

# Understanding Your Power Needs

NAI Commercial Real Estate Inc.



## Watt does it all mean?

A question that is often posed to realtors regarding commercial and industrial buildings is “how much power is available”?

Electricity and power distribution can be a confusing topic for the average person and unless you are familiar with some of the terminology, trying to understand the process can often leave you with more questions than answers.

We recently took a few minutes to speak with Steve Zasilakos from Cosmos Electric Ltd., a family owned and operated electrical contracting company in Edmonton for over 20 years, to try and give a basic overview of electricity as it pertains to commercial applications. The following information should help provide a general understanding about power.

## What is the difference between Volts, Amps, and Watts?

We can't necessarily see electricity, however, we can measure it by its effects. An ampere, or Amp represents the amount of current in a circuit. Voltage is defined as the circuit's “potential difference” and can be seen as the amount of “pressure” that drives electricity in a circuit. Watts are a measure of the use of electrical power. (One Watt is equal to one Volt multiplied by one Amp.)

## What the heck does that mean?

One of the best analogies I've heard that makes this easier to understand is that of the garden hose. The water pressure in the hose would represent the voltage, and the amp value is like the volume of water flowing through the hose. The wattage, then, is the total amount of water that comes out of the hose, per unit of time.

Putting your thumb over the end of the hose could be compared to increasing the voltage as it would make the water squirt further, however that doesn't mean there is a larger volume of water flowing through the

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hose, so if you have a larger “bucket” to fill you will need to increase the amps.

\*Note. Do NOT attempt to increase the voltage from a power supply line by putting your thumb over the end of the wire.

If you replace the hose in this analogy with an electrical wire, it is easy to see the relation. In an electrical circuit, the voltage may be 120, (as is most common in electrical outlets in Canada and the U.S.) so most appliances are meant to run on this voltage. Various appliances however operate at different amp levels, and therefore at a different wattage.

Appliances that use a larger amount of current, such as an electric stove may be on a separate circuit with a higher voltage. More pressure, or voltage, would be required to supply the needed amps to the appliance, because it has a higher wattage. Without the higher voltage, it wouldn't run, because it would be “starved” for the amps it needed to be able to operate.



## Single phase versus 3 phase power

Electrical service is transmitted in the form of an alternating current whose magnitude and direction reverse cyclically. If you were to put a voltage meter on a single phase AC (alternating current) line and magically slow it down so that you could see it, you would see the voltage peak in one direction and then reverse polarity sixty times per second.

Three phase service is just three single phase lines which are out of phase by one third of a cycle so that the individual voltages peak one after another in sequence, resulting in a cleaner, more efficient distribution of power. Typical single phase 120/240 volt service @ 100 amps provides 24,000 watts of power, while in comparison typical 3 phase 120/208 volt service @ 100 amps can provide 35,984 watts of power.

Most newer commercial and residential buildings (i.e. apartments) have a 3 phase power supply coming in to the building, which is often converted to single phase as it is routed into the individual suites. The 3 phase power would be used to run elevators, boilers, etc. because 3 phase electric motors can be much smaller than a single phase electric motor while running more efficiently and providing the same amount of horsepower.

## What kind of power do I need?

Simply put, it depends on the equipment you are running. Many industrial machines and most major commercial food equipment require 3 phase power to operate. While it is possible to convert single phase current to three phase using a rotary phase converter, there is often a significant loss of efficiency and the possibility of damage or accelerated wear to equipment involved.

Knowing what type of electrical power your equipment runs on, how many pieces of equipment will be running, and when they will be running ( independently or at the same time ) are all factors that must be considered when determining your power requirements.

An electrician or electrical engineer can assess your operation and help calculate your needs as they pertain to power supply. If your operation has specific requirements in terms of power, its better to consult a professional to determine if a particular location is right for you rather than guess and find out the hard way that it isn't.

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