

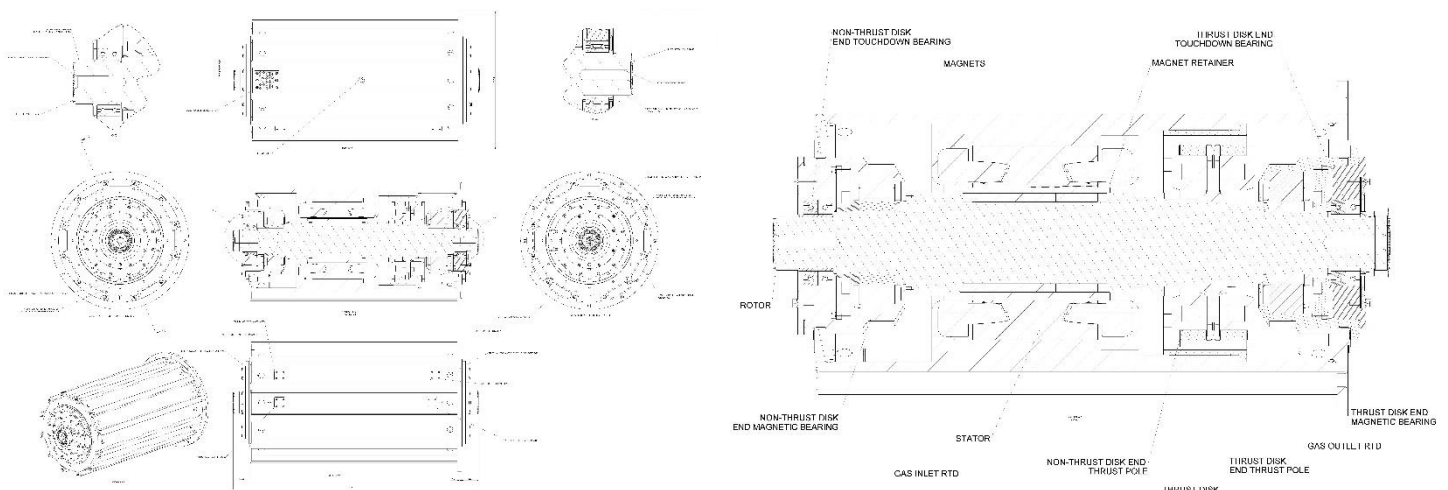


## Waste Energy Recovery in Natural Gas Pressure Regulating Stations 500kW Permanent Magnet Gas Expander Generator

Natural Gas Pressure Regulating Stations maintain acceptable operating pressure in hundreds of thousands of miles of pipelines. These stations make up an integral part of natural gas infrastructure but are inefficient and waste easily accessible energy. Gas Let-down Generators generate renewable energy from the flow of natural gas through pressure regulating stations. By employing an inline turboexpander, these systems generate electricity by expanding natural gas to an appropriate outlet pressure and temperature.

TPS have designed a bespoke high-speed Permanent Magnetic Gas Expander Generator to facilitate efficient recovery of this rejected energy, to reduce energy costs and improve profitability whilst providing a source of power with lowest carbon footprint. This range of generators has been designed for easy integration with the Anax Turboexpander (ATE). The ATE is a packaged turbine designed to generate electrical power from the flow and pressure let-down of natural gas at pressure regulating stations. The TPS PMG offers elite power conversion efficiency, and its high-power density enables a lightweight, compact system design. The robust PMG generator uses active magnetic bearings to enable high-speed, high-reliability operation with a low maintenance requirement due to the contactless nature of the magnetic bearings. This configuration enables seamless integration with the Anax Turboexpander across a wide range of pressure let down opportunities which is critical to Anax's value proposition.

**The Gas Expander Generator is shown in the schematic below:**



## Performance Table

Standalone Generator	500kW Generator
Nominal Operating Speed (rpm)	15,000 to 20,000
Over-speed Capability (rpm)	20,000
Output at full speed (kW)	520
Torque Rating (Nm)	286
Machine Orientation	Horizontal
Bearing Failure Mitigation	Bearing controller UPS (primary) Touchdown bearings (secondary)
Output Frequency (Hz)	600
Bearing Type	Permanent Magnetic
Operating Mode	Continuous
Duty Cycle	Continuous at all power levels from 25-100% load
Torque Overload Rating	110% - 1 minute 125% - 3 seconds
Working Fluid	Natural Gas
State	Pressurised Gas
Insulation Class	H
Voltage Class (V)	600
Full Load Current (A)	700
Rotor Poles	4 Pole

### Key benefits of our technology:

- Designed for Harsh Environments
- Fuel Efficient to Reduce Carbon Footprint
- Low Operating Costs
- Compact and Lightweight
- Reduced Mechanical Complexity
- High Energy Conversion Efficiency

TPS are able to deliver a suite of Permanent Magnet based electric machines operating in the speed range of 16,000rpm to 23,000rpm. These utilise the latest in magnetic bearing technology to deliver oil free, frictionless and low vibration operation. Our systems will also work with other types of bearing technologies such as journal, foil and air bearings.

With over 40 years' experience, a team of highly skilled engineers and technicians, and a track record in creating world-class high speed machines why go anywhere else? To discuss your project or for any further information please contact our marketing department at [marketing@turbopowersystems.com](mailto:marketing@turbopowersystems.com) or +44 (0) 191 482 9288.