

## Fact Sheet: Utility service class rates: Time of Use Metering

Tony Baleno, Baleno Engineering, PLLC  
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### **Introduction**

Utilities have a variety of service classes and rates that differentiate between customers. There are three major group classifications that most customers fall within: *Residential, Small General and Large General* (sometimes called *residential, commercial and industrial* depending on the utility). While there are several other special rate classes that may apply to certain customers, these rate classes account for the bulk of all utility customers.

Dairy farms generally fall within the first two groups: *Residential* and *Small General*. Small dairy producers that are metered through a residence meter fall under the residential rate class. Large dairy producers using separate metering for the dairy farm are billed under the small general classification.

The small and large general rate classes are separated by the magnitude of the metered demand. There can be differences between utilities but it is fairly common that to be billed under the “small” classification, the demand needs to be less than 100 kW. Businesses whose demand exceeds 100 kW for each month of a 12-month period are billed under the “large” classification. Both of the small and large general rate classes are subject to metered demand. For more information on metered demand, see the fact sheet entitled “**Understanding Metered Demand**”.

One service classification that many people have heard about involves variable pricing of electricity based upon the time of day and month. This service class is often looked at as a potential means of lowering overall energy costs for certain businesses. Depending on the how a dairy farm is operated, this service class may have a beneficial impact on costs for some dairy operators.

### **Time of Use**

Utilities have come to realize that during certain months of the year and during certain time periods during those months, they experienced very high peak use of electricity by their customers. These peaks put considerable strain on the generation, transmission and distribution systems during those periods. To build and maintain an electric system capable of regularly achieving these peaks can cost hundreds of millions of dollars and could result in much higher rates.

In order to mitigate this problem, utilities and rate commissions devised rate structures that related to the period when the energy is used. As an example, it is not unusual for utilities to experience peak electrical usage in the daylight hours during hot weather. It is also common to find that electrical usage drops off in the evening during these months. The rates take into account the higher average production costs of electricity associated with the high demand periods.

They also developed rates for periods when electric use was very low and less costly to produce and supply. They took the high use, high cost peak periods, the low cost, low use periods and the period in-between the high and lows and came up with a billing structure tied directly to the time of the day and season when energy was used. This is the basis of *time of use (TOU)* billing rates.

The intent was to discourage energy use during the peak demand times and encourage use of electricity during the low demand periods. This was accomplished by increasing the cost per kWh during the peak use times and decreasing the cost/kWh during low use periods. The in-between period was priced lower than peak but higher than off peak rates as a further encouragement to move load to the off-peak times. This is something of a “*carrot and stick*” approach to encourage shifting of use to low demand low cost periods, thus leveling overall system demand.

At the time when TOU began to be promoted by utilities, metering had not yet reached the level of sophistication commonly available in today’s marketplace. Most metering devices were mechanical devices with internal clocks to control the registers. Today, with the availability of digital solid state metering devices, metering of TOU has become simple and inexpensive when compared to early applications.

TOU billing can provide significant cost benefits to many customers who are able to shift their loads into the off-peak billing periods. Shifting loads into the off-peak periods is the key to gaining benefit from TOU.

### ***Time of use on dairy farms***

Can TOU be utilized to a dairy producer’s advantage? The answer to this question will depend greatly on how the dairy operation is run. Each dairy farm will be different. The rate periods for TOU billing in the National Grid (PSC No. 207 Electricity) service area is shown below:

#### **RATE PERIODS:**

##### Winter (December, January, February)

On Peak:	5:00 p.m. to 8:00 p.m., weekdays
Shoulder Peak:	9:00 a.m. to 5:00 p.m., weekdays
Off Peak:	8:00 p.m. to 9:00 a.m., weekdays
	All hours, weekends
Christmas and New Year’s are defined as off peak.	

##### Summer (June, July, August)

On Peak:	11:00 a.m. to 5:00 p.m., weekdays
Shoulder Peak:	8:00 a.m., to 11:00 a.m. and 5:00 p.m., to 8:00 p.m., weekdays
Off Peak:	8:00 p.m. to 8:00 a.m., weekdays
	All hours, weekends
Independence Day is defined as off-peak.	

##### Off-Season (March, April, May, September, October, November)

Off-Season:	All hours of all days
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As can be seen in the TOU schedule shown, there are six months during the year when all use is “Off Season” and would be billed at the “off peak” rate. Also note that TOU rates are only in effect during weekdays with weekends and holidays billed at off peak rates. So, the analysis only hinges on weekdays during the winter and summer months.

In order to examine the issue, the dairy operator needs to be very aware of when and how much electricity is being used on the dairy farm. It would be necessary to determine which loads could be shifted into the “off-peak” periods from the “peak” or “shoulder peak” periods. Once this is known, it will be necessary to estimate the number of kWh that cannot be shifted from either the peak or shoulder peak periods and then estimate what these kWh will cost under the TOU rates. *They will cost more.*

It would then be necessary to estimate the total kWh that will be used during the off peak period and calculate the cost of electricity used during the off peak periods. *These will cost less.* If the combined cost of electricity for all three periods plus other billing costs are less than those experienced under standard rate class billing, it would probably make sense to request conversion to TOU billing.

### ***Does Time of use work?***

There are many customers using TOU to lower their electric bills each month. Many of these customers have installed timer controls that keep specific loads turned off until they are into the off peak periods.

One of the most common off peak loads is water heating. However, to make it work, the water heater needs to be sized large enough supply adequate hot water during the peak and shoulder peak periods. Another deferrable load is water pumping provided enough water could be stored and flowed by gravity during the peak and shoulder peak periods.

Dairy farms don’t differentiate between weekends and weekdays. For the most part, today’s large dairy operations are 24 hours seven day per week operations and use electricity at a fairly consistent rate with the exception of summer cooling needs.

Can TOU benefit dairy producers? Shifting enough load to an off peak period on a dairy farm during the summer and winter months may or may not be possible. Confined animal feeding operations would be hard pressed to defer daytime barn fan cooling loads during hot summer months while field grazed herds could do this. Dairy operators milking large herds three times a day would not be able to defer much load to off hours while those with smaller herds on double milking’s might be able to. A great deal revolves around the specifics of the individual dairy operation.

### ***Summary***

Dairy farm owners that are seriously considering TOU rates for their dairy operation should contact their utility representative to discuss the rates and schedule. They then need to carefully analyze their operation to determine if TOU can provide economic benefit for their operation.