

## Your Reliable Guide for Power Solutions

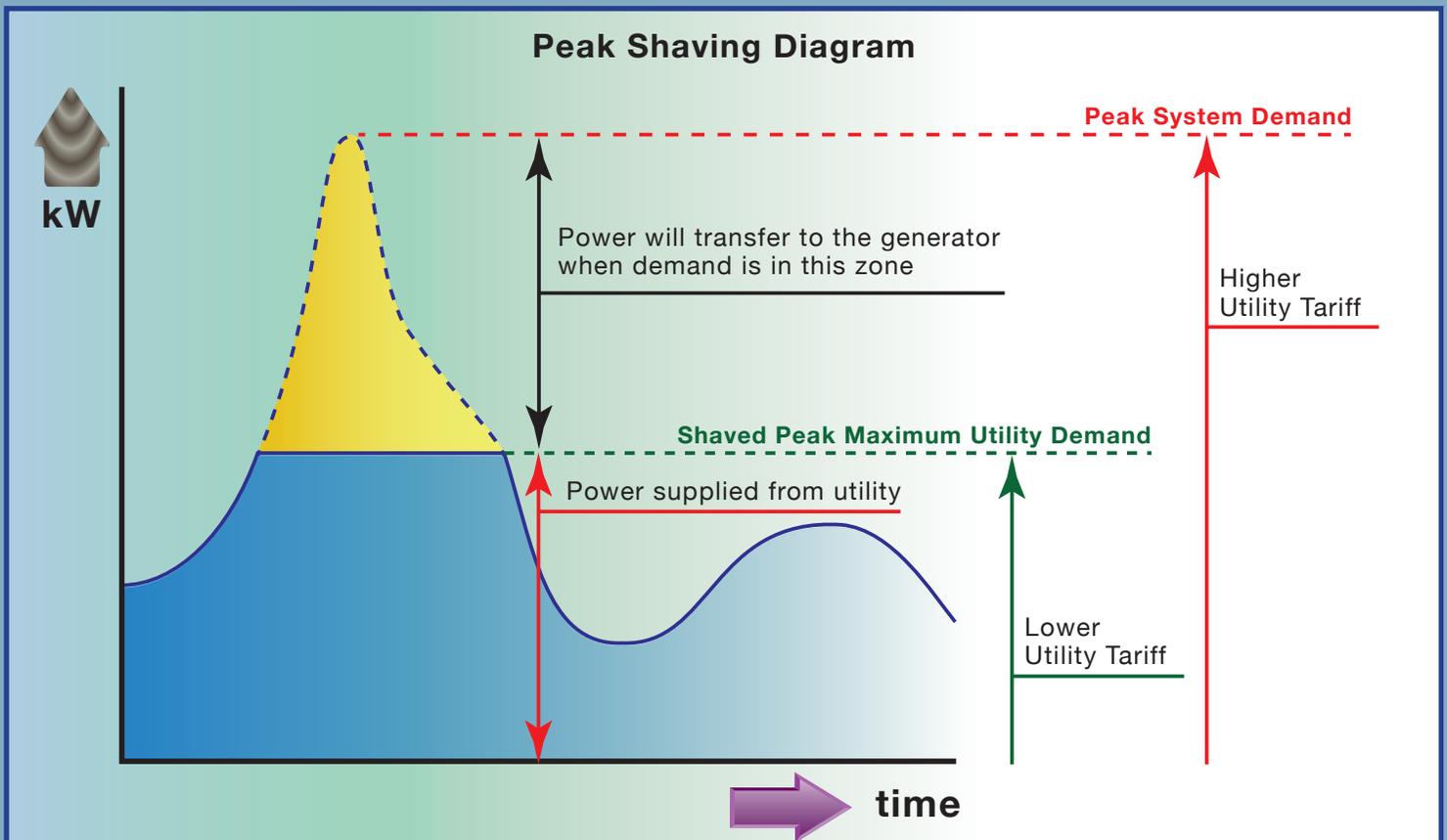
To fulfill our commitment to be the leading supplier in the power generation industry, the Total Energy Systems, LLC. team ensures they are always up-to-date with the current power industry standards as well as industry trends. As a service, our **Information Sheets** are circulated on a regular basis to existing and potential power customers to maintain their awareness of changes and developments in standards, codes and technology within the power industry.

### Generator Set Peak Load Shaving Applications

#### 1.0 Introduction

Peak Load Shaving is a term used when a generator set system is used to supply electrical loads for short periods of time when loads on utilities are significantly above average.

*This Information Sheet discusses the use of devices with generator sets to better manage utility power consumption costs by using generator power during peak loads when utility-company kilowatt-hours are most expensive. (Continued over)*



**Utility Demand** - Usually is calculated using demand intervals. These intervals are short, usually around 15 minutes. Overall usage is aggregated over the time intervals and tracked for a total.

**kW Demand** - The average is calculated for a given time period.

**Peak Shaving** - The ability to control power received from a utility supplier during intervals of high demand. This limits or reduces tariffs a utility will levy for ensuring power during a billing period.

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## 2.0 Utility Supply Company Rates:

Utility companies charge consumers for the peak power they will use and the rate at which they consume power. Two consumers can consume the same amount of electricity during a month. But Consumer A might consume most of their monthly power in just two days while Consumer B uses the same total amount steadily throughout the month.

The utility company has to install additional expensive, higher capacity electrical equipment to provide Consumer A with above-normal power needed for short periods of time. The additional equipment is not needed for Consumer B, whose higher steady-state power demand on many days remains within the utility's normal steady-state power production levels.

Utility companies charge cents/kWh for steady energy consumption during a billing period and impose a \$/kVA demand premium for maximum demand during that period. It is much more economical to draw energy for longer periods of time (e.g. 30-days) at cents/kWh rate than it is to draw power more quickly (e.g. two days) and pay the maximum-demand premium.

Not every electrical utility customer consumes power at a steady rate. Certain manufacturing processes or seasonal factor, may greatly increase their power demand on the utility for short periods of time. In these cases utility companies might impose at peak kWh rate tariff to guarantee the power required for these limited periods. While utilities may offer reduced rates for power used during night hours, not all consumers can plan their additional power usage around such reduced-rate periods.

## 3.0 Peak Load Shaving:

To avoid maximum demand charges, consumers can install their own peak-load-shaving electrical generators. If their utility agrees, a generator or generators can be run during peak demand periods to reduce shave power consumption from the grid and ensure maximum tariff rates are avoided. Reducing peak demand kVA can reduce the customer's electrical power operating costs dramatically.

Some utility companies look to off-load large power demands from some consumers, especially during their peak overall demand periods or to avoid imposing power rationing, blackouts or the rolling power cuts known as brownouts during events such as long heat waves. Utilities often are prepared to negotiate special terms when customers agree to transfer their load to their own generators. This may be even more attractive to the utility company if a customer can feed some of this self-generated power back into the grid system.

## 4.0 EPA Specification:

On-site, peak-load-shaving generators must meet and comply with the latest Environmental Protection Agency (EPA) exhaust gas emission regulations. EPA allows standby generators to use older Tier engines with more lenient emission standards. But standby generators CANNOT be used for peak-load-shaving purposes because those are deemed prime power applications.

## 5.0 Advantages of Peak Shaving:

There are a number of other advantages to be considered by installing peak-load-shaving generators:

- Reducing overall electrical utility tariffs improves profitability and lowers overhead.
- Using the surplus heat energy of a peak-shaving generator can reduce heating costs if combined heat and power generators are employed to offset the power requirements of a facility's heating, hot water or steam demands.
- Generators can operate independently if the utility supply is interrupted or compromised by grid failures, blackouts or brownouts. Such power losses or abnormal fluctuations can create major financial and safety issues, even for brief periods.

## 6.0 System Components:

Electronic controls can reliably track when a reduction in grid-power consumption is desirable to avoid any higher demand premiums, then automatically start the generators and transfer load from the utility to a peak-load-shaving generator system. The generator will also start when the utility power fails and act as a standby generator.

The systems can be arranged to switch power to the generator or to have the generator brought into parallel with the utility power. Pre-set, user-adjustable demand and timer sensors in a load management system (LMS) controller will control the generators to provide the required kW to the electrical loads of the customer's facility.

The latest advances in supervisory control and data acquisition (SCADA) computer systems now allow complete systems to be controlled. These include programmable logic control systems, or PLCs, that interface and control all processes such as heating, ventilation, air conditioning, and security and energy consumption in real time. Such controls allow reliable and cost effective management of complex functions.

Once the peak rate period has expired, the LMS controller will shut down the generators after a cool down period and transfer facility loads back to the utility source. Code UL 1588 applies to systems with voltages of 600 volts or less. Systems over 600 volts and less than 15 kVA are covered by UL 891 in accordance with all relevant ANSI, IEEE and NEMA regulations.

## 7.0 Feasibility Study Assistance:

To obtain a detailed and comprehensive economic study for Peak Load Shaving, consumers should use the services of a consulting power systems engineer. Also, many distributors and dealers of the leading peak-shaving generator manufacturers will assist in determining the feasibility of peak-load shaving by providing estimates of costs and utility charge saving and describing what control options are available.

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