## Global Cumulative Installed Wind Capacity 2001-2017*


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### PROTECT YOUR WIND TURBINE FROM ARC-FLASH HAZARDS

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### Potential Areas Of Damage

- Induction Generator
- Transformer
- Gearbox
- Electrical Switchboard

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### What Causes Arc Flash?

- Insulation breakdown
- Equipment failure
- Phase-to-phase or ground faults

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### What Determines Severity?

- **SYSTEM VOLTAGE**
  - Voltage as low as 120 volts produce enough current to cause an arc flash

- **INCIDENT ENERGY**
  - Heat made up of a combination of the radiated heat and convection heat.
  - The closer a person is, the more incident energy they will experience

- **ARC CHARACTERISTICS**
  - Arc duration effects the amount of incident energy which is proportional to time
  - A longer arc length creates more incident energy than a shorter arc

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### Dangers From An Arc Flash

- **Hotter than the sun**
- **Blast pressure exceeding 2000 psi**
- **Shrapnel traveling over 700 MPH**
- **Fire hazards after the flash**
  - (Concentration of flammable materials)

- **Wind Turbines are far from medical help/meters above ground or sea level**

- Severe burns
- Lung damage
- Vision loss
- Eardrum ruptures
- Barotrauma
- Death

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### Cost Of An Arc Flash

- **Equipment destroyed**
- **Downtime/ Loss of revenue**
- **Injury or death**

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### Mitigation of Arc Flash

- **CURRENT-LIMITING FUSES**
  - Do not react as quickly or at all if the arcing current is less than their fault threshold
  - They can reduce the potentially damaging incident energy released. Different fuse classes affect how much current limitation they provide.
  - Learn more: Littelfuse.com/SafetyByDesign

- **ARC-FLASH RELAY**
  - Faster clearing time
  - Trips in less than 1 millisecond
  - While relays cannot prevent an arc-flash, they can limit the damage to equipment, downtime for repairs, and injury to workers.
  - Learn more: Littelfuse.com/ArcFlash