
The Ten Challenges/Issues/Opportunities/Roadblocks/ Requirements to Ensure that the Electricity Supply Industry Has the Physical and Human Resources Needed for the Next Thirty Years

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Last year, consultants at Black & Veatch (B&V) decided to lay out the principle challenges (they called them “issues”) facing the electric industry. They came up with ten, an easily remembered number. Then, in an uncharacteristic—for consultants—bout of humility, B&V’s consultants decided to find out what the people in the industry thought. Ask the experts, as opposed to the “experts.” B&V hired a reputable surveying firm and collected hundreds of responses, some of them detailed and many of them heartfelt.¹

So, rather than tell you what I think the industry needs to do to reach its 160th birthday, I’ll tell you what the people who have to make it happen think. And, in an era in which six months seems like a long time, they looked out farther than most of us would have expected.

Let’s examine those ten challenges in order of importance as decided by the respondents. No build up from least to most important. This isn’t an awards ceremony.

#1 — RELIABILITY

What has the industry sold in the past if not a service reliable in both physical and economic senses? You expected the lights to go on, you knew the price, you knew that the supplier would not rip you off, and, most important, you could expect the electricity supplier to act as if it had an obligation to provide that reasonably priced and reliable service even under difficult or unfavorable conditions. Those suppliers were in it for the long term. Unfortunately, that supplier did not run an efficient operation nor did it price its services in a manner that reflected costs. but, as a trade off—not one ever explicitly recognized—the arrangement reduced the risk of extreme shifts in price and conditions of service for consumers. Reduction of risk has value.

Here's the problem going forward, as I see it. After the 2003 blackout, the government and the industry decided to institute—or, better still, reinforce—a rules-based approach to reliability.² Sort of like the Sarbanes-Oxley approach to corporate governance, which focuses on procedure more than results. The industry decided to define reliability in terms of ticking off boxes. Companies that can tick off all the right boxes fulfill their reliability obligations. Admittedly, operators in a network industry have to follow rules, or they undermine the stability of the entire network, but the metrics for reliability—as far as I can tell—do not include dependability of fuel supply, price volatility, vulnerability to terrorism or foreign affairs, or the impact of climate change. Basically, if the lights go out because the utility did not trim trees around the lines, it has not met its NERC reliability requirements. If the lights go out because drought affects water intake at power stations, that’s an act of God. How does the end result differ for the customer, though?

The industry does not look at reliability in terms of what customers want, what they will pay for, or whether off-grid technologies might serve the customers better than grid-based solutions. In addition, many consumers of power need more reliable service than the grid provides. I do not think that industry standards have kept up with customer needs.

¹ Black & Veatch Corporation: “First Annual Strategic Directions Electric Utility Industry Survey,” 2006, administered by Sierra Energy Group.

² Leonard S. Hyman, “Reliability for Whom? or Cui Bono?,” presented to Chartwell Reliability Summit; Atlanta, GA; 8 March 2007.



The industry can provide reliable, economic service, as defined by the customer, or it can provide a commodity product on delivery terms that it sets itself. If it chooses the former path, it can sell a customized product. If it chooses the latter path, somebody else will provide what the customer wants.

#2 — AGING ASSETS

Respondents to the survey said that about half of industry assets were near, at or beyond their useful lives. That situation creates two regulatory problems. First, consumers will have to pay higher prices in order to pay for the replacement of aged, written-off equipment put into service at 1960s prices with new equipment purchased at 21st century costs. Second, old equipment cannot perform the functions required to attune pricing to usage patterns.

I'd argue, however, that having so much decrepit, obsolete and fully depreciated plant out there presents the industry with an incredible opportunity. As an aside, go back to the days after the Bell System had installed a lot of analog electronic exchanges. When digital switches came along, the Bell System resisted their installation, arguing that the analog switches could do almost the same thing as the digital ones, so why write off all that recently made investment? The Bell System held back from the digital revolution, while others moved ahead. The electric industry, on the other hand, has not made investments that need protection. It could bring its infrastructure and services into the 21st century without a need to make massive write-offs and the embarrassing attempts to make customers pay for what no longer serves them. I'd say, go for it. An opportunity like this knocks once.

#3 — ENVIRONMENT

Those in the trenches worried about environmental issues before their leaders, who just recently emerged from the caves, prodded by melting icebergs and election results. Nuclear companies worry about fuel disposal and coal burners about carbon emissions and coal transportation problems. They all realize, I am certain, that the government will impose restrictions on them sooner than on automobile owners.

Yet, consider a peculiarity of the regulated sector of the business. Utilities will invest in whatever the regulators put in rate base, because they earn returns on that investment. Environmental investments (even intangible and dubious ones) earn the same return as nuclear power plants, although I'd argue that they are a lot less risky. Regulators have not yet heard about Modigliani and Miller or the new capital standards for banks. Utilities can raise the money to do the job, and the smarter managers have started to look at environmental investment as a business opportunity. That, generally, means a regulated business opportunity, which brings up two questions: who does what in restructured states and whether those regulated investments will have real environmental impact, or will they simply pad the rate base of the utilities? As for the former question, environmental improvements will come out of the pockets of many of the unregulated participants, so I don't expect them to show enthusiasm over the new environmentalism. As for the latter question, I'd expect less than meets the eye, but a lot more than nothing.

Other aggressive investors, including General Electric, have pumped money into the environmental arena. There's no shortage of money and these people, however environmentally oriented, do it to make a profit.

You have to understand that the electric industry lobbies on a lowest common denominator basis. If a few companies object, the industry does not lobby for something, and if a few companies want something and the rest



hold back, nothing happens, at least not until the outside forces look too irresistible to ignore. The industry had a record of opposing any environmentally-related changes until it becomes too late to affect the outcome. I think that the industry finally got that message. So, I would hope that the combination of aged plant that needs replacement, aggressive outsiders that will move in if the utilities do not, and the realization that there might be money made in solving a problem, as opposed to money lost in complying with new rules, will lead to action on this front.

#4 — REGULATION

Regulators—including those in standards setting organizations and the system operators—set returns that may or may not attract capital, shift risk (usually unwittingly), set prices that may or may not reflect costs, and write the rules for the markets that they have created.

People in the industry show a clear preference for having their cake and eating it, too. The survey shows that they want to reduce their risk by passing on as many costs as possible to consumers on an automatic basis. Yet they also want incentive regulation, usually meaning extra profits on specific investments. They do not want regulation that places real responsibility on them, in a way that makes them responsible for the consequences of their actions. As much as I object to that attitude, because it does not foster a consumer-oriented or problem-solving behavior, I have to admit that it makes sense in a regulatory environment that tends to punish for errors but not reward for excellence.

Regulation as is, with modifications bolted on to meet specific circumstances, means a future of emphasis on investment as the solution to any problem in the regulated arena, and rigid rules of operation and oversight in the supposedly unregulated arena. That situation leads me to draw two conclusions. First, no market player will attempt to make a business of finding the lowest cost means to provide customers with the service that they want.³ Nobody has an incentive to do so. Second, the nominally unregulated and still monopolistic markets set up to allocate supply will not realize what I think is the primary benefit of competitive markets, namely the freedom and incentive to discover new ways of doing business. The government did not let markets develop competitively. It imposed the rules. I don't think that any major market in the commercial world developed from a fixed set of rules determined in advance by the government.

Regulators remain in control over all electric markets, one way or another. They will encourage, direct or thwart the policies needed to meet our electric needs. They show no signs of going away.

#5 — AGING WORK FORCE

All numbers point to the same conclusion: massive retirement of skilled workers who know how to make the aging facilities work, not to mention employees who know how to file rate cases. Not that the industry couldn't find new workers. It does not require dirty or demeaning work. It pays reasonably well. It can pay more if it has to. It can't out source or off-shore key functions if it takes reliability seriously, either, so that should add to the

³ Leonard S. Hyman, "Why the Transmission Network as Presently Planned Will Not Provide the Efficient, Economic and Reliable Service that the Public Wants," in Karyl B. Leggio, David L. Bodde and Marilyn L. Taylor, eds., *Managing Enterprise Risk* (Amsterdam: Elsevier, 2006).



security of the job. It can reach out to groups in the population it has not hired in the past, too. However, it must secure the knowledge of the aging workers before they walk out the door. Beyond that, what's the big deal; as long as managements realize that they have to plan for the big wave of retirements.

#6 — LONG-TERM INVESTMENT

This concern must puzzle outsiders. After all, by law, regulators must provide a return high enough to attract capital, and prices in the deregulated market should adjust to attract capital to the sector when demand starts to outrun supply. And aren't huge pools of capital, with more money than they can invest intelligently, sloshing around in search of investment opportunities?

Yet, restructuring may have, inadvertently, created disincentives to investment. Seemingly attractive inducements to invest produced little investment, so, perhaps the potential investors read the fine print and decided to abstain. In some cases, I am convinced, utilities chose not to make attractive regulated investments because doing so would endanger the even higher returns earned by their affiliates in the unregulated sector. However, in those parts of the country that retained the old structure, let me say that the utilities should have no trouble raising needed capital for long-term investments as long as the utilities make mainstream decisions and justify them and the regulators follow the law and act in a reasonable and timely fashion. I think that what has happened in the restructured states has prompted regulators to take their duties more seriously.

As for the competitive market sending signals, I'm not sure what signals a day-ahead market sends to long-term investors, especially when the rules for that market could change when the price in it shoots above politically-acceptable levels. Would long-term supply contracts facilitate investment? Possibly, but who would sign the contracts? I doubt that consumers would want to sign contracts. They do not buy other products on long-term contracts. The local utility could sign up, but why should it take the risk? In restructured states, it has no assurance that it will serve the customers whose purchases would back up the contract. Why take a risk without a reward? Admittedly, some will speculate on the direction of the market, hoping to get in at the bottom and sell out at the top. That activity may not produce the best long-term consequences for consumers or for the industry.

Moving on to new sources of funding, the repeal of the Holding Company Act in 2005 opened the door to new types of investors, but I get the impression that they want a combination of security and freedom to finance as they wish, without second guessing by the regulators. The latter requirement may account for their preference for investment outside the United States, to date.

I would have put the issue of long-term investment at #2, right after reliability. I think that we have to get over the desire to create a textbook-ideal market. I sure wouldn't want to invest in one, given the alternatives. Who wants to invest for 30 years just to make cost of capital and sell the product at marginal cost? Only economists, I suggest, and they don't have enough money to rebuild or expand the electric industry. Let's get serious about signals for investment, what sort of investment the signal attracts, and whether we can afford to experiment on a nationwide scale before discovering the answer. There's a lot of cheap money out there now, ready to invest. I can't speak for conditions in 2037, though. This is the time to make long-term investments, and this is the time to get the signals right. And, I'd argue, that providing extra incentives, right now, won't cost much. I'd rather have the money at current costs plus something extra than at future costs with no extra payments. Just my opinion.



#7 — FUEL POLICY

Another topic that I think deserves a higher rating for importance. Fuel cost makes up a big part of the electric bill. Swings in fuel prices account for much of the volatility of electricity prices. We intend to import more fuel from unfriendly regions. The most important fuel, coal, accounts for a significant portion of the nation's carbon emissions. The nuclear fuel repository will not be open for business until 2017 (if we are lucky), but we may need more nuclear power to reduce carbon emissions. Despite two Energy Policy acts, I doubt that we have a coherent fuel policy, anyway.

We do have a fuel policy in the electric industry, though, which consists of pushing whatever is today's lowest cost fuel, without any consideration for the risks that policy imposes on unwitting customers. That simple, in restructured states, especially. That does not mean that the government should impose a fuel mix. The government does not know enough to impose a fuel mix, and would favor politically-connected producers, whether coal miners or wind farmers.

Unfortunately, the markets in restructured states do not give consumers choice of fuels, or the ability to hedge their bets over a period of time. That gets us back to the business of risk. Diversity of supply lowers risk, and that has value to consumers. It is worth something. Sometimes the financial markets cannot protect against all the risks in the same way as having a power plant available. Financial experts use the term optionality to describe what I mean. Just looking at tomorrow's lowest price as a criterion for generation is like judging portfolio performance solely on the basis of total return, without consideration of risk.

If the industry intends to keep profitable customers in the fold, and not have executives testifying before Congressional committees after some predictable disaster takes place, it had better develop a fuel policy, and make sure that somebody can enforce it.

#8 — MARKET STRUCTURE

Considering the impact of market restructuring on the industry, I would have expected this topic higher on the list. The responses do tell us a lot, though. Basically, people in the field do not want the industry to stay where it is, do not want a return to full integration, do not want full wholesale and retail competition, but they do want to keep competitive markets where they work and disassemble the others. That's a mixed message with a pragmatic conclusion, possibly an indication of the nature of the restructuring, which has pushed for process and optics more than results.

Please understand that just about any industry structure will produce electricity for consumers, if they have the money to pay for it, even if the structure prevents the electric industry itself from doing the whole job and causes consumers to rely on independent service providers or on themselves, as long as the buyers and sellers have enough time to adjust to the new circumstances. People show enormous resourcefulness. But we do not want our electricity system to resemble the Argentine telephone system before privatization. We want the electricity market to supply us with the most reliable service appropriate to our needs at the best possible price. (Remember, however, that reliability, to me, means more than the industry's definition.) I'm not hopeful that we arrive at that destination in either the openly regulated or supposedly deregulated markets for two reasons. First, because those in charge decide what customers should want. Second, because nobody has the responsibility for the creation,



production and delivery of a product, which means that nobody can pressure all the components of the supply chain to produce a desirable, competitively-priced end product.

Structure requires more work, but, to me, that means less prescription and more focus on the customer. That thought didn't make it into the survey replies.

#9 — TECHNOLOGY

When I was on the EPRI Advisory Board, I heard about all the wonders of new technology and precious little about why the utilities did not use the stuff. I remember, too, the presentation of a Department of Energy official, making a pitch for new R&D projects. I asked him why, as a taxpayer, I should support more R&D funding when the industry had not adopted existing technologies. He replied that a different office handled implementation.

Now, back to the survey. The respondents showed real enthusiasm for technology. They expected to make investments in all sectors of the business, which, presumably, means that they see benefits from technology in all aspects of the business. What would drive them to invest? Cost savings and regulatory requirements seemed the most important reasons.

So, with that information, why worry about technology? The utilities and unregulated industry players will employ any technology that seems likely to pay off. Right? Probably not. The utilities operate under a regulatory regime that tends not to encourage innovation. Mistakes end up on the shareholders' tab and successes accrue to the benefit of customers. In addition, the utility might not collect any financial reward from technological improvement other than a return on the investment, because reducing costs reduces the revenue that the utility needs to collect from consumers. That's not a framework that encourages innovation. Some regulators have proposed specific financial incentives for specific investments, usually higher returns on those investments. That policy puts the regulator in the business of choosing technologies and discourages non-rate base innovation. Encouraging greater use of beneficial technology—that is beneficial to consumers—requires an incentive-based regulatory regime that lets the utilities that implement the technology decisions keep some of the benefits.

As for the unregulated market participants, one would expect that they would take whatever steps that would improve their profits. I'm not sure, though. I think of unregulated generation, nowadays, as more of a financial game than an operating business. The participants make big money investing or disinvesting at the right moments, by the right bidding procedures in the markets and by smart fuel procurement. I wonder if productivity improvements and new ideas for operations get a lot of attention.

So, given the market framework, new electric technology might make an enormous difference to the economy, but not to the electric companies that would implement most of the changes. That's why technology belongs near the bottom of the list, in the eyes of the people in the business. Unless, of course, somebody else, such as the customer or an outsider, decides to use the technology in a way that takes away business from the industry.

#10 — SECURITY/BUSINESS CONTINUITY

Basically, the respondents said, "What, me worry?" Presumably, they don't view the electric industry as a terrorist target. That attitude seems to carry over into many decisions: reliance on liquefied natural gas from



unstable regions as a new energy source, long distance transport via natural gas pipelines and electric transmission through unpoliced regions, and forcing companies into bigger, centralized markets although doing so might increase the possibility that a catastrophe will have bigger consequences.

I'm not privy to the deliberations of the FEMA/Department of Energy/FBI crowd. Maybe they have dealt with all of these issues, but, based on public pronouncements and policies, I doubt it. My guess is that they swept these issues under the rug, if they looked at them at all. (Of course, I won't know, because the answer is a state secret, no doubt.) The responses in the survey, to me, indicate complacency. I think that we need to do a real risk evaluation, and factor the costs of those risks into our evaluations of policy. Remember, driving without auto insurance is cheaper until you have an accident.

CONCLUSION

The respondents to the Black & Veatch survey focused on concrete issues and on mechanics, to a great extent. Well, somebody has to do so, making sure that the wheels turn while the policymakers think about the big issues. But I am disappointed that the practical people who make the wheels turn did not discuss two business issues that the policymakers have ignored. Dealing with these two items, in my view, may make the difference between survival and success. The first issue is risk allocation. The industry and its regulators must begin to differentiate between lowest cost and lowest risk adjusted cost. Otherwise, they will continue to make long-term decisions based on short-term criteria. The second is customer focus. The industry and its regulators need to think of the principal goal of the business as making sure that customers get what they want in terms of reliable (which, to me, means predictable and sustainable) service and the best possible price, and, in the process of doing so, learn how to package and sell that product so the customer can make the right choices.

In short, the electricity industry does require physical and human resources to survive, but it needs more than that to succeed.

Thank you.