

# The Kinetic Energy Potential of Pressurized Natural Gas Wells

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Kinetic Energy equals one-half of  
the mass times the velocity  
squared.

**Written as:  $KE = \frac{1}{2}mv^2$**

<b>Kinetic Energy Potential of High-Pressure High Flow-Rate Gas Wells</b>			
<b>for Producing MW's of Electricity</b>			
<b>Computation of the ideal power produced by pressurized gas Methane (M=16 kg/kmol)</b>			
	<b>High Pressure Gas Wells</b>		
<b>Enter Flowrate in Mcfd</b>	<b>10,000</b>	<b>6,000</b>	<b>2,000</b>
Volumetric flow rate in cfs:	115.7	69.4	23.1
<b>Enter Pressure in psig:</b>	<b>7000</b>	<b>5000</b>	<b>3000</b>
Pressure ratio for expansion to 15 psig	0.0021	0.0030	0.0050
<b>Enter Temperature in degrees Fahrenheit:</b>	150	150	0
Temperature in degrees Kelvin	338.6	338.6	255.2
<b>Equals Power Produced in Megawatts (MW)</b>	<b>359</b>	<b>150</b>	<b>33</b>
<b>Equals MW Hours Per Year</b>	2,988,395	1,247,621	272,496
<b>Equals Annual Profits @ 2.5-cents/kWh</b>	<b>\$149,419,771</b>	<b>\$62,381,026</b>	<b>\$13,624,814</b>
Expected Temperature w/ isentropic expansion turbine	82.32	88.94	75.41
Expected Temperature in degrees Fahrenheit	-311.23	-299.30	-323.65
Ideal work (kJ/kg)	577.56	562.62	405.29
volumetric rate in m <sup>3</sup> /s	3.28	1.97	0.66
mass flow rate in kg/s	888.21	380.66	100.99
mass flow rate in lb/s	1954.06	837.45	222.18
power produced in kW	512,994	214,169	40,930
power produced in hp	687,660	287,090	54,866
<b>Enter turbine efficiency</b>	0.7	0.7	0.8
power produced in kW, with above efficiency	359,096	149,918	32,744
power produced in hp, with above efficiency	481,362	200,963	43,893

Three high-pressure, high flow rate natural gas wells of the magnitude of the well presented in Column One has the kinetic energy potential to generate as much power as a nuclear power plant that would cost billions of dollars to build!

Problems Associated with the use  
of Rotating Equipment in regard  
to Harnessing the Potential  
Energy of Natural Gas Wells are:

# Pressure Changes of the Kinetic Energy Resource

Centrifugal Forces try to Rip the  
Equipment Apart

End Thrust



# Inability to Process Dual-Phase Working Fluids

Three components comprise the linear power equipment used to harness the kinetic energy of natural gas wells:

(1) a linear alternator that is driven back-and-forth by a pneumatic ram in order to generate 60 Hz AC electrical power; and, (2) a pneumatic ram prime mover, being a movable piston and rod within a cylinder that is actuated by a (3) driver that controls the flow of high-pressure natural gas into the cylinder of the ram and directs the exhaust flow from the cylinder.

# Ram



# Driver





# Linear Alternator



# Movable Coil of Alternator



# Unit Under Construction by Linear Power, Ltd.





# Propane Gas-lift Kinetic Energy



# Bench Test of Unit



Linear Power is Developing a  
wide range of Linear Power  
Equipment Capable of  
Harnessing Kinetic Energy  
Resources