

AEIC GRID ADVANCEMENT PROGRAM • CHALLENGE BRIEF

Overcoming Capacity Bottlenecks

Challenge 03. The operating problem, why it is hard, and what the cohort will work.

Working session**Cadence****Eligibility****Join****Program**

Tuesday, October 13, 2026, 2:00 p.m. ET

Second Tuesday of every month, 2:00 p.m. ET

AEIC members and any electric utility

<https://aeicopscenter.org/grid-advancement>

AEIC Center for Operational Excellence

The problem

The load showed up faster than the wires can.

Data centers, industrial electrification, transportation, heat. The requests are landing in interconnection queues at a size and a speed the planning process was never built to absorb. A large-load customer wants an answer in months. A transmission upgrade wants years. That mismatch is now the binding constraint on the grid, and it is not one you can build your way out of on the customer's schedule.

So utilities are being asked to relieve capacity constraints without always building new capacity. Get more out of what is already in the ground. Squeeze the headroom sitting unused inside a conservative static rating or an unbalanced circuit. That is the promise of grid-enhancing technologies and non-wires alternatives, and it is a real promise. The products are real and they work. What makes this hard is everything around them: a planning standard, a tariff, and a control room that were all built to count capacity a different way.

Why this challenge

Because the bill lands on people who did not ask for the load.

Transmission cost has historically been socialized, which worked when growth was broad and slow. When the new capacity is being built for one campus, socializing it means a residential customer pays for infrastructure they will never touch, to serve a customer who may not still be there in ten years. That is an affordability problem with a technical trigger, and it is the fastest way to lose a regulator and a community at once.

The build-first reflex makes it worse. Every speculative megawatt you build to be safe is capital committed against demand that has not proven itself, and every megawatt you do not build is economic development handed to the next state. Non-wires alternatives matter because they are the only tool that buys time without buying certainty you cannot yet justify.

Where utilities actually are

Most shops are running some version of the same three plays.

Study, then build. The impact study finds the constraint, the constraint calls for a rebuild or a new substation, and the queue backs up behind the construction calendar. Rigorous, defensible, and now slow enough to cost real projects.

Static ratings on everything. Line ratings are set against conservative worst-case ambient assumptions, because that is what the planning standard was built to protect. Most of the year, most of those lines carry far less than they safely could. The headroom exists. Nobody is allowed to count on it.

Case-by-case exceptions. Where a grid-enhancing technology has gone in, it went in as a one-off, championed by one engineer against one constrained segment, and never made it into the planning workflow. It solved a problem. It did not change the process.

None of that is wrong. It is what you do when your obligation is firm service and your only accepted proof of capacity is a static number.

The hard part

The technology mostly exists. Dynamic line ratings, power-flow control, phase balancing, advanced conductors, flexible interconnection, storage as a wires asset, targeted demand response. All real, all running somewhere today. The hard part is not the technology. It is these four things.

1. Half the load in the queue may not be real, and you have to plan as if all of it is. Large-load developers shop the same project across multiple utilities and multiple states. Some of what is in your queue is a duplicate of what is in someone else's. You cannot tell which, and you are committing capital and a construction schedule against a number you do not trust. Every planner in this program is living this, and few utilities have a defensible way to price the risk of being wrong in either direction. That is an unsolved problem in the discipline, not an oversight in your shop.

2. Grid-enhancing technologies give you conditional capacity, and your obligation is firm. A dynamic rating hands you headroom on most days, not every day. A power-flow controller relieves a constraint under the conditions you modeled. Firm service does not care about most days. Until a planning standard and an interconnection agreement can accept capacity that is real but conditional, the honest engineering answer is still to build the wire, and the technology stays a pilot forever.

3. The regulatory model pays you to build and does not pay you to avoid building. A rebuilt line goes into rate base and earns a return for decades. A sensor network, a software license, and a demand response payment mostly do not. That is not cynicism, it is arithmetic, and it means every non-wires alternative clears a financial bar its wired equivalent never has to clear. Solvable, but only by utilities that bring regulatory and finance into the room with their planners.

4. The intelligence sits with planning and the switching sits with operations. Dynamic capacity is only capacity if an operator will use it during a peak hour, on shift, with a real event unfolding. That means field data crossing into the control room, which runs straight into NERC-CIP, and an operator trusting a rating that moves underneath them. Trust is not a data integration project. It gets earned slowly, and it is rarely funded and rarely owned.

If you need one sentence to carry into a commission meeting: **every non-wires alternative has to clear a financial bar its wired equivalent never has to clear. That is a compensation gap, not a technology gap, and it is a question for the regulator, not for our planners.**

None of those four barriers is local to you. In some form, all four show up in all ten challenges in this program: the data that cannot cross the OT boundary, the value that is an avoided build, the work that falls between planning and operations, and the decision that has to be made without proof. If your list looks like this one, you are not behind. You are in the same room as everyone else.

And "we do not know how much of our queue is real" is a legitimate answer here. It is a finding, and it is a more useful thing to bring than a number you cannot defend.

What the cohort will work

Not "which technology should we buy." The room will work the questions that block deployment.

- How are you separating real large load from speculative large load, and what have you been willing to put in a contract?
- What does an interconnection agreement look like when the capacity is flexible or curtailable, and who has gotten one signed?
- What planning standard or study process has been changed to let a non-wires alternative count as capacity?
- Is anyone earning a return on construction they avoided, and what has survived a regulator?
- What did you pilot that did not scale? That is the most valuable hour in this program, and it is the one you can only get from peers who have actually tried it.

What to bring

You do not need a solved problem. You need an honest one. Come with:

- One constrained circuit or corridor you are stuck on
- What your queue looks like, and how much of it you actually believe
- The non-wires option you looked at and did not deploy, and why
- One thing you tried that did not work

If the honest answer to any of those is "we do not know," bring that. It is a finding, not a failure, and you will not be the only one saying it.

What you get

- This brief, and a short video briefing, before the session
- The Flight Plan, a working pilot scaffold, inside InnovationWorks
- The session itself, with the utilities living this problem
- A retrospective afterward: what the cohort tried and what happened

Join

Tuesday, October 13, 2026, 2:00 p.m. ET. Recruitment runs per challenge, so your planning and interconnection people can come to this one without committing to all ten.

Open to AEIC members and to any electric utility. If you run a utility, you are welcome here.

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Knowledge of one is the knowledge of all.

Sources: this challenge was developed from research of public utility filings. The technology landscape for this challenge is maintained separately inside InnovationWorks.