TOWN BOARD AND PLANNING COMMISSION JOINT WORK SESSION

August 3, 2026 - 5:30 PM
Evergreen Room, 250 N. 11th Street, Windsor, CO 80550

To view Town Board meeting broadcasts, visit
www.windsorgov.com/MeetingsOnDemand.

AGENDA

GOAL of this Work Session is to have the Town Board receive information on topics of Town business from the Town Manager, Town Attorney and Town staff in order to exchange ideas and opinions regarding these topics.

Members of the Public in attendance are asked to be recognized by the Mayor before participating in any discussions of the Town Board

WORK SESSION AGENDA ITEMS

1. General Information on Data Center Land Use Planning - C. Malone, Planning Manager; K. Mihm, Deputy Town Attorney

The Town of Windsor will make reasonable accommodations for access to Town services, programs, and activities and will make special communication arrangements for persons with disabilities. Please call (970) 674-2400 by noon on the Thursday prior to the meeting to make arrangements.

MEMORANDUM

Date: August 3, 2026
To: Mayor and Town Board
From: Carlin Malone, Planning Manager
Kim Mihm, Deputy Town Attorney
Re: General Information on Data Center Land Use Planning - C. Malone, Planning Manager; K. Mihm, Deputy Town Attorney
Item #: 1.

Background / Discussion:
Executive Summary
There are no data centers currently proposed in the Town of Windsor. However, recent activity in nearby areas has raised questions about how the Town would regulate a data center if one were proposed. This work session aims to give the Town Board and Planning Commission an overview of the main land use impacts of data centers, what other jurisdictions are regulating, and what Windsor might consider regulating. We will discuss relevant planning considerations, public concerns, and how other communities are responding.

<u>Overview of Data Centers</u>

A simple description of a data center is a physical building, containing computers and associated equipment that comprise the infrastructure for the internet.

IBM describes a data center as: *"a physical room, building or facility that houses IT infrastructure for building, running and delivering applications and services. It also stores and manages the data associated with those applications and services." (www.IBM.com – History of data centers)*

Data centers have existed since the 1940s. While early equipment was large and inefficient, today's technology is more compact and efficient. Growth in internet use, cloud computing, online applications, processing, and artificial intelligence has led to an increase in data centers.

<u>Overview of Public Concerns</u>

The main public concerns about data centers typically are environmental: water and power use, noise, location, and facility size. Concerns also include energy efficiency, sustainability, utility availability, and possible increases in utility rates.

<u>Water and Onsite Recycling</u>
Data centers use water for cooling, but not all are high-water users. Some use closed-loop cooling systems that recycle water and minimize usage. The Town could require this technology, as many jurisdictions do, including Weld County (see attached ordinance).

A closed-loop system works like a car radiator: it is filled once and recycles water internally, with little evaporation and minimal water use. Wastewater from data centers is handled like other commercial or industrial users. Unlike other industrial uses, only greywater (similar to household wastewater) enters the sewer. If water becomes contaminated and it cannot be treated onsite, it must be removed and treated off-site so that it does not enter the Town's wastewater system.

Another technique is absorbing the heat generated at the source through a technology called Direct-to-chip (D2C) cooling for AI and High Performance Computing (HPC). This is an advanced thermal management technology that removes heat by circulating a liquid coolant through a cold plate placed directly on top of a microprocessor. However, this technology can require more water than other cooling techniques (www.vertiv.com - Understanding Direct-to-chip Cooling in HPC Infrastructure - A Deep Dive into Liquid Cooling). Alternatively, the heat source could be used as a resource, providing heating to nearby buildings (American Planning Association - Data Center Waste Heat Recovery) (attached).

The Town should consider requiring data centers to:

- Use closed-loop non-evaporative cooling systems
- Recycle and reclaim water, including wastewater
- Provide a “will serve” letter from the water provider (if not the Town)
- Submit a water plan for all site uses, existing and proposed

Power and Onsite Power Generation

Data centers require significant power for cooling, backup batteries and generators to keep machines from overheating or experiencing a power outage. This raises concerns about strain on local infrastructure and potential increases in energy costs for residents.*

Not all data centers are the same, and there are ways these concerns are being addressed by the industry. The Town could require data centers to generate supplemental power onsite, using methods such as solar, wind, or natural gas, reducing the draw from the power grid. While there are several methods for self-generating power, some of the cleanest and safest methods are through solar and natural gas. Fuel cells, a common form of power generation for these centers, are generated from natural gas. Data centers may work with utility providers to create their own "private" grid, which is not reliant on the overall energy grid. These private grids provide power to the consumer and ensure that the overall energy grid is not impacted, resulting in the data center being more self-sufficient.*

Emergency power, often provided by diesel generators, should be managed with noise mitigation techniques. Emergency power would be important in emergency situations if the self-generating power grid failed and would be used periodically during routine maintenance of the diesel generators (see the following Noise and Mitigation section). (*www.energy.gov - US Dept of Energy, Office of Electricity - Clean Energy Resources to Meet Data Center Electricity Demands) (attached)

Weld County requires data centers to provide a “will serve” letter from their power provider and limits total capacity to less than 50 megawatts (MW). The Town could consider similar requirements, including:

- Self-contained, onsite power generation using clean energy
- Submission of a proposed onsite power system with the site plan
- A megawatt capacity limit

Noise and Mitigation

Data centers have the potential to produce noise from cooling fans, turbines, and generators. The Town should require modern noise mitigation techniques to reduce these impacts. Weld County limits noise to 65 decibels at the property boundary, which is appropriate for industrial areas. Windsor could adopt a similar standard for facilities in the Heavy Industrial (HI) zone.

The Town should require a noise mitigation plan identifying a maximum acceptable decibel level with any data center proposal.

Location Limitations

It is common practice to limit centers to industrial zone districts, with larger scale facilities limited to a heavy industrial zone or zones. If a data center that is 50 MW or greater is proposed within Town limits, the Town should consider restricting it to the Heavy Industrial (HI) zone, where it would be compatible with other permitted uses. Many activities in the HI zone, such as petrochemical industries, refining industries, food processing, manufacturing, warehousing, slaughterhouses, foundries, autobody shops, and trucking operations, would have greater impacts—especially noise, vibration and truck traffic—than a data center. (Windsor Municipal Code Sec. 16-1-140(c)(2))

Weld County Ordinance

Weld County has an ordinance that was developed and adopted last year. Weld County chose to enact standards for these facilities rather than have a land use code that was silent on the use. The Weld County code serves as one example of what elements could be considered as requirements, prior to drafting an ordinance.

Other Communities

Many communities are regulating data centers to address concerns about size, energy use, and water consumption. For example:

- Longmont recently passed an ordinance banning hyperscale data centers, capping energy use at 100 megawatts or 5% of the region's grid capacity, whichever is lower. The city-owned utility's substations cannot support larger loads, and the ordinance requires applicants to provide detailed utility service documentation.
- Larimer County has a temporary moratorium on new data center permits while it develops specific land-use regulations.
- Weld County amended its code to define data centers, restrict them to industrial zones, and require proof of adequate water supply, utility approval for electricity, and strict noise limits of 65 decibels at property lines. Weld County also enacted regulations regarding power generation.
- Denver, Broomfield and Jefferson County have enacted moratoriums to study the impacts of data centers on water supplies, public health, and infrastructure.
- The Town of Johnstown is currently discussing with their town council data center land use and economic impacts and considerations for developing standards (Town Council Work Session on July 13, 2026)(attached).

Some communities require data centers to be self-contained, generating their own power and recycling water onsite. Others are considering limits on the number of centers or total megawatt demand. These approaches help ensure that data centers do not strain local resources or dominate the landscape. (www.energy.gov - US Dept of Energy, www.planning.org - American Planning Association)

Financial Impact:
There are economic considerations. However, the goal of this work session is to discuss the land use impacts.

Relationship to Strategic Plan:

Recommendation:
After discussion, the Town Board will decide how to proceed. Options include:

- Asking staff to gather more information for a future work session
- Directing staff to draft a moratorium concerning data centers to allow for further review and deliberation
- Directing staff to draft an ordinance addressing land use impacts of data centers for future discussion
- Taking no action

CC:
Shane Hale, Town Manager
Eric Lucas, Deputy Town Manager
John Thornhill, Community Development Director
Scott Ballstadt, Director of Planning

Attachments:
1. Weld County - Data Center Ordinance 26-01
2. US Dept of Energy - "Clean Energy Resources to Meet Data Center Demands"
3. Colorado Municipal League - Data Center Presentation 2026
4. American Planning Association - "Data Center Waste Heat Recovery"
5. Town of Johnstown - July 13 2026 Town Council Work Session Packet

Weld County Code Ordinance 2026-01

In the Matter of Repealing and Reenacting, with Amendments, Chapter 23 Zoning of the Weld County Code

Be it ordained by the Board of County Commissioners of the County of Weld, State of Colorado:

Whereas, the Board of County Commissioners of Weld County, Colorado, pursuant to Colorado statute and the Weld County Home Rule Charter, is vested with the authority of administering the affairs of Weld County, Colorado, and

Whereas, the Board of County Commissioners, on December 28, 2000, adopted Weld County Code Ordinance 2000-1, enacting a comprehensive Code for the County of Weld, including the codification of all previously adopted ordinances of a general and permanent nature enacted on or before said date of adoption, and

Whereas, the Weld County Code is in need of revision and clarification with regard to procedures, terms, and requirements therein.

Now, therefore, be it ordained by the Board of County Commissioners of the County of Weld, State of Colorado, that Chapter 23 Zoning of the Weld County Code be, and hereby is, repealed and re-enacted, with amendments, to read as follows.

Chapter 23
Zoning

ARTICLE I - General Provisions

Amend Sec. 23-1-90. – Definitions, as follows:

[Change all italicized terms throughout this section to non-italics.]

The following specific words and phrases, when appearing in this Chapter in uppercase letters, shall have the meanings stated in this Section:

DATA CENTER: A BUILDING or BUILDINGS used to house information technology or telecommunications equipment with which digital information is processed, transferred, and/or stored, with no limitation on its peak electrical load. A DATA CENTER may include associated ancillary STRUCTURES, including, but not limited to, OFFICES, security BUILDINGS, cooling water tanks, and backup power systems with a total generation capacity of less than fifty (50) megawatts.

All other definitions remain unchanged.

ARTICLE II - Procedures and Permits

Division 3 - Site Plan Review

Amend Sec. 23-2-160. - Application requirements for site plan review.

Any person wanting to apply for a Site Plan Review shall arrange for a preapplication conference with the Department of Planning Services. The purpose of the application is to give the applicant an opportunity to demonstrate, through written and graphic information, how the proposal complies with the standards of this Chapter. The following supporting documents shall be submitted as a part of the application:

A. through E. - No change.

F. Evidence of water in compliance with the requirements of C.R.S. 29-20-301, et seq.

G. - No change.

H. A “will serve” letter from the electricity provider serving the area where the property is located.

I. though T. - No change.

U. A statement explaining that the USE is compatible with the existing or future DEVELOPMENT of the surrounding areas as permitted by the existing zoning and with the future DEVELOPMENT of the area as projected by the Comprehensive Plan or MASTER PLAN of affected municipalities and any Intergovernmental Agreement. Such USE shall adhere to the following operation standards, to the extent that they are affected by location, layout, and design prior to construction and operation. Once operational, the operation shall conform to the standards listed below:

1. Noise. USES shall be located, designed, and operated in accordance with the noise standards as established in Chapter 14, Article IX, of this code. In addition to the dB(A) noise limits in Section 14-9-40 of this code, no DATA CENTER shall be allowed to exceed a C-scale noise limit of sixty-five decibels (65 dB(C)) as measured at any point on the subject property boundary.

Remainder of Section – No change.

Division 4 - Uses by Special Review

Amend Sec. 23-2-240. - Design standards.

A. An applicant for a Use by Special Review shall demonstrate compliance with the following design standards in the application and shall continue to meet these standards if approved for DEVELOPMENT.

1. Water in compliance with the requirements of C.R.S. 29-20-301, et seq.

Remainder of Section – No change.

Amend Sec. 23-2-250. - Operation standards.

An applicant for a Special Review Permit shall demonstrate conformance with the following operation standards in the Special Review Permit application to the extent that the standards affect location, layout and design of the Use by Special Review prior to construction and operation. Once operational, the operation of the USES permitted shall conform to these standards.

A. The operation of the USES shall comply with the noise standards enumerated in Chapter 14, Article IX, of this code. In addition to the dB(A) noise limits in Section 14-9-40 of this code, no DATA CENTER shall be allowed to exceed a C-scale noise limit of sixty-five decibels (65 dB(C)) as measured at any point on the subject property boundary.

Remainder of Section – No change.

Amend Sec. 23-2-260. - Application requirements.

A. through D. - No change.

E. Supporting Documents. The following supporting documents shall be submitted as part of the application:

1. - No change.

2. Proof of water in compliance with the requirements of C.R.S. 29-20-301, et seq.

3. - No change.

4. A noise mitigation plan indicating anticipated noise levels and proposed mitigation may be required sufficient to demonstrate the proposed USE will comply with the applicable noise limits.

5. and 6. - No change. Insert new 7.

7. A “will serve” letter from the electricity provider serving the area where the property is located.

Remainder of Section – No change.

ARTICLE III - Zone Districts

Division 4 - Industrial Zone Districts

Amend Sec. 23-3-310. - I-1 (Light Industrial) Zone District.

A. through E., no change.

F. Uses by Special Review. The following BUILDINGS, STRUCTURES and USES may be constructed, occupied, operated and maintained in the I-1 Zone District upon approval of a permit in accordance with the requirements of Article II, Division 4 of this Chapter.

1. through 4. - No change. Insert new 5.

5. DATA CENTERS.

Renumber remainder of section as necessary.

Amend Sec. 23-3-320. - I-2 (Medium Industrial) Zone District.

A. and B. - No change.

C. Uses allowed subject to Site Plan Review. The following USES shall be allowed in the I-2 Zone District following approval and recording of a Site Plan in accordance with Article II, Division 3, of this Chapter. Any USE conducted outside of an ENCLOSED BUILDING shall be SCREENED from adjacent PUBLIC RIGHTS-OF-WAY and ADJACENT LOTS in any Zone District other than I-3.

1. through 8., no change. Insert new 9.

9. DATA CENTERS.

Renumber as necessary. No other changes to this section.

Amend Sec. 23-3-330. - I-3 (Heavy Industrial) Zone District.

A. and B., no change.

C. Uses allowed subject to Site Plan Review. The following USES shall be allowed in the I-3 Zone District following approval and recording of a Site Plan in accordance with Article II, Division 3, of this Chapter.

1. through 11. - No change. Insert new 12.

12. DATA CENTERS.

Renumber as necessary. No other changes.

Be it further ordained by the Board that the Clerk to the Board be, and hereby is, directed to arrange for Municode to supplement the Weld County Code with the amendments contained herein, to coincide with chapters, articles, divisions, sections, and subsections as they currently exist within said Code; and to resolve any inconsistencies regarding capitalization, grammar, and numbering or placement of chapters, articles, divisions, sections, and subsections in said Code.

Be it further ordained by the Board, if any section, subsection, paragraph, sentence, clause, or phrase of this Ordinance is for any reason held or decided to be unconstitutional, such decision shall not affect the validity of the remaining portions hereof. The Board of County Commissioners hereby declares that it would have enacted this Ordinance in each and every section, subsection, paragraph, sentence, clause, and phrase thereof irrespective of the fact that any one or more sections, subsections, paragraphs, sentences, clauses, or phrases might be declared to be unconstitutional or invalid.

Publication: January 14, 2026
First Reading: January 26, 2026
Publication: January 30, 2026, in the Greeley Tribune
Second Reading: February 9, 2026
Publication: February 13, 2026, in the Greeley Tribune
Final Reading Rescheduled to: February 25, 2026
Continued to: April 6, 2026
Publication: April 10, 2026, in the Greeley Tribune
Effective: April 15, 2026

The Board of County Commissioners of Weld County, Colorado, adopted the above and foregoing Ordinance, on motion duly made and seconded, by the following vote on the 6th day of April, A.D., 2026:

Scott K. James, Chair: Nay
Jason S. Maxey, Pro-Tem: Aye
Perry L. Buck: Aye
Lynette Peppler: Aye
Kevin D. Ross: Aye

Approved as to Form:

Bruce Barker, County Attorney

Attest:

Esther E. Gesick, Clerk to the Board

Clean Energy Resources to Meet Data Center Electricity Demand

The last time the United States experienced rising electricity demand was before the early 2000s due to a growing economy, a growing population, and a corresponding change in consumer adoption of electric products such as air conditioners, computers, and incandescent lighting. During that time, we experienced electricity demand increases of up to 30%. However, that time of intense growth was followed by years of flat electricity demand, primarily due to innovations in and implementation of energy efficiency improvements, and because of economic headwinds and a decline in domestic manufacturing.[1]

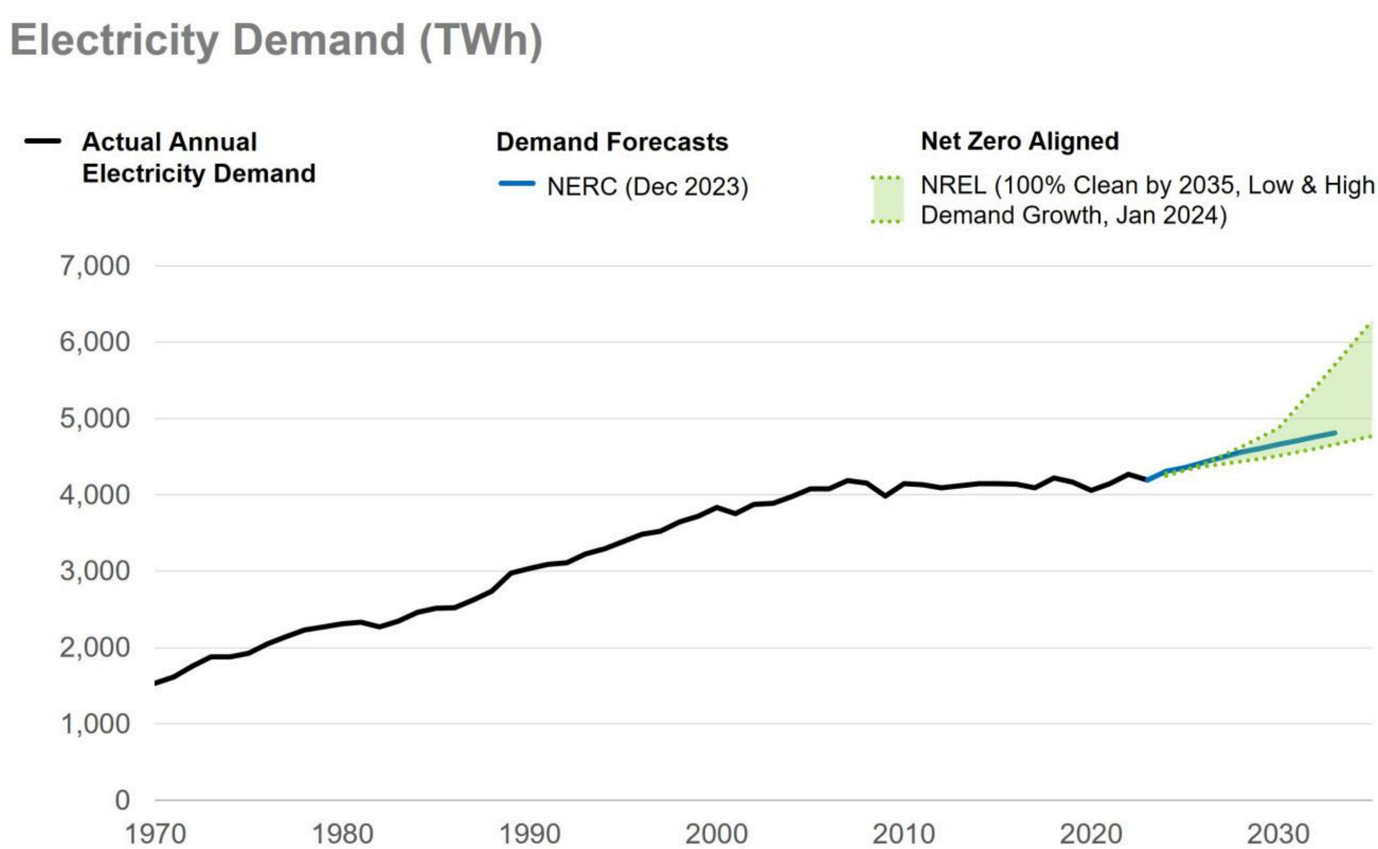
Now, in response to transformations in technologies like artificial intelligence (AI), data center expansion, new domestic manufacturing, and electrification in different sectors, the United States is returning to a period of rising electricity demand, with total energy demand potentially growing ~15-20% in the next decade (See Figure 1).

The U.S. Department of Energy (DOE) has been anticipating and planning for rising electricity demand underscored by the nationwide goal to reach net-zero emissions economy-wide by 2050. To reach this goal, we expect at least a doubling in current electricity demand.[2] Addressing rising electricity demand requires a portfolio approach to meet near-term growth with commercially available technologies, while also paving the way to support long-term growth.

Data center deployment, partly driven by the need to power new AI applications, is a significant factor of near-term electricity demand growth. The Electric Power Research Institute (EPRI) estimates that data centers could grow to consume up to 9% of U.S. electricity generation annually by 2030, up from 4% of total load in 2023.[3] At a national level, data centers are critical to supporting America's economic growth by powering businesses and enabling continued leadership in innovation, including for AI applications.

This blog outlines DOE resources available to help data center developers meet electricity demands with clean energy solutions that can improve flexibility and modernize the grid while maintaining reliability and affordability.

Figure 1: U.S. Electricity Demand (1970-2035)



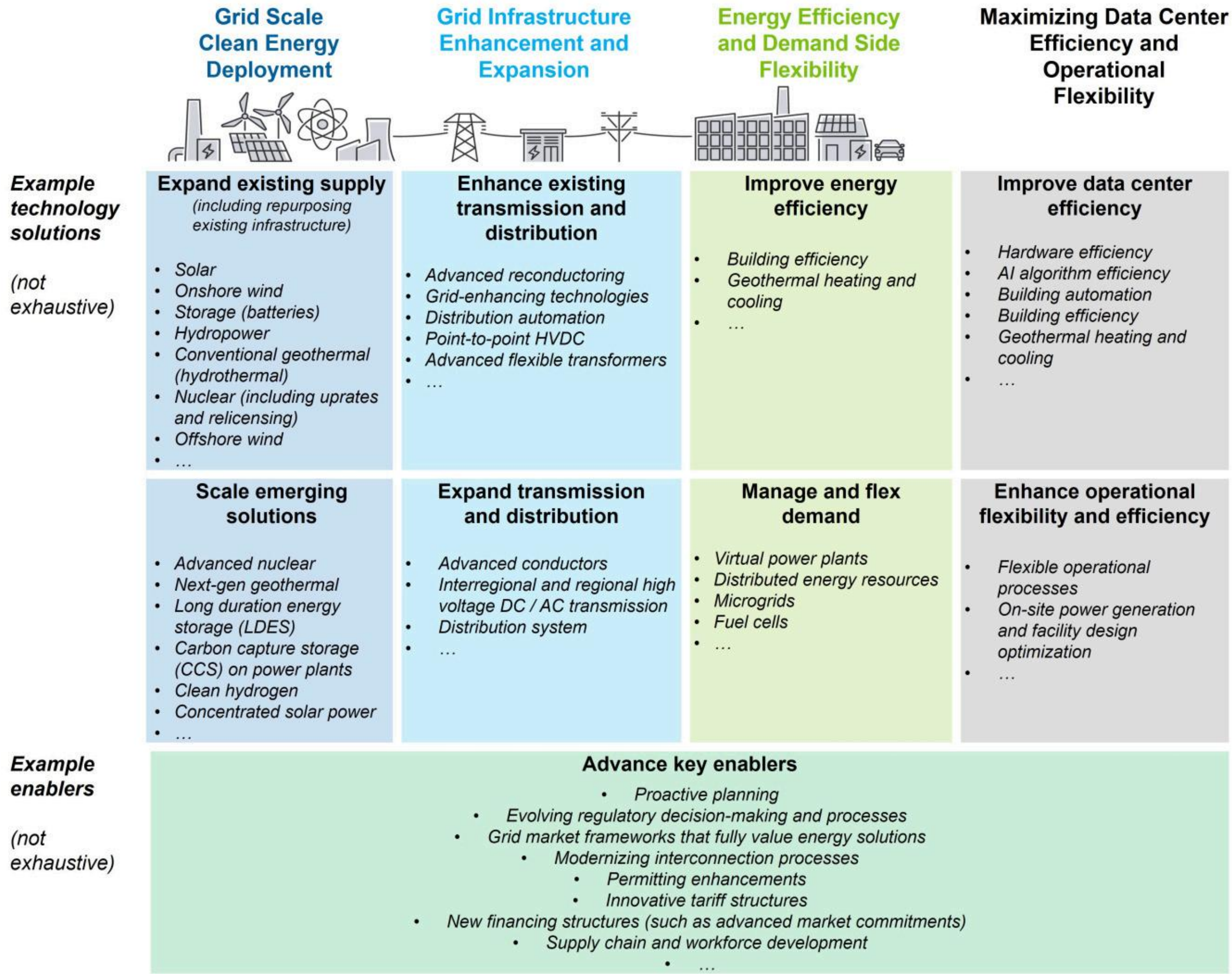
Meeting Data Center Electricity Demand

Data center electricity demand has specific characteristics. It is growing rapidly and varies regionally. Data centers can impact regional grids given the steep increases in load size, may be geographically constrained due to latency requirements, and often require firm power sources to operate continuously. Projections of data center electricity demand growth continue to evolve due to developing use cases and demand for AI and the speed of improvements in energy efficiency. **Building on a series of congressionally mandated reports on data center energy use and efficiencies, DOE's Lawrence Berkeley National Laboratory (LBNL) is assessing current and near-future data center energy consumption and water use.** The report is scheduled to be released at the end of 2024.

A broad suite of tools can be used to meet and manage rising electricity demand and lower overall peak demand (See Figure 2). Approaches that span the whole power system include deploying clean generation and storage technologies; leveraging existing nuclear and hydropower infrastructure; redeveloping retired coal power plant sites; enhancing and expanding grid infrastructure; and maximizing energy efficiency and demand resources. Complementary non-technology-based solutions for managing demand growth include proactive planning, innovative tariff structures, optimizing grid performance, adopting alternative financing structures to fund new energy projects, and supply chain and workforce development. Pursuing key enablers like interconnection and regulatory reforms can unlock the barriers to adopting these energy solutions. DOE's Future of Resource Adequacy Report outlines the portfolio of solutions available to address rising electricity demand in the near and long term, while maintaining system reliability.

Near-term data center driven electricity demand growth is an opportunity to accelerate the build out of clean energy solutions, improve demand flexibility, and modernize the grid while maintaining affordability. Today, solar energy, land-based wind energy, battery storage, and energy efficiency are some of the most rapidly scalable and cost competitive ways to meet increased electricity demand from data centers. Given data centers' need for clean firm power, scaling other energy technologies, such as next-generation geothermal and nuclear, will also be critically important to meet data center electricity demand. With greater investment today, these energy solutions, which are covered by DOE's Pathways to Commercial Liftoff reports, could enable hundreds of gigawatts of capacity on the grid by the mid-2030s and through 2050 to help meet the energy and power needs of data centers and increase the reliability and affordability of the power system.

Figure 2: Examples of Tools to Address Growing Electricity Demand from Data Centers



While the pace and characteristics of data center electricity demand can present challenges in an evolving power system, targeted actions can help the United States maintain a reliable, affordable, secure, and resilient power system. State policymakers, regulators, utilities, data center owners and operators, energy developers, technology providers, grid planners, communities, and the broader grid stakeholder ecosystem all have critical roles to play in accelerating deployments of the solutions needed to support demand growth alongside decarbonization and grid security.

Stakeholders can start acting today to leverage funding opportunities, tax credits, technical reports, and technical assistance to address demand growth and expand our clean energy ecosystem. Detailed below are DOE resources available to support data center electricity needs including:

- Grid Scale Clean Energy Deployment
- Grid Infrastructure Enhancement and Expansion
- Maximizing Energy Efficiency of Data Centers
- Demand Side Flexibility

- Technical Assistance Programs for State and Local Officials, Energy Professionals, Communities, and Large Energy Users

If you have questions on the DOE resources, please feel free to submit them through the businesshub@hq.doe.gov mailbox with the subject "Load Growth".

DOE Resources Available to Support Data Center Electricity Needs

Grid Scale Clean Energy Deployment

Building additional clean energy is a cost-effective way to meet new loads and is necessary for meeting carbon emissions reduction goals. Tax credits such as the Clean Energy Production Tax Credit (§45Y) and Clean Energy Investment Tax Credit (§48E) also can help support clean energy investments on top of existing DOE funding.

Name	Type	Eligibility	Description
Title 17 Innovative Energy Loans (1703)	Loan; Financing Program	Project developers	Loan guarantees for projects that deploy innovative or significantly improved clean energy technologies (e.g., energy generation and storage, transmission and distribution systems, efficient end-use technologies, etc.) or employ innovative manufacturing processes or manufacture innovative technologies at commercial scale.
Title 17 Energy Infrastructure Reinvestment Program (1706)	Loan; Financing Program	Project developers	Direct loans and loan guarantees available to projects that retool, repower, repurpose, or replace energy infrastructure that has ceased operations.
Tribal Energy Financing	Loan; Financing Program	Federally recognized Tribes,	Direct loans and loan guarantees for energy-related projects available to federally recognized tribes, including

Program		tribally-owned developers	Alaska Native village or village corporations, or a Tribal Energy Development Organization that is wholly or substantially owned by a federally recognized Indian tribe or Alaska Native Corporation.
Civil Nuclear Credit Program	Grant	Owners or operators of commercial U.S. reactors	Funding to help preserve the existing nuclear fleet at risk of retirement due to economic factors, which can provide carbon-free power to data centers.
Generation III+ Small Modular Reactor Pathway to Deployment Program	Notice of Intent issued to for funding opportunity	Project developers	To spur the necessary industry-wide momentum, DOE intends to offer funding for projects under this solicitation through two tiers: Tier 1 will provide up to $800 million to support up to two first-mover teams of utility, reactor vendor, constructor, and end-users/off-takers committed to deploying a first plant while facilitating a multi-reactor, Gen III+ SMR orderbook. Tier 2 will provide up to $100 million to spur additional Gen III+ SMR deployments by addressing key gaps that have hindered the domestic nuclear industry in areas such as design, licensing, supplier development, and site preparation.
Critical Facility Energy Resilience (CiFER)	Notice of Intent issued for funding opportunity	Project developers	DOE intends to issue a Funding Opportunity Announcement (FOA) seeking applications for financial assistance awards under a competitive pilot demonstration grant program, as authorized in section 3201 of the Energy Act of 2020, for energy storage projects that are wholly U.S.-made, sourced, and supplied.
Hydroelectric Incentive Programs	Grant	Owners or authorized operators of a hydroelectric facility	More than $750 million through three programs to support energy production, energy efficiency improvements, and enhancements at existing hydropower facilities.
Interconnection Innovation e-	Technical Assistance	Interconnection stakeholders	The i2X program enables simpler, faster, and fairer interconnection of clean

Xchange (i2X)			energy resources via stakeholder engagement, data and analysis, strategic roadmaps, and tailored technical assistance.
Non-powered Dam Development Assistance	Technical Assistance	Project developers	Holistic pre-feasibility assessments of non-powered dam retrofits supported by the best available nationwide data and a suite of online tools.
HydroWIRES Calls for Technical Assistance	Technical Assistance	Hydropower hybrids and pumped hydro power developers and other stakeholders	These recurring technical assistance calls aim to pair utilities and hydropower developers with leading national lab capabilities on pumped storage valuation, hydropower hybrid design, hydropower operations, and other grid integration topics.
Rural and Agricultural Income & Savings from Renewable Energy (RAISE) Initiative	Technical Assistance	Farmers, farm associations	Provides technical assistance, market analysis, and business model research to help farmers and communities deploy wind technologies at multiple scales for local and regional consumption with the goals of enabling farmers and small businesses to earn supplemental income, including through farm associations that could develop and own projects financed through fee-for-service models. Includes funding for technology development and commercialization of distributed wind turbines for the agricultural sector.

Grid Infrastructure Expansion and Enhancement

A variety of innovative grid solutions, including those enabled by artificial intelligence (AI), can help utilities and asset owners improve utilization of existing infrastructure. Technologies such as dynamic line ratings, grid topology optimization, and other solutions can meet growing load by more efficiently and intelligently using existing infrastructure.

Name	Type	Eligibility	Description

Grid Resilience and Innovation Partnerships (GRIP)	Grant	Varies by Topic Area; includes states, grid operators, project developers, and others.	$10.5 billion in federal funding to support projects that enhance grid resilience and deploy innovative grid technologies that improve reliability and resilience. This program seeks to support innovative partnerships or innovative technologies to transform the grid and catalyze non-federal public and private sector capital.
Title 17 Innovative Energy Loans (1703)	Loan; Financing Program	Project developers	Loan guarantees for projects that deploy innovative or significantly improved clean energy technologies (e.g., energy generation and storage, transmission and distribution systems, efficient end-use technologies, etc.) or employ innovative manufacturing processes or manufacture innovative technologies at commercial scale.
Title 17 Energy Infrastructure Reinvestment Program (1706)	Loan; Financing Program	Project developers	Direct loans and loan guarantees available to projects that retool, repower, repurpose, or replace energy infrastructure that has ceased operations.
Transmission Facilitation Program	Loan; Financing Program	Project developers	$2.5 billion in commercial support for qualified transmission projects through tools such as capacity contracts, public-private partnerships, and loans.
Transmission Facility Financing Program	Loan; Financing Program	Project developers	$2 billion to pay for the costs of direct loan for the construction and modification of transmission facilities.
Reconductoring Economic & Financial Analysis Tool (REFA)	Tool	Utility transmission planners and grid planners	REFA is a first of its kind tool designed to help utility transmission planners better understand the financial, environmental and economic benefits of reconductoring upgrades, using traditional or advanced conductors.
National Interest Electric Transmission	Other	Project developers, other stakeholders	Special designation that enables DOE and the Federal Energy Regulatory

Corridors (NIETC)		(anyone may submit information to inform NIETC designation)	Commission to use financing and permitting tools to spur construction of transmission projects within a NIETC.

Maximizing Energy Efficiency of Data Centers

Energy efficiency is a key tool in reducing energy consumption from data center facilities. DOE has long been a leader in developing improved cooling technologies, including for data centers. For instance, ARPA-E has an ongoing COOLERCHIPS program focused on commercializing innovative cooling technologies for data centers. DOE national labs have built exascale computing facilities with a Power Usage Efficiency (PUE) of 1.03, demonstrating state of the art techniques for data center efficiency.[4] DOE is also leading the Energy Efficiency Scaling for 2 Decades initiative, with a goal to increase the energy efficiency of the microelectronics that are needed for computation at data centers by a factor of 1000 over 2 decades. DOE is continuing to develop programs to support data center owners in energy efficiency and industrial decarbonization. In addition, tax incentives, such as the 179D Tax Deduction, enable building owners to claim a tax deduction for installing qualifying energy efficient systems in buildings.

Name	Type	Eligibility	Description
Center of Expertise for Energy Efficiency in Data Centers	Technical Assistance	Data center operators, owners, and other stakeholders	Lawrence Berkeley National Laboratory offers assessment tools, trainings on specific technologies and best practices, and certification for data center energy practitioners.
Data Center Energy Practitioner Program (DCEP)	Training and Credentialing	Individuals, groups, organizations, federal employees	The DCEP Program training is a comprehensive program spanning 1-4 days. The DCEP program certifies practitioners as qualified to evaluate the energy status as well as efficiency and decarbonization opportunities in data centers. The curriculum includes several software tools with what-if capabilities to enhance the learning experience. Three credentials are available.

			• Generalist • IT specialist • HVAC specialist Best practices factsheets and other resources are available through the DCEP website.
Better Plants Initiative	Technical Assistance	Any U.S. based manufacturing company or industrial-scale energy-using organizations	Manufacturers and owners of industrial facilities (including data centers) in the Better Plants Program set energy saving goals, usually 25% over 10 years. Participants receive national recognition, technical support, in-plant trainings, energy saving resources, and other opportunities.
Data Center Accelerator Toolkit	Report/Resource Collection	Data centers	The Data Center Accelerator Toolkit collects guidance, factsheets, best practices, and other resources to help navigate these dynamics, based on the work of DOE's Better Buildings Data Center Accelerator. This toolkit addresses specific barriers and solutions for energy management in 5 primary data center types, including real-world examples for each.
Better Climate Challenge	Technical Assistance	Organizations, such as data center owners or operators, committed to reducing GHG emissions	Owners and operators of commercial and industrial facilities commit to a target of at least 50% reduction in scope 1&2 GHG emissions within 10 years. Participants receive national recognition, direct technical assistance, resources, and opportunities for peer exchange.
Onsite Energy Program	Technical Assistance	Industrial facilities and other large energy users	Provides technical assistance, market analysis, and best practices to help large energy users, including data centers, increase the adoption of onsite clean energy technologies.
Energy Efficiency Revolving Loan	Direct Support; Technical Assistance	States	$250 million in federal funding to provide capitalization grants to States to establish a revolving loan fund

Fund Capitalization Grant Program			under which the state provides loans and grants for energy efficiency audits, upgrades, and retrofits to increase energy efficiency and improve the comfort of buildings.
50001 Ready	Resource	Facilities and organizations	Energy management program provides guidance and resources for implementing best practices and standard operating procedures aligned with the ISO 50001 energy management system standard.

Demand Side Flexibility

Demand flexibility can help avoid increasing peak demand. Distribution resources, such as virtual power plants, have the potential to increase the efficiency of existing and new grid infrastructure. DOE is accelerating the use of virtual power plants to support grid needs. For example, the Office of Clean Energy Demonstrations Distributed Energy Systems' program provided $50 million for projects that design and operate distributed energy systems that integrate high levels (>25% of peak demand) of variable clean energy resources.

Name	Type	Eligibility	Description
Title 17 Innovative Energy Loans (1703)	Loan; Financing Program	Project developers	Loan guarantees for projects that deploy innovative or significantly improved clean energy technologies (e.g., energy generation and storage, transmission and distribution systems, efficient end-use technologies, etc.) or employ innovative manufacturing processes or manufacture innovative technologies at commercial scale.
Grid Resilience and Innovation Partnerships (GRIP)	Grant	Project developers	$10.5 billion in federal funding to support projects that enhance grid resilience and deploy innovative grid technologies that improve reliability and resilience. This program seeks to support innovative partnerships or innovative technologies to transform the grid and catalyze non-federal public and private sector capital.

Connected Communities 2.0	Grant	Governments, industry stakeholders, communities	$65 million in federal funding to validate grid-edge technology innovations in real-world situations and provide new tools for utilities, grid planners and operators.
Distributed Energy Systems Demonstrations	Financial Assistance	Project developers	$50 million in federal funding to support a portfolio of projects that demonstrate and validate reliable operations and financial value from a range of grid topologies with diverse energy resources and distributed energy systems ownership models.

Technical Assistance Programs for State and Local Officials, Energy Professionals, Communities, and Large Energy Users

DOE and the National Laboratories can provide technical assistance to states to help develop specific solutions and projects to address growing electricity demand.

Name	Type	Eligibility	Description
State Technical Assistance Program	Technical Assistance	Public utility commissions and state energy offices	For State Regulators, offered through a multi-lab consortium including Lawrence Berkeley National Laboratory, National Renewable Energy Laboratory, and Pacific Northwest National Laboratory. This program provides regulators targeted support in addressing regulatory challenges, including developing innovative tariffs structures and regulatory environments to enable efficient deployment of resources for data centers, and in developing regulatory strategies to enable data center operational flexibilities and behind-the-meter resources

State Energy Program Technical Assistance	Technical Assistance	States, territories, and the District of Columbia	For State Energy Offices, to provide national lab and 3rd party expertise in support of state-led energy initiatives. This can include supporting development of regional plans and solutions for states that want to plan for data center development.
Clean Energy Innovator Fellowship Program	Technical Assistance/Capacity Building	Recent graduates and energy professionals	The program supports recent graduates and energy professionals to spend two years working with eligible Institutions including electric cooperatives, grid operators, municipal utilities, public utility commissions, state energy offices and Tribal entities.
National Association of Regulatory Utility Commissioners (NARUC)-National Association of State Energy Officials (NASEO) Advanced Nuclear State Collaborative	Technical Assistance	Public utility commissions and state energy offices	Provides state energy officials access to DOE and national lab nuclear expertise to inform regulatory and policy questions surrounding the consideration and deployment of new nuclear generation.
The Interagency Working Group (IWG) on Coal and Power Plant Communities and Economic Revitalization	Technical Assistance	Energy communities	Provides technical assistance, resources, and funding guides to support economic revitalization in Energy Communities. The IWG houses resources such as the Coal Power Plant Redevelopment Visualization Tool, which serves as a public database and map to enable state and local economic development officials, project

			developers, and power plant owners to identify clean energy generation and data center siting opportunities in fossil energy communities.
Renewable Energy Siting through Technical Engagement and Planning (R-STEP)	Technical Assistance	State and local governments, communities	Helps communities better plan for and meaningfully engage in the development of large-scale renewable energy and energy storage projects.
Onsite Energy Technical Assistance Partnerships (TAPs) | Better Buildings Initiative	Technical Assistance	Industrial facilities and other large energy users	DOE's regional network of Onsite Energy Technical Assistance Partnerships helps facilities across the nation integrate the latest onsite energy technologies by providing specialized technical assistance, including initial screenings for multi-technology solutions, more advanced analysis to support project installations, and more.
Supercharging the Electric Grid	Technical Assistance	Industry Stakeholders	Enhances internal and external coordination in the energy industry through resources and best practices, analytical and capacity support, and field validations.

[1] Energy Information Administration, Per Capital Residential Electricity Sales in the U.S. Have Fallen Since 2010, 2017.

[2] North American Electric Reliability Corporation (NERC), Electricity Supply and Demand Data, 2023; Energy Information Administration (EIA) Monthly Energy Review; National Renewable Energy Laboratory (NREL) Pathways to 100% Clean Electricity, 2022. Note that electricity demand includes transmission losses and direct use.

[3] EPRI, Powering Intelligence: Analyzing Artificial Intelligence and Data Center Energy Consumption, 2024.

[4] Oak Ridge Frontier Supercomputer: https://science.osti.gov/-/media/ascr/ascac/pdf/meetings/202207/UpdateFrontier_ASCAC_202207.pdf

NREL Energy Integration Facility: https://www.nrel.gov/computational-science/measuring-efficiency-pue.html

CML

COLORADO MUNICIPAL LEAGUE

ANNUAL CONFERENCE

WESTMINSTER 2026

Municipal Regulation of Data Centers

Presented by

Brian Rulla

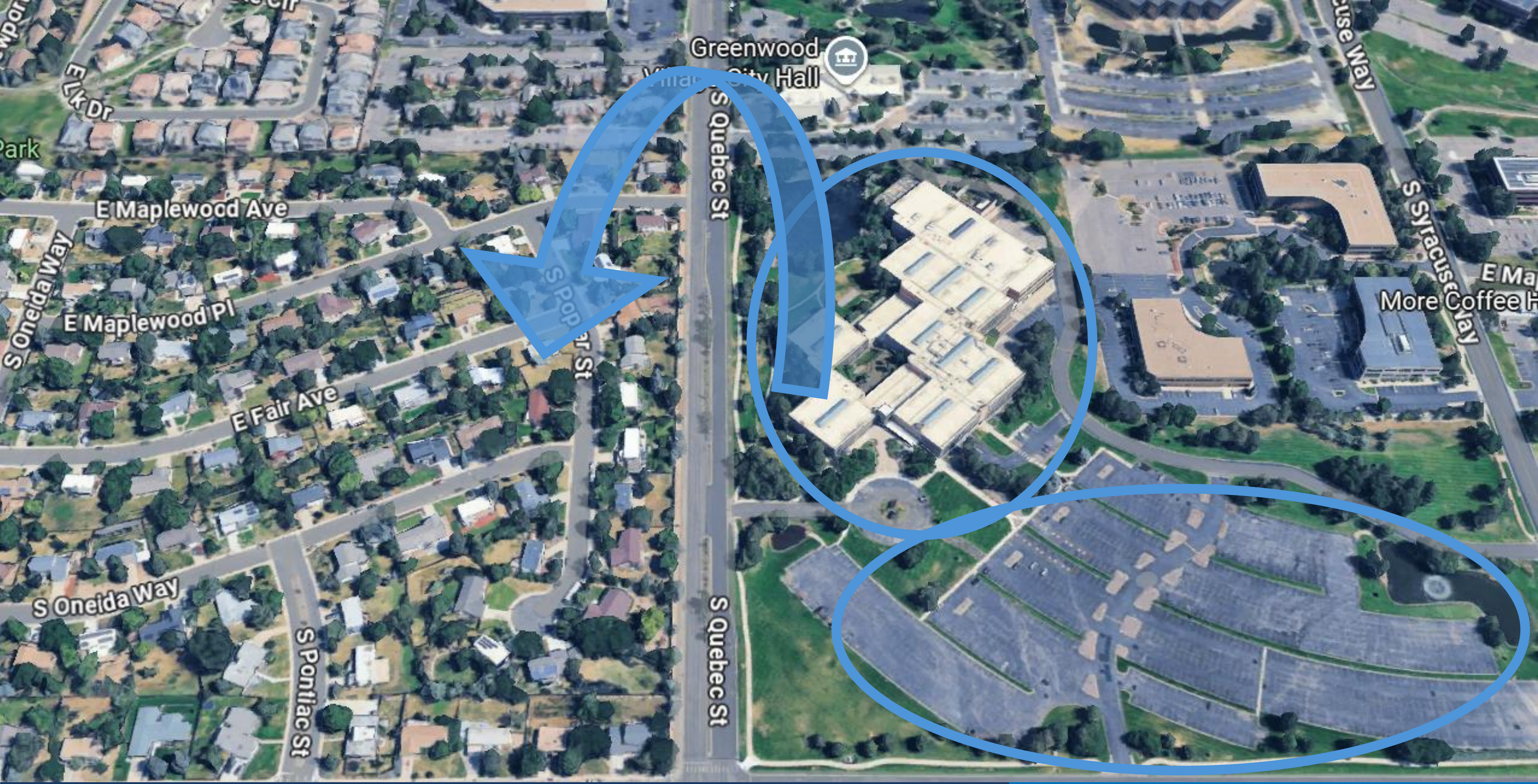
Sr. Assistant City Attorney

Aurora, Colorado

Data Centers in the News


S Quebec St
S Poplar St


6200 S Quebec St
Recently viewed
2D


Greenwood Village City Hall
S Quebec St
E Maplewood Ave
E Maplewood Pl
E Fair Ave
S Oneida Way
S Pontiac St
S Poplar St
E Lk Dr
Park
S Syracuse Way
E Ma
More Coffee H


Search this area
New Albany
Meta Data Center
Recently viewed
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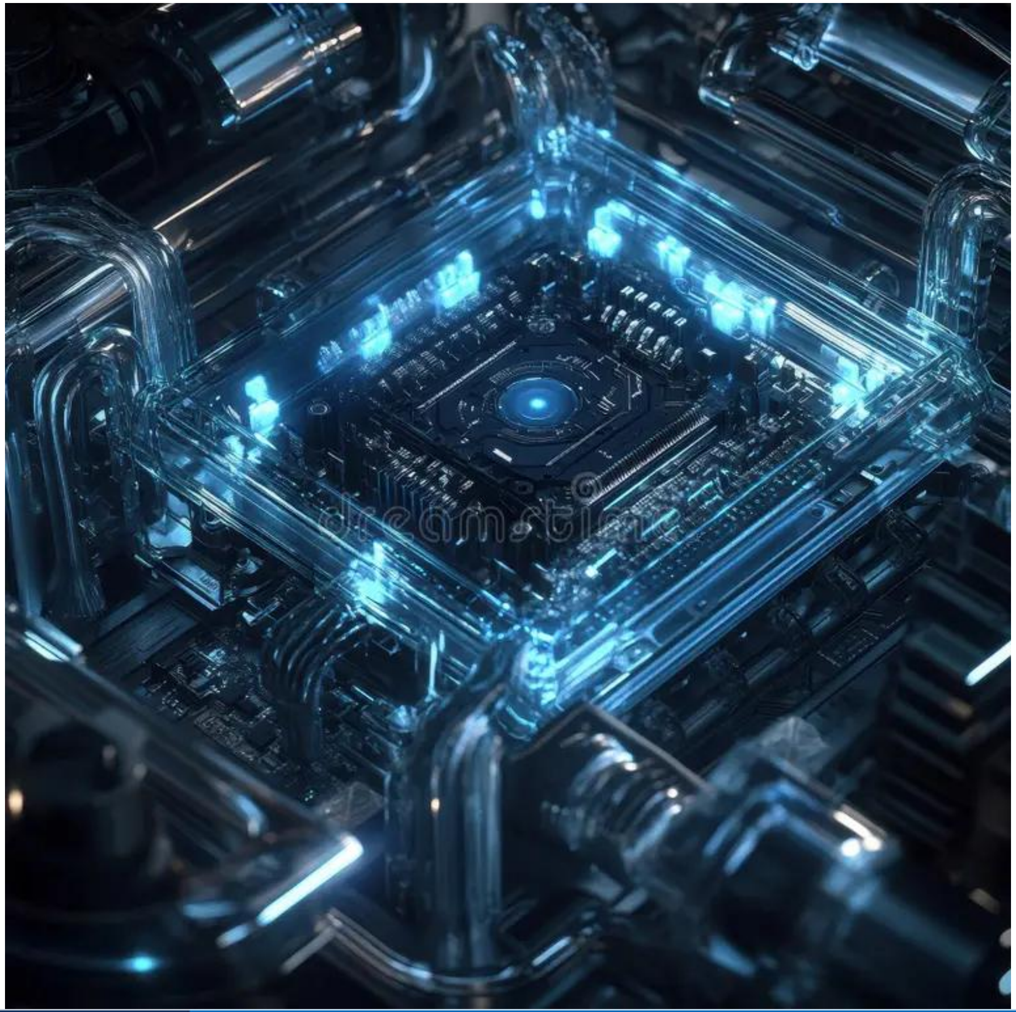
Data Center

Data Center - Specialized facility for housing networked servers, computers, and networking infrastructure (IT equipment) necessary for digital services: cloud computing, AI models, streaming, banking, etc.



Edge / Micro Centers

Enterprise

Regional Colocation

Hyperscale

Edge / Micro Centers

Bldg. Size: 500–5,000 sq ft

Demand - .05-1 MW

(750 – 1,000 Homes)

Positioned close to the end-user to minimize latency

Cell towers, hospitals, campuses, industrial facilities

Enterprise

Regional Colocation

Hyperscale

Edge / Micro Centers

Bldg. Size: 500–5,000 sq ft

Demand - .05-1 MW

(750 – 1,000 Homes)

Positioned close to the end-user to minimize latency

Cell towers, hospitals, campuses, industrial facilities

Enterprise

Bldg Size:5k – 50k sq ft

Demand - 1-10 MW

(10k – 12k Homes)

Single corporation, university, government agency

Regional Colocation

Hyperscale

Edge / Micro Centers

Bldg. Size: 500–5,000 sq ft

Demand - .05-1 MW

(750 – 1,000 Homes)

Positioned close to the end-user to minimize latency

Cell towers, hospitals, campuses, industrial facilities

Enterprise

Bldg Size:5k – 50k sq ft

Demand - 1-10 MW

(10k – 12k Homes)

Single corporation, university, government agency

Regional / Colocation

Bldg. Size:50k – 250k sq ft

Demand - 10-50 MW

(50k -60k Homes)

Multi-tenant facilities benefit from highly efficient, purpose-built electrical architecture

Multi-state service area, colocation providers

Hyperscale

Edge / Micro Centers

Bldg. Size: 500–5,000 sq ft

Demand - .05-1 MW

(750 – 1,000 Homes)

Positioned close to the end-user to minimize latency

Cell towers, hospitals, campuses, industrial facilities

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(10k – 12k Homes)

Single corporation, university, government agency

Regional / Colocation

Bldg. Size:50k – 250k sq ft

Demand - 10-50 MW

(50k -60k Homes)

Multi-tenant facilities benefit from highly efficient, purpose-built electrical architecture

Multi-state service area, colocation providers

Hyperscale

Bldg. Size:250k – 2m+sq ft

Demand - 75-700+ MW

(700k – 800k Homes)

Massive facilities requiring immense financial capital to deploy custom-engineered hardware

Cloud, AI, and global internet platforms

Hyperscale Data Center

Meta Prometheus Campus

New Albany, Central OH

Worlds 1st gigawatt scale data center

- Equivalent to 800-900k homes
  - (Denver has < 400k homes)
- On site gas powered generation
- *Building 5 Pictured

Hyperscale Data Center

Project Jupiter - Oracle

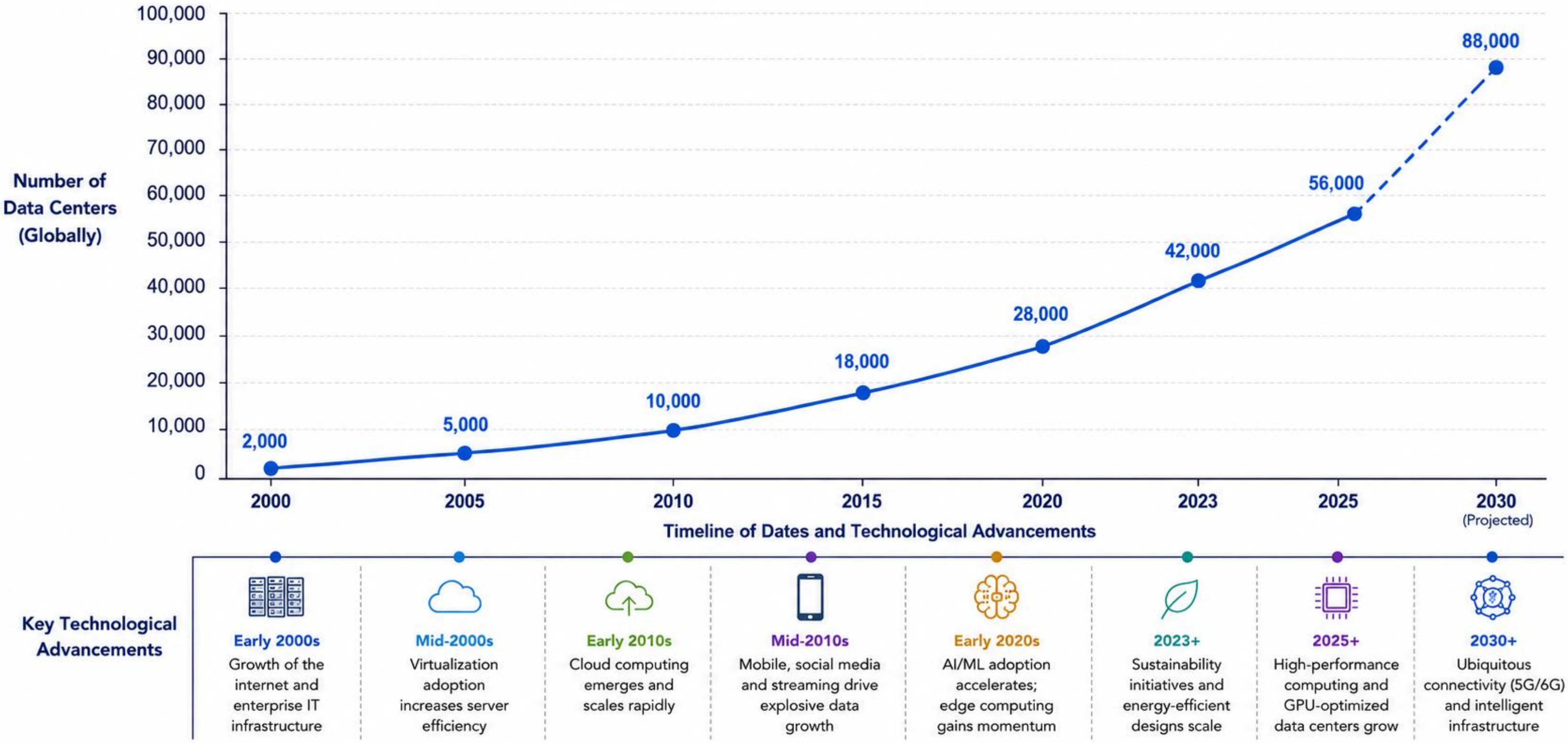
Between Las Cruces NM & El Paso TX

2.5 Gigawatt Facility

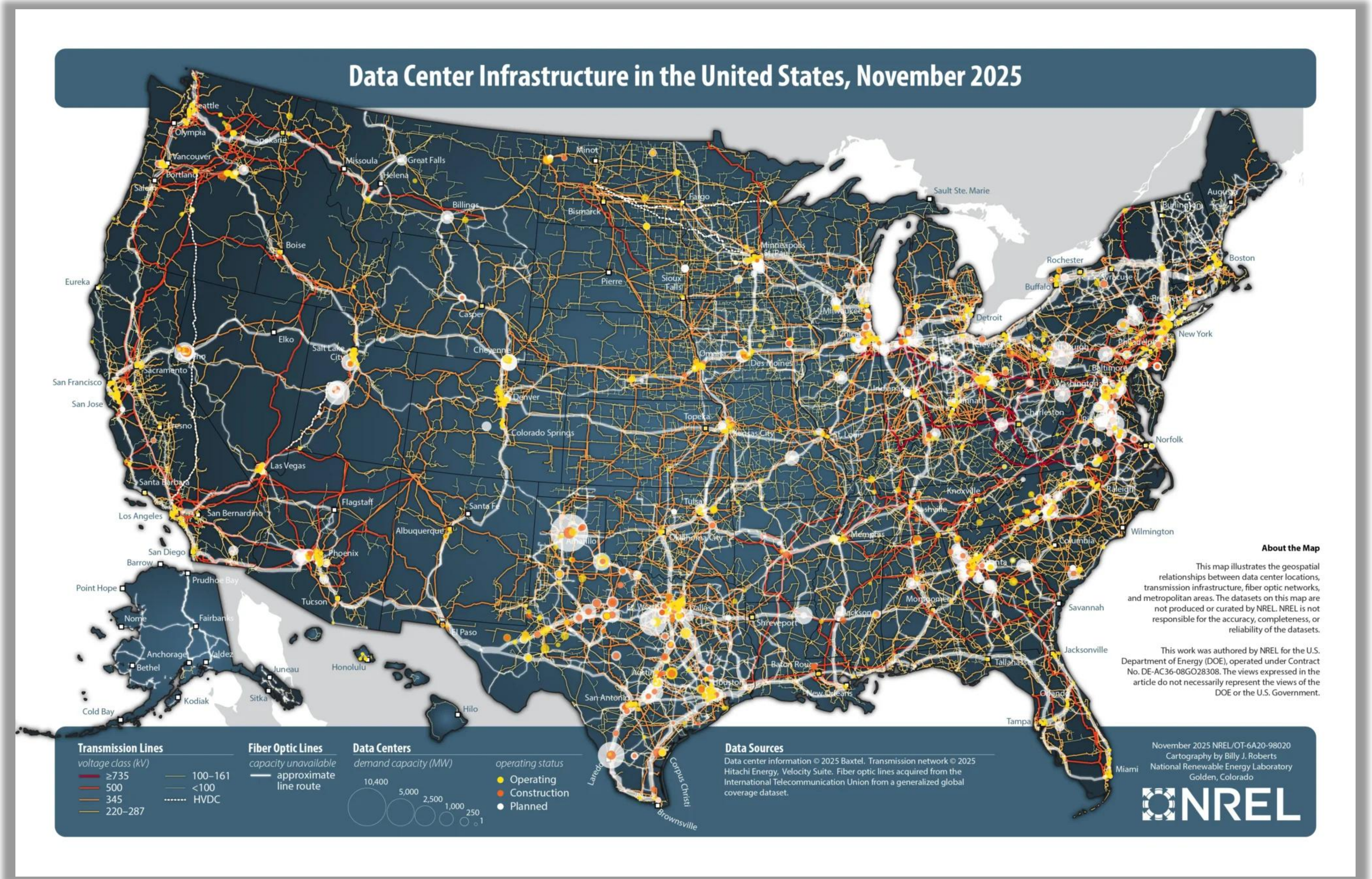
- Self Contained – Not connected to NM power grid
- Methane driven instead of natural gas

2.5 Gigawatts is equivalent to New Mexico's entire existing grid

Data Center Growth

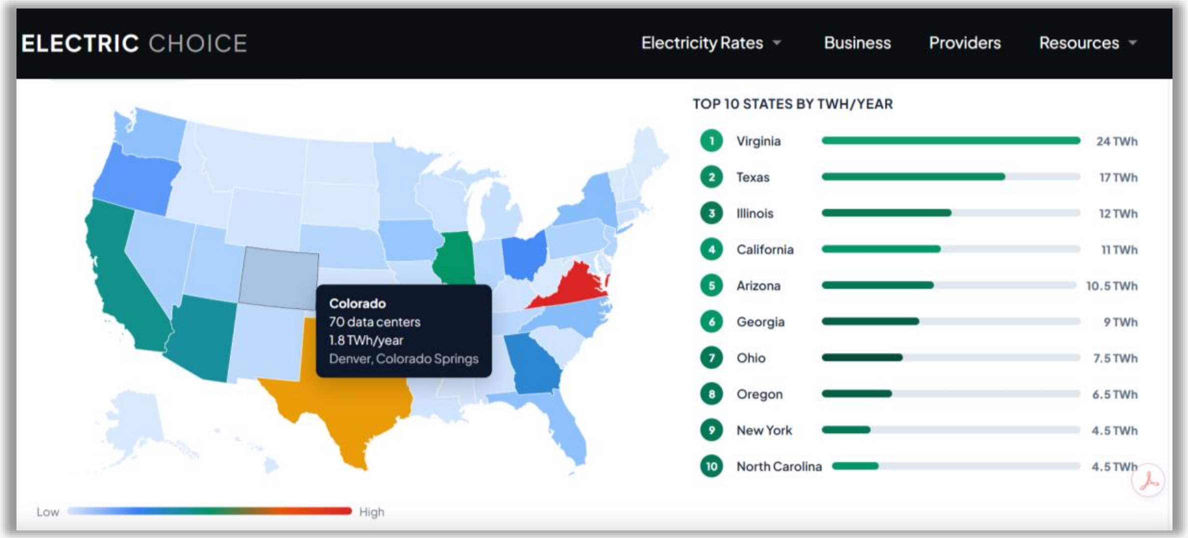


Note: Numbers are approximate. Source: Statista, DC Byte, Uptime Institute, Gartner (2023–2024)

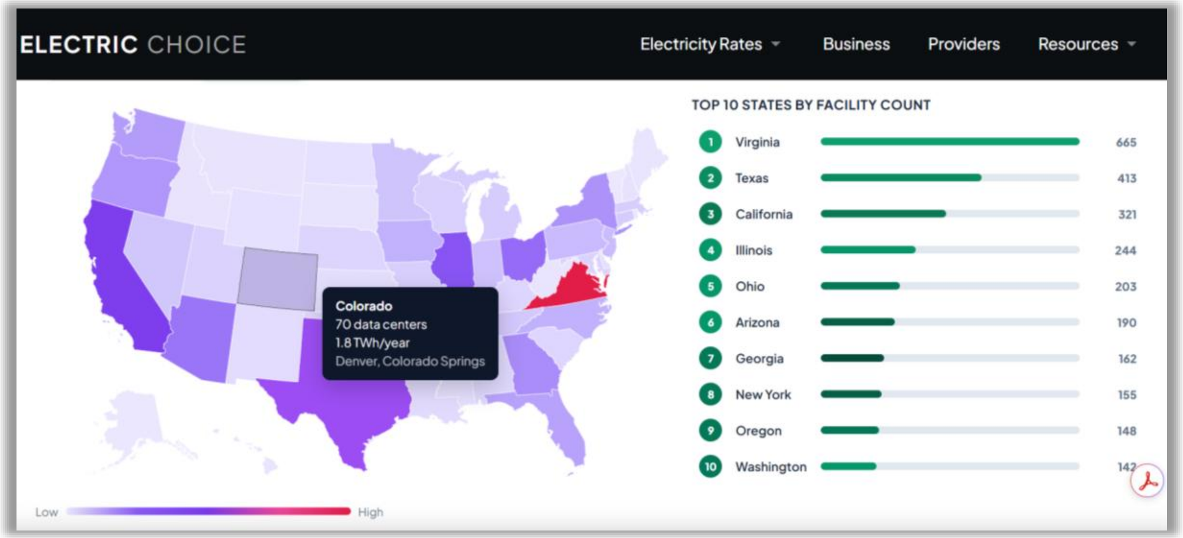

Data Center Infrastructure in the United States, November 2025
About the Map
This map illustrates the geospatial relationships between data center locations, transmission infrastructure, fiber optic networks, and metropolitan areas. The datasets on this map are not produced or curated by NREL. NREL is not responsible for the accuracy, completeness, or reliability of the datasets.
This work was authored by NREL for the U.S. Department of Energy (DOE), operated under Contract No. DE-AC36-08GO28308. The views expressed in the article do not necessarily represent the views of the DOE or the U.S. Government.
Transmission Lines
voltage class (kV)
≥735
500
345
220–287
100–161
<100
HVDC
Fiber Optic Lines
capacity unavailable
approximate line route
Data Centers
demand capacity (MW)
10,400
5,000
2,500
1,000
250
1
operating status
Operating
Construction
Planned
Data Sources
Data center information © 2025 Baxtel. Transmission network © 2025 Hitachi Energy, Velocity Suite. Fiber optic lines acquired from the International Telecommunication Union from a generalized global coverage dataset.
November 2025 NREL/OT-6A20-98020
Cartography by Billy J. Roberts
National Renewable Energy Laboratory
Golden, Colorado
NREL

Data Centers - Nationally

Concentration of Energy Use

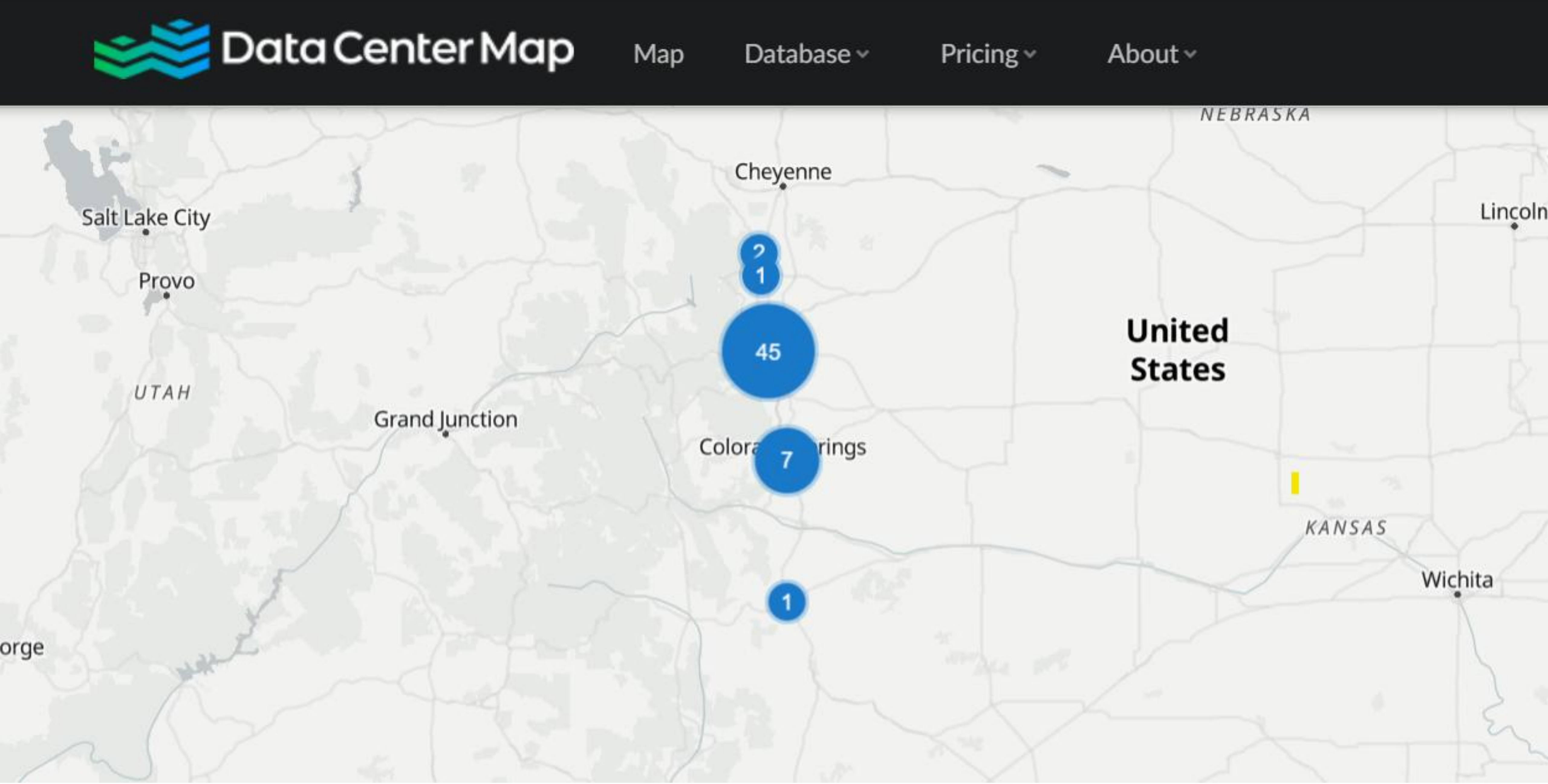


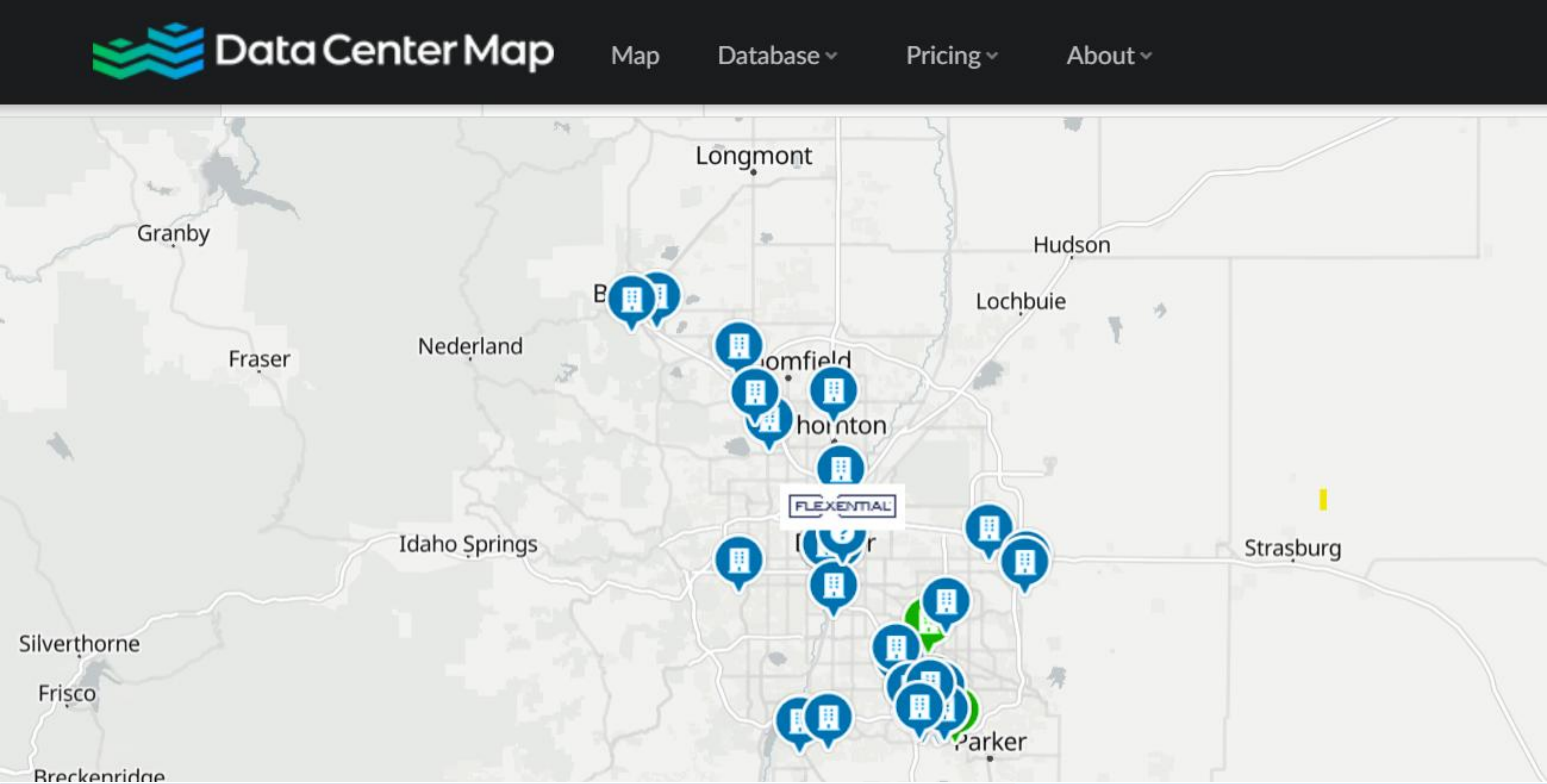
Concentration of Number



Data center power consumption, facility counts, and major operators by state

# ▲	STATE	DATA CENTERS	TWH/YEAR	MAJOR HUBS & OPERATORS
18	Nebraska	42	2.1	Omaha, Lincoln • Google, Meta
19	Indiana	85	2	Lebanon, La Porte, Indianapolis • Amazon ($15B), Meta ($10B), Microsoft ($1B)
20	Tennessee	68	1.8	Nashville, Memphis • Oracle ($1.5B), xAI ($1B+)
21	Colorado	70	1.8	Denver, Colorado Springs • Flexential, Viawest
22	New Mexico	28	1.6	Albuquerque, Los Lunas • Meta
23	Minnesota	78	1.5	Minneapolis, Shakopee


Data Center Map
Map
Database
Pricing
About
NEBRASKA
Cheyenne
Salt Lake City
Lincoln
Provo
2
1
45
United States
UTAH
Grand Junction
7
KANSAS
Wichita
1


Data Center Map
Map
Database
Pricing
About
Longmont
Granby
Hudson
Lochbuie
Nederland
Fraser
Idaho Springs
FLEXENTIAL
Strasburg
Silverthorne
Frisco
Parker

DENVER METRO DATA CENTERS

SQUARE FOOTAGE OVERVIEW

Denver metro contains an estimated

1.5 – 2.5 MILLION

SQUARE FEET

of data center space

DTC / INVERNESS *(Enterprise Colocation)*

500,000+ SF Largest concentration of facilities

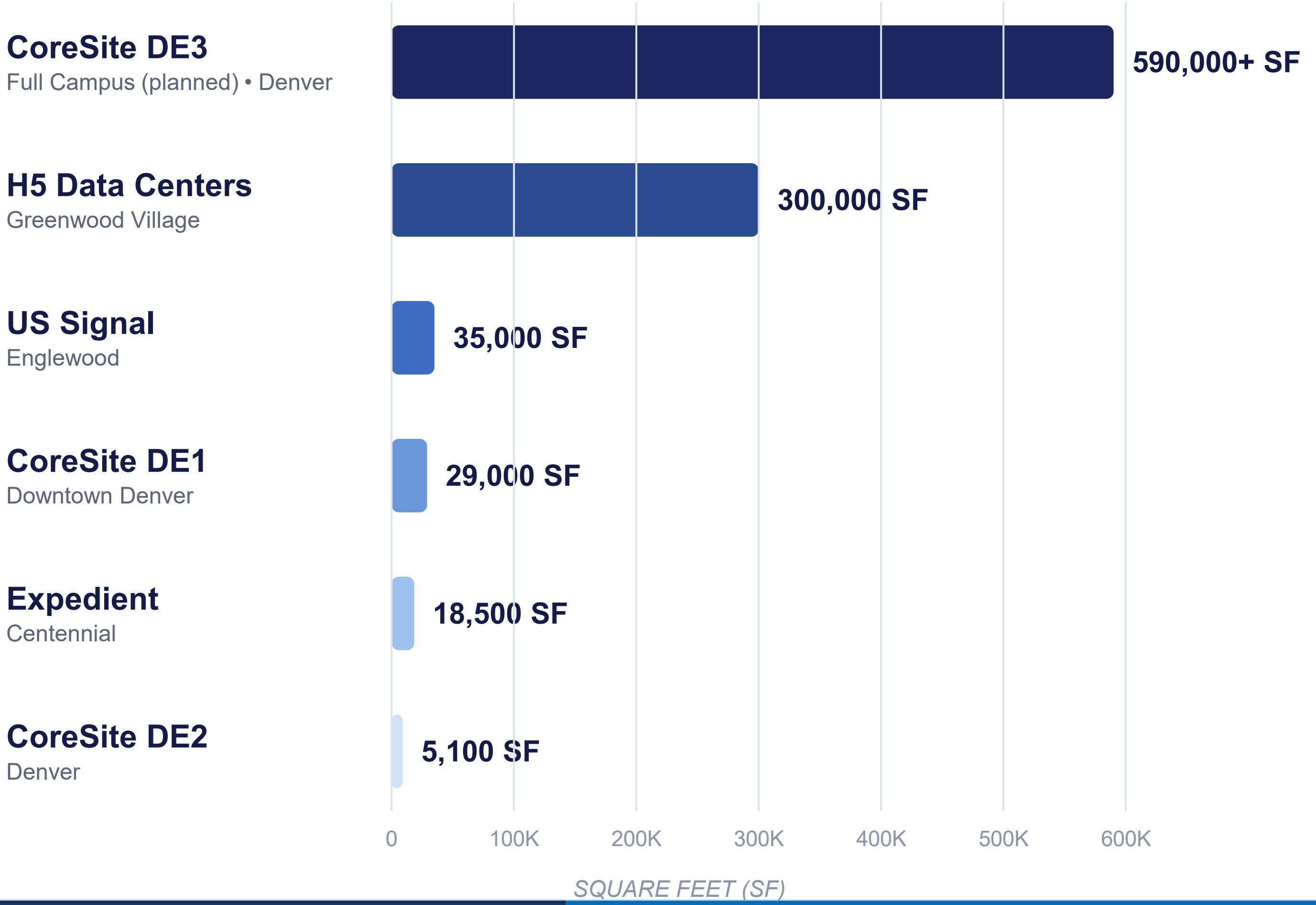
DOWNTOWN DENVER *(Carrier Hotel Cluster)*

100,000+ SF Multiple carrier hotels and colocation sites

AURORA *(Growth Corridor)*

500,000+ SF Emerging large-scale and hyperscale growth

PUBLISHED SQUARE FOOTAGE FOR MAJOR FACILITIES



Source: DataCenterMap.com (Denver Metro Area Inventory) | As of May 2024

Many facilities do not publish square footage.

DENVER METRO DATA CENTERS

MEGAWATT (MW) USAGE OVERVIEW

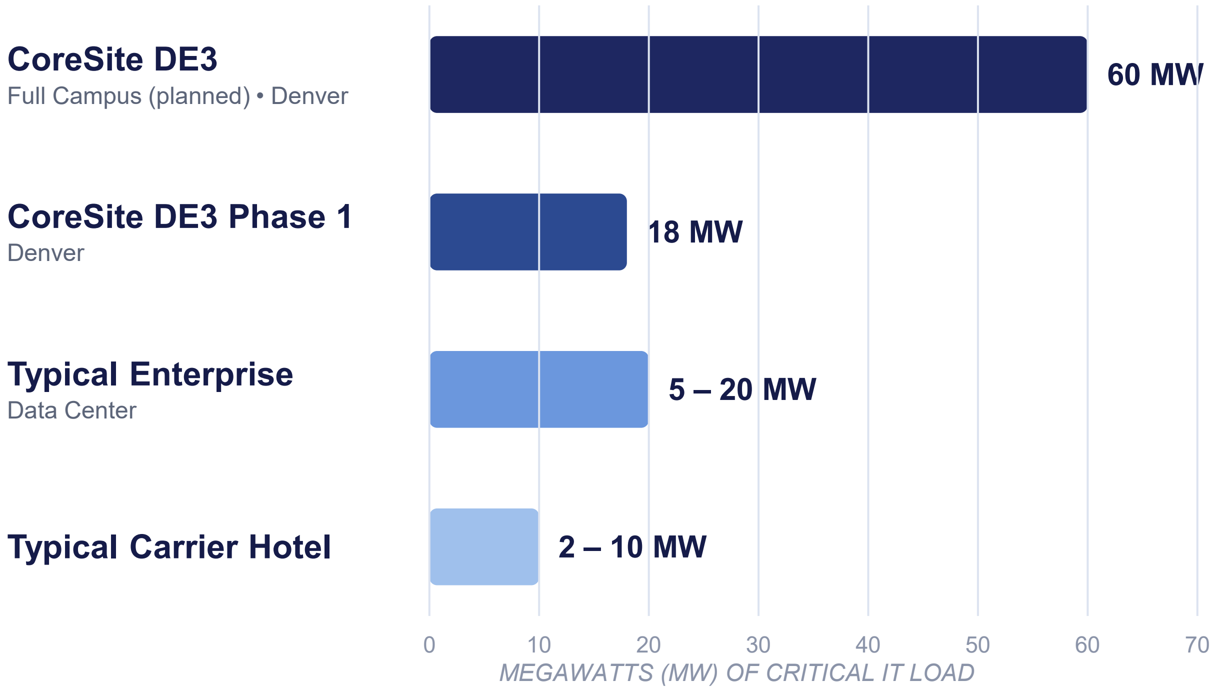
Denver metro has an estimated

150 – 300 MW

OF INSTALLED POWER CAPACITY

supporting critical IT infrastructure

PUBLISHED POWER CAPACITY FOR MAJOR FACILITIES



Source: DataCenterMap.com (Denver Metro Area Inventory) | As of May 2024

Power capacity is rarely published for most data centers.

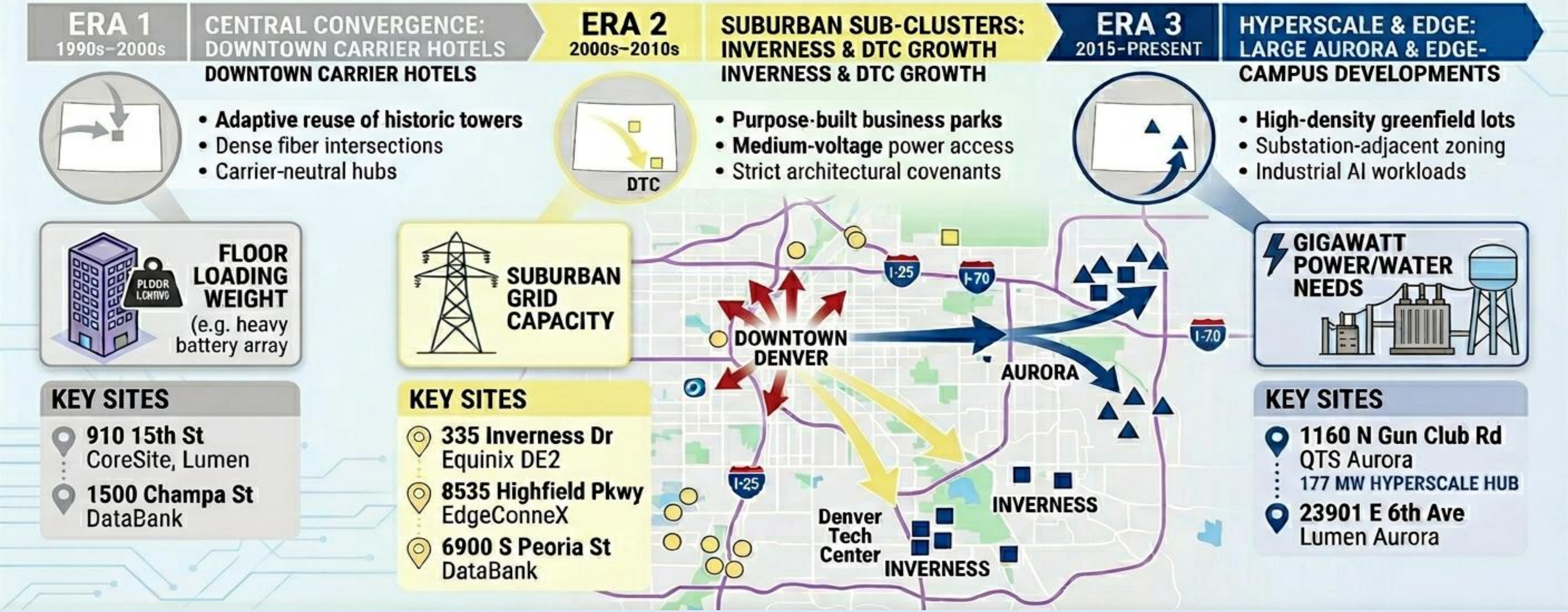
POWER CONSUMPTION PERSPECTIVE

1 MW
powers roughly
750 – 1,000 homes

60 MW campus
≈ electricity demand of
45,000 – 60,000 homes

Future AI campuses
commonly request
100 – 500+ MW sites

COLORADO DATA CENTER MIGRATION: SPATIAL-TEMPORAL ANALYSIS (1990s - PRESENT)



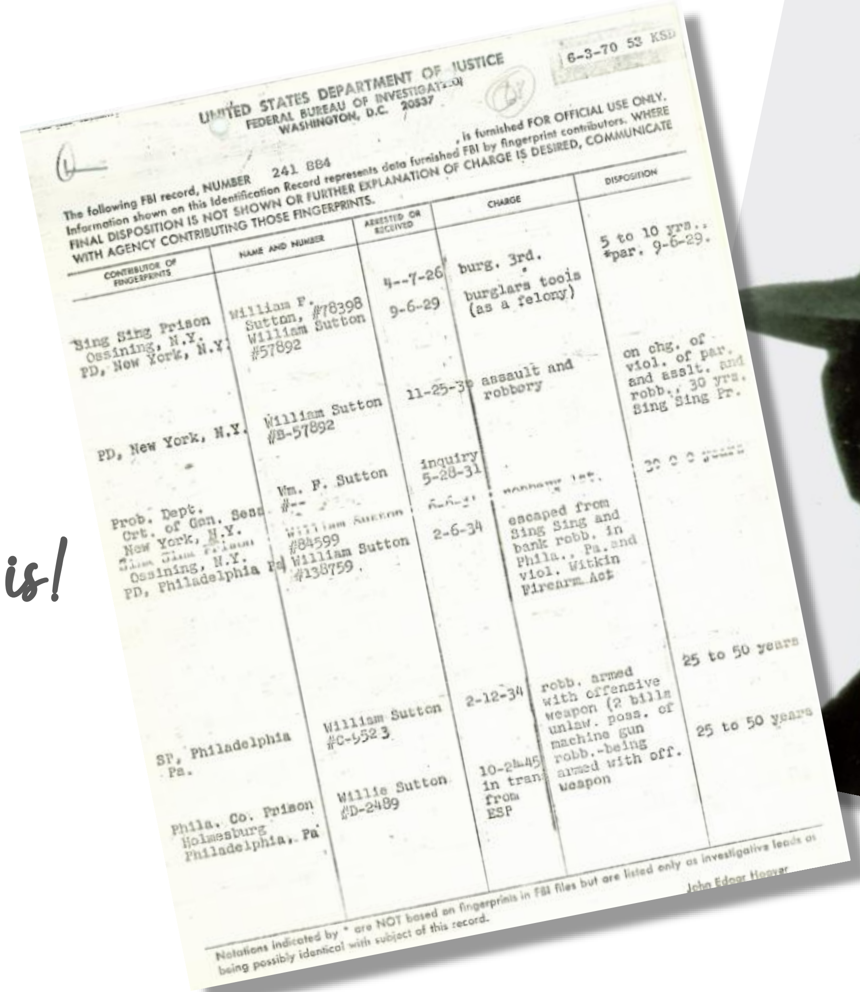
DataCenterMap

Illustrative data attribution by Untranvertited by DataCenterMap

Willie Sutton

Q: Why do you rob banks?

A: That's where the Money is!



UNITED STATES DEPARTMENT OF JUSTICE
FEDERAL BUREAU OF INVESTIGATION
WASHINGTON, D.C. 20537

6-3-70 53 KSD

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CONTRIBUTOR OF FINGERPRINTS	NAME AND NUMBER	ARRESTED OR RECEIVED	CHARGE	DISPOSITION
Sing Sing Prison Ossining, N.Y. PD, New York, N.Y.	William F. Sutton, #78398 William Sutton #57892	4--7-26 9-6-29	burg. 3rd. burglars tools (as a felony)	5 to 10 yrs., *par. 9-6-29.
PD, New York, N.Y.	William Sutton #B-57892	11-25-30	assault and robbery	on chg. of viol. of par. and asslt. and robb., 30 yrs. Sing Sing Pr.
Prob. Dept. Crt. of Gen. Sess. New York, N.Y.	Wm. F. Sutton #-- [illegible]	inquiry 5-28-31 [illegible]	robbery 1st.	30 [illegible] years
[illegible] Ossining, N.Y. PD, Philadelphia Pa	William Sutton #84599 William Sutton #138759	2-6-34	escaped from Sing Sing and bank robb. in Phila., Pa. and viol. Witkin Firearm Act	
SP, Philadelphia Pa.	William Sutton #C-5523	2-12-34	robb. armed with offensive weapon (2 bills) unlaw. poss. of machine gun	25 to 50 years
Phila. Co. Prison Holmesburg Philadelphia, Pa	Willie Sutton #D-2489	10-24-45 in trans from ESP	robb.-being armed with off. weapon	25 to 50 years

Notations indicated by * are NOT based on fingerprints in FBI files but are listed only as investigative leads as being possibly identical with subject of this record.

John Edgar Hoover

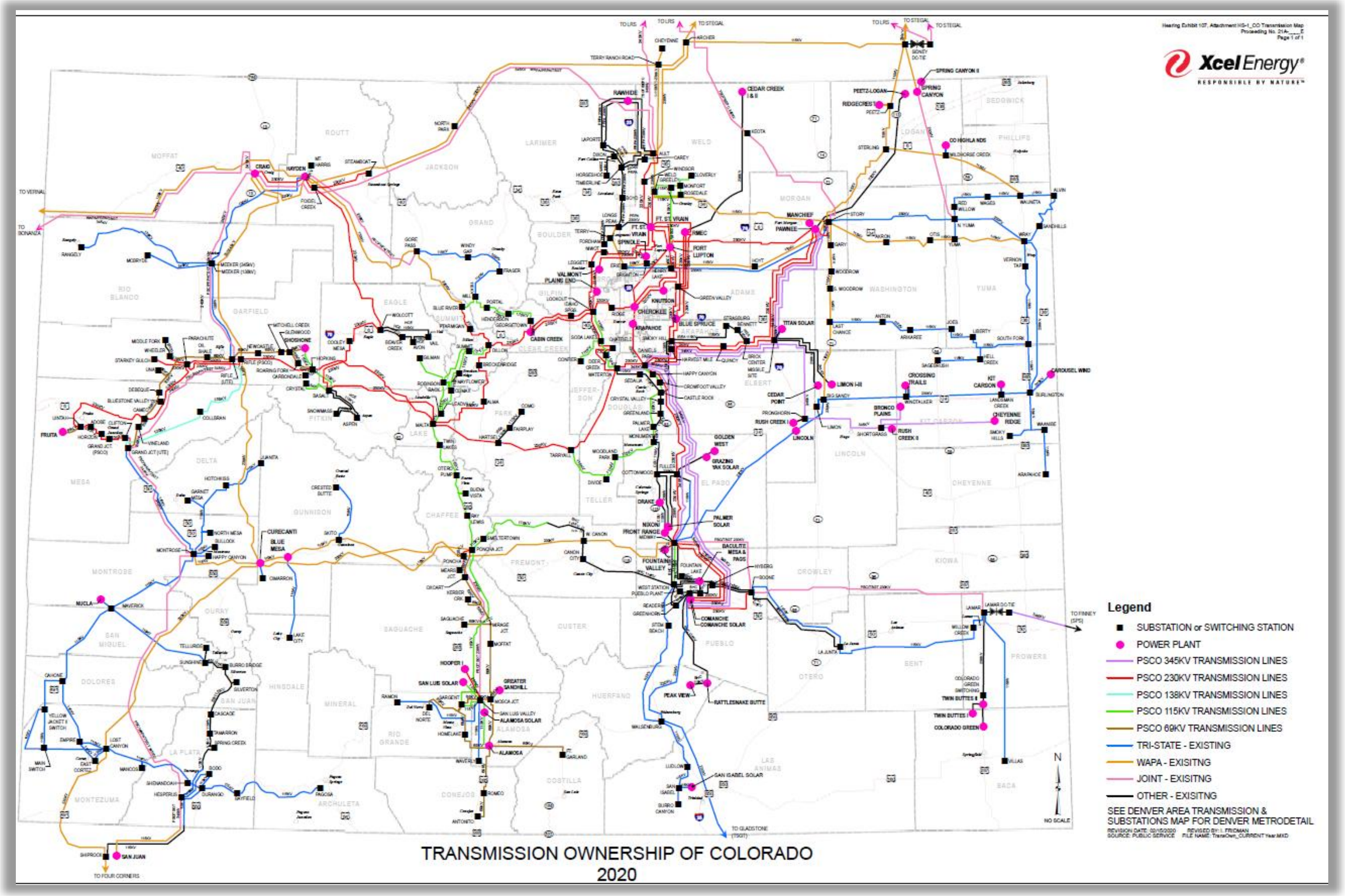
Sutton's Law of Data Center Location

Where are you building Data Centers?

Where the Power Is!

..and Water..

...and telecom...



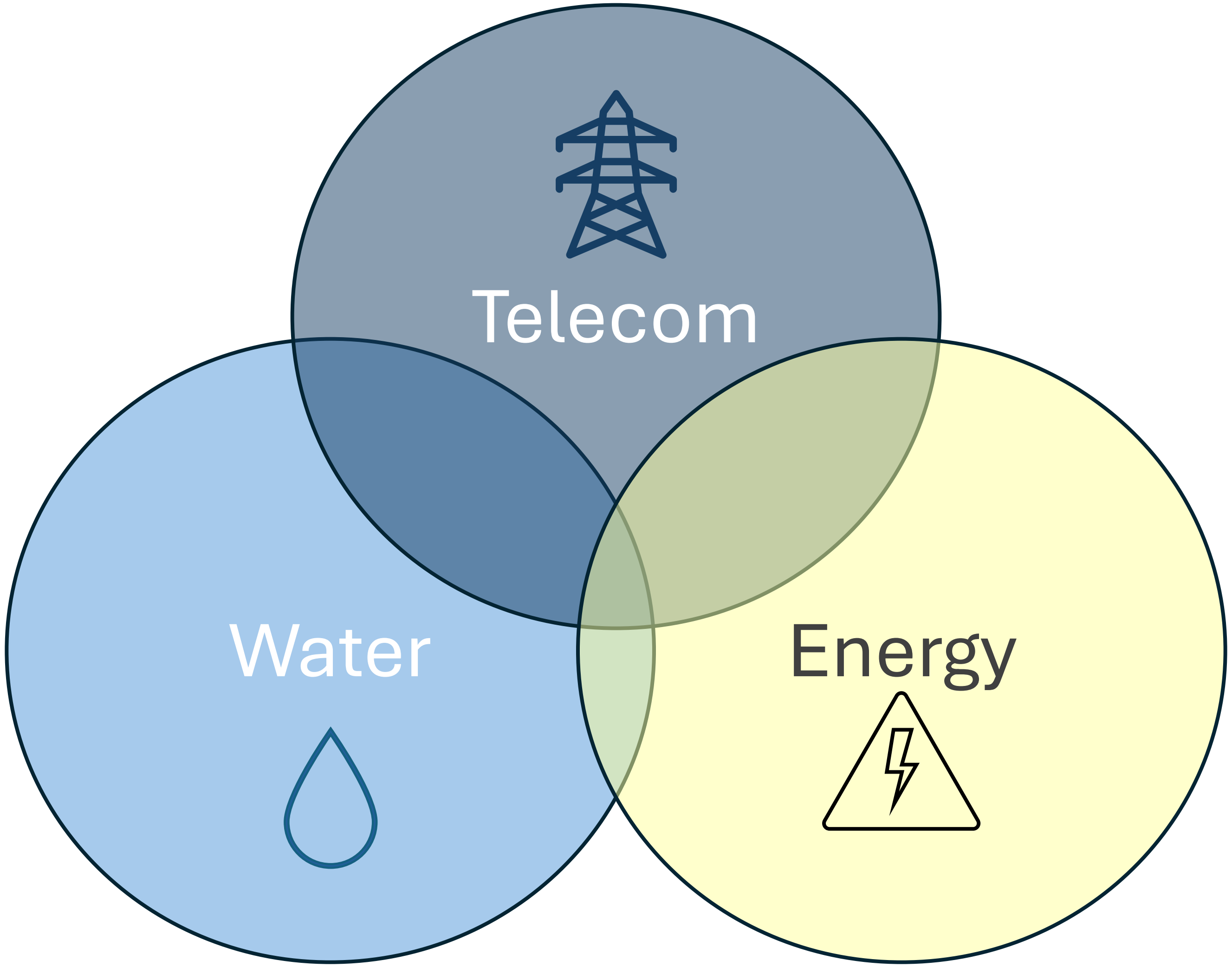
Water – Energy – Communications

Data Centers require a confluence of availability of Energy, Water, and Telecommunications

Each of those elements, in turn, rely on the availability of the other

SIMULTANEOUS INFRASTRUCTURE SCALING

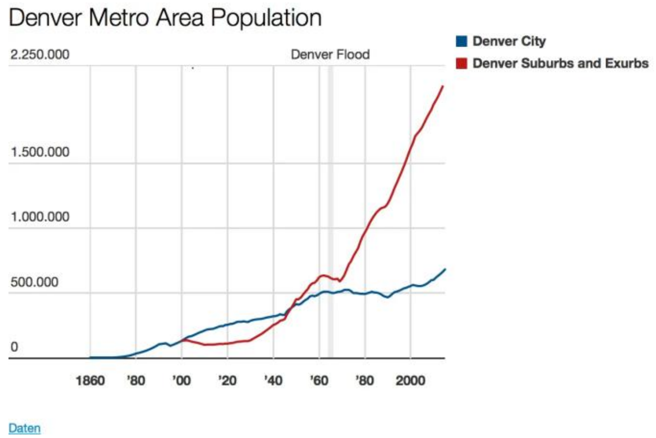
WATER, **POWER**, and **DATA** are structurally inseparable. An escalation in data processing capacity (Telecom) triggers an automatic, lock-stepped expansion in electric grid strain (Power) and resource extraction (Water). A strain on any single resource destabilizes the other two.



Water: Demand vs. Supply

Denver Metro Area population increase ~ 1 million 20 yrs

Colorado’s population increased by ~ 40% since 2000



Seasonal Drought

Year over year warming Temperatures and reduced snowpack

Colorado River Crisis

Energy: Demand vs. Supply

Population Increase

Shift toward battery power (EV's, etc.)

- Not just more people but more people using more electricity

Commercial Growth

SB 19-236

- Required Clean Energy plans
- Accelerated retirement of fossil facilities
- Statutory Emission Reduction

HB 21-1266

- Further expansion of clean energy plans
- Additional CO2 Cuts
- Required reduction in greenhouse gas on Oil and Gas industry

Shuttering of Coal Plants

Transmission infrastructure

- No way to transmit energy if it is available
- Still requires rare earth minerals (copper, etc.)

Data Center Water Uses

Direct Water Usage (Onsite)

Evaporative Cooling

Closed Loop Cooling

Indirect Water Usage (Offsite)

Energy production

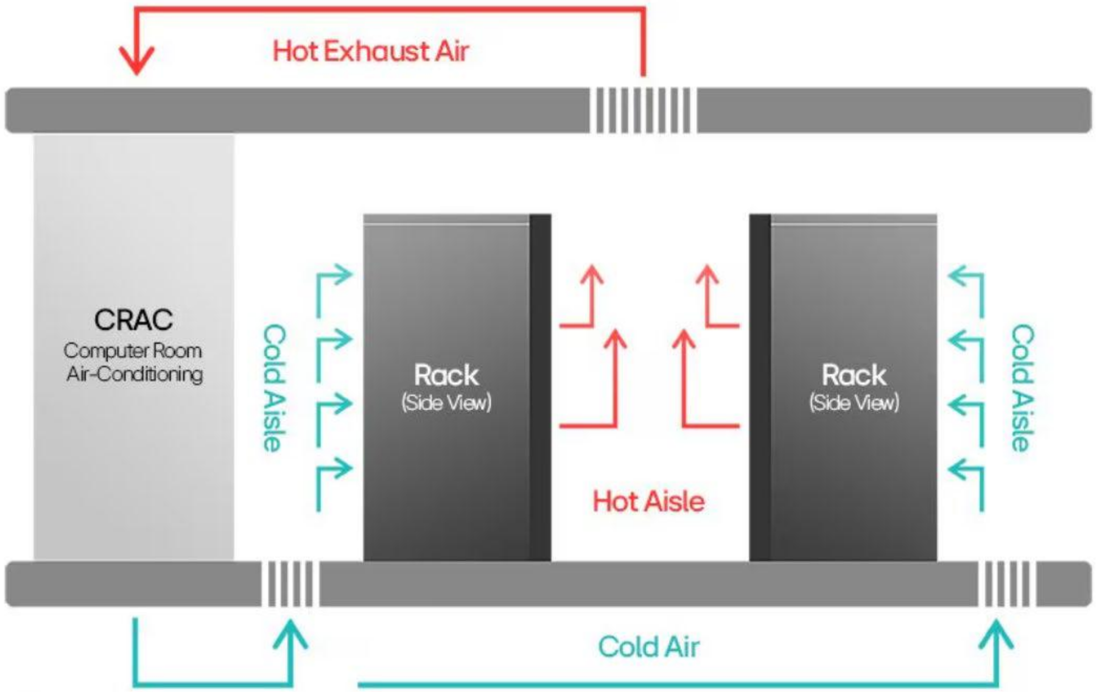
Manufacture / Production of semiconductors, hardware, etc.

Indoor Cooling

Air Cooling

- Similar to traditional air conditioning

- 'Cool' & 'Hot' aisles ushering cool air to server racks and warm air out to exhaust

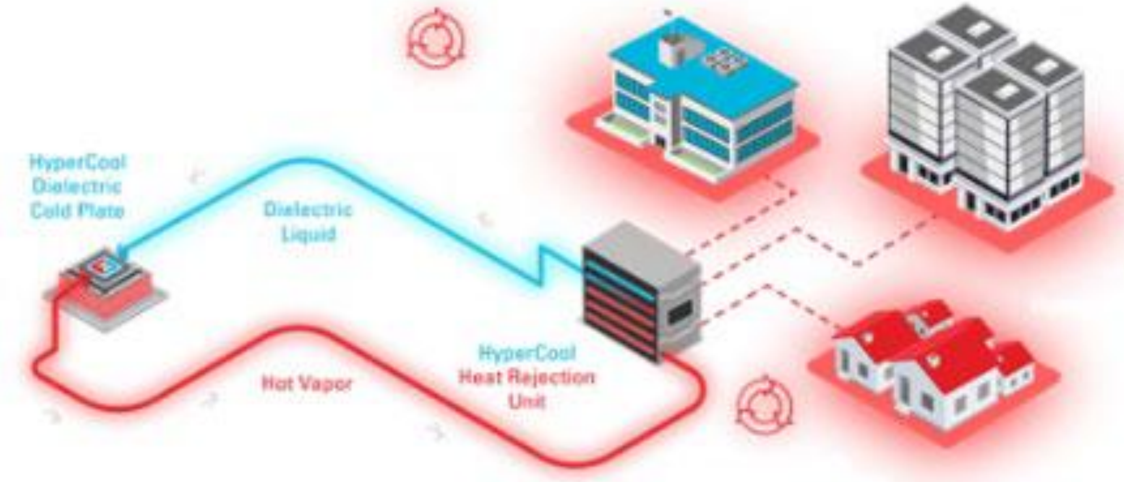


Indoor Cooling

<u>Liquid/Direct to Chip (DTC)</u>

- Chips and Processors are cooled by direct contact with air or water/glycol-filled lines

- Circulated in a look between servers and air-cooled chillers/radiators



Outdoor Cooling

Dry cooling:

More electricity, very low water use

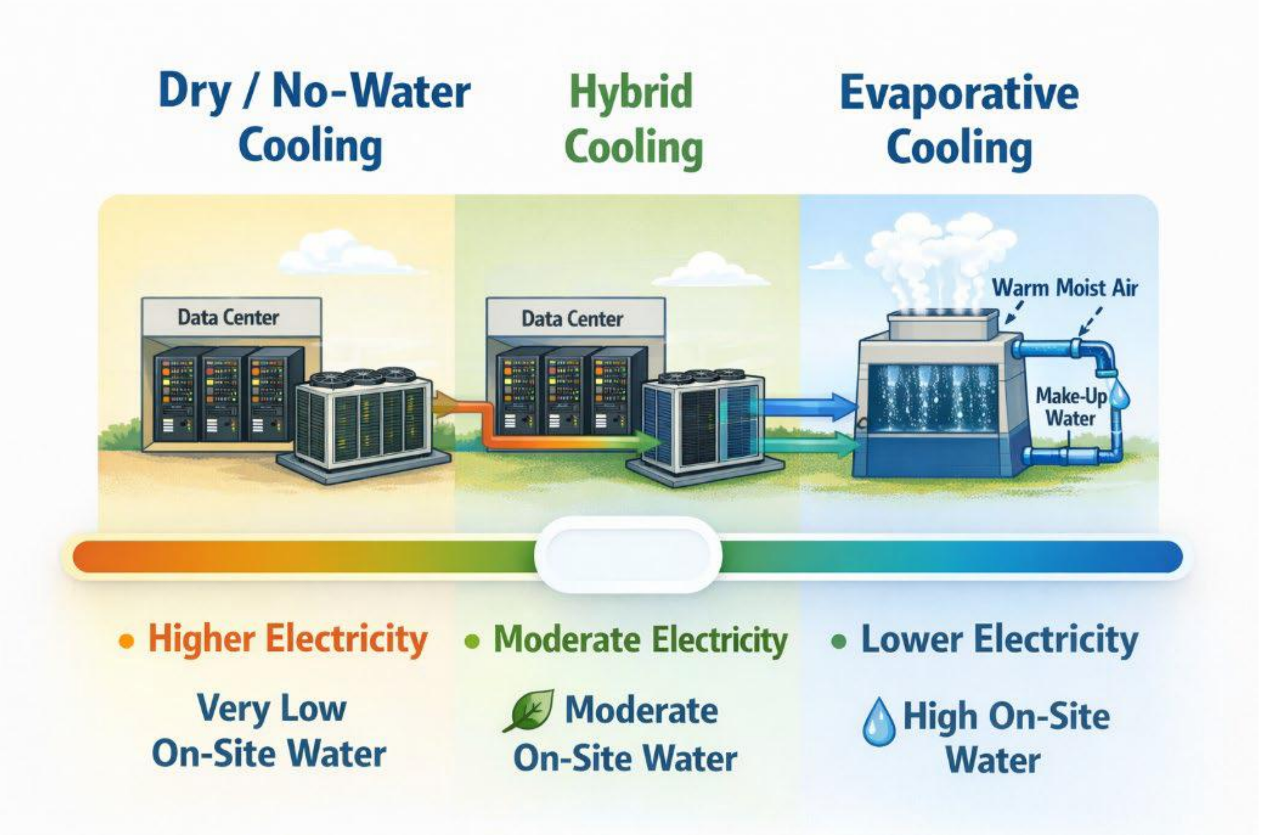
- Closed-loop system carries heat to outdoor radiators/chillers
- One-time system fill with water, no need to replenish

Hybrid: mix of dry cooling and evaporative

- Moderate electricity, moderate water use
- Most dry cooling, switches to evaporative cooling on hot days

Evaporative cooling:

- Less electricity, high water use
- Uses cooling/evaporative towers to cool
- Must continually replenish evaporated water with new water



Outdoor Cooling

- All three outdoor methods can capitalize on “free cooling” when weather permits.

- Free cooling utilizes the cooler outside air temperatures to temporarily take the place of the power intensive chillers/compressors.

- Combined with the relatively dry air, these cooler temperatures in the fall, winter, and spring make the Colorado region appealing to data centers looking to take advantage of lower energy requirements.

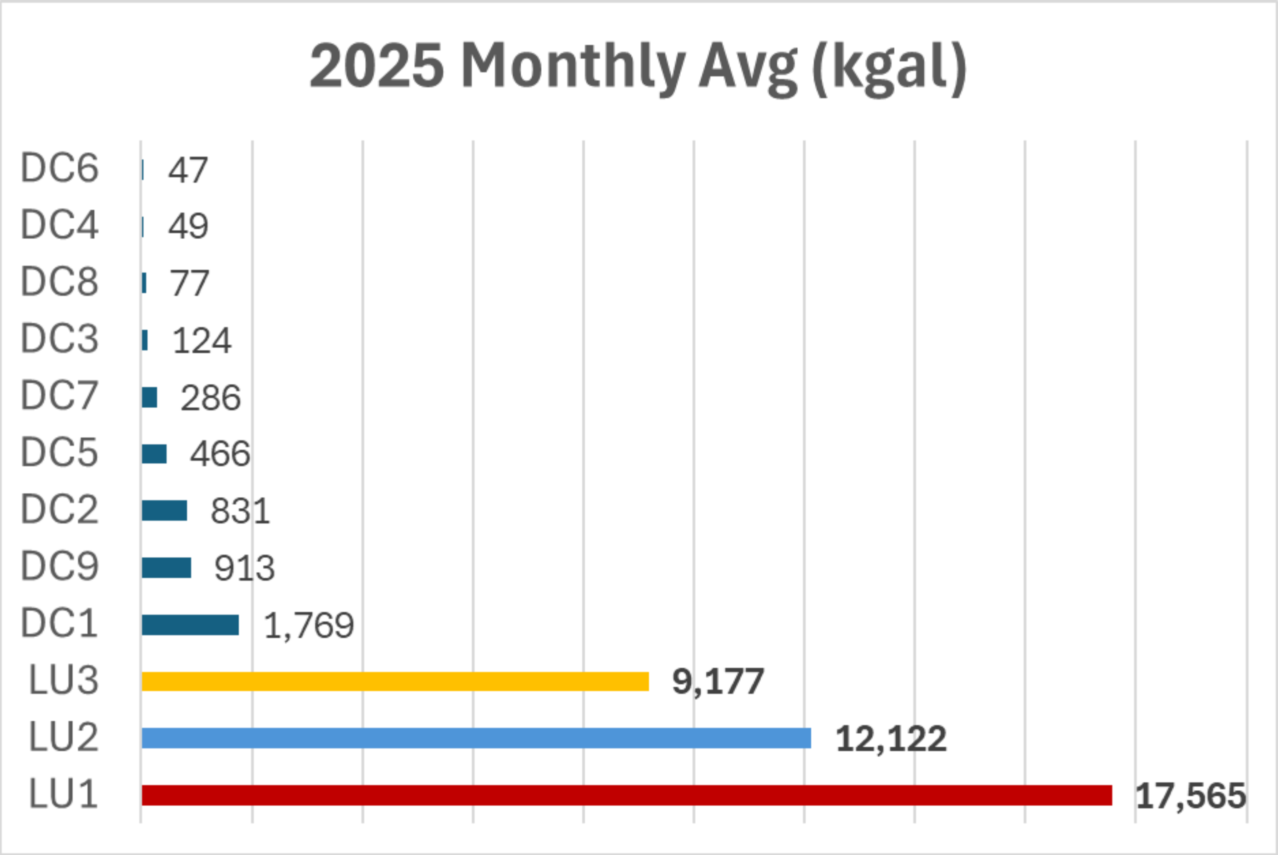
Water Restrictions

Aurora Large Water User Guide

Volumetric Use (Avg gal/acre/day)		Non-Recoverable Use			
		≤25%	26% - 50%	51% - 75%	76% - 100%
	≤600	Allowed - Low Volumetric Use Low Non-Recoverable	Allowed - Low Volumetric Use Low Non-Recoverable	Allowed - Low Volumetric Use/ Moderate Non-Recoverable	Allowed - Low Volumetric Use/ High Non-Recoverable
	601-1,000	Allowed - Low Volumetric Use Low Non-Recoverable	Allowed - Low Volumetric Use Low Non-Recoverable	Allowed - Low Volumetric Use/ Moderate Non-Recoverable	Allowed - Low Volumetric Use/ High Non-Recoverable
	1,001 - 2,000	Allowed - Avg Volumetric Use/ Low Non-Recoverable	Allowed - Avg Volumetric Use/ Low Non-Recoverable	Allowed - Avg Volumetric Use/ Moderate Non-Recoverable	Allowed - Avg Volumetric Use/ High Non-Recoverable
	2,001 - 2,500	Allowed - Avg Volumetric Use/ Low Non-Recoverable	Allowed - Avg Volumetric Use/ Low Non-Recoverable	Allowed - Avg Volumetric Use/ Moderate Non-Recoverable	Allowed Under Exemption Only
	2,501 - 3,000	Allowed - High Volumetric Use/ Low Non-Recoverable	Allowed - High Volumetric Use/ Low Non-Recoverable	Allowed Under Exemption Only	Not Allowed
	3,001 - 3,500	Allowed Under Exemption Only	Allowed Under Exemption Only	Not Allowed	Not Allowed
	3,501+	Allowed Under Exemption Only	Not Allowed	Not Allowed	Not Allowed

Water Use Comparison

Aurora's Large Water Users



Data Center Impacts

JOB CREATION

- **On Site:** Limited given size of structure
- **Adjacent:** Construction; Maintenance, Suppliers

⇄

POWER EXPANSION

Catalyst: Data Centers lay infrastructure for future development

⇄

FINANCIAL

Tax: Opportunity to increase sales and use tax base

Denver

- 1 year Moratorium on approvals for zoning applications, Site Development Plans and Amendments

- Data Center defined as a facility where the primary use is the storage, processing, management and transmission of digital data and/or support for the delivery of cloud computing services

- Does not apply to:
  - Existing Data Centers
  - Previously approved projects
    - CoreSite DE3
  - Telecommunications facilities
- City will study environmental, health, utility, and land use issues

Longmont

- Bans Hyperscale Data Centers in the City
  - 100 MW peak demand or 5% of Platter River Power Authorities generating capacity

- Smaller scale data centers not subject to the ban

- Staff directed to prepare additional regulations for permitted data centers
  - PUE requirements
  - Water limits
  - Cooling, Noise, Lighting standards

Broomfield

- Proposed 18 Month Moratorium on Data Centers
  - Will not accept land use applications or pre-submittal activities for Data Centers
  - Data Center Facility defined at 10MW +
  - Review zoning code, water management, etc.
  - Passed 1st Reading June 2nd
  - 2nd Reading and public hearing is scheduled for July 7th

Woodland Park

- Proposed 12 Month Moratorium
- No submission, acceptance, processing, review, public hearing, approval, or siting of a Data Cetner
- Data Center Defined
  - Computing or data storage facility; or
  - Facility with primary or accessory use is computing/data storage w/ demand 1MW+
  - Any computing/data storage facility with significant impact on water
- Passed 1st Reading June 18th
- Public Hearing July 16th

County Regulation

County	Term	Details
Jefferson County	5/19 - 10 Month Moratorium through 3/7/2027	No new data center unless 1,500 ft setback / PUD process
Boulder County	Public hearing set for 7/2 6 month Moratorium	Planning staff directed to amend land use code
Larimer County	6 Month Moratorium through 8/25	Does not stop existing projects; Community outreach; Study impacts
Saguache County	5/5 – Approved Emergency 6 Mont Moratorium	Enacted in response to San Luis Valley Rual Electric receiving inquiries from rural data center developers
Archuleta County	6/16 – Approved Emergency 6 month Moratorium	Notes impacts of Data Centers; No mention of study or direction to staff

Weld County

WELD COUNTY, CO

- Updated Code for Data Centers April 2026 – 2026-01

- Data Cener - A building or buildings used to house information technology or telecommunications equipment with which digital information is processed, transferred, and/or stored, with no limitation on peak electrical load.

- Requires a “Will Serve” letter for electricity and proof of water in compliance with state requirements under C.R.S. 29-20-301.

- Establishes a dBC noise limit of 65 decibels for data centers at the property line.

- Redefines Data Centers as a Conditional Use
    - I1 Industrial – Use by Special Review
    - I2-3 Industrial – Site Plan Review

- Prohibits Data Centers in Agricultural Zones

Moratorium – Drafting Points

Duration

Relatively shorter is probably safer

Scope

All Data Centers?
Certain Size?
In process applications?
Amendments to in process applications?

Statutory Authority

§31-23-301 et seq., C.R.S.
Home Rule – Article XX
Local Code

Clear Purpose

Study Community Impact
Water Supply
Energy Damand
Health Impacts
Land use

State Legislation

SB 26-102 – Large Load Data Centers

- Impacted Data Centers with new loads >30MW or Combined >60MW
- Directed PUC to determine if data centers could match electric consumption with clean sources
- DOLA develop statewide model code
- Development site assessments for local review
- Community Outreach
- Senate Transportation & Energy Committee postponed indefinitely 5/11

HB 26-1030 –Data Center Utility Modernization

- Created authority in Office of Economic Development to administer statewide incentive program
- Proposed state sales and use tax exemptions for certified data centers
  - 100% Rebate for 20 years
  - Target projects >250 million investment
- Allowed regulated electric utilities to submit a targeted resource acquisition application to the commission to propose methods of meeting emerging large-load customer needs
- Specifies how a utility may finance resource and infrastructure needs in connection with emerging large-load customers
- House Energy & Environment postponed indefinitely 5/7

THANK YOU!

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Data Center Waste Heat Recovery

PAS QuickNotes 117

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The recent surge in artificial intelligence (AI) use has driven a similar increase in data center development (/publications/document/9318086/). In most cases, data centers are resource drains that negatively impact neighboring communities. An average data center uses between four and five times the energy of a similar-sized office building, and its servers generate so much heat that they need year-round, constant cooling. This waste heat can become a valuable resource (https://www.datacenterknowledge.com/cooling/how-to-put-the-heat-from-data-centers-to-good-use), however, when it is used instead of fossil fuels to heat nearby buildings. A growing number of projects in the U.S. (https://www.smithgroup.com/perspectives/2022/data-centers-are-a-hot-market-dont-waste-the-heat) and around the world are now using data centers as heat sources for nearby buildings.

Background

The waste heat generated by increasing numbers of large U.S. data centers is a valuable resource that can be used to heat nearby residences and businesses, offsetting fossil fuel use. Credit Gerville/Getty Images.

Data centers are responsible for 4.4 percent (https://escholarship.org/uc/item/32d6m0d1) of U.S. electricity use. That number is expected to double by 2030 (https://www.pewresearch.org/short-reads/2025/10/24/what-we-know-about-energy-use-at-us-data-centers-amid-the-ai-boom/) with the AI boom. Cooling comprises 40 percent (https://www.congress.gov/crs-product/R48646) of data center operating expenses. Globally, the energy represented by the annual waste heat (https://doi.org/10.1016/j.apenergy.2025.125489) from data centers roughly equals the natural gas use of New York State (https://www.eia.gov/dnav/ng/ng_sum_snd_a_EPG0_VC0_Mmcf_a.htm).

Heat recovery projects have shown that these facilities can ease the energy burden of nearby structures, offering cost savings for residents, businesses, and institutions. Offsetting fossil fuel use with data center waste heat also reduces carbon emissions, mitigates the urban heat island effec (https://doi.org/10.1080/01944363.2023.2259358)t, and improves regional air quality — especially if the data center is powered by renewable energy (/planning/2025/dec/is-using-green-energy-to-power-data-centers-a-solution-to-community-concerns/).

This waste heat has real monetary value, and recovering it makes financial sense. Studies have found internal rates of return between 16 percent (https://doi.org/10.1016/j.spc.2022.02.006) and 43 percent (https://doi.org/10.1115/1.4067444) for heat recovery projects in the United States. One study evaluating the use of geothermal wellfields to store summer data center waste heat for winter use calculated an 11.9 percent (https://doi.org/10.1016/j.enbuild.2019.01.012) internal rate of return.

Waste Heat Recovery Basics

In a data center waste heat recovery system, heat from the data center is captured from the air or water used to cool its servers, either through a heat recovery chiller (https://californiaeda.com/benefits-of-heat-recovery-chillers-as-they-contribute-to-decarbonization-and-building-electrification/) or heat exchangers, and sent to a nearby heat load (user of heat) through connecting infrastructure, such as a district energy system (https://www.energy.gov/sites/default/files/2021/03/f83/District_Energy_Fact_Sheet.pdf). In the U.S., such systems are usually found on institutional campuses and in the downtown districts of legacy cities.

The best candidates for heat recovery are larger data centers, with their greater generation of waste heat, and urban data centers, with their proximity to residential and commercial heat loads. Though designing new data centers to be heat-sharing resources is most efficient, existing data centers can often be retrofitted for waste heat recovery. In rural areas, data center waste heat can be sent to nearby agriculture (https://www.ceagworld.com/greenhouse-produce/can-data-centers-power-the-next-phase-of-cea-growth/) or aquaculture (https://datacentremagazine.com/news/how-can-a-green-mountain-data-centre-support-a-trout-farm) facilities.

Heat recovery projects are not without obstacles. Large-scale data centers in urban and suburban areas present livability, walkability, and noise concerns; electrical infrastructure usually requires upgrades; and new physical infrastructure may be needed to connect a data center to its nearby heat load. Private data center operators, utilities, local government, developers, and end users of heat all need to work together to bring a project to fruition. Planners can play a key role in coordinating this process.

Waste Heat Recovery Project Examples

In 2010, the U.S. National Renewable Energy Laboratory (NREL) built a 220,000 square-foot lab and office building heated entirely by a data center (https://www.csemag.com/recycling-101-waste-heat-recovery/) in Golden, Colorado. Since then, heat recovery technology has become standardized (https://www.opencompute.org/documents/2025-03-18-ocp-heatreuse-wp-referencedesigns-v0-1-pdf).

Many Scandinavian cities have legacy district heating networks, making them good candidates for data center waste heat recovery. In Sweden, Stockholm's Open District Heating (https://eu-mayors.ec.europa.eu/sites/default/files/2023-10/2023_CoMo_CaseStudy_Stockholm_EN.pdf) initiative partners with 20 data centers and other heat sources to meet the heating needs of 30,000 apartments each year. Across the Baltic, the Google data center in Hamina, Finland (https://datacentremagazine.com/data-centres/google-data-centres-excess-heat-to-warm-finnish-homes), provides enough waste heat to meet 80 percent of that small city's needs. Tallaght (https://youtu.be/utycKCBnYbo?si=7H4Wb8x0ceiY67H5), a suburb of Dublin, Ireland, constructed a new heat recovery system and district heating network that sends waste heat from an Amazon data center to local municipal buildings, the Technical University of Dublin, and 131 affordable apartments, offsetting 1,400 tons of carbon emissions (https://reasonstobecheerful.world/data-center-heat-green-energy/) annually. And in the industrial district of Rjukan, Norway (https://greenmountain.no/turning-waste-heat-into-value/), the world's largest land-based trout farm was designed and built to use waste heat from a nearby data center.

In the U.S., Amazon's Seattle Headquarters (https://www.aboutamazon.com/news/sustainability/the-super-efficient-heat-source-hidden-below-amazons-seattle-headquarters)— including the high-rise Doppler Building — is heated entirely with waste heat from a nearby carrier hotel (https://www.aeanet.org/what-is-a-carrier-hotel/) with multiple data center tenants. In San Jose, California (https://www.prnewswire.com/news-releases/pge-begins-energy-infrastructure-upgrades-to-bring-san-joses-net-zero-community-to-life-302424740.html), developer Westbank is working with utility PG&E to create a district energy system linking three data centers to 4,000 apartments in the downtown district.

Planning Tools for Waste Heat Recovery

Data center waste heat represents an underused but increasingly valuable local resource. Planners can explore the possibilities for their communities through the following approaches:

- Start a conversation with utilities about the potential benefits of incentivizing the development of heat-sharing infrastructure. Ask about areas or projects for which district heating (https://www.eversource.com/residential/save-money-energy/clean-energy-options/geothermal-energy/geothermal-pilot-framingham) might be feasible.

- Create a GIS map of waste heat sources (https://www.seai.ie/data-and-insights/district-heating-map) and identify their proximity to heat loads or district heating candidate areas.
- Use energy benchmarking program (https://www.epa.gov/sites/default/files/2021-02/documents/benchmarking_building_performance_standards_section1.pdf) data where available to identify areas with higher heating demand density (https://www.sciencedirect.com/science/article/pii/S1364032120302781).
- Identify and map environmental justice communities for priority heat access.
- Talk with data center developers about incorporating waste heat recovery systems as pilots or future projects.

To support implementation, consider the following regulatory tools:

- Offer zoning incentives (/publications/document/9310036/), such as relaxed building size or height limits, for data centers that share at least 10 percent of their waste heat.
- Add data center heat recovery goals to regional climate action plans, comprehensive plans, or sustainability and energy plans.
- Set measurable goals. For example, Germany's Energy Efficiency Act (https://www.orbitalindustries.com/posts/wasted-power-data-center-regulation-in-the-eu) requires new data centers to recover 20 percent of waste heat by 2028.
- Develop community benefit agreements (/publications/document/9007654/) for projects that prioritize heat sharing.
- Offer expedited permitting for projects that provide heat sharing or other community benefits.

Conclusions

Data centers represent a potential community resource: their waste heat can be recovered to meet local heating needs. The technology is robust (https://www.powermag.com/shared-power-building-data-centers-that-serve-everyone/), and the economics are favorable. By creating the right conditions for collaboration, planners can play a key role in transforming data centers into community partners in climate action for more sustainable development.

This PAS QuickNotes *was prepared by Timothy Spencer, an energy and resilience planner.*

FURTHER READING

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Town Council Work Session Communication

Agenda Date: July 13, 2026

Subject: Consideration for Data Center Development

Attachments: 1. Data Center Presentation

Presented by: Sarah Crosthwaite, Economic Development Director
Jennifer Simmons, Planning and Development Director

Work Session Item Description:

The following memorandum provides an overview of data centers, including their scale, utility demands, land use considerations, and potential economic impacts and partnership opportunities. The purpose of this memo is to provide Town Council with information and to solicit feedback on the direction Council would like staff to take regarding the development of a policy for the attraction and development of data centers within the Town.

I. DEFINING DATA CENTERS

- Specialized facilities that house computer systems and digital infrastructure such as servers, storage systems, and networking equipment.
- Designed to store, process, and distribute large amounts of data securely and efficiently.
- Operate 24/7 with built-in redundancy (backup power, cooling systems, security) to ensure reliability.
- Range from enterprise and small facilities (boutique/local providers) to large-scale "hyperscale" facilities/campuses operated by major technology companies.

II. DATA CENTER TYPES & EXAMPLES

Boutique Colorado Data Center Examples:

- **CoreSite – Downtown Denver:** 157,000 SF facility; campus expected to expand incrementally; 5–10 MW *(not verified, estimated)*. Moderate power demand; designed for redundancy rather than massive load. Supports the tech ecosystem rather than acting as a major tax generator.
- **Iron Mountain DEN-1 – Downtown Denver (industrial corridor along I-70):** 180,000 sq. ft. facility (6-acre campus); 14.4 MW. Uses renewable energy sources. Creates strong tax revenue with relatively

low service demand (i.e. Police, Fire, School impact).

- **Colorado Colocation (Darwin Data Center) – Lakewood:** 5,000 SF facility; campus expected to expand incrementally; 2 MW. Minimal power strain; serves regional companies and IT providers. Provides modest but stable tax revenue.
- **Earthnet Data Center (Massive Networks) – Boulder:** 24,686 SF (shared building with other users); 1–5 MW range. Very low power strain; serves startups, research, and regional businesses. Limited fiscal impact but important for the local tech ecosystem.

Hyperscale U.S. Data Center Examples:

- **Amazon Web Services – Northern Virginia (Ashburn "Data Center Alley"):** One of the largest concentrations of data centers in the world, supporting AWS cloud infrastructure. Approximately 300 data centers distributed throughout the region; 3,900 MW.
- **Microsoft – Quincy, Washington:** Campus leveraging access to affordable hydropower from the Columbia River. 270-acre campus; 622 MW.
- **Google – Council Bluffs, Iowa:** Campus supporting Google Cloud, Search, and YouTube operations; expected to expand incrementally. 2.9 million SF campus (approximately 66 acres); 40–90 MW per individual facility.
- **Meta – Altoona, Iowa:** Facility supporting Facebook, Instagram, and WhatsApp platforms. 5+ million SF facility (approximately 114 acres); 1,400 MW.

Site Selection Factors for Hyperscale Data Centers:

- As of 2026, Colorado does not have any operational hyperscale data centers. While the state has attracted smaller enterprise and colocation facilities, it has generally not been competitive for hyperscale investment due to a combination of factors, including the absence of targeted state incentives, a lack of a coordinated statewide data center attraction strategy, regulatory and permitting considerations, and constraints related to available power infrastructure and electrical capacity.
- Requires hundreds to thousands of acres of land, typically contiguous.
- Built in phases over many years.
- Extremely high utility demand; 24/7 operations (different from a home that has peak vs. non-peak hours of consumption).
- Strategic location decisions based on:
    - Power availability and cost including ability to scale up.
    - Access to fiber connectivity and reliability.
    - Climate (for cooling efficiency).
    - Robust tax and policy environment (local, regional, and state incentives).

III. DATA CENTER UTILITY IMPACTS

Energy Scale Difference between Boutique and Hyperscale:

- Boutique: 1–15 MW (power)
- Hyperscale: 100–1,000+ MW (power)

Energy Efficiency:

Data centers require large amounts of reliable, continuous power to operate efficiently. Existing power providers in CO are unable to meet those demands in the near-term without significantly investing in expanding their infrastructure.

Power providers such as Xcel Energy and United Power have created ‘Large Load’ request processes that put the burden on large power developers/applicants to fund the studies and infrastructure upgrades required to meet their demand. These processes have a goal to ensure residents and existing power users are not affected nor impacted from a rate perspective or access to power on a large load user coming onto the grid. PVREA does not have a ‘Large Load’ request process.

Data Centers are increasingly located near wind and solar farms. This strategy helps absorb excess renewable energy that might otherwise be wasted. Data centers can utilize this surplus power, improving overall energy efficiency and reducing renewable energy waste.

Case Study – Google Campus, Pine Island, Minnesota (1,900 MW): In partnership with Xcel Energy, Google is developing a clean energy data center campus designed to be carbon free. It includes:

- 200 MW of solar power
- 1,400 MW of wind energy
- 300 MW iron air battery system

Waste Heat Recovery:

Waste heat recovery means data centers can capture excess heat generated by servers and repurpose it for beneficial uses, improving overall energy efficiency and reducing wasted energy. Depending on location and available infrastructure, recovered waste heat can be used to heat nearby commercial buildings, residential developments, district energy systems, greenhouses, or industrial facilities, reducing overall energy demand.

Municipalities can encourage or require waste heat recovery through development standards, building codes, or development agreements where appropriate and economically feasible.

Case Study – U.S. National Renewable Energy Laboratory (NREL), Golden, Colorado: Since 2010, NREL has utilized waste heat generated from an on-site data center to heat its laboratory and office building. The project includes:

- An on-site data center where the heat it generates is used to heat the remainder of the building
- Waste heat recovery used to heat a 220,000-square-foot laboratory and office facility
- Successful operation since 2010, demonstrating the feasibility of capturing and reusing excess heat. A model that has helped advance broader adoption of waste heat recovery technologies in data

center design

***Power Demand Equivalency – Context for Johnstown:**

Total Johnstown Housing Units: 8,097 (SFH & Multi); estimated overall energy consumption of 26 MW (during peak).

Power Level	Equivalent Homes (2,000 sq. ft. home approx.)	Scale Reference
1 MW	~309 homes	
10 MW	~3,086 homes	Comparable to a small town
50 MW	~15,432 homes	Comparable to a mid-size city (ex. Raleigh, NC)
100 MW	~30,863 homes	
1,000 MW (1 GW)	~308,632 homes	Comparable to a principal city (ex. Los Angeles, CA)

Water Demand & Cooling Technology:

Data center cooling systems are becoming more advanced and are designed to reduce both energy and water use over time. Many modern facilities utilize several water efficient cooling systems. Below is a general description of several of the more common cooling systems.

- **Air Cooling:** One of the most common and traditional cooling methods used in data centers. This system uses air conditioning units, vents, and ducts to remove heat generated by servers and IT equipment. Cool air is circulated through server rooms while hot air is exhausted away from the equipment. This process is not efficient or effective for data centers utilizing large amounts of electricity.
- **Open-Loop Cooling:** Uses water evaporation to cool IT rooms and equipment. Water is circulated through cooling towers where heat is released through evaporation into the atmosphere. This process is similar to evaporative cooling methods used in agriculture and industrial operations. It is highly effective for removing heat but is highly water intensive.
- **Closed-Loop Cooling:** Continuously recycles and reuses water instead of discharging it after one use. Heated water is cooled through a cooling tower or heat exchanger and then recirculated back through the system. This process can reduce water waste and can be supplemented by incorporating recycled wastewater, capturing rainwater, and non-potable water sources.
- **Direct-to-Chip Cooling:** Delivers liquid coolant directly to GPUs and CPUs through tubes or cooling plates. The liquid absorbs heat at the source before circulating to a heat exchanger. Because direct-to-chip cooling systems use liquid coolants, operators select non-corrosive, electrically non-conductive fluids and incorporate leak detection sensors, high-quality seals, and preventative

monitoring to minimize the risk of leaks. Cooling systems must also comply with environmental and safety regulations to protect personnel, equipment, and the surrounding environment. This process is highly efficient in delivering coolant where needed, comparable to drip irrigation in agriculture. However, this is a costly system and requires specialized infrastructure and maintenance.

***Water Cooling Technology Ranking:**

Cooling System	**Relative Water Use**	**Relative Energy Intensity**	**Efficiency Considerations**
Air Cooling	Lowest	Highest	Requires little to no process water. Not efficient from an energy perspective, requires higher energy demand to cool facility.
Closed-Loop	Low	Low	Continuously recycles and reuses water instead of discharging it after one use. More energy efficient than air cooling. Some makeup water may be needed.
Direct-to-Chip	Moderate-Low	Lowest	Delivers liquid coolant to GPUs and CPUs through tubes or cooling plates. The liquid absorbs the heat efficiently. The liquid must be disposed of properly and building these types of data centers are very costly and require specialized infrastructure and maintenance. Small amounts of makeup water may be needed.
Open-Loop	Highest	Moderate	Uses water evaporation to remove heat from IT equipment. Water is circulated through cooling towers, where heat is released into the atmosphere through evaporation. Offers good energy efficiency but has the highest water consumption due to evaporation and continuous replacement of new water.

***Disclaimer:** The estimates and equivalency comparisons in the previous tables are provided for illustrative purposes only and are based on publicly available research and generalized assumptions. They are intended to provide context for the relative scale of potential energy use and cooling technology efficiency. They should not be interpreted as definitive, site-specific, or guaranteed values. Actual resource consumption varies widely based on factors such as facility size, technology, operations, cooling systems, climate, and efficiency. The table should not be relied upon as a precise representation of the energy or water-cooling technology efficiency of any proposed data center in Johnstown.

IV. FISCAL IMPACT & EMPLOYMENT

Tax revenue will depend on the size of the facility. Boutique facilities can provide minimal to moderate property and personal business property tax revenue while hyperscale facilities generate high tax revenue. Both project types often request incentives from local and state partners, with hyperscale projects being fully reliant (incentive driven) on property and sales tax rebates and waiver of fees.

Fiscal Pros:

- **Strong Property Tax Base:** Data centers often represent high capital investment, leading to significant property tax revenues due to the value of the building and infrastructure.
- **Personal Property Tax Revenue:** Equipment housed within data centers (servers, hardware) can generate substantial personal property tax revenues, depending on state law and depreciation schedules.
- **Minimal Service Demand:** Data centers typically require limited municipal services (e.g., schools, public safety, parks), resulting in a favorable cost-to-revenue ratio.

Fiscal Cons:

- **Incentive Sensitivity:** Data center projects often seek tax incentives or abatements, which can reduce near-term fiscal benefits but, in the long term, do provide a revenue stream.
- **Depreciation of Equipment:** Personal property (PP) tax revenues may decline over time as equipment depreciates. However, as equipment is replaced with new assets, those assets are placed on new depreciation schedules, generating additional personal property tax revenues.
- **Limited Multiplier Effect:** Compared to other commercial or industrial uses, data centers generate less secondary economic activity (e.g., retail, hospitality).

Employment Impact:

Facilities typically have low employment density, meaning they generate relatively few permanent jobs compared to the amount of land and infrastructure they use. In the regional context, unemployment rates are currently 4.8% in Weld County and 4.2% in Larimer County, both of which include individuals who are not actively participating in the workforce. This suggests that, overall, most individuals who are able and willing to work are already employed in a relatively tight labor market. Within this environment, attracting data centers is often viewed as a strategic economic development approach because they do not significantly compete for the already limited local talent pool that other industries rely on for hiring and retention.

In Johnstown specifically, the local labor force is 12,284 people, which grew by 8.35% from 2024 to 2025. The Town’s unemployment rate is approximately 4%, which is 0.3% below the national average. Taken together, these indicators reflect a growing but still competitive labor market, where job-creating industries must be considered alongside their ability to align with available workforce capacity.

Employment Pros:

- **High-Wage Technical Jobs (Long-term):** Positions in IT, engineering, and facility management tend to be well-paid.
- **Construction Jobs (Short-Term):** Development phases can generate significant temporary employment.

Employment Cons:

- **Limited Permanent Employment:** Once operational, data centers typically employ relatively few people per square foot compared to other land uses.
- **Specialized Workforce Needs:** Jobs may require highly specialized skills, which may not align with the existing local workforce without targeted training programs.

V. INCENTIVES CASE STUDY – COLORADO

The following is a ***fictional case study*** to represent the potential revenue and incentives that a data center could generate and request, specific to Johnstown within Weld County. The table below outlines key assumptions of the fictional project.

Assumption	Value
Data Center Size	35 MW
New Machinery & Equipment Investment	$2,000,000,000
Assessed Value Rate	29.0%
Assessed Value	$580,000
Weld County Mill Levy Rate	15.038 mills
Town of Johnstown Mill Levy Rate	23.947 mills
Refund Percentage per Year (incentive)	50.0%

The following scenarios assume that data center equipment and machinery are replaced on either a 3- or 5-year cycle, with each replacement beginning a new depreciation schedule for personal business property tax purposes. The depreciation schedules have been fast tracked to account for the replacement of the machinery and equipment. The examples also assume a hypothetical Town incentive equal to a 50% rebate of eligible personal business property tax to demonstrate how such an incentive could function over time.

3-Year Depreciation, Revenue, & Incentive Scenario:

Year	Depreciation Schedule	Assessed Value	Taxes Due to Weld County	Taxes Due to Town of Johnstown	50% Refund to Company	Net New Revenue to Town

Year 1	92.0%	$533,600,000	$8,024,277	$12,778,119	$6,389,060	$6,389,060
Year 2	50.0%	$290,000,000	$4,361,020	$6,944,630	$3,472,315	$3,472,315
Year 3	25.0%	$145,000,000	$2,180,510	$3,472,315	$1,736,158	$1,736,158
Total		**$968,600,000**	**$14,565,807**	**$23,195,064**	**$11,597,532**	**$11,597,532**

5-Year Depreciation, Revenue, & Incentive Scenario:

Year	Depreciation Schedule	Assessed Value	Taxes Due to Weld County	Taxes Due to Town of Johnstown	50% Refund to Company	Net New Revenue to Town
Year 1	92.0%	$533,600,000	$8,024,277	$12,778,119	$6,389,060	$6,389,060
Year 2	75.0%	$435,000,000	$6,541,530	$10,416,945	$5,208,473	$5,208,473
Year 3	50.0%	$290,000,000	$4,361,020	$6,944,630	$3,472,315	$3,472,315
Year 4	40.0%	$232,000,000	$3,488,816	$5,555,704	$2,777,852	$2,777,852
Year 5	22.0%	$127,600,000	$1,918,849	$3,055,637	$1,527,819	$1,527,819
Total		**$1,618,200,000**	**$24,334,492**	**$38,751,035**	**$19,375,518**	**$19,375,518**

**The Town refunds 50% of new Town tax revenue from this investment to the company each year for 3 or 5 years. Weld County property taxes are collected by the County and are not part of the Town's incentive; shown for context only.*

VI. LAND USE & DEVELOPMENT CODE CONSIDERATIONS

Johnstown's current Land Use Development Code (LUDC) does not specifically define or classify data centers as a standalone land use. As a result, data centers would currently be categorized as Warehouse with Indoor Storage, which is permitted only through a Use by Special Review (USR) process within the I-1 (Light Industrial) and I-2 (Heavy Industrial) zoning districts.

Based on the Town's current zoning, there are fewer than 160 acres west of I-25 that are zoned I-1 and could independently accommodate a data center application through the existing USR process. Because the LUDC does not contain standards specific to data centers, any application submitted today would be reviewed under the existing Warehouse with Indoor Storage criteria. The current Code does not address the unique characteristics of data centers, including high electrical demand, water use, cooling technologies, backup power systems, noise, and other environmental and infrastructure considerations discussed in this memorandum.

As communities continue to evaluate data center development, many have established land use classifications and development standards that distinguish between different types of facilities based on their scale and operational characteristics. Two common classifications include:

- **Boutique Data Centers:** Smaller facilities with relatively compact footprints that are often suited for infill or adaptive reuse projects. While these facilities can also be developed on greenfield sites, Johnstown's available industrial land could readily accommodate a boutique data center campus from a land availability perspective.
- **Hyperscale Data Centers:** Large campus-style developments that typically occupy greenfield sites and require significant electrical infrastructure. Although they encompass substantial acreage, these

facilities generally have low day-to-day activity levels, with relatively few employees and limited traffic once operational.

Land Use Development Pros:

- Low traffic generation and minimal impact on road networks (after construction activities cease).
- Limited demand for public services (schools, parks, etc.).
- Can serve as a long-term, stable land use with minimal disruption to surrounding areas.

Land Use Development Cons:

- Large land consumption with relatively low employment density.
- May limit opportunities for more active or mixed-use development.
- Often visually and functionally less integrated into community fabric.
- Rapid advancements in technology may reduce the usefulness of current data center facilities over time, creating uncertainty about their future adaptability and redevelopment potential.

VII. COUNCIL DIRECTION REQUESTED

Based on the information presented in this memorandum, staff is seeking Council feedback on the following policy considerations:

- **Approval Process:** Should data centers be permitted by right, through a Use by Special Review (USR) process, or prohibited within the Town?
- **Land Use Classification:** Should the Town establish a dedicated land use classification for data centers within the Land Use Development Code (LUDC)? If so, should the Town distinguish between boutique and hyperscale data centers based on their scale, operational characteristics, and potential impacts?
- **Zoning Districts:** In which zoning districts, if any, should data centers be permitted?
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infrastructure improvements, or other community benefits.

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Reviewed and Approved for Presentation,

Town Manager

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Data Center Discussion

TOWN COUNCIL WORK SESSION
JULY 13, 2026

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Objectives

- Define Data Centers
- Explain the variety of data center sizes
- Discuss potential impacts and opportunities
- Receive Town Council direction regarding future policy

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What is a Data Center?

- Houses servers and digital infrastructure (stores data digitally)
- Operates 24/7
- Requires reliable power and cooling
- Range from boutique facilities to hyperscale campuses

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Boutique vs. Hyperscale – Not all Data Centers are the same

BOUTIQUE DATA CENTER
1 – 15 MW

SIZE & POWER
1 – 15 MW of power
Smaller buildings; compact footprint

CUSTOMERS
Serves regional businesses, enterprises, and local organizations

UTILITY DEMAND
Moderate power and water use
Depending on cooling technology

CAPITAL INVESTMENT
Lower capital investment than hyperscale

SITE CONSIDERATIONS
Can fit on infill or smaller sites; easier to integrate into existing areas

HYPERSCALE DATA CENTER
100 – 1,000+ MW

SIZE & POWER
100 – 1,000+ MW of power
Large campus with multiple buildings

CUSTOMERS
Supports global cloud providers and massive digital platforms

UTILITY DEMAND
Extremely high power and water demand
24/7 operations

CAPITAL INVESTMENT
Very high capital investment (billions of dollars)

SITE CONSIDERATIONS
Requires large, contiguous greenfield sites and major infrastructure

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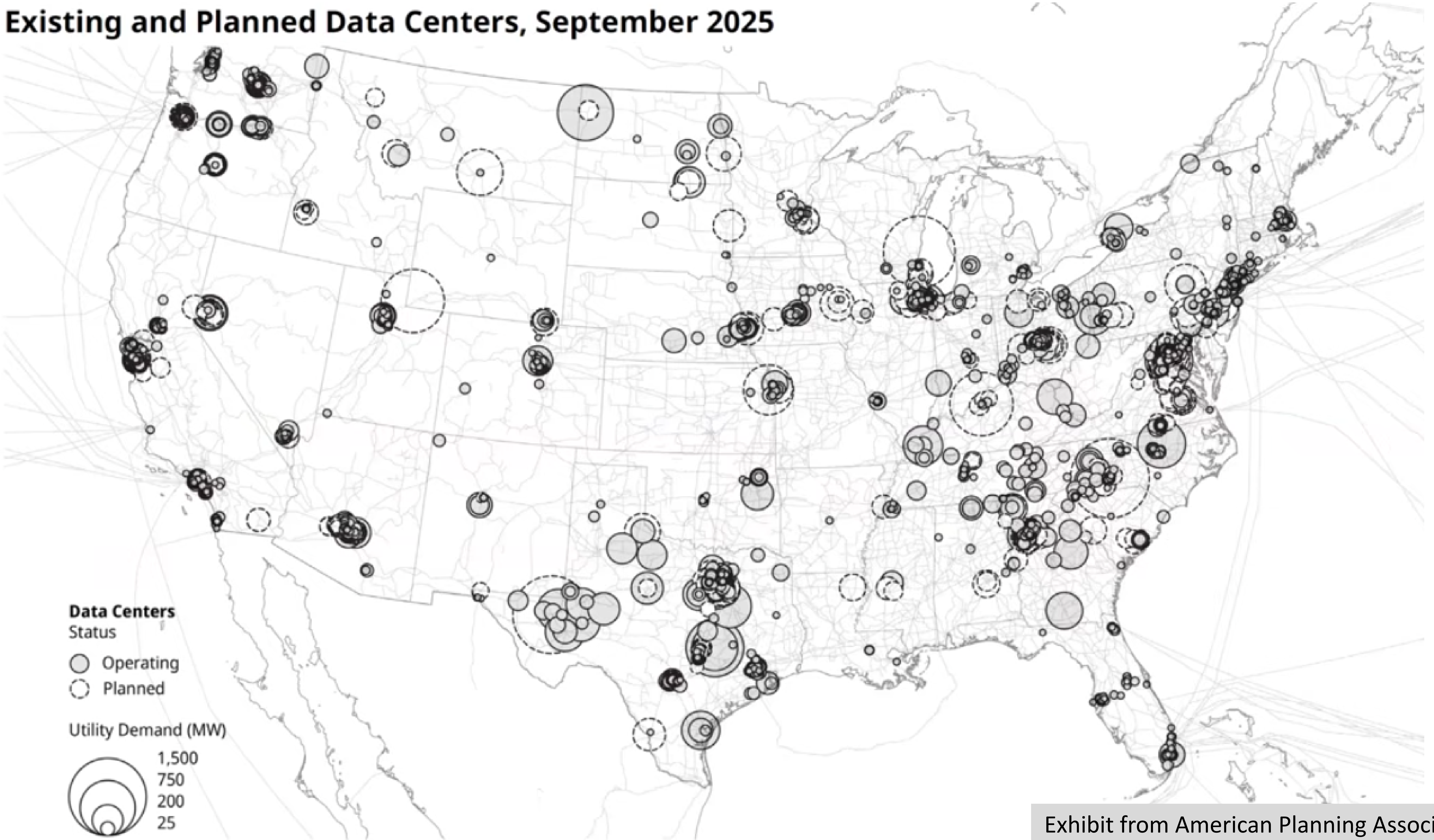
Existing and Planned Data Centers, September 2025



Justin Kollar / 2026

Exhibit from American Planning Association; Technology Division.
Webinar presented April 2026
https://www.youtube.com/watch?v=3Wp6DGEfoLs

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Utility Factors – Energy & Power Considerations

Power Demand
- Boutique 1-15 MW
- Hyperscale 100-1,000 MW

Power Providers
- Xcel Energy & United Power require large load applicants to fund infrastructure improvements related so that existing customers are not affected from a reliability and rate perspective. PVREA currently does not have a formal large load process.
- Data centers operate 24/7 and require reliable uninterrupted electricity

Johnstown Considerations
- Total Johnstown Housing Units: 8,097 (SFH & Multi); estimated overall energy consumption of 26 MW (during peak).

Power Level	Equivalent Homes (2,000 sq. ft. home approx.)	Scale Reference
1 MW	~309 homes	
10 MW	~3,086 homes	Comparable to a small town
50 MW	~15,432 homes	Comparable to a mid-size city (ex. Raleigh, NC)
100 MW	~30,863 homes	
1,000 MW (1 GW)	~308,632 homes	Comparable to a principal city (ex. Los Angeles, CA)

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Utility Factors – Water Cooling & Emerging Technologies

Data Center Industry Trends

- Modern data centers increasingly prioritize renewable energy integration (ex. locating near renewable energy sources such as wind/solar farms), water conservation (ex. cooling technologies), and energy recovery technologies (ex. waste heat) to reduce environmental impacts.
- Water demand depends almost entirely on the cooling technology selected. Modern facilities increasingly use closed-loop systems, direct-to-chip cooling, recycled water, and waste heat recovery to reduce both energy and water consumption.

Cooling System	Water Use	Efficiency Considerations
Air Cooling	Lowest	Requires little to no process water. Not efficient from an energy perspective, requires higher energy demand to cool facility.
Closed-Loop	Low	Continuously recycles and reuses water instead of discharging it after one use. More energy efficient than air cooling. Some makeup water may be needed.
Direct-to-Chip	Moderate Low	Delivers liquid coolant to GPUs and CPUs through tubes or cooling plates. The liquid absorbs the heat efficiently. The liquid must be disposed of properly and building these types of data centers are very costly and require specialized infrastructure and maintenance. Small amounts of makeup water may be needed.
Open-Loop	Highest	Uses water evaporation to remove heat from IT equipment. Water is circulated through cooling towers, where heat is released into the atmosphere through evaporation. Offers good energy efficiency but has the highest water consumption due to evaporation and continuous replacement of new water.

It is important to note that data center cooling systems are becoming more advanced and are designed to reduce both energy and water use over time.

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Economic Factors – Fiscal & Employment Impact

Data Center Fiscal Benefits

- Building and infrastructure generate property tax revenue
- Servers & IT equipment (machinery and equipment) can generate substantial personal property tax revenue
- As equipment is replaced, new depreciation schedules begin, creating an ongoing source of tax revenue.
- Data centers are considered low cost to serve; typically require limited municipal services once operational (Police, Fire, etc.)

Johnstown Considerations

- Many projects request local and state incentives to remain competitive.
- Personal property tax revenue declines as equipment depreciates but can be renewed through future equipment replacement cycles.
- Limited Secondary Spending; compared to other commercial or industrial uses, data centers generate less secondary economic activity (e.g., retail, hospitality).

Data Center Employment Impact

- During construction data centers create 100-1,000 of temporary construction jobs
- During operations data centers employment impact is significantly lower but includes high-paying technical positions (final employment number depends on size of data center)

Johnstown Considerations

- Limited workforce competition; with regional unemployment around 4% and a tight labor market, data centers generally do not compete heavily with other employers for local workers.

Fictional Data Center Project – Revenue & Incentive Values

The following is a *fictional case study* to represent the potential revenue and incentives that a data center could generate and request, specific to Johnstown within Weld County.

Assumption	Value
Data Center Size	35 MW
New Machinery & Equipment Investment	$2,000,000,000
Assessed Value Rate	29.0%
Assessed Value	$580,000
Weld County Mill Levy Rate	15.038 mills
Town of Johnstown Mill Levy Rate	23.947 mills
Refund Percentage per Year	50.0%

3-Year Depreciation, Revenue, & Incentive Scenario

Year	Depreciation Schedule (%)	Assessed Value	Taxes Due to Weld County	Taxes Due to Town of Johnstown	50% Refund to Company	Net New Revenue to Town
Year 1	92.0%	$533,600,000	$8,024,277	$12,778,119	$6,389,060	$6,389,060
Year 2	50.0%	$290,000,000	$4,361,020	$6,944,630	$3,472,315	$3,472,315
Year 3	25.0%	$145,000,000	$2,180,510	$3,472,315	$1,736,158	$1,736,158
Total		$968,600,000	$14,565,807	$23,195,064	$11,597,532	$11,597,532

5-Year Depreciation, Revenue, & Incentive Scenario

Year	Depreciation Schedule (%)	Assessed Value	Taxes Due to Weld County	Taxes Due to Town of Johnstown	50% Refund to Company	Net New Revenue to Town
Year 1	92.0%	$533,600,000	$8,024,277	$12,778,119	$6,389,060	$6,389,060
Year 2	75.0%	$435,000,000	$6,541,530	$10,416,945	$5,208,473	$5,208,473
Year 3	50.0%	$290,000,000	$4,361,020	$6,944,630	$3,472,315	$3,472,315
Year 4	40.0%	$232,000,000	$3,488,816	$5,555,704	$2,777,852	$2,777,852
Year 5	22.0%	$127,600,000	$1,918,849	$3,055,637	$1,527,819	$1,527,819
Total		$1,618,200,000	$24,334,492	$38,751,035	$19,375,518	$19,375,518

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Land Use & Development Factors – Johnstown Framework

Where does Johnstown stand today?

- Data centers are not identified or defined in the Land Use Development Code.
- If a data center was proposed, it would be categorized as Warehouse with Indoor Storage.
  - Allowed only through a Use by Special Review (USR) in the following zoning districts:
    - I-1 Light Industrial
      - Approximately 100 acres available west of/adjacent to the interstate
    - I-2 Heavy Industrial
      - No land available

Johnstown Considerations

- The LUDC does not currently contain standards addressing:
  - Electrical demand
  - Backup power systems
  - Water use & cooling systems
  - Environmental impacts

- If an application for a data center was submitted today, it would be able to be processed. However, today's LUDC was not written with data centers in mind.

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Town Council Feedback & Direction

Approval Process: Should data centers be permitted by right, through a Use by Special Review (USR) process, or prohibited within the Town?

Land Use Classification: Should the Town establish a dedicated land use classification for data centers within the Land Use Development Code (LUDC)? If so, should the Town distinguish between boutique and hyperscale data centers based on their scale, operational characteristics, and potential impacts?

Zoning Districts: In which zoning districts, if any, should data centers be permitted?

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Performance Metrics: What performance metrics should a data center project be required to meet to be eligible for incentives? Examples may include capital investment, job creation, wage levels, renewable energy commitments, water conservation measures, waste heat recovery, public infrastructure improvements, or other community benefits.

Can we legally prohibit data centers?

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