

Today's Energy Market*By John Scricca****Self Generation***

Energy is one of the most critical issues of our time. Changing weather patterns, security concerns, world events, and price escalation are forcing our planet to face a stark reality; continued total reliance on conventional means of producing and distributing energy threatens our economy and could drastically change our way of life. In consideration of the most recent energy price increases, the elastic has broken. In the last year, fossil fuels including natural gas, oil, and gasoline have had double digit price increases. These fossil fuels used to power the utilities' generation plants have influenced electric costs in some parts of the country to also see significant price increases. Did you ever think a year ago you would be happy to find gas for \$3.00 per gallon? We must change our behavior and use technology to match the changes brought about by an existing aged infrastructure, national security concerns, and costs we never thought we would see.

Random House defines Self Generation as "the production or reproduction of something without the aid of an external agent; spontaneous generation."

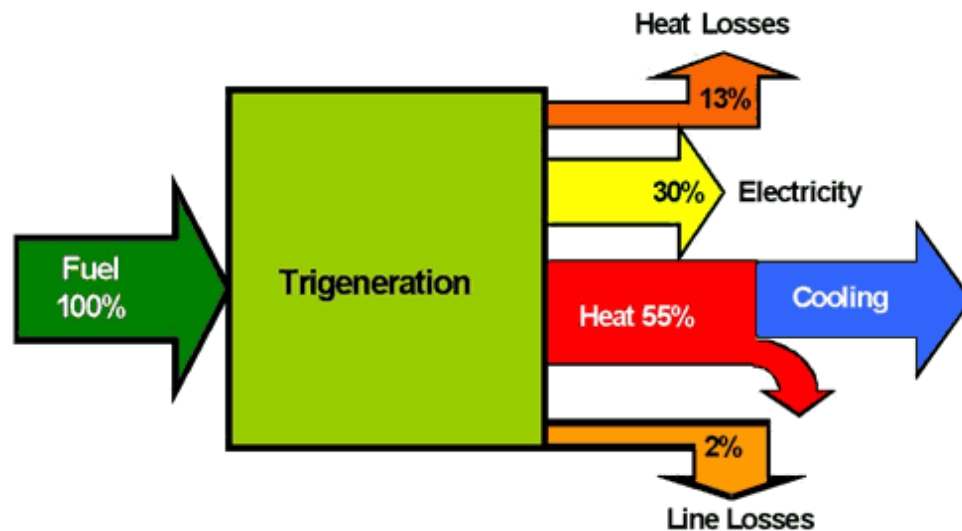
In the technical interpretation of this paper, self generation is the production of electricity on-site and all or part of the power is consumed on-site by the end-user.

Self generation refers to the distributed technologies of utilizing wind turbines, internal combustion engines, microturbines, small gas turbines, photovoltaics, and fuel cells installed on the user's side of the utility meter to provide electricity for a portion or the entire user's electric load. As the direct result of the dramatically increasing electric and natural gas costs, many residential, commercial, institutional, and industrial customers are exploring the alternatives to use energy more efficiently. Of course the economic and competitive pressures to cut costs, as well as requirements to reduce emissions of air pollutants have again put energy on the front burner.

Cogeneration

Cogeneration is the simultaneous production of electricity and heat, usually in the form of steam or hot water, from one primary fuel. This combined heat and power production would require a fuel as the input, typically utilizing natural gas. Taking this a step further if your building has a requirement for cooling, you may use the generators' heat in an absorption chiller to serve the buildings cooling needs. As the need increases for more efficient technology and as a result of optimizing your energy dollar or should I say three dollars, having the need for cooling while using the byproduct of heat in an absorption chiller to serve the buildings cooling requirement will provide the preferred method to supply a building's power and energy requirements. This reference to Trigeration will provide the user the most efficient use of energy for the building's electrical, heating and domestic hot water, as well as cooling of the facility. As natural gas costs increase it becomes more

important for the commercial, institutional, and industrial customer to utilize the fuel to its most optimum level. As the name implies, Trigereneration refers to the simultaneous production of three energies, utilizing the electricity and heat with cogeneration, as well as providing cooling through the absorption process. Trigereneration energy systems are applicable when there is a need for cooling or chilled water by the end-user. The on-site application of a trigereneration system where the electrical, thermal, and cooling energy is utilized can produce system efficiencies approaching 90%.



* CHP is the acronym for cogeneration (combined heat and power production), CHCP is the acronym for trigereneration (combined heat, cooling and power production).

These on-site trigereneration systems are significantly more efficient, environmentally superior and financially desirable when compared to the traditional power plant. Clients will experience energy costs substantially lower than if power were supplied from the grid. The energy savings will pay for the capital cost of equipment over a duration of time. These systems can produce chilled and hot water simultaneously delivering to the occupants of the building the optimum of comfort and control.

Trigereneration systems are applicable and financially desirable for the following, to name a few:

- Educational Facilities
- Healthcare
- Hotels
- Casinos and Resorts
- Restaurants
- Manufacturing
- Airports
- Supermarkets
- Office Buildings

Facilities which use trigeneration systems to produce power and use the thermal byproduct for heating, domestic hot water, process heat, absorption cooling, and other thermal requirements will maximize the system efficiency, equating to significantly reduced energy costs.

“By understanding what might happen in the future we can reduce the effort of what Alvan Toffler calls ‘Future Shock’ by preparing our minds today for what will most likely be tomorrow.” As quoted by David A. Johnson

This quote by David Johnson reminds us that we must prepare for the future today. Unfortunately, the future is upon us today, as a society so dependent upon energy we have not learned the lesson from past years regarding dependence on foreign oil and its influence upon all energy costs.

Clean Energy Renewables

States throughout the country are developing policies and programs to help bring cost-effective clean energy technologies to their residents and businesses. Clean energy technologies include: solar, geothermal, wind, hydrogen fuel cells, hydro-power, and landfill gas. The efforts of these programs will improve the end use of energy efficiency, increase production of renewable energy, and improve electrical generation efficiency. As a result of clean energy technologies; clients will save energy, improve air quality, reduce the emissions of greenhouse gases, and improve the reliability and security of the electric distribution system. Due to increasing energy costs in the U.S., many states have instituted financial support programs designed to stimulate demand for behind-the-meter installations of renewable technology. Some states offer the financial support to buy down the cost of renewable energy generating equipment and offer low interest construction financing. The level of financial support will vary based on the specific economics of the project.

National Energy Policy

The Energy Policy Act of 2005 was passed by the House of Representatives and the Senate on July 28 and 29, respectively. The President signed the policy into law on September 9th. The Policy allows for low income grant money for renewable and energy efficiency projects, renewable energy incentive, federal government renewable energy purchase requirement, public buildings use of photovoltaic, rebate program for expenses incurred with the installation of renewable energy systems, and significant tax incentives for investment in specific sources of power generation. Sections of the Policy address incentives for various other energy related issues. The Energy Plan, released in May 2001 states in section 3-5;

“A family of technologies known as combined heat and power (CHP) can achieve efficiencies of 80% or more. In addition to environmental benefits, cogeneration projects offer efficiency and cost savings in a variety of settings, including industrial boilers, energy systems, and small, building scale applications. At industrial facilities alone, there is potential for an additional 124,000MW of efficient power from gas-fired cogeneration, which could result in annual emissions reductions of 614,000 tons of Nox emissions and

44 million tons of carbon equivalent. Cogeneration is also one of a group of clean, highly reliable, distributed energy technologies that reduce the amount of electricity lost in transmission while eliminating the need to construct expensive power lines to transmit power from large central power plants. “

Moving Forward/Recommendations

Thomas R. Casten and Sean T. Casten state in “Transforming Electricity” that the average fossil fuel power plant in the U.S. is 33% efficient, therefore the remaining 67% of the energy used to generate is released as waste heat.

Quoted by Goethe “He who moves not forward goes backward”

Combined heat and power can more than double the efficiency to greater than 66% and with Trigeneration to even greater levels of efficiency, thereby reducing the quantity of fuel consumed, as well as reducing pollution. CHP and CHCP will save energy dollars and by creating power on-site improves the reliability and quality of the client’s source of energy. For many of the reasons discussed, end users including commercial, industrial, institutional, state and federal government have installed more than 50,000 megawatts of CHP in the United States.

PinnacleOne is dedicated to providing clients unbiased professional advice as it relates to their specific and unique requirements. By purely providing energy consulting services with no interest in selling equipment or commodity, only the clients’ best interest is achieved. PinnacleOne has helped customers achieve aggressive energy conservation initiatives by providing an open minded and unique approach. Retaining an energy consultant today requires the expertise and in depth knowledge to address power distribution systems, utility rate structures, commodity purchasing, renewable energy, cogeneration, water conservation, LEED® consulting, commissioning services, as well as demand-side management.



John Scricca has gained considerable experience in all aspects of customer service in the energy industry during his 27 years in the field, including engineering, business development, and management.

His responsibilities have included engineering design, energy conservation and consulting, combined with extensive experience in account management, electrical and natural gas distribution sales, performance contracting, and building automation. He specializes in providing energy consulting services to a wide range of customers, including government agencies, municipalities, electric and natural gas utilities, colleges and universities, Fortune 500 industrial firms, and institutional clients.

He has served on various national committees including the American Gas Association and Gas Research Institute. He is a member of IEEE, ASHRAE, American Management Association, and various local Chambers of Commerce. John has a B.S. in Electrical Engineering.

John currently serves as the Senior Energy Manager of PinnacleOne Energy Solutions in the Eastern United States, providing consulting services in the areas of energy conservation, water conservation, and cogeneration.