# Oracle Achieves High Quality Power with Fast Payback Summary

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Oracle Corporation, the software giant based in Redwood Shores, California, is the world's leading supplier of information management software. Its products operate in everything from personal digital assistants to global information networks.

For Oracle's thousands of software developers, as well as customers that depend on non-stop 24-hour-a-day technical support, power interruptions can be extremely costly. "It can mean as much as 5 to 10 million dollars per day for us in lost sales and productivity," states Jeff Byron, Oracle's Corporate Utility Manager. "It also affects our customers who have mission-critical support needs."

### Options for High Reliability

Oracle's need for reliable power was the driving force behind setting up its own substation, a 13 MW electrical distribution system, and a power monitoring network. Savings in electricity costs were an added benefit. The project's total budget was $6 million, with an estimated payback period of 3 years. Oracle first considered purchasing electricity from the local utility at primary voltage, 12 kV, also known as involtage buy-up. However, the utility feeder to Oracle would still be shared with residential and other non-industrial loads, and be subjected to several outages per year.

Instead, Oracle decided to intercept the 60 kV circuit from the utility's transmission line that passes over the Oracle campus. Since the 60 kV circuit's unplanned outage rate proved to be more reliable, at less than one event per five years, and payback was favorable, Oracle's board of directors approved the project and construction began.

### Operation and Maintenance

Once Oracle became owner/operator of a 13 MW distribution system, it could no longer rely on the local utility to provide operation and maintenance of the substation. Oracle was also responsible for the potential repair of miles of underground cable and 16 sets of secondary switches and transformers.

To reduce the risks of running their own electrical distribution, Byron selected PowerLogic® ION® energy and power management system. Full-featured PowerLogic® ION meters are now installed at the substation and at the transformer of each critical building. They are directly connected to the corporate Ethernet network by 10BaseT and 10BaseFL links. Byron and others have desktop access to power system data via PowerLogic® energy management software.

Oracle valued the system's scalability, affordability, and revenue-accurate metering. The system also offers growth potential to monitor additional off-site locations and provides access for multiple simultaneous users.

Jeff Byron, Corporate Utility Manager, analyzes a voltage waveform at his desktop.

**Oracle employs the system for:**

- Monitoring harmonics, transients, waveforms, sags/swells, and other disruptions.
- Monitoring substation operation, switches, and alarms.
- Tracking energy use, peak demand, time of use, and power factor.
- Automatically reading meters.
- Paging facility personnel during alarms.
- Reading temperatures, pressures, and oil levels in main and secondary transformers.

**Disturbance Sources and Solutions**

The metering and reporting system has already helped the company identify sources of, and corrective actions for, many potentially damaging disturbances. In one year, the system measured more than 30 utility-side transient events, which Byron can immediately compare against CBEMA curves using the PowerLogic software.

Byron has also set up alarms to trigger on under-voltage, as well as temperatures and oil levels in secondary transformers. When a preset condition is reached, the meter sends an alarm to the energy management software, "a situation I can immediately see on-screen in my office," he explains. This gives Byron a real-time view of his critical loads. Moreover, "if a fault hits when I'm away from my office, even at home, I get pages from the system within 30 seconds," says Byron.

Power quality is also monitored at the substation's incoming 60 kV. If there is a disturbance, "in a matter of seconds, know whose fault it was," says Byron. "If it's the utility's fault, I'm on the phone to their transmission dispatch within minutes. If it originated on our side, we fix the problem."



**New Performance Standards for Energy Providers**
In addition to helping Byron decide on corrective actions, the power quality information lets him measure an Energy Service Provider's ability to meet performance requirements.

Byron believes that it's not enough for ESPs to be focusing solely on price and sell bulk power cheaper than the utility. "There is an evolving need among commercial customers to want better power quality," says Byron, "and the ability to measure power quality is the starting point. With these meters it's not that difficult to take the next step, and not just buy bulk power by the kilowatt-hour, but buy premium power one cycle at a time."

Oracle's local utility, Pacific Gas & Electric (PG&E), sees a growing number of commercial customers concerned about power quality. Byron realizes that this power probably won't come at bargain rates. It may even cost more. Yet he firmly believes that other companies would be willing to pay more for better electricity when they realize what the productivity improvements should be.

**Increased Knowledge and Control**
Byron appreciates the freedom of monitoring critical power aspects of the campus himself. He no longer depends on the local utility for information, or a consultant to diagnose a problem.

Power quality monitoring has proven its value to Oracle. More savings are being realized by identifying areas of high energy usage, improving energy efficiencies, and auditing utility bills. Meters will be added at the first site and other campuses, then linked together as the company moves toward aggregate energy reporting for all its campuses.

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