Standard Authorization Request (SAR)

Complete and submit this form, with attachment(s) to the NERC Help Desk. Upon entering the Captcha, please type in your contact information, and attach the SAR to your ticket. Once submitted, you will receive a confirmation number which you can use to track your request.

The North American Electric Reliability Corporation (NERC) welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	Transmission System Planning Performance Requirements for Extreme Weather		
Date Submitted:	July 5, 2023		
SAR Requester			
Name:	Mohammed Osman, Lead Engineer of System Analysis, Power System Analysis William Lamanna, Senior Engineer – Reliability Assessments Scott Barfield-McGinnis, Principal Technical Advisor, Power Risk Issues and Strategic Management		
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SAR Type (Check as many as apply)			
☒ New Standard ☒ Revision to Existing Standard ☒ Add, Modify or Retire a Glossary Term ☐ Withdraw/retire an Existing Standard		☐ Imminent Action/ Confidential Issue (SPM Section 10) ☐ Variance development or revision ☐ Other (Please specify)	
Justification for this proposed standard development project (Check all that apply to help NERC prioritize development)			
☒ Regulatory Initiation ☐ Emerging Risk (Reliability Issues Steering Committee) Identified ☐ Reliability Standard Development Plan		☐ NERC Standing Committee Identified ☐ Enhanced Periodic Review Initiated ☐ Industry Stakeholder Identified	
Industry Need (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):			
The current transmission planning Reliability Standard TPL-001-5.1 – Transmission System Planning Performance Requirements[1] does not expressly require transmission planners and planning coordinators to consider extreme hot and cold weather in their transmission planning assessments. In particular, Reliability Standard TPL–001–5.1, Table 1, provisions 2.f (stability) and 3.b (steady state)			

[1] TPL-001-5.1 at https://www.nerc.com/pa/Stand/Reliability%20Standards/TPL-001-5.1.pdf.

Requested information
require stability and steady state analyses, respectively, to be performed for certain traditional extreme events, but does not expressly require them for extreme heat and cold conditions. Extreme weather-related events that have spanned the continent in recent years demonstrate the challenges associated with planning for extreme heat and cold weather events, particularly those events that affect a wide area or that occur during periods when the Bulk-Power System (BPS) must meet unexpected high demand. Extreme heat and cold weather events have occurred with greater frequency in recent years, and are projected to occur with even greater frequency in the future. At the same time, the changing resource mix has resulted in a grid that is increasingly more susceptible to the impacts of extreme heat and cold weather events. Recent extreme weather events have shown the risk that such events can pose to the reliable operation of the BPS, and have highlighted the high risk to life and extreme economic impacts that can result from unplanned load shed during such conditions. Long-term transmission planning, along with other measures, can play an important role in identifying and helping to minimize these risks. Accordingly, this project will revise the NERC transmission planning Reliability Standards, consistent with FERC Order No. 896,[2] to address the study of extreme heat and cold conditions. The impact of concurrent failures of BPS generation and transmission equipment and the potential for cascading outages that may be caused by extreme heat and cold weather events should be studied and corrective actions should be identified and implemented. These standard(s) should use benchmark extreme heat and cold weather events for the required studies, and require the development of planning cases with appropriate sensitivities over a wide-area. The standard should also require the identification and implementation of corrective actions where system performance requirements are not met, including appropriate coordination and communication of studies.
Purpose or Goal (How does this proposed project provide the reliability-related benefit described above?):
Consistent with FERC Order No. 896, this purpose of this project is to address the reliability gap pertaining to the consideration of extreme heat and cold weather events that exist in current transmission planning standards (e.g., NERC Reliability Standard TPL-001-5.1 – Transmission System Planning Performance Requirements). In Order No. 896, NERC was directed to develop a new or modified Reliability Standard ("Standard") that requires the following: (1) the development of benchmark planning cases based on information such as major prior extreme heat and cold weather events and/or future meteorological projections; (2) planning for extreme heat and cold weather events using steady state and transient stability analyses expanded to cover a range of extreme weather scenarios, including expected availability of the resource mix during extreme heat and cold weather conditions, and including the broad area impacts of extreme

[2] Order No. 896, *Transmission System Planning Performance Requirements for Extreme Weather*, 183 FERC ¶ 61,191 (2023), available at https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20230615-3100&optimized=false.

Requested information
heat and cold weather; and (3) the development of corrective action plans that mitigate specified instances where performance requirements during extreme heat and cold weather events are not met.
Project Scope (Define the parameters of the proposed project):
The scope of the proposed project is to develop a new transmission planning Standard, or modify an existing Standard, to address the directives from FERC Order No. 896 pertaining to the study of extreme heat and cold events. New or revised definitions may be required. This project may also need to revise Standard MOD-032-1 – Data for Power System Modeling and Analysis[3] for data sharing.
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[4] which includes a discussion of the reliability-related benefits of developing a new or revised Reliability Standard or definition, and (2) a technical foundation document (*e.g.,* research paper) to guide development of the Standard or definition):
The drafting team is responsible for the development of new Standard or the revision of Standard TPL-001-5.1 that shall achieve the actions listed below related to addressing concerns pertaining to transmission system planning for extreme heat and cold weather events outlined in the Order that impact the Reliable Operation of the Bulk-Power System. The technical justification of the reliability-related benefits of developing a new Standard, modified Standard, or industry definition were addressed in the NOPR[5] and Order. The following actions have been listed in a sequence consistent with the directives in the Order. **A. Develop New or Modified Standard** Develop a new or modified Standard[6] to require the following:[7] 1. Development of benchmark planning cases based on major prior extreme heat and cold weather events and/or meteorological projections; 2. Planning for extreme heat and cold weather events using steady state and transient stability analyses expanded to cover a range of extreme weather scenarios including the expected resource mix's availability during extreme heat and cold weather conditions, and including the wide-area impacts of extreme heat and cold weather; and

[3] See MOD-032-1 at https://www.nerc.com/pa/Stand/Reliability%20Standards/MOD-032-1.pdf.
[4] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to NERC.
[5] See Docket RM22-10-000, NOPR 179 FERC ¶ 61,195, document number 2022-13471 at https://www.federalregister.gov/documents/2022/06/27/2022-13471/transmission-system-planning-performance-requirements-for-extreme-weather.
[6] Order at P25.
[7] Order at P27.

Requested information

3. Development of corrective action plans that mitigate specified instances where performance requirements for extreme heat and cold weather events are not met.[8]

Also, identify the responsible entities for developing benchmark planning cases and conducting wide-area studies.

B. Develop Benchmark Events and Planning Cases Based on Major Prior Extreme Heat and Cold Weather Events and/or Meteorological Projections

The drafting team must consider approaches that would provide a uniform framework for developing benchmark events while still recognizing regional differences. For example, consider defining benchmark events around:

- a projected frequency (e.g., 1-in-50-year event); or
- a probability distribution (95th percentile event).

Although the NOPR did not specify how these benchmark events should be developed, the NOPR provided two examples: (1) the drafting team could develop the benchmark event or events during the standard development process; or (2) the drafting team could include in the new or modified Standard a framework establishing a common design basis for the development of benchmark events. In developing a new of modified Standard, responsible entities are to be required to:[57]

1. Develop extreme heat and cold weather benchmark events;[9]
2. Develop benchmark planning cases based on identified benchmark events; and
3. Describe/define the types of heat and cold scenarios/events that responsible entities must study.[10]

For instance, a benchmark event could be constructed based on data from a major prior extreme heat or cold event, with adjustments if necessary to account for the fact that future meteorological projections may estimate that similar events in the future are likely to be more extreme.[11]

The drafting must consider the examples of approaches for defining benchmark events identified in the NOPR (e.g., the use of projected frequency or probability distribution).[12]

The drafting must ensure that benchmark events that all responsible entities likely to be impacted by the same extreme weather events use consistent benchmark events. Doing so is important to ensuring that neighboring planning regions are assuming similar weather conditions and are able to coordinate

[8] NOPR, 179 FERC ¶ 61,195 at P 51.
[9] Benchmark events will form the basis for a planner's benchmark planning case— i.e., the base case representing system conditions under the relevant benchmark event—that will be used to study the potential wide-area impacts of anticipated extreme heat and cold weather events.
[10] Order at P35.
[11] NOPR, 179 FERC ¶ 61,195 at P47.
[12] Order at P36.

Requested information

their assumptions accordingly. Allowing responsible entities significant discretion to determine the applicable meteorological conditions would not meet the objectives of the Order.[13]

Extreme heat and cold benchmark events must reflect regional differences in climate and weather patterns.[14]

The drafting team may and is encouraged to engage the national labs, RTOs, NOAA, and other agencies and organizations in developing benchmark events.[15]

To provide for a common design basis for responsible entities to follow when creating benchmark planning cases, case are to represent:[16]

1. Potential weather-related contingencies (*e.g.,* concurrent/correlated generation and transmission outages, derates) and expected future conditions of the system such as changes in load:
2. Transfers;
3. Generation resource mix; and
4. Impacts on generators sensitive to extreme heat or cold (due to the weather conditions indicated in the benchmark events).

The drafting team must ensure the new or modified Standard contains appropriate mechanisms for ensuring the benchmark event reflects up-to-date meteorological data. A mechanism to update the benchmark event at least every five years would strike a reasonable balance between the benefits of using the most up-to-date meteorological data and administrative the burdens of collecting and analyzing such data.[17]

C. Defining "Wide-Area"

The drafting team in developing a new or modified Standard must include that transmission planning studies consider the wide-area impacts of extreme heat and cold weather.[18] The drafting team should consider approaches in defining "wide-area" over a geographical area consistent with weather and electrically, and how these two approaches correlate.[19] The drafting team must clearly describe the process that a responsible entity must use to define the wide-area boundaries.[20]

[13] Order at P37.
[14] Order at P38.
[15] Order at P37.
[16] Order at P39.
[17] Order at P40.
[18] Order at P41.
[19] Order at P47.
[20] Order at P50.

D. Entities Responsible for Developing Benchmark Events and Planning Cases, and for Conducting Transmission Planning Studies of Wide-Area Events

a. Entity Responsible for Establishing Benchmark Events

The Order directed NERC to develop requirements that address the types of extreme heat and cold weather scenarios responsible entities are required to study, including the development of benchmark events and benchmark planning cases.

The drafting team shall develop the new or modified Standard consistent with the approach the Commission took in Order No. 779 (i.e., TPL-007-1 – Transmission System Planned Performance for Geomagnetic Disturbance Events). Also, define mechanisms to periodically update extreme heat and cold weather benchmark events.[21]

The drafting team may use an existing functional entity or a group of functional entities (e.g., a group of planning coordinators) to designate the tasks of developing benchmark planning cases and conducting wide-area studies.[22]

b. Entities Responsible for Development of Planning Cases and Conducting Transmission Planning Studies of Wide-Area Events

The drafting team is to (1) designate the responsible entities responsible for developing benchmark planning cases, and (2) specify which responsible entities have an obligation to conduct wide-area studies under the new or modified Standard.[23]

The drafting team may designate the tasks of developing benchmark planning cases and conducting wide-area studies to an existing functional entity or a group of functional entities (*e.g.,* a group of planning coordinators). If needed, the drafting team may propose to establish a new functional entity registration to undertake these tasks by working with NERC registration and legal staffs. The drafting team, if considering such an approach, will need to consider that a new functional registration will require a modification to the NERC Rules of Procedure, which can take additional time to complete.[24]

E. Coordination Among Registered Entities and Sharing of Data and Study

In determining the responsible entities that will be developing benchmark planning cases and conducting wide-area studies, the drafting team must ensure there is a mechanism is place to ensure the sharing of data and studies. For example, it is possible that the selected responsible entities under the new or modified Standard will not be able to request and receive needed data pursuant to MOD–032–1, absent modification to that Standard.[25]

The drafting team must require system information and study results sharing and coordination among planning coordinators and transmission planners with transmission operators, transmission owners, and generator owners for extreme heat and cold weather events.[26]

The drafting team must address wide-area coordination among giving due consideration to relevant factors identified by commenters in the Order and NOPR[27,28] At a minimum, the drafting team must require responsible entities to share the results of their wide-area studies with other registered entities

Requested information

consistent with TPL-00-1-5.1 (e.g., transmission operators, transmission owners, and generator owners that have a reliability related need for the studies).[29]

F. Concurrent/Correlated Generator and Transmission Outages

The drafting team must require the study of concurrent/correlated generator and transmission outages due to extreme heat and cold events in benchmark events as described in more detail below. Previous extreme weather events have demonstrated that there is a high correlation between generator outages and cold temperatures, indicating that as temperatures decrease, unplanned generator outages and derates increase. Because of this correlation, it is necessary that responsible entities evaluate the risk of correlated or concurrent outages and derates of all types of generation resources and transmission facilities as a result of extreme heat and cold events. Some generators may be unavailable under extreme heat or cold conditions and thus their potential outages must be considered in extreme heat and cold weather planning scenarios. The drafting team may strike a balance between allowing responsible entities discretion to ensure the study incorporates their operating experience and the need to create a robust framework that ensures extreme heat and cold events are adequately studied.[30]

G. Conduct Transmission System Planning Studies for Extreme Heat and Cold Weather Events

1. Steady State and Transient Stability Analyses

In a steady state analysis, the system components are modeled as either in-service or out-of-service and the result is a single point-in-time snapshot of the system in a state of operating equilibrium. A transient stability (dynamic) analysis examines the system from the start to the end of a disturbance to determine if the system regains a state of operating equilibrium. Performing both analyses ensures that the system has been thoroughly assessed for instability, uncontrolled separation, and cascading failures in both the steady state and the transient stability realms.

The drafting team must require that responsible entities:

1. Perform both steady state and transient stability (dynamic) analyses in the extreme heat and cold weather planning studies (in the long-term planning horizon[31]);

[21] Order at P59. See also Order No. 779 at https://www.federalregister.gov/documents/2016/09/30/2016-23441/reliability-standard-for-transmission-system-planned-performance-for-geomagnetic-disturbance-events.
[22] Order at P62.
[23] Order at P60.
[24] Order at P62.
[25] Order at P73.
[26] Order at P65.
[27] See Appendix A, P81 and P82 for additional information.
[28] See Appendix B, P57, P64, and P70.
[29] Order at P77.
[30] Order at P88 through P91.
[31] Order at P95.

Requested information

2. Define a set of contingencies that responsible entities will be required to consider when conducting wide-area studies of extreme heat and cold weather events under the new or modified Standard;
3. Develop specific criteria for determining which outages should be considered in the benchmark planning case; and
4. Model demand load response in their extreme weather event planning area.[32]

2. Sensitivity Analysis

Sensitivity analyses help a transmission planner to determine if the results of the base case are sensitive to changes in the inputs. The use of sensitivity analyses is particularly necessary when studying extreme heat and cold events because some of the assumptions made when developing a base case may change if temperatures change. For example, during extreme cold events, load may increase as temperatures decrease, while a decrease in temperature may result in a decrease in generation.[33]

In developing sensitivities the drafting must:

1. Require the use of sensitivity cases to demonstrate the impact of changes to the assumptions used in the benchmark planning case; and
2. Establish a baseline set of sensitivities for the new or modified Standard. FERC stated that while it would not require the inclusion of any specific sensitivity in Order No. 896, NERC should consider including conditions that vary with temperature such as load, generation, and system transfers.[34]

3. Modifications to the Traditional Planning Approach

The drafting team must require the use of planning methods that ensure adequate consideration of the broad characteristics of extreme heat and cold weather conditions that also address:

1. Whether probabilistic elements can be incorporated into the new or modified Standard and implemented presently by responsible entities, and
2. Identify any probabilistic planning methods that would improve upon existing planning practices, but are infeasible to include in a new or modified Standard at this time.[35]

H. Implement a Corrective Action Plan if Performance Standards Are Not Met

The Order specifies that NERC must develop standards that require Corrective Action Plans that include mitigation for any instances where performance requirements for extreme heat and cold events are not

[32] Order at P111 through P116.
[33] Order at P124 and also at P126.
[34] Order at P124.
[35] Order at P134, P138, and P158.

met; therefore, the drafting must require the development of extreme weather corrective action plans that:

1. Identify specified instances when performance standards are not met;
2. Require certain processes to facilitate interaction and coordination with applicable regulatory authorities or governing bodies responsible for retail electric service as appropriate in implementing a corrective action plan;
3. Require mitigation for specified instances where performance requirements for extreme heat and cold events are not met (*i.e.,* when certain studies conducted under the Standard show that an extreme heat or cold event would result in cascading outages, uncontrolled separation, or instability);
4. Determine whether corrective action plans should be required for single or multiple sensitivity cases;
5. Determine whether corrective action plans should be developed if a contingency event that is not already included in benchmark planning case would result in cascading outages, uncontrolled separation, or instability;
6. Establish required study contingencies and baseline sensitivities for which a corrective action plan is required; and
7. Require that responsible entities share their corrective action plans with, and solicit feedback from, applicable regulatory authorities or governing bodies responsible for retail electric service issues.[36]

I. Other Extreme Weather-Related Events and Issues

Reliability Standard Implementation Timeline

NERC must submit a responsive Reliability Standard to FERC by December 23, 2024.

The proposed implementation timeline for a new or modified Reliability Standard must have an implementation beginning no later than 12 months after the effective date of a Commission order approving the proposed new or modified Reliability Standard.[37]

The drafting team in developing the standard has the discretion to develop a phased-in implementation timeline for the different requirements of the proposed Reliability Standard (*i.e.,* developing benchmark cases, conducting studies, developing corrective action plans, etc.). However, this phased-in implementation must begin within 12 months of the effective date of a Commission order approving the proposed Reliability Standard and must include a clear deadline for implementation of all requirements.[38]

Other

There is a concern that there is limited modeling of protection systems in dynamic assessments currently, and any dynamic simulation of extreme events would require significant modeling of protection systems to provide for convergence of the numerical simulation. The drafting team in developing the planning requirements for extreme heat and cold weather must take into account any

Requested information
deficiencies in dynamic modeling of protection systems. The dynamics databases used for transient stability simulations by various interconnections typically do not include comprehensive dynamic models of relays installed in the interconnection. The drafting team should consider wide-area applications by various interconnections that may not typically include comprehensive dynamic models of relays installed in the interconnection.[39] The drafting team should consider the cost impacts to responsible entities.
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
The cost impact is unknown and will be considered during drafting team meetings. However, The SAR proposes to either create a new Standard or modify an existing Standard(s) that would require responsible entities to create Corrective Action Plans to address risks related to transmission system planning performance for extreme weather directed in the Order. The costs associated are anticipated to be comparable to those associated with a responsible entity's performance of TPL-007-1 – Transmission System Planned Performance for Geomagnetic Disturbance Events.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g.*, Dispersed Generation Resources):
BES facilities may be uniquely impacted by the results of improved studies that incorporate enhanced extreme heat and cold weather scenarios and sensitivity analyses performed by the transmission planners. Mitigating and corrective actions may require transmission system topology changes, including but not limited to re-evaluating load shedding plans as a safety net in response to high demand in extreme heat and cold weather over a wide-area. For example, if studies reveal thermal violations that could be anticipated during extreme weather, transmission facilities may need to be upgraded. Generation facilities may be impacted by having to change the way concurrent or coincident generator outages are managed and planned to reduce the likelihood of not meeting high demands over a wide-area. For example, if multiple generators are disrupted due to pipeline issues and don't have dual fuel capability.
To assist the NERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g.*, Transmission Operator, Reliability Coordinator, etc. See the most recent version of the NERC Functional Model for definitions):
The development of a new or modified Standard should consider drafting team individuals from the following functional entities: Balancing Authority, Generator Owner, Planning Coordinator, Reliability Coordinator, Transmission Owner, and Transmission Planner.

[36] Order at P152 through P158, and P165.
[37] Order at P188.
[38] Order at P193.
[39] Order at P68 and P74.

Requested information
Do you know of any consensus building activities[40] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
In Order No. 896, FERC highlighted that industry experts agreed that extreme weather events are likely to become more severe and frequent in the future and there is a need to address them in the long-term planning horizon.
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so, which standard(s) or project number(s)?
TPL-001-5.1a and MOD-032-1.
Are there alternatives (e.g., guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives.
None.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those that apply.	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☒	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☒	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
☐	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☐	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☐	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
☒	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

Market Interface Principles	
Does the proposed standard development project comply with all of the following Market Interface Principles?	Enter (yes/no)
1. A reliability standard shall not give any market participant an unfair competitive advantage.	Yes

[40] Consensus building activities are occasionally conducted by NERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Market Interface Principles	
2. A reliability standard shall neither mandate nor prohibit any specific market structure.	Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard.	Yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards.	Yes

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
e.g., NPCC	No needed Regional or Interconnection variances were identified. The Order did acknowledge that the drafting team consider approaches that would provide a uniform framework for developing benchmark events while still recognizing regional differences in climate and weather patterns, among other considerations; therefore, the use of region is considered to be the common geographical understanding and not NERC Regional Entity footprints. The Commission disagreed that Regional Entities and reliability coordinators should not lead the development of benchmark events and that the drafting team should.[41]

For Use by NERC Only

SAR Status Tracking (Check off as appropriate).	
☐ Draft SAR reviewed by NERC Staff ☐ Draft SAR presented to SC for acceptance ☐ DRAFT SAR approved for posting by the SC	☐ Final SAR endorsed by the SC ☐ SAR assigned a Standards Project by NERC ☐ SAR denied or proposed as Guidance document

Version History

Version	Date	Owner	Change Tracking
1	June 3, 2013		Revised
1	August 29, 2014	Standards Information Staff	Updated template
2	January 18, 2017	Standards Information Staff	Revised

[41] Order at P58.

2	June 28, 2017	Standards Information Staff	Updated template
3	February 22, 2019	Standards Information Staff	Added instructions to submit via Help Desk
4	February 25, 2020	Standards Information Staff	Updated template footer

Appendix A

Excerpts from NOPR, 179 FERC ¶ 61,195

P51. February 2011 Southwest Cold Weather Event and January 2014 Polar Vortex Cold Weather Event

81. While balancing authorities and other entities must share system information and study results with their transmission and planning coordinator pursuant to Reliability Standards MOD-032-1 and TPL-001-5.1 as described above, there is no required sharing of such information—**or required coordination**—among planning coordinators and transmission planners with transmission operators, transmission owners, and generator owners, thus limiting the benefits of additional modeling. Sharing system information and study results and **enhancing coordination** among these entities for extreme heat and cold weather events could result in more representative planning models by better:

> (1) integrating and including operations concerns (e.g., lessons learned from past issues including corrective actions and projected outcomes from these actions, evolving issues concerning extreme heat/cold) in planning models; and
>
> (2) conveying reliability concerns from planning studies (e.g., potential widespread cascading, islanding, significant loss of load, blackout, etc.) as they pertain to extreme heat or cold.

82. Therefore, as part of its revisions, NERC should require system information and study results sharing, and **coordination** among planning coordinators and transmission planners with transmission operators, transmission owners, and generator owners for extreme heat and cold weather events. To better understand the benefits of the suggested actions, we are inviting comments on:

> (1) the parameters and timing of coordination and sharing;
>
> (2) specific protocols that may need to be established for efficient coordination practices; and
>
> (3) potential impediments to the proposed coordination efforts.

Appendix B

Excerpts from Order No. 896

57. Environmental Defense Fund (EDF), Tri-State, and Eversource Energy Service Company (Eversource) propose that reliability coordinators should have the responsibility to perform wide-area planning and coordination in collaboration with other impacted reliability coordinators

64. there is no required sharing of such information related to extreme heat or cold weather events—or required coordination—among planning coordinators and transmission planners with transmission operators, transmission owners, and generator owners. Sharing system information and study results and enhancing coordination among these entities for extreme heat and cold weather events could result in more representative planning models by better integrating and including operations concerns (*e.g.,* lessons learned from past issues including corrective actions and projected outcomes from these actions, evolving issues concerning extreme heat/cold) in planning models; and conveying reliability concerns from planning studies (*e.g.,* potential widespread cascading, islanding, significant loss of load, blackout, etc.) as they pertain to extreme heat or cold.[42]

70. Tri-State suggests that the balancing authority should address the results of the studies and how they should communicate those results among the transmission planners. Tri-State also asserts that the balancing authority is responsible for resource adequacy and should communicate resource needs for the area with the responsible transmission planners who can evaluate system needs and "provide access to remove" resource needs.

[42] NOPR at P81.