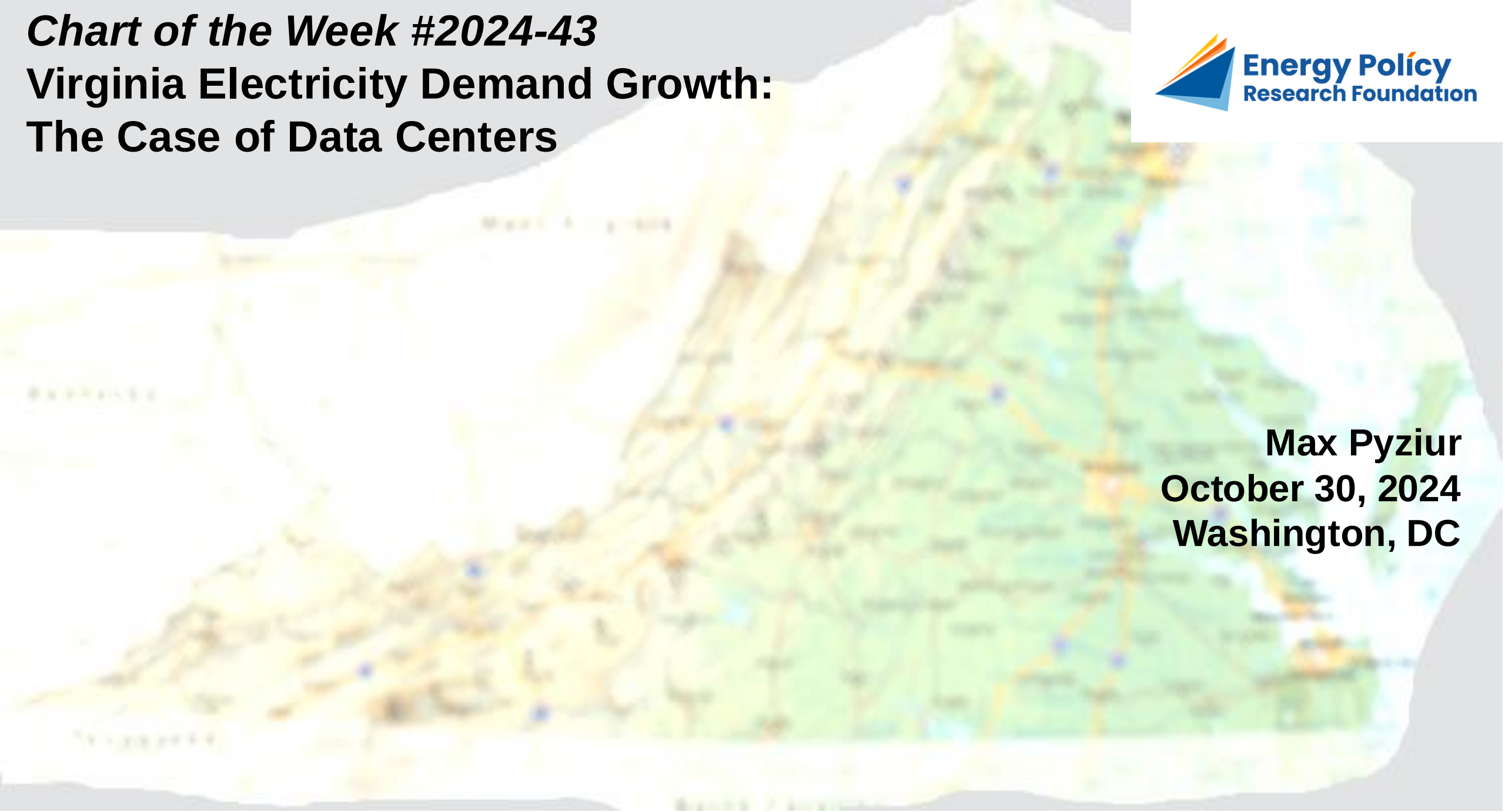
Chart of the Week #2024-43

Virginia Electricity Demand Growth: The Case of Data Centers



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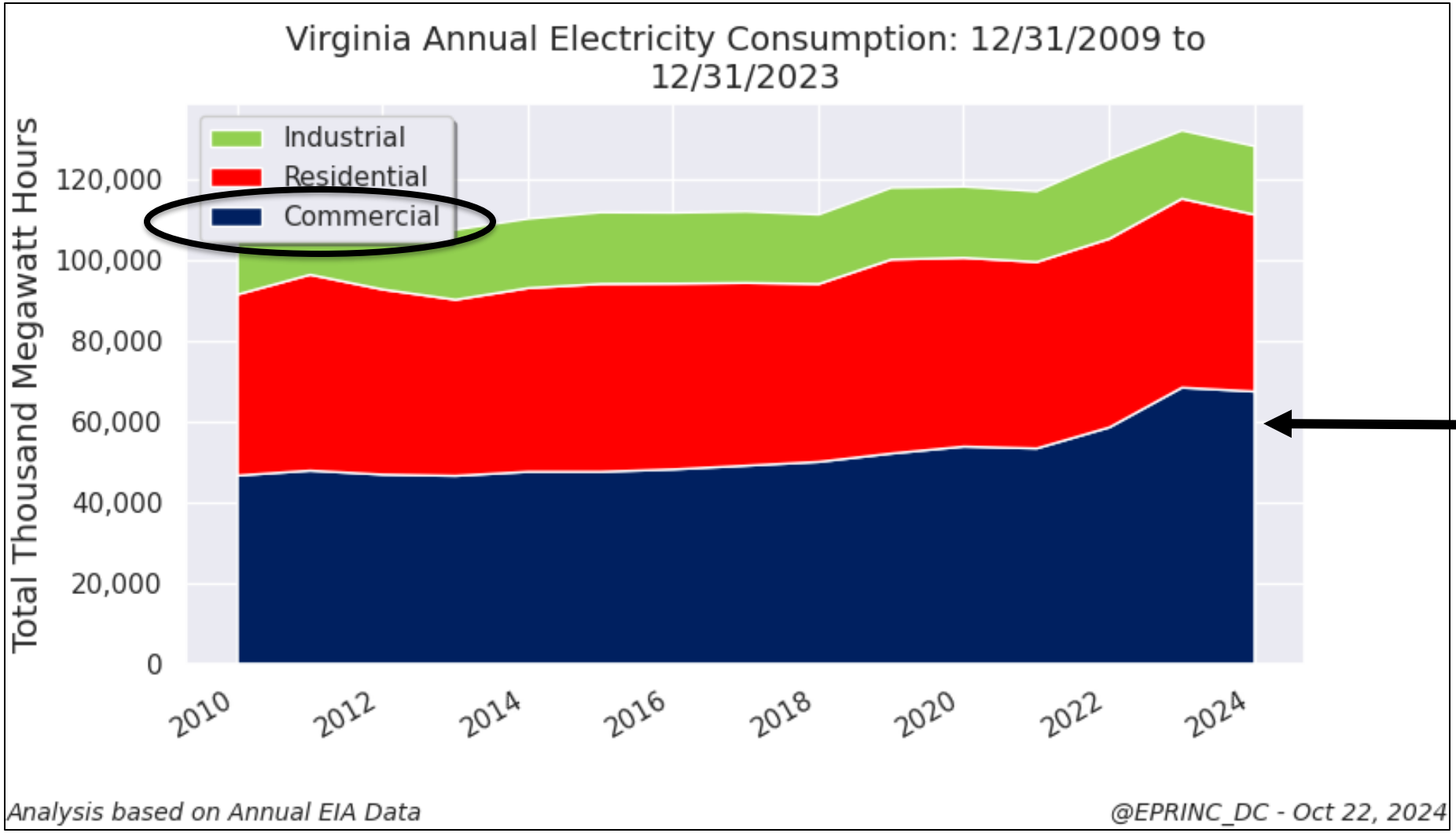

Recent Virginia commercial electricity demand growing at 5.8%/yr driven by the expansion of data centers.

Virginia Electricity Demand Growth: The Case of Data Centers

- As of early 2024, there were over 10,600 data centers located throughout the world. Of these, approximately half were in the U.S.
- In the U.S., data centers are not distributed equally across the country. Rather, they are located in states with affordable commercial real estate, robust network connectivity, infrequent natural disaster occurrences, and lower-cost electricity. Washington State, Illinois, and Texas are three with high data center concentrations. However, Virginia dominates them all.
- The number of U.S. data centers is growing to accommodate expanding data needs driven by entertainment (streaming services), telecom (smartphones and tablets), security (doorbell cameras), SCADA (Supervisory Control and Data Acquisition – remote management of industrial processes as well as data-gathering from related devices), and many other requirements for data storage and dissemination.
- Additional data center demand growth is expected to be driven by the use of generative artificial intelligence (AI). Currently, an AI data request consumes 10 times the electricity of a typical Google search request. But the rate of future AI acceptance and usage is uncertain, thereby challenging power generation planning.
- During 2023, Virginia data center electricity demand is estimated to have accounted for 32 terawatt hours (TWHs), over 25% of the state's power needs of 128 TWhs. This is almost half of Virginia's total 2023 commercial electricity demand of 67.5 TWhs.
- *… continuing …*

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- **Dominion Energy, one of Virginia's primary utilities, connected 94 data centers requiring 4 GW of generating capacity from 2019 to 2023. During 2024, Dominion expects to connect another 15. Not only are the number of data centers increasing, their size is as well, now requiring capacities ranging between 100 to 1,000 megawatts.**
- **From 2009 to 2019, Virginia's commercial power demand grew at an annual rate of 1.4%; from 2019 to 2023, Virginia's commercial power needs grew annually at 5.8%, primarily driven by the rapid expansion of data centers (at this rate, commercial power demand will double within 12 years). By comparison, during this same period, Virginia's residential and industrial electricity demand declined by 1.6% and 1%, respectively.**
- **Challenging the planning of electricity production is EPA's recently promulgated power plant rule (New Source Performance Standards - NSPS; Docket number: EPA-HQ-OAR-2023-0072) that was finalized July 8, 2024. The rule mandates that most coal- and gas-fired power plants capture 90% of their GHG emissions by 2032; if not, they need to shutdown by 2039. EPA estimates that this will lead to the retirement of 42 thousand megawatts of coal plants, and use of natural gas for power generation would decline by 37%.**
- **NSPS has been challenged by a number of affected constituents (put link in here) requesting that the U.S. Supreme Court "stay" (temporarily stop enforcement) the regulation. On October 16, 2024 and while recognizing the merits of the plaintiffs' interests, the Court refused a stay. The case continues on December 5, 2024 in the DC U.S. Circuit Court of Appeals.**

This slide deck is available at: https://eprinc.org/chart-of-the-week/

For more information on these charts, please contact Max Pyziur (maxp@eprinc.org).