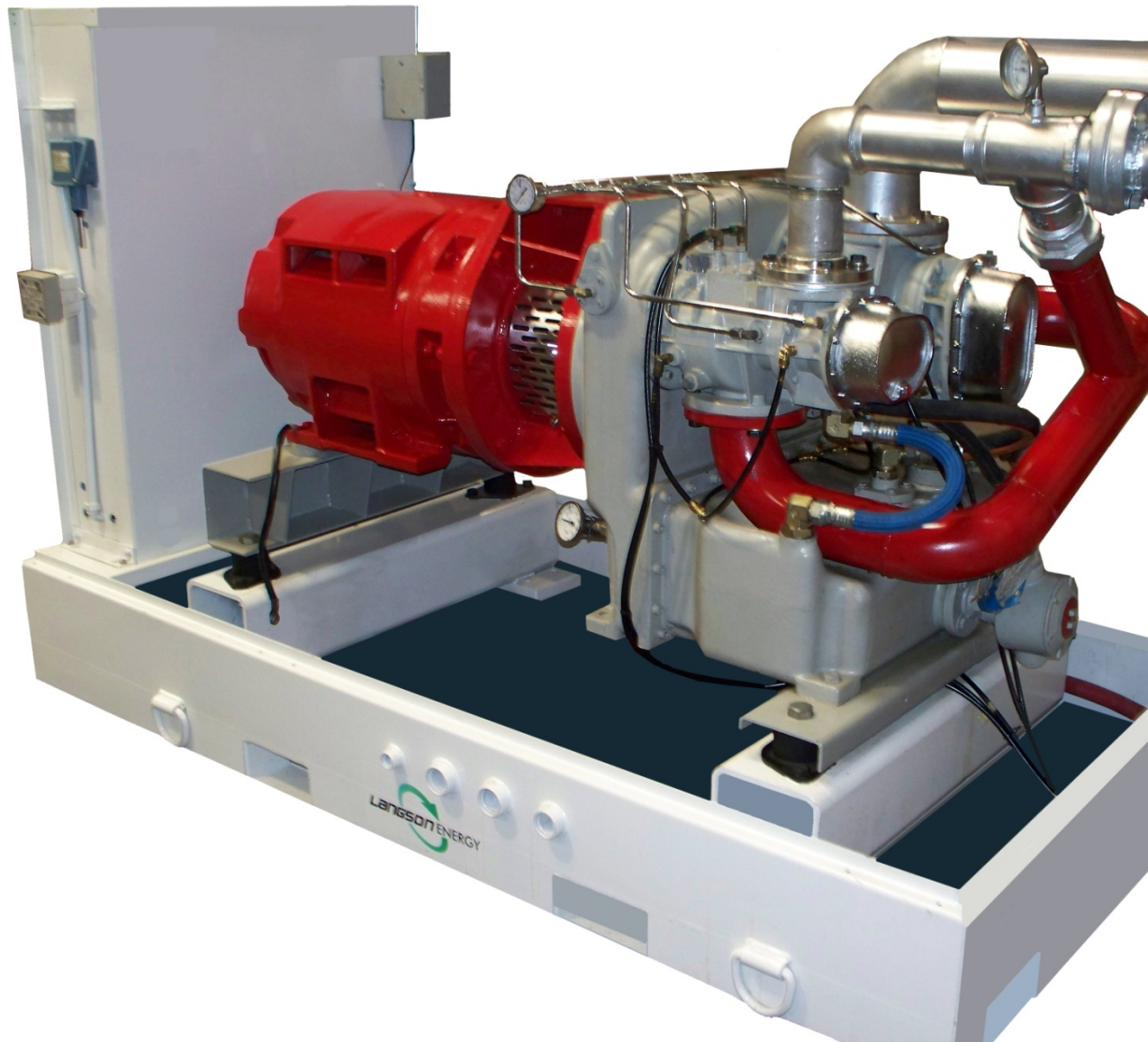




Gas Pressure to Green Energy™

Energy Recovery from Natural Gas Letdown Stations



Prepared by:

Langson Energy, Inc.



Summary

Langson Energy's Total Flow Gas Letdown Generator™ or GLG™ is an economically viable solution to energy recovery applicable to natural gas pressure reduction stations and city-gates. This truly revolutionary engine for waste energy recovery will dramatically improve the economics of green energy.

The Langson Gas Letdown Generator™ has significantly lower capital costs than other green alternatives. By integrating LEI technology with off-the-shelf components that have a proven history of reliable, robust, low-maintenance performance, Langson has solved the challenges of expensive turbine solutions to generating green power from wasted gas pressure. Traditional turbines (a.k.a. turbo-expanders) have been the accepted method for generating power from pressure for many years. However, their high capital costs and difficulty in handling fluctuations in flow rates and pressure have proven to be significant hurdles to their widespread adoption.

Langson's Gas Letdown Generator™ is an economically viable solution to generating base-load, green energy from gas pressure.

I. Introduction

The U.S. natural gas pipeline network is a highly integrated transmission grid that delivers natural gas to and from nearly any location in the lower 48 States. It is comprised of more than 210 natural gas pipeline systems; 305,000 miles of interstate and intrastate transmission pipeline; more than 1,400 compressor stations that maintain pressure on the network and ensure continuous forward movement of supplies; more than 11,000 delivery points, 5,000 receipt points, and 1,400 interconnection points that provide for the transfer of natural gas throughout the United States.¹ The pipeline grid efficiently and safely moves more than 20 trillion cubic feet (Tcf) of natural gas annually to residential, commercial and industrial consumers.

Generally the gas pipeline transmission system operates at high pressures required to transport the gas over great distances. This pressure must be reduced to lower levels for distribution to many different types of end users. Pressure letdown is accomplished in stages and at multiple locations throughout the system (e.g. 1000 psi to 600 psi, 600 psi to 250 psi, 250 psi to 100 psi, etc.) The high pressure is reduced through mechanical regulating devices known as pressure reducing valves (PRVs). These devices reduce the pressure of the gas to the desired levels but wastefully dissipate the kinetic energy contained in the gas.

II. Langson Energy's Solution

Langson Energy, Inc. has developed an exceptionally efficient and unique piece of power conversion equipment, the Gas Letdown Generator™. This uniquely adapted engine utilizes helical screw technology, which has been utilized in the compressor business for over 100 years. By investing years of research, experimentation and true entrepreneurial and inventive genius, Mr. Langson has developed



a method for this proven, low cost, low maintenance technology to operate as an energy conversion engine. The solutions to the challenges conventional turbines face are:

Capital Costs – The installed capital cost of the Gas Letdown Generator™ is significantly less than other green energy solutions. Langson modifies readily-available and proven off-the-shelf components. This holds the capital investment in a Gas Letdown Generator™ to a fraction of what would be required for a turbine installation. Helical screw technology has a proven track record of literally millions of hours of operation and tens of thousands of installations worldwide.

Additionally, this is a total flow production machine, there are no heat exchangers, no organic medium to transfer energy and operating efficiencies in excess of 60% to 75% can and have been routinely achieved.

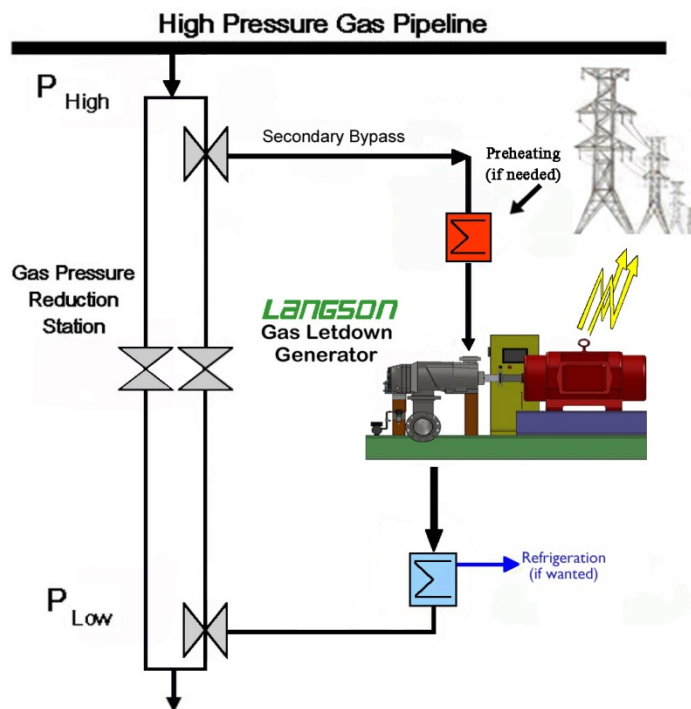
Operating Costs – The operating costs of the Gas Letdown Generator™ are estimated to be significantly less than turbines. In fact, the only routine maintenance is a bearing inspection and replacement every 100,000 hours. We eliminate the routine maintenance costs of the oiling system. Our engine will run for countless hours, trouble-free, providing extremely low maintenance and operational costs and with significant advantages in durability and for handling contaminants.

Turbines are traditionally very susceptible to contamination due to their very high speeds and low tolerances. The Gas Letdown Generator™ does not suffer from these limitations. It can directly handle contaminants that would severely damage turbines. Additionally, we apply patented coatings to the screws depending on the requirements of the installation allowing for an even broader range of gases.

Pressure Ratios and Flow Rates – The Gas Letdown Generator™ has the ability to handle fluctuations in temperature, flow and pressure. Power Generation is directly tied to pressure and flows which may not be consistent. The GLG™ handles fluctuations easily and with no adverse effects.

The lower capital cost of the Gas Letdown Generator™ allows any installation to scale their investment to better match year round flows and pressures. No longer is a producer tied to a massive turbine and installation budgets to support such an investment.

Base-Load Green Power – One of the key challenges facing the expansion of green energy generation is that popular methods such as wind and solar provide intermittent power generation and require backup power facilities in order to maintain an adequate base-load power supply. Langson's Gas





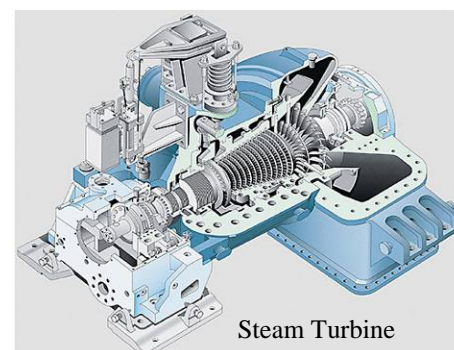
Letdown Generator™ operates 24 hours a day, 7 days a week, generating green power capable of fulfilling green energy mandates **while increasing** base-load generating capabilities.

Distributed Power – Another key advantage of the Gas Letdown Generator™ is the ability to enhance the grid with distributed power production for those producers who like the option of distributed generation in addition to centralized power plants. Capital investment in electrical transmission facilities does not have to be the driving force of designing for delivery of power.

Redundancy Capability – Lower capital investment and GLG™'s modular and compact design allow for the ability to create parallel, expandable and redundant power generation capabilities on a distributed basis. On those sites with sufficient flows and pressures to warrant multiple units, multiple units could be deployed for power outputs up to 50 MW and beyond.

III. Turbines

Turbines are well-known throughout the power generation industry. They are rotary engines that extract energy from a fluid flow, whether that is gas, steam or combustion (e.g. jet engines). They efficiently use the energy in the fluid and are widely utilized for power generation. However, turbines have economic challenges when used as an expander for converting waste pressure to power.



Large turbine manufacturers that have tried to promote this market have identified a number of key hurdles to economic application of turboexpanders to pipelines. A variety of site specific factors affect project economics, the most important of which are the high capital cost of the systems themselves, and the recoverable value of the electricity generated. Other key variables include the gas flow rate and pressure drop, which together determine the power generation potential, and the hourly, daily and seasonal variability in flow. ²

IV. Summary

Langson Energy's Gas Letdown Generator™ will revolutionize the production of green power from gas pressure letdown stations. Countless opportunities to make carbon free, base load green power are now re-opened in the gas distribution industry. This new technology warrants a re-examination of the potential of those installations with a new paradigm, the Langson Energy Gas Letdown Generator™ Paradigm.

References:

¹ Energy Information Agency, [About U.S. Natural Gas Pipelines](http://www.eia.doe.gov), 2008, www.eia.doe.gov

² Interstate Natural Gas Association of America (INGAA), 2008, [Waste Energy Recovery Opportunities for Interstate Natural Gas Pipelines](#)