ENER-CORE

Summary for Investors of the Ener-Core PowerStations

October 2016

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1. Ener-Core and Dresser-Rand Overview

Ener-Core has designed, built, tested and operated its proprietary technology, Power Oxidation, as an alternative to the traditional combustion chambers within commercially available gas turbines. The integration of Ener-Core's Power Oxidizer technology within utility-scale gas turbines can enable the turbines to produce ultra-clean, base-load power and exhaust heat from waste gases while maintaining very low emissions.

In late 2015, " Diesel and Gas Turbine Worldwide" (a leading global industry trade publication) published a timeline highlighting the most significant contributions to the evolution of gas turbines, spanning from 1903 to present day; Ener-Core's Power Oxidation technology was published as the most recent significant contribution to gas turbines.

In 2016, Dresser-Rand, a Siemens Business (DR/S) secured a global license of this technology, which granted DR/S the right to manufacture and commercially deploy Ener-Core's technology within the 1 to 4 megawatt gas turbine power range. Other gas turbine manufacturers such as General Electric, Kawasaki, Rolls Royce, Caterpillar/Solar turbines and Mitsubishi Hitachi Power also manufacture various sized gas turbines that can utilize the Ener-Core technology to forge new markets and expand their existing markets for their gas turbine product lines.

Why did DR/S pay a license fee to secure the rights to manufacture and sell Ener-Core's technology, and allocate its global commercial and manufacturing teams to accelerate the deployment? Similarly, why did "Diesel and Gas Turbine Worldwide" select Ener-Core as being such a significant contribution to the evolution of gas turbines on a global scale?

To better understand the reasons for the adoption, it's useful to step back and clarify the basics of CHP (Combined Heat and Power) systems that currently provide 11% of global power production, and are projected to provide 20%-25% global power production by 2030.

Note: *Combined Heat and Power (CHP) systems, also known as cogeneration systems, generate electricity and useful thermal energy in a single, integrated system. CHP is not a technology, but an approach to applying technologies. Heat that is normally exhausted to atmosphere in conventional power generation is recovered as useful energy, which avoids the losses that would otherwise be incurred from separate generation of heat and power.*

2. Overview of Components/Phases of Standard Gas Turbine

Illustration 1 shows the 3 stages of standard gas turbine operation.

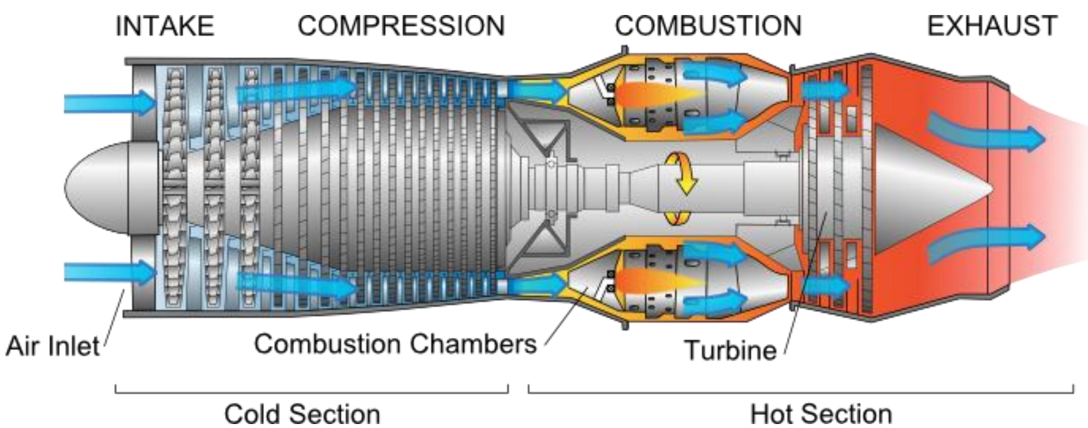


Illustration 2 shows greater detail of the 3 stages of standard gas turbine operation.

The following steps highlight the three stages of a standard gas turbine operation:

1. **Standard Compression:** A constant flow of ambient or outside air is drawn through the intake and into the compressor where the air is compressed prior to flowing into the combustion chamber.
2. **Standard Combustion:** Premium fuel is injected and mixed with the compressed air and combusted (ignited) within a small chamber (or multiple chambers). The heat generated quickly increases the pressure and temperature of the air.
3. **Standard Decompression/Exhaust:** After leaving the combustion chamber, the hot gas decompresses. The energy from the decompression is released at a fixed rate, and most of the energy is used to rotate the blades of the turbine. The rotation of the turbine serves two purposes:

   a) Rotates the compressor (i.e. phase 1, above)
   b) Rotates an electromagnetic shaft, which induces electrical currents (i.e. generates electricity)

   Note: *The net work or "heat energy" that exits the turbine as exhaust is a valuable source of ultra-clean heat which is typically used for steam generation, cooling via absorption chillers, climate control and curing ovens etc.*

3. Where are these Standard Gas Turbine Power Generation Units Installed?

Siemens (including the Dresser-Rand and Rolls-Royce businesses within Siemens), General Electric, Caterpillar (including Solar Turbines business within Caterpillar) and Mitsubishi Hitachi Power, etc. manufacture and sell gas turbines into every market that requires electricity. From powering cities and municipal services, to manufacturing plants and offshore oil platforms, gas turbine power plants are sold worldwide into applications such as the following:

- Utility Power Generation
- Cogeneration of Electricity & Heat
- Peaking Power
- Power Generation for Production & Processing Facilities
- Mobile Power

Industrial Power Generation – Product Manufacturing, Oil & Gas, Etc.

- From asphalt production and animal rendering to chemical processing, pharmaceuticals, integrated circuits and even industrial bakeries, the list of industries deploying gas turbines to generate their own power and heat on-site is immense.

Institutions/Buildings

- Universities
- Prisons
- Resorts
- Hospitals
- And others…

4. Why the Markets for Gas Turbines will Continue and Expand

The US Department of Energy is legislating for CHP system infrastructure to increase from 8% to 20% of total US power supply by 2025.There are several reasons for this support from the US government (and similar support from governments overseas):

First, urging industries to generate their own power locally and utilize the heat energy is cheaper, more efficient, and environmentally cleaner than the status quo of having those same industries purchase their power from the grid and separately burning natural gas or propane to meet their heat energy demands.

Second, the environmental restrictions on large, centralized fossil-fuel based power plants and nuclear power plants has made it challenging to get new plants permitted and financed. This lack of additional new centralized power capacity has shifted more demand to decentralized base-load power (power sources located near the site consuming the power, and providing power 24/7). Wind and solar energy are assisting the move to de-centralized power, but neither of them can provide this base-load power desired by industrial facilities.

Third, many existing energy utilities in expanding economies lack the power generation capacity or the transmission grid capacity to keep up with the increasing power demands of their industrial customers; this inability to provide stable electrical power to developing regions often results in outages (or black-outs). The shift to de-centralized power plants near the points of energy consumption prevents energy utilities and grid owners/operators from needing to deploy substantial capital into increasing the capacity of existing transmission grids to keep up with rising demands for power.

5. Why are Major Corporations Adopting Ener-Core's Technology?

In order to understand why Dresser-Rand, a Siemens business, adopted Ener-Core's technology, and why other industrial leaders are likely to do the same, we will need to illustrate the differences between the standard gas-fired turbine, (as explained in the previous sections) and the gas-fired turbine with Ener-Core's Power Oxidizer as an alternative to a standard combustion chamber.

Let's start with a modified version of the illustration 2 on page 1 of this document.

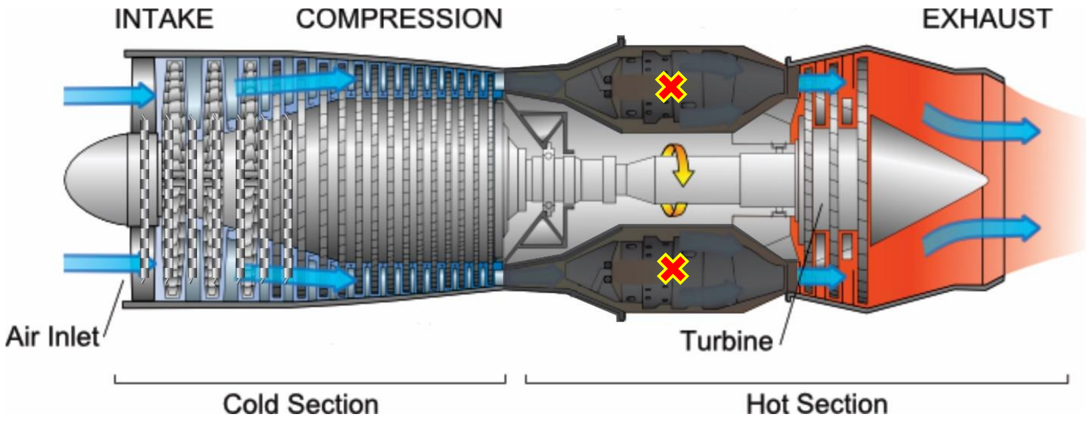
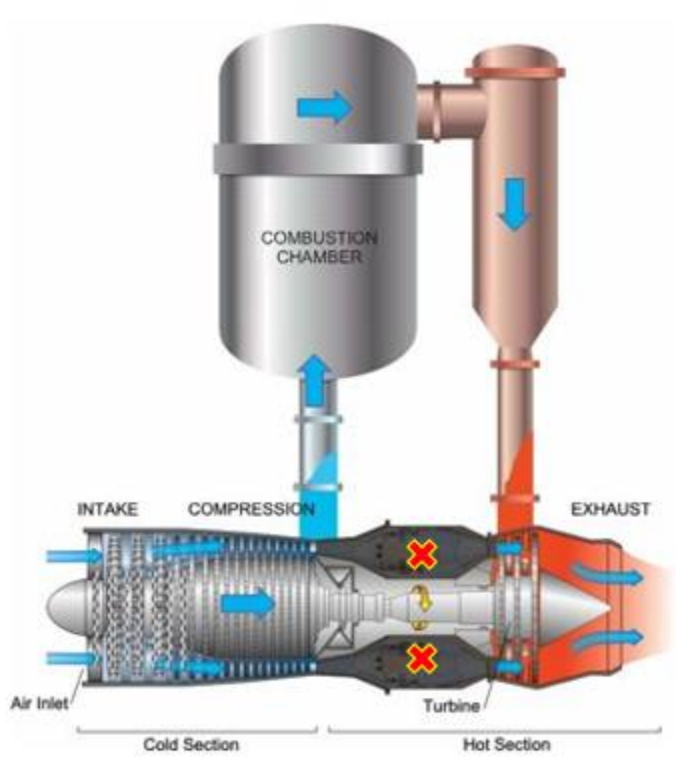


Illustration 3 shows a gas turbine with combustion chamber blacked out (represented by red/yellow "X").



As displayed in illustration 3 (above), the rotating sections of the turbine remain in place, while the combustion chamber is no longer part of the system (it is factory removed). In a standard gas turbine, the traditional combustion chamber is specifically designed to blend a measured ratio of premium fuel with compressed air to achieve the desired firing rate. These combustion chambers are **exclusively designed to run on premium high octane fuels.**

In illustration 4, (shown left) the standard combustion chamber is replaced with the Ener-Core Power Oxidizer.

Although a standard combustion chamber and Ener-Core's Power Oxidizer deliver similar **temperature, pressure, and flow rate** to the turbine, the Ener-Core Power Oxidizer has roughly 300 times the volumetric working area of the standard combustion chamber. This

Illustration 4 shows a gas turbine with the Ener-Core oxidizer with the standard combustion chamber factory removed (blacked out in image).

means that instead of the 50 milliseconds (1/20th of a second) of residence time designed into a standard combustion chamber, the Ener-Core Power Oxidizer provides nearly 5000 milliseconds (3 seconds) of residence time. Why is this important? It is important because it enables the **Power Oxidizer to provide complete oxidation of most VOC/HAP** (volatile organic compounds/hazardous air pollutants) that are found in the waste gases of nearly all manufacturing and production facilities globally. Ener-Core's technology enables the modified gas turbines to run and generate energy from these same waste gases, thereby converting these "waste gases" into a "free fuel" that can now be used productively to generate power and heat.

Image 1 shows an Ener-Core Power Oxidizer assembly. The white vessel provides extended residence time over standard gas turbines.

There are several other advantages of the Power Oxidizer, such as the opportunity to turn down (or turn off) an existing pollution abatement device used by the industrial facility to destroy (or abate) waste gases. The turn-down (or turn-off) of the traditional air pollution abatement device enables industrial facilities to create additional savings in operational costs. Furthermore, many companies are forced to limit their production activities due to stringent environmental regulations. However, the Power Oxidizer enables these companies to expand their operation or increase production, as the technology generates on-site energy with extremely low NOx emissions (the definition and importance of NOx emissions is discussed later in this document).

At this point, let us take a moment to stress the importance of residence time in the combustion chamber stage of a gas turbine. As previously stated, standard gas turbine combustion chambers are sized and designed to mix compressed air and premium fuel into a designated chamber where controlled combustion occurs. The purpose is to release the fuel's energy via a combustion reaction, which elevates the temperature and pressure of the incoming compressed air just prior to the distribution through the turbine housing. The designs of the standard combustion chambers makes them extremely efficient for natural gas, propane or jet fuel; **regardless of the type of fuel, standard combustion chambers are limited to premium fuels only.** The length of time that the fuel is combusted within the chamber is called the *residence time*. The 50 milliseconds of residence time in a standard gas turbine combustion chamber is not sufficient enough to completely combust and provide suitable destruction efficiency with most waste gases.

Standard gas turbine combustion chambers have an operating temperature of roughly 2300°f-2800°f (1260°C-1540°C), but only provide roughly 1/20th of a second (50 milliseconds) of residence time, which is insufficient to combust and provide suitable destruction with most waste gases and the various compounds found within these waste gases.

Typically, waste gases that are destroyed with a thermal abatement device (flare, oxidizer etc.) are exposed in a combustion chamber for greater than .5 to 1.5 seconds (500 - 1500 milliseconds) at >1350°F to 1650°F (>730°C to 900°C) to reach complete destruction of the pollutants. These systems do a better job destroying the waste gas and its various compounds, but they don't utilize the gas to produce electrical energy (they are solely used to destroy the pollutants, and help the industrial facilities to remain compliant with local air quality laws).

As stated above, the Ener-Core Power Oxidizer provides approximately 3 full seconds of residence time at >1800°F (980°C), meaning that Ener-Core can achieve a higher destruction efficiency (completeness of destruction) of nearly all VOC/HAP than any other thermal abatement technology. More importantly, it means that licensees of this technology, such as DR/S can now deploy **an innovative new version of their gas turbines that can release the energy of various waste gases and rotate their turbine to generate energy without using costly premium fuels.**

Materials of Construction:

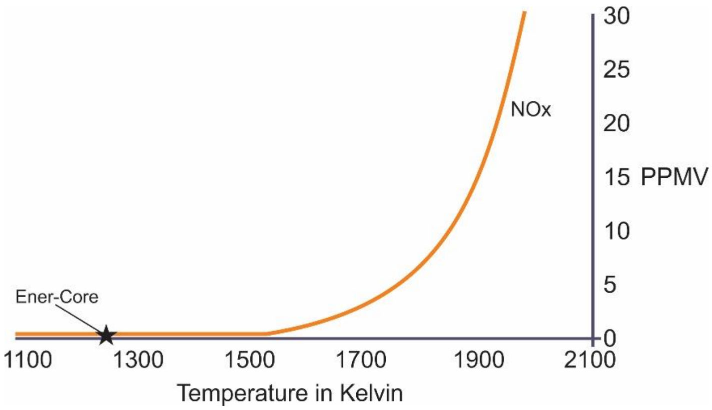
The Ener-Core Power Oxidizer is designed and built like an oxidizer (thermal abatement devices used worldwide to destroy waste gases and air pollutants), and not at all like the combustion chamber found within standard gas fired turbines. The vessel, ceramics, and insulation are made from materials commonly used in the pollution control industry for thermal oxidizers. This durable oxidizer approach to a gas turbine combustion chamber enables corporate licensees of the technology to deploy an innovative gas turbine that breaks away from operating solely on premium fuels, and enables their industrial customers to generate their own on-site energy from waste gases that have no alternative use and are hence deemed to be either free or substantially lower cost than premium fuels.

NOx Emissions & the Ener-Core Advantage:

NOx (a common term used to define mono-nitrogen oxides NO and NO_2), causes a wide variety of health and environmental challenges because of various compounds and derivatives in the family of nitrogen oxides. NOx gases react to form smog and acid rain as well as being central to the formation of fine particulate matter (PM) and ground level ozone, both of which are associated with adverse effects for the environment. Moreover, NOx is a greenhouse gas and it accumulates in the atmosphere with other greenhouse gasses potentially causing a gradual rise in the earth's surface temperature.

NOx gases are produced from the reaction among nitrogen, oxygen and hydrocarbons during combustion at high temperatures. Significant NOx production occurs at 2300°f (1260°C), which is why standard gas fired turbines and engines produce high levels of NOx in their combustion chambers. The US Environmental Protection Agency (EPA) and other local environmental agencies have implemented NOx emissions control regulations to ensure that gas turbines and other forms of stationary equipment (i.e. industrial boilers) don’t emit high levels of NOx into the atmosphere.

The Ener-Core Power Oxidizer operates at roughly 1800°f (982°C), which is significantly below where NO_x production escalates rapidly. The result is **a guaranteed <1 ppmv (parts per million by volume) NOx in the exhaust stack,** which is by far the cleanest in the industry, and substantially below the levels required by even the most stringent air quality standards.



Graph 1 illustrates NOx formation at increasing temperatures.

Cleanest Heat & Power System

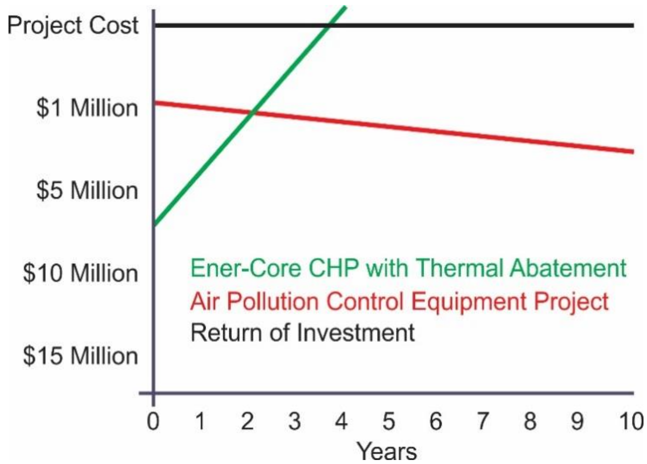
NO_x emissions are regulated to various degrees worldwide. Progressive areas in Europe and the United States are now implementing regulations such as the South Coast Air Quality Management District in California regulation 1110.2 which makes all gas fired turbines without NO_x treatment systems (typically Selective Catalytic Reduction systems) non-compliant on January 1st 2017. Similar NO_x regulations continue to be adopted globally as a cornerstone of most clean air initiatives.

NO_x Summary Statement:

All gas fired turbines utilizing the Power Oxidizer will be emitting roughly 1/10th of the legally allowable limits of NO_x. Simply put, the Ener-Core Power Oxidizer makes any gas fired turbine the cleanest and most environmentally friendly gas turbine available.

Emissions Abatement Equipment with Value:

Generally, pollution control and thermal abatement equipment don't provide any economic value to their customers. Most of the time, abatement equipment is installed merely to comply with environmental regulations.



Ener-Core's PowerStations can not only help meet and/or exceed the most stringent environmental regulations, but also reduce a company's cost of operation by substantially reducing the amount of energy they need to purchase from their local utility. Graph 2 shows the typical operational cost of air pollution equipment that yields no economic value, whereas Ener-Core's PowerStation typically provides a payback in less than 4 years and a continued/sustained reduction in OPEX from the reduced (or eliminated) need to purchase energy from a utility.

Graph 2 illustrates that a waste gas treatment project utilizing a thermal abatement device that can service the same waste gas airflow as the 2 MW system never achieves a return of investment, whereas the Ener-Core & DR/S combined heat and power package has a rapid rate of financial return on investment.

Note: *The red line in the graph represents the turnkey installation cost of an estimated 15,000 SCFM regenerative thermal oxidizer.*

Commercial Applicability:

1. **Ultra-clean steam production per kilowatt – 1 x 2 MW Ener-Core PowerStation = 13,500 lbs. /hr.**

The 2 MW Ener-Core PowerStation exhaust contains enough heat energy to produce 13,500 lbs. /hr. of ultra-clean steam (350°F (175°C) saturated at 15 PSI) when paired with a waste heat recovery boiler.

Industrial customers tend to place a significant economic value on on-site heat, and will utilize the clean heat provided by this system to generate more steam, more chilled water, more drying capacity, and/or more climate control capacity. In addition, all these industrial applications usually require purchase and consumption of premium fuels; Ener-Core enables these various applications of heat to be produced from waste gases that are a natural (and typically un-used) by-product of the facilities production.

2. **Low Emissions Power Generation + Emissions Abatement Device**

With up to 99%+ destruction efficiency of various types of gas and with NOx emissions of less than 1 ppmv, Ener-Core's 2 MW PowerStation is not only the cleanest power generation equipment, but is also one of the cleanest thermal abatement devices.

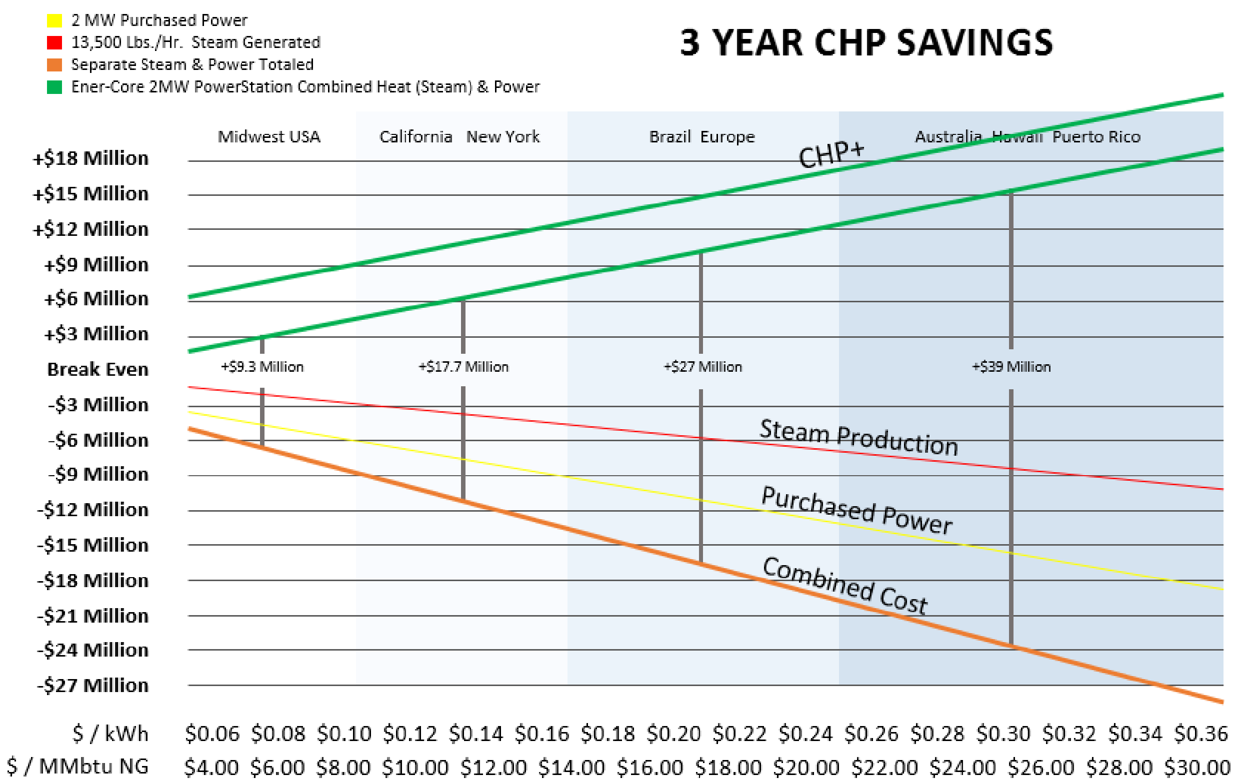
The technology can reduce or replace gas fired thermal abatement device(s) which results in reducing the NOx emissions of industrial facilities.

3. Utilization of Waste Gas as Fuel

The more waste gas or process gas that is introduced into the Ener-Core technology, the less purchased fuel (and purchased electricity) is needed by the industrial facility. As a gas turbine's "economic efficiency" is measured by the conversion of purchased fuel to power, and Ener-Core's systems run on fuels which have little to no economic value, the Ener-Core technology will typically be more efficient than any competitor.

It's important to note that **the cost of purchased premium fuels typically represents 60-70% of the total cost of energy produced** (in fact, cost of fuels is far more influential than the cost of the equipment, as equipment capital costs typically represent approximately 20% of the total cost of energy in calculating the total cost of energy produced). Hence, free fuels (or reduced cost fuels) enable the production of low cost electricity and low cost steam, despite the fact that upfront CAPEX costs are slightly higher than standard equipment.

CHP Savings (Different Regions & Cost):



Graph 3: Three Year CHP Savings with Ener-Core PowerStation

Graph 3 above represents the CHP savings with Ener-Core's 2MW PowerStation as compared to different regions (US – Midwest & California & International – Brazil, Europe & Australia). As the cost for producing steam ($ / MMbtu Natural Gas (NG)) and purchasing electricity ($ / kWh) increases, the savings from the 2MW PowerStation increases over the four different regions.

A large percentage of a company's overhead is attributed to utilities like steam generation and electricity. For example, in California, at $ 0.14 ($/kWh) for electricity and $11.00 ($/MMbtu NG) for steam production, the total 3 year operational cost of steam production and purchased power would be more than $11 million (shown in Graph 3). Installation of the 2MW PowerStation offers the same industrial facility a productive alternative by generating on-site power and steam from natural gas. This helps offset a plant's operational costs by more than $17 million over a 3 year period *(the emission abatement value is not captured in the savings calculations)*.

The savings potential increases with the increasing cost of producing steam and purchasing power from California to Australia to more than $39 million over a 3 year period.

Graph 3 also captures what separates the Ener-Core CHP PowerStations from other CHP technologies. **Ener-Core's technology offers more than just CHP, it offers "CHP Plus" (CHP+).** CHP+ enables an additional $3 million in savings over a 3 year period when taking the following into consideration:

1) Ener-Core PowerStations' NOx offsets (<1ppmv)
2) Ener-Core PowerStations' utilization of waste gas/VOCs as fuel for the generation of useful power and heat
3) Ener-Core PowerStations' ability to replace or reduce the use of an industrial facilities' existing thermal abatement device and rely solely on the PowerStation for use

A Word about CHP from "Power Engineering" Magazine:

"According to GlobalData, a research and consulting firm, in North America CHP capacity is projected to grow from 93,500 MW now to nearly 116,000 MW in 2020. "They make great economic sense and the environmental impact is also quite unique," said Scott Parent, Engineering Leader for GE's new Distributed Generation business. "What we're seeing is really good economics with specialized factories and processing plants that make great sense."

Altogether, the U.S. has more than 82,000 MW of CHP capacity at 4,200 sites. More than 70 percent of that capacity is fueled with natural gas. Most of that power is used in industrial applications such as paper, refining, chemical and food processing. CHP is also used to power hospitals, universities, military bases and residential facilities. The potential to add more CHP capacity to the U.S. grid is significant, ranging from 50,000 to 200,000 MW, according to some studies.

The Obama administration wants to boost CHP capacity by 40,000 MW, or 50 percent, by 2020. That was the goal established in an executive order directing several federal agencies and departments to encourage more investment in CHP projects through existing programs and policies. If that goal is met, American businesses would save an estimated $10 billion a year in energy costs. The emissions reduction would be tantamount to taking 25 million cars off the road."

8. Case Study: The Pacific Ethanol Evaluation Process

Overview: The process of producing ethanol is energy intensive, using large amounts of electricity and steam. The ethanol production process also generates a waste gas composed of volatile organic compounds ("VOCs") that requires destruction. Most ethanol plants elect to use thermal oxidizers to destroy these VOCs. However, these waste gas streams are extremely low in energy density, often making it necessary to purchase pipeline-quality natural gas, to mix with the VOCs, in order to destroy these low-Btu gases.

Issue: The costs of extra natural gas, along with maintenance and compliance costs to operate the thermal oxidizers within the environmental standards can be as much as $500,000 or more each year, for a typical ethanol plant. This adds to the facility's carbon emissions, since any natural gas burned in the thermal oxidizer produces additional CO_2 emissions.

Solution: Pacific Ethanol, Inc. the leading producer and marketer of low-carbon renewable fuels in the Western United States agreed that, rather than incur these ongoing costs to destroy these waste gases, it would deploy the Ener-Core DR/S Power Oxidizer technology to use (rather than solely destroy) the waste gases while producing other valuable clean energy. In early 2015, the company purchased the Ener-Core DR/S technology for application at its Stockton ethanol facility. The Power Oxidizer system offers the facility a productive alternative to the flaring (or burning) of their low-Btu waste gases, ensuring compliance with costly environmental regulations while at the same time generating on-site power and steam from the waste gases, thereby offsetting the ethanol plant's purchases of electricity and natural gas.

The cogeneration facility will use two (2) 1.85 MW Dresser-Rand KG2-3GEF gas turbines with matching Ener-Core Power Oxidizers ("KG2-3GEF/PO"). Each unit outputs an estimated 1.85 MW of clean electricity and 13,500 lb. /hr. of steam from an integrated heat recovery steam generator.

The new co-generation system which couples Dresser-Rand's turbine and Ener-Core's Power Oxidizers is planned to be installed and operational in the 4rth quarter of 2016. Once installed, the system will enable the Stockton ethanol facility to replace most of the energy that it currently purchases, thereby reducing energy costs by an estimated **$3 - $4 million /year**. At the same time, the Stockton ethanol facility will eliminate the need for an existing pollution control device, an RTO (Regenerative Thermal Oxidizer), becoming **one of the first ethanol plants with the lowest levels of air emissions in the ethanol industry**.

Conclusion: The entire project is being achieved with an investment of approximately $12 million. As a result, the investment payback on the project is planned to be achieved within **three years**. Just as importantly, the Stockton ethanol plant will gain a true competitive cost advantage, by reducing its overall plant operating costs by $3 - $4 million /year, which is a substantial amount for one ethanol plant. Lastly, the new facility will provide the Stockton plant with a natural "hedge" against the risk of future rises in electricity costs and future increases in the air quality standards mandated by the local, regional and national governments.

Installing the Ener-Core DR/S system at other ethanol plants or in other industrial facilities such as oil refineries, petrochemical plants, etc. will result in different levels of cost savings, depending on the local utilities delivered electricity and gas prices. Furthermore, although this particular case study was focused on an ethanol plant, Ener-Core and its partners believe that equivalent, or in many cases, even better economics can be achieved in many other industries.