Draft Fifth Power Plan
Comments from Sophometrics
11/17/2004

Tone of Comments

The draft Fifth Power Plan is on target in many respects. The gist of the plan (relating conservation to a more secure future) is honest and understated. That message holds several broad and hard lessons for our manufacturing-intense economy.

Sophometrics' comments endeavor to expand the Fifth Power Plan's context to include change, the development community, and the gap in research created by the artful application of capitalism we experience in today's market.

Outline of Comments

This outline reflects comments made at the November 10, 2004 Seattle public hearing by Doug Bors, President of Sophometrics (dbors@sophometrics.com, or 206 963 3077). Comments 7 and 9 (below) were skipped on November 10 out of respect for the time of many other participants.

Comments

1. **Partnership** --- The starting position of the Fifth Power Plan seems to be, "the power industry holds a responsibility to the region to help fuel the economic success of the Northwest."

While this is true, it is also true that the economic community of developers and business leaders benefit from investment in many aspects of our community. Further, aggressive investment in conservation by utilities in our region can be made more effective by developers and business leaders that know (and act on) the leverage they have regarding energy.

Thus, the reference to "market transformation" in the plan should be upgraded to "partnership with the economic development community." And, like other traditional marketing foci, this must be an active communications channel that requires about as much energy and attention as the plan development process.

Developing this partnership is more urgent than we might think. The next swing in development in Seattle is on the boards now. That is, action CNSV-3 is too slow.

2. **Conservation Environment** --- I strongly reinforce the idea behind establishing an "environment" wherein conservation resources and distributed solutions are "deals that cannot be refused." Even though we have significant rebate programs and considerable marketing to

back these up, we still have many technology solutions that do not win the attention of developers because the solution's perceived risk is too high or the ROI is too low.

In order to fix this (i.e., to motivate the economic community) we must create design and engineering support, and define rebate levels that take the risk out of the hands of developers.

3. **Demand Response** --- in the mix of demand response projects, include several demand leveling technologies like ice-storage cooling.

4. **Wind Procurement Policy** --- While I accept the idea that our region could wait until wind sources drop in price before we ramp up our wind investments, I have two concerns about the way that delay is implemented. You can think of the procurement curve as a conversation with wind power manufacturers. The current plan says, "we are playing with you; we are going to buy a few now and let you starve for a while, then we will want inexpensive, high-quantity delivery later." Instead, the manufacturers need to develop a steadily growing, incrementally more competitive manufacturing curve. We should not assume that manufacturers would sell to other regions of the country to fill in the gap.

I feel we should plan a smoother procurement curve, accelerating slightly the volume of wind development in the region. This will help our case for growing an effective wind industry, which then has the opportunity to optimize their delivery structures and minimize the cost of wind development. (Reminder, it is more than the machines that make up this story.)

We must be cautious to believe that wind power cost will come down significantly until after the procurement rate is scaled up.

5. **Wind Integration Policy** --- I agree that the installation of about 500 MW of wind production at diverse locations will help us understand the costs of wind integration. However, I am a believer both in modeling and in standards. National standards for interconnection of wind power plants are nearing the conclusion of their first significant version. But, even these standards are missing several key points. The most important points relate to wind power saturation limits (i.e., the maximum portion of wind power production).

I presented a paper for EPRI in 2003 that classified the types of interface issues concerning wind power production. They include power quality and safety problems at the scale of single machines. They include power quality, safety, and line stability (regulation) problems at the scale of one wind farm. And they include overall grid stability, reliability and economic issues at the scale of a region.

The standards developed so far are missing the need to curtail wind production in order to optimize the overall grid value (i.e., economic return) as wind power penetration reaches 15 to 25% of the total electric power delivery. (This discussion assumes we do not consider storage schemes, which I touch on later.)

Thus, I strongly recommend that modeling stay in the picture, including both grid operations and economic modeling. The first 500 MW of wind installation should be correlated to the models to prove the efficacy of the models. Further, one or more of the first wind farms should be equipped with curtailment capability in order to test the notion of increasing wind power saturation limits before saturation is reached. (Sharing curtailment across a wide range of wind farms is much more effective than installing curtailment on a few wind farms late in the development schedule.)

6. **Bonneville's Role** --- I read this suggested change as a focus on the accountability of Bonneville's activities. It stems from some level of distrust based on past economic performance. Bonneville has an advantage in the market; their hydro power allows them to absorb some risk, which they have done. It also could (and has in the past) encourage them to attempt risky ventures. This is not all bad. We need sources of research and development dollars in the Northwest (especially on behalf of the construction industry), and allowing Bonneville to represent one of those sources is important. Perhaps the intent of the suggested change can be met another way, without taking the full value of hydro out of Bonneville's hands (and at the same time transferring full risk of hydro shortages to individual utilities).

7. **Alternative Energy Research** --- I realize that the Fifth Power Plan draft report calls for a follow-on implementation plan to identify economical conservation technologies; thus, you are not specific about technologies. However, I feel you should be more specific about investment in research and development in near-commercial ventures related to alternative energy sources. I would hope that the report identified specific goals for wind-turbine research, e.g., the installation of not-yet-commercialized wind machines at test sites, the installation of a prototype data center facility with distributed generation providing the power reliability requirements, and the installation of a significant, dispatchable CHP, peak-leveling device in an urban context. (There are other projects, also; these three serve as examples of items that should appear in you plan.)

We must note that there are several wind companies struggling to survive and only a few others undertaking significant development of new ideas. We must support this idea development in order to win the bet that the cost of wind energy will come down.

8. **Hydrogen** --- Hydrogen is not an alternate energy source, it is a transport mechanism. Last year the President announced a plan to develop hydrogen as a component of the US energy fabric. At the time it seemed like a forward-looking program, perhaps 40 years in the future. This year California opened its first public hydrogen fueling station. And Ford Motor Company is driving two internal combustion hydrogen cars in and around Dearborn, Michigan. A recent RMI report places estimates of global hydrogen fueled cars at between 10% and 50% of new cars by 2010. The RMI report identifies a implementation plan for hydrogen systems that combines the market forces of building energy use, electric power leveling (storage), and automotive use to jump-start hydrogen as an energy delivery system. The RMI plan identifies technologies that have been invented, tested, and prototyped. In most cases, these technologies have already been subjected to manufacturing plans.

Thus, I feel the Fifth Power Plan should address projects regarding hydrogen. At least three projects come to mind. (This comment provides specific examples to support the notion that GEN-9 and GEN-15 should each list some specific examples of firming and shaping technologies.)

First, implement a series of automotive fueling stations, running on a mix of natural gas reformers and electrolysis; located to extend up from California, through Portland, to Seattle, and on to Vancouver, BC. Our first station could be at SeaTac Airport to fuel the hotel shuttle fleets. The first big win will be cleaner air at the pick-up and drop-off points at the Airport. The relationship to the electric system is to discover if electrolysis (as a portion of the hydrogen production portfolio) holds electrical power system impacts. For example, it might become a means to more fully utilize transmission structures by producing hydrogen during off-peak hours. Also, if automotive transport reliance on the electric grid grows, then the power system growth predictions may change sooner than we think.

Second, implement a building fuel system designed for load-peaking and used for CHP to make it economical. Place this system at an urban fueling station. This is a test case for several economic wins that we often identify. It is a model for reducing transmission reinforcement. It combines a site for automotive and building production of hydrogen. It could be large enough to contain both natural gas and electrolysis conversion options, so the best economic conversion choice could be made hour for hour. And, it could become home base for a shared vehicle fleet.

Third, implement an electrolysis production system at a wind power site reasonably close to an urban center (perhaps Spokane) and test its capability to curtail wind farm output on demand, i.e., test power storage, and use the hydrogen for an industrial or automotive use.

9. **Independent Power Producers** --- Although the draft report does not use these exact words, it appears that the present IPP ownership contributes to the volatility of our region's power cost. Yet, no particular advantage is cited for maintaining IPP ownership (except, of course, that it is Federal law).

So, we might ask, "Is it appropriate to encourage procurement of IPP generation facilities by our region's utilities on an opportunistic basis?" By opportunistic, I mean when the economic values swing in favor of utility purchase.