*Letter to the Editor*

# Reference: "Energy Policy, or Lack Thereof"

March 27, 2003

Dr. Wayne C. Turner, Editor-In-Chief
Strategic Planning for Energy and the Environment
Oklahoma State University
Stillwater, OK

Dear Dr. Turner,

Thank you for your offer to provide the forum for discussion of the reference topic. Alas, there is no super Btu or magic pill that will solve the energy and environmental problems. I believe that most people have the desire to conserve and better manage their energy use, but what is lacking is a leadership direction.

There are many energy consultants that have been successful managing energy. Most have a passion for a particular type of application where they have gained experience and been successful. Although these applications may vary significantly, they usually provide the predicted energy results.

The efforts of the 1980s and 1990s to improve equipment efficiency levels have greatly reduced energy consumption. Equipment performance ratings like EER and COP are used as the minimum standard for design and purchasing of new equipment. These efficiency improvements were vital to the growth of the power industry.

In many areas of the country, electric power generation can barely keep up with "on peak" demand requirements. Limitations in some transmission and distribution networks hamper the stability of the system and restrict economic growth. Some utilities offer load curtailment or load shifting programs that address the immediate need for "on

peak" demand reduction but are not necessarily long-term solutions.

There is a distinct difference between "on peak" and "off peak" power. The electricity industry is not short of power, but short of on-peak power. During the "on peak" demand periods, all generating equipment is operating, nuclear, hydro., and coal, oil and gas-fired units. From the most efficient, least polluting, to the least efficient, most polluting, all units are operating at or near full capacity. Transmission and distribution networks are at or above designed capacities with high line losses. During "off peak" periods, only the most efficient, least polluting units are in operation, and transmission and distribution networks are way below capacity.

My view of a long-term solution lies in the ability to manage energy use by reducing "on-peak" (kW) demand and shifting a considerable amount of energy use (kWh) to non-peak hours. Comfort air conditioning is one of the major villains that contribute to "on-peak" power. It is the largest single component driving "on-peak" demand upward. Yet, this air conditioning component may also be the hero. Heating and cooling are the only energies that can be created and stored during non-peak periods for use during "on-peak" periods.

The AEE *Energy Engineering Journal* (Vol. 100. No. 3) (2003) has two excellent articles on thermal storage:

> Mr. John S. Andrepont's "Solutions for Demand Management" reviews three types of thermal storage systems (chilled water, low temperature fluid and ice). Mr. Andrepont has drawn from his experiences with chilled water storage.
>
> Mr. William Gilbert, Jr. "Icing Energy Costs" discusses his experiences with thermal ice storage systems. These systems have been so successful that ice storage may become the standard for cooling for all Johnson County Schools.

Chilled water storage, low temperature fluid storage, and ice storage all have different advantages for a variety of applications, and they all work. They all reduce "on-peak" demand and shift energy use to non-peak hours. There are thousands of thermal energy storage systems in operation and providing this type of energy management in this country and through the world. These types of systems will play a major role in any long-term solution to the energy crisis.

In order to have the desired energy impact, TES will have to be

considered or evaluated as the basis of design on all air conditioning systems. This may require some direction in the national energy policy or in state and local government energy policies. There should also be some guidelines such as:

- new construction, expansions, etc. where the system cooling capacity is 100 tons or more.

- replacement chillers, regardless of the reason, when the system capacity is 200 tons on more.

During the 1990s, utility incentives encouraged owners and design engineers to evaluate TES systems. Many installations resulted from these incentives, and more importantly, many engineers used these to expand their education of TES systems. For the most part, utility incentives disappeared after de-regulation, yet TES systems continue to be installed.

TES systems can generally be justified on their own merits and financial incentives should not be necessary. However, timing is everything. If the goal is to reduce the growth of the "on-peak" demand factor resulting from air conditioning within 5 years, some type of motivational incentives will be necessary.

State public service commissions often motivated the utility incentives of the 1990s. Utilities were required to make an effort to balance their generation loads as a condition of rate increase approvals. There are no incentives to encourage deregulated generating utilities to balance their loads. However, the environment benefits of nighttime generation may provide this encouragement.

The generator input heat rate is approximately 40 percent less during the cooler night hours then it is during hot day hours. Forty percent less input energy results in forty percent less emissions. Also, any kWhs shifted from "on-peak" hours are essentially transferred from the least efficient daytime generators to the most efficient nighttime generators. Power plant emissions are a real environmental issue and must be considered in any energy policy. When all the environmental benefits of nighttime generation are evaluated, there should be some type of incentive to encourage it. Perhaps some form of "emissions credits" could be created to encourage utilities the promote these TES applications

The energy situation will not be resolved within the foreseeable future. Long-term solutions should be enacted. While some new technologies are in the early stages of development, the focus on tried and proven TES technologies should be expanded.

Thank you again for the opportunity to express my views.

Sincerely,

C. Louis Clark, Jr., CEM

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ABOUT THE AUTHOR

**Lou Clark**, the president of C. Louis Clark, Jr., LLC, is a thermal/mechanical energy application specialist. Lou received a BSME from Johns Hopkins Univ., has over 30 years combined chiller and ice storage experience, is a Certified Energy Manager, and a member of ASHRAE & AEE. He has been directly involved in over 140 thermal ice storage projects and is presently under a special contract with Baltimore Aircoil Co. to promote and develop thermal ice storage applications in the Mid-Atlantic & Northeast.

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