The Joyce Foundation

Data Center Initiative

ABOUT US

The Joyce Foundation

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Programs

- Education & Economic Mobility
- Environment
- Gun Violence Prevention & Justice Reform
- Democracy
- Culture
- Journalism

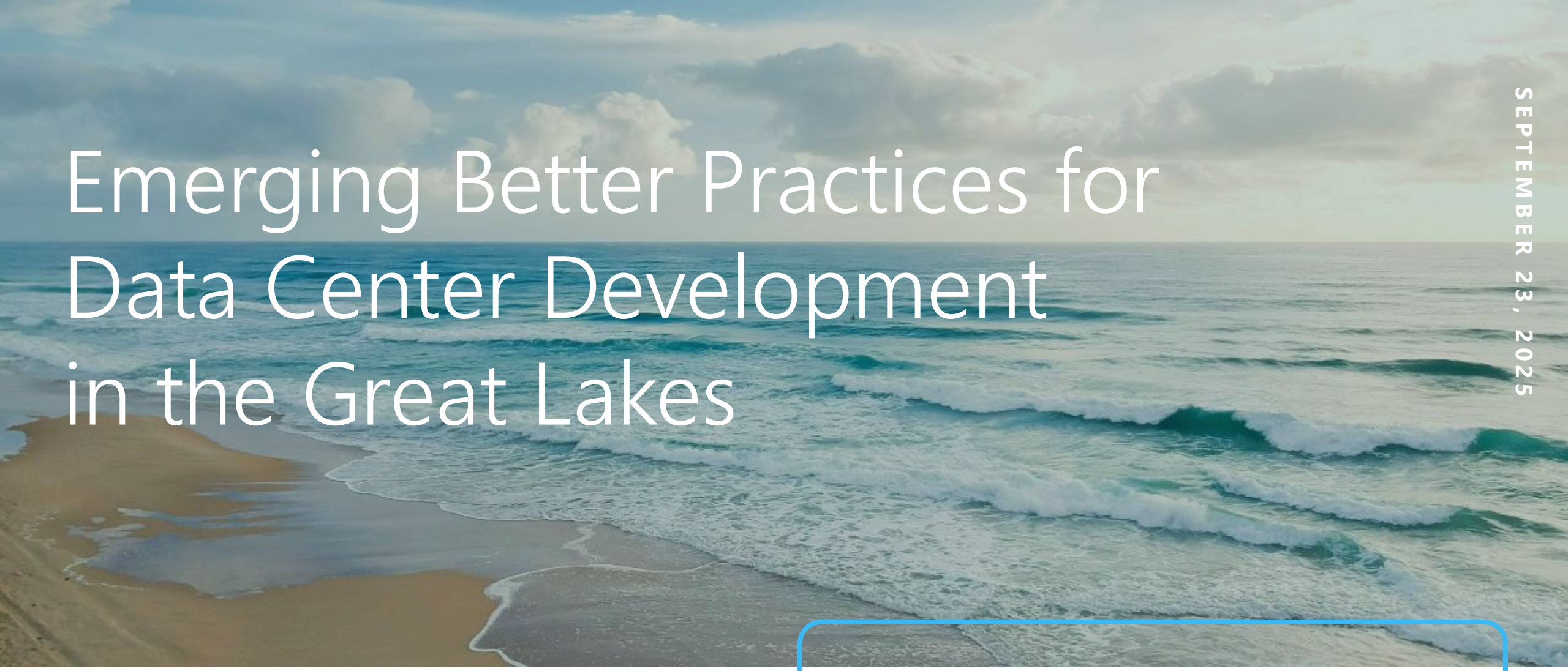
GRANT STRATEGY	HISTORY & SIZE	APPROACH
Advancing racial equity and economic mobility for the next generation of Great Lakes residents.	Founded in 1948. Based in Chicago with assets of $1.2 billion, distributing $66 million in 2023.	Moving ideas to actions by supporting policy research, development, and advocacy.

Goal

Support research and policy that helps states and communities minimize negative impacts of data center development to people and nature and maximize potential benefits.

Work Streams

- Research and Analysis
- Convenings and Outreach
- Digestible Information for Policymakers, Communities, Advocates



Emerging Better Practices for Data Center Development in the Great Lakes

SEPTEMBER 23, 2025

FRESH COAST
Climate Solutions

Bold Solutions. Transformative Action.

Our Vision

We work to reverse climate change by helping clients achieve bold, equitable, and impactful solutions.

Our Core Services

Our Clients

We consider friends and collaborators

Fresh Coast's Data Center Project with the Joyce Foundation

UNDERSTAND MARKET ACTIVITY

IDENTIFY BETTER PRACTICES

SHARE KNOWLEDGE

Better Practices
Practices currently established, or recommended, that will likely minimize negative impacts of data center development to people and nature and maximize potential benefits.

Presenters

PAUL GRUBER - Program & Engagement Lead, Fresh Coast Climate Solutions

- 20+ years working in clean energy and transportation, sustainability planning, and community engagement
- Supporting 50+ southeast MI businesses in 2023-2025 to advance and implement sustainability programs, GHG assessments, and environmental management studies - Centrepolis Accelerator's *MI Climate Wise Business Program*, City of Ann Arbor's *Green Business Challenge*
- MBA/MS in Sustainable Business, University of Michigan
- pgruber@freshcoastclimate.com

JOSH BRUGEMAN – Co-Founder, Fresh Coast Climate Solutions

- 20+ years working in cleantech, ESG, CSR, and circularity
- Expert in Residence, Centrepolis Accelerator; Director Clean Energy Accelerator, NextEnergy
- Leading engagements with start-ups to Fortune 500s to reverse climate change: create more resilient supply chains, develop and commercialize advanced technologies, and build brands that increase integrity while reducing risk
- MS in Land Use & Urban Planning, University of Michigan
- jbrugeman@freshcoastclimate.com

Today's Topics

01 Review of Current Landscape

02 Emerging Trends & Insights

03 Emerging Better Practices

04 Q&A and Discussion

Today's Topics

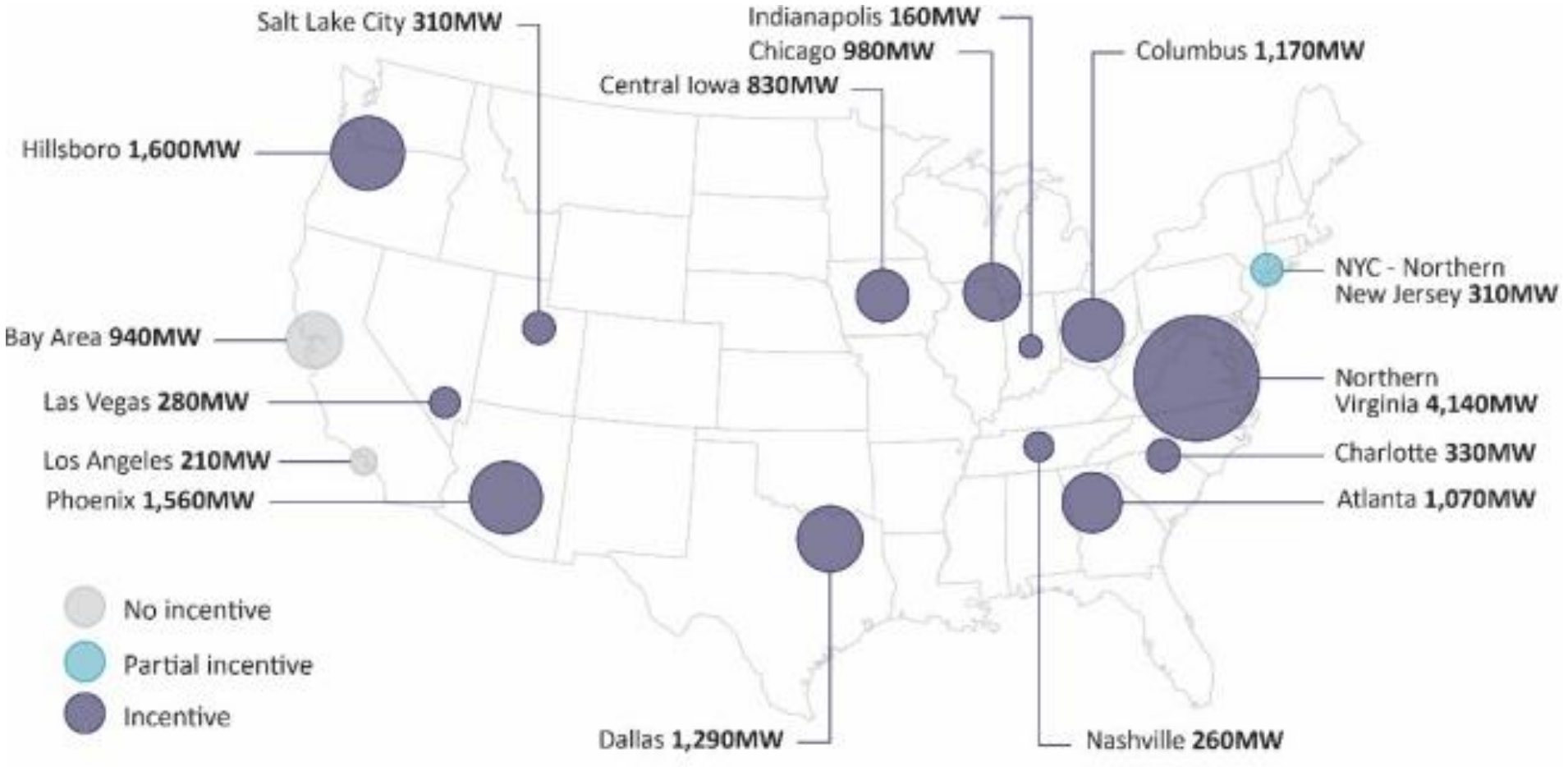
Review of Current Landscape 01

Emerging Trends & Insights 02

Emerging Better Practices 03

Q&A and Discussion 04

~2,717 Data Centers Operating in the U.S.



Joint Legislative Audit & Review Commission. (2023) "Report to the Governor and the General Assembly of Virginia: Data Centers in Virginia 2024." Virginia.gov

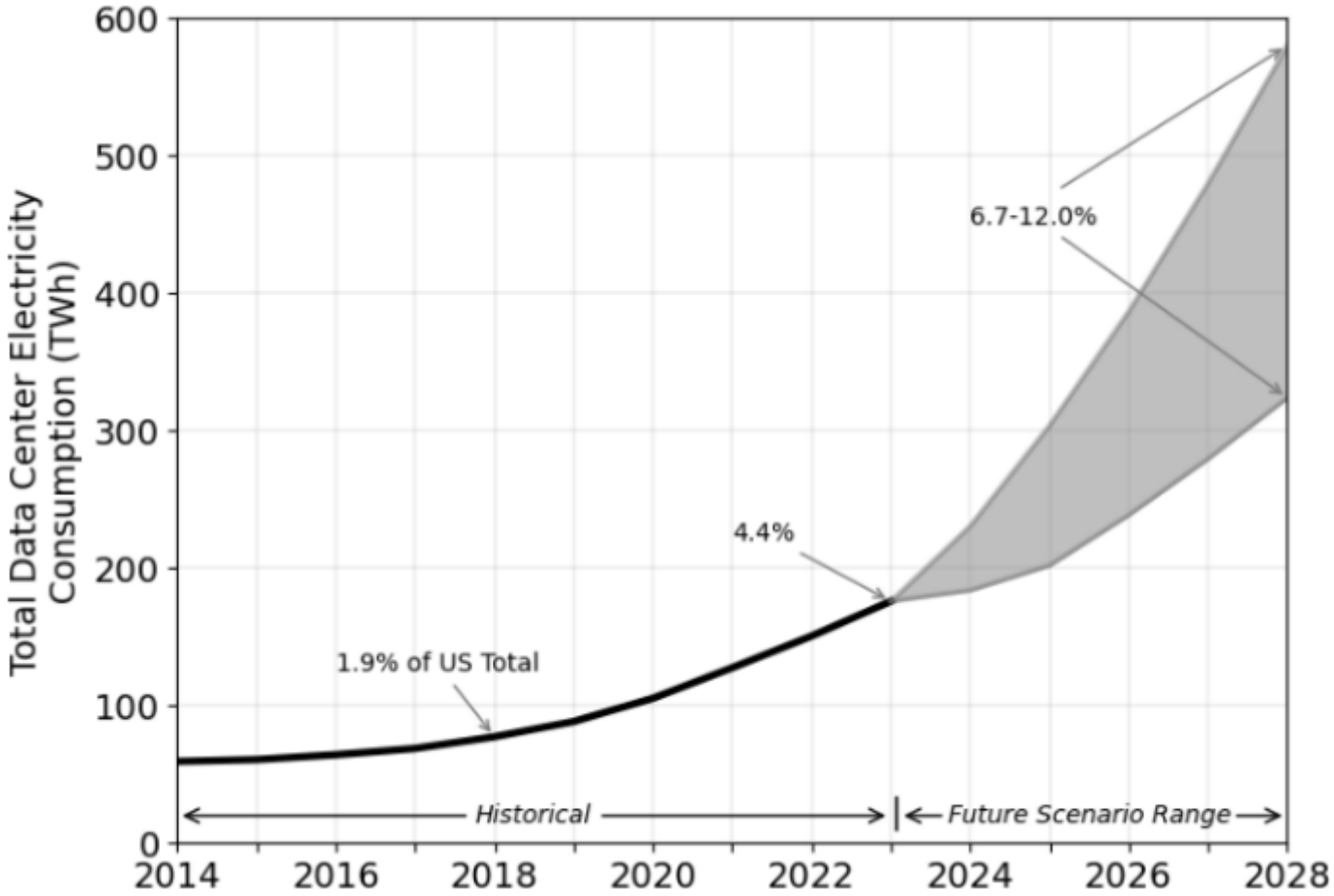
Note: Preliminary – Research Underway

U.S. Electricity Demand Growth

Historical and projected

- In 2023, data centers consumed 4.4% of U.S. electricity.
- In 2028, data centers are projected to consume up to 12.0% of U.S. electricity.

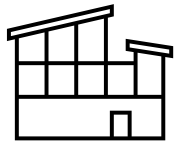
Total U.S. data center electricity use from 2014 - 2028



1 Shehabi, A.; Newkirk, A.; Smith, S.; Hubbard, A.; Lei, N.; Siddik, M., et al. (2024). 2024 United States Data Center Energy Usage Report. *Lawrence Berkeley National Laboratory*. Report #: LBNL-2001637.

Energy, Water, and Land Use Impacts

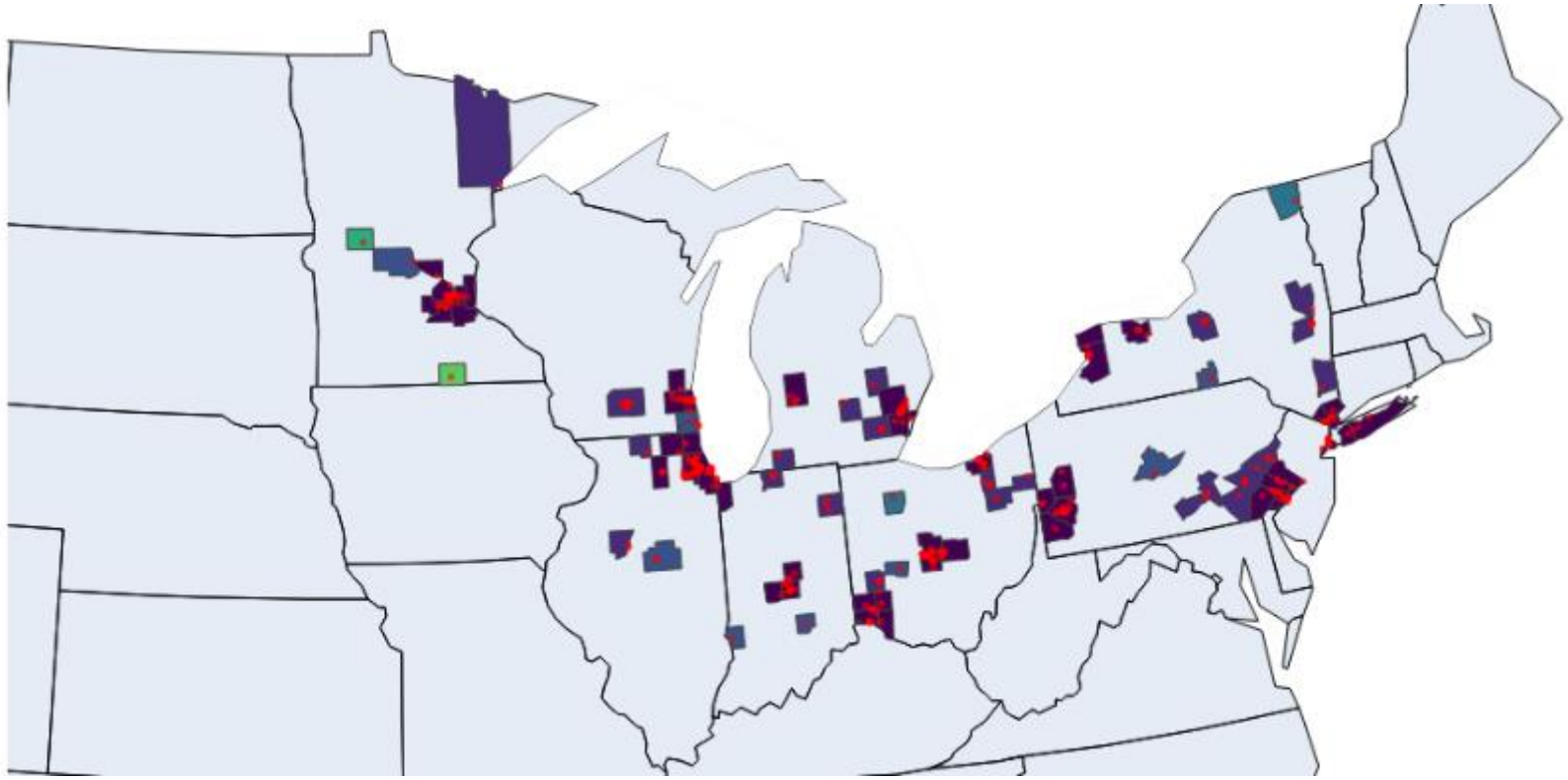
Estimated from news, academic, and government articles and reports

	Energy	Water	Land
	4.4% of total U.S. electricity in 2023 (176 TWh) Up to 12% by 2028 (580 TWh)[1]	211 billion gal/year for electricity production + 17 billion gal/year used at facilities (i.e., cooling)[1,2]	~100,000 acres across US (156 sq mi)
	10-30 MW average facility = 10k to 30k homes (small city) = 100-300 GWh/year	300,000 gal/day/avg. facility[3] (1-5 million gal/day for Hyperscaler)	~30 acres/average facility (and growing; 500+ acres for largest Hyperscaler campuses)
	10 Wh/AI search (e.g., to craft an email; up to 1 hr of LED lightbulb use)	~5 to 12 oz/AI search (e.g., to craft an email)	~13 sq ft land/person (and growing)

1 Shehabi, A.; Newkirk, A.; Smith, S.; Hubbard, A.; Lei, N.; Siddik, M., et al. (2024). 2024 United States Data Center Energy Usage Report. *Lawrence Berkeley National Laboratory*. Report #: LBNL-2001637.
2 LBNL Center of Expertise for Energy Efficiency in Data Centers. Water Efficiency. (Accessed 6.15.2025).
3 Copley, Michael, NPR. 2022. Data centers, backbone of the digital economy, face water scarcity and climate risk.

~499 Data Center Operating in the Great Lakes Region (~18% of US total)

Most in large metro areas; many near Great Lakes



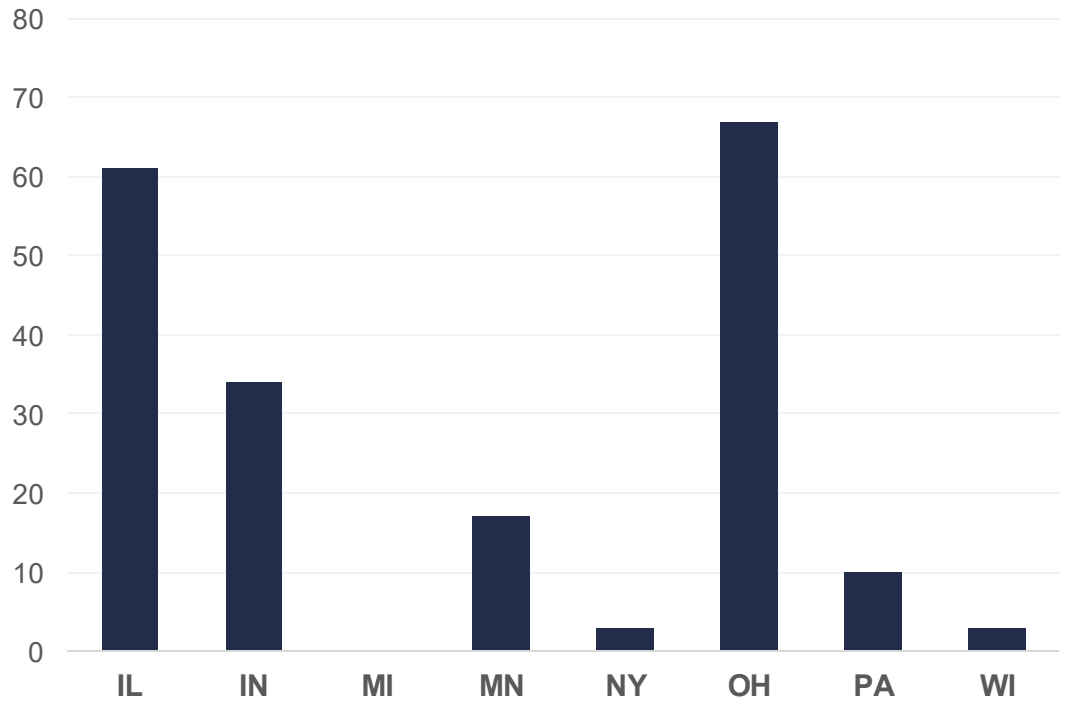
Rural/Urban Characterization of counties with Data Centers

Great Lakes region data centers:

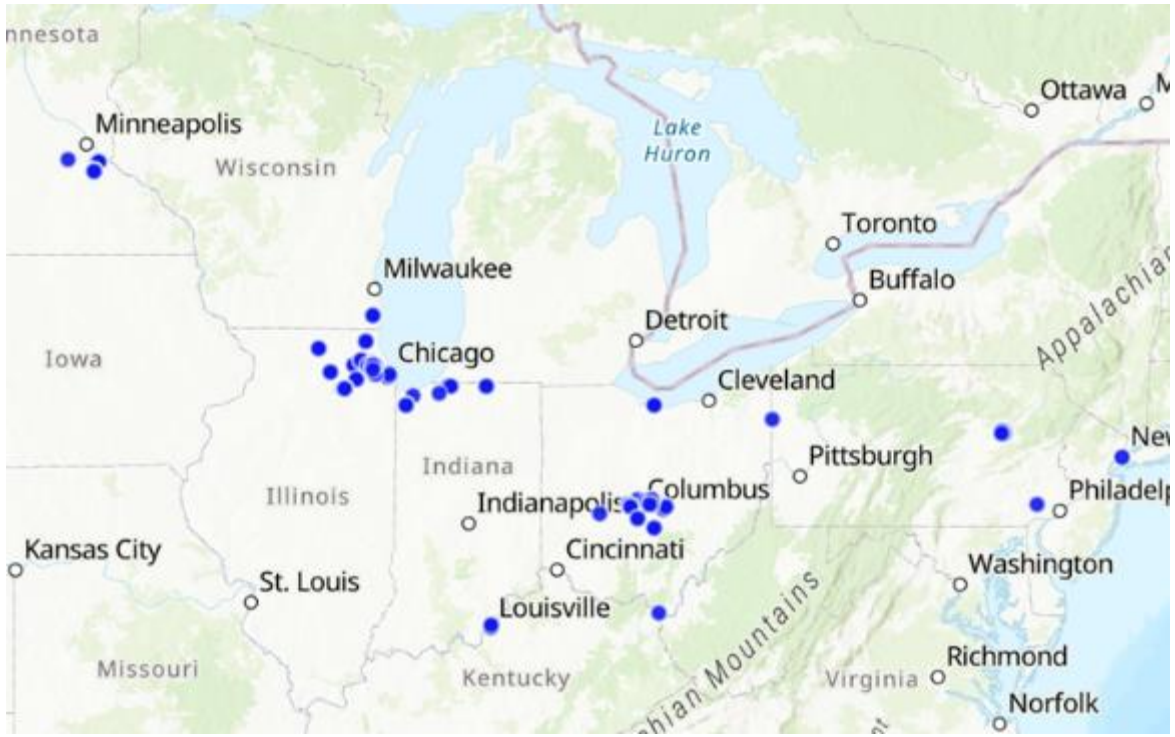
- Counties: 86
- Total: 499
- Large metro: 85.0%
- Medium metro: 12.0%
- Small or nonmetro: 3.0%

Note: Preliminary – Research Underway

Locations of Planned Data Centers in the Great Lakes (as of Dec. 2024)



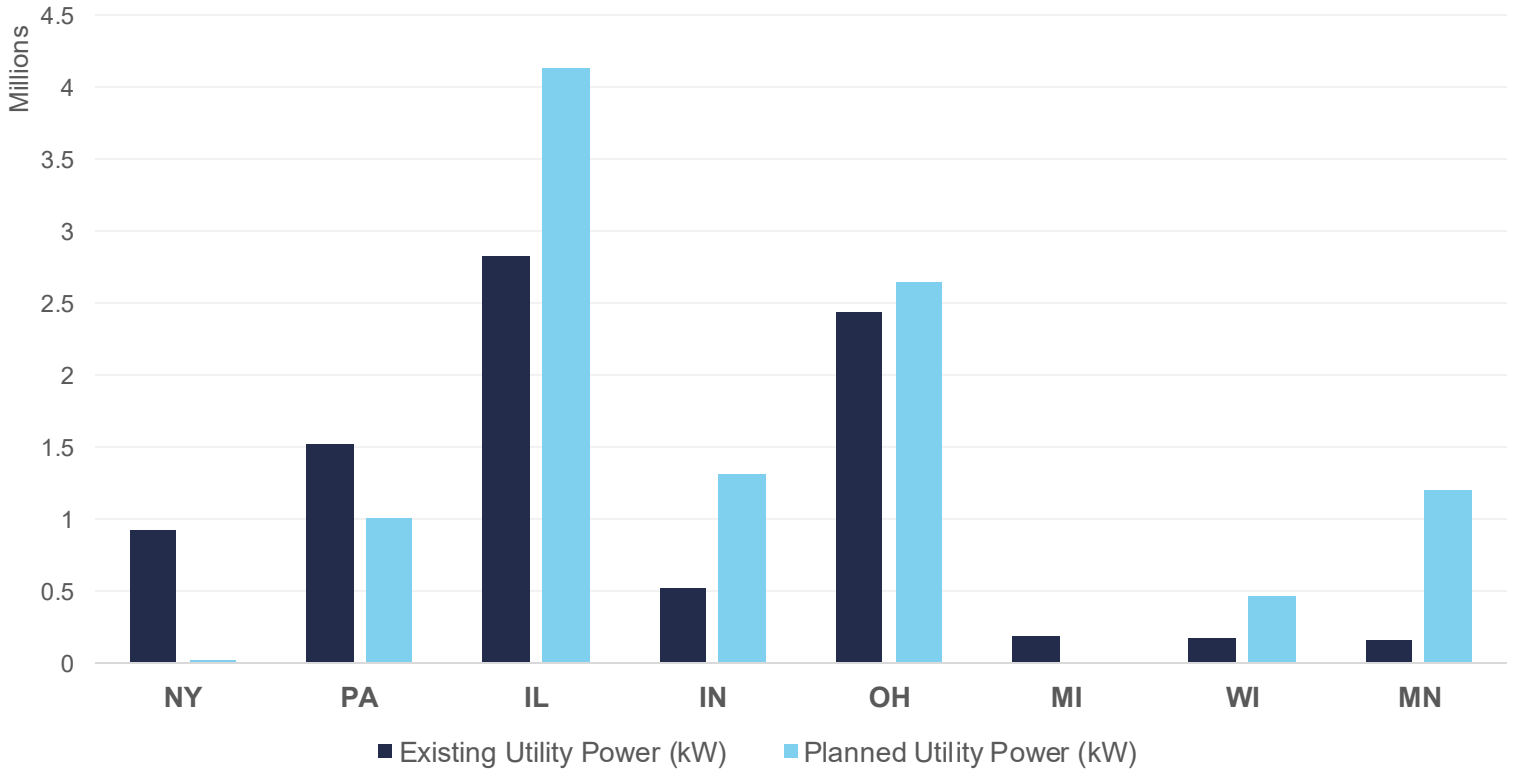
Planned Data Centers by State



Location of Planned Data Centers

Note: Preliminary – Research Underway

Increased Energy Demand in Great Lakes States



Existing UPS Power (Kw) of Data Centers by State

Several GL Data Centers are expected to significantly increase their electricity demand.

- **Illinois** leads in both current and planned UPS power capacity even though many facilities are Wholesale.
- **Ohio** shows one of the highest total demands, and planned growth will push it even further.
- **Minnesota** and **Indiana** have steep percentage increases in planned energy use—indicating these states may face the most rapid change relative to their current footprint.
- **New York and Michigan** appear to be nearing a plateau.

Note: Preliminary – Research Underway

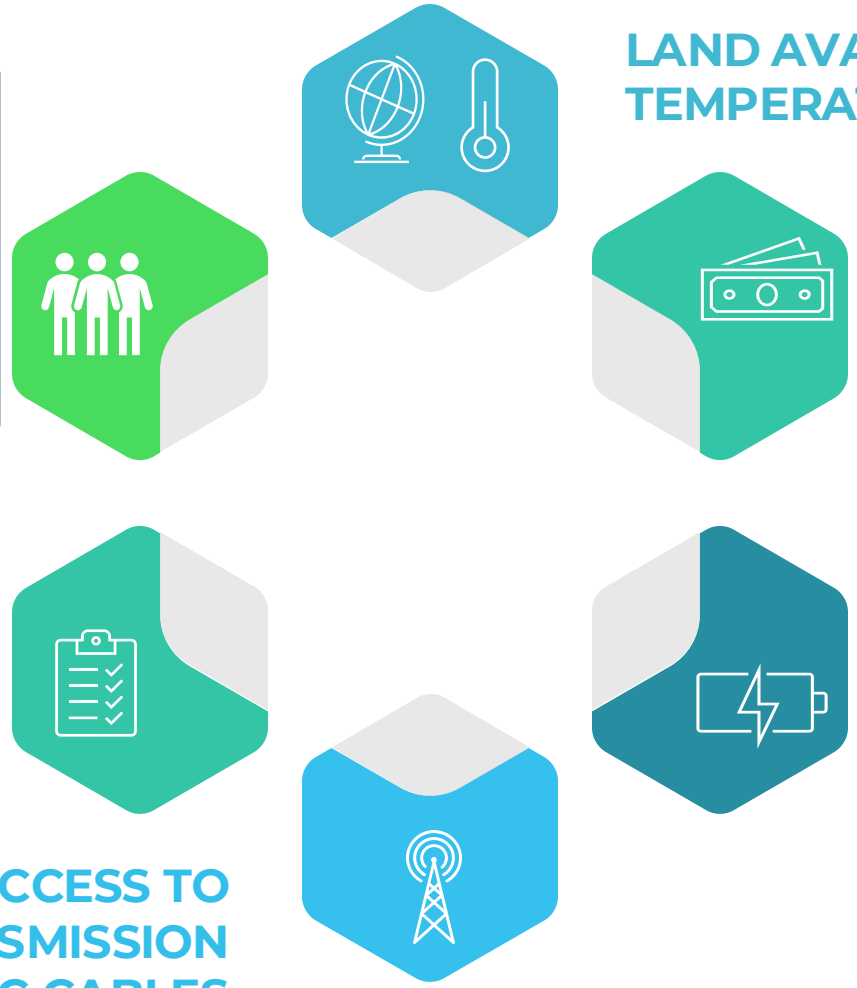
What Do Developers Look For In A Location?

Key Attributes: Access, Requirements, and Economics

COMMUNITY RISK, IMPACTS, AND ENGAGEMENT

Investors/developers track risk, but few track engagement as an important attribute.

STATE/MUNICIPAL REQUIREMENTS AND INCENTIVES



ACCESS TO ENERGY SOURCE, TRANSMISSION LINES, & FIBER OPTIC CABLES

LAND AVAILABILITY & TEMPERATE CLIMATE

ENERGY AND WATER COSTS

Some states are beginning to require developer transparency on energy and water evaluation, use, and reporting.

POWER CAPABILITIES AND EASE OF INTERCONNECTION/ UTILITY REQUIREMENTS

Today's Topics

Review of Current Landscape 01

Emerging Trends & Insights 02

Emerging Better Practices 03

Q&A and Discussion 04

Data Center Industry Map

DEVELOPERS

Prometheus, CHIRISA, DATABANK, WHITEFIBER, IRON MOUNTAIN, BELLTOWNPOWER, related DIGITAL, rowan digital infrastructure, AVAIO DIGITAL, Princeton Digital Group, edged, DIGITAL REALTY, SOLUNA, Energy Abundance, cologix, POWER HOUSE DATA CENTERS, PRIME DATA CENTERS, HATCHWORKS, APPLIED DIGITAL, DATAVOLT, EdgeCore Digital Infrastructure, SURGE DEVELOPMENT GROUP, ENDEAVOUR INSPIRED INFRASTRUCTURE, DIGITALBRIDGE, CleanArc DATA CENTERS

BACKERS

Microsoft, Alphabet, SoftBank, MGX TECHNOLOGIES, amazon, Meta, ORACLE

INVESTORS

ENGINENO.1, ARCLIGHT CAPITAL PARTNERS, BLUE OWL, quinbrook infrastructure PARTNERS, BLACHAMBER, AUTODESK FOUNDATION, ENERGY IMPACT PARTNERS, GIGAFUND, DIGITALBRIDGE, ECP, SPRING LANE CAPITAL, SIP Global Partners, Breakthrough Energy, catalus, KKR, OPPIDAN, Blackstone, GLOBAL INFRASTRUCTURE PARTNERS, nuveen A TIAA Company, SNOWHAWK

POWER PROVIDERS

TPG, OKLO, DEEP FISSION, LAST ENERGY, Intersect Power

WORKFORCE

SALUTE, edgeconnex®

ENERGY TECHNOLOGIES

XL Batteries, wind CORES, dug, STEIIUM DATA CENTERS, wiwynn, aggreko, DELTA, TAGORE TagoreTech Inc, LAST ENERGY, Schneider Electric, Saitek, BLACK BOX

COOLING TECHNOLOGIES

motivair, Chemours, arteco ENGENIOUS COOLANTS, Immersion4, submer, wafr, FLUIX, ICEOTOPE PRECISION LIQUID COOLING, DCX, jetcool A Flex Company, CoolIT systems, GRC GREEN REVOLUTION COOLING The Immersion Cooling Authority, ThermalWorks, ALLIED CONTROL IMMERSION COOLING, liquid stack, STULZ, TEIMMERS, KAORI, CHILLDYNE, Asperitas IMMERSED COMPUTING, MIDAS IMMERSION COOLING, BOYD CORPORATION, FUJITSU, ENGINEERED FLUIDS, Airedale APPLIED THERMAL INNOVATION

REITS

DIGITAL REALTY, IRON MOUNTAIN, EQUINIX

Scale of Data Center Investments is Increasing

Tally of U.S. data center announcements - to be constructed between 2025 and 2030

Estimate in early 2025	Estimate in September 2025
~$300-500 B	$1.4 T+

From Billions to Trillions: Data Centers' New Scale of Investment

Chernicoff, D. "From Billions to Trillions: Data Centers' New Scale of Investments." Data Center Frontier, 3/13/2025

Commonly Considered Impacts of Data Center Development: Economic, Environmental, Community

POTENTIAL POSITIVES

- New economic activity and tax revenues
- Construction & operational job creation
- Increased outside investment could improve grid reliability
- Support for renewable energy investment & brownfield redevelopment

POTENTIAL NEGATIVES

- High energy demand, strain on the grid, and unfair cost allocation
- High water use and impacts on water recharge and availability
- Land use conflicts, noise, air/health impacts, & real estate values/affordability
- Increased use of fossil fuels & greenhouse gas emissions

Data Center Development Activities

"Better practices" are beginning to be emerge

Better Practices
Practices currently established, or recommended, that will likely minimize negative impacts of data center development to people and nature and maximize potential benefits.

Practices likely to result in mostly
POSITIVE Impacts

Technologies/System Design
- Energy efficiency; heat recovery
- Water efficiency/reuse
- Net Zero/Renewables commitments and investments
- Evidence that renewables/battery can lead to DC operation faster than new fossil fuel plants
- Advanced communications/IT infrastructure
- Advanced building materials and construction + requirements (zoning, setbacks, screening)
- Design for upgrades/end-of-life

Power/Grid/Load Management
- Demand Side Management (DSM)
- Virtual Power Plant (VPP)
- Energy storage (incl. long duration, second life); Renewables

Market/Economics
- Repurposing industrial/brownfield sites

State/local policymaking
- "Qualified Data Centers" new business category/requirements
- Fair cost allocation
- Interconnection standards (load/reliability)
- Energy requirements
- Water requirements (evaluation, use, reuse, disclosure)
- Public transparency

Private-Public Collaboration
- Sustainability standards/Lifecycle metrics
- State + Local policy coordination
- Transparency
- Site specific impact analysis; verification
- Sustainable Development Playbook

*List compiled from reviews of 1,000+ news, academic, industry, and govt. news and reports

Data Center Development Activities

Many practices need evaluation

Practices likely to result in
MIXED Impacts (or UNKNOWN at Present)

Technologies/System Design
- Reducing build time/time to operations
- Conventional nuclear; Small Modular Reactors (SMRs)
- Advanced cooling technologies (closed loop, liquid, immersion, seawater)
- AI optimization and Quantum computing investments

Power/Grid/Load Management
- All power sources are being pursued (nuclear, natural gas, renewables, batteries)
- Co-location; new on-site natural gas plants (behind-the-meter, "grid-optional," "power production zones")
- New natural gas plants; gas extraction
- Natural gas as potential bridge to renewables
- New supporting software for power gen
- New grid infrastructure

Environmental/Community Impacts
- Carbon and biodiversity offsets; carbon credits

Market/Economics
- $1Ts in AI infrastructure/power industry investments through early 2030s
- New real estate category established
- All major tech companies invested + other industries diversifying (e.g., O&G, food)
- AI space race/"gold rush" (faster, more capable, more efficient computing)
- Vertical integration (power, water, DCs)
- "Build it and they will come" approach
- Developer/Utility facility and energy growth projections
- New private-public partnerships

Federal/State/Local Policy Making
- Federal de-regulation (econ growth, but enviro/community impacts)
- State incentives (tax incentives, exemption)
- Streamlined permitting
- State/community pushback: moratoriums, pauses, rejections

*List compiled from reviews of 1,000+ news, academic, industry, and govt. news and reports

Data Center Development Activities

Some industry trends and practices require re-evaluation

Trends/Practices likely to result in mostly
NEGATIVE Impacts

Market/Economics

- Risk of stranded assets as tech/upgrades evolve rapidly
- Focus on rapid growth and economic benefits without full evaluation (leading to grid load/reliability issues, higher electricity costs, enviro/community impacts)
- Supply chain constraints (AI chips, transformers, natural gas turbines)
- Developers not paying full share of grid infra upgrades (evidence of electricity costs increasing - e.g., in PJM)

Environmental/Community Impacts

- Loss of farmland and ecosystems (wetlands, forests)
- Increasing use of diesel generators for backup
- Concern with PFAs spread with cooling technologies
- Community impacts: Transparency, siting, land use, real estate value, noise, air quality, health, ecosystem, watershed
- Risk of increased e-waste as tech is replaced

Federal/State/Local Policy Making

- Increased fossil fuel investment; extending life of coal mines and power plants (less efficient forms of energy; delays emissions reductions)
- Risk that State climate goals cannot be met
- Risk that private company climate goals cannot be met
- New tariffs on steel, aluminum, energy imports to increase grid infrastructure costs
- Rapid economic-based decision making without considering enviro/comm impacts
- State removal of authority from local decision makers
- NDAs signed by municipal officials, lack of transparency

*List compiled from reviews of 1,000+ news, academic, industry, and govt. news and reports

Data Center Policy Overview

National Caucus of Environmental Legislators (NCEL), April 2025

Ratepayer Protection

Ensure residents and small businesses do not pay for new power generation and transmission infrastructure that primarily serves data centers.

- Georgia SB 34
  - (pending)
- Utah SB 132
  - (enacted 2025)

Transparency

Require data centers to share energy & water consumption data.

- Texas SB 1929
  - (enacted 2023)
- Georgia HB 1192
  - (passed house & senate, vetoed by Governor 2023)

Demand Side Solutions

Enable data centers to reduce peak demand and improve grid reliability.

- Texas SB 6
  - (enacted 2025)
- Virginia HB 2578
  - (pending)

Clean Energy

Require data centers to obtain at least a portion of their energy from renewable sources.

- Minnesota HF 16
  - (enacted 2025)
- New Jersey S 4143
  - (pending)

Source: National Caucus of Environmental Legislators. "Data Centers Issue Brief" (4/29/2025)

Ordinances include Development and Transparency Requirements but limited Monitoring and Enforcement Requirements

Comprehensive Plan Amendment and Zoning Ordinance Amendment (2024-present) – Loudoun County, VA

- Conditional/special use permitting; requirements for legislative review and public hearings before Planning Commission and Board of Supervisors

Draft Data Center Ordinance (Jul 2025) – Albemarle County, PA

- Definition, utility power, cooling system, setbacks, landscaping/screening, size limits, noise limit/study, screening, special use permit, overlay district/special use permit

Data Center Model Ordinance (Aug 2025) – York County, VA

- Requirements: Specific use criteria, Size limit, setbacks, parking, noise limit, air impacts, safety, setbacks, riparian buffer, utility power verification
- Incl. Environmental and Community Impact Analysis; Environmental Impact Assessment; encourages Green Building

Proposed Ordinance - Carbon County, PA

- Requirements: Size limits, landscape buffer, screening and fencing, noise limit and study, water feasibility study, power study from utility/electric provider, emergency management, aesthetics, parking

Local Guidelines for Data Center Development – Urban Land Institute (2024)

- Guidance: Zoning, permitting, mitigation testing (power, water, noise), monitoring and community review

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"Better Practices" are Emerging for Managing Data Center Developments

Better Practices
Practices currently established, or recommended, that will likely minimize negative impacts of data center development to people and nature and maximize potential benefits.

New Business Category

New industry definitions, programs, and policies

Revisiting and adapting

Fair Cost Allocation

Investigations of rising costs

New rules and tariffs

New Developer Requirements

New requirements established at State, County, and Local levels

Load Management + Resiliency

Manage loads to reduce strain on grid

Allow for flexibility

Efficiency & Clean Energy

New energy and water efficiency requirements

Integrate and validate new tech

Study impacts of integrated renewables + storage compared to new natural gas

Private + Public Coordination

No Non-Disclosure Agreements (NDAs)

Improving State + Local information flow and coordination

New sustainability/lifecycle frameworks and metrics, site specific impact analysis, and playbooks

"Better Practices" are Emerging for Data Center Development

New Business Category

New industry definitions, programs, and policies

Revisiting and adapting

"Qualified Large-Scale Data Centers" (MN)

- New category of business with special requirements
- Energy and water evaluation, use, and reporting
- Prevailing wage, peak usage fee, renewable energy, sustainable construction
- Also, streamlines permitting and establishes info flow among state and local agencies

Various states are revisiting previous data center policies

- Revisit tax exemption for data centers (OH, MN)
- Revisiting interconnection rules (PA, IL)
- Pauses/Moratoria (OH, GA, MD, MO, KY, AR)

"Better Practices" are Emerging for Data Center Development

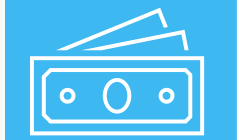
Fair Cost Allocation

Investigations of rising costs

New rules and tariffs

States and Utilities review data center costs to all ratepayers, establish new tariffs

- PJM study shows monthly residential bill increases in $20s in NJ and DC and tie increase to new infra for data centers
- Projections of future bill increases from 1-5% in 2026 and 30-60% by 2030 without substantial ratemaking/policy change
- New tariffs to promote fair cost allocation for grid upgrades (MN, annual fee; OH: new AEP tariff, 85% prepayment; IN: 80% prepayment bill proposed; PA: developing large-load tariff)
- More policy debate and new rules/tariffs to establish fair cost allocation (OR; GA; VA)



"Better Practices" are Emerging for Data Center Development

New Developer Requirements

New requirements established at State, County, and Local levels

New requirements for new developments

- Overlay zones/max % of land (MD)
- Special use permitting and public hearings (Loudoun County, VA, Albemarle County, PA)
- No by-right zoning (Loudoun County, VA)
- Size limitations, Substation screening, Set back requirements, Visual screening and architectural requirements, Meet noise standard (Fairfax County, VA)

"Better Practices" are Emerging for Data Center Development

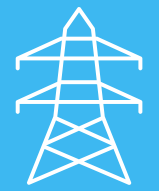
Load Management + Resiliency

Manage loads to reduce strain on grid

Allow for flexibility

States and utilities push to use existing load management strategies

- Demand Size Management (DSM) programs to control, reduce, and reduce loads during peak times, to improve grid stability
- Virtual Power Plant (VPP) programs to incorporate renewables and storage into data centers and manage load during peak times, to improve carbon footprint and improve grid stability
- Opportunity to use AI optimization to improve systems/networks and improve load management



"Better Practices" are Emerging for Data Center Development

Efficiency & Clean Energy

New energy and water efficiency requirements

Integrate and validate new tech

Study impacts of integrated renewables + storage compared to new natural gas

Requiring existing technologies and developing and validating new technologies

- New energy and water use efficiency requirements (MN)
- Integration and validation of efficiency and ecosystem benefits of advanced cooling technologies (closed loop, liquid, immersion, seawater) and heat recovery
- Incentivize 24/7 renewable energy with storage, on site and with Power Purchase Agreements (PPAs)

"Better Practices" are Emerging for Data Center Development

Private + Public Coordination

No Non-Disclosure Agreements (NDAs)

Improving State + Local information flow and coordination

New sustainability/lifecycle frameworks and metrics, site specific impact analysis, and playbooks

Improving information flow and transparency

- Encourage municipal leaders across states/regions to avoid signing NDAs
- County-State Government communication of potential opportunities and impacts (Calvert County, MD)
- Special Use Permit process, ensuring public input (Albermarle County, VA)
- Business First Stop program (MN) informs all pertinent state agencies of new proposals
- Sustainability frameworks for construction, operations,
- More study and consideration of operational and lifecycle impacts of operating data centers (e.g., upgrades and end-of-life)

Landscape of Sustainability Frameworks for Data Centers

Voluntary frameworks and associations to track sustainability efforts

ASSOCIATIONS & COALITIONS

CDP

GRI

The iMasons Climate Accord™

SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

GRESB

the green grid®
enabling data center efficiency

ASHRAE®

ENERGY EFFICIENCY STANDARDS

ENERGY STAR

ISO 50001
ENERGY MANAGEMENT

WATER STEWARDSHIP

ALLIANCE FOR WATER STEWARDSHIP

WATER STEWARDSHIP WAVE VERIFIED
BY SCS GLOBAL SERVICES

GREEN BUILDING STANDARDS

GREEN GLOBES
BUILDING CERTIFICATION

Better Buildings CHALLENGE
U.S. DEPARTMENT OF ENERGY

U.S. GREEN BUILDING COUNCIL
LEED CERTIFIED
USGBC

CODE FOR A SUSTAINABLE BUILT ENVIRONMENT
BREEAM

Sustainable Building Standards for Data Centers

Two federally-recognized (GSA approved) sustainable building standards tailored to digital infrastructure

Both enable data center developers of new and operators of existing sites and campuses to assess environmental sustainability

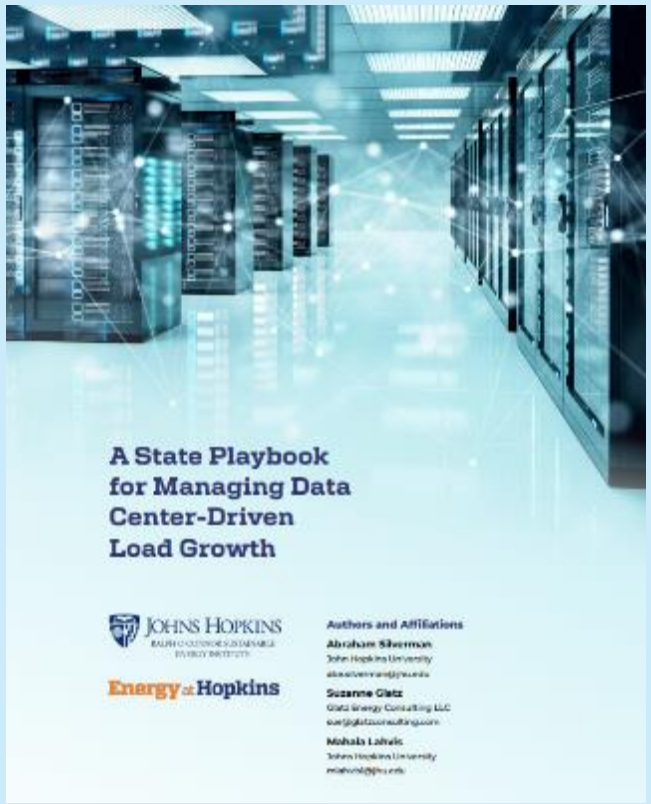
Leadership in Energy and Environmental Design (LEED) - U.S. Green Building Council

- Since mid-2000s, 1,610 certified/registered data centers globally (44 M sq m)
  - Energy and Atmosphere: Power Usage Effectively (PUE), on-site renewable energy
  - Water Efficiency: Water Usage Effectiveness (WUE), recycling
  - Sustainable Site: Stormwater management, reduce heat island, location
  - Materials & Resources: Recycled content, responsible sourcing, waste diversion
  - Indoor Environmental Quality: Filtration, daylighting, occupant comfort
  - Innovation: novel efficiency, reuse, AI-optimization

Green Globes Certification for Data Centers – Green Building Initiative

- Since 2010s, 10+ certified/registered data centers in U.S. (~1-2 M sq ft)
  - Energy: PUE, renewables, load management
  - Water conservation: WUE, recycling, reuse, low-flow systems
  - Operations/Management: Monitoring, metering, performance tracking
  - Site: Habitat protection, resiliency
  - Materials: Recycled content, low-carbon materials, waste diversion
  - Indoor Environmental Quality: Air quality, thermal comfort, lighting
  - Innovation: Advanced cooling, AI-load balancing, carbon accounting

Playbook - Data Center Energy Loads



A State Playbook for Managing Data Center-Driven Load Growth - Johns Hopkins Univ. Energy Institute

- Specific to data centers, focuses on load management and recommendations for state policy makers
- Establishes recommendations based on how to achieve: time-to-power, fair cost, lower risk of investment, clean energy goals, econ. benefits, etc.

Guidance

- ✓ Improve Administrative Information Collection & Processing of Data Center Requests
- ✓ Clarify the Right of Utility Regulators to Tailor Rates
- ✓ Establish Substantive Requirements for New Requests
- ✓ Require Contribution to Grid Modernization Funds to Provide Ratepayer Relief for Costly Transmission Needed for Data Centers
- ✓ Require Flexibility in Data Center Operations
- ✓ Develop New "Non-Firm" Tariff Services
- ✓ Impose "Bring Your Own" Energy or Capacity Requirements
- ✓ Set Clean Energy Content Requirements
- ✓ Moratorium (option)

"Better Practices" are also being established by some Developers and Investors

Resource use, cost, efficiency

EFFICIENCY

Enhance energy and water efficiency through smarter design and operational practices

CLEAN ENERGY

Invest in new renewable energy development and avoid new fossil fuel generation

OFF-SET

Match 24/7 energy use to renewable sources through Renewable Energy Credits or Power Purchase Agreements.

TRANSPARENCY

Transparency with project plans and development; Public commitments to net-zero, water, etc. Share status of implementation & reporting.

ASSOCIATIONS

Membership in sustainability-focused industry association(s)/ coalition(s) to collaborate with stakeholders

FRAMEWORKS

Utilize third-party verified sustainability frameworks for green building standards, energy efficiency, and water stewardship.

Behavioral change and trust

Ongoing Research

- Continue study of emerging industry trends and insights based on news and research reports
  - *Focus attention on impacts of data centers – benefits and impacts*

- Continue to compile case studies and emerging "better practices" regarding data center developments
  - Including new frameworks and playbooks for stakeholders and decision makers

Next Steps

- Website: www.joycefdn.org/news/data-center-development
- November 2025 - University of Virginia Weldon Cooper Center Research
  - Electricity demand forecast for each Great Lakes state
  - Economic impact analysis for each Great Lakes state
- December 2025 - Webinar: Data Center Development: Emerging Insights for Communities
- Under Development: Forecast of water demand from data centers

Today's Topics

Review of Current Landscape 01

Emerging Trends & Insights 02

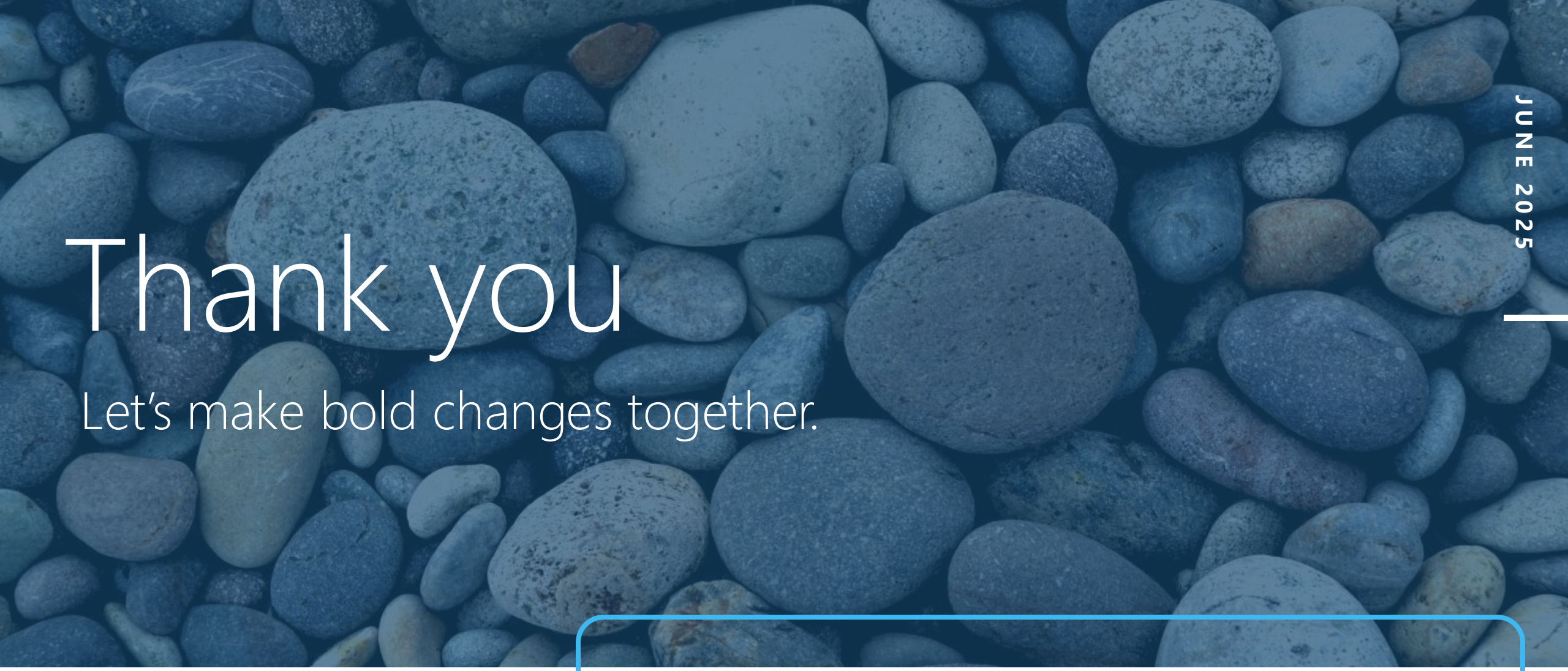
Emerging Better Practices 03

Q&A and Discussion 04

Q&A and Discussion

We welcome your thoughts and questions!

- What other information do you need to inform your policy recommendations and decision making?



Thank you

Let's make bold changes together.

JUNE 2025

FRESH COAST
Climate Solutions

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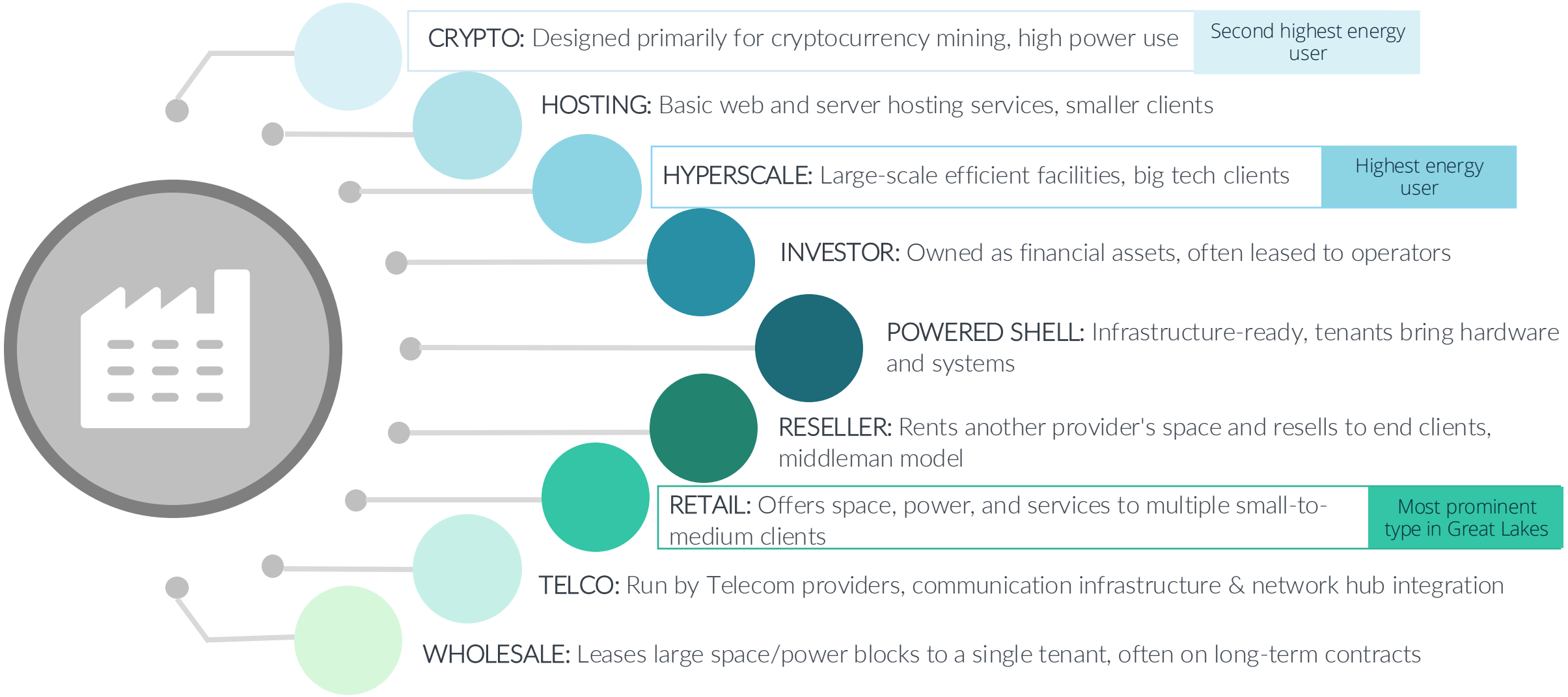
Appendix

FRESH COAST
Climate Solutions

Bold Solutions. Transformative Action.

Types of Data Centers



CRYPTO: Designed primarily for cryptocurrency mining, high power use — Second highest energy user

HOSTING: Basic web and server hosting services, smaller clients

HYPERSCALE: Large-scale efficient facilities, big tech clients — Highest energy user

INVESTOR: Owned as financial assets, often leased to operators

POWERED SHELL: Infrastructure-ready, tenants bring hardware and systems

RESELLER: Rents another provider's space and resells to end clients, middleman model

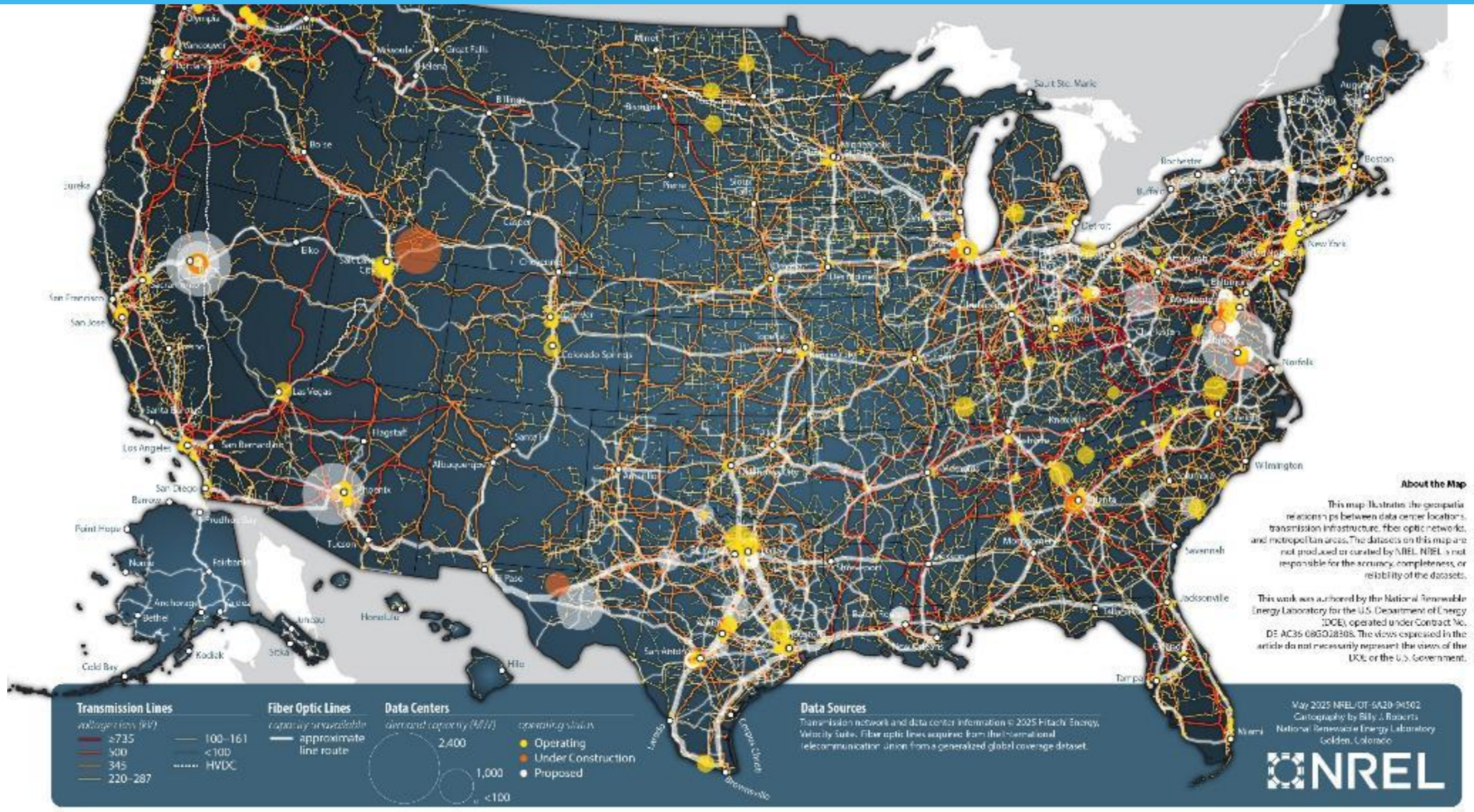
RETAIL: Offers space, power, and services to multiple small-to-medium clients — Most prominent type in Great Lakes

TELCO: Run by Telecom providers, communication infrastructure & network hub integration

WHOLESALE: Leases large space/power blocks to a single tenant, often on long-term contracts

Adapted from: Ferreira, Joao-Pedro. University of Virginia Weldon Cooper Center for Public Service. (2025 May 8). "Economic, Fiscal and Energy-related Impacts of Data Centers in the Great Lakes Region." 2nd Advisory Board Meeting.

Data Center Infrastructure in the US - Fiber Optic and Transmission Lines, 2025



Roberts, B. (2025, May). Data Center Infrastructure in the United States, 2025 (Map). NREL.

Visualizing Data Center Expansion

Data Centers in the Great Lakes Region are expanding rapidly. In Virginia, data center growth has brought economic benefits but also heavy land, energy, grid, and water use, community pushback. Counties and cities are reacting with new requirements.

Part of "Data Center Alley" in Ashburn, VA

Creative Commons

Meta's Henrico Data Center in Sandston, VA

Virginia Public Media. (2025, June 26). Data centers keep growing in Virginia — and so does energy demand. VPM News.

329+ Data Centers in Virginia

Virginia Mercury. (2024, May 28). Virginia Explained: Data center expansion, with all its challenges and benefits. Energy + Environment.

Methodology

Synthesis of News/Research on Data Center Developments and their Econ/Enviro/Community Impacts

Identification and prioritization of research sources and information

- Sources: DCK, DCF, DCD, Utility Dive, HPCwire, The Register, CRN, SiliconANGLE, Stack, Uptime, and targeted Google News queries (Build/Invest/Tech/Research).
- Process: Scrape article text & summary (Newspaper3k) and cache body text for consistent screening.
- Relevance filters: Great Lakes region, exclude speculation without commitment, drop low-signal PR-wire/crypto-only articles
- 3-stage deduplication: URL-level, normalize title, and token-signature match with tie-break ranking prioritizing trusted sources and project signal
- Output: Excel file with a log of kept and skipped news articles for analyst evaluations and feedback

Methodology

Synthesis of News/Research on Data Center Developments and their Econ/Enviro/Community Impacts

Summary Metrics

- Total articles reviewed: 4,150
  - Review period: Jan 6 – Sep 15, 2025
  - Average: 16 articles per day
- Breakdown by Category
  - General: 1,149, Investment: 559, Research: 533, Tech: 178, Sustainability: 72, Legislation: 57
- Great Lakes relevance: 7.4% of kept items are tagged as GL-related

Methodology

Synthesis of News/Research on Data Center Developments and their Econ/Enviro/Community Impacts

Article Selection

- Articles from the relevant time period are manually sorted into the categories "Investments," "Technology," "Legislation," "Research," "Sustainability," and "Other."
- Articles are then selected for a bi-weekly update based on relevance to the data center industry, level of potential economic/environmental/community impact (H/M/L), location in the Great Lakes Region, and focus on new or updated news. Announcements and news on impacts of data centers are reviewed.
    - Multiple articles reporting the same news from different sources are selected based on the amount of relevant data, credibility of the source, and depth of information provided.
    - Any updates that are highly region-based outside of the United States are removed from the list, unless they detail innovative technology or provide a basis for legislation that could be used in the Great Lakes Region.
    - Articles regarding updates on cities in the Great Lakes region are prioritized.
    - Federal/National new that could impact the Great Lakes region is prioritized.
- This methodology began as a “process of elimination” style, but due to the large number of articles we adjusted to a "selective approach" where we select articles that stand out as higher impact and the follow the above guidelines as highlighted.