WHITE PAPER

Preparing Inverter-Based Resources for Regulatory Changes: Efficient and Cost-Saving Strategies for NERC Compliance Programs

HSI Industrial Skills — Reliability Matters

IBR Reliability Standards, Costs and Challenges.

The renewable generation industry has reached a pivotal point in its role in bulk system reliability. In 2023, the U.S. Energy Information Administration showed 21% of energy production came from renewable resources. As this sector has grown, it has gained attention from the industry and regulators alike. With inverter-based resources (IBR) playing a larger role, regulations are becoming more stringent.

Our white paper discusses how the North American Electric Reliability Corporation's (NERC) Reliability Standards impact IBRs. It also offers guidance for IBR Generation Owners (GOs) and Operators (GOPs) on managing their responsibilities to minimize the costs and challenges of compliance while maximizing generation capabilities.

Navigating NERC Standards: **Practical Insights for GOs and GOPs**

With proper preparation, meeting NERC Standards for GOs and GOPs doesn't have to be intimidating. Many GO/GOPs currently operate without compliance issues.

Why is this important now? Some facilities are limiting their generation capacity to avoid reaching the threshold that mandates NERC registration as a GO or GOP. We want to demonstrate that restricting capacity to limit compliance requirements is not a sound business strategy.

Most NERC requirements align closely with routine operations. Compliance often involves ensuring data is readily accessible for training and auditing. Templates can be developed and used as needed. Engaging the right people at the right time ensures timely preparation of component information and facility ratings.

Compliance solutions are well-established in the industry. In the end, relatively few extra tasks over and above good utility practices are needed to meet compliance requirements.

Here are some things to consider when weighing your investment against the NERC standards:

- **Avoid limiting facility size:** Don't restrict the size of your facility just to avoid mandatory reliability standards.
- **Leverage contractor expertise:** Don't overlook the role of your OEMs (original equipment manufacturers) and EPC (engineering, procurement, and construction) contractors. They often hold critical data needed for NERC compliance. Engage them early in the process to streamline compliance and ensure data requirements are included in the construction contracts. This preparation ensures your facility is ready from day one.
- **Address compliance early:** Don't *"figure it out later."* Address compliance issues well before your facility starts operating. Proactive preparation ensures you're ready for potential audits and can respond efficiently, with all necessary information readily available.
- **Recognize the role of variable resources:** Don't assume being a *"variable resource"* means contributing less to reliability. This segment is becoming a significant part of energy production, and regulators view IBRs as a collective force generating gigawatts of power.
- **Integrate reliability into routine operations:** Don't treat reliability as a separate or secondary task. Integrate reliability practices into your daily operations to make them a natural part of your routine. These practices include managing logbook entries, communication, and training, while maintaining thorough records as evidence.

Key Considerations

CONSIDER THIS SCENARIO:

Imagine your generator is ready to start operating. You plan to operate it safely and reliably, even without NERC requirements to meet.

> **Would you ignore cyber protection for your facility?**
>
> **Will you maintain and test the components that protect your investment?**
>
> **Are you prepared to follow operating instructions from your Transmission Operator (TOP)?**

If the answer to these questions is yes, you probably have processes in place that address NERC compliance. They just need to be documented properly. Many tests required for commissioning align with NERC standards. These standards are designed not only to promote grid reliability but also to ensure the security of your facility.

Leveraging Compliance for Investment Opportunities

Choosing not to limit your facility below NERC bright line criteria can open doors to additional investment opportunities. Investors are inclined to select options with the highest potential and lowest risk. Conforming to NERC standards is viewed as safeguarding their investment, enhancing the credibility of your facility.

Consistency Pays Off

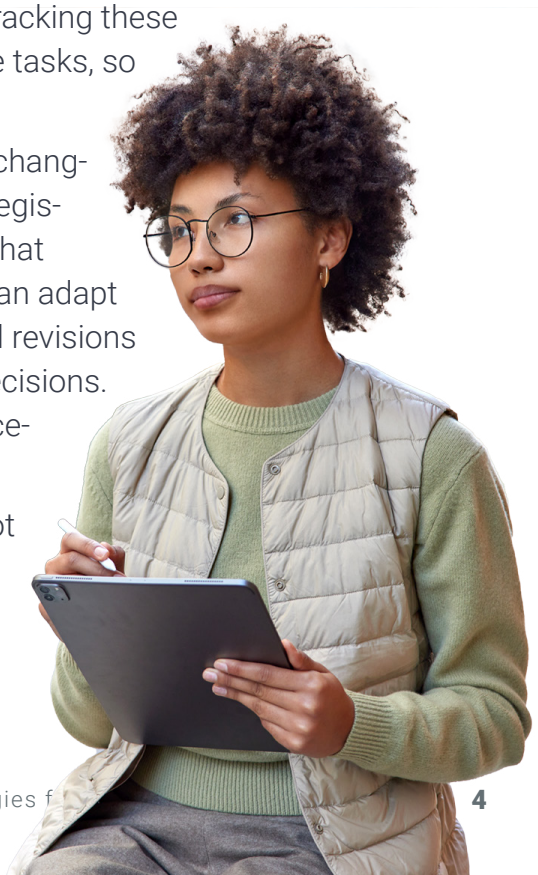
HERE'S AN EXAMPLE:

Imagine you have a 55-gallon drum that needs to be filled by the end of the year using a Dixie cup out of a faucet. If you fill three or four cups each day, by the end of the year, the drum will be full. However, waiting until the day before the deadline creates unnecessary challenges. While it's still possible to fill the drum with a lot of help, maintaining consistency throughout the year makes the task much more manageable.

As a registered entity, you participate in the development and review of NERC standards. As part of the registered ballot body, standards won't come as surprises or be unmanageable. NERC does not create reliability standards. Instead, industry volunteers create and vote on new standards, revisions, and updates. The process – from standards authorization to requests for drafting team members, posted versions, and consideration of comments – is fully transparent. By knowing where to look, you can anticipate upcoming requirements, ensuring you're prepared long before they come into effect.

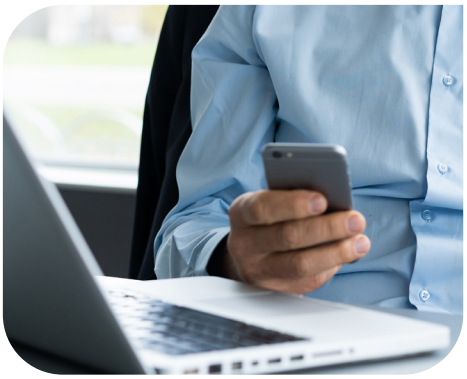
Meeting compliance obligations is a responsibility, but many of the tasks required for NERC compliance are already part of routine operations. Key elements for meeting these requirements include:

- **Documenting evidence:** One example of documentation is work orders for protection system maintenance. Even without standards, tracking these activities is necessary. The difference is recording evidence tasks, so you have the data when requested.
- **Monitoring regulatory changes:** Standards are constantly changing, from cybersecurity to cold weather requirements and registration specifics for IBRs. Transparency is key – knowing what changes are anticipated and being discussed means you can adapt accordingly. Understanding others' views on standards and revisions can provide a new perspective and influence your voting decisions. NERC issues bulletins on standards and compliance enforcement, so you don't have to research upcoming changes.
- **Preparing for audit spot checks and alerts:** Audits and spot checks primarily involve gathering common data for specific needs. This data includes detailing experiences during system events, communication, and maintaining comprehensive logbooks as crucial evidence.



Consider the following key items when preparing for compliance:

- **Component list for facility rating:** Essential for effective planning, the component list details the equipment and systems used in your facility. Get this information from your EPC contractors before the project is complete, ideally including it in your contract. Securing this data can be challenging if left until later.
- **Documented evidence for ride-through capabilities:** The manufacturer can provide the necessary data. It should be straightforward to obtain and verify. The number either meets the criteria or it doesn't. You need to inform your regulator, so they know the equipment you have for the no trip zone.
- **Interconnection studies:** Typically conducted when a new facility starts operations, these studies satisfy some of the MOD standards, including short circuit and steady state studies. Ensure they are completed and reviewed as part of your compliance preparation.
- **Negotiated post-commission timeframe:** Arrange for a 30- or 60-day period following the commercial operations date to address any discrepancies or issues. Ensure the manufacturer is available during this time for any necessary clarifications or questions.



Internal Controls

Auditors increasingly emphasize the importance of robust internal controls to verify compliance with requirements. Common concerns include maintaining up-to-date protection system documentation and cybersecurity implementation measures. Although not mandatory, implementing strong internal controls helps a facility adhere to operational standards and best practices.

For large multi-state utilities managing extensive assets, a comprehensive set of internal controls, tests, and practices may be appropriate. However, renewable generators can achieve the same goals with a few well-organized documents and procedures.

The most effective internal control is a well-executed compliance program. This approach ensures compliance is taken seriously without being an overwhelming focus.

- **Reliability standards audit worksheets, or RSAWs**, are tools designed to streamline the audit process. RSAWs consist of questions, data requests, and evidence requests, all designed to assess compliance. Initially created for auditors, RSAWs are now publicly available, allowing entities to understand the evaluation criteria.

  Completing RSAWs at your own pace before an audit allows you to thoroughly document your processes and procedures, making them a valuable internal control tool. Once completed and approved, RSAWs are ready for submission when you get an audit request.

- **Procedures** are also critical internal controls. Many standards mandate procedures for areas such as protection systems, maintenance and testing, facility ratings, and event reporting. Developing procedures for each applicable requirement is a control. Each procedure outlines the responsibilities, detailing who, what, where, and when. Procedures and documentation can be stored on a SharePoint site for easy access.

Implementing these controls helps maintain your program's effectiveness and is relatively straightforward. With proper attention, managing these controls is achievable.

Training

Establishing systems is just the beginning. Every member of your organization – from leadership to field operators or control center staff – must implement the systems effectively. Ultimately, compliance is driven from the top down, with leadership setting the tone, and operators ensuring every action and piece of data is properly recorded for compliance purposes.

Training is crucial, whether mandated by a NERC standard, required for safe operation, or needed to ensure all staff, whether new or experienced, understand and follow procedures and processes integral to their job role.

To meet compliance, ensure training is delivered on schedule, reaches all necessary personnel, and is thoroughly documented. Additionally, any changes to processes, such as updates to settings, capabilities, or policies, should be communicated promptly and documented clearly.

- **Senior Staff Training:** Understanding and qualifying risk enables an organization to make more informed business decisions based on opportunity instead of compliance risk. This understanding comes through proper training and awareness of the standards, which provides a clear grasp of compliance risks.
- **Operations Training:** Effective training is essential for operations personnel. Anyone involved in onsite switching or working in the control room must be adept at proper communication and respond correctly to any operating instruction.
- **SME Training:** SMEs need to know how to establish and document evidence according to an RSAW. Keeping RSAWs up to date makes audits or document requests straightforward. Before an audit, it's important to coach SMEs to ensure they are familiar with the procedures and understand the documented evidence.
- **New Employee Training:** Familiarizing new employees with NERC compliance should be a key part of their onboarding training. All staff, from executive leadership to operators and field workers, need to understand what NERC is, the requirements involved, and the importance of maintaining and storing evidence, such as logs or action reports.

Making Sure You're Compliant

When commissioning a new site, **ensure construction contractors provide data for all relevant standards**, particularly those related to relays such as PRC-005 and FAC-008. Verify the relays provide clear and accurate reports, and make sure your contractors are fully aware of the requirements.

The **documentation you receive should be clear and easily accessible**, not a lengthy PDF that's blurry from scanning and hard to search.

You should have a procedure for every standard that applies to you, with each procedure only one or two pages long. Simply printing the standard and replacing GO/GOP with your organization's name isn't sufficient for daily compliance.

You should write specific and concise procedures, including who is responsible, what needs to be done, where it should be done, and when. When relevant, include additional information about why certain actions, like maintaining a list, are required.

The renewable generation sector is at a transformative juncture, with IBRs increasingly integral to bulk system reliability. As the industry evolves, so do the regulatory frameworks governing it. Viewing NERC compliance as an opportunity rather than a constraint allows facilities to capitalize on their full potential.

By aligning compliance efforts with routine operations and strategic planning, IBRs can enhance their credibility, attract investment, and contribute meaningfully to grid reliability. As the industry continues to grow and evolve, a proactive, informed approach to compliance will be key to navigating the regulatory landscape and achieving long-term success.

Commonly Asked **Questions**

How many personnel hours are required for compliance?

Allocate between 60 and 80 hours to establish your compliance program and conduct initial training. Instead of starting from scratch, adapt existing material to suit your specific needs. After the initial training, most generator compliance programs typically require six to eight hours a month to maintain. It's essential to monitor your program regularly and ensure updates are made as standards or procedures evolve.

What is the scope of a typical audit?

Audit scopes generally align with the Compliance Monitoring and Enforcement Program (CMEP) published annually by NERC. The CMEP identifies three or four high risk standards for auditors to focus on, rather than auditing every requirement within a standard.

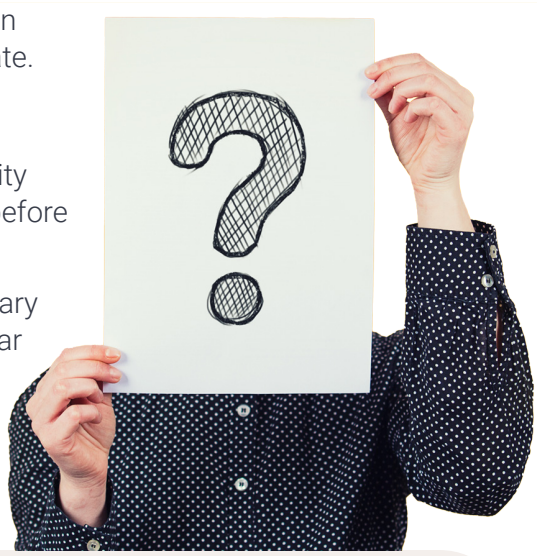
For example, COM-002 addresses operating instructions. A GOP with control room personnel receiving operating instructions from a TOP must demonstrate they understand how to properly respond. Personnel must be trained in three-part communication before assuming duties at the desk.

Protective system testing is another critical compliance element for GO/GOPs. For a new facility, the initial protective system component testing date marks the beginning of the timeline for retesting, an essential part of your protection system maintenance plan. The first audit for the facility will be scheduled based on either the commissioning date or commercial operations date.

When should training occur?

All operators should be trained and qualified before the facility becomes operational. New operators must be fully trained before taking on desk responsibilities.

Training should be ongoing. Continuing education is necessary to keep up with changes in standards and processes. Regular cybersecurity training is also essential. Certified system operators must complete continuing education hours (CEHs) to maintain their certification.



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