

How to Survive the Financial Crisis Without Killing Reliability

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For over a decade consultants like me have been helping clients improve the cost-effectiveness of their spending on reliability. This has gone by various names, including "bang per buck analysis," "project prioritization" and "asset management." In most cases, the situation involved clients who had gotten into reliability trouble and needed to improve their performance, while optimizing the spending required to do so. In other cases, due to deregulation, mergers, or just the quest for re-engineering and process improvement, clients wanted to optimize their spending while maintaining the existing level of reliability.

Running the Engine in Reverse

In the current environment, some of the same techniques may need to be employed for a different reason: the financial crisis may require many utilities to spend less money, especially capital dollars, and they know it will likely have a negative impact on reliability for the short term, but they want to be sure that the deterioration is as little as possible despite the budget cuts. This is essentially running the "bang per buck" engine in reverse.

The good news is that if you have already been using project prioritization in some form you already know which projects to cut, since it is simply a matter of decreasing the threshold on the classic funding curve. For more background on the funding curve, see my [Energy Pulse](#) articles:

- [The Next Level in Project Prioritization - Getting Beyond Point Scoring](#)
- [The Strategic Value of a 'Get No Worse' Scenario](#)

In the second article, I discussed how important it is to know the level of spending that would cause reliability to "get no worse." In the current financial crisis, the value of that scenario is even more obvious, since it will be a crucial threshold for planning. It may be acceptable, for example, for a utility to tell its customers and

regulators that under the current circumstances they intend to only "tread water" for a year or two in terms of reliability performance, despite what they may have intended to do in better times. On the other hand, if the crisis requires more severe cutbacks than even the get no worse scenario, then it will be important for the utility to know that fact and to be able to communicate it, which the scenario will help them to do, especially if they have already been using it to make their plans for achieving performance goals.

Once the get no worse threshold is crossed and the decision is made to let reliability actually deteriorate for a period, there is still important work to be done to minimize the impact, both in its severity and duration. Here again, the smart utility will have honed its planning tools to be able to reasonably quantify such a scenario. It will know how much deterioration takes place when there is virtually no money spent on reliability, and also how much each currently funded program contributes to offsetting or even overcoming that deterioration.

Running Hard Just to Stay Even

One of the lessons that utilities have learned over the years is that reliability is like a treadmill, in that you have to run at a pretty good pace just to stay even. This is because the natural tendency of a system is to deteriorate, so if you literally do nothing but restore service when outages occur, without any preventive maintenance, then the outages will begin to occur more often. There even gets to be a point where it can pay to do some preventive maintenance to avoid the corrective maintenance that would be required, but as I have demonstrated elsewhere (["Why Utility Maintenance Is Rarely Self-Funding"](#)), utilities rarely get to see that point because it involves a level of reliability that most customers and regulators would find intolerable.

The calculations involved in this kind of planning are complex but doable. For starters, it must be realized that it is not a static question, since the deterioration accumulates over time. Moreover, there are significant non-linearities, which is part of why the funding curve is typically so non-linear. It may be worthwhile to look at a few specific examples of drivers of reliability spending: trees, equipment deterioration, and growth.

Trees Take Time (and money)

For example, if a utility were to simply stop trimming trees (which is not typically a capital expense, but is still a way to conserve some cash), the immediate impact will be that those circuits which were due to be trimmed this year will start to have contact-caused outages (and probably an increase as well in non-contact outages like those due to broken limbs and fallen trees). Normally, that involves only about one-quarter of the circuits, if the utility is on a four-year cycle. Also, the contact

will be only slightly increased at first, because most of the trees will not have grown back enough to overcome the clearance that was established when they were last trimmed.

In about three or four years, though, tree-caused outages will really begin to get out of hand, as the circuits that were due to be trimmed in the first year get more than just incidental contact, and also the trees that were due to be trimmed in subsequent years begin to add their effect. By the fifth or sixth year after eliminating tree trimming, the worst of the increase will have taken place, and further deterioration will be modest. The occasional ice storm or windstorm will cause the utility to spend much more than it used to in such storms, and there may even be some liability claims for public safety. In short, it's not a pretty place to be, but it takes about five years of neglect to get there.

Equipment gets older each year

For other kinds of outages, many utilities have found that the rate of deterioration may be in the range of five to ten percent per year. This includes the classic kinds of equipment failure such as broken cross-arms, broken ties or insulators, lightning arresters, cutouts, underground cable, etc. Obviously, at a rate of say, seven percent, the deterioration would cause such outages to double in about 10 years (the rule of 72), or increase by 50 percent in six years, 22.5 percent in three years, etc.

For both the tree-caused and the equipment deterioration-caused outages, a good strategy can be to at least focus maintenance on the backbone or mainline of the circuits, where outages cause the most customer interruptions. And, of course, what is true for the backbone is even more true for sub-transmission circuits and transmission lines, except that the redundancy in the latter may provide a degree of resiliency. Clearly, as we have learned from the blackouts over the years, including the disaster of August 2003, transmission outages are major risks and should definitely be avoided. In addition, the new NERC standards carry monetary penalties that can be significant.

Dismal Economic Outlook means Less Growth

On the brighter side, we can expect that the financial crisis may reduce the need for some of the larger types of funding: new business, public works accommodation, and capacity. If the economy slows down, we can expect all of these to slow down as well (unless a government program aimed at replacing aging public infrastructure is used as an economic stimulus, as has been suggested by the president-elect). And, of course, even in a dismal economy there can be pockets of growth that will need to be accommodated. But in general one should expect a much decreased level of spending on those three categories, which often make up

about half of a typical utility's T&D capital budget. As for generation, the same would be true were it not for the wild card of greening the fleet.

In summary, it is time once again to "sharpen the pencil," meaning it is time to do the kind of planning that we have urged for years in terms of quantifying the rate of natural deterioration of reliability and also the cost-effectiveness of various projects that can overcome that deterioration and improve reliability. This time, the question is different, i.e., how do we cut the expenditure and have the least impact on reliability, but the methods are very similar, and utilities that have been using those methods for years will have an advantage in responding to the current crisis.