For the Missouri Public Service Commission

In response to request for comments regarding distributed energy resource issues

File Number EW-2017-0245

Comments of Oracle Utilities

I. Introduction

Oracle Utilities appreciates the opportunity to offer comments regarding the integration of distributed energy resources. The rapid adoption of these resources nationwide means that now is the right time to understand the impacts this will have on Missouri's electric grid and electric utilities. Thank you for considering this important issue.

Oracle Utilities helps electric, gas and water utilities worldwide enhance the customer experience, increase operational efficiency and achieve performance excellence. We work with more than 2600 utilities around the world, including the largest utilities in the United States. The largest provider of cloud services in the industry today, our software enables our clients to adapt more nimbly to the complex, evolving utilities future.

In the past, the electric grid was an analog tool, a system of poles and wires that were operated manually. Our modern grid is very different. The grid is increasingly a digital tool, enabled by software and information technology that predict and respond to grid conditions in real time. The grid of the future needs to be even more advanced in order to efficiently integrate distributed energy resources (DERs) into planning and real-time operations.

In these comments, we will focus on how software can improve the integration of DERs.

II. Existing utility systems were not designed to fully integrate DERs

The answers to many questions from the Commission's September 6, 2017, order require insight into actual penetration levels of DERs, as well as the performance characteristics and location of specific DERs.

Consider the question, "Will any distribution system upgrades be required to accommodate or facilitate the development of distributed energy resources?" While the utilities continuously make investments in maintaining a high-performing grid, the simple answer to this question is no doubt, "Yes." In order to comprehensively answer this question, though, one would need to know where all of the DERs are on the grid and how each of those DERs will function under different conditions and in some cases varying customer behavior.

Most utility systems in use today were built for a different grid, where DERs weren't a core issue. These systems work well, as demonstrated by the utilities' high reliability levels. At the same time, these systems weren't intended to provide sufficient information to fully integrate DERs into utility planning and operations, which will become an issue as more DERs are placed on the grid. For example, many

distribution management systems are simply based on the utility's SCADA system. Customer-located DERs, including behind-the-meter DERs, are invisible to SCADA, which isn't designed to see beyond the transformer to the low-voltage network. Many DERs are also treated as undifferentiated assets (e.g. "rooftop solar") as opposed to unique assets (e.g. "a 5kw rooftop solar system oriented at 30 degrees southwest-facing with zero shade and a load shape derived from observed historical performance").

III. Modern software solutions are built for full DER integration

Utility software vendors recognized the shortcomings of existing systems, and have developed tools to enable full integration of DERs. At Oracle Utilities, for example, we have upgraded our Network Management System to include DER integration functionality. This tool now includes features like a full asset registry that records unique attributes of each DER and a low-voltage network management tool that models individual feeders beyond the transformer.

While the specifics of a grid management system will differ by utility, some of the core capabilities that the system should support include:

- **In-depth network modeling**, which will be central to load forecasting and capacity planning. Grid operators need accurate profiles for each DER device to improve generation predictions based on location, time, weather, and condition of the equipment. Similarly, profiles of equipment enrolled in DR programs can help utilities reduce overloads or mitigate voltage violations in the precise places and amounts needed. Software is vital to maintaining this information in a useful format, but collecting the information will require a significant effort from the utilities. Utilities can also offer incentives for DER and DR programs that can ease bottlenecks and further maximize efficiency while reducing the need for emissions-plagued generation.
- **Islanding**, which is a new way to manage outages and restorations. With DER coming onto the grid, the outage management system must harness a broad range of customer data and resources across the entire distribution grid. It must then aggregate that information and present it with operational context so that outage management personnel can determine a prioritized way to more quickly restore power to customers. In the futue, islanding could permit a utility to isolate parts of a grid and power each part individually using local solar gardens, batteries, backup and rooftop generators, and even demand response to balance the local requirements in real time. Similar to effective alarm management, islanding requires accurate visibility of the distribution grid combined with intelligent data management. Again, software is vital to achieving this functionality, but is not the sole component. Islanding for an extended period would require additional non-software investments in advanced technology.
- **Value-based services**, based on location and devices. To scale up to millions of devices, utilities will need automated information management processes with customers/contractors involved to capture key attributes and populate a DER device registry that, in turn, can be used to model the customer connections and grid impacts. When utilities begin offering multiple programs involving customer-owned equipment, a smart device asset management system will become imperative. The utility will need the system to support scalable data management processes

required for the exponential growth of sensor-based devices. Smart device management will facilitate very sophisticated outage, distribution, DER and demand management programs.

IV. Integration of DERs will require new software investments from utilities

Part of the Commission's interest in seeking information on DER integration is likely to identify future utility investment needs. In addition to new hardware and traditional grid-based assets, utilities will need to enhance their internal systems used to plan and operate the grid. One of those key systems is grid management software. Because new tools are available that have the functionality to fully integrate DERs, the Commission should be prepared to examine proposed investments in software upgrades.

V. Conclusion

Fully integrating DERs into utility planning and operations is the right goal for Missouri. In addition to operational benefits to the utility, customers will be better off with improved DER integration. Customer-sited systems will deliver greater value to the grid, and customers will have more opportunities to benefit from managing their energy use. Meeting this goal is only possible with the right tools and systems in place. Many existing utility systems work well for today's grid, but fall short of what the grid of the future requires. Missouri's utilities will need Commission support to invest in grid modernization and new software functionality that supports the planning and operation of the evolving electricity grid, including full integration of DER.

Thank you for the opportunity to provide these comments. I am available to discuss these comments in more depth should you have any questions.

Sincerely,

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