

8.B. Example of Electrical Costs and How to Reduce the Demand Charge

The following example illustrates the difference between demand (kW) and energy (kWh) and the impact on electrical costs.

Assume a plant has two duplicate air compressors, either one of which can supply production needs for the 352 hours per month of operation (22 days, 16 hours/day). However, there is also a process that requires the second compressor to start and operate for 45 minutes once a day.

Energy charges are assumed to be \$.042 per kWh, and demand at \$8.00 per kW.

Energy:	Number 1	Number 2
Compressor # 1: 100 kW x 352 hrs x \$0.042 =	\$1,478.40	
Compressor # 2: 100 kW x 22 days x 0.75 hrs x \$0.042 =		\$69.30

Demand:

Each compressor is 100 kW and is billed at the demand rate of \$8.00 per kW.

Compressor # 1: 100 x \$8.00	\$800.00	
Compressor # 2: 100 x \$8.00		\$800.00

Electric utility charges for the month per compressor:	\$2,278.40	\$869.30
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Total charges for electricity for the month (not including tax, adjustments, and other charges):		\$3,147.70
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Note that:

1. The demand charges for compressor # 2 are significantly greater than its actual energy charges.
2. The demand charge for compressor # 2 represents more than 25 percent of the total charges for both compressors.
- **Best practices to reduce demand charges for this example might include:**
 1. **Restructure the process so that the second compressor operation is performed after normal production hours.**
 2. **Utilize high pressure off-line storage** (see Section 5.F).
 3. **Do not base the calculated or estimated energy cost reductions on the average blended total dollar amount of the monthly electric bill and the total kWh consumed, which provides the “aggregate” rate. Rather, evaluate the reduction, if any, in demand charges. Also, the use of the marginal or incremental cost of the final kWh consumed will provide a more accurate estimate of savings.**
 4. **The person responsible for efficient energy management and compressor operation should understand:**
 - a. **The electric utility’s rate structure.**
 - b. **The process requirements and the compressed air and total plant electric load profiles of the facility.**
 5. **Involve the utility account representative by requesting a written response to the question of how to obtain the most favorable rate.**