ABUNDANCE INSTITUTE

Request for Comments on Bolstering Data Center Growth, Resilience, and Security

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The Abundance Institute is a mission-driven non-profit dedicated to creating the policy and cultural environment where emerging technologies can develop and thrive in order to perpetually expand widespread human prosperity. This comment is designed to assist the agency as it explores these issues. The views expressed in this comment are those of the author(s) and do not necessarily reflect the views of the Abundance Institute.

Introduction and Summary

Thank you for the opportunity to participate in this Request for Comment. The Abundance Institute is a mission-driven nonprofit focused on creating space for emerging technologies to grow, thrive, and reach their full potential. Data centers represent the backbone for developing various new technologies in both the digital and the physical spaces. I am Josh T. Smith, the Energy Policy Lead at the Institute. Our energy policy work has focused on interconnection queues, data center regulation, and the institutional differences in regional transmission operator governance (RTOs).

Reporting and public conversations around data centers have correctly identified the critical problem for data centers as energy supply. This concern has often been overstated–effectively ignoring half of the equation by only looking at the growing demand for electricity.

My central advice to the National Telecommunications and Information Administration (NTIA) is to examine both sides, supply and demand. There are both large energy users looking for ways to meet their energy needs and substantial energy resources looking to connect and supply that energy. A successful NTIA report would establish what holds back would-be energy suppliers from serving that demand and recommend solutions for regulators at every level.

To summarize our suggestions for the eventual National Telecommunications and Information Administration report on data centers, NTIA should:

1. Design and suggest policies that leverage market signals to guide energy investments.

2. Encourage federal, state, and local action to streamline permitting of data centers and their related energy infrastructure. In particular, NTIA should encourage regional transmission operators and states to consider how they interconnect resources. The Texas model, employing an energy-only approach and a philosophy of "connect and manage," is the only system operator not slowing dramatically.[1]

3. Resist calls to require additionality in the supply of energy sources in favor of relying on market signals to energy suppliers and private additionality and matching efforts.

4. Allow and encourage innovative solutions to energy needs, such as co-location and flexibility, to continue evolving and developing. To maintain certainty as people experiment, policymakers should apply existing and well-known cost allocation principles to these new business practices.

My reply to the request for comments is responsive to questions 1, 2(a), 2(c), 2(e), 3(a), 3(b), 3(c), 4(c), 5(e), 7, 7(a), 7(b), 7(c), 7(e), 7(f), and 11.

Building Abundant, Reliable Energy for All Users

In question 3(a), the NTIA asks if "an imbalance between demand and supply" of energy is expected. Blackboard drawings of supply and demand curves from Economics 101 imply a more fixed view of markets by focusing on an end state rather than the process.

1 Josh T. Smith, "ERCOT Is the Only One Getting Energy-Only Right," *Powering Spaceship Earth,* August 3, 2024, https://poweringspaceshipearth.substack.com/p/ercot-is-the-only-one-getting-energy.

In reality, supply and demand equilibrate over many different choices and actions of many different actors. The long-run and short-run equilibrium can be very different as short-term price increases incentivize new entrants, bringing down prices. Prices are usually cast as the villain in public discussions. Economists instead emphasize that prices are the *heroes.* Policymakers should approach energy questions with this process and the role of prices in mind.

In practice, this means considering what prevents supply from entering the market. Here, the answers are straightforward. Addressing energy needs swiftly and effectively requires a dual focus on permitting reform and interconnection improvements.

1. To reform the interconnection process, the NTIA should encourage RTOs and states to learn from the successes of the Texas "connect and manage" style of regulation.[2] The energy-only system is simpler for compliance and evaluation. It allows dramatically greater amounts of energy supply to be connected to the system in much less time.[3] In addition,

2 Tyler H. Norris, "Beyond FERC Order 2023: Considerations on Deep Interconnection Reform" (Duke University Nicholas Institute for Energy, Environment, and Sustainability, August 2023), https://nicholasinstitute.duke.edu/sites/default/files/publications/beyond-ferc-order-2023-considerations-deep-interconnection-reform.pdf; Tyler H. Norris, "Pre-Workshop Comments and Exhibit of Tyler H. Norris of Duke University," Pre-workshop Comments AD24-9-000, September 2024, https://nicholasinstitute.duke.edu/publications/comments-ferc-workshop-innovations-efficiencies-generator-interconnection.

3 Josh T. Smith, "ERCOT Is the Only One Getting Energy-Only Right," *Powering Spaceship Earth,* August 3, 2024, https://poweringspaceshipearth.substack.com/p/ercot-is-the-only-one-getting-energy; Josh T. Smith, "Is All This Red Tape Really to Protect Incumbents?," *Powering Spaceship Earth,* May 3, 2024, https://poweringspaceshipearth.substack.com/p/is-all-this-red-tape-really-to-protect; Josh T. Smith, "How Texas Builds and Grows," *Powering Spaceship Earth,* April 25, 2024, https://poweringspaceshipearth.substack.com/p/how-texas-builds-and-grows.

researchers have recently laid out fundamental and extensive deficiencies in the capacity market approach.[4]

2. On permitting reforms, the NTIA should encourage state and local governments to expedite permits for data centers and related energy infrastructure. There are also growing numbers of barriers to renewable projects, such as local bans on wind and solar.[5] Even homeowners associations are sometimes barriers to installing solar, batteries, or other energy technologies at residential locations.[6] The NTIA should recommend ways to overcome this localized opposition.[7]

The Last 20 Years Are A Better Guide Than The Last 24 Months

Neither of these two changes, permitting reform or interconnection queue solutions, represent overnight fixes. Taking a view of the next few years, rather than what has happened in the last few

4 For an overview of these problems, see the work of Todd Aagaard and Andrew N. Kleit, especially their book *Electricity Capacity Markets* (Cambridge, United Kingdom New York, NY: Cambridge University Press, 2022).

5 Lawrence Susskind et al., "Sources of Opposition to Renewable Energy Projects in the United States," *Energy Policy* 165 (June 1, 2022): 112922, https://doi.org/10.1016/j.enpol.2022.112922; Elizabeth Weise and Suhail Bhat, "Local Governments Block Green Energy: Here's How USA TODAY Measured the Limits Nationwide," *USA TODAY*, accessed November 4, 2024, https://www.usatoday.com/story/news/investigations/2024/02/04/green-energy-nationwide-bans/71841275007/; Matthew Eisenson et al., "Opposition to Renewable Energy Facilities in the United States: June 2024 Edition" (Columbia Climate School Sabin Center for Climate Change Law, June 2024), https://scholarship.law.columbia.edu/sabin_climate_change/226/; James W. Coleman, "Overcoming Local Roadblocks to Energy Transport and a Cleaner New Energy System" (American Enterprise Institute, August 2022), https://www.aei.org/wp-content/uploads/2022/08/Overcoming-Local-Roadblocks-to-Energy-Transport-and-a-Cleaner-New-Energy-System.pdf?x91208.

6 Josh T. Smith, "Making It Easier to Put up Rooftop Solar: Technically Legal, Hard to Get," *Powering Spaceship Earth*, May 25, 2024, https://poweringspaceshipearth.substack.com/p/making-it-easier-to-put-up-rooftop.

7 In 2022, the National Renewable Energy Laboratory released databases of barriers to wind and solar development. "NREL Releases Comprehensive Databases of Local Ordinances for Siting Wind, Solar Energy Projects," National Renewable Energy Laboratory, August 9, 2022, https://www.nrel.gov/news/program/2022/nrel-releases-comprehensive-databases-of-local-ordinances-for-siting-wind-solar-energy-projects.html.

weeks is vital for setting good policy. The history of energy and computing is a more useful guide than intemperate news reports. Keep in mind that dramatic improvements have been seen in computing efficiencies. One team summarized the global trend as a six-fold increase in computing with only a one quarter increase in energy use.[8] There is little reason to doubt continued efficiencies.

Past misses in estimating the future energy requirements of the internet and personal computing should feature prominently alongside claims that data centers will consume outsized shares of electricity.[9] The early history of personal computers was replete with poor analysis. Echoes of this can be seen today in confusions between the growth rates and absolute growth required by data center expansions.[10]

To the extent that recent news reports have highlighted energy consumption increases or emissions increases, these reflect temporary trends and upfront costs in developing AI. As artificial

8 Eric Masanet et al., "Recalibrating Global Data Center Energy-Use Estimates," *Science* 367, no. 6481 (February 28, 2020): 984–86, https://doi.org/10.1126/science.aba3758.

9 See, for example, the careful work of Jonathan Koomey as compared to other claims that computers would use half of all electricity. For a useful overview, Robinson Meyer's reporting for *Heatmap* is an excellent introduction: "Is AI Really About to Devour All Our Energy? There is precedent for this panic," *Heatmap,* April 16, 2024, https://heatmap.news/technology/ai-energy-consumption. For the academic debunking of more extreme claims, see: Jonathan G Koomey, "Worldwide Electricity Used in Data Centers," *Environmental Research Letters* 3, no. 3 (July 2008): 034008, https://doi.org/10.1088/1748-9326/3/3/034008; Jonathan G. Koomey et al., "Sorry, Wrong Number: The Use and Misuse of Numerical Facts in Analysis and Media Reporting of Energy Issues," *Annual Review of Energy and the Environment* 27, no. 1 (November 2002): 119–58, https://doi.org/10.1146/annurev.energy.27.122001.083458; Jonathan Koomey, "Separating Fact from Fiction: A Challenge for the Media [Soapbox]," *IEEE Consumer Electronics Magazine* 3, no. 1 (January 2014): 9–11, https://doi.org/10.1109/MCE.2013.2284952; Jonathan G Koomey, "Rebuttal to Testimony on 'Kyoto and the Internet: The Energy Implications of the Digital Economy,'" n.d.

10 Josh T. Smith, "Doubling a Pebble Doesn't Make a Mountain," *Powering Spaceship Earth,* September 6, 2024, https://poweringspaceshipearth.substack.com/p/doubling-a-pebble-doesnt-make-a-mountain; Josh T. Smith, "A Crisis of Our Own Making?," *Powering Spaceship Earth,* August 16, 2024, https://poweringspaceshipearth.substack.com/p/a-crisis-of-our-own-making.

intelligence improves, we should see both efficiencies rise in energy use and discover ways to reduce environmental costs.[11] Because energy costs are a substantial portion of data center operations, there are natural and pre-existing motives for data centers to find solutions that reduce those costs.

Additionality Requirements Are Counterproductive And Unnecessary

Marrying reforms that streamline permitting with ill-defined questions of additionality is impossible. An additionality requirement merely substitutes one regulatory thicket for another. The arguments around hydrogen tax credits are a concrete example of the problems of mandated additionality. A requirement that data centers bring their own supply, whether that is defined as "clean" or defined as "dispatchable," introduces uncertainty and discourages data center development.[12]

Because the interconnection queue is overwhelmingly made up of clean generators, there is no need to apply additionality requirements to data centers. That is, requiring data centers to build equal supplies of their own energy generation is misplaced. Instead, regulators should focus on removing barriers to new supply entering the market. As I wrote in *Heatmap* with Alex Trembath of the Breakthrough Institute:

11 Josh T. Smith, "Operation Gigawatt: It's Ok to Want More," *Powering Spaceship Earth*, October 27, 2024, https://poweringspaceshipearth.substack.com/p/operation-gigawatt-its-ok-to-want; Josh T. Smith, "Doubling a Pebble Doesn't Make a Mountain," *Powering Spaceship Earth*, September 6, 2024, https://poweringspaceshipearth.substack.com/p/doubling-a-pebble-doesnt-make-a-mountain; Josh T. Smith, "A Crisis of Our Own Making?," *Powering Spaceship Earth*, August 16, 2024, https://poweringspaceshipearth.substack.com/p/a-crisis-of-our-own-making; Josh T. Smith, "Magic Machines," *Powering Spaceship Earth*, August 9, 2024, https://poweringspaceshipearth.substack.com/p/magic-machines.

12 Alex Trembath and Josh T. Smith, "Abundance Will Meet the Energy Demands of AI," Heatmap News, October 15, 2024, https://heatmap.news/ideas/abundance-additionality-permitting-reform.

> *There are more than enough clean generators queueing to enter the system — 2.6 terawatts at last count, according to the Lawrence Berkeley National Laboratory. The unfortunate reality, however, is that just one in five of these projects will make it through — and those represent just 14% of the capacity waiting to connect. Still, this totals about 360 gigawatts of new energy generation over the next few years, much more than the predicted demand from AI data centers. Obstacles to technology licensing, permitting, interconnection, and transmission are the key bottlenecks here.*

Finally, data center companies are already investing significant resources into building more generation on top of matching their demand with real-time clean energy generation. There is no need to mandate ongoing actions. NTIA should consider recommending that agencies work with companies in their private pursuits to green their energy consumption and supply chains. For example, by assisting in relevant data collection or through making building the relevant energy assets easier.

Co-Location Should Be Allowed To Develop Further Under Existing Cost Allocation Rules

The emergence of co-location between energy generation and data centers suggests that the electricity market is an innovative area. The Federal Energy Regulatory Commission's recent conference demonstrates that there are open questions about co-location.[13] Co-location should be allowed, further studied, and traditional practices of cost causation should be applied to prevent cost-shifting.

13 Federal Energy Regulatory Commission, Technical Conference on Co-Located Load, AD24-11-000, https://elibrary.ferc.gov/eLibrary/docketsheet?docket_number=AD24-11-000&sub_docket=All&dt_from=1960-01-01&dt_to=2024-10-29&chklegadata=false&pageNm=dsearch&date_range=custom&search_type=docket&date_type=filed_date&sub_docket_q=Allsub.

In addition, policymakers must consider the long-term. Complaints that a data center co-locating with an existing nuclear or other "clean-firm" generator takes supply from the market or other consumers are short-sighted and fundamentally confused. This is the way all markets work. If I purchase a loaf of bread, then that loaf is no longer available to you. However, my purchase encourages breadmakers to expand the supply. Electricity is certainly a more complicated good than bread, but the market process in the background is the same.[14] Policies directly lowering the cost of new entry for energy suppliers will go much further than objecting to new business models for data centers and energy companies that may actually reduce total system costs.

Flexibility From Data Centers Should Be Enabled But Not Required

Similarly, the ability of energy consumers to flexibly adapt to grid conditions is a young practice. This is an area that public agencies should not make firm requirements around yet. However, the NTIA could recommend that regulators at state and local levels begin reconsidering how to design rates that encourage flexibility that does not fit the already familiar versions of demand response. One example is a 2016 data center development in Wyoming. The data center employs its backup to serve the wider grid, which reduces costs for both the data center and the local grid.[15]

14 For example, see the commentary of Devin Hartman and Kent Chandler of the R Street Institute on the Amazon and Talen deal: https://www.rstreet.org/commentary/the-fuss-and-advantages-of-siting-large-consumers-at-power-plants/.

15 Shayle Kann, "Can chip efficiency slow AI's energy demand?," Catalyst Podcast, https://www.latitudemedia.com/news/catalyst-can-chip-efficiency-slow-ais-energy-demand; Josh T. Smith, "Microsoft's 2016 flexible data center," https://x.com/smithtjosh/status/1813977990155682139.

These actions should enable two forms of flexibility. First, the flexibility that comes from relying on backup and co-located energy assets in response to grid conditions must be enabled by policy. Data center companies have already shown interest in this option. Second, flexibility from the nature of the computing at the data center may also face policy barriers. Some data centers require 100 percent uptime. Other uses with lower latency requirements can be shifted off the system's peaking times to support the grid's safe and reliable operation.

Regulators need to enable such cases of flexibility. One option is to create a process to joining the system that accounts for expected peak load contributions of flexible loads. Requiring that all data centers adopt such practices will backfire because of differences in computing needs for different computing uses. However, adding new pathways onto the grid expands options and possible business models. Because the system is heavily permissioned today, new options are valuable to operators and data centers.

Requiring flexibility, enrollment in traditional demand response programs, or singling out data centers to be first to have their loads shed sets poor incentives for the entire system. It singles out specific solutions in an novel industry where such rules could easily prevent better solutions from emerging.

Conclusion

By fostering a market-driven approach to energy access and encouraging permitting reform, the NTIA can create a supportive environment for data centers, facilitating their role in driving technological advancement and economic growth across the country.

I appreciate your efforts on this question and would welcome the opportunity to work with you or answer further questions if I can be of any assistance.

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