

Power Reliability and Quality Adds Power Value

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It is estimated that \$27 billion dollars was lost as a result of power mishaps during 1996. Within the industry, there is little agreement on the effect that electric power industry restructuring will have on the future reliability and quality of the system. However, many engineering experts are concerned that the number of mishaps will increase as the electric power industry becomes more competitive because (i) power will travel over longer distances to reach the customer, (ii) increased system impedance will make it more susceptible to sags from faults, (iii) power suppliers will have less incentive to resolve system problems cooperatively, (iv) price cutting pressures will result in decreased system maintenance and (iv) more breakdowns will result from antiquated, and ill-maintained, end-user equipment.¹

NOT SURPRISINGLY, THE UNCERTAIN IMPACT OF ELECTRIC POWER RESTRUCTURING ON THE RELIABILITY AND QUALITY OF ELECTRIC POWER HAS RESULTED IN INCREASED ATTENTION BEING GIVEN TO ISSUES OF PREVENTION, LOSS CONTROL, ALLOCATION OF LIABILITY RISK, AND INSURANCE, IN ADDITION TO THE UNIVERSAL CONCERNS ABOUT PRICE.

The 1996 western states outages prompted an immediate focus on reliability issues. The Department of Energy created a special task force on reliability issues which is reported to be moving closer to backing a "stronger role" for the Federal Energy Regulatory Commission in reviewing electric power reliability standards.² In addition, the North American Electric Reliability Council has made compliance with reliability protocols "mandatory" rather than

“voluntary,” and in an effort to obtain greater input into its decisions on power reliability standards, recently voted to open its decision-making process to endusers.³

Moreover, power suppliers and end-users are beginning to become more aware of the serious legal implications posed by problems in power reliability and quality, as the traditional utility “gross negligence” liability standards begin to be replaced by breach of contract, negligence and, perhaps, strict liability standards. This has resulted in new interest in power reliability and quality in power contract negotiations, loss control and maintenance, and reviews and audits of insurance requirements.

There are other recent events that raise a cause for concern. For example, Pacific Gas & Electric (PG&E) recently was found criminally liable, and exposed to multimillion dollar liability, for failing to comply with proper tree-trimming maintenance that resulted in a massive fire in Nevada.⁴ Additionally, reductions in staffing at PG&E were reported to have increased the obstacles faced by that utility in restoring service after torrential rains caused power disruptions in Southern California in 1995.⁵ Similarly, the recent spate of Federal Aviation Administration flight control computer breakdowns reportedly is related to poor maintenance, and inadequate generators and back-up power sources.⁶ Indeed, while the Electricity Consumers Resource Council recently stated its belief that electric power restructuring will have no adverse effect upon reliability, it conceded that the industry may become less effective in dealing with emergency conditions.⁷

Not surprisingly, the uncertain impact of electric power restructuring on the reliability and quality of electric power has resulted in increased attention being given to issues of prevention, loss control, allocation of liability risk, and insurance, in addition to the universal concerns about price. Take the example of Hannaford Bros. Co., a retail supermarket company with almost \$3 billion in annual sales from approximately 150 retail stores in eight states. These stores, together with three distribution facilities and a corporate office complex, consume almost 60 MW of non-coincident peak load at a cost of roughly \$27 million per year.

Responding to a perceived price and reliability problem, Hannaford began installing gas-driven engine generators to generate electricity at each of its locations, and to disconnect from the utility grid. These generators will provide up to 645 kW of capacity, with average operating efficiencies of 33 percent to 37 percent, depending upon load

factor. The sites are linked to each other through controls that provide integrated load management and full-unit dispatchability, whether against the company's own load or in response to advantageous market prices. Hannaford expects to provide back-up power by using the excess capacity that it generates.

Hannaford's average electric cost is expected to drop by almost a third. In addition, Hannaford expects its new system to increase power reliability and quality because self-generation will insulate each facility from New Hampshire's frequent distribution-related outages during adverse weather events. From a legal point of view, Hannaford will become more directly liable for damage or injury associated with power problems; however, careful attention to loss control and maintenance, and the purchase of appropriate insurance, can offset that increased risk.

Another example is the development of sophisticated power transfer products that can shift power from a primary to a secondary source without interrupting end-user service when a power problem is detected. One such product, PowerDigm Transfer, is being marketed by PowerDigm Systems, a subsidiary of Baltimore Gas & Electric Company. This solid-state transfer switch is reported to be able to detect momentary interruptions, sags and swells, and to transfer from a primary to a secondary power source within microseconds so as to avoid enduser equipment operation interruptions. The switch is reported to be able to handle loads up to 38 kV.

There are indications that the electric power industry is on the verge of an avalanche of interest in power reliability and quality. To list just a few: (i) a session on products liability implications of electric power was presented at the annual meeting of the American Bar Association last summer; (ii) a special Department of Energy task force soon will be issuing its report on the reliability of the bulk power system; (iii) each state considering increasing electric power competition is focusing on reliability concerns; and (iv) EPRI has stated its interest in increasing research and development on power quality products.

Clearly, the entire industry is beginning to recognize that one way to reduce costs, and to gain market share, is to increase reliability and quality.

References

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