

## Sizing Temporary Electrical Service for Construction Sites



Sizing and securing temporary electrical power is essential to any new construction project as it will serve as the only source of electricity until permanent service can be brought in. Sizing calculations must be as accurate as possible because service that is too large can be unnecessarily costly, and if it's too small, project progress will be hindered by tripping breakers and insufficient power. Here are some important considerations when sizing temporary power for a construction or renovation project:

- Electrical requirements for items such as jobsite lighting, power tools, battery chargers, and various other construction equipment should be calculated by the square foot.
- When determining the power needs for construction trailers, allow for HVAC, copiers, computers, coffee makers, electric heaters, and any other devices that will be used.
- What will the seasonal heating and cooling needs be over the course of the project? Keep in mind that HVAC may be required for tempering materials and curing and drying finishes.
- Will there be power-hungry equipment like tower cranes, construction elevators, sump pumps, dewatering systems, etc., that require electricity?
- Determine whether structural steel will be erected using electrical arc welders, gas welders, or a combination of both.
- If the building is to have permanent elevators, will power be required for setup and installation?

Once the service size has been calculated, a good rule of thumb is to add 20% to allow spare capacity for the unexpected surprises and changes that almost invariably occur. It's also important to ensure that temporary services are properly located. They should be close enough to the building and construction trailers to avoid voltage drops and won't need to be relocated before the end of the project. Different utility companies have different requirements for temporary power installations, but most require that load calculations be submitted and approved.



## Omni Combines Facility Electrical Shutdown with Annual SOP Testing



Omni was recently contracted by a previous customer to provide power and controls for a new processing area. The project involved adding a new 800 amp breaker to their existing switchgear, during which time a sizable portion of the electrical system would need to be shut down and restarted.

It was during the planning phase that facility managers realized the project presented an opportunity to kill two birds with one stone. The plant's first annual SOP review was due to take place in a few weeks, and the shutdown would be an ideal time to conduct electrical functional testing.

The shutdown began on a Friday at 5 a.m. While one Omni team worked on tying in the new breaker, other technicians walked the entire building with plant maintenance personnel to ensure that backup generator and UPS power was provided to equipment and systems per design. This included assessing functionality of standby/emergency systems for lighting, critical exhaust and HVAC systems, process equipment, boilers, and PH waste and neutralization, and verified power to control panels, HMIs, PLCs, and the like.

The emergency systems functioned extremely well overall. Automatic transfer switches operated within an 8-second time frame, and the generator ran loaded and without incident. The UPS, which had been sized at installation for future capacity, performed as expected. Only one problem was discovered – two critical condensate pumps needed to be added to the emergency power system – and promptly rectified. After 30 minutes, work was completed and full power was restored. All facility systems went back to normal operation and the generator entered its cool-down cycle.

## Scientists are Finding Ways to Generate Electricity from Thin Air



Scientists are continually looking for new sources of sustainable energy, and two recent discoveries are showing great promise in this arena. In March 2023, Australian researchers from Monash University reported their discovery of an enzyme that converts air into energy in the journal [Nature](#). Many bacteria have been shown to use hydrogen from the atmosphere as an energy source in nutrient-poor environments, so the team set out to learn how. They were able to extract a hydrogen-consuming enzyme called Huc from a common soil bacterium and demonstrate how it turns hydrogen gas into an electrical current.

Purified Huc is extremely stable and can be stored for long periods of time while retaining its ability to generate energy,

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and the bacteria that produce it can be grown in large quantities. Research is still at an early stage, but scientists believe Huc has considerable potential for use as an alternative energy source for small devices.

In another discovery recently reported in the journal [\*Advanced Materials\*](#), scientists from the University of Massachusetts, Amherst have invented a device that can generate electricity from humidity, a nearly boundless resource in our atmosphere. Dubbed Air-Gen, the device, which is about the size of a fingernail and thinner than a human hair, is made from two electrodes and a thin layer of material dotted with nanopores suspended between two chambers. When water molecules pass through the nanopores, they knock against the holes' edges and create an electric charge imbalance between the chambers, effectively mimicking the way clouds produce lightning and essentially creating a battery that can run continuously.

Like the Australian study, there's still a lot of work to be done to optimize and scale up the technology, but members of the scientific community believe it could have an "enormous impact" in the future.

## HEALTH & SAFETY: How to Lift Properly and Protect Your Back from Injury

We've all heard the phrase "lift with your knees, not your back", but good advice for preventing back injury doesn't end there. Here are ten tips for preventing back injuries whether you're on the job or at home:

- 1. Get as close to the load as possible** and plant your feet shoulder-width apart with one foot slightly ahead of the other.
- 2. Don't bend at the waist.** Bend primarily from the hips and knees with head up and shoulders back. Squat down, engage your core muscles, and lift from between your legs.
- 3. Hold objects close to the waist and avoid twisting.** Turn by moving your feet, not your torso.
- 4. When carrying weight in one hand, keep your spine aligned.** Planting your free hand on your thigh can help you maintain proper alignment.
- 5. Reverse these steps when setting a heavy object down,** which can be just as risky as picking one up.
- 6. Use a back support belt.** Wear it low on your trunk and loosen it when you're not lifting.
- 7. Stay in good physical condition.** Extra weight not only puts excessive strain on the spine but it can prevent you from being able to hold heavy objects close enough to your core.
- 8. Stretch and loosen up before work** to warm up stiff muscles and tendons. Research proves that trunk flexibility and mobility are significantly lower in the morning than later in the day.
- 9. Safe lifting guidelines should be used when lifting any size load,** not just heavy ones. This is especially important for those who suffer from chronic back problems.
- 10. Store heavy objects between knee and shoulder level** when possible, and don't chance it if you suspect a load is too heavy to lift safely. Use a mechanical aid, break the load down into smaller parts, or get help.

