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Data Center Siting: Issues for Local Communities

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Questions to Answer

- What are the impacts of data centers?
- If the negative impacts can't be completely eliminated, what can communities do to manage them?
- How can Lincoln generate valuable policy insights to aid communities in their decision-making? Can we give them specific guidance based on their local energy and water resource availability?

Currently Active Data Centers

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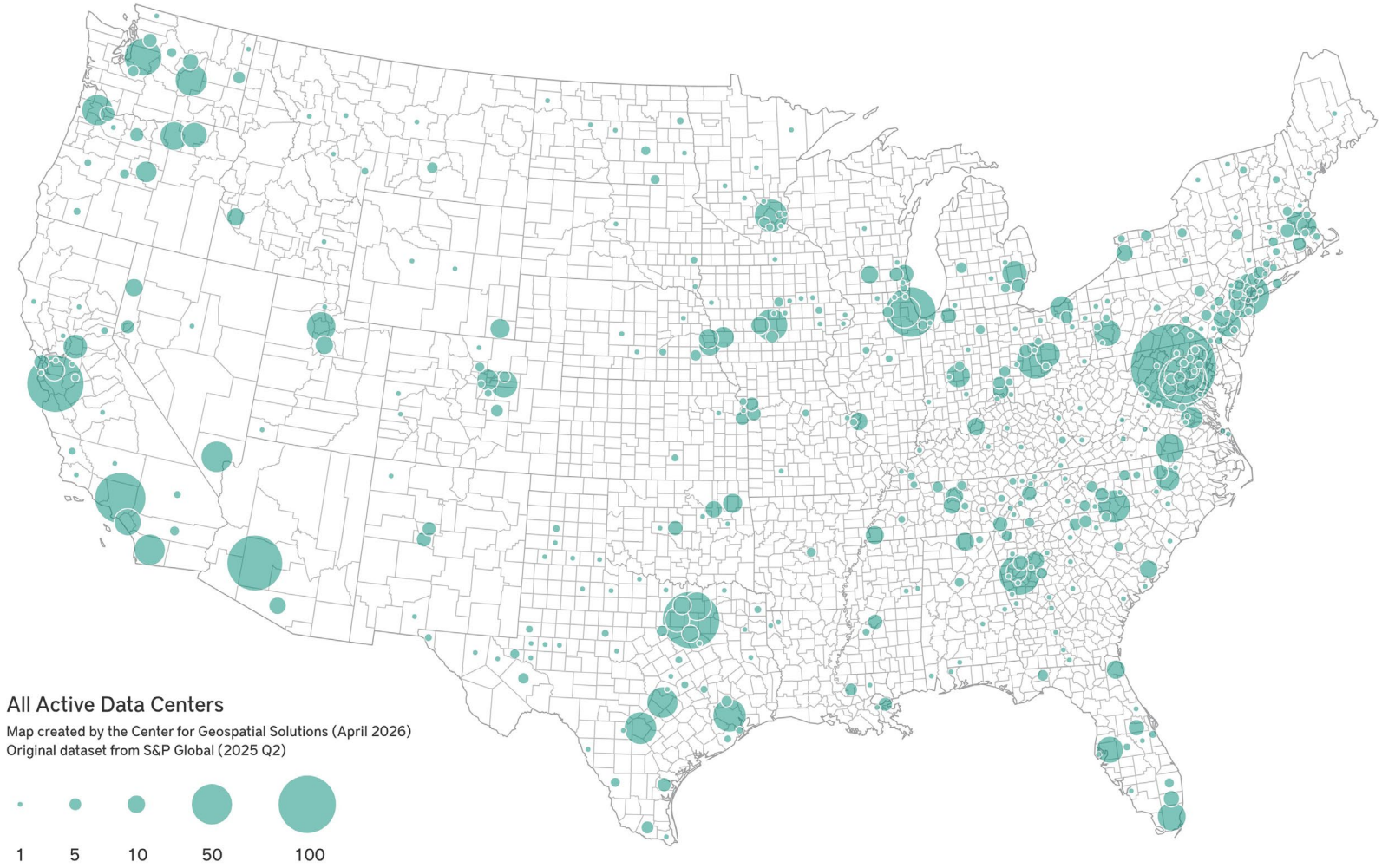


Data Centers Snapshot

- Data Centers aren’t new. It's the AI data centers and their enormous appetite for computing power that’s new and a little frightening
- AI and Digital solutions will be a major tool in the development and management of Smart Cities and many other uses
- This increasing use of AI will require expanded construction of data centers, which are also growing in bulk and size
- Electricity demand for data centers projected to be130 GW by 2030
- Large data centers can consume 5 million gallons/day or more for cooling
- Each 100-word AI prompt uses 519 milliliters of water (1 bottle)
- The data center footprint impact will get much larger, according to estimates by the Department of Energy and the Los Alamos National Laboratory

Potential Land and Energy Impacts

- Hyperscale Data Center (50-100+ MW IT load)
- Land footprint: 100-300 acres (sometimes larger)
- Building footprint: 500,000 – 1.5+ million sq. ft.
- Mid-Size Enterprise Data Center (5-20 MW)
- Land footprint: 10-40 acres
- Building footprint: 50,000 – 250,000 sq. ft.
- Rule of Thumb: 205 acres per MW of IT capacity (varies by design & expansion plans
- A data center running continuously: 1 MW = 8,760 MWh/year. 100 MW can power 75,000 – 100,000 homes

Potential Water Impacts

Air-Cooled (Minimal Water)

Near zero operational water use

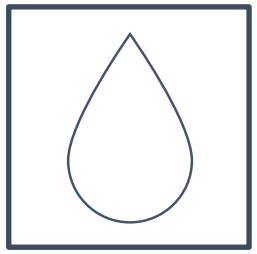
Higher electricity use

Evaporative / Cooling Tower Systems

1–5 million gallons per day (MGD) for a 100 MW facility

(Or ~: 2–5 gallons per kWh)

Annual water use for 100 MW: ~300–1,500 MGY (highly climate-dependent)



Liquid Cooling for AI

Can increase water intensity if cooling towers are used

Some facilities are shifting to closed-loop or recycled water systems

Current Trends

- **AI data centers are increasing:**
  - Power density (50–100+ kW per rack)
  - Total campus power (300–1000+ MW)
- **Water constraints are driving:**
  - Air cooling in dry regions
  - Reclaimed wastewater use
- **Utilities now planning multi-gigawatt data center corridors.**
  - It's a dynamic industry; many technology, planning factor, and facility components are changing simultaneously.

Geography of Potential New Data Centers

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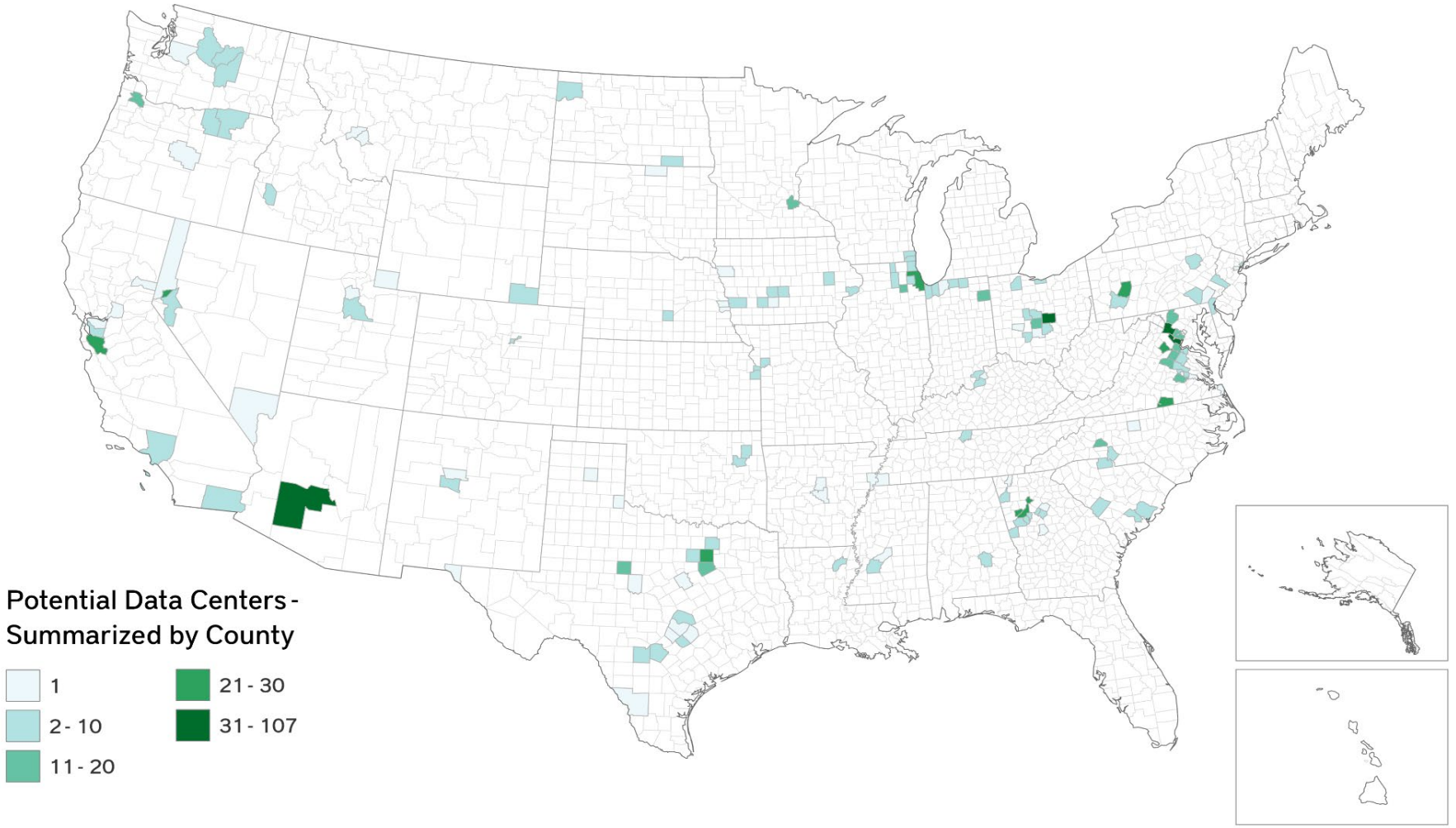
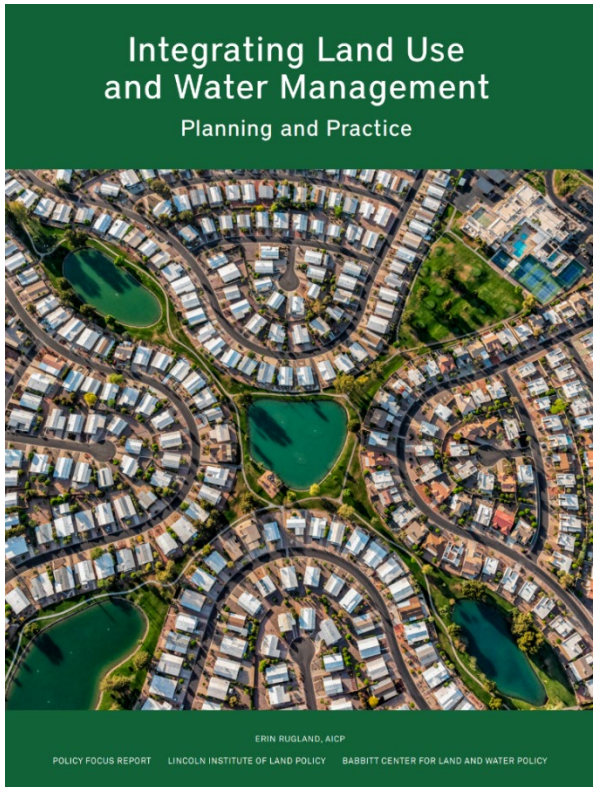


An Integrated Land and Water Policy Problem

- Data centers raise a complex set of interconnected land use and water challenges
- Actual community impacts vary, and depend on a complex set of environmental, technological, and policy factors
- Each data center proposal approved or denied is the product of a decision made by a local government
- Land use planning and water policies are usually not well integrated at the local level. When they are, it can help local governments to better respond the stress of data center applications



Issues Analysis List

- **Water cooling:** What is the source of the water and the amount withdrawn? Is it consumptively used? Where is it discharged? Can the remaining water be recovered and continually reused onsite? Is there an opportunity for close-loop cooling?
- **Energy:** What is the stability of the existing electric grid and the availability of additional generation capacity on site?
- **Water rates:** Is the water acquisition cost for the data center being paid for in the community water system? Or can all costs be assessed directly to the user? What rate structure modifications would be required to do that?
- **Property Taxation:** How to recover the full cost of this facility to the community? (Since there are really no jobs to boost the local economy except construction.) How to calculate the overall community impact that might be recoverable in property taxation?

Issues Analysis List

- **Land value capture:** Once the data center is built, it will lower the value of land around it and will disincentivize other development. Or will it?
- **Impact Fees:** Might this be a strategy that communities can use to offset the local costs to the community? This is a one-time fee at the time of project approval, so how big should this fee be to cover the long-term impact?
- **Municipal approval options:** What might these be? Special Zoning districts? Negotiated MOUs? Specific planning and zoning ordinances? Are there good case examples of communities that have handled this well?
- **Indirect land use impacts**: How are data centers being sited on lands with competing uses (e.g., agriculture, tribal lands, solar farms), and what are the indirect impacts (e.g., are they crowding out other kinds of development?).

Issues Analysis List

- **Governance / oversight issues:** Are these centers being located in fragmented jurisdictions? How transparent is the application process? What are the overall regional cumulative impacts?
- **Offset accounting:** Usually a mismatch between corporate "water-positive" pledges and local scarcity. Nearly all major cloud companies have pledges to be "water positive" by some future date, but their “offsets” are often not within the same watershed. Whether offsetting schemes actually result in reduced aggregate withdrawals in water-stressed basins must be evaluated.
- **Water permitting:** Water permitting and reporting/compliance frameworks are generally lacking and not integrated into tax incentives. Groundwater permitting more specifically is often weak and/or opaque, especially in rural areas. Negative externalities of water table drawdown ("dewatering") on neighboring groundwater users is a serious risk. What kinds of monitoring and regulation are in place?

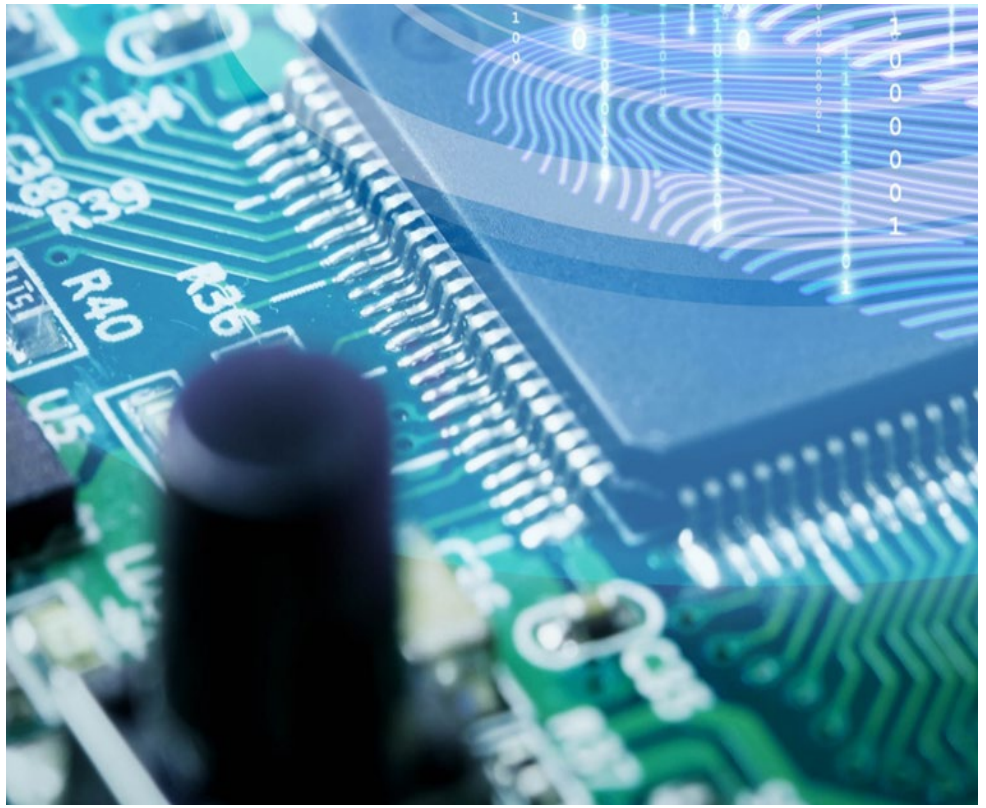
Do Data Centers Affect Surrounding Land Values?

(Photo by Nathan Howard/Getty Images). Virginia *Mercury,* February 10, 2025.

- Do we even know?
- Amazon Web Services Data Center near single family homes
- Stone Ridge, Virginia

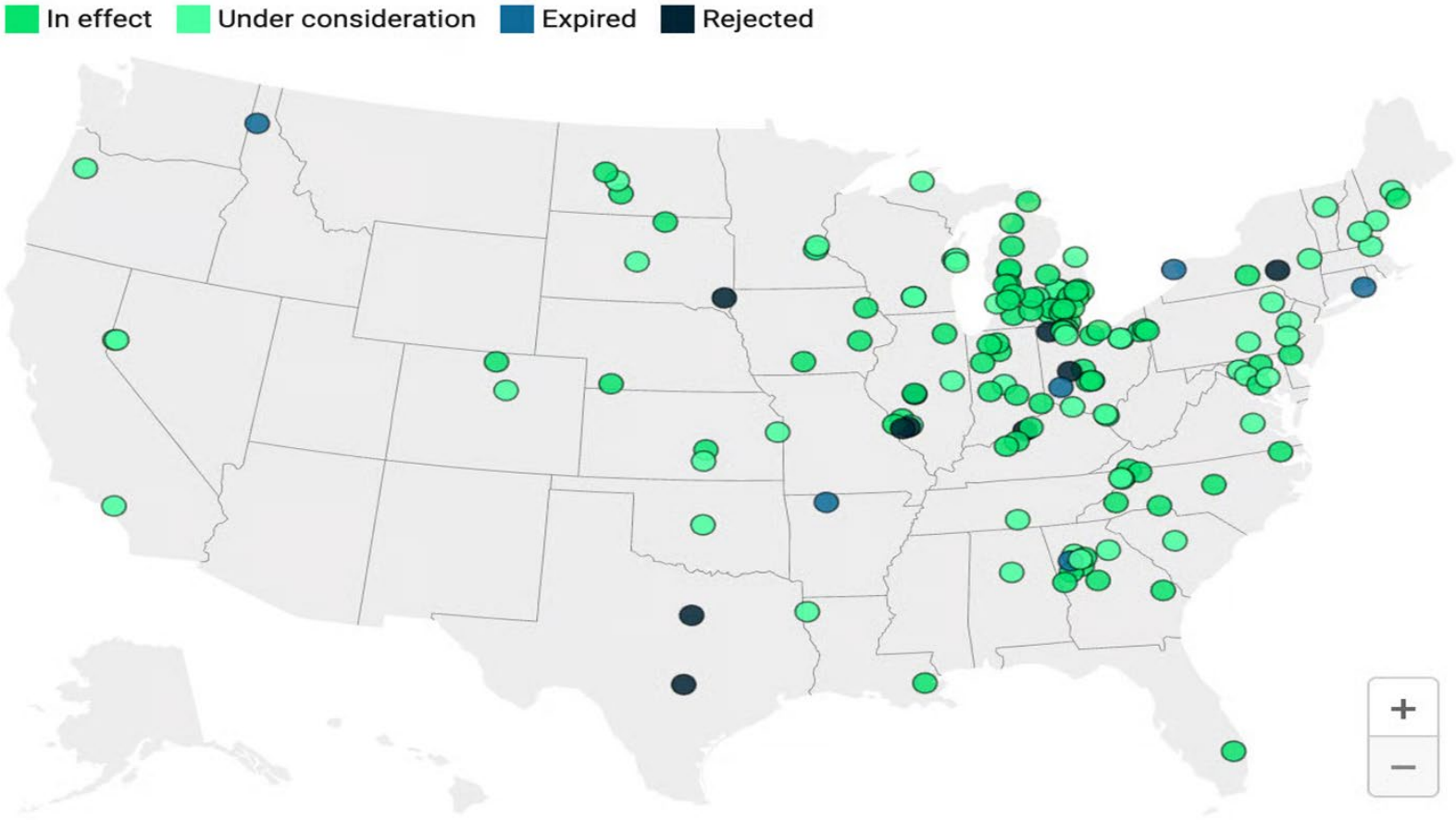
Opacity in Data Center Siting and Operations

- Limited public disclosure of energy use, water consumption, emissions and supply chains
- Complex corporate structures and nondisclosure agreements obscure operational impacts and accountability
- This opacity limits community awareness, meaningful participation, and informed public decision making



150+ legislative bodies across the US have taken action on data center moratoriums

Of these, most are at the local level. 16 of the efforts are at the state level, marked on the map by their respective state capitals.



Map: Katie Malone/Technical.ly • Created with Datawrapper

Calling a Time Out on Data Centers

STATES

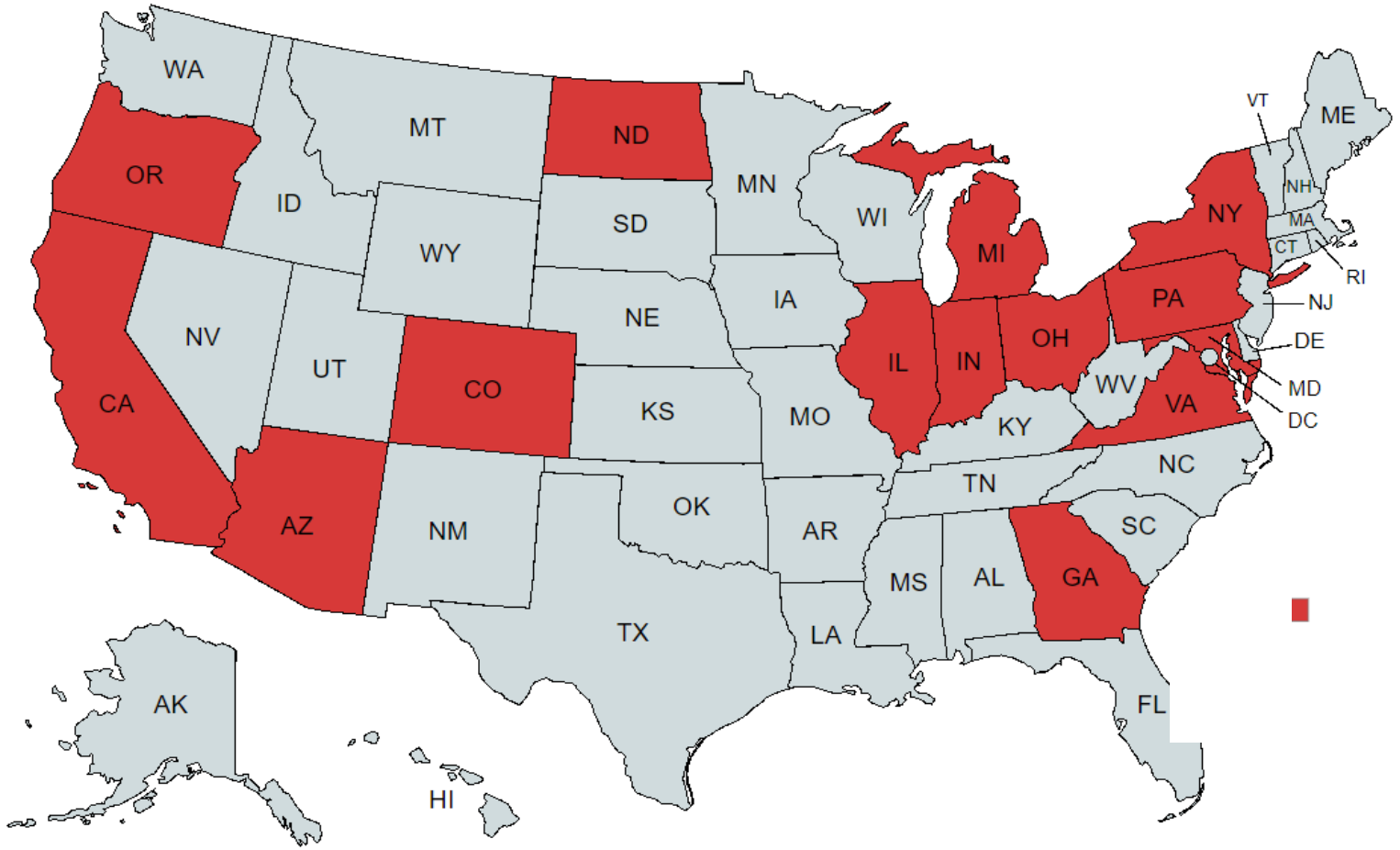
1. Georgia
2. Florida
3. Maine
4. Maryland
5. New York
6. Oklahoma
7. Vermont
8. Virginia

LOCAL JURISDICTIONS

1. Columbus, OH Metro Area
2. Denver, CO
3. Eagan, MN
4. New Orleans, LA
5. St. Louis, MO Metro Area
6. Urbana, IL
7. 4 counties in Maryland
8. 19 communities in Michigan

Data Center Ordinance Trends

From our preliminary research, the shaded states have city or county ordinances that explicitly address "data centers." This analysis is not exhaustive.



Arizona Activity on Data Centers

STATE ACTION

1. HB 2756 (2026 Session): Electric rates
2. HB 1774 (vetoed): Pre-emption of local authority
3. EO 2025-13: Streamline energy infrastructure development
4. Data Center Tax Incentive Extension
5. ACC Rate Classification Docket
6. Proposition 207 (2006): Requires government compensation when regulations diminish property value

LOCAL ORDINANCES

1. Chandler
2. Phoenix
3. Mesa
4. Marana
5. Tucson
6. Maricopa County
7. Pima County (under review)
8. Goodyear (under review)

NOTE: Data centers require low internal humidity so are attracted to desert areas

Data Center Risks

- Many risks with Data Center Siting in local communities
- Lots of media coverage & published reports on energy and water risks
- Lincoln's work is focusing on enabling the local authority necessary for making sustainable siting decisions
- A new issue emerged in our research

A New Financial Risk: Data Center Abandonment

- Completely absent from the general data center discussion
- Why is this a possibility?
  - Chip evolution is rapid: chips can become obsolete within a 5-10 year period
  - Even the racks on which the chips are stored are designed for certain specific types of chips and may become obsolete too
- The cost of chip and rack replacement and reconstruction is higher than the cost of abandonment and new construction elsewhere

What is the Solution?

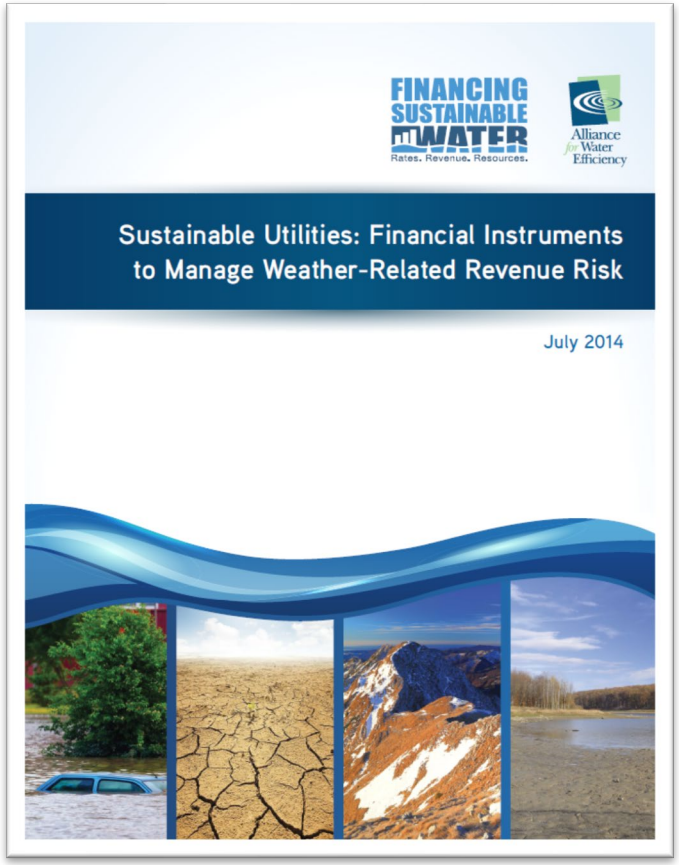
- Financial Risk Instruments are options that could be required of a data center applicant
- Abandonment and decommissioning would automatically trigger payment to the community to deal with the legacy structures

Types of Financial Risk Instruments

- Lincoln is creating tools for data center siting ordinances
- We will assemble the best examples from the large number of ordinances already adopted
- We have retained a risk management expert to create examples of these four instruments tailored to data centers:
  1. Insurance policy
  2. Derivative contract
  3. Hybrid instrument, such as a surety bond
  4. Structured purpose vehicle (a separate legal entity)

Expert Assistance

- John Polasek, President of AIWEX, Inc.
- A highly skilled professional in the finance and risk mitigation arena with over 25 years of experience
- Experience working for multiple top-tier investment banks (Bank of America, Merrill Lynch, Bear Stearns, JP Morgan, and Deutsche Bank)
- Successfully structured and executed numerous financing and risk mitigation structures for renewable power projects around the globe
- The Four Financial Risk Instruments will be completed by June 1, 2026



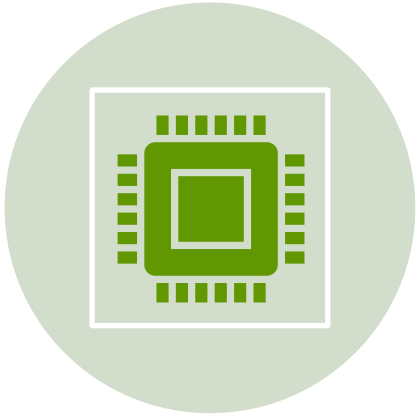
In Summary: What Do Local Communities Need?

- Adequate local authority to make the right decisions
- Accurate analyses of the LOCAL energy and water availability
- Strategies for avoiding energy and water rate shock
- Advice on taxation revenues and possible fiscal impact
- Ability to negotiate community benefits
- Tools for addressing the financial risk of resource overconsumption and potential abandonment

What Lincoln Will Publish in 2026

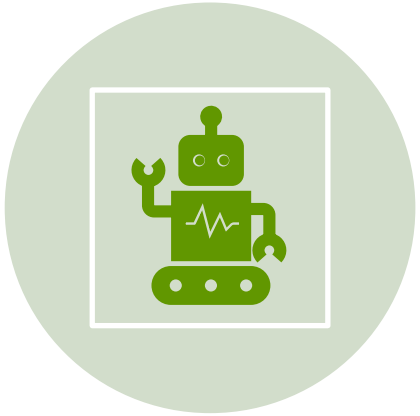
- A geospatial sense of the problem
- Recommendations for zoning tools for communities to use and modify as needed
- A strategy for avoiding water rate shock impacts to household ratepayers
- A process for creating community benefit agreements
- Template Examples of financial risk instruments
- Case studies in VA and AZ showing hydrological gap analyses

More Interesting Facts About Data Centers



COMPANIES, SUCH AS MICROSOFT, ARE TESTING UNDERWATER DATA CENTERS

APPROX. 11,800 DATA CENTERS WORLDWIDE (OVER 5,400 IN USA)



AI USE ACCOUNTS FOR 20% (+) OF DATA CENTER WORKLOAD CAPACITY

Thank you

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