

## Successful Implementation – Energy Conservation Measure

<b>Measure</b>
Control of maximum power demand by installation of MD controller
<b>Equipment</b>
Electrical maximum demand controller
<b>Industry / Sector</b>
Pharmaceutical
<b>Year of Implementation</b>
2000
<b>Cost Benefit Analysis</b>
⦿ Type of Measure: Low investment
⦿ Annual energy Savings: Nearly 300 kVA of maximum demand
⦿ Actual cost savings: Rs. 3.70 lakh
⦿ Actual investment : Rs. 1.00 lakh
⦿ Payback: 4 months
<b>Implementation Highlights</b>
<ul style="list-style-type: none"> <li>☞ This measure is of relevance to all industries under the 2-part tariff. Demand charges are paid based on any half-an-hour period maximum demand during the metering period.</li> <li>☞ Maximum demand controller installed on the incomer into the plant ensures that costly mistakes never occur.</li> <li>☞ Very useful for plants with highly fluctuating power loads.</li> <li>☞ Equipment is locally available and serviced.</li> </ul>

### Summary

MD controller monitors the demand of the plant and compares it to a set maximum value. Non-essential loads can be switched off automatically when the actual demand exceeds the set point.

**Background**

A pharmaceutical company had a Contract Demand of 1700 kVA. The maximum demand registered by the plant was 1500-1680 kVA monthly. The average operating demand was 1150 kVA.

A careful evaluation of the pattern revealed that the plant experiencing power cuts 2-3 times a day. After the power was restored, all operating equipment would be switched on immediately within 25-45 minutes. This would result in high demand being registered on the tri-vector meter. The plant was short of personnel who could monitor the demand pattern & control the demand.

A maximum demand controller was installed at the incoming 11kV bus. This controller now monitors the demand. The maximum set point is 1400 kVA. If the demand exceeds this level, the controller switches off non-essential loads like pumping & second air-conditioning compressor. These can be switched on later when the load has stabilized in the plant.

**Principle**

Electrical motive loads consume more energy during start to overcome starting torque. At this time, the loads draw more current & the demand is increased. If such loads are simultaneously started ( or started within few minutes of each other ) in a plant, the maximum demand shoots up. If this occurs within the same metering period, the maximum demand is registered high for the plant.

This can be avoided by either slowly starting up and staggering the loads over an hour or more ( highly impractical ) or by monitoring the load rise and switching off loads, in case a set value is reached. The latter function is automatically performed by a MD controller.

**Details of techno-economics:**

<b>Particulars</b>	<b>Actual energy savings</b>
Contract Demand	<b>1700kVA</b>
Earlier MD	<b>1500-1680 kVA</b>
MD after installation of controller	<b>1400 kVA</b>
Demand savings per month @ Rs. 150/ kVA	<b>205 kVA</b>
Annual Cost savings, Rs. lakh	<b>3.70</b>
Cost of implementation, Rs. lakh	<b>1.00</b>
Simple payback period, Year	<b>4 months</b>

**Implementation issues**

- ☞ The MD controller has to be installed as near as possible to the tri-vector meter in order similar values are recorded and monitoring is relevant to the billing.
- ☞ Some connections have to be rewired so that secondary loads can be switched-off when needed either all at once or in priority.
- ☞ Load prioritisation has to be done in consultation with process operators.