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How a Plan to Save the Power System Disappeared

A federal lab found a way to modernize the grid, reduce reliance on coal, and save consumers billions. Then Trump appointees blocked it.

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Story by Peter Fairley

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ON AUGUST 14, 2018, Joshua Novacheck, a 30-year-old research engineer for the U.S. National Renewable Energy Laboratory, was presenting the most important study of his nascent career. He couldn't have known it yet, but things were about to go very wrong.

At a gathering of experts and policy makers in Lawrence, Kansas, Novacheck was sharing the results of the Interconnections Seam Study, better known as Seams. The Seams study demonstrated that stronger connections between the U.S. power system's massive eastern and western power grids would accelerate the growth of wind and solar energy—hugely reducing American reliance on coal, the fuel contributing the most to climate change, and saving consumers billions. It was an elegant solution to a complicated problem.

Democrats in Congress have recently cited NREL’s work to argue for billions in grid upgrades and sweeping policy changes. But a study like Seams was politically dangerous territory for a federally funded lab while coal-industry advocates—and climate-change deniers—reign in the White House. The Trump administration has a long history of protecting coal companies, and unfortunately for Novacheck, a representative was sitting in the audience during the talk: Catherine “Katie” Jereza, then a deputy assistant secretary in the U.S. Department of Energy Office of Electricity.

Jereza fired off an email to DOE headquarters—before Novacheck had even finished speaking, according to sources who viewed the email—raising an alarm about Seams’ anti-coal findings. That email ignited an internal firestorm. According to interviews with five current and former DOE and NREL sources, supported by more than 900 pages of documents and emails obtained by InvestigateWest through Freedom of Information Act requests and by additional documentation from industry sources, Trump officials would ultimately block Seams from seeing the light of day. And in doing so, they would set back America’s efforts to slow climate change.

A nearly impermeable electrical “seam” divides America’s eastern and western power grids. These giant pools of alternating current on either side of the Rockies contain a total of 950 gigawatts of power generation by thousands of power plants. (A third grid serves Texas.) But only a little over one gigawatt can cross between them. Western-grid power plants in Colorado send bulk power more than 1,000 miles away to California, for example, but merely a trickle across the seam to its next-door neighbor Nebraska. That separation raises power costs, and makes it hard to share growing surpluses of environmentally friendly wind and solar power. And years of neglect have left the grids—and the few connections between them—overloaded and ill-prepared to transition to highly variable renewable energy.

The East-West seam divides cities, time zones, and energy resources (NREL) The Seams study set out to determine whether uniting America's big grids would pay. Seven aging converter stations presently mediate the meager power flows across the East-West seam. Should power companies simply rebuild these electrical "stitches," or should they upgrade to longer or stronger links? Seams' working hypothesis had been that upgrading might create a more reliable, sustainable, and affordable U.S. power system. The study's results bore that hypothesis out.

But Jereza's email put the study in trouble: Her concern reached the top ranks at NREL and DOE, according to an August 22, 2018, email from NREL project leader, Aaron Bloom, to top researchers and planners at U.S. power companies and grid operators. "There was some significant political blowback at the most senior levels of DOE as a result," Bloom wrote. "We hit a political trigger point." Bloom noted that the email had reached Dan Brouillette, who was second in command to then-Secretary of Energy Rick Perry at the time, and has since taken over his position.

The fallout was swift: The lab grounded Bloom and Novacheck, prohibiting them from presenting the Seams results or even discussing the study outside NREL. At the end of 2018, Bloom left NREL for the private sector. Dale Osborn, a retired grid-planning expert and a key adviser to Seams, says Bloom thought his career was over at NREL. "He told me, 'I'll never get a decent project again,'" Osborn recalls.

And the \$1.6 million study itself disappeared. NREL yanked the completed findings from its website and deleted power-flow visualizations from its YouTube channel. An NREL document shows that Bloom and Novacheck expected to submit an article to a top grid-engineering journal within six weeks after the Kansas event. That paper remains blocked two years later.

Withholding NREL's grid research is an example of what experts such as Arjun Krishnaswami, a policy analyst at the Natural Resources Defense Council, calls the "deep politicization" of DOE and its national labs under Donald Trump. At a moment when Europe, China, and others are racing ahead with advanced long-distance energy-transmission technologies, grid experts say that technology has gone nowhere in the United States—thanks to a failure of leadership in Washington.

A FEW WEEKS BEFORE THE Kansas summit, things were looking good for the Seams study. On July 26, 2018, Bloom was center stage at a grid symposium in Iowa, releasing the study's findings. In invitations to the event, the transmission enhancements Seams described had been billed as a "trillion-dollar economic event." Bloom was on fire, speaking on his feet without notes for nearly two hours. "We've been imagining cleaner, bigger modern grids for about 40 years," Bloom expounded, "and now is the time to make it happen."

Bloom showed off his team's sophisticated methodology using high-resolution video simulations. One simulation showed a hypothetical heat wave in August 2038, causing air conditioners to drive up power demand. As the rising sun swept across the U.S., yellow circles representing solar plants expanded. Surplus power from solar plants in the West flooded eastward, limiting the need for pricier and dirtier midwestern coal power. And as the sun set, the Midwest's expansive wind farms began to spin, sending power westward and minimizing use of the West's coal- and gas-fired generators.

"This is a bold new world that we're seeing," Bloom told the Iowa conference. Indeed, the 20- to nearly 35-gigawatt flows he presented—at times exceeding New York State's peak power consumption on the hottest day of the year—are far beyond what America's existing grids can handle. But Seams presented a path to that future.

Grid operation was simulated for 2024 to 2038 because the simulated equipment would take several years to build—and would serve for decades. At the request of the study’s technical-review committee, the core Seams scenario assumed a “carbon policy” under which power plants would be charged an increasing penalty for the carbon dioxide they released. The industry experts on the committee saw this as a rational way to test the system under higher levels of solar and wind deployment, according to NREL documents and emails.

As expected, the simulations showed that exchanging power across the Rockies enables generators on either side to serve a wider area, reducing the number of plants required, and trims operation of the remaining fossil-fueled generators. And they demonstrated that the resulting savings in fuel and equipment more than pay for the added transmission. The benefits were particularly dramatic for the carbon-price scenario. It would eliminate up to 35 megatons of CO₂ emissions a year by 2038—equivalent to the current annual carbon emissions from U.S. natural-gas production and distribution. And it would return about \$2.50 or more for every \$1 invested in transmission.

The design that delivered the largest cost reduction linked up transmission lines to form a new transcontinental network: a “supergrid.” Seams simulated a 7,500-mile supergrid that would ship bulk power around the U.S.—a network reaching from Washington State to Florida. Even in the study’s less-ambitious scenario, the supergrid was saving consumers \$3.6 billion a year by 2038.

But there was a problem: Improving the energy grid would reduce America’s reliance on coal. According to NREL’s simulations, coal-fired power plants would shut down en masse over the coming decades, and they would drop

even faster with upgraded transmission. That proved to be a very inconvenient finding.

ON THE CAMPAIGN TRAIL, Trump's promises to revive "clean, beautiful coal" spoke to both the blue-collar and anti-regulatory elements of his political base. After his election, he filled his administration with coal-industry veterans, withdrew from the Paris climate-change agreement, and rolled back coal regulations. Yet coal plants kept closing. In fact, coal shutdowns have accelerated during the Trump administration compared with Obama's. Then-Secretary Perry was under pressure to stem the bleeding in America's struggling coal industry, and his strategy was to frame coal plants as the grid's protector against extreme weather, cyberattacks, and other emergencies. Things weren't going well. That January, the federal commission that regulates power and gas markets unanimously shot down Perry's proposal to subsidize coal plants, as well as nuclear generators.

Enhanced grid resilience was a likely outcome of the Seams expansions. That's easy to see from high-profile disasters where gaps in transmission led to otherwise avoidable blackouts. During Japan's post-tsunami grid meltdown in 2011, mighty generators around Osaka were unable to fill in for the troubled nuclear power plants northeast of Tokyo. And experts say power plants across the U.S. could be helping power California avoid heat wave-induced blackouts right now, if the U.S. power system was more interconnected. But Perry prioritized securing resilience by protecting coal and nuclear power plants, which store months of fuel on-site.

Trump officials were already seeking tighter control over all analysis from the Office of Energy Efficiency and Renewable Energy, which oversees NREL. In May 2018, EERE circulated an "enhanced" list of "Tier 1" topics requiring political sign-off before researchers could publish their findings, according to documents and emails obtained through a FOIA request and a lawsuit filed by the Center for Biological Diversity. Tier 1 topics included

anything related to grid reliability or “projections of entire energy sectors,” such as fossil fuels or renewable energy. NREL emails show that Seams was under scrutiny as early as June 2018. Novacheck wrote in one email that Seams’ results were “extremely sensitive” and that the researchers were “not allowed to show any results without direct DOE approval.”

Seams escalated into a major political problem after the Iowa and Kansas presentations. Career DOE employees had approved those talks but had not alerted EERE’s political appointees; expanded disclosure requirements were supposed to exempt conference talks. Still, when DOE higher-ups had seen the news coverage from Iowa, they complained to Cathy Tripodi, then the acting assistant administrator running EERE. Insiders say she was livid.

Less than three weeks later came Jereza’s email alert during the Kansas presentation. Jereza zeroed in on Seams’ use of carbon pricing, according to insiders interviewed by InvestigateWest. They say the angst over carbon pricing in the Seams study was baseless. “It didn’t advocate anything. It just said, ‘If this is the scenario we’re dealing with ... then this is what happens,’” one former DOE official says. But the political danger arising from Kansas was immediately grasped by Tom Sloan, the state representative who organized the seminar. Sloan sought to assuage Jereza after Novacheck’s presentation. He also emailed Novacheck with some advice: “It is not good when one works hard and the results are immediately dismissed because they are not politically correct.”

Sloan, now retired, says the concern from Trump appointees such as Jereza went beyond the carbon tax. “The administration was committed to helping the coal industry,” he says. And Seams showed that, with or without a carbon price, coal power would be adversely affected by a better grid. “The impact on coal is going to be there if you allow low-cost, renewable power to move,” Sloan says.

After Jereza threw her red flag, Tripodi ordered a clampdown on Seams, insiders say. She delegated implementation to Alex Fitzsimmons, then EERE's 28-year-old chief of staff and chief policy adviser, who had previously worked with fossil-fuel-minded energy think tanks associated with the billionaire oil refiner and GOP mega-donor Charles Koch. Three months before he moved to DOE, Fitzsimmons was quoted as saying that coal-plant shutdowns and anti-pipeline protests threaten lives because fossil fuels keep the heat on during extreme cold snaps.

Fitzsimmons called Martin Keller, NREL's lab director, and Seams was swiftly locked down. NREL had a \$406 million budget in 2018, mostly through EERE. But it was in a precarious situation under the Trump team, which had repeatedly proposed cutting more than half of EERE's funding. Seams was expendable, because its funding made up less than a quarter of 1 percent of NREL's budget. "Keller is very smart and politically astute and doesn't want to piss off the administration," a former DOE official speculates. "He's going to figure out that he can slow that one study down and keep everybody happy."

Keller, Jereza, Tripodi, and Fitzsimmons all declined to comment after repeated requests from InvestigateWest. In an email sent yesterday, a DOE spokeswoman reiterated the agency's earlier statements, saying that Seams is "still under review" at NREL and that it "will be released upon completion."

THE POLITICAL FOOTPRINT ON Seams can be seen in the final report drafted by Bloom and his collaborators. Bloom shared version 14 of the paper at the Iowa conference, but a week after the Kansas talk, the drafts underwent a process of editorial ping-pong between Bloom and Novacheck, NREL leaders, and DOE officials. DOE heavily redacted documents it released through FOIA, but drafts obtained separately by InvestigateWest show how the edits evolved from August to November 2018.

Wordsmithing and euphemisms replaced direct references to carbon. The study's higher-renewables "carbon policy" scenario, for instance, became a "VG," or variable-generation, scenario—a reference to wind- and solar-power output that shifts with the weather. The "carbon price" became an "emissions price." Other elements simply vanished, such as a statement that CO₂ emissions were projected to drop to 30 percent of their 2024 levels by 2038. The phrase "coal plants were retired" similarly disappeared, along with colorful bar charts that had shown how Seams' added transmission shrank coal's share of power generation to a thin black line.

By the time the editorial exchanges ended in early November, the corrections appeared to be stretching the authors' comfort zone. After the Kansas conference, emails show that Bloom was instructed not to share drafts beyond NREL. But he ran what would be the final draft by Jay Caspary, a co-author and the Southwest Power Pool's research and development director. Elements of that final draft concerned the authors, according to a November 7 email from Bloom to Douglas Arent, an NREL lab director: "I reviewed these edits with Jay Caspary, we can live with this revision, but there are some caveats." In his same-day response, Arent focused instead on further appeasing NREL's political minders: "Here are my suggested refinements to hopefully avoid DOE 'over reactions.'"

Over the next year, the administration promoted Fitzsimmons to deputy assistant secretary, and Tripodi stepped up to head the department's Office of Policy. Jereza left for the industry-affiliated Electric Power Research Institute, where she is now a vice president. The Seams study, in contrast, went nowhere. Its final report remains unpublished.

Nearly a year after Arent's November 7 reply—the last substantive discussion of Seams in the FOIA documents—a group of grid experts publicly called out the DOE at a transmission conference, saying that Seams was completed and that DOE had "bottled" it up. DOE

communications staff insisted that the study was ongoing. A statement issued in September 2019 asserts, “DOE career staff reviewed preliminary results and saw an opportunity to strengthen the study by expanding the project to model and analyze additional scenarios.” DOE suggested that Seams would be released in 2022.

An NREL media-relations person responded to InvestigateWest’s queries to NREL officials, providing a statement “on behalf of the laboratory” that parroted DOE’s. NREL’s statement added only that “all information that is currently available” on Seams is on the project’s website. The site claims that more than 30 industry organizations “are helping guide” the study via the technical-review committee. Caspary, that panel’s co-chair, says it has not met in more than two years.

ACCORDING TO SUSAN TIERNEY, a former assistant secretary of energy who chairs NREL’s External Advisory Council, national labs have operated with considerable independence in the past: “There was an understanding that the labs have a duty to perform quality research. I was not familiar with situations where there was an editorial thumb on the scale.”

But under Trump, political appointees have made unprecedented moves to regulate how science is conducted, according to a historical analysis and warning by experts in science and the law in the journal *Science*. And other scientific studies—especially those related to climate change—have been similarly slow-walked or buried. One of them was a DOE-commissioned study on grid resiliency, completed in April 2018. Michael Webber, an energy expert at the University of Texas at Austin and the study’s leader, notes that his conclusion—that increased transmission, not just fuel-storing generators, helps grids respond to extreme events—conflicted with statements made by DOE leaders. “I never got a message from anybody saying ‘Please do a study that concludes coal is magical,’ so there was never direct pressure on me for that. But I could sort of read the winds,” Webber says.

In the case of Seams, DOE's interference has had a real and practical impact. Caspary says he has been waiting for access to Seams' simulation tools to do follow-up studies for the Southwest Power Pool. There's a growing backlog of wind and solar projects seeking to use the Pool's lines.

And by labeling the study incomplete and blocking its publication, DOE has diminished the credibility of Seams' findings. One power-sector trade journal, noting what it called "a lot of hype" after the Iowa meeting, said Seams wasn't even a study: "It actually was a slide deck describing some future real study."

That loss of credibility hinders the chances of jump-starting large-scale power-grid planning in the United States. The power-industry expert Peter Fox-Penner, who runs the Boston University Institute for Sustainable Energy, says the U.S. is falling behind other major economies when it comes to creating the big grid links that make a transition to renewable energy possible. As Fox-Penner writes in his 2020 book, *Power After Carbon: Building a Clean, Resilient Grid*, "Without better integrated planning, we can't even guess at the amount of transmission we need and where and how it should be built. Europe, Australia, and other countries are starting to get a good handle on these questions while the United States lags well behind." The International Energy Agency has estimated that China's growing interregional transmission could save its consumers and industries \$9 billion a year.

Meanwhile, the nationwide report on grid congestion that DOE is required by law to update every three years—a crucial component of grid planning—is two years behind schedule. (DOE's website still anticipates a 2019 update to the Obama administration's 2015 study.)

And there are more signs of trouble at NREL, where two more grid-modeling studies are now missing in action. Tierney says the three studies

were planned as a trifecta: Seams was the prelude; a North American-wide study adding in Texas, Mexico, and Canada was the main event; and an analysis of electrifying energy demands primarily met by coal, gas, and petroleum would be the closer. The last study's final phase explores how U.S. grids could supply extra power to replace fossil fuels, face the same political sensitivities as Seams, and has yet to surface. Tierney says NREL told her last year that it was “awaiting sign-off” at DOE.

NREL’s continental-scale study, meanwhile, is far behind schedule. Until early July, the North American Renewable Integration Study’s project website was still promising final results last year. NREL now says results could be out later this year, but a Canadian official tells InvestigateWest that 2020 is unlikely. Osborn, the retired power planner, is a member of the study’s technical-review committee and speculates that NREL officials put it on hold in hopes of a more receptive administration come 2021.

If NREL researchers are able to work unencumbered by political concerns and release Seams in its entirety, it could help point the U.S. toward a greener future, in which a robust economy runs on renewable energy. But for now, Seams is demonstrating an unintended finding—that when administrations stick their hands into scientific research, politically inconvenient truths are in peril.

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