Chart of the Week #2024-07

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# Global Data Centers, Transmission Networks, and Crypto Mining – Part 2

*As the Number of Data Centers Continue to Expand, There Are Several Drivers to Their Location: Low-Cost and Stable Supplies of Electricity is One of Them*

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# Figure 1. Relative Sizes of Largest Data Center Markets

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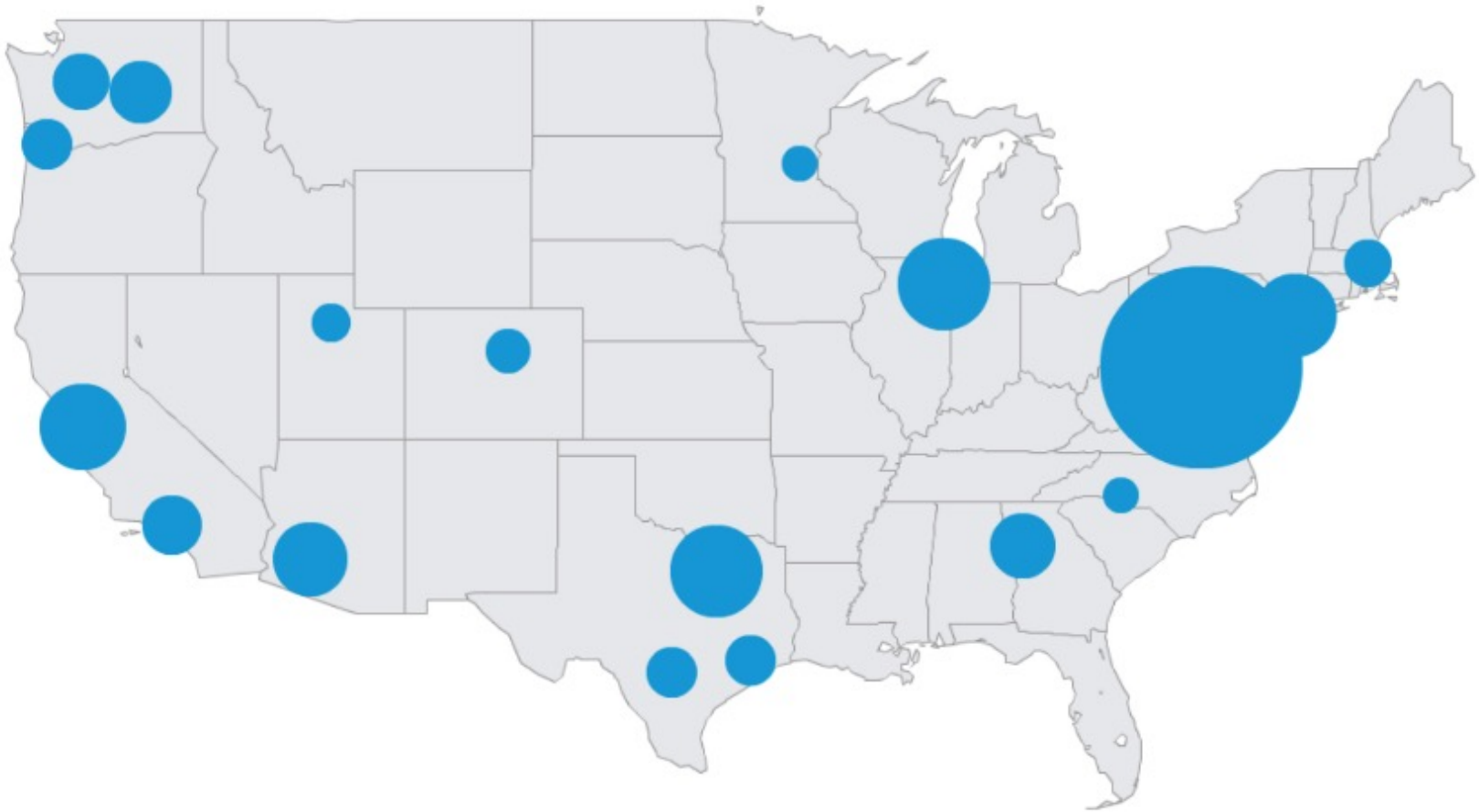
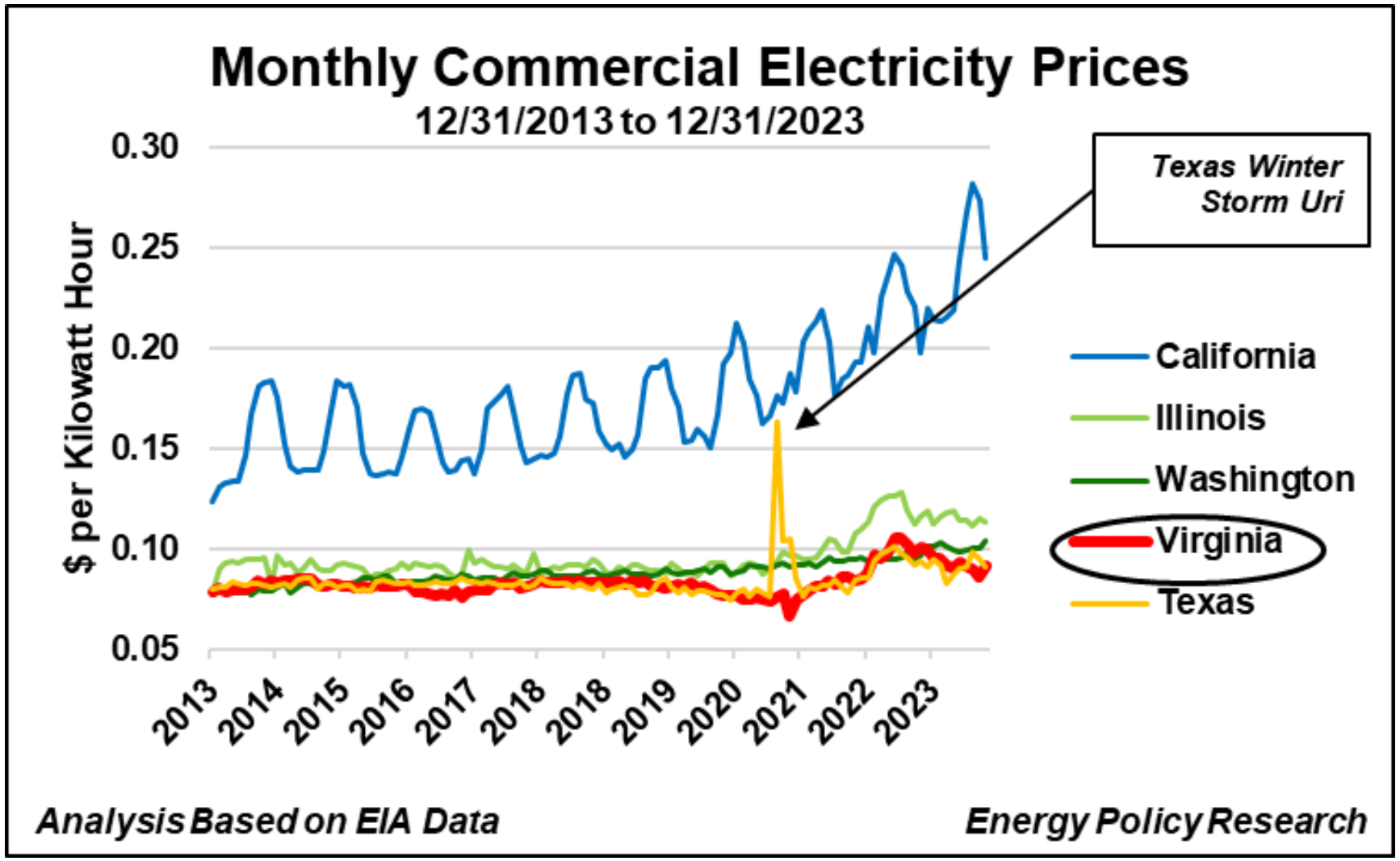
Figure 1: Relative Sizes of Largest Data Center Markets (megawatts of power capacity) - 2021 [13]



# Global Data Centers, Transmission Networks, and Crypto Mining – Part 2

- As mentioned in Part 1, the number of U.S. data centers is growing to accommodate expanding connectivity needs coming from 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 needs for data storage and dissemination. Key states where data centers are located are in California, Washington State, Texas, and Illinois. But the sizeable growth is in Northern Virginia (*Figure 1*).
- As data centers continue to expand, there are several attributes that determine their placement: affordable commercial real estate, robust network connectivity, infrequent natural disaster occurrences, and low-cost electricity (Figure 2). Along with low-cost electricity, Northern Virginia easily meets the other requirements. (*Figure 2*).

## Figure 2. Monthly Commercial Electricity Prices

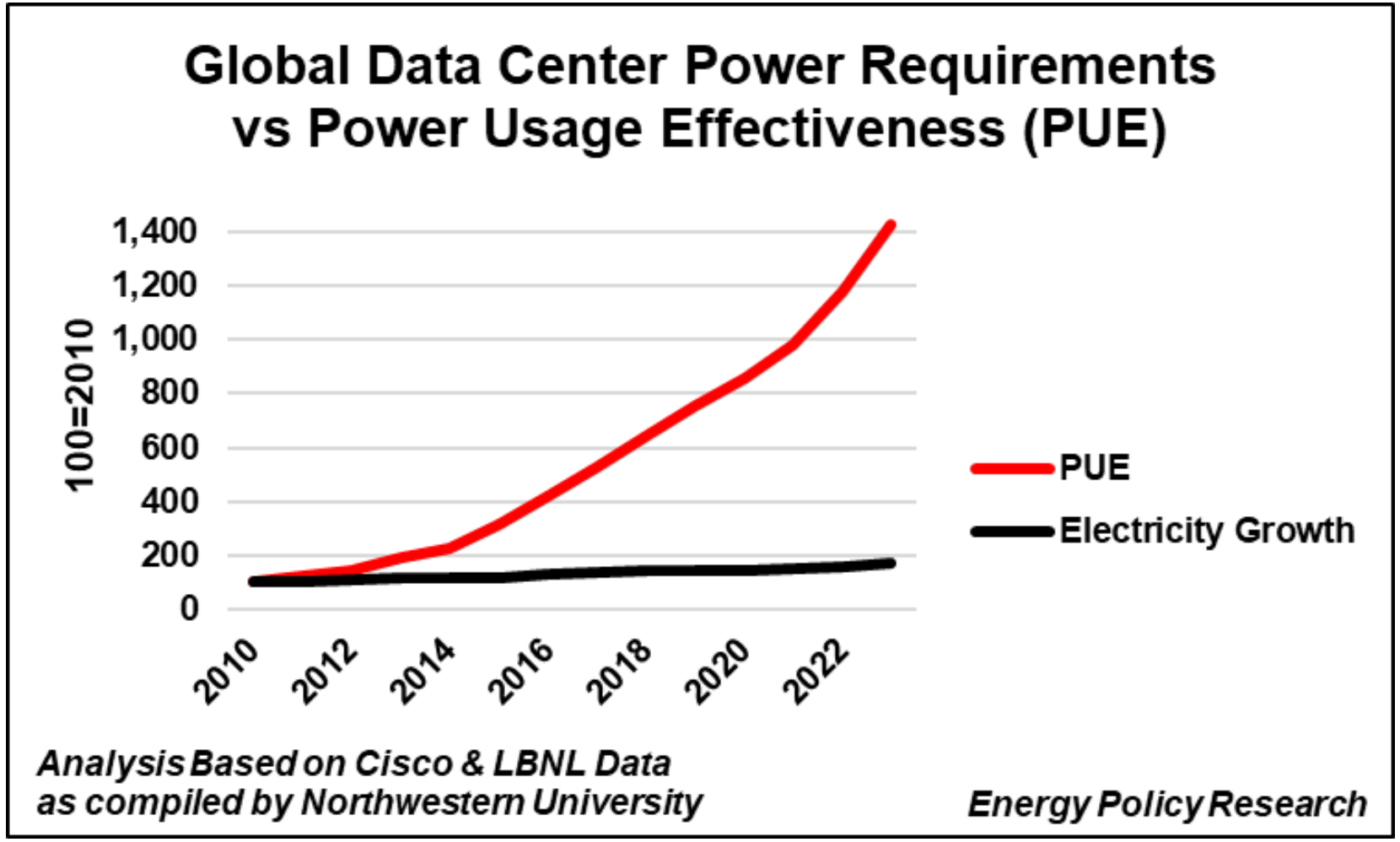


# Despite Large Efficiency Gains, Global Data Center Electricity Requirements Are Growing

- Data center power requirements have grown from 2010 to 2023 grew by 168%, or just over 4% annually. However, using Cisco and LBNL (Lawrence Berkeley National Laboratory) data, data center workload (processing, storage, transfer - the power usage effectiveness or PUE, an industry measure of efficiency) grew by 1,430%. Electricity growth was restrained thanks to efficiency gains coming from faster computer processors, solid-state drives, and fiber-optic network cables (Figure 3).

Image by Tumisu from Pixabay

## Figure 3. Growth in Global Data Center Workload Units vs Electricity Demand



# Will Efficiency Gains Continue as AI Use Increases?

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- Despite the huge efficiency gains and modest growth in energy demands in the last decade and a half, forecasters are anticipating huge processing requirements from the adoption of AI (artificial intelligence), thereby spiking electricity requirements.

Image by geralt from Pixabay

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- This slide deck is available at: https://eprinc.org/chart-of-the-week/
- For more information on this chart, please contact Max Pyziur (maxp@eprinc.org).