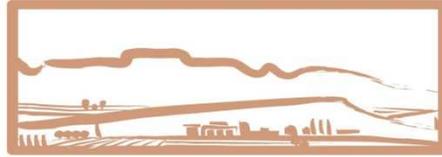


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CITIZENS FOR DIXIE'S FUTURE

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Subject: Lake Powell Pipeline (LPP) Financial Model

Thank you for the modeling work performed by Applied Analysis on behalf of the Washington County Water Conservancy District. As I understand it, the purpose of the model is to aid in the decision-making process for the LPP by showing the distribution of construction and operating costs to Washington County citizens and businesses over time. It's a very welcome addition to the discussion of the LPP's viability. This paper outlines some questions and potential issues with the model in the hope that we can work together to resolve them in a more private and less polarizing environment than has been the norm for our interactions. Please respond by May 9 concerning your willingness to try this operating mode.

Personal introduction

I am an engineer with some finance background: Electrical and Software/Computer Engineering with masters work in systems engineering and modeling, and an MBA with concentrations in macro-economics and finance. I spent much of my 37 year career at The Boeing Company modeling complex highly integrated systems. I hold patents in modeling processes and systems modeling and am a member of Boeing's Technical Fellowship. My professional work involved the model-based design of airplane architecture, driving the integration of the detail design with it, and using the models to verify airplane behavior under various probabilistic conditions. While I have never done financial modeling, I know something of modeling and finance in general. I'm a facts, data and logic guy; if the facts have a clear basis and the conclusions are logical, I'll support them.

Summary Impression of the LPP Financial Model

For such an expensive and important decision, the viability of the Lake Powell Pipeline (LPP) should be determined to a very high probability. Even though there are many variables that have a basis in water resource technology, the case can largely be reduced to the related financial viability. I support the use of modeling to help make an informed decision about the LPP. Valid models must be clear in their basis, delineating facts from assumptions and assigning probabilities in order to be used for decision-making. From my limited exposure to the LPP Financial Model, I can't delineate facts from assumptions and it does not include the necessary probability variations required to support conclusions about financial viability.

Specific Issues and Requests

The presentation at the November 21st CIRPAC meeting was very interesting, although not what I expected. An actual demonstration of the model was a very good way to expose the audience to the purpose and power of the model. I had expected more of an explanation of the model's design, but certain elements of the design could be surmised from the demonstration. What follows here is an outline of the model elements that in my initial opinion should be strengthened or clarified in order for it to be a valid predictor of financial viability.

Data Accuracy - facts versus assumptions versus demonstration

One of the primary responsibilities in using a model is the assessment of the accuracy of the data used in the execution of the model. There are many variables used by the model, and many of them have substantial influence on the results. The model's documentation should include a list and classification of the values used for those variables into the following categories:

1. Those which are considered factual (with reference to a valid source)
2. Those which are assumed to be factual but without source validation
3. Those which have no factual basis (e.g., those which are used for demonstration purposes).
4. Those which are "control" variables (e.g. usage and impact rate structures)

As far as I can tell, the results of the model from the November CIRPAC committee meeting have not been characterized, and that will lead to misconceptions by any audience. A request: could you supply the list of variables used in the model, the values for those variables used in the November CIRPAC demonstration (and in other model executions if you think they are pertinent), a classification of those values and the results of the model execution for those variable values?

Probabilities

Any model is only as good as its design and the data fed to it. This is especially important in predictive models where by definition the values of the variables are uncertain. There are very large uncertainties involved in the LPP financial model, and I saw no evidence that the model was designed to be probabilistic. This is absolutely necessary in order for the model to be of value. There are many variables that have important probabilities, for example:

1. Lake Powell's ability to supply the LPP (considering the river's over-allocation, increasing demands, and the impact of climate change/drought)
2. Washington County population growth
3. Graduated conservation costs and resulting yields
4. Local water supplies (including those not previously identified)
5. Construction and operations costs
6. Interest rates over the financing period
7. Ability to secure financing

For a project of this importance and expense, the overall probability of success should be extremely high and be reasonably demonstrated as such. Considering the impact of incorrect analysis in case of the LPP on county and personal finances, and ultimately real estate values, a probabilistic model showing a range of outcomes with well-founded probabilities assigned is required for the model to be worthwhile.

Source and terms of financing

The model assumes that a 2008 understanding between the WCWCD and the Division Water Resources of the state's financing is true and binding. A fundamental error such as the assumption of a fixed 4% interest rate leaves room for concern. Even if the state services the bond for an extended period without a contribution from Washington County, that interest (and interest on that interest) will have to be repaid at some point. The bond market's appetite for municipal bonds such as this may drive the rate considerably higher than expected. Due to its huge ramifications, additional verification that the legislature shares the stated understanding seems prudent.

Model Verification

Could you outline the processes you used to verify the model would produce correct results? Is the design of the model is proprietary? With the economic health of the county at stake, the processes used to verify the design and the implementation should be recorded and available to the public. As an analogy in the airplane certification process, all methods and tools used to verify the airplane is safe are approved by the FAA.

Recommendation

The probability of reaching an untenable financing situation should be determined to be extremely remote. Quantifying "untenable" and "extremely remote" is a necessary exercise that I haven't yet seen performed. We should define those terms and then determine through model executions that the terms can reasonably be met. If the model was not designed to be probabilistic, it may be difficult to add that feature at this stage. As a practical alternative, the model could be iteratively executed for a two sets of scenarios:

1. Different combinations of values for each variable over the range of their individual probabilities; for each output, the combinational probability could be determined and compared to our "worst case".
2. Using the worst case acceptable outcome (the level of impact and use fees that would be unacceptable), determine the sets of variable values that could result in that case, determine the cumulative probability of those cases, and compare them to the minimum acceptable probability of that worst case outcome.

You may have done some of this already, but perhaps not with acknowledged probabilities or with determined limits. Something like this is necessary to demonstrate the financial case.

Conclusion

The model-based analysis of the LPP financial viability is a very significant development. However, from information currently known about the model, it appears to be a significantly inadequate predictor of future financial requirements, consequences and overall viability.

CDF opposes the LPP for three primary reasons: 1) we should be excellent stewards of our local water before we look elsewhere for more, 2) the current and anticipated use of the Colorado as a water source is unsustainable, and 3) the probability of an untenable LPP financial plan is too high. Addressing our understanding of item 3 would be a great next step.

Signed April 23, 2014

Tom Butine, President of the Board, Citizens for Dixie's Future