



# USING BIG ASS FANS TO IMPROVE ENERGY EFFICIENCY





# 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.

## Why add fans to conditioned spaces?

Air conditioning is great — but it's expensive and can be horrifically inefficient. Big Ass Fans® work with air conditioning systems to make them more effective. The fans use a fraction of the energy of an HVAC system, 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.

## 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 3 to 6 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

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*

A/C ONLY	A/C AND FANS
Air Dry Bulb Temp = 75°F	Air Dry Bulb Temp = 80°F
Mean Radiant Temp = 75°F	Mean Radiant Temp = 80°F
Humidity Ratio = 0.009	Humidity Ratio = 0.009
Air Speed = 20 fpm	Air Speed = 135 fpm
Metabolic Rate = 1.1 met	Metabolic Rate = 1.1 met
Clothing Insulation = 0.75 clo	Clothing Insulation = 0.75 clo
PMV: -0.01 PPD: 5%	PMV: -0.01 PPD: 5%

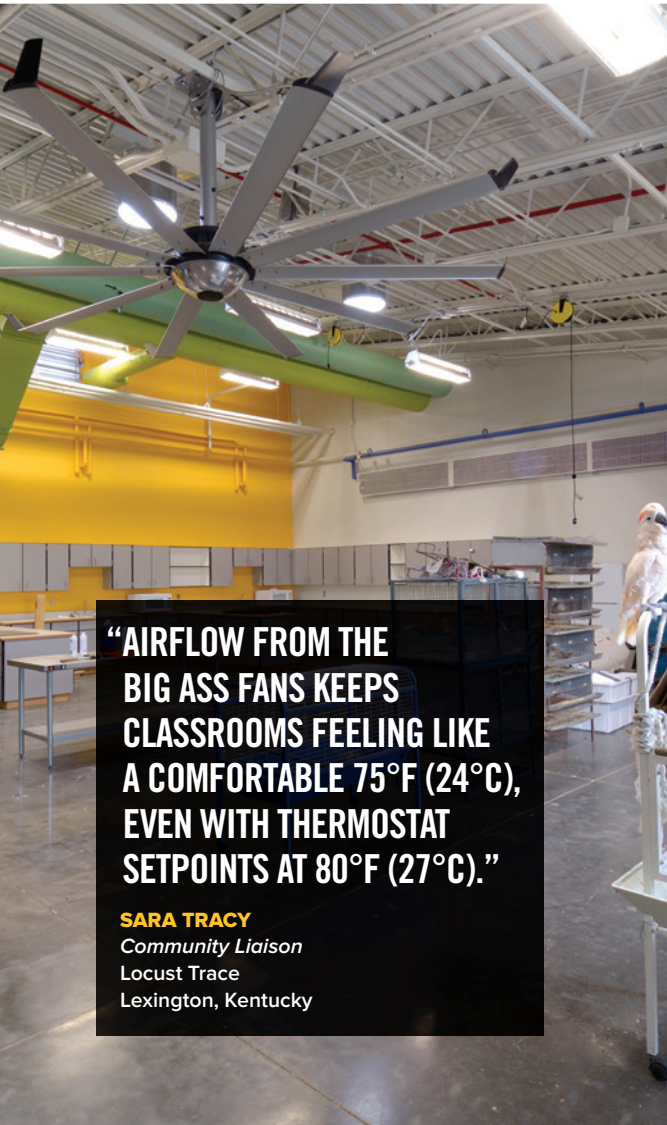
Source: CBE Thermal Comfort Tool

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

**“AIRFLOW FROM THE BIG ASS FANS KEEPS CLASSROOMS FEELING LIKE A COMFORTABLE 75°F (24°C), EVEN WITH THERMOSTAT SETPOINTS AT 80°F (27°C).”**

**SARA TRACY**

Community Liaison  
Locust Trace  
Lexington, Kentucky





Capital GMC Buick Cadillac  
Regina, Saskatchewan, Canada



Bullitt Center  
Seattle, Washington

# COOLING WITHOUT AIR CONDITIONING

## Why is heat a problem?

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

TEMPERATURE	PRODUCTIVITY LOSS
77°F (25°C)	0.0%
80°F (27°C)	-3.2%
85°F (29°C)	-8.8%
90°F (32°C)	-14.3%
95°F (35°C)	-19.9%
100°F (38°C)	-25.4%
105°F (41°C)	-31.0%

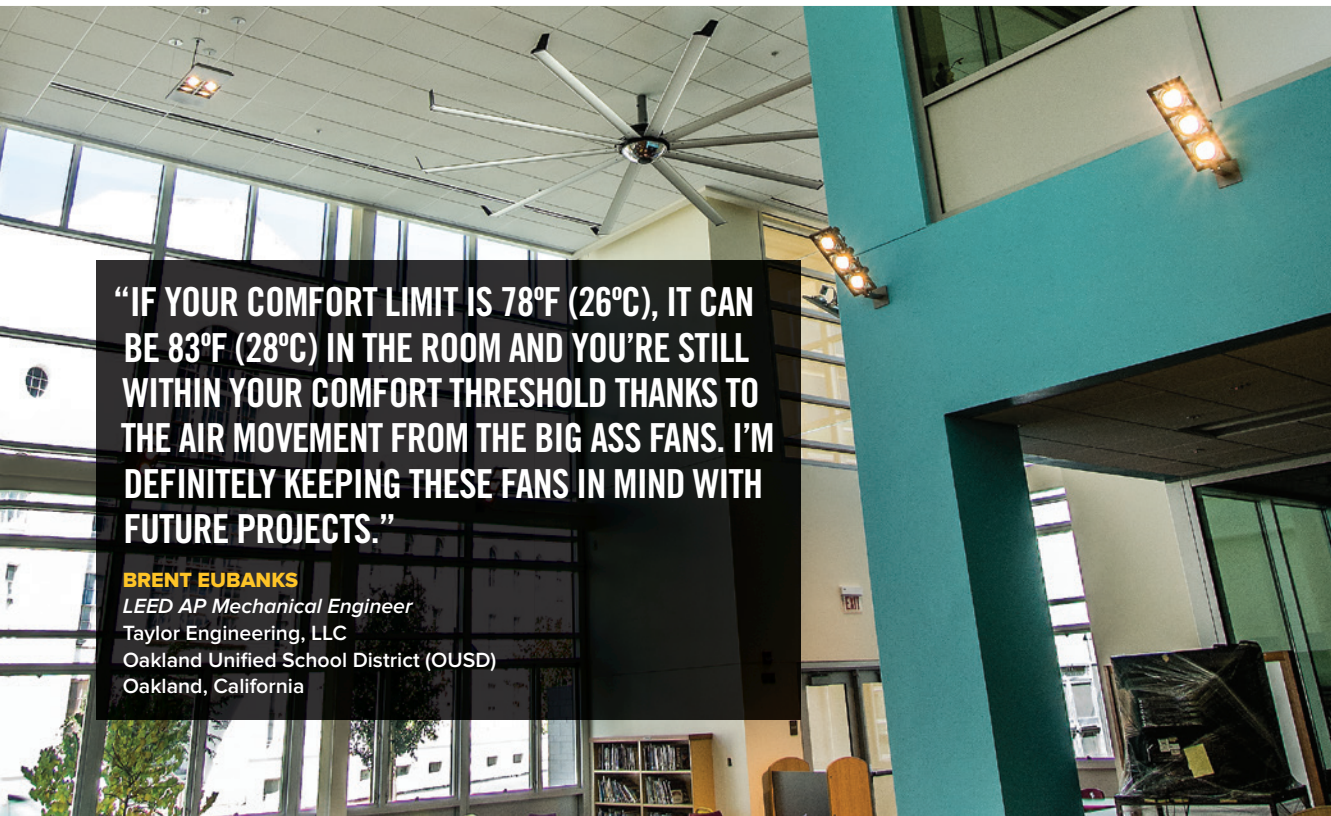
Source: Seppänen, O., Fisk, W. J. and Lei, Q. H. (2006)

## 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?

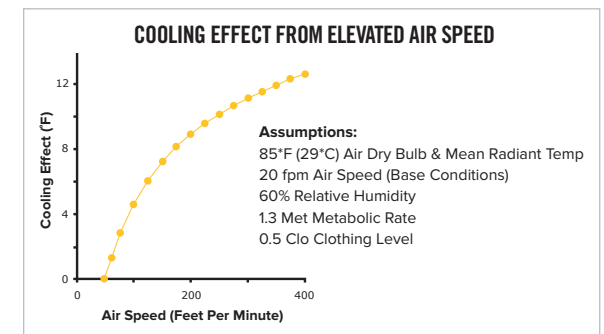
Big Ass Fans are incredibly effective and efficient. Plus, they don't take up floor space like pedestal fans and they're not loud like box fans.



**“IF YOUR COMFORT LIMIT IS 78°F (26°C), IT CAN BE 83°F (28°C) IN THE ROOM AND YOU’RE STILL WITHIN YOUR COMFORT THRESHOLD THANKS TO THE AIR MOVEMENT FROM THE BIG ASS FANS. I’M DEFINITELY KEEPING THESE FANS IN MIND WITH FUTURE PROJECTS.”**

### BRENT EUBANKS

LEED AP Mechanical Engineer  
Taylor Engineering, LLC  
Oakland Unified School District (OUSD)  
Oakland, California



Increased airflow can make you feel 4 to 5°F (2 to 3°C) cooler — without disrupting sensitive environments

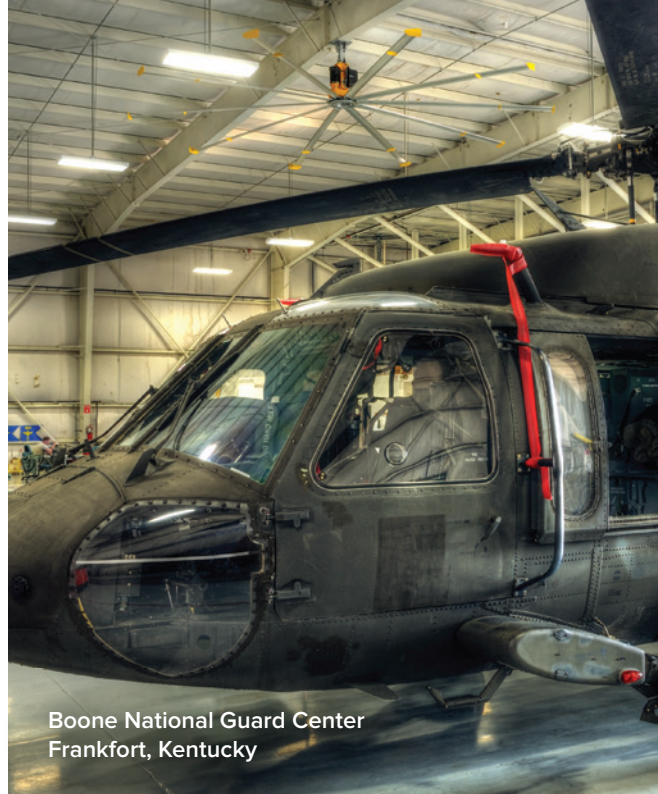
# WINTER ENERGY SAVINGS AND DESTRATIFICATION

## What happens in the winter?

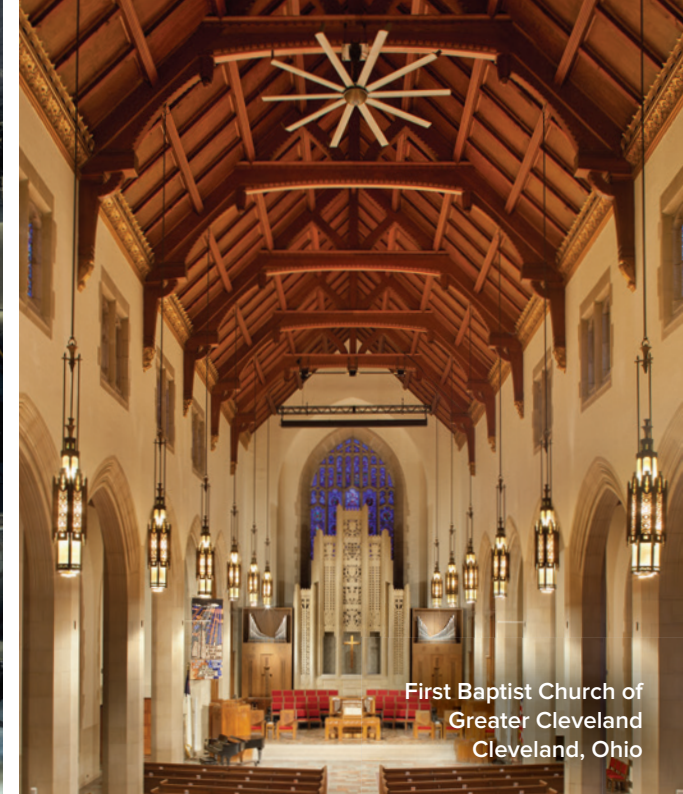
In the winter, heat rises and can get trapped at the ceiling, leading to huge temperature differences and massive heating bills.

## How does it work?

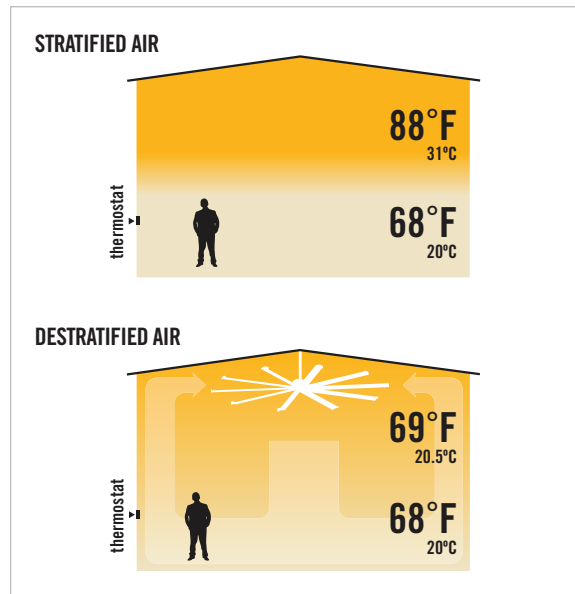
Fans aren't just for cooling. Big Ass Fans operate slowly in the forward direction, thoroughly mixing air without creating a draft. Air velocity at the floor does not exceed the limit for draft set in Standard 55 (30 feet per minute or less), so there's no need to reverse the fans. The result is up to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



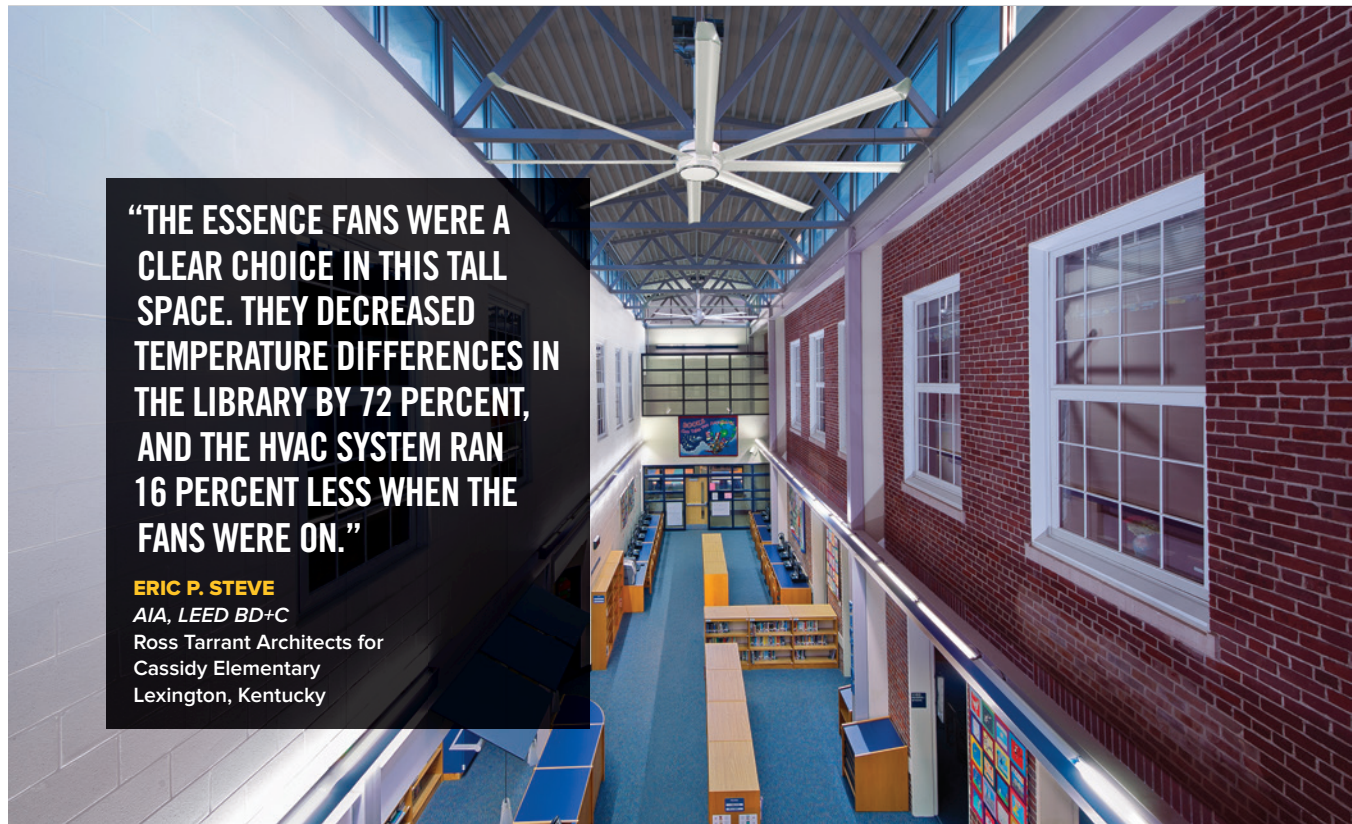
Boone National Guard Center  
Frankfort, Kentucky



First Baptist Church of  
Greater Cleveland  
Cleveland, Ohio



Winter heating, with and without Big Ass Fans



**“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  
Lexington, Kentucky



Big Ass Solutions  
Research & Development Lab  
Lexington, Kentucky



Red Bank Middle School  
Chattanooga, Tennessee



**“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  
Fairfax, Virginia

# 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.

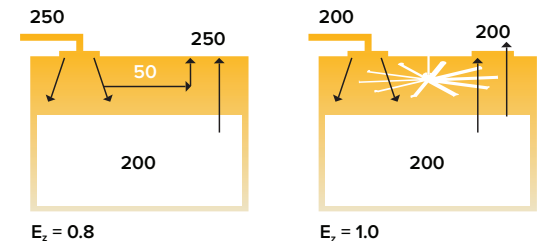
## How do Big Ass Fans help?

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 (ft <sup>2</sup> )	2000	2000
Zone population (people)	16	16
Breathing zone outdoor airflow (cfm)	200	200
Typical zone air distribution effectiveness (E <sub>z</sub> )*	0.8	1.0**
Outdoor air intake flow (cfm)	250	200

\*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*

IEG Plastics  
Bellefontaine, Ohio



Planet Fitness  
Portsmouth, Virginia



**“IN 37 YEARS OF ENGINEERING AND CONSTRUCTION MANAGEMENT, I’VE NEVER SEEN A PRODUCT LIKE THE BIG ASS LIGHT FIXTURES. EVEN BETTER, THE FIXTURES ARE EXPECTED TO SAVE \$115,000 ANNUALLY IN ENERGY COSTS [COMPARED TO METAL HALIDES].”**

**BRUCE AYCOCK**  
Senior Manager of Facilities Engineering  
American Airlines  
Dallas, Texas

# ENERGY SAVINGS WITH LEDS

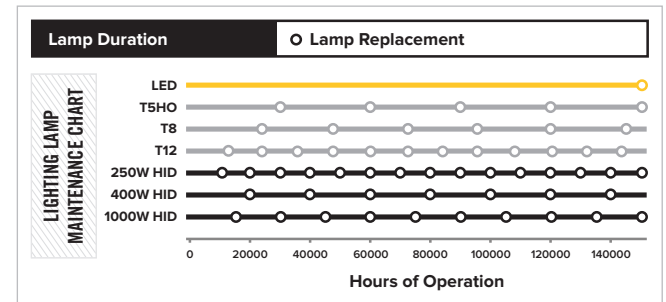


## Why LEDs?

Replacing fluorescent or metal halide lights with LED fixtures can result in serious savings. Not only do LEDs use much less energy than other light sources, they also last longer. Less energy, less maintenance, better light.

## Why are Big Ass Light LEDs better?

Big Ass Light LEDs use half the energy of traditional metal halide bulbs and 20 percent less than fluorescents.



Big Ass Light LEDs last way, way, way longer than other light fixtures

# GREEN RATING SYSTEMS

Big Ass Solutions can contribute to credit achievement in the following sustainable living programs:

## LEED®

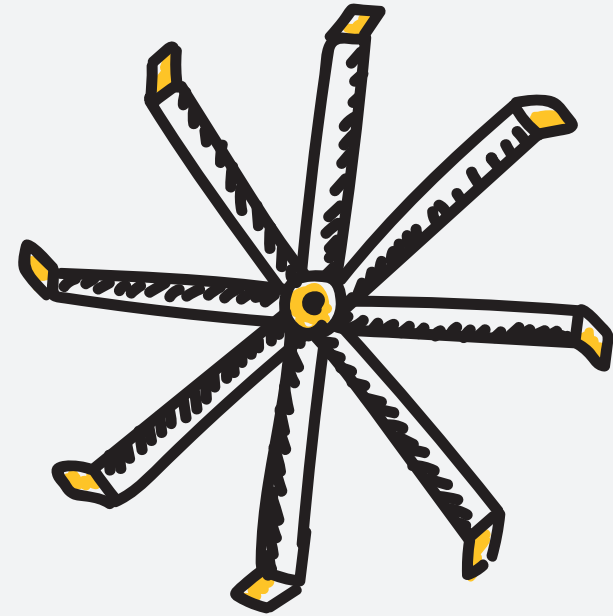
- EA Prerequisite 2 – Minimum Energy Performance
- EA Credit 2 – Optimize Energy Performance
- EA Credit 4 – Demand Response
- EA Credit 6 – Enhanced Refrigerant Management
- EQ Prerequisite 1 – Minimum Indoor Air Quality Performance
- EQ Credit 1 – Enhanced Indoor Air Quality Strategies
- EQ Credit 5 – Thermal Comfort
- IN Credit 1 – Innovation

## Living Building Challenge™

- Imperative 06 – Net Positive Energy
- Imperative 08 – Healthy Indoor Environment

## Green Globes®

- Section 3.3 – Energy, Path B
- Section 3.7.1 – Ventilation Requirements



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## LET'S TALK!

Interested in free design assistance or learning more about how Big Ass Solutions can benefit your projects? Our applications engineers and LEED accredited professionals would love to help! Visit [design.bigassfans.com](http://design.bigassfans.com) to learn more.



For a more in-depth look at how Big Ass Fans and Big Ass Light LEDs contribute to green building strategies, visit [www.bigassfans.com/energy](http://www.bigassfans.com/energy)