Agenda Date: January 10, 2019
Item Number: A1

Docket: **U-151958**
Company: Staff Investigation

Staff: Jason Ball, Deputy Assistant Director – Energy Economics & Reliability
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Recommendation

Close Docket U-151958, Staff Investigation into Reliability Benchmarking.

Summary

In 2015, the commission opened an investigation under Docket U-151958 to investigate the validity of an econometric approach to benchmarking reliability performance. As part of that investigation, the commission contracted with Power System Engineering, Inc. of Madison, Wisconsin, to perform an econometric benchmarking study. The final report, titled "Reliability Targets for Washington's Three Investor-Owned Utilities" was filed with the commission on June 7, 2017. The commission solicited comments from interested parties and held a workshop on September 19, 2017.

Based on the work in this docket, staff concludes that econometric reliability benchmarking is useful for evaluating aggregate reliability performance, but is limited in how it can be used to inform investment decisions. Further, penalties associated with reliability benchmarks may have the unintended consequence of biasing investment decisions toward projects with specific reliability performance benefits. This would occur at the expense of projects that have more value across a wider range of benefit categories. Therefore, investments in local system infrastructure should be evaluated using the business cases supporting those investments rather than aggregate benchmarks. In total, staff found that:

1. Utilities should continue to develop benchmarking methods and metrics, particularly as they assess whether to make investments specifically to improve reliability performance.
2. Reliability benchmarks (econometrically derived, or otherwise) should not be used to establish penalty mechanisms as this time.
3. Infrastructure investments should be evaluated using their underlying business cases and a wide range of benefit streams, including benefits related to reliability improvements.
4. Evaluation of reliability-specific investments should happen on a case-by-case basis in consideration of the project need.

During the course of this review, electric utilities continued to submit annual reliability reports pursuant to WAC 480-100-398. After reviewing the 2017 reliability reports, staff identified significant inconsistencies in the types of information utilities were reporting as well as categories of information included in the reports that were largely unrelated to reliability. Staff

initiated a broader review of reliability reporting with the goal of assessing the need for improving the usefulness of content of the reports and eliminating certain content unrelated to reliability. A team comprised of the commission's regulatory services, policy, and consumer protection sections was assembled to undertake this assessment. The team's objectives were to:

- Gain a better understanding of the context in which the content of the reliability reports originated and continues to evolve;
- Discuss possible content improvements to the annual reliability reports in an effort to provide stakeholders with useful reliability information; and,
- Develop a briefing on staff's findings and recommendations.

Due to the fact that reliability performance benchmarks are typically provided in annual reliability reports, the broader reliability reporting inquiry included an additional layer of review of reliability benchmarking methods and the value of those benchmarks. Therefore, staff's recommendations with regard to econometric benchmarking, and reliability benchmarking more generally, were informed by both the efforts in Docket U-151958 and the reliability reporting inquiry. The results of that inquiry are included as Attachment A to this memo.

Background

Investor-owned electric utilities (IOUs) subject to the commission's jurisdiction are responsible for providing reliable electric service to their retail electric customers. However, whether a given utility's reliability performance is adequate, poor, or even too aggressive is often difficult to ascertain. As a rough gauge on the reasonableness of each utility's reliability performance, when reporting reliability performance, utilities also report performance benchmarks.

Traditionally, utilities benchmark reliability performance in one of two ways: by peer group comparison or by comparing utility reliability performance against their own historical performance. However, these traditional benchmarking methods do not reflect an objective view of what reliability level each utility should target. Since each utility has unique service territory characteristics, a peer group will never accurately represent the utility in question. Therefore, a peer group could lead to incorrect conclusions about the appropriate level of reliability performance. Similarly, a utility that is striving to maintain consistency with a historical reliability level does not objectively know if that historical level is appropriate; there is nothing indicating whether that historical reliability performance is poor or excessively high.

Econometric benchmarking studies aim to address the shortcomings of traditional reliability benchmarking studies. An econometric benchmarking study uses nation-wide data to establish quantifiable relationships between certain service territory characteristics and reliability performance. In turn, those relationships are used to determine the expected reliability performance of a utility based on that utility's specific service territory characteristics. This generates a modeled, "expected" reliability performance using identical service territory characteristics for the utility in question. This model provides more meaningful information on the performance level a utility should target given its unique circumstances.

Overview of Consultant's Report

Results

Commission staff contracted with Power Systems Engineering, Inc. to produce an econometric benchmarking study and to generate econometrically derived reliability targets for all three electric IOUs in Washington. The study was entered into Docket U-151958 on June 7, 2017. The study found statistically significant relationships between reliability performance and forestation, customer density, frequency of thunderstorms, terrain complexity (quantified by standard deviation of elevation), and undergrounding. With a quantified relationship between reliability performance and these factors, the consultant produced a statistical model controlling for each factor. The resulting model creates reliability targets for each utility based on unique service territory characteristics.

The modeled reliability targets for both SAIDI and SAIFI is as follows:[1]

SAIFI Targets with 90 Percent Confidence Intervals

	Target (expected performance)	Upper C.I. (90%)	Lower C.I. (90%)
Avista	1.05	1.29	0.82
Puget Sound Energy	0.90	1.10	0.70
Pacific Power	1.50	1.83	1.17

SAIDI Targets with 90 Percent Confidence Intervals

	Target (expected performance)	Upper C.I. (90%)	Lower C.I. (90%)
Avista	116	147	86
Puget Sound Energy	113	142	83
Pacific Power	123	155	90

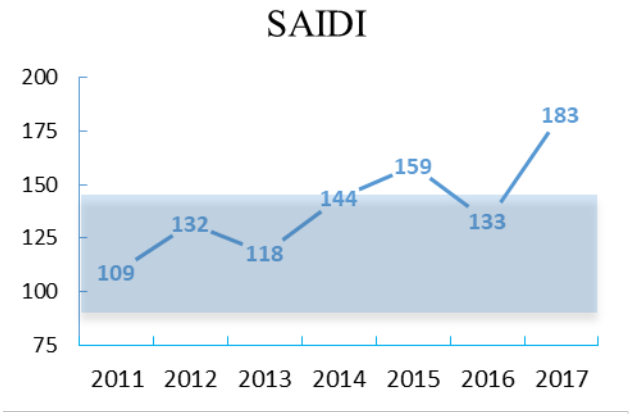
Actual Utility Performance

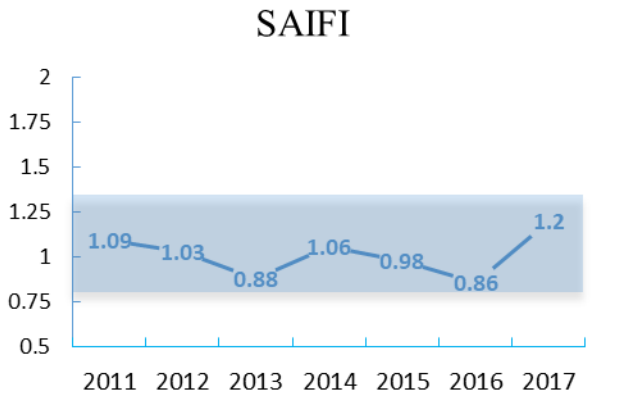
The charts below summarize the utilities' actual SAIDI and SAIFI performance levels during the study years in comparison to the econometrically-derived target range:

[1] The confidence intervals, above, represent the statistical uncertainty of the model. While the model predicts an expected reliability performance for each utility, the "true" expected performance likely falls somewhere within the 90 percent confidence interval. The "expected" performance is essentially the midpoint of the confidence interval.

AVISTA

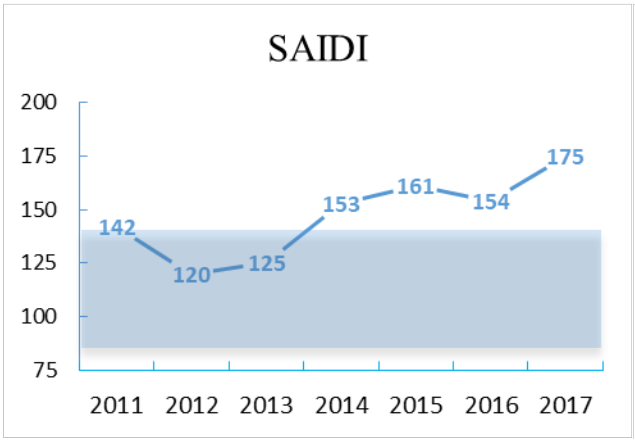
Shaded Area Represents Modeled (Expected) Performance

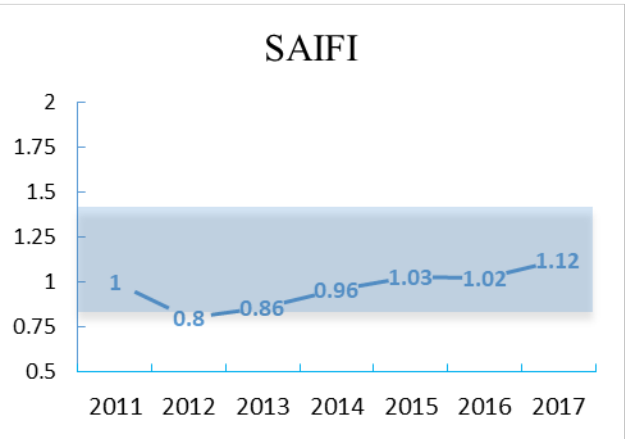




Puget Sound Energy

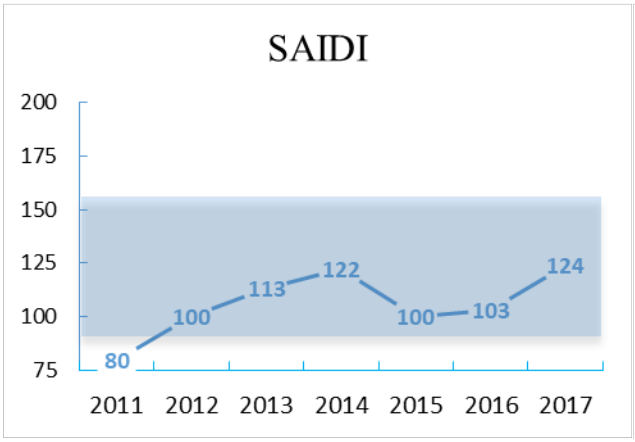
Shaded Area Represents Modeled (Expected) Performance

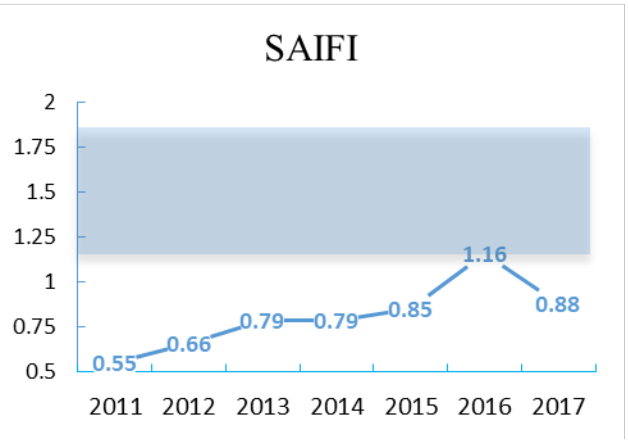




Pacific Power

Shaded Area Represents Modeled (Expected) Performance





Interpretation of Results

Avista

While Avista seems to be well within the expected range for SAIFI (with a five-year average of 1.00 and a 90 percent confidence interval for expected score of 0.82 – 1.29), the company's SAIDI performance is slightly more concerning. Avista's five-year average for SAIDI was 147 while the 90 percent confidence interval for expected score was 86 – 147. In other words, Avista's five-year running average for SAIDI is on the verge of breaching its upper boundary. Additionally, with a SAIDI score of 183 for 2017, which is by far the company's highest SAIDI score over the seven year study period, Avista's event durations should be monitored closely over the coming years.

PSE

PSE's performance is similar to that of Avista. While PSE seems to be well within the expected range for SAIFI, the company appears to be beginning to underperform on SAIDI. PSE's five-year running average for SAIDI is 154, which is notably higher than the upper boundary of the expected performance (which is 142). Like Avista, PSE's event durations should be monitored closely over the coming years.

Pacific Power

Pacific Power has markedly different performance issue from Avista and PSE. While both Avista and PSE seem to be bumping up against the upper boundary for SAIDI performance, Pacific Power's performance is well within the expected range (with a five-year average performance of 112 and a 90 percent confidence interval for expected performance of 90 – 155). However, Pacific Power appears to be over-performing with respect to SAIFI. While the 90 percent confidence interval of expected performance is 1.17 – 1.83, Pacific Power's five-year average is 0.89. With what appears to be over-performance on event frequency, there is risk that the company is over-investing in reliability and putting upward pressure on rates. Therefore, Pacific Power's investments in reliability should be monitored closely over the coming years.

Summary of Comments from Stakeholders

Public Counsel supports employment of reliability benchmarks, but does not believe that current methodologies for establishing reliability targets are suitable. Public Counsel supports the notion that econometric benchmarking may assist in revealing whether the reliability performance of Washington electric investor-owned utilities is deteriorating beyond an acceptable level. Public Counsel also supports individualized targets for each utility, and supports imposing penalties for not meeting reliability targets. Public Counsel's primary concern with econometric benchmarking is with the lack of specific variables in the model.

Boise White Paper commented that while general reliability metrics like SAIDI and SAIFI may be useful to the commission in a broad context, such metrics may not provide the commission

with relevant information to properly gauge how well IOUs are serving their customers, and particularly their largest customers. Boise proposes that for large customers, the economically efficient level of reliability might be evaluated best through specific service data relative to individual customers. Boise does not support the notion that an econometric approach provides a sound basis for evaluating the need for reliability investments; aggregate reliability metrics say very little about performance with respect to individual customers.

The three investor-owned electric utilities were unanimous in their objection to econometric models being used to establish penalty mechanisms or assess the need for reliability investments. Although the utilities all point to shortcomings in the model produced by Power Systems Engineering, including the lack of precision in the benchmarks produced by the large confidence intervals, the most forceful objections seemed to be based on the notion that econometric benchmarks by themselves are not useful for assessing specific investments. Many factors are considered when making investment decisions or making a decision to improve or relax reliability performance, including customer satisfaction and expectations, cost effectiveness of investments, risk assessments associated with aging infrastructure, and reliability valuation.

While Pacific Power does not support the use of an econometric approach whatsoever for assessing reliability performance, both Avista and PSE have commented that they believe an econometric approach can provide a useful perspective on the utility's performance as it may highlight areas where further examination is warranted. PSE notes, however, that an econometric approach is only one point of reference and should be considered alongside other information.

Avista also suggests the commission rely on each utility's stated reliability objective, its quantitative support for objectives, documentation of the reliability investments intended to achieve objectives, and assessments of cost effectiveness.

Staff Reliability Reporting Inquiry

Staff's broader investigation into reliability reporting addresses numerous topics related to reliability investing and reporting, some directly and some tangentially. The full inquiry report is included as Attachment A to the memo. Staff concludes that, while reliability has always been a core function of electric utilities, it should not be analyzed as a standalone business objective. Rather, reliability outcomes are the result of multiple decision processes across a company which, themselves, are driven by value propositions beyond just improved reliability.

In evaluating the larger picture of reliability monitoring, staff found substantial statistical uncertainty with any benchmarking approach, including econometric benchmarking. It is difficult for utilities to fully commit to a target that is imprecisely derived. Therefore, utilities should be free and encouraged to use a combination of approaches or develop new, novel, or more sophisticated means to establish performance benchmarks. Those approaches can work in concert to inform utility objectives and improve or relax reliability performance.

Conclusion

While an econometric approach produces what staff believes is the most meaningful benchmarks for each individual utility, those benchmarks are of limited value when evaluating typical distribution system investments. The benchmarking investigation, based on multiple sources of information, exposed weaknesses in relying on aggregate reliability performance benchmarks to justify individual investment decisions. As discussed in Attachment A, investment decisions are driven by comprehensive business cases and are only marginally informed by aggregate reliability metrics. The decision to move forward with an investment is very rarely driven by the sole objective of meeting reliability targets.

Further, the IOUs engage in a myriad of reliability practices, but it is sometimes challenging for them to communicate to regulators their purpose and scope. While some information currently reported to the commission may have reliability implications, not all of it is useful in measuring reliability. Therefore, each electric IOU's reliability report needs to be more digestible. Topics beyond a strict interpretation of "reliability" may be better addressed in arenas with more complete and deliberative conversations.

The reliability reporting inquiry contains multiple recommendations to ensure readability and to begin addressing these important topics. Staff believes the commission should issue a notice requesting comments and a workshop on the staff reliability reporting inquiry.

Recommendation

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Attachment A is provided
in electronic format only