

Compressed Air Technology

Power Generation and Energy
Storage Technology

Kepler Energy, Inc.
Powering a brighter tomorrow



History

The Nereus Compressed Air System and Nereus Piston System are efficient power generation and energy storage systems.

Kepler Energy began working on a power generation system that produces electricity from low pressure gas flow in 2007. This led Kepler Energy to develop the Nereus Compressed Air System (patent pending). In 2009, Kepler Energy introduced the Nereus Piston System (patent pending). Both systems are highly efficient power generation and energy storage systems for the energy industry.

Advantages

The advantages the Nereus System has over conventional power generation is its ability to efficiently produce electricity from low pressure gases. With a steam turbine, gas pressures must be in the thousands of psi and high flow rates to produce significant amounts of electricity. With the Nereus System, electricity can be produced from pressures as low as 30psi and much lower flow rates which provides efficient conversion of gas pressure to electricity.

The Nereus Systems are designed to perform several functions:

- Work with hydrogen production technology to reduce production costs.
- Work with gas forming chemical reactions to produce electricity for consumption.
- Work with heating sources (for example geothermal and industrial waste heat) to produce electricity.
- Work with naturally compressed gases (for example natural gas wells) to produce electricity for the energy market.
- Work in conjunction with or separate from steam turbines to produce electricity.

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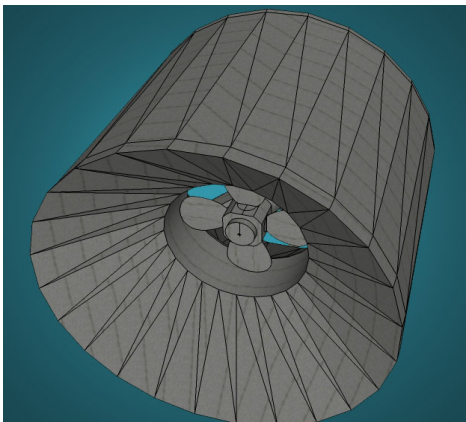
How Does It Work?

The Nereus Systems are devices which convert the energy stored in compressed gas into rotational mechanical energy. The technology uses the density of water to amplify the force against the turbines. By using buoyancy to cycle a turbine up and down in water or rotate a crankshaft with a piston, the Nereus System can produce large quantities of electricity from pressurized gas. The system gains its efficiency by using the density of water (800 times denser than air) to produce a magnitude larger force against the turbine or crankshaft than a steam turbine can produce using the same amount of compressed gas.

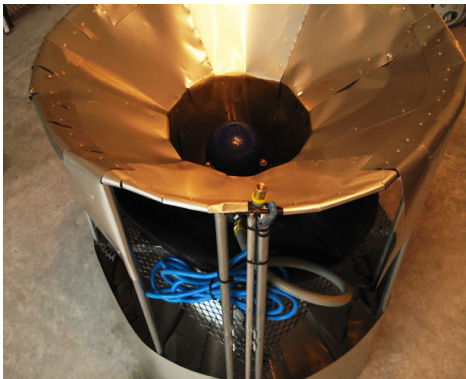


Why Low Pressure Gases?

No other technology in the world extracts energy from low pressure gas as efficiently as the Nereus Technology.



CAD drawing of Nereus Compressed Air System. Bottom view.



Completed system that produces 100W of power. Middle removed for viewing.

A Growing Industry

Kepler Energy recognized early on that the renewable energy market was growing rapidly and would increase at greater rates as energy prices spiked and the need for new energy sources became apparent. When we began reviewing the energy market in 2005 we recognized there were sources of energy not being utilized. Low pressure gas was one source of fuel we felt was overlooked. This source of power has never been tapped and until the development of the Nereus System, was lying dormant.

Facts about the energy industry:

- The hydrogen market in 2005 was \$798.1 million and is estimated to reach \$1.6 billion by 2010.
- The electrolyzer and fuel cell market was \$98 million in 2005 and estimated to reach \$16.98 billion by 2012.
- The renewable energy market volume will increase from \$95.8 billion in 2007 to \$124.4 billion in 2010 and reach \$198.1 billion in 2015 worldwide.
- The Nereus Systems have advantages for rural and developing countries as well as offshore applications.

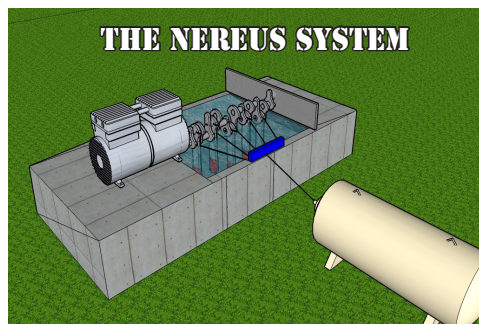
Stage of Development

Kepler Energy is developing a 1kW pilot project. We are using the experience of building the prototypes of these two systems to scale the technology to a size that can be commercialized. We have begun putting together an energy balance report that will calculate the efficiencies and energy input versus the energy output of a 1kW and 1MW system.

In 2009, Kepler Energy redesigned the land based version of the compressed air system which led to the Nereus Piston System. This system utilized the previous designs ability to capture energy from low pressure gas but did it in a smaller, more compact area to decrease cost of building and maintaining the system. We are currently building a demonstration prototype of this system.



Market Interest



CAD drawing of Nereus Piston System.

The Nereus System can use chemical reactions to produce electricity, potable water and heating and cooling of living areas.

There is enough pressurized gas under the surface of the earth, that if coupled to the Nereus technology it would provide enough electricity to power the World for years.

The Nereus Systems have an excellent opportunity to penetrate the off grid and developing energy markets as a first step to commercialization. Kepler Energy has been working on using chemical reactions to produce compressed gases to power the Nereus System. The chemical reaction of sodium bicarbonate and acetic acid not only produces compressed carbon dioxide to power the Nereus system which produces electricity, but also has the byproducts of fresh potable water, sodium acetate and the reaction is an endothermic reaction (a reaction that becomes very cold when reacting) that can be used for heating and cooling of a living area. There are many other chemical reactions that produce pressurized gas with byproducts that are important to the markets. Kepler Energy is reviewing many of these reactions.

As we scale the systems to 100kW, 1MW and larger, the technology has advantages for the oil and gas industry as well as the geothermal industry. In a typical well, oil and natural gas can remain because the economic feasibility of the well is reached before all of the contents are extracted. We are working on projects to capture the pressurized gases contained in the wells to decrease the economic feasibility of the well and thus increase the extraction and profit of the well.

Pressures at a wellhead can be as high as 16,000psi which can be used to produce large amounts of energy from moving the gas through the Nereus System. In the North Sea, one oil and gas platform can produce 80 thousand cubic feet (mcf) of natural gas a day. This compressed gas can be used to power our system to produce electricity from the compressed gas and have the natural gas left over as a product for further energy uses (as currently is the case). Kepler Energy is working to tap this market and take advantage of this huge energy potential that exists.

The Energy Information Administration (EIA) estimates there is 1,500 Trillion cubic feet (Tcf) of natural gas resources in the US. The amount of energy in extracting the compressed gas and using it to produce energy as a power source for our technology before it is used for other energy production would be enough to power the United States for many years. The EIA also estimates there are another 100,000 Tcf of natural gas located deep beneath the earths surface that is under tremendous pressure (between 5,000psi and 20,000psi) with technology only being able to reach 1,100 Tcf currently. There are many companies working to tap this energy source as quickly as possible.



Why A Joint Venture?

Intellectual Property

Kepler Energy filed for full patent protection on its technology in 2008 along with a PCT. Our patent is currently under review by the USPTO. We have filed multiple provisional patents as well to protect new information and designs.

A Win-Win

Low pressure gas is an important energy source that has not been utilized by current technologies. In using water as a medium to amplify the force of the compressed gas to extract energy, Kepler Energy has developed a way to produce electricity from this vast amount of potential energy.

With the increasing demand for energy and prices steadily rising again, Kepler Energy wants to take advantage of these market conditions to introduce this technology and scale the system rapidly by building a joint venture with a strong company and licensing the technology to take advantage of the current economic climate.

Proposed Joint Venture

Kepler Energy is seeking companies interested in developing the Nereus Compressed Air System and Nereus Piston System to further the technology. We have built the foundations of this technology to show that it can penetrate a large market segment as well as validated and demonstrated the ability of the system to produce electricity from many different sources of compressed gas. As the system is scaled beyond the current size, the market potential for the system will increase exponentially.

Kepler Energy is looking to build a partnership with companies in the clean energy market. We continue to develop the Nereus systems using resources at our disposal to make the technology a great success.

Kepler Energy filed for full patent protection on the Nereus Compressed Air System in 2008.

The Nereus System has a significant market potential in the energy industry.

Kepler Energy is committed to making the Nereus Technology a success.



About Us

Kepler Energy, Inc. was founded to research and commercialize renewable and alternative energy technologies. The Nereus Compressed Air System and the Nereus Piston System are designed to be an environmentally sound, power generation and energy storage system that uses the pressure of compressed gas to produce electricity.

Contact Information:

Kepler Energy, Inc.

Phone: (904) 305-4397

Fax: (904) 291-9596

Email: info@kepler-energy.com

Kepler Energy continues to research and develop new technologies in ocean and tidal renewable energy systems, electromagnetic motors as well as collaborate with the University of Florida to research new hydrogen membranes for hydrogen production. Kepler Energy has developed key relationships with the Florida Institute of Sustainable Energy (FISE), Sandia National Labs as well as the Center for Ocean Energy Technology (COET). We work closely with many university, private and national labs to maintain cutting edge research into new energy technologies. Our goal is to continue working with our partners to develop new technologies for the energy market.