing zone outdoor airflow (L/s)	100	100
Typical zone air distribution effectiveness (E <sub>z</sub> )*	0.8	1.0**
Outdoor air intake flow (L/s)	125	100

\*Table 6.2.2.2 of ASHRAE Standard 62.1-2013  
\*\*Must be approved by local code official



*Without overhead fans (left), heating systems need to supply more outdoor air into a space to maintain adequate air quality. With fans (right), air is distributed more effectively into the breathing zone*





## CASE STUDY: ANYTIME FITNESS

### PROBLEM

Anytime Fitness Hamilton in Queensland, Australia, is the state's most awarded Anytime Fitness, but the air inside reflected the impact of every curl, crunch, lift and lunge. Members consistently complained about stuffy, stagnant conditions so

management lowered the thermostat setpoint to 21°C – well below their preferred 24°C. Members were more comfortable, but power bills spiked dramatically. Anytime Fitness Hamilton needed a way to keep its clientele cool without breaking the bank.



**“BIG ASS FANS HAVE IMPROVED AIR CIRCULATION A RIDICULOUS AMOUNT! WE’VE EVEN SEEN A 20 PERCENT SAVINGS ON POWER BILLS, AND MEMBERS ARE REALLY HAPPY THAT IT FEELS SO MUCH COOLER IN THE GYM NOW.”**

**SANDY KING**

*Regional Manager  
Anytime Fitness  
Brisbane, Queensland*

## **SOLUTION**

One Essence® and two Haiku® fans by Big Ass Fans® generate the airflow that Anytime Fitness Hamilton requires to accomplish both goals. Members remain comfortable even during the gym’s busiest hours. The staff maintain the thermostat setpoint at a steady 24°C and often leave the air conditioning off entirely during early morning hours, resulting in a

20 percent savings on power bills. The fans also improved the space’s air quality, clearing the sweaty odour that can plague fitness facilities.



# SPECLAB™

Visualise Big Ass fans in your projects with our proprietary 3D airflow simulator.

SpecLab features patent-pending technology developed at our LEED accredited R&D facility in the USA. We spent more than 12,000 man hours ensuring we're providing industry-leading accuracy.

- Only CFD software that combines air movement from ceiling fans, ANSI/ASHRAE Standard 55 thermal comfort calculations, and ASHRAE Standard 216P performance criteria
- Ability to show you the expected Average Air Speed and Average Cooling Effect of the areas of your concern
- Customise your layout to include objects that mirror those in your space



## LET'S TALK!

Interested in free design assistance or learning more about how Big Ass Fans can benefit your projects? Our team of experts would love to help!

Visit [bigassfans.com.au/contact-us](http://bigassfans.com.au/contact-us) or call **1300 244 277** to learn more.



**BIG ASS  
FANS**

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