



Z Solutions®

## **CASE STUDY: MULTI-DIMENSIONED MARKET RESEARCH**

### **SITUATION**

A large electric utility in the Northeast needed to quantify the benefits of existing programs designed to reduce the frequency of power outages on its system. The programs may be something as simple as trimming the branches of trees near power lines, or as involved as a re-engineering of the electric distribution system. The company needed to determine not only whether the programs reduced outages but what expenditures are most cost-effective? This is a difficult question to answer because outages are predominantly determined by weather conditions in the utility's service territory. A major storm will cause outages even in well-run systems. When the company reviewed their outage results for the year in question it appeared none of the activities were successful. At first glance reviewing summary reports of the time period before the prevention work and after the work showed that the frequency of outages increased. Therefore, one would assume that the outage prevention work was not effective. The company felt this was not a true comparison. They felt that given the bad weather the actual number of outages seen in the area would likely have been worse.

### **ANALYTIC SOLUTION**

Z Solutions addressed this problem through a remarkably complex predictive model. In addition to building a model that predicted outages given weather, the modeling effort had to handle different customer makeup of the areas (commercial, residential and industrial), different development (urban, rural, suburban) and different levels of forestation (wooded, clear, etc.). Accurately modeling the impact of the weather based on the severity and other factors was the key challenge in the project. All of these factors interact to determine if an outage occurs on a given day. The only practical solution to this problem was a Neural Network modeling effort. All other approaches would not have effectively picked up all important interactions in this situation.

### **RESULTS**

As a result of this analysis the company was able to demonstrate that outages in the year in question were significantly less than they would have been without the interventions. As an extra bonus the company was able to compare different outage reduction techniques to determine the most cost effective approaches.

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