



## Jamaica's Power Grid Leverages Digital Grid Management to Ensure Stability and Reliability of Operations



**“It is important we have the best grid management systems in place to ensure that we’re optimizing grid operational awareness, planning and management to achieve our decarbonization, reliability and cost improvement objectives.”**

**— Lincoy Small, Director, System Operations, JPS**

## **CHALLENGE**

- Increase renewables penetration from 11% to 50% by 2030
- Reduce outage duration and response time
- Improve system visibility and maximize the value of advanced metering and field sensors
- Promote EV proliferation and enhance DER awareness and management across the distribution network

## **SOLUTION**

- AspenTech Digital Grid Management software implementations:
- AspenTech OSI monarch SCADA™
  - AspenTech OSI Generation Management System™(GMS)
  - AspenTech OSI Energy Management System™ (EMS)
  - AspenTech OSI Advanced Distribution Management System™(ADMS)
  - AspenTech OSI Outage Management System™(OMS)

## **VALUE CREATED**

- Reduced customer outage response time
- Greater grid visibility and ability to fully leverage investments in smart devices and integrate renewables
- Enhanced operator experience and efficient system maintenance
- Improved distribution grid performance
- Reduced patrol time and enhanced SAIDI performance



## Managing DERs, Renewables and an Increasingly Complex Grid

Jamaica Public Service (JPS) has a unique—and uniquely challenging—mission. As the sole transmission and distribution company of electricity for Jamaica, JPS is responsible for the reliable delivery of power to about 700,000 customers through an island-wide network. Because Jamaica has no interconnects enabling import or export from/to other countries, it must rely exclusively on the 1,000-plus MW of installed capacity and JPS's ability to transmit and distribute electricity reliability and safely.

JPS is leading efforts to modernize the country's electricity grid and expand access to electricity, partly in response to a government mandate to accelerate renewables generation and reduce greenhouse gas emissions. With the energy transition reshaping how utilities operate, Jamaica's grid needs to manage additional capacity of distributed energy resources (DERs), such as electric vehicles (EVs) and residential solar photovoltaic (PV) systems. Renewable energy sources currently account for a fraction of Jamaica's energy. "Jamaica's energy sector is rapidly evolving to satisfy aggressive global targets to increase renewable energy penetration from 11% today to 50% by 2030," says Lincoy Small, director of system operations at JPS.

Expanding the island's transmission system is a critical step that will need to be taken to manage the dramatic increase in renewables. Most of Jamaica's nearly 160 MW of wind and solar are located on the west side of the island, while the major load centers are in the east.

"To support grid reliability improvements while lowering electricity costs for our customers, the grid will also need to significantly increase its reliance on energy storage systems to support the influx of renewables, as well as other grid modernization and expansion initiatives," Small explains.



## A Deliberate, Steady Approach

With limited resources and a long list of priorities, JPS knows it cannot accomplish all its grid modernization goals at once. Instead, the utility has adopted a step-by-step approach, resulting in steady progress to benefit customers while advancing reliability and renewable integration goals.

For example, to manage increasing grid complexities and a proliferation of renewables, including DERs, JPS has steadily rolled out smart technologies to elevate situational awareness. These technologies include the installation of distribution automation switches and advanced metering infrastructure (AMI), or smart meters. JPS began deploying smart meters in 2016. Deployment is currently nearly 80% and is expected to be close to 100% by 2026.

Previously, JPS was using a paper-based system to manage the layout of the distribution grid and its power flows. This dependence on manual reads to assess and execute load transfers and reconfigurations resulted in frequent truck rolls. There were no real-time tools to aid the distribution system management.

With Jamaica's rapid influx of DERs, renewable energy goals, investments in field sensors and other smart devices producing more data, relying on manual distribution system management processes was not sustainable. JPS transitioned to a more automated approach to grid modernization by collaborating with digital providers such as AspenTech to create a roadmap to achieve grid integration and reliability objectives.

| JPS and Aspen Technology: Charting a Nearly Twenty-Year Partnership |                                                                                                                                  |
|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Year                                                                | Grid Capabilities                                                                                                                |
| 2008                                                                | JPS selects AspenTech OSI monarch SCADA, GMS and EMS technology to control and monitor power generation and transmission systems |
| 2017                                                                | Integrates AspenTech OSI DMS to boost system awareness, safety and management of smart sensors and devices                       |
| 2019                                                                | Adds Fault Location Isolation and System Restoration (FLISR) technology                                                          |
| 2021                                                                | Incorporates AspenTech OSI OMS                                                                                                   |
| 2025                                                                | Transitions from DMS to AspenTech OSI ADMS                                                                                       |
| Ahead                                                               | Looks to integrate AspenTech OSI Distributed Energy Resource Management System™ (DERMS)                                          |

A deliberate modernization strategy driven by AspenTech Digital Grid Management solutions has enabled JPS to steadily build its grid capabilities and keep up with changing energy and sustainability demands—all while ensuring the reliable delivery of energy to its customers.

JPS operates its generation fleet using AspenTech OSI GMS suite for advanced planning and real-time control operations. For planning, JPS employs linear regression and neural network algorithms to forecast short-term load and deploys comprehensive schedule management to manage multiple generation schedules. These schedules could be consolidated into composites and, along with unit and economic constraints, fed into unit commitment processes to produce efficient dispatch schedules. In real-time, these schedules dictate the dispatch commands to generation units, enabling precise control, reserve management and economic dispatch to meet demand. The system also calculates and manages inadvertent interchange in real time and is equipped with a comprehensive alarm management framework that ensures operators and engineers maintain full situational awareness of fleet operations.



# AspenTech OSI ADMS Provides Improved System Safety & Reduced Outage Duration Times

JPS—along with its employees and customers—have all benefited from digital grid management implementation. For one, enhanced distribution system visibility has led to a dramatic reduction in switching incidents, greatly improving system safety. Additionally, moving to the advanced distribution management system (ADMS) has improved outage detection and prediction, reducing patrol times and improving SAIDI (System Average Interruption Duration Index) performance. “We needed a tool to understand the power flow and reconfiguration needs because we have a lot of reliability challenges on the distribution network,” says Small. “With the paper-based system we needed many resources and personnel for switching exercises. Having an ADMS with switching capability has enabled us to cut back on needed resources and significantly reduce outage duration times.”

JPS has also enlisted the help of its customers to support improved outage response. With the ADMS in place, JPS launched a mobile app that lets customers submit an outage or problem report, which then shows up in real time for operators within the OMS. Customers can monitor the status of their issue and the response, and get notifications when a JPS team member is en route or on-site and when power is restored.

A significant driver for moving to the ADMS was to provide JPS operators a single platform on which they could perform multiple tasks. “We wanted to eliminate the cost of integrating separate systems into one that operators could work with,” Small explains. “Now, we’ve done it and everything is working together seamlessly.”

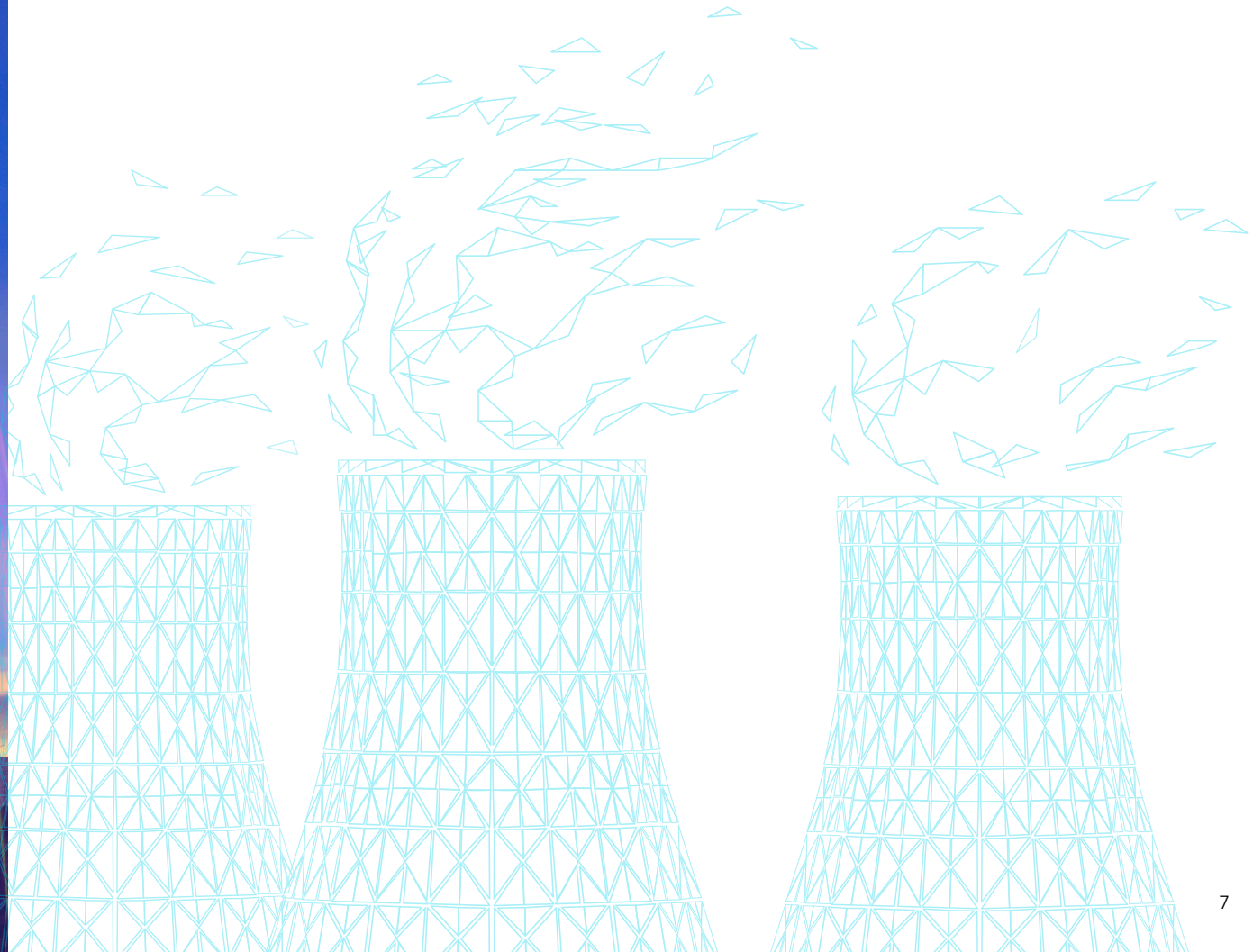




## Continuing the Grid Modernization Journey, Next Up DERMS

Even with all of the grid capabilities that JPS has added over the years, the utility's grid modernization journey is just getting started. With the increased use of DERs across Jamaica, JPS wants to be able to leverage AspenTech OSI DERMS to visualize and manage DER impact on the grid.

The utility's first objective in pursuing grid modernization is to better serve its customers. JPS is keenly aware that other providers are closely following their every move. "Across the Caribbean and Latin America, we are quickly becoming a North Star for other utilities," says Small.





## About Aspen Technology

Aspen Technology, now part of Emerson, is a global software leader helping industries at the forefront of the world's dual challenge meet the increasing demand for resources from a rapidly growing population in a profitable and sustainable manner. AspenTech solutions address complex environments where it is critical to optimize the asset design, operation and maintenance lifecycle. Through our unique combination of deep domain expertise and innovation, customers in asset-intensive industries can run their assets safer, greener, longer and faster to improve their operational excellence.

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