

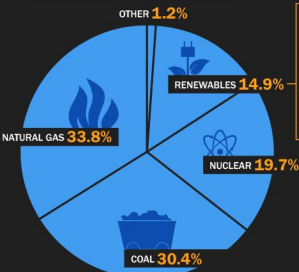
# POWER GENERATION INDUSTRY HAZARDS

Though many living in North America may not realize it, the power plants, wind farms, and solar panels scattered throughout the continent are the bedrock of modern life. Without the power generated by legacy industries like coal and natural gas, or more modern renewable energy sources like wind or hydroelectric, the entire continent would quickly revert back to oil lamps and horse-and-carriage transportation.

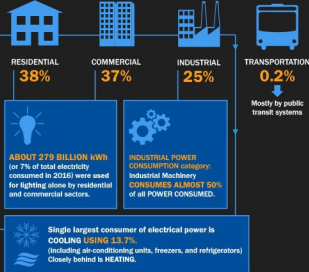
No industry is more tied to modern, everyday life than the Power Generation Industry.

## FLOWS OF POWER

All of the power came from the following sources

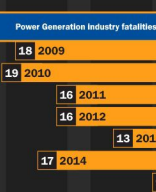


Electricity consumption in the United States was about 3.85 TRILLION KILOWATT-HOURS (kWh) in 2016



## INJURIES & FATALITIES

### Power Generation Industry fatalities



The number of non-fatal electrical injuries rose to 2,480 in 2015, the highest since 2009



## TIME & MONEY LOST

The Electric Power Generation, Transmission and Distribution industry has received

104 CITATIONS → COSTING \$570,925 between October 2016 and September 2017

OSHA estimates the net monetized benefits of compliance with all power generation regulations is

\$130 million annually

CALCULATED BY COMBINING



## REGULATING BODIES

Bulk Power Generation facilities must legally comply with regulations from two specific entities

### North American Electric Reliability Corporation (NERC)

All bulk power system owners, operators, and users must comply with NERC-approved Reliability Standards. Those standards deal primarily with maintenance and system stability.

### A bulk Power Generation facility is defined as:

"An electricity generating facility with at least one megawatt (or 1,000 kilowatts) of total electricity generating capacity."

### Occupational Safety and Health Administration (OSHA)

OSHA's rules for general industry apply broadly, but CFR 29 1910.269 is the specific directive provided for the power generation industry. Included in the regulation are special requirements for Lockout/Tagout (LO/TO), Arc Flash, Fall Protection, and Confined Space marking.

While OSHA's broad regulations for electrical work apply across the United States, the power generation industry receives additional guidance in §1910.269, which touches on the following industry-specific hazards.

## LOCKOUT/TAGOUT

OSHA has estimated that following their general standard §1910.147 for LO/TO will prevent 120 deaths and 50,000 injuries per year.

LO/TO violations accounted for 12% of all US fatalities in 2013. The Power Generation industry is given additional specific LO/TO requirements in §1910.269(d).

### Power Generation Specific Requirements

- Tags must be highly durable, able to withstand water, moisture, corrosion, and wear over time
  - They must be consistent in size, color or shape; the font and message style should be consistent across the facility
  - They must identify the employee who placed them
  - When working with large multiple groups or in collaboration with another team, LO/TO procedures need to be overseen by a single employee who works to keep everyone safe
- Workers are likely to encounter LO/TO hazards anywhere they interact with transmission lines or other machinery in the Power Generation industry, particularly if they perform maintenance or repair work.

Want more information on LO/TO best practices? Download a FREE Guide: [GraphicProducts.com/LOTOguide](http://GraphicProducts.com/LOTOguide)

## SOLUTIONS

Get Master Lock padlocks, tags, and devices that meet industry standards from Graphic Products. Need custom LO/TO tags specific to your facility? Use DuraLabel Industrial label printers to print LO/TO tags, equipment procedure labels, custom safety signs, and more.

Master Lock® Products: [Store.GraphicProducts.com/loto](http://Store.GraphicProducts.com/loto)  
DuraLabel Industrial Printers and Supplies: [DuraLabel.com](http://DuraLabel.com)

## ARC FLASH

§1910.269 Addresses protecting employees from flames and electric arcs in paragraph (j)(8).

In addition to the general arc flash requirements that all employers must follow (assess the workplace for flame and electric-arc hazards and determine the level of available heat energy from electric arcs) Power Generation Industry employees are further required to:

- Supply heat resistant personal protective equipment (PPE) that will not melt or ignite and continue to burn when exposed to the high estimated heat energy that can be experienced from high powered electric arcs
- Ensure that employees wear the supplied PPE, and that the PPE has an arc rating of greater than or equal to the maximum available heat energy

Want more information on Arc Flash best practices? Download a FREE Guide: [GraphicProducts.com/AFlabelguide](http://GraphicProducts.com/AFlabelguide)

## SOLUTIONS

The most comprehensive way to indicate an Arc Flash hazard to an employee is with a highly visible Arc Flash label, combined with PathFinder floor marking tape to mark safe approach distances. PathFinder floor tape takes minutes to implement and is a simple, affordable, and effective way to help workers see the danger and avoid Arc Flash injuries.

DuraLabel Industrial Printers and Supplies: [DuraLabel.com](http://DuraLabel.com)  
PathFinder Floor Marking: [FloorMarking.com](http://FloorMarking.com)

## FALL PROTECTION

A lack of proper fall protection was the number one most cited standard in 2016. 29 CFR 1926.501 applies broadly and lays out specific guidelines for fall protection standards, but an additional addendum applies for the power generation industry.

Falling deaths in the Power Generation industry are often caused by electrical exposure. OSHA offers specific safety regulations for Power Generation workers operating at a high altitude.

### 29 CFR 1910.269(g)(2)(i)-(B)

The employee:

- Cannot be allowed to fall more than 2 feet before their safety equipment kicks in
- Should not be able to fall and come into contact with a lower level
- Must be tethered securely if they are more than 4 feet off of the ground

The fall protection used by an employee must be:

- Flame resistant
- Able to withstand a high amount of force in a drop test (starting at 4,000 pounds)

FACTS (for workers in the Power Generation industry):

- Heat from electrical currents can be equivalent to lightning bolt heat
- Average lightning bolt is hotter than the sun's surface
- Electrical currents have enough energy to melt through traditional restraints

For Example: The National Institute for Occupational Health and Safety (NIOSH) references a line worker being electrocuted and falling to his death as a primary example of a fall hazard that the typical Power Generation worker might face.

## SOLUTIONS

Labels and signs can be used to identify the location of fall-prevention equipment, secure tie off points, and known environmental hazards to employees working at height.

DuraLabel Industrial Printers and Supplies: [DuraLabel.com](http://DuraLabel.com)

## CONFINED SPACES

The confined space regulations found in §1910.269(e) that apply to the Power Generation industry are similar to the general industry standard that applies to all employers.

According to OSHA, if a worker in the general industry enters into enclosed spaces in accordance with the permit-space entry requirements of paragraphs (d) through (k) of §1910.146, they are considered compliant with paragraph (e) of the Power Generation industry-specific section as well

§1910.146 gives an example of the wording that could be used to mark a permit-required confined space:

**DANGER**  
PERMIT-REQUIRED  
CONFINED SPACE,  
DO NOT ENTER

In addition to this or similar text, the sign should follow the ANSI Z355 standards for a danger sign.

Workers often enter confined spaces in the Power Generation industry when performing maintenance, and very frequently do not realize that poking their head through an opening poses a life-threatening hazard such as poor air quality. Correctly identifying a confined space with signs and providing tools to help workers perform their work without needing to enter a dangerous space is significantly important to keeping fatalities low and lowering the injury rate.

Want more information on Confined Spaces best practices? Download a FREE Guide: [GraphicProducts.com/CSguide](http://GraphicProducts.com/CSguide)

## SOLUTIONS

Rely on durable premade Confined Space Labels by Graphic Products to warn your employees of dangers posed to confined spaces. Choose your label message, size, and material or customize your own.

Premade Labels and Signs: [GraphicProducts.com/premade](http://GraphicProducts.com/premade)



Protect Employees from the Power Generation Industry's Top Four Hazards!

Download your FREE Guide [GraphicProducts.com/power](http://GraphicProducts.com/power)

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