NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Development Mapping of FERC Order 901 Directives and Other Guidance to Standards Development Projects, Draft SARs, and Pending SARs

July 2025

Background

The Federal Energy Regulatory Commission (FERC) issued Order No. 901 on October 19, 2023, which included directives on new or modified NERC Reliability Standard projects. FERC Order No. 901 addresses a wide spectrum of reliability risks to the grid from the application of Inverter-Based Resources (IBR); including both utility scale and behind-the-meter or distributed energy resources. Within the Order, there are four milestones that include sets of directives to NERC. The first milestone was achieved on January 17, 2024, as NERC filed its initial work plan to address all aspects of FERC Order No. 901 throughout the next three years[1]. The filed work plan includes extensive detail on Standards Development approach and next steps to accomplish the suite of directives addressing IBR. The work plan was intended to be an initial roadmap to guide development for each of the Reliability Standards Projects identified as a 901-related project.

Milestone 2 Projects

All Reliability Standards Projects associated with directives for Milestone 2 are identified in the table below. Milestone 2 projects include 2021-04, 2020-02, and 2023-02, which have passed industry comment and ballot. NERC filed the Standards associated with the Milestone 2 projects with the Federal Regulatory Authorities on November 4, 2024.

---

[1] INFORMATIONAL FILING OF THE NORTH AMERICAN RELIABILITY CORPORATION REGARDING THE DEVELOPMENT OF RELIABILITY STANDARDS RESPONSIVE TO ORDER NO. 901; 01/17/2024; https://www.nerc.com/FilingsOrders/us/NERC%20Filings%20to%20FERC%20DL/NERC%20Compliance%20Filing%20Order%20No%20901%20Work%20Plan_packaged%20-%20public%20label.pdf

Milestone 3 Projects

All Reliability Standards Projects associated with directives for Milestone 3 are identified in the table below. Standards Authorization Requests (SARs) were created and submitted by NERC staff to the Standards Committee in May 2024 and were posted for comment. The projects include 2020-06, 2021-01, and 2022-02 and are anticipated to be filed with the Federal Regulatory Authorities by November 4, 2025.

Milestone 4 Draft SARs

Finally, two Reliability Standards Projects will be created to address the operational and planning study directives from FERC Order No. 901. Two SARs are anticipated to be drafted and completed by Q3 of 2025. Consideration will be needed with other active transmission planning-related Reliability Standards Projects to ensure any potential overlapping requirements are effectively coordinated between drafting teams (DTs). These projects are anticipated to be filed by November 4, 2026.

Resources

FERC Order No. 901 – Final Rule Reliability Standards to Address Inverter-Based Resources

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
1A	7	3	"**Second, by November 4, 2025, NERC must submit new or modified Reliability Standards addressing the interrelated directives concerning: (1) data sharing for registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate;** and (2) data and model validation for registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate."	Project 2022-02 Uniform Modeling Framework for IBR.
1B	7	3	"**Second, by November 4, 2025, NERC must submit new or modified Reliability Standards addressing the interrelated directives concerning:** (1) data sharing for registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate; and (2) **data and model validation for registered IBRs,** unregistered IBRs, and IBR-DERs in the aggregate."	Project 2020-06 Verifications of Models and Data for Generators.
1C	7	3	"**Second, by November 4, 2025, NERC must submit new or modified Reliability Standards addressing the interrelated directives concerning:** (1) data sharing for registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate; and (2) **data and model validation for** registered IBRs, **unregistered IBRs, and IBR-DERs in the aggregate.**"	Project 2021-01 System Model Validation with IBRs.
2	7	2	"NERC must also submit, by November 4, 2024, new or modified Reliability Standards that require disturbance monitoring data sharing and post-event performance validation for registered IBRs."	Project 2021-04 Disturbance Monitoring Data Capabilities and Data Sharing from Generator Owners.
3A	7	4	"**Finally, by November 4, 2026, NERC must submit new or modified Reliability Standards addressing** planning and **operational studies for registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate**."	Pending Operational Studies SAR (Anticipated Q1 2025).

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
3B	7	4	"**Finally, by November 4, 2026, NERC must submit new or modified Reliability Standards addressing planning** and operational **studies for registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate**."	Pending Transmission Studies SAR (Anticipated Q1 2025).
4	76	3	**"Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require registered IBR generator owners and operators to provide IBR-specific modeling data and parameters (e.g., steady-state, dynamic, and short circuit modeling information, and control settings for momentary cessation and ramp rates**) that accurately represent the registered IBRs **to their planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities that are responsible for planning and operating the Bulk-Power System**."	Project 2022-02 Uniform Modeling Framework for IBR.
5	77	3	"Nevertheless, to support accurate modeling and performance, we direct NERC to consider during its standards development process AEU and ACP/SEIA's suggested data sharing requirements when developing the framework, criteria, and necessary data exchange requirements to meet the registered IBR data sharing directive."	Project 2022-02 Uniform Modeling Framework for IBR.
6	78	3	"**As discussed in more detail in section IV.C of this final rule, we are also directing NERC to develop new or modified Reliability Standards that require the use of approved industry IBR models** that accurately reflect the behavior of all IBRs during steady state, short-circuit, and dynamic conditions."	Project 2022-02 Uniform Modeling Framework for IBR.
7	80	4	"The Commission did not propose in the NOPR to address new cyber or physical security protections of IBRs beyond those in existing applicable Reliability Standards. Therefore, while we decline to direct NERC to	Ongoing coordination with

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
			develop IBR-specific cyber or physical security Reliability Standards for IBRs in this effort, NERC should evaluate whether there are gaps that must be addressed."	NERC Staff and RSTC.
8A	85	2	"**Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal to direct NERC to include in the new or modified Reliability Standards technical criteria to require registered IBR generator owners to install disturbance monitoring equipment at their buses and elements, to require registered IBR generator owners to provide disturbance monitoring data to Bulk-Power System planners and operators for analyzing disturbances on the Bulk-Power System**, and to require Bulk-Power System planners and operators to validate registered IBR models using disturbance monitoring data from installed registered IBR generator owners' disturbance monitoring equipment."	Project 2021-04 Disturbance Monitoring Data Capabilities and Data Sharing from Generator Owners.
8B	85	3	"**Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal to direct NERC to include in the new or modified Reliability Standards** technical criteria to require registered IBR generator owners to install disturbance monitoring equipment at their buses and elements, to require registered IBR generator owners to provide disturbance monitoring data to Bulk-Power System planners and operators for analyzing disturbances on the Bulk-Power System**, and to require Bulk-Power System planners and operators to validate registered IBR models using disturbance monitoring data from installed registered IBR generator owners' disturbance monitoring equipment**."	Project 2020-06 Verifications of Models and Data for Generators.
9	85	2	"We further agree with the findings in NERC reports (e.g., a lack of high-speed data captured at the IBR or plant-level controller and low-resolution time stamping of inverter sequence of event recorder	Project 2021-04 Disturbance Monitoring Data Capabilities and

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
			information has hindered event analysis) and direct NERC through its standard development process to address these findings."	Data Sharing from Generator Owners.
10	86	2	"Thus, in developing the directed data collection requirements, we direct NERC to consider the burdens of generators collecting and providing data, while assuring that Bulk-Power System operators and planners have the data they need for accurate disturbance monitoring and analysis."	Project 2021-04 Disturbance Monitoring Data Capabilities and Data Sharing from Generator Owners.
11	86	3	"Likewise, regarding CAISO's request that the Commission direct NERC to consider requiring registered IBRs to provide additional data, we agree that such data collections may be warranted, and direct NERC to consider through its standards development process whether additional IBR data points (e.g., telemetry collections or other automated platform integrations) are needed to further enhance real-time visibility of Bulk-Power System operations."	Project 2022-02 Uniform Modeling Framework for IBR.
12	102	3	"Specifically, as proposed in the NOPR, we direct NERC to submit to the Commission for approval one or more new or modified Reliability Standards that require: (1) transmission owners to provide to Bulk-Power System planners and operators modeling data and parameters for unregistered IBRs in their transmission owner areas that, individually or in the aggregate, materially affect the reliable operation of the Bulk-Power System and (2) distribution providers to provide to Bulk-Power System planners and operators modeling data and parameters for IBR-DERs in the aggregate in their distribution provider areas where the IBR-DERs in the aggregate materially affect the reliable operation of the Bulk-Power System."	Project 2022-02 Uniform Modeling Framework for IBR.

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
13	104	3	"Recognizing that there may be instances in which transmission owners are unable to gather adequate unregistered IBR modeling data and parameters to create and maintain unregistered IBR models in their transmission owner areas, we modify the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require each transmission owner, if unable to gather accurate unregistered IBR data or unable to gather unregistered IBR data at all, to provide instead to the Bulk-Power System planners and operators in their areas: (1) an estimate of the unregistered IBR modeling data and parameters, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of any data provided by unregistered IBRs, and (4) the method used for estimation."	Project 2022-02 Uniform Modeling Framework for IBR.
14	104	3	"To support this data collection, we further direct NERC to consider commenters suggestions to implement a process or mechanism by which transmission owners would receive modeling data and parameters."	Project 2022-02 Uniform Modeling Framework for IBR.
15	105	3	"Accordingly, to account for instances in which distribution providers are unable to gather adequate modeling data and parameters of IBR-DERs to create and maintain IBR-DER models, we modify the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require that each distribution provider, if unable to gather accurate IBR-DERs data in the aggregate or unable to gather IBR-DERs data in the aggregate at all, provide instead to the Bulk-Power System planners and operators in their areas: (1) an estimate of the modeling data and parameters of IBR-DERs in the aggregate, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of the data provided by IBR-DERs, and (4) the method used for estimation."	Project 2022-02 Uniform Modeling Framework for IBR.

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
16	105	3	"In support of above, we further direct NERC to consider commenters' suggestions to implement a process or mechanism by which distribution providers would receive modeling data and parameters."	Project 2022-02 Uniform Modeling Framework for IBR.
17	106	3	"For those areas with IBR-DERs that in the aggregate materially affect the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we direct NERC to determine the appropriate registered entity responsible for providing data of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, or, when unable to gather such accurate IBR-DERs data, to provide instead to the Bulk-Power System planners and operators in their areas: (1) an estimate of the modeling data and parameters of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, (2) an explanation of the limitations of the availability of data, (3) an explanation of the limitations of any data provided by the IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, and (4) the method used for estimation."	Project 2022-02 Uniform Modeling Framework for IBR.
18A	108	3	"Regarding CAISO's concern regarding the potential "compliance trap" where planners and operators rely on third-party data and IRC's request that the final rule specify the data to be submitted by all IBRs (i.e., registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate) and transmission devices using similar technologies, **we direct NERC to determine through its standards development process the minimum categories or types of data that must be provided to transmission planners, transmission operators, transmission owners, and distribution providers** necessary to predict the behavior of all IBRs **and to ensure that compliance obligations are clear.**"	Project 2022-02 Uniform Modeling Framework for IBR.

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
18B	108	3	"Regarding CAISO's concern regarding the potential "compliance trap" where planners and operators rely on third-party data and IRC's request that the final rule specify the data to be submitted by all IBRs (i.e., registered IBRs, unregistered IBRs, and IBR-DERs in the aggregate) and transmission devices using similar technologies, **we direct NERC to determine through its standards development process the minimum categories or types of data** that must be provided to transmission planners, transmission operators, transmission owners, and distribution providers **necessary to predict the behavior of all IBRs and to ensure that compliance obligations are clear**."	Project 2022-02 Uniform Modeling Framework for IBR.
19	108	3	"**As discussed in more detail in section IV.C of this final rule, we are also directing NERC to develop new or modified Reliability Standards that require the use of approved industry IBR models** that accurately reflect the behavior of all IBRs during steady state, short-circuit, and dynamic conditions."	Project 2022-02 Uniform Modeling Framework for IBR.
20	122	3	"**Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require the use of approved industry generic library IBR models** that accurately reflect the behavior of IBRs during steady state, short-circuit, and dynamic conditions when developing planning, operations, and interconnection-wide models."	Project 2022-02 Uniform Modeling Framework for IBR.
21	124	3	"We direct NERC to determine through its standards development process which nation-wide approved component models are needed to build IBR plant models for steady state, short-circuit, and dynamics studies."	Project 2022-02 Uniform Modeling Framework for IBR.

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
22	125	3	"Accordingly, we direct NERC to develop new or modified Reliability Standards that require the sole use of nation-wide approved component generic library models for system models to facilitate the exchange of neighboring entities' respective planning and operation models and to build interconnection-wide models."	Project 2022-02 Uniform Modeling Framework for IBR.
23	126	3	"With respect to NERC's recommendation for model benchmarking, we direct NERC to determine through its standards development process whether the development of benchmark cases to test model performance and a subsequent report comparing model performance are needed and at what periodicity."	Project 2020-06 Verifications of Models and Data for Generators.
24A	140	3	"**Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require** the generator owners of registered IBRs, **transmission owners that have unregistered IBRs on their system, and distribution providers that have IBR-DERs on their system to provide models that represent the dynamic behavior of these IBRs at a sufficient level of fidelity to provide to Bulk-Power System planners and operators to perform valid interconnection-wide, planning, and operational studies on a basis comparable to synchronous generation resources**."	Project 2021-01 System Model Validation with IBRs.
24B	140	3	"**Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require the generator owners of registered IBRs,** transmission owners that have unregistered IBRs on their system, and distribution providers that have IBR-DERs on their system **to provide models that represent the dynamic behavior of these IBRs at a sufficient level of fidelity to provide to Bulk-Power System planners and operators to perform valid**	Project 2020-06 Verifications of Models and Data for Generators.

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
			interconnection-wide, planning, and operational studies on a basis comparable to synchronous generation resources."	
25A	141	3	"**We also direct NERC to require** the generator owners of registered IBRs and **the transmission owners that have unregistered IBRs on their system to provide to the Bulk-Power System planners and operators (e.g., planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities) dynamic models that accurately represent the dynamic performance of** registered and **unregistered IBRs, including momentary cessation and/or tripping, and all ride through behavior**."	Project 2022-02 Uniform Modeling Framework for IBR.
25B	141	3	"**We also direct NERC to require the generator owners of registered IBRs and the transmission owners that have unregistered IBRs on their system to provide to the Bulk-Power System planners and operators (e.g., planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities) dynamic models that accurately represent the dynamic performance of registered and unregistered IBRs, including momentary cessation and/or tripping, and all ride through behavior**."	Project 2020-06 Verifications of Models and Data for Generators.
26	141	3	"Recognizing that there may be instances in which transmission owners are unable to gather accurate unregistered IBR modeling data and parameters to create and maintain accurate unregistered IBR dynamic models in their transmission owner areas, we modify the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require each transmission owner, if unable to gather accurate unregistered IBR data or unable to gather unregistered IBR data at all, to provide instead to the Bulk-Power System planners and operators in their	Project 2022-02 Uniform Modeling Framework for IBR.

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
			areas, dynamic models of unregistered IBRs using estimated data in accordance with this final rule's section IV.B.3 data sharing directives."	
27	141	3	"Further, we direct NERC to require distribution providers to provide to the planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities aggregated dynamic models that adequately represent the dynamic performance of IBR-DERs on their systems that in the aggregate have a material impact on the Bulk-Power System, including momentary cessation and/or tripping, and all ride through behavior (e.g., IBR-DERs in the aggregate modeled by interconnection requirements performance to represent different steady-state and dynamic behavior)."	Project 2022-02 Uniform Modeling Framework for IBR.
28	141	3	"Recognizing that there may be instances in which distribution providers are unable to gather data that accurately represents IBR-DERs in the aggregate, we modify the NOPR proposal and direct NERC to include in the proposed new or modified Reliability Standards a requirement that the distribution provider, if unable to gather data of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, provide to the Bulk-Power System planners and operators (i.e., the data recipients) a dynamic model using estimated data for IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, in accordance with this final rule's section IV.B.3 data sharing directives."	Project 2022-02 Uniform Modeling Framework for IBR.
29	141	3	"Furthermore, we acknowledge that there may be areas with IBR-DERs in the aggregate that materially impact the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider. Therefore, we modify the NOPR proposal and direct NERC to determine the appropriate registered entity responsible for providing adequate data and parameters of IBR-DERs that in the aggregate have a	Project 2022-02 Uniform Modeling Framework for IBR.

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
			material impact on the Bulk-Power System, and to identify the registered entities for coordinating, verifying, and keeping up to date the respective dynamic models."	
30	141	3	"Finally, NERC must ensure that the proposed new or modified Reliability Standards account for the dynamic performance of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System."	Project 2022-02 Uniform Modeling Framework for IBR.
31	143	3	"While we decline to include this level of detail in the directive to NERC, we nonetheless direct NERC to establish a standard uniform model verification process."	Project 2020-06 Verifications of Models and Data for Generators.
32	143	3	"Therefore, we direct NERC to define the model verification process and to require consistency among the model verification processes for existing Reliability Standards (e.g., FAC-002, MOD-026, and MOD-027) and any new or modified Reliability Standards."	Project 2020-06 Verifications of Models and Data for Generators.
33	146	3	"Accordingly, we direct NERC to develop new or modified Reliability Standards that require the use of the DER_A model or successor models to represent the behaviors of IBR-DERs that in the aggregate have a material impact on the Bulk-Power System at a sufficient level of fidelity for Bulk-Power System planners and operators to create valid planning and operations and interconnection-wide models and to be able to perform respective system studies."	Project 2022-02 Uniform Modeling Framework for IBR.
34	149	3	"Moreover, although the Reliability Standards will apply to a different (albeit overlapping) set of entities than Order No. 2023, we believe consistency is needed between the complimentary proceedings and therefore direct NERC to include in the new or modified Reliability Standards a similar model verification process timeline consistent with Order No. 2023 modeling deadline requirements."	Project 2020-06 Verifications of Models and Data for Generators.

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
35	156	3	"Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and **direct NERC to submit new or modified Reliability Standards that require Bulk-Power System planners and operators to validate,** coordinate, and update in a timely manner the system models by comparing all generator owner, transmission owner, and distribution provider verified IBR models (i.e., models of registered IBRs, unregistered IBRs, and IBR-DERs that in the aggregate have a material impact on the Bulk-Power System) and **resulting system models against actual system operational behavior**."	Project 2021-01 System Model Validation with IBRs.
36A	157	3	"**Furthermore, for those areas with IBR-DERs in the aggregate that materially impact the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we modify the NOPR proposal to direct NERC to determine the appropriate registered entity responsible for the data and parameters of IBR-DERs in the aggregate** and to establish a process that requires identified registered entities to coordinate, validate, and keep up to date the system models."	Project 2022-02 Uniform Modeling Framework for IBR.
36B	157	3	"**Furthermore, for those areas with IBR-DERs in the aggregate that materially impact the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we modify the NOPR proposal to direct NERC to** determine the appropriate registered entity responsible for the data and parameters of IBR-DERs in the aggregate and to **establish a process that requires identified registered entities to coordinate, validate, and keep up to date the system models**."	Project 2021-01 System Model Validation with IBRs.

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
37A	161	3	"**Specifically, we direct NERC to develop new or modified Reliability Standards that require planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities to establish for each interconnection a uniform framework with modeling criteria, a registered modeling designee, and necessary data exchange requirements both between themselves and with the generator owners, transmission owners, and distribution providers to coordinate the creation of transmission planning, operations, and interconnection-wide models (i.e., system models)** and the validation of each respective system model."	Project 2022-02 Uniform Modeling Framework for IBR.
37B	161	3	"**Specifically, we direct NERC to develop new or modified Reliability Standards that require** planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities to establish for each interconnection a uniform framework with modeling criteria, a registered modeling designee, and necessary data exchange requirements both between themselves and with the generator owners, transmission owners, and distribution providers to coordinate the creation of transmission planning, operations, and interconnection-wide models (i.e., system models) and **the validation of each respective system model**."	Project 2021-01 System Model Validation with IBRs.
38A	161	3	"**Further, we direct NERC to include in the new or modified Reliability Standards a requirement for generator owners, transmission owners,** and distribution providers **to regularly update and communicate the verified data and models of registered IBRs**, unregistered IBRs, and IBR-DERs **by comparing their resulting models against actual operational behavior to achieve and maintain necessary modeling accuracy for inclusion of these resources in the system models.**"	Project 2020-06 Verifications of Models and Data for Generators.

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
38B	161	3	"**Further, we direct NERC to include in the new or modified Reliability Standards a requirement for generator owners, transmission owners, and distribution providers to regularly update and communicate the verified data and models of** registered IBRs, **unregistered IBRs, and IBR-DERs by comparing their resulting models against actual operational behavior to achieve and maintain necessary modeling accuracy for inclusion of these resources in the system models.**"	Project 2021-01 System Model Validation with IBRs.
39	161	3	"For those areas with IBR-DERs in the aggregate that have a material impact on the reliable operation of the Bulk-Power System but do not have an associated registered distribution provider, we modify the NOPR proposal to direct NERC to determine the appropriate registered entity responsible for the models of those IBR-DERs and to determine the registered entities responsible for updating, verifying, and coordinating models for IBR-DERs in the aggregate to meet the system models directives."	Project 2021-01 System Model Validation with IBRs.
40	161	3	"NERC may implement this directive by **modifying Reliability Standards** MOD-032-1 and **MOD-033-2 or by developing new Reliability Standards** to establish requirements mandating an annual process **to coordinate, validate, and keep up-to-date the transmission planning, operations, and interconnection-wide models.**"	Project 2021-01 System Model Validation with IBRs
41	174	4	"Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop and submit to the Commission for approval new or modified Reliability Standards that require planning coordinators and transmission planners to include in their planning assessments the study and evaluation of performance and behavior of registered and unregistered IBRs individually and in the aggregate, as well as IBR-DERs in	Pending Transmission Studies SAR (Anticipated Q1 2025).

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
			the aggregate, under normal and contingency system conditions in their planning area."	
42	174	4	"These Reliability Standards should require planning coordinators and transmission planners to include in their planning assessments the study and evaluation of the ride through performance (e.g., tripping and momentary cessation conditions) of IBRs in their planning area for stability studies on a comparable basis to synchronous generation resources."	Pending Transmission Studies SAR (Anticipated Q1 2025).
43	174	4	"The new or modified Reliability Standards should also require planning coordinators and transmission planners to study the Bulk-Power System reliability impacts of registered and unregistered IBRs individually and in the aggregate, as well as IBR-DERs in the aggregate, in their planning models of their area and in their interconnection-wide area planning models."	Pending Transmission Studies SAR (Anticipated Q1 2025).
44	174	4	"Further, the new or modified Reliability Standards should also require planning coordinators and transmission planners to study the Bulk-Power System reliability impacts of registered and unregistered IBRs individually and in the aggregate, as well as IBR-DERs in the aggregate, in adjacent and other planning areas that adversely impacts a planning coordinator's or transmission planner's area during a disturbance event."	Pending Transmission Studies SAR (Anticipated Q1 2025).
45	175	4	"Accordingly, we direct NERC to consider in its standards development process whether to include in new or modified Reliability Standards a requirement that planning coordinators and transmission planners include a wide set of grid stress performance conditions (i.e., both typical and extreme conditions) in planning assessments."	Pending Transmission Studies SAR (Anticipated Q1 2025).
46	175	4	"Likewise, with regards to NERC's comments related to on-peak and off-peak studies, we direct NERC to consider in the standards development	Pending Transmission

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
			process whether to require planning coordinators and transmission planners to account in planning assessments for both on-peak and off-peak conditions, normal and abnormal (contingency) conditions with high penetration levels of IBRs (i.e., registered IBRs, unregistered IBRs, and IBR-DERs that in the aggregate have a material impact on the Bulk-Power System), and normal and abnormal conditions with low inertia."	Studies SAR (Anticipated Q1 2025).
47	176	4	"We adopt the NOPR proposal and direct NERC to submit to the Commission for approval one or more new or modified Reliability Standards that require reliability coordinators and transmission operators to include the performance and behavior of registered and unregistered IBRs individually and in the aggregate, as well as IBR-DERs in the aggregate, (e.g., IBRs tripping or entering momentary cessation individually or in the aggregate) in their operational planning analyses, real-time monitoring, and real-time assessments, including non-bulk electric system data and external power system network data identified in their data specifications."	Pending Operational Studies SAR (Anticipated Q1 2025).
48	176	4	"Further, we agree with commenters and direct NERC to submit to the Commission for approval new or modified Reliability Standards requiring reliability coordinators and transmission operators, when performing operational studies, as well as operational planning analyses, real-time monitoring, real-time assessments, and other analyses, to include in these studies all generation resources (i.e., all generation resources including all IBRs) necessary to adequately assess the performance of the Bulk-Power System for normal and contingency conditions."	Pending Operational Studies SAR (Anticipated Q1 2025).
49	177	4	"We adopt the NOPR proposal and direct NERC to submit to the Commission for approval one or more new or modified Reliability Standards that require balancing authorities to include the performance	Pending Operational Studies SAR

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
			and behavior of registered and unregistered IBRs individually and in the aggregate, as well as IBR-DERs that in the aggregate have a material impact on the Bulk-Power System, (e.g., resources tripping or entering momentary cessation individually or in the aggregate) in their operational analysis functions and real-time monitoring to support the reliable operation of the Bulk-Power System during normal and contingency conditions."	(Anticipated Q1 2025).
50	190	2	"Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop new or modified Reliability Standards that require registered IBR generator owners and operators to use appropriate settings (i.e., inverter, plant controller, and protection) to ride through frequency and voltage system disturbances and that permit IBR tripping only to protect the IBR equipment in scenarios similar to when synchronous generation resources use tripping as protection from internal faults."	Project 2020-02 Modifications to PRC-024 (Generator Ride-through).
51	190	2	"The new or modified Reliability Standards must require registered IBRs to continue to inject current and perform frequency support during a Bulk-Power System disturbance."	Project 2020-02 Modifications to PRC-024 (Generator Ride-through).
52	190	2	"Any new or modified Reliability Standard must also require registered IBR generator owners and operators to prohibit momentary cessation in the no-trip zone during disturbances."	Project 2020-02 Modifications to PRC-024 (Generator Ride-through).
53	190	2	"NERC must submit new or modified Reliability Standards that establish IBR performance requirements, including requirements addressing frequency and voltage ride through, post-disturbance ramp rates, phase	Project 2020-02 Modifications to PRC-024 (Generator Ride-through).

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
			lock loop synchronization, and other known causes of IBR tripping or momentary cessation."	
54	193	2	"Therefore, we direct NERC through its standard development process to determine whether the new or modified Reliability Standards should provide for a limited and documented exemption for certain registered IBRs from voltage ride through performance requirements."	Project 2020-02 Modifications to PRC-024 (Generator Ride-through).
55	193	2	"Further, we direct NERC to ensure that any such exemption would be applicable for only existing equipment that is unable to meet voltage ride-through performance. When such existing equipment is replaced, the exemption would no longer apply, and the new equipment must comply with the appropriate IBR performance requirements specified in the Reliability Standards (e.g., voltage and frequency ride through, phase lock loop, ramp rates, etc.)."	Project 2020-02 Modifications to PRC-024 (Generator Ride-through).
56	193	2	"Finally, we direct NERC, through its standard development process, to require the limited and documented exemption list (i.e., IBR generator owner and operator exemptions) to be communicated with their respective Bulk-Power System planners and operators (e.g., the IBR generator owner's or operator's planning coordinator, transmission planner, reliability coordinator, transmission operator, and balancing authority)."	Project 2020-02 Modifications to PRC-024 (Generator Ride-through).
57	199	2	"Pursuant to section 215(d)(5) of the FPA, we modify the NOPR proposal. To the extent NERC determines that a limited and documented exemption for those registered IBRs currently in operation and unable to meet voltage ride-through requirements is appropriate due to their inability to modify their coordinated protection and control settings, we direct NERC to develop new or modified Reliability Standards to mitigate the reliability impacts to the Bulk-Power System of such an exemption."	Project 2020-02 Modifications to PRC-024 (Generator Ride-through).

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
58	208	2	"Pursuant to section 215(d)(5) of the FPA, we adopt the NOPR proposal and direct NERC to develop and submit to the Commission for approval new or modified Reliability Standards that require post-disturbance ramp rates for registered IBRs to be unrestricted and not programmed to artificially interfere with the resource returning to a pre-disturbance output level in a quick and stable manner after a Bulk-Power System."	Project 2020-02 Modifications to PRC-024 (Generator Ride-through).
59	208	2	"Further, the Reliability Standards must require generator owners to communicate to the relevant planning coordinators, transmission planners, reliability coordinators, transmission operators, and balancing authorities the actual post-disturbance ramp rates and the ramp rates to meet expected dispatch levels (i.e., generation-load balance)."	Project 2023-02 Analysis and Mitigation of BES Inverter-Based Resource Performance Issues.
60	209	2	"We direct NERC to submit to the Commission for approval new or modified Reliability Standards that would require registered IBRs to ride through any conditions not addressed by the proposed new or modified Reliability Standards that address frequency or voltage ride through, including phase lock loop loss of synchronism."	Project 2020-02 Modifications to PRC-024 (Generator Ride-through).
61	209	2	"The proposed new or modified Reliability Standards must require registered IBRs to ride through momentary loss of synchronism during Bulk-Power System disturbances and require registered IBRs to continue to inject current into the Bulk-Power System at pre-disturbance levels during a disturbance, consistent with the IBR Interconnection Requirements Guideline and Canyon 2 Fire Event Report recommendations."	Project 2020-02 Modifications to PRC-024 (Generator Ride-through).
62	209	2	"Related to ACP/SEIA's comment recommending to revise the directive to require generators to maintain synchronism where possible and continue to inject current to support system stability, we direct NERC, through its	Project 2020-02 Modifications to

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
			standard development process, to consider whether there are conditions that may limit generators to maintain synchronism."	PRC-024 (Generator Ride-through).
63	222-223	1	"Pursuant to § 39.2(d) of the Commission's regulations, we modify the NOPR proposal and direct NERC to submit an informational filing within 90 days of the issuance of the final rule in this proceeding… NERC's informational filing should include a detailed, comprehensive standards development plan and explanation of how NERC will prioritize the development of new or modified Reliability Standards directed in this rule… NERC should take into account the risk posed to the reliability of the Bulk-Power System, standard development projects already underway, resource constraints, its ongoing registration of Bulk-Power System-connected IBR generator owners and operators, and other factors as necessary."	Completed and filed with FERC on January 17th, 2024 Link to: Order No. 901 Workplan Informational Filing (NERC).
64A	226	2	"Further, we believe that there is a need to have all of the directed Reliability Standards effective and enforceable well in advance of 2030 and direct NERC to ensure that the associated implementation plans sequentially stagger the effective and enforceable dates to ensure an orderly industry transition for complying with the IBR directives in this final rule prior to that date."	Each of the identified Reliability Standards Projects in Milestone 2 will include implementation plans that assure all new or modified Reliability Standards are effective and enforceable before 2030.
64B	226	3	"Further, we believe that there is a need to have all of the directed Reliability Standards effective and enforceable well in advance of 2030	Each of the identified Reliability

Index	Paragraph of Order	Milestone	Directive Subpart Summary	Active Project # Draft SAR # or Pending SAR name
			and direct NERC to ensure that the associated implementation plans sequentially stagger the effective and enforceable dates to ensure an orderly industry transition for complying with the IBR directives in this final rule prior to that date."	Standards Projects in Milestone 3 will include implementation plans that assure all new or modified Reliability Standards are effective and enforceable before 2030.
64C	226	4	"Further, we believe that there is a need to have all of the directed Reliability Standards effective and enforceable well in advance of 2030 and direct NERC to ensure that the associated implementation plans sequentially stagger the effective and enforceable dates to ensure an orderly industry transition for complying with the IBR directives in this final rule prior to that date."	Each of the identified Reliability Standards Projects in Milestone 4 will include implementation plans that assure all new or modified Reliability Standards are effective and enforceable before 2030.