



NARUC

National Association of Regulatory Utility Commissioners

Financial Toolbox Series: Cloud Computing Brief

The National Association of Regulatory Utility Commissioners (NARUC) Center for Partnership and Innovation (CPI) Financial Toolbox series explores the types of financial tools utility regulators can use to support integration of electricity system technologies that benefit the public interest. This brief was prepared by Chris Villarreal (Plugged In Strategies) and Kerry Worthington (NARUC) and is based upon work supported by the Department of Energy under Award Number DE-OE0000818.¹ The speakers' [presentations](#) and [recordings](#) can be found at www.naruc.org/cpi-1/electricity-system-transition/valuation-and-ratemaking/.

On September 24, 2020, NARUC CPI hosted a webinar on Cloud Computing, featuring presentations from Amazon Web Services, Cloud for Utilities, and Advanced Energy Economy. The webinar and this companion brief provide public utility regulators with a succinct summary of technology and regulatory issues related to cloud computing. This brief covers:

- What cloud computing is and does
- Benefits of cloud computing and typical challenges in the electric utility sector
- Status of adoption and barriers
- Regulatory treatment approaches used to facilitate utility conversion to cloud computing
- Resources for commissioners and commission staff with more detailed information about cloud computing

¹ This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

What is Cloud Computing? Is it Different than Other Assets?

Standard business practices call for information technology (IT) solutions to address day-to-day business decisions that impact operations, corporate health, and customer satisfaction. Traditionally, utilities either built or outsourced equipment “on-premises” (such as data centers and software stored on computer hard drives) to enable business information systems and grid situational awareness. Cloud computing is the ability to access services, such as software and data, over the Internet. Leasing arrangements for cloud software is referred to as a Software as a Service (SaaS) contract.

Amazon Web Services defines cloud computing as: “the on-demand delivery of IT resources over the Internet with pay-as-you-go pricing.”¹

Instead of buying, owning, and maintaining physical data centers and servers, one can access technology services, such as computing power, storage, and databases, on an as-needed basis.² **Figure 1** shows applications, platforms, and infrastructure in the cloud, representing services and applications that can be hosted and accessed via the Internet and need not be located on hardware or at locations owned by the utility. In International Data Group’s (IDG) 2020 Cloud Computing Study, IDG reports that 81 percent of organizations across all industries have a least one application in the cloud, up from 73 percent in 2018.³

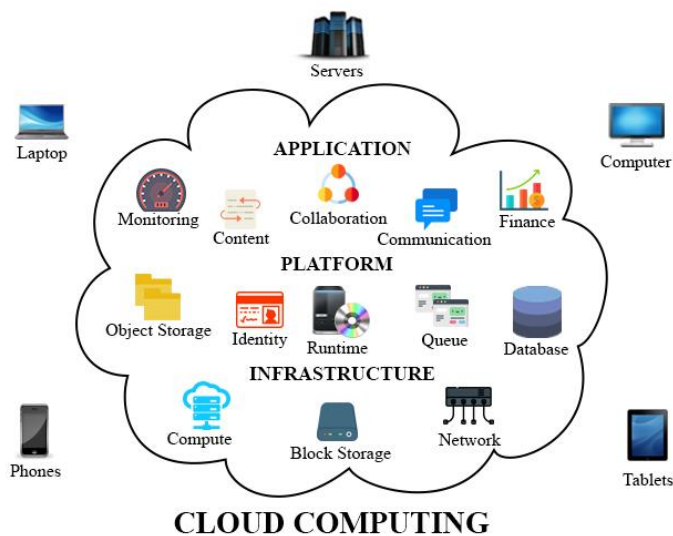


Figure 1: Cloud Computing Services and Applications

Much like the electricity capacity they build, standard practice was for utilities (and companies in other industries) to build their solution centers for their peak usage of data. Costs for these custom, proprietary IT systems were accounted for in the same manner as other capital assets, incurred and paid upfront then amortized over the asset’s life. The utility has the opportunity to earn a rate of return on capital expenses (sometimes referred to as “capitalized”).

Today, companies and utilities are able to procure IT solutions as they need them and often at a lower cost. Across all industries, hybrid systems (partially on premises and off premises) or “cloud” solutions (completely off premises) are widely available. However, cloud solutions and SaaS contracts are typically

² <https://aws.amazon.com/what-is-cloud-computing/>

³ <https://www.idg.com/tools-for-marketers/2020-cloud-computing-study/>

considered an operating expense for utilities. As a result, the utility does not have the opportunity to earn a rate of return (sometimes referred to as “expensed”).

As of at least November 2016, when NARUC passed a resolution on the regulatory treatment of cloud computing, regulators have been exploring barriers to utilities making prudent investments for the benefit of customers.⁴ As of 2018, Generally Accepted Accounting Principles (GAAP) began to allow commissions to treat cloud computing expenses as capital expenses. As of September 2020, only a few states have approved their utility treating SaaS as a capital expense.⁵

What Does Cloud Computing Offer to Utilities?

Utilities are increasingly looking at cloud solutions to assist in the operations of their system, including housing large data sets, supporting the implementation of demand-side management programs, operating customer information systems, and even visualizing data about the grid, such as through Supervisory Control and Data Acquisition (SCADA) (see **Figure 2**). Similar to traditional, on-premises solutions, cloud services can address a variety of business challenges. Utilities can contract for these services when they need them and providers offer various customizations of their products.



Figure 2: 2020 Utility Cloud Uses

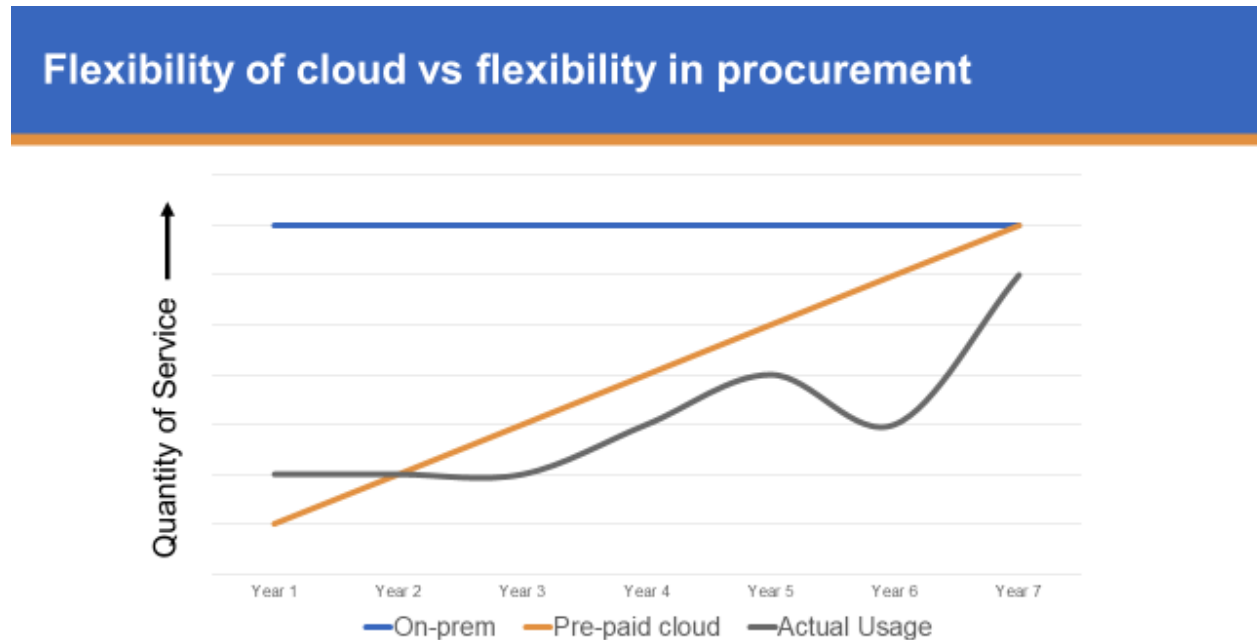
Some of the benefits that moving to a cloud solution could bring to utilities include:

- Better utilization of capital
- Lower costs
- Enhanced security
- Greater agility and flexibility
- More accessible and usable information
- Enhanced interoperability

⁴ <https://pubs.naruc.org/pub.cfm?id=2E54C6FF-FEE9-5368-21AB-638C00554476>

⁵ Some SaaS contracts are indisputably operating expenses, such as human resource software.

The most discussed potential benefit of cloud computing to utilities and customers is lower costs. Because cloud services are accessed using a “pay-as-you-go,” model, by moving to cloud solutions, utilities can pay for what they use. This approach is in contrast to a utility investing in “on-premises” hardware, which are built for peak usage days even if those peak times occur a handful of times. Cloud solutions allow a utility to pay for what it needs and ramp up or down in response to changing conditions. This flexibility provides benefits to utilities and customers as it allows utilities to avoid over-spending on IT, discontinue approaches that are not working, and be more responsive to customer needs. **Figure 3** from Advanced Energy Economy shows a representation of the costs of procuring on premises and cloud solutions.



9

Figure 3: On-premises vs. cloud solution costs over time

In this example, on-premise solutions are paid for all at once, even though they are not fully utilized until several years out. Pre-paid cloud solutions comes closer to meeting the actual needs of the utility, which results in lower costs up front that are then scaled up over time.

Despite these many applications and benefits, all transitions include challenges. Typical areas of focused preparation for utilities (and regulators) implementing cloud computing solutions include:

- Retraining technology staff and overcoming incumbent system management;
- Understanding the utility’s and provider’s role in securing the system and owning the data; and
- Ensuring robust implementation and interoperability plans to support integration before, during, and after system changes.

Status of Cloud Computing Adoption and Barriers

Widespread adoption of cloud resources by utilities has been delayed compared with other industries for reasons unique to the regulated utility sector. Specifically, the current utility business model

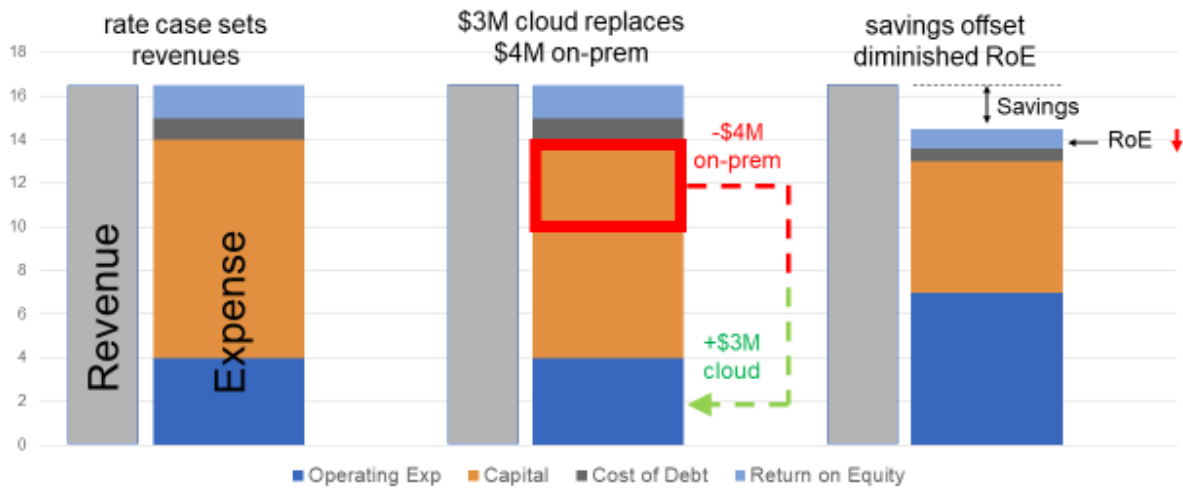
incentivizes utility investment in capital costs rather than operational costs. In February 2020, a 152-utility survey conducted by Cloud for Utilities found that 58 percent of respondents “agree” that they “made the decision to pursue on-premises IT solutions over cloud solutions because of the inability to earn a rate of return for cloud solutions.” Additionally, although 23 percent of utilities reported that their regulator allows for a rate of return for cloud solutions, 37 percent did not know if their regulator allows for a rate of return for cloud solutions.

Viewed strictly as a financial investment decision, for a utility seeking a data solution, existing accounting rules would encourage the utility to invest in hardware (capital expense) even if a cloud solution (operating expense) were less expensive. **Figures 4A-4C**, from Advanced Energy Economy, provide an illustrative example to explain the short-term and long-term incentives and impacts from foregoing earnings on capital expenses in favor of operating expenses.

- In **Figure 4A**, the utility retains savings in the short-term by selecting a \$3 million cloud investment over a \$4 million on-premises investment.
- After the utility gained in Figure 4A, the regulator would match the new revenue to the new expenses. This would result in lower rates to control revenue. In Figure 4B, the utility has diminished earnings from Return on Equity (RoE).
- In **Figure 4C**, the utility would shift their expense from a capital expense to an operating expense. Because there is a capital tracker (but no operation expense tracker), the utility will be eligible for a lower RoE. Despite the regulator reconciling revenues and total expenses in the next rate case, overall, switching to a cloud solution will reduce RoE and impact the financial health of the utility.

The result of this example is that the utility loses revenue when choosing a cloud solution, either as a true-up in the next rate case or via a clawback mechanism in the interim. Even when the cloud solution is demonstrably less expensive, the utility is not financially better off due to the unequal treatment of capital and operating expenses and their impacts on utility revenue.

Standard Cost of Service: Short-term financial impacts Savings retained as earnings



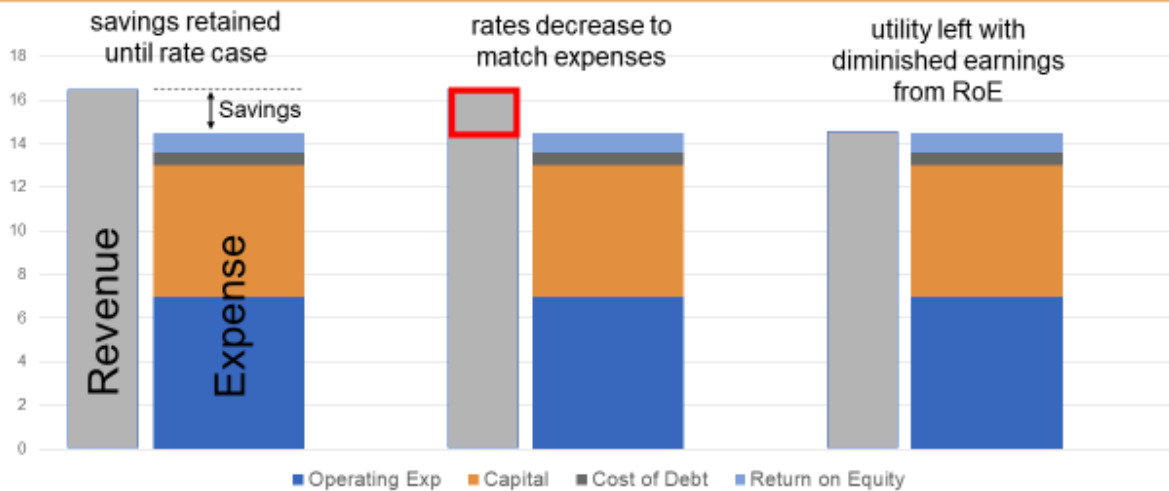
*Simplified illustration, cost of debt and RoE higher than usual so that they are visible. Taxes excluded (pass through).

3

Figure 4A: Results of the utility selecting a \$3 million cloud investment over a \$4 million on-premises investment. The utility gains in the short-term.

Standard Cost of Service: Long-term financial impacts

Savings disappear, RoE remains diminished

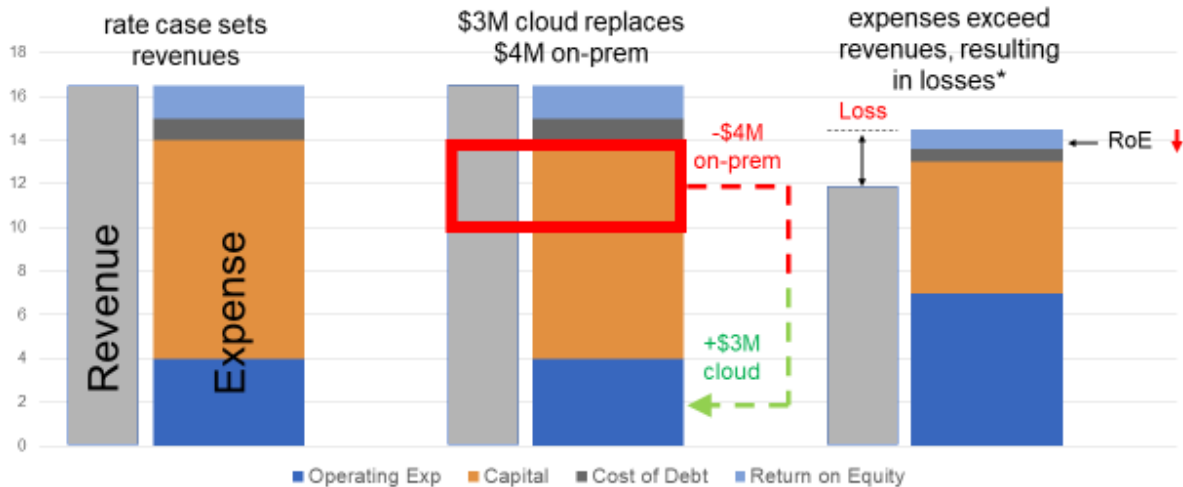


4

Figure 4B: After the utility gained in Figure 4A, the regulator would match the new revenue to the new expenses. This would result in lower rates to control revenue. The utility has diminished earnings from Return on Equity (RoE).

Capital Trackers/Clawbacks: Short-term financial impacts

Revenues reconciled with Δ capital, not Δ operating exp.



*Simplified illustration. Impacts are exaggerated for visibility. Effects are directionally accurate but would be smaller in magnitude for an actual utility.

5

Figure 4C: Capital Trackers will adjust revenue up or down depending on actual capital used. Clawbacks would only be a downward adjustment. The utility would shift their expense from a capital expense to an operating expense.

Regulatory Treatment Approaches to Facilitate Utility Conversion to Cloud Computing

In 2016, NARUC passed a resolution encouraging state commissions to consider allowing utilities to earn a rate of return or provide other incentives for the use of cloud computing solutions.⁶ This resolution acknowledged the utility financial bias towards capital expenditures while recognizing the potential customer, environmental, societal, and grid benefits of cloud computing.

More recently, the Federal Energy Regulatory Commission (FERC) issued a Notice of Inquiry seeking comments on the benefits and risks of cloud computing services in association with the operation of the bulk power system.⁷ This initiative is in response to comments from a prior FERC workshop where several Regional Transmission Organizations (RTOs) noted the growth of cloud-based solutions for the operation of their markets and protection of data. One RTO noted that existing Critical Infrastructure Protection rules appear to limit their ability to choose cloud services even when those solutions are cheaper and provide more value.⁸

A recent change in Generally Accepted Accounting Principles (GAAP) now provides for capitalization of implementation costs for most cloud solutions, though it did not speak to the cloud solution itself. By following GAAP, utilities and commissions can allow for operational costs to be treated like capital costs and earn a return. However, commissions retain the ability to decide whether the solution is appropriate or not.⁹ For example, in a May 2016 decision, the New York Public Service Commission allowed utilities to earn a rate of return on prepaid leases for software services, stating that “[t]o the extent that these leases are prepaid, the unamortized balance of the prepayment can be included in rate base and earn a return.”¹⁰ Additionally, regulators also retain the ability to decide if a SaaS contract is truly an operating expense rather than an alternative capital expense and justly classified it an operating expense without the opportunity to earn a rate of return.

According to AEE, Alabama, Illinois, Ohio, and Pennsylvania have also taken action on cloud for utilities:

⁶ <https://pubs.naruc.org/pub.cfm?id=2E54C6FF-FEE9-5368-21AB-638C00554476>

⁷ *Virtualization and Cloud Computing Services*, 170 FERC ¶ 61,110 (2020).

⁸ *Id.* at P 12.

⁹ *See, e.g., Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision*, Order Adopting a Ratemaking and Utility Revenue Model Policy Framework, New York Public Service Commission, Case 14-M-001 at fn. 114 (May 19, 2016).

¹⁰ *Id.* at 104.

State Actions on Cloud for Utilities

New York PSC confirmed existing rules allowed for software licenses to be prepaid / capitalized.	Illinois Most extensive process to date, but rule was not approved. Allows for flexible payments and provided an 80% capitalization rate for cloud.	Ohio PUC made a general statement that it was in the public interest. Invited utilities to propose in rate cases.
Pennsylvania Capitalized cloud implementation costs prior to GAAP change. Granted capitalization in specific rate cases.		Alabama Alabama Power granted authority to capitalize cloud and related costs on an ongoing basis.



53

As cloud computing options for utility operations and services increase, commissions might want to consider options in response to that growth. Examples include allowing the utility to treat costs associated with implementing cloud solutions as capital expenses or allowable for earning a return on investment; requiring the utility to describe options and cost differences between “on-premise” solutions and cloud/pre-paid solutions; and bringing the states’ own accounting rules up to date with GAAP.

What’s Next?

In response to the growth of cloud solutions and adoption by utilities, some states have begun to look at changing incentives. Understanding the accounting treatment changes that a regulator might need to consider is not a simple task, but more engagement between regulators, utilities, consumer advocates, and solution providers are needed to guide the discussion and for each state to determine their strategy. Cloud solution capabilities are increasing, which can bring lower operational costs and savings to customers, but only if the incentives are aligned to benefit utilities and customers in a way that encourages adoption of win-win approaches.

Resources for More Detailed Information

“Capitalizing the Cloud: An analysis of challenges and opportunities for the Canadian utilities sector,” KPMG, prepared for the Canadian Electricity Association and the Canadian Gas Association (March 2020). https://www.energyregulationquarterly.ca/wp-content/uploads/2020/04/CEA_CGA_-_Capitalizing-the-Cloud-Report-EN_04.23.20.pdf

“Financial Toolbox: Cloud Computing,” NARUC, Center for Partnerships and Innovation (October 2020). <https://pubs.naruc.org/pub/8929ED7E-155D-0A36-317C-08848BB4DCFD>

Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision, Order Adopting a Ratemaking and Utility Revenue Model Policy Framework, New York Public Service Commission, Case 14-M-001 (May 19, 2016).

<http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={D6EC8F0B-6141-4A82-A857-B79CF0A71BF0}>

“Regulatory Accounting of Cloud Computing – Software as a Service in New York & Illinois: Case Study Navigating Utility Business Model Reform,” Advanced Energy Economy, et al. (2018).

https://info.aee.net/hubfs/IL_NY%20Cloud%20Computing%20Final%20.pdf

“Resolution Encouraging State Utility Commissions to Consider Improving the Regulatory Treatment of Cloud Computing Arrangements,” NARUC, adopted December 2016.

<https://pubs.naruc.org/pub.cfm?id=2E54C6FF-FEE9-5368-21AB-638C00554476>

“Smart Grid Interoperability: Prompts for State Regulators to Engage Utilities,” NARUC CPI (April 2020)

<https://pubs.naruc.org/pub/28950636-155D-0A36-313C-73CCEA2D32C1>

“The Interface between Utility Regulation and Financial Markets,” NARUC CPI (November 5, 2018)

<https://pubs.naruc.org/pub/8BA0B811-DACC-6863-1992-9188F70783AC>

“Utility Earnings in a Service-Oriented World: Optimizing Incentives for Capital- and Service-Based Solutions,” Advanced Energy Economy (January 30, 2018)

https://info.aee.net/hubfs/AEE%20Institute_Utility%20Earnings%20FINAL_Rpt_1.30.18.pdf

Virtualization and Cloud Computing Services, 170 FERC ¶ 61,110 (2020).

https://www.ferc.gov/sites/default/files/2020-05/E-19_6.pdf

What is cloud computing?” Amazon Web Services (no date).

<https://aws.amazon.com/what-is-cloud-computing/>

“What is cloud computing? A beginners guide,” Microsoft Azure (no date).

<https://azure.microsoft.com/en-us/overview/what-is-cloud-computing/>

“Why NARUC wants state regulators to incentivize utility cloud computing,” Herman Trabish, Utility Dive (December 6, 2016). <https://www.utilitydive.com/news/why-naruc-wants-state-regulators-to-incentivize-utility-cloud-computing/431603>