Combined Demand Response and Demand Control; The Benefits of a Hybrid Approach

By Theo Breitenstein

Summary

In recent years Demand Response and Peak Load Control has become an important tool and component of a balanced electric energy market. This paper compares these different approaches to relieve short term demand pressure (Demand Response, DR) for the purpose of managing the supply side, as well as, addressing the benefits of everyday Automated Demand Control (ADC). In particular, it shall address the successful coexisting of both measures under one roof if the right technology and strategy is applied.

In conclusion: ***The utilization of a Peak Load Control System with multiple layers of logic to accomplish both Demand Response and Demand Control strategies provides the end user with the ability to generate substantial savings and generate additional cash flow. No one will deny the success of such a Hybrid Approach. Examples of such Intelligent Peak Load Control Systems are the ones offered by Emacx Systems, Inc.***

Demand Response

As demand for electric energy continues to increase, the additional generation capacity has not kept pace to match this demand. One of the most effective ways to address this issue is by asking consumers to reduce their electric demand. This has led to Demand Response programs offered by several ISOs throughout the country that pay commercial and industrial users to curtail their electric loads during these demand peaks. In the past such Demand Response has not been very efficient as it has relied upon manually turning the load on and off. Manually triggered curtailment Events often result in unforeseen consequences and can be quite risky. Today's technology offers Intelligent Demand Response Technology where loads are automatically controlled and monitored. Participation in such Events becomes much less risky without sacrificing production, product quality, or building comfort. Such technologies detect the need for load shedding, communicate the demand to participating users, automate load shedding, and verify compliance with demand-response programs.

Demand Control

Demand Control is the art of Intelligent Peak Load Control (IPLC) to avoid demand peaks and its associated expense in a facility without jeopardizing operations.

The electrical power used is measured and transmitted synchronously from a utility measurement device (utility meter) to a controller (in most cases, the utility supplies measurements via power impulses). The transmitted actual power is monitored by a microprocessor, controlled and continuously compared with target values and load parameters. Trending is performed within the imposed utility interval to evaluate power ratios in order to switch electrical loads connected to the controller on, off or reduce them depending on the preset values such as maximum kW and priorities.

A microprocessor calculates all necessary switching operations and thereby prevents loads / load groups from being switched off or reduced unnecessarily and enables optimal utilization of the set nominal power consumption. Each month of the year has an assigned maximum demand threshold the system will maintain. Continuous synchronous scanning and load analysis ensures optimum operation without exceeding the preset kW value. IPLC controls equipment as a function of assigned priority levels and duty break parameters when called for curtailment, designated equipment is reduced for a short duration until the demand reduction objective is achieved. Overall demand reduction of about 8-10% of the total connected, evaluated load is possible in order to not jeopardize operations or comfort in any facility.

The Hybrid System Approach

The goal of a Hybrid Approach is to capture the strength of Demand Response and utilize an Intelligent Peak Load Control System (ADC). Such a combination of Automated Demand Control and Demand Response forces facilities or energy engineers, to develop a clear demand, curtailment strategy in order

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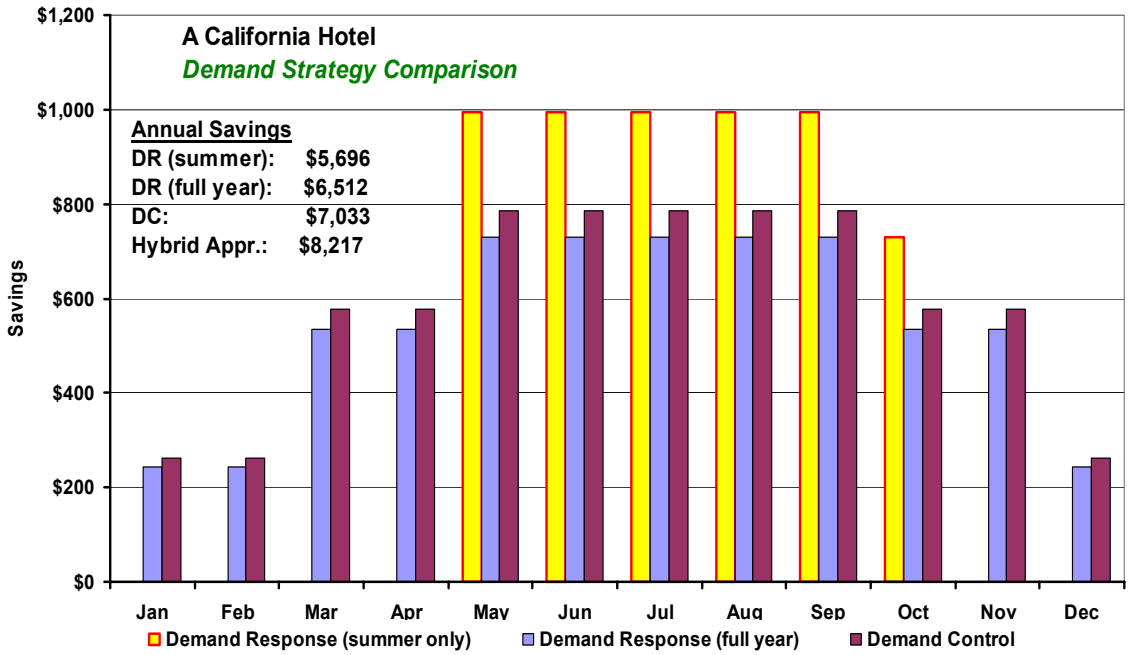
to reap its great benefits. The main benefits are generating additional cash-flow for the enterprise and at the same time initiate energy conservation measures.

The Automated Demand Control System with its IPLC capabilities allows the customer to have daily demand and energy savings achieving a level of automation to participate more easily in Events under Demand Response programs. The question arises how to balance the two especially considering the mechanics of DR. Typically a DR Event calls for a committed load to be curtailed on the day of the event. Assuming that the demand control system already has curtailed the load based on the monthly threshold one can ask, how much further can one cut into the load profile and what will it do to the DR kW base line going forward? The following table gives an actual sample of a NY-City Hospital enrolled in a DR program and curtailing on a daily basis with the means of an IPLC System from Emacx Systems, Inc. **The conclusion is: The suggested Hybrid Approach allows DR and ADC to coexist under one roof with a clear advantage and additional savings to the end user.**

NYC Hospital's actual savings using an Emacx IPLC System		Jan-Dec	kW-Peak Base Line going forward for DR	Highest Peak
Demand Savings with IPLC	417 kW	$ 34,650		6,720 kW
Demand Response Revenue		$ 44,446	6,540 kW	
Total		**$ 79,096**		
Difference DR Base Line vs. Highest Peak IPLC	180 kW			
Deduction due to New DR Base Line $60 /kW for DR ($60 x 180kW)		$ 10,800		
With **NO Demand Control System** savings going forward **Total**		$ 44,446		
Utilizing **Hybrid Approach** savings going forward **Total**		$ 68,296		
Advantage due to Hybrid Approach		**$ 23,850**	**+ 54%**	



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