PERSPECTIVE

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YOU PLAY LIKE YOU PRACTICE

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In this article, we offer key best practices for generation-related system operations. These best practices become increasingly valuable as edge weather conditions remove the degrees of freedom normally enjoyed by system operations in normal conditions. Assessing operations now for these best practices will help ensure that the lights stay on without breaking the bank.

PLANNING AND ORGANIZATION

Tight definition of the roles and responsibilities of two key system operations' roles is crucial:

System Operator: typically performs energy control room-type functions, coordinates real-time generation and transmission functions, and other tasks.

Portfolio Manager: typically performs economic optimization functions related to generation planning, unit commitment and dispatch, fuel supply coordination, emissions optimization, among others.

These roles create a hub for system operations and are expected to make seamless and flawless handoffs of operational information, usually in real time. Organizations that excel at the system operations function have well-defined roles for the process owners with supporting documentation that is used in their operations. The tasks within each function are documented in policies and detailed procedures that describe process work flows, responsibilities, and specification of "decision rights," enabling the process to move forward quickly.

A key best practice for planning and organizing is separating responsibility for reliability in operations from responsibility for economic operation to ensure that the appropriate objective function (i.e., reliability in edge weather and economics during normal weather) is optimized. For instance, in normal conditions, the portfolio manager creates a plan (usually refreshed twice a day) to optimize the economic combination of fuel, units, and trading activities, and the system operator executes the plan.

In edge weather conditions, real-time events drive near real-time refreshing of the optimization plan.

Training is a critical aspect of system operations, and frontrunners pay special attention to training for all the planning and operating procedures for both normal and edge weather conditions. For instance, their training manuals contain protocols and detailed procedures for edge weather conditions, and their personnel review and use these procedures as part of their job training during normal conditions.

A key indicator of success in system operations and planning is the seamlessness with which the many organizations and support roles interact to quickly solve the delicate balance of reliability and economic decisions.

"Organization structure is the "center of the universe" for system operations; quick, coordinated analysis and contingency plan implementation requires a solid organization structure to communicate clearly and effectively," said E. Greg Darnell, Fleet Operations Manager, Southern Company

COMMUNICATION AND INFORMATION SHARING

Effective communications is the distinguishing trait of system operations that are able to balance economics and reliability functions effectively.

Best practice sharing of information is characterized by two key dimensions:

Quality and Quantity: The same near real-time information about unit output, status, fuel, system load, and deviations of units from forecast is available to all constituencies in the system operations process.

Accessibility: The information is a combination of accessible reports, databases, and forecasting tools made available to users electronically through intranets and portals with appropriate security and viewing rights. For example, generation plants as a group are often excluded from the circle of functions that are in the communications loop. Plant management should understand the condition of the system as a whole to enable them to create their own contingency plans.

"There is a plan developed for contingencies that are expected to happen. We have an Alert Level Chart that allows the operator to communicate the level of alert and the parties know where we are from a system standpoint without a lot of discussion," said Greg Ford, vice president, Georgia System Operations Corporation. You play like you practice. Those organizations that hold their communications practices to the highest standards during normal weather are better able to share critical information in edge weather conditions.

EXECUTION

In normal conditions, system operations will be expected to execute multiple, interlocking contingency plans to ensure reliability at the most economic cost to customers.

These practices are important under normal conditions, but are especially relevant for edge weather conditions, where the margins for error are smaller. Because neighboring systems that you may normally lean on are likely to be under duress as well, they probably are unable to assist, thereby eliminating contingencies precisely when they would be the most valuable.

Know What To Do: To be ready to meet these high expectations, account for the unexpected and unplanned eventualities.

Best practices include using formal scenario planning ("what-if" analyses) to create an optimal plan that specifically addresses:

- Generator loss
- Fuel availability
- Load (weather) deviations.

As the number of system constraints increases, the criticality of scenario and contingency planning increases geometrically.

Know What Can Be Done: The best practice for system operations is to have ready access to unit, fuel supply, and environmental constraints. For example, a contingency plan may assume a unit is available when it is actually down on a forced outage. Likewise, some marginal units that may be called upon to meet summer loads cannot run at certain times of the day due to emissions constraints.

"During severe weather, the planning process shifts to a more conservative mode, considering a broader range of possible outcomes over a longer planning horizon to ensure that the plan can accommodate reasonably bounding scenarios," said Mark Oliver, Manager of Portfolio Management at Progress Energy.

Execution of the best-made plans assumes that access to planning tools and models is available, and if access is disrupted, back-up options to these tools should be available. For instance, having a less sophisticated, but service able spreadsheet-based commitment-and-dispatch model can bridge the gap if your main planning tool becomes unavailable.

Effective execution requires considerable depth in planning and an intimate knowledge of the assets available to meet the demand.

Making risk-adjusted decisions in real-time operations is a key best practice and happens only through disciplined, repetitive and realistic planning, and what-if analysis.

TECHNOLOGY

System operations run a fine-line between being surprised by information and encumbered by it. Best practices for technology deployment provide a fast, broad scan and a readily accessible drill-down capability to fully explore a system condition or scenario outcome.

Best-practices in the fast, broad-scanning capability include:

- Information push technologies, such as pages and e-mails sent to wireless devices that inform people of load, weather, generation, or fuel deviations from normal (or planned). The availability of wireless and remote connectivity tools has simplified the task of keeping all the people involved centrally (and marginally) in the system operations and reliability functions.
- Communication of real-time plant and unit changes-in-availability status.
- Use of real-time weather feed services.

Best-practices in drill-down capability include:

- Intranet portals and web sites to keep all parties involved in and informed of system operations decisions, even though they are spread across a wide geographical area. The plant manager at a large coal unit needs to know that a big plant in his company has gone offline unexpectedly.
- Remote access desktop software to simplify access to applications and tools on a server or desktop, even in the middle of the night from a distant location. This access is invaluable to portfolio managers and fuel supply coordinators, especially those that are not in an around-the-clock energy control room environment.
- Remote monitoring of fuel (gas or oil) inventory and usage at plants.

Remote start capability is another example of how technology can help system operations react effectively when time is of essence, as long as accurate fuel availability and unit condition is also available.

"Within the transmission realm, we are very active in supporting new technologies to improve grid performance, including dynamic synchronous condensers, diamond-based coatings for electronic components, and devices which can help operators "see" what's happening in distant locations (phasor measurement units)," says W. Terry Boston, executive vice president, Power System Operations at TVA.

Ultimately, proper selection and deployment of technology is the price of getting into the game. Real value is created under edge weather conditions through the manipulation of the technology by well-trained and experienced personnel.

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