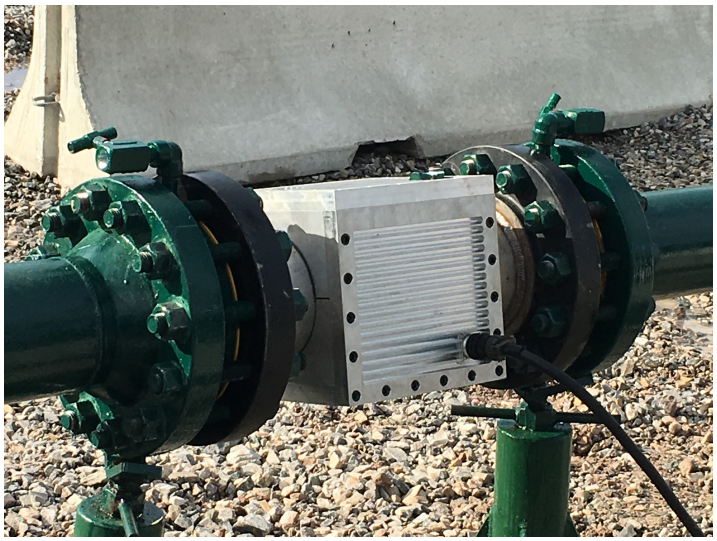
IN-PIPE TURBINE GENERATOR (IPTG)

***Patent Pending**

INTRODUCING: Lightning Master's innovative In-Pipe Turbine Generator (IPTG) RELIABLE, 24/7, OFF-THE-GRID GREEN POWER FOR YOUR SCADA AND OTHER BATTERY CHARGING NEEDS.



Lightning Master's innovative **I**n-**P**ipe **T**urbine **G**enerator **(IPTG)** system is designed to provide electricity at isolated locations lacking commercial power. It generates power using the flow of gas through the pipeline without combustion of fossil fuels.

The IPTG is an electric generator contained in a two-foot section of 6"stainless steel pipe. It is installed using standard industry flanges. Feed piping may be flanged up or down to that size. The pipe is tested to 2,000 PSI.

Magnetic flux produced by rotation of magnets on the turbine within the pipe produce electric current in coils mounted around the exterior of the pipe. The generator outputs through an umbilical cable to its control box that may be mounted conveniently near the site batteries and SCADA system for remote generator system monitoring through the existing site SCADA system.

The IPTG overcomes the drawbacks of solar panels, thermal-electric generators, diesel generators, combustion turbine generators, and wind. It is less expensive, requires less maintenance, is resistant to damage, and burns no fuel, reducing the site environmental footprint. The In-Pipe Turbine Generator is designed to generate power 24 hours a day and be maintenance-free for extended periods. IPTG operation and output may be monitored through the existing site SCADA system.

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MECHANICAL:

- Generator weight - approximately 300 pounds
- Generator outside dimensions:
  pipe - 24" length, 6" diameter
  flanges - Class 600 - O.D.14"
  generator enclosures - 11" cube around pipe
- Control box dimensions: 12" x 12" x 6" deep
  25' umbilical cord between generator and control box
- Does not compromise the structural integrity of the pipeline
- Hydro-tested to 2000 PSI (more to come)
- Easy installation -uses industry standard flanges to bolt into the pipeline
- Stainless Steel construction - H2S resistant
- Designed for use in a Class 1, Division 1 area
- Minimum product flow restriction - approximately 5-10 PSI pressure differential in normal operations
- Theft resistant

ELECTRICAL:

- 250w output at 24VDC with nominal flow of 70 mph through a 6" pipe (output varies with gas flow)
- Available in 12, 24 or 48 volt output (more to come)
- IPTG's may be run in series for additional power
- Interchangeable modular turbine sections accommodate different gas flow rates

ENVIRONMENTAL:

- Green design - generates electricity without burning fossil fuel
- No combustion or pollution
- Zero emissions

MONITORING:

- Output to communicate generator operating parameters (RPM, voltage, wattage and temperature) through Customer SCADA system (MODBUS, RS232, RS485, or ETHERNET)
- 128 day data logging

MAINTENANCE:

- **Low maintenance - 18 month inspection intervals**
- **Rotating components are modular with slide-out/slide-in replacement of the entire rotating section**
- **Assuming no mechanical damage, there should be no maintenance required on the components external to the pipe.**

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