

December 18, 2014

From: Laura McCarten, Xcel Energy
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Merritt,

Thanks for the opportunity to provide some thoughts, questions and suggestions about the Ramboll evaluation report. This is a good effort to start with the broad view, and then determine steps to further refine this analysis in order to yield more facts and details, insights, and ultimately a more informed understanding to guide the path forward. We certainly see this as the start of a process that will engage all of us in a deeper discussion, learning and exchanging ideas, and building a better understanding towards shared goal of the providing this 21st century legacy community with the best energy offerings available.

To capture further input on this draft I'll be reaching out to internal colleagues including our staff that operate our District Energy system in Denver and others who have been involved in analysis of CHP and other outlined technologies.

Our comments are organized in a couple of categories. First, we lay out some high level comments and suggestions for an expanded economic analysis that would help provide a more comprehensive, solid understanding of how to develop and market this site. We also lay out some high level questions or suggestions on the evaluation process, and provide specific questions and suggested changes to some of scenario evaluations. Finally, we respond to the list of posed questions.

Value of Contrasting BAU economics to current service offering

We would characterize the “current offering” as area heating provided by our natural gas distribution system, either forced air for residential and commercial applications or gas boilers for other applications, along with electric supply from our electric grid. This current offering can be viewed as a platform on which to incorporate many of the other innovative energy systems being evaluated for this project. We believe the current offering is most cost effective to serve the Ford Site, and as a regulated utility we are subject to the regulatory framework which is charged to ensure reasonable costs and reliable service for utility customers. Further, Xcel Energy’s power generation portfolio is one of the cleanest in the country and we are on the path to achieve further reduction of carbon emissions and other environmental impacts, all while maintaining strong reliability and evolving to a more advanced grid design and operation. Recognizing that this effort has determined the preference for starting with Combined Heat and Power (CHP) and district heating platform for an innovative development effort, we

believe that an understanding of the economic tradeoff in this is needed for the successful marketing and development plan for the Ford site. Such an analysis would inform the valuation of the innovative approach to site development, what incentives or subsidies may be necessary, and their magnitudes, and how those could affect the process to market the site and interact with developers and others parties.

As reported by a variety of sources, CHP is best applied at facilities where the CHP system can operate efficiently, serving significant, continuous and concurrent electric and thermal demands. And, the most efficient sizing for CHP is to match thermal output to the site's baseload thermal demand. "There are a number of commercial and industrial applications that characteristically have sufficient and coincident thermal and electric loads for CHP, e.g. food processing, pulp and paper plants, laundries, and health clubs. Most commercial and light industrial applications have low base thermal loads relative to the electric load, but have high thermal loads in the cooler months for heating." (source FVB report on CHP to the MN DER). In the case of the Ford site, the range of baseload thermal demand is generally known, reflecting the range of anticipated applications at the site. How does this defined demand load influence the economics of the CHP facility? Understanding this would better serve the marketing and development approach for the site and help identify strategies that could be pursued to reduce the cost premium.

Another key factor in the economic analysis of CHP is what price is received for the electricity generated. The report assumes that the CHP output would be bought at a "meaningful price". If the output is sold to the local utility, the price paid is the utility's avoided cost, to ensure the utility's customers aren't paying too high a price for the power. Xcel Energy current avoided cost is lower than the price a small CHP facility would likely require. What price did Ramboll assume in its analysis? This is the type of information that can start to provide a better understanding the degree of the cost premium for various aspects of innovative energy design.

Evaluation Criteria Weighting

As the analysis progresses it would be helpful to consider an appropriate weighting factor for each evaluation criteria. Here's an example of a possible approach to determining such factors, looking specifically at the resilience factor. This factor is a little murky, but one way to think of it is to reflect the ability of a given technology to keep the Ford site powered (electric, heating, cooling, etc.) in the case of an outage to the electric power grid (or, outside of the BAU, natural gas heating service). Xcel Energy's electric grid is over 99.9% reliable, i.e. on average a customer is without electricity or heat, less than 0.1% of the time. The natural gas heating system is even more reliable. Given this, it seems that no innovative alternative technology would offer significantly better "resilience" than the current offering, because it can only improve within that very narrow band of 0.1% to something still above zero. Incorporating a CHP facility at the site, with

the presumption that the CHP inherently has a positive affect to the site's resiliency, means that the range of variation in resilience between different applications is even smaller - hence even less significance between any scenarios. The conclusion is that scoring on resilience provides no insight in a comparative evaluation of various scenarios. We recognize that this conclusion may not hold if the definition of "resiliency" is different.

Additional levels of resilience may be desired or required for certain applications at the site, and may be best addressed by a customer specific, rather than overall site solution. The cost vs value assessment of improvement in overall site resilience should be understood. An electric microgrid application may be a solution for achieving the desired resiliency performance, and would be an opportunity to showcase innovation.

There is another consideration that likely affects much of the scoring and so all should be reviewed for this: as per the State of Minnesota's Next Generation Improvement Act of 2007 which established goals through the Conservation Improvement Program (CIP), Xcel Energy offers a comprehensive portfolio of energy efficiency programs intended to drive customers of all types to reduce their energy consumption. A prerequisite to qualify for these efficiency programs is to be an Xcel Energy customer. Thus, the evaluation should reflect a potential risk for technologies that could either a) impact future customers' ability to qualify for programs if they're not an Xcel Energy customer or b) capture the conservation benefit for the system once up front thereby limiting future customers from achieving future energy conservation benefits.

Specific questions, suggestions

1) Ruling Out Technologies (page 2) - A waste incineration plant was ruled out due in part that the stress on the traffic system to deliver the waste (fuel) is deemed unacceptable. Should the analysis also rule out further consideration of use of wood waste, biomass or other new fuels that would also entail stress on the traffic system?

2) Technology Scoring (page 2) - It says that technologies deemed to not be economically viable can still be scored. Economic viability is a key component to realizing the implementation of a technology, but this critical measure remains vague with no defining context. Without a solution to achieve economic viability is a technology worth scoring or even including in further the evaluation? It would be useful to get more information as to what about each technology is not economically viable (upfront capital, O&M, etc), attach a dollar amount to the gap(s) and potential solutions and sources for subsidy to achieve economic viability.

3) Definition of Legacy/Innovation (page 3) – Understandable, this definition is fairly subjective. While a very laudable goal for this once-in-a-lifetime redevelopment opportunity, and a stated priority of Mayor Coleman and the City, it would be helpful to start identifying more specific parameters and metrics to guide further evaluation of options and tradeoffs.

4) Power Grid & Market (page 6) - The assumption states that excess CHP power can be sold to Xcel Energy for a meaningful price. We'd like to get some definition on that assumption to understand what price range is being used. I'm happy to ask our staff to assist on evaluating their current assumed price and even help establish a range using some existing Power Purchase Agreements (PPAs) while respecting the confidentially clauses within those PPAs.

6) Business As Usual (page 6) - The evaluation states "In terms of resilience, the technologies are reliable, although it does not provide any heating and electricity supply to the site in case of respectively gas cut off and power grid failure. The system can hardly be seen as innovative, but it is fairly energy efficient and cost effective." We assume that this refers to BAU as we understand and outline above. By contrast, the current offering of Xcel Energy's natural gas and electric systems incorporate engineering, operations and regulatory standards to ensure maximum customer reliability and as such, are among the most proven and assured technologies for resilience.

Considerations – responses to the posed questions (page 10)

Q: Is any technology missing that should be in the list?

A: Potential for piloting an emerging micro grid technology to support the goal of Legacy/Innovation?

Q: Are the ratings fair?

A: see above notes

Q: Do you agree with the assumptions laid out in the paper?

A: Tremendous work from all thus far. Both Xcel Energy staff and Ramboll have open questions requiring a dialogue. A conference call with both parties is being scheduled.

Q: How should the agreed 5 goals (Net-Zero, Resilience, Innovation, Energy Efficiency and Cost Effectiveness) be weighted and prioritised if any?

A: Prioritized into primary and secondary goals and ranked as follows:

Cost Effectiveness (primary)

Energy Efficiency (primary)

Innovation (secondary – should be considered in concert with cost effectiveness)

Net-Zero (secondary)

Resilience (secondary – as per earlier discussion)

Q: Which setup should be taken forward for further detailed design?

A: As mentioned above, economic viability remains a crucial and lacking component throughout this analysis. Void of any defined costs for capital, O&M (operations & maintenance), ROI, site acquisition, etc it is difficult at this time to suggest a setup to take forward. I would strongly consider adding costs to these options that include needed subsidy amounts to achieve economic viability.

Again Merritt, thank you again for the opportunity to participate in the TAG and weigh in on this document. Looking forward to an exciting redevelopment project!

Regards,
Laura McCarten