Evolving Energy and Water Dynamics and the Impact on Healthcare Systems

By: Thomas Foster

This paper provides an overview of the potential issues related to the supply and demand imbalances for energy and water. Increasing demand for electricity and water may lead to higher costs and uncertainty looms over the reliability of these critical resources. In response, "Big Tech" organizations and health systems have crafted partnerships or utilized Energy as a Service (EaaS) transactions to enable cost effective and reliable service. The paper outlines some financing considerations and key questions for a health system before undertaking an EaaS partnership.

Background

Energy and water are critical components of a health system's operations and directly impact quality of care, operational efficiency, and sustainability. According to an Energy as a Service (EaaS) firm: "Healthcare facilities consume approximately 10.3% of the total energy used by commercial buildings in the U.S." and spend $6.5 billion annually on energy. [1] As the energy and resource landscape evolves, health systems should be cognizant of overall cost and reliability.

Improving energy and water efficiency to mitigate costs across an enterprise are not new concepts. It is common for new buildings to have sophisticated systems that reduce the operating expenses related to energy and water management. However, demand for electricity is poised to soar as artificial intelligence (AI) data centers, manufacturing plants, and, through a general push towards electrification, more products draw from the grid. *The Wall Street Journal* highlighted this trend in two bluntly titled articles: "Get Ready to Pay More for Less-Reliable Electricity" [2] and "AI Is About to Boost Power Bills—Who'll Take Heat for That?". [3] Furthermore, a January 2025 report from RMI noted how electricity demand is expected to increase: "As of the end of 2024, [public utility] IRPs [integrated resource plans] across the United States anticipate load to grow 20 percent by 2035 compared to 2021 levels. This is up from prior projections – 12 percent at the end of 2023, 9 percent in August 2022, and 7 percent in January 2021." [4] Across the United States, power bills have already risen as "electricity prices have increased at a compound annual growth rate of 5.7% over the last five years, a considerable acceleration since the preceding five years when prices were roughly flat," *The Wall Street Journal* reported. [5]

In addition to an expected increase in demand, "intermittency" embedded in some forms of energy and other factors are impacting electricity supply and reliability. The Midcontinent Independent System Operator (MISO), a Regional Transmission Organization (RTO), provides open-access transmission service and monitors the high-voltage transmission system in the Midwestern United States, Manitoba, Canada,

and a southern U.S. region that includes much of Arkansas, Mississippi, and Louisiana. A February 2024 report titled "MISO's Response to the Reliability Imperative" highlighted how surplus reserve margins—generating capacity that can be deployed immediately or in emergencies—have dwindled:

> "Over the last 10-plus years, surplus reserve margins in MISO have been exhausted through load growth and unit retirements. Since 2022, MISO has been operating near the level of minimum reserve margin requirements. While MISO has implemented several reforms to help avert near-term risk, more work is urgently needed to mitigate reliability concerns in the coming years. In fact, the region only averted a capacity shortfall in 2023 because some planned generation retirements were postponed and some additional capacity was made available to MISO.
>
> "However, MISO cannot count on such actions being repeated going forward. Indeed, the North American Electric Reliability Corporation (NERC) projects the MISO region will experience a 4.7 GW shortfall beginning in 2028 if currently expected generator retirements actually occur. Notably, NERC says that shortfall will occur *even if* the 12-plus GW of new resources that are expected to come online by then actually materialize. This is because the new resources that are being built have significantly lower accreditation values than the older resources that are retiring." [6]

Access to the grid is not guaranteed either. Dominion Energy provides electricity to Northern Virginia's data-center alley, and it "expects the time it takes to connect large data centers to the electric grid to increase by one to three years, amid a surge of requests, bringing the total wait time to as long as seven years." [7] Grid failures and blackouts have occurred in different regions of the United States over the years, and the power grid is also vulnerable to cyberattacks. [8] Finally, according to the U.S. Energy Information Administration, Western U.S. hydropower generation fell to a 22-year low for the year October 2022 - September 2023 as "Hydropower generation in the western United States can vary significantly from year to year because the amount of precipitation influences generation." [9]

Water is also a precious resource that is facing shortages, especially in the Southwestern United States. A *60 Minutes* piece explained the tough choices southwest states are facing as the Colorado River diminishes and reservoirs fall to historically low levels (Colorado, New Mexico, Utah, Wyoming, Arizona, California, and Nevada and 30 Native American tribes reside within the Colorado River Basin). [10] In May 2023, California, Arizona, and Nevada agreed to a usage cut of 3 million acre-feet, or nearly 1 trillion gallons, of water by 2026 (an acre-foot is the amount a typical family of four uses in a year). [11]

Similar to the needed investments in the power grid, "the nation's total reported needs for clean water infrastructure are $630.1 billion," according to the "2022 Clean Watersheds Needs Survey" conducted by the Environmental Protection Agency (the report was published in April 2024). [12] In 2023, Google's data centers consumed 6.1 billion gallons of water, a 17% increase from 2022. [13]

Overall, the current trends indicate higher costs for electricity and water as utilities and operators attempt to supply the resources needed for growing demand. Furthermore, certain regions of the country may face reliability issues and shortages of electricity and/or water.

Preparations by "Big Tech"

In his novel *East of Eden*, John Steinbeck observed "...that during the dry years the people forgot about the rich years, and during the wet years they lost all memory of the dry years." [14] The quote remains relevant as society extrapolates cyclical trends into long-term forecasts about the future (recall the 1979 *BusinessWeek* cover story "The Death of Equities"). [15] While the future is uncertain and predictions about energy and water availability could be misguided, the prominent investor, Howard Marks, titled a 2001 memo "You Can't Predict. You Can Prepare." [16] and companies such as Microsoft, Google, and Amazon are preparing.

Microsoft and Brookfield signed an agreement to deliver over 10.5 GW of new renewable power capacity globally [17] while Constellation Energy plans to restart the Three Mile Island nuclear plant for Microsoft's power needs. [18] Google is partnering with nuclear-energy startup Kairos Power "to purchase nuclear energy from multiple small modular reactors (SMRs)" and "enable up to 500 MW of new 24/7 carbon-free power to U.S. electricity grids and help more communities benefit from clean and affordable nuclear power." [19] Finally, Amazon signed an agreement with Energy Northwest, a consortium of state public utilities, to enable the development of four advanced SMRs. [20]

While SMRs are a new and untested technology, "Small modular reactors could eventually make the power source cheaper, safer and faster to build," *The Wall Street Journal* wrote. [21] However, nuclear power still has critics and the Federal Energy Regulatory Commission (FERC) in November 2024 blocked a request by Amazon and Talen Energy to generate electricity from a Pennsylvania nuclear plant. [22]

Semi-conductor companies are strategically building their fab facilities to recycle significant amounts of water. It is counterintuitive that TSMC would build its new facilities in Arizona, a desert region already facing a shortage of water (a typical fab facility can consume up to 4.75 million gallons of water per day). [23] However, water recycling and reclamation technology are integrated directly into TSMC's Arizona facilities: "TSMC Arizona's fabs are designed and built ... to achieve a 90% water recycling rate. The company has started the design phase of building an industrial water reclamation plant with a design goal of achieving 'near zero liquid discharge', bringing nearly every drop of water back into the facility." [24] Other examples of water conservation include Intel, [25] Las Vegas, [26] and Pure Water Southern California, an initiative seeking to "become one of the world's largest water recycling programs." [27]

Energy as a Service (EaaS) Overview and Financing Structures

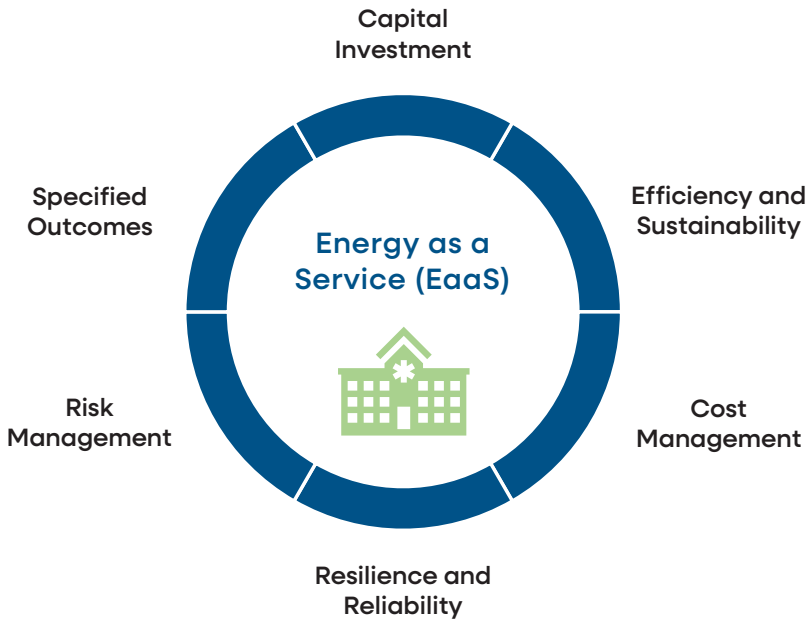
Health systems have large amounts of capital invested in property, plant, and equipment (PP&E) but the management of energy and water resources is secondary to the core mission. Secondly, the technology to diversify energy sources and achieve efficiencies exists but can be an expensive investment. Given the difficult operating environment, declines in operating margins across the industry, and debt capacity limitations, organizations are seeking ways to finance non-core projects "off-balance sheet." Many healthcare organizations have already partnered with other investors and private equity to invest in underdeveloped markets and improve health outcomes.

Certain investors are comfortable with energy projects as they are essential service and typically produce steady cash flows (e.g., KKR and Energy Capital Partners announced a $50 billion partnership "to accelerate the development of data center and power generation and transmission infrastructure for the rapid expansion of artificial intelligence and cloud computing globally."). [28] Therefore, partnering with third parties to monetize and improve existing energy assets or develop a "greenfield" type project may provide opportunities for all the stakeholders.

EaaS is a structure that allows owners of facilities to partner with an expert operator on efficiency improvements and cost reductions while transferring operational risk. EaaS projects can be limited to a single facility or service or span across multiple campuses and encompass several projects. Projects have included heat pumps, centralized utility distribution systems, automated systems and controls, renewable energy implementation, lighting replacement, and HVAC improvements, among others. Through an upfront capital commitment, a private developer can operate a project through a performance-based contract tied to the successful delivery of a service to a user. In a "greenfield" scenario, the developer may also construct the project with a "design-build" delivery method. *

Projects typically require limited investment from the user since the developer provides the capital. The finance component is embedded in an EaaS transaction and can be structured to be off-balance sheet for the user, depending on the organization's objectives. Depending upon the contract terms and transaction structure, the compensation to the developer can fluctuate based upon certain execution metrics and allow for liquidated damages to the user in the event of non-performance. *

Every EaaS structure is unique and there are strategic, financial, and accounting factors that need to be carefully considered by a health system. *



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Improving Existing Assets

In June 2024, Adventist Health (CA) and Bernhard crafted a 30-year EaaS partnership "to initiate a systemwide innovative energy transformation project" to reduce Adventist's annual utility spend, further its decarbonization goals, and provide a "material increase in reliability and resiliency across the network." [29] An overview of the partnership appears below:

- Adventist and Roseville Sustainable Energy Partner (the "Borrower") entered into a 30-year concession agreement: (i) Adventist received a cash payment of $351 million and, (ii) non-cash improvements over a period of five (5) years in an amount equal to an energy improvement design-build agreement. [30]

- The financing mechanism was a public offering of $362,285,000 of tax-exempt municipal bonds and $55,565,000 taxable municipal bonds. [31]

    - "Payments due on the Series 2024 Bonds are expected to be made from the Monthly Services Charges received by the Borrower from Adventist as payment for thermal services pursuant to the terms of the Thermal Services Agreement." [32]

    - Adventist is not directly responsible for the repayment of the bonds; instead, payments under the Material Contracts are unsecured general obligations of Adventist. [33]

    - Despite the bonds not having a security interest in the assets or revenue of Adventist, S&P assigned a "BBB+" (negative) rating to the bonds and utilized its "U.S. And Canadian Not-For-Profit Acute Care Health Care Organizations" criteria. "The 'BBB+' rating reflects our view of Adventist Health's credit quality, with this transaction being incorporated into our credit rating analysis on Adventist Health," said S&P Global Ratings credit analyst Chloe Pickett. [34]

Another example is The Ohio State University's (OSU) 2017 public-private partnership (P3) with ENGIE North America and Axium Infrastructure. Some transaction highlights appear below. [35]

- ENGIE North America and Axium Infrastructure created Ohio State Energy Partners.

- For a 50-year lease, Ohio State Energy Partners paid $1.165 billion in cash consideration to OSU; OSU pays Ohio State Energy Partners an annual utility fee.

- OSU used the proceeds from the sale to further its strategic plan ($150 million was used specifically for academic collaboration).

- Expected improvement in energy efficiency of 25 percent ($250 million of estimated savings) within 10 years.

The two examples illustrate that an organization can potentially monetize its existing energy assets and apply the proceeds to other capital projects and strategic investments or to strengthen liquidity.

Greenfield Project Example

As part of its multibillion-dollar expansion project for the Detroit flagship hospital, Henry Ford Health System (HFHS) utilized an "off-balance sheet" availability payment model for a $235 million Central Energy Hub (CEH). According to HFHS, "The CEH will feature a hot and chilled water pump system that will provide electric heating and cooling to the new hospital facilities—the new patient tower, shared services building and parking deck—allowing the system to limit and eventually fully avoid natural gas usage in those facilities. That means those buildings, including the CEH itself, will produce zero fossil fuels or emissions by our target dates in 2050." An overview of the transaction appears below. [36]

- Project: Henry Ford Health Detroit South Campus Central Utility Plant Project
- Borrower: Provident Group - HFH Energy LLC
- User: HFHS (MI)
- Description: Construction of a central utility plan that will supply the chilled and hot water needs of a hospital complex and related facilities.
- Financing mechanism: public offering of $249,345,000 tax-exempt, municipal "green" bonds [37]
    - Bondholder security: HFHS makes quarterly availability payments to the Borrower during the Services Period (availability payments are an unsecured obligation of HFHS; the bonds do not have a security interest in the assets or revenue of HFHS).
    - Moody's assigned an "A3" (stable) rating and used its "Generic Project Finance Methodology" (the rating was one-notch lower than the "A2" Moody's rating of HFHS). [38]
- Design details: "The electric heating and cooling equipment will be powered primarily by long-term power purchase agreements (PPAs) tied to wind and solar projects" [39] and the design "includes a rainwater capture system that replenishes the cooling towers' water feed cistern … anticipated to save approximately 480,000 gallons of city drinking water each year." [40]

Availability Payment Model *

While every transaction is unique, a general overview of a non-recourse availability payment transaction is described below.

- Borrower: A special purpose vehicle (SPV) created solely for the purpose of constructing and operating the project; enables non-recourse to the equity sponsor, user, and contractors. Depending upon the ownership structure of the SPV, tax-exempt financing may be available for the project.

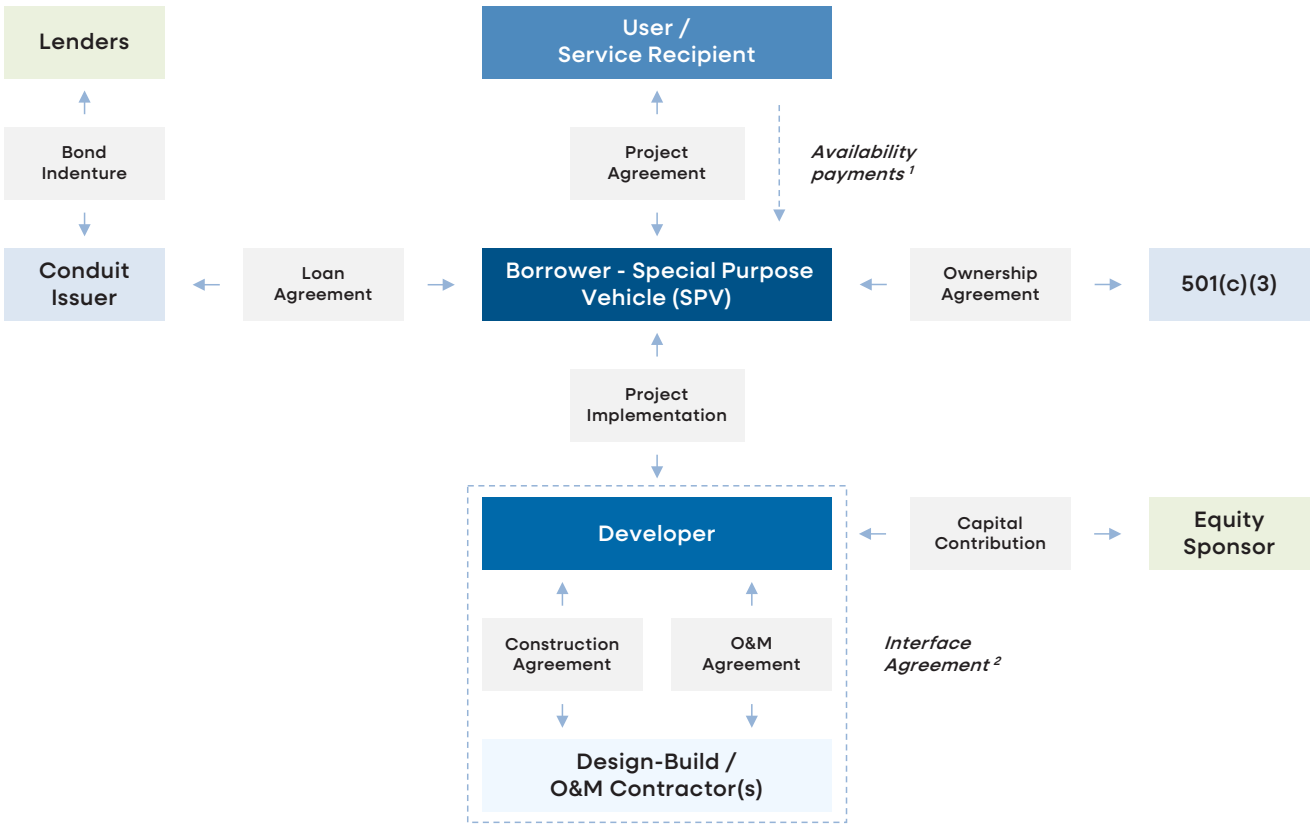
- User or service recipient: The end-user of the service makes availability payments under a project agreement. If the service ceases, the user or service recipient can stop the availability payments until the service restarts and may be entitled to liquidated damages.

- Equity sponsor and developer: Provides equity capital for the project. The availability payments are sized to provide an adequate return on equity. An equity contribution can range from 10% to 40% of the capital needed to complete the project.

- Conduit issuer: A public authority that enables the issuance of tax-exempt bonds (if applicable).

- Lenders: Bondholders or other debt investors

- Design-build and O&M contractors: Firms and contractors that specialize in construction management and operating the project.



1. "Availability payments" are typically comprised of a fixed "capital charge" sized to cover debt service and equity returns; an escalating "services charge" sized to cover operating, lifecycle, and SPV costs (indexed for inflation); less any deductions for unavailability or performance failures (subject to a cap); plus any extraordinary items. 2. The Interface Agreement outlines the allocation of responsibilities, risks, and liabilities among the project participants.

As a possible off-balance sheet structure, the availability payment model allows the user to preserve its debt capacity for other strategic projects and initiatives. Also, operational duties are shifted away from the user to a contractor with specific experience and expertise in maintaining and operating a project.

The major risks embedded in the availability payment structure stem from construction and operations. The parties are dependent on a project being delivered within the agreed upon timeframe and budget, and construction delays or operational problems can negatively impact all the stakeholders. Furthermore, while the structure is non-recourse to the service recipient, the essentiality of the project may require the user to provide capital, under certain circumstances, to keep the project afloat. Also, missed or delayed availability payments by the user can impact the perception of the user's creditworthiness by rating agencies and bondholders. Agreements among the parties can be complex and a higher cost of capital is typical than if a user simply financed a project with its enterprise credit. Finally, the governance or control of the borrower is limited for the user and the borrower has some discretion on how to operate the project and allocate resources.

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*Bond Financing Mechanics **

Many structures involve permanent financing issued through the capital markets, and below are some considerations related to a bond financing.

- Offering type: Nonprofit health systems are accustomed to using a public offering of municipal securities (tax-exempt or taxable) for their capital needs while for-profit entities can possibly use a taxable private placement to accredited investors. [41] Securities offerings can provide a lower cost of capital than other financing structures but require compliance with a variety of disclosure-related legal obligations.

- Tax-exempt bonds and compliance: Projects for a nonprofit health system will generally be eligible to utilize tax-exempt bonds (subject to review by an experienced bond and federal tax counsel familiar with tax-exempt bond regulations). However, many rules and regulations govern the use of tax-exempt bonds and below are some considerations:

    - Existing assets that were originally financed with tax-exempt proceeds are subject to ongoing tax compliance regulations and will need to be extensively reviewed. In the event tax-exempt bonds need to be repaid or defeased during an asset transfer, it can be prohibitively expensive.

    - An inclusion of federal tax credits within a project's financing structure may impact whether tax-exempt bonds can be utilized. Therefore, borrowers should consider if (i) tax-exempt bonds or (ii) taxable bonds coupled with tax credits provide a lower cost of capital.

    - If an issuance of tax-exempt bonds provides the funds, "private use" needs to be thoroughly considered and reviewed by tax attorneys. For example, the attorneys will review management and operator contracts and whether any sales of excess capacity might trigger private use.

- Bond documents: The indenture will contain the important definitions, flow of funds, covenants (bond and operating), and other items important to bondholders. For the borrower, a flexible indenture can allow for the inclusion of other projects and the issuance of additional debt as technology changes and/or a project scope evolves.

    - There may be limitations in an organization's existing bond documents and covenants on how a transaction can be structured (e.g., limitations on divestitures or how proceeds from a sale of assets may be applied).

- Market reception: The transactions issued as municipal securities in the capital markets have received broad reception from institutional investors. P3s have been utilized for major infrastructure projects and investors are familiar with the investment and risk considerations. However, institutional investors are extremely diligent and will review all aspects of the transaction with a focus on structure, security provisions and flow of funds, covenants, construction and implementation timelines, and the credit profile of the user.

- Cost of capital: The credit rating of the bonds may be a notch lower than the rating on the health system's senior debt. Therefore, the project's structure and relationship with the user, along market conditions, will drive the overall cost of capital. The closer the relationship, the lower the spread between project finance debt and a health system's senior bonds. Overall financial conditions and credit spreads also determine demand from institutional investors.

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Sustainable Finance Considerations

Sustainable finance issues have become focal points for both borrowers and investors. As many projects are crafted to reduce energy and/or water usage, the debt portion of the transaction may be eligible for the "green" [42] or "sustainability" [43] designation to improve the debt's marketability (the HFHS transaction was designated as a "green" bond and reviewed by Sustainalytics). [44] To avoid "greenwashing," borrowers seeking to issue bonds should consider obtaining a Second Party Opinion (SPO) on a financing plan and framework. Ongoing reporting and tracking the use of proceeds are other important considerations for the SPO and investors.

In addition, general corporate purpose debt facilities can utilize a "sustainability-linked" [45] finance structure. Typically, the structure provides flexibility for the use of proceeds and incorporates one to three key performance indicators (KPIs) related to a borrower's environmental and potentially social goals. The KPIs are tested annually against pre-defined targets and enable a small pricing reduction in the debt facility. KPIs need to be material to the borrower's business with targets that result in benefits beyond normal operations.

Management Team Involvement

Before undertaking a project or partnership, members of the management team and many different stakeholders across the organization will need to provide input.

- For a chief financial officer (CFO), EaaS can provide an alternative source of capital with a reduction in operating expenses. Commodity prices play a role in the cost of energy and certain strategies can also be incorporated within a structure to ensure cost certainty (albeit certainty comes at a premium).

- As infrastructure management is not a core business of the enterprise, the chief operating officer (COO) will primarily focus on how the partnership impacts the organization's overall operations and risk. The operator's expertise in implementing and managing the overall project, employees, and assets are important considerations.

- Facilities management: Deferred maintenance is not always a priority during the annual budget process. EaaS can provide additional capital for non-core but critical projects. The partnership will also allow the user to leverage the operator's expertise and supplement the current staff's knowledge.

- The sustainability leader will focus on how a project and partnership will help the enterprise meet its sustainability targets.

Health System Self-Assessment Questions

Below are some questions that can help a health system assess and review its management of energy and water infrastructure assets.

- How does energy and water infrastructure management complement the enterprise's core mission?

- Are energy and water assets fully optimized (in terms of cost and sustainability efforts) within the overall enterprise profile?

- What are the future capital expenditure needs for energy and water infrastructure? Is the organization contemplating raising capital for infrastructure specific projects?

- Has the organization considered how rising costs of energy and/or water could impact operations and cash flow? How do potential outages in electricity or water factor into the organization's overall risk management and business continuity plans?

- Is the organization's footprint located in certain regions of the country that are vulnerable to reliability issues?

- **Does the organization have a framework for working with private equity or other investors on joint ventures or partnerships?**

- **Are there concerns about the potential accounting implications from the execution of an EaaS transaction?**

- **What are the organization's overall goals (e.g., reduction in operating expenses, improving balance sheet liquidity)?**

Conclusion

As demand for energy and water potentially exceeds the supply of these critical resources, costs may rise while overall reliability in certain regions could be compromised. Big Tech organizations have taken steps to diversify their energy and water sources, and some health systems have utilized innovative technology and financing structures to improve their access to resources. The trend is expected to continue as health systems seek to optimize and improve energy and water infrastructure while leveraging unique financing structures with third parties.

- Kristi Eberhardt contributed to the "Sustainable Finance Considerations" section of this paper.

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