



# Michaels Engineering Energy Brief

## PUTTING OUT CASH FIRES WITH VFDs



### SUGGESTIONS...

Do you have certain Energy Efficiency topics you'd like to know more about? Send an email with your suggestion to the author listed below and your topic might become a future Energy Brief!

### DID YOU KNOW...

...Systems are necessarily designed using fans and pumps that are larger than they need to be...

...resulting in unnecessary energy consumption most of the time.

### MEET THE AUTHOR



Jeff Ihnen is the Energy Division Manager at Michaels Engineering. For more information on this topic or additional energy concerns, please contact Jeff at:

(608) 785-1900 or  
JLI@MichaelsEngineering.com

### → PUTTING OUT CASH FIRES WITH VFDs

Suppose you need to drive from Minneapolis to Des Moines on a regular basis for business. What would you do? Most likely you would board your vehicle and drive three and a half hours south on I-35.

If you were to make the trip using the logic and design of nearly all fan and pumping systems, you would instead drive a bus every time because once in a while you need to take a bunch of coworkers along; or you might drive the distance with your brakes on so you don't get caught speeding.

Sound crazy? Read on.

### → HUH?

Electricity is a wonderful thing, but the fact is, it only comes off the grid at 60 Hertz in North America. This frequency dictates the speed of every AC motor, which is typically 1,800 revolutions per minute.

Fans and pumps come in discrete sizes like a car engine, and like a car engine they will produce a certain output at a given speed with a high level of confidence. However, a car's engine speed is capable of changing continuously depending on the load and the driver's operation of the gas pedal. This is not possible with an AC motor.

Air and fluid systems that are present in practically every commercial and industrial facility are designed with margins of error. Additionally, many systems have to accommodate changing conditions due to factors like weather changes and production or product changes. Typically, the fans and pumps driving fluids in these systems operate at continuous full flow, or they are throttled. This would be like driving a huge vehicle all the time only because you need it once a year, or driving with the brakes on because too much speed is a bad thing.

### → THE OPPORTUNITY

In practically every building that has them, fans and pumps are wasting energy every day of the year and almost every minute they are running. Some facilities may have 40 year-old systems operating this way, while many systems are being installed to this day with constant speed fans and pumps that waste, in some cases, HUGE amounts of electrical energy. It isn't uncommon for motors in the hundreds of horsepower size-range, or even in excess of 1,000 horsepower to be installed with throttling (brakes) control, even today!

Why would this happen? It could be any number of things: first cost, lack of time, lack of technical/energy understanding, or "this is the way we've always done it and it works". Yes, it may work, but what a cash-flow killer! Using a personal bus as a principle mode of transportation, or driving with the brakes on is like burning cash. Only rock stars, politicians and John Madden can afford that!

### → THE SOLUTION

Install variable frequency drives (gas pedals) on your fans and pumps that require variable output or constant part-load output. Practically every building has numerous potential applications. Paybacks for many applications are so quick that you wouldn't think twice, like you wouldn't think about buying a bus or driving with your brakes on!

Specific applications will be discussed in a future brief.