Question	Answer
How do you see a future NERC standard requiring EMT studies interacting with FERC Order 2023 process timeline requirements that come with penalties?	As written presently, the NERC SAR includes proposed requirements for 1) developing EMT modeling requirements, 2) having an EMT model (and maybe all models) quality check process, and 3) having a methodology for when and where to conduct EMT studies as part of the interconnection process. FERC Order 2023 includes requirements/directives for providing EMT models, but does not specify details on EMT studies necessarily. So there is flexibility to develop and adapt processes for inclusion of EMT studies during the interconnection process. However, fitting them into the timelines of the cluster system impact study process will be a challenge for industry moving forward. More effort is needed to develop automation tools to expedite interconnection model processing so more time can be dedicated to conducting system studies.
For entities currently implementing IEEE 2800, what steps can we take now to simplify harmonization with future NERC FAC-001 / - 002 requirements?	Adoption of IEEE 2800-2022 will likely set up entities (i.e., TOs) very well for future FAC-001 standards revisions, if that moves forward. The SAR was crafted based on IEEE 2800-2022 requirements and thus there is great harmonization there.
Is the goal of FAC-001 and FAC-002 SAR is to include detailed new requirents into NERC standards?	The SAR requires that specific categories or topics be addressed in requirements. For example, reactive power-voltage control, frequency response, etc. However, the technical details (e.g., rise time, droop, response time, damping, etc.) are not hard-coded by the SAR to provide TOs with flexibility.
What can be done to improve interconnection studies and requirements while industry waits for NERC standard changes?	Develop modeling requirements, considering all models during the interconnection study process as a package deal. Develop model quality check processes and IBR performance conformity assessment processes that can be automated and streamlined.
is interoperability of models being included in modelling work?	Interoperability of models, to our knowledge, is not included in the NERC work plan broadly. However, the concept of the uniform modeling framework proposed by FERC/NERC, requiring NERC to maintain a list of acceptable models, continues to drive toward use of standard library models for phasor domain transient (PDT) stability studies. This is not applied to the EMT space.
Since the FAC-001/2 SAR intends to improve requirements during the interconnection process, why aren't these changes made in the FERC GIA/GIP?	Some NERC guidelines and reports have emphasized the need for FERC GIA/GIP improvements and multiple industry forums have also advocated for this. We are not aware of any activities at the FERC level to change the pro forma GIA/GIP to include technical details pertaining to IBRs beyond what was included in FERC Order 2023. Focus is primarily on FERC ORder 901 implementation.

NERC IRPS is working on a whitepaper on best commissioning practices. Will recommendations from the whitepaper be included in the FAC-001/FAC-002 SAR?	The recommendations could be incorporated into implementation of the requirements. For example, the requirements would likely require that GOS have a documented commissioning process that gets assessed/reviewed by a Regional Entity. However, the details would likely be left to GOs/developers to adopt and/or implement as they see fit. So the white paper could help in that regard.
Assuming GFM technology was available for all fuel types, do you have a sense of how adopting these controls might reduce the need for EMT studies?	GFM is not currently commercially available across all IBR types. However, this is an open area of R&D that would need further vetting and exploration. Speculation is that this would not be for many years once GFM is widespread. EMT studies are expected to increase over time as our penetration levels of IBRs, and also power electronic based loads, increases on the system with or without GFM.
For the strong grid test, is the GFM voltage control point at HV side or MV side?	HV side with droop settings.
Do you know if BESS's or Data Center loads could be used as a "steady" load (like the old aluminum loads) for building islands after a large scale blackout?	Using BESS as a steady load to stabilize an island's grid after a large-scale blackout is theoretically feasible. This is due to its fast response times and ability to discharge energy on demand. However, the effectiveness of a BESS as a steady load depends on its capacity, state of charge, and the overall grid management system. Using Data Center loads for this purpose is likely more challenging but could be looked at with support from data center developers/owners/operators.
As utilities de-commission power plants, system inertia is becoming an area of concern. How do grid following and grid forming IBRs behave during a fault?	Grid forming BESS provides a grid-stabilizing attribute that supports low inertia/weak grid conditions that helps stabilize these types of systems. Grid following struggle under these operating conditions and do not support the grid in that way. So GFM BESS in these areas of system inertia/low short circuit strength systems is one key focus for adoption.
Are the issues with Large Load characteristics of variability and reactive power needs rather than just capacity?	Large load issues/risks on the grid include generation/transmission capacity, but go beyond that to include voltage and frequency support (both steady state and dynamic), load ramping and variability factors driven by AI-focused data centers performing training runs for large language models, monitoring and data sharing requirements for event analysis, and more.

is system strength impact of data centers considered in risk assessments?	Today from a grid study perspective this may not be a common analysis for large load/data centers today, but system strength should be looked at for future data center grid studies as they have a heavy percentage of power electronic devices that make up their facility, including converters/inverters/VFDs, and these high frequency power electronic devices can have operational and stability challenges under different system strength conditions. As the industry develops a dynamic model for data centers, the model should be closely studied under different system strenght levels.
Can you talk about frequency response [MW/0.1Hz] capabilities of the new technology.	IBRs have the capability to provide frequency response and fast frequency response. These are codified in IEEE 2800-2022 Clause 6.
Can you talk about control scheme challenges with IBR and Large Load integration?	Theoretically, control interactions and instabilities may occur between large loads and IBRs. We are not aware of such specific incidents as of now. However, large loads (e.g., data center) instabilities have been observed lately. For example, some papers highlight resonance phenomenon was observed in multiple data centers in low, medium, and high frequencies (i.e., 11 Hz, 49-71 Hz, and 5-10 kHz).
Can you talk about how likely SMR's (small modular reactors) will be used for data center? How about fuel cells?	There have been many very large partnerships and investment announcements between generation owners/operators/developers and large load owners/operators/developers over the course of 2024. These include SMRs, fuel cells, and other generation resources including solar, batteries, and wind. It is hard to predict exactly which of these announcements will come to fruition, but what we know is these are massive investments and partnerships that go a long way to getting long term financing contracts in place and accelerating the potential for these to get developed whether in pilot projects or first commercial projects. The massive exponential growth of data centers and their urgent need to get built and powered is putting a positive message to all generation developments and technologies that more is needed, and it may be likely that we'll see a combination of all types of generation types come online in the coming years to meet this demand.