



# **PREPARING FOR THE DIGITAL RUSH: WHAT TO KNOW BEFORE A DATA CENTER COMES TO YOUR COMMUNITY**

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# *Alliance for Water Efficiency*

# ABOUT ALLIANCE FOR WATER EFFICIENCY

*The Alliance for Water Efficiency's mission is to promote the efficient and sustainable use of water across North America.*

- AWE supports water efficiency practitioners from 500+ organizations
  - Members include water utility agencies, local and state governments, businesses and industry partners, nonprofits, universities, and more
- AWE develops cutting-edge resources, facilitates peer-to-peer learning and collaboration, and advocates for public policy and funding initiatives to advance the adoption of water efficiency

*Visit [a4we.org](http://a4we.org) or check us out on social media to learn more!*



# COMING SOON: DATA CENTER PRIMER

- The **Data Center Primer** provides information on
  - Data center types and functions
  - Data center cooling technologies
  - How much water is used in data centers
  - How to ensure water is appropriately considered in data center development.
- Written for local water providers and water utility professionals.



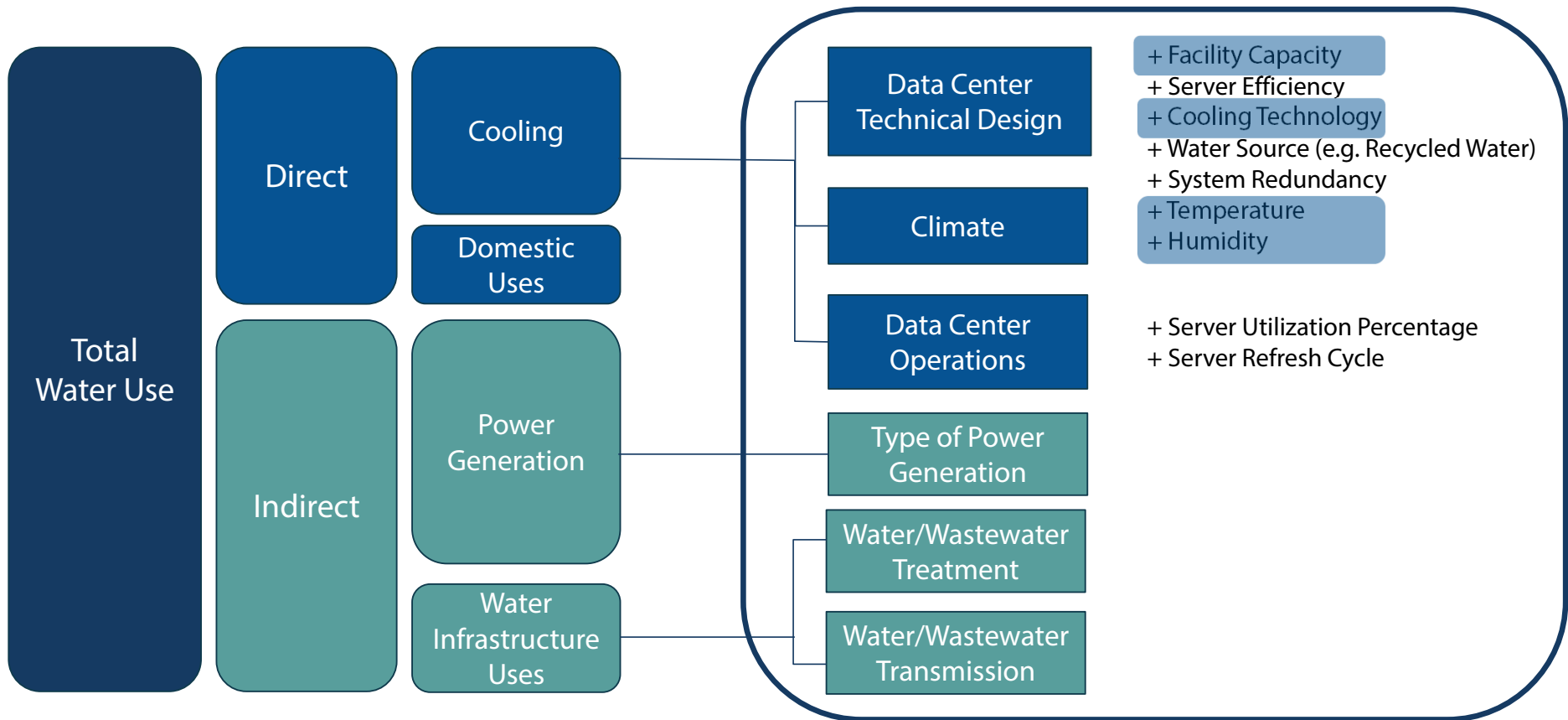
## KEY TAKEAWAYS

There is no one-size-fits-all solution for data centers to maximize water efficiency.

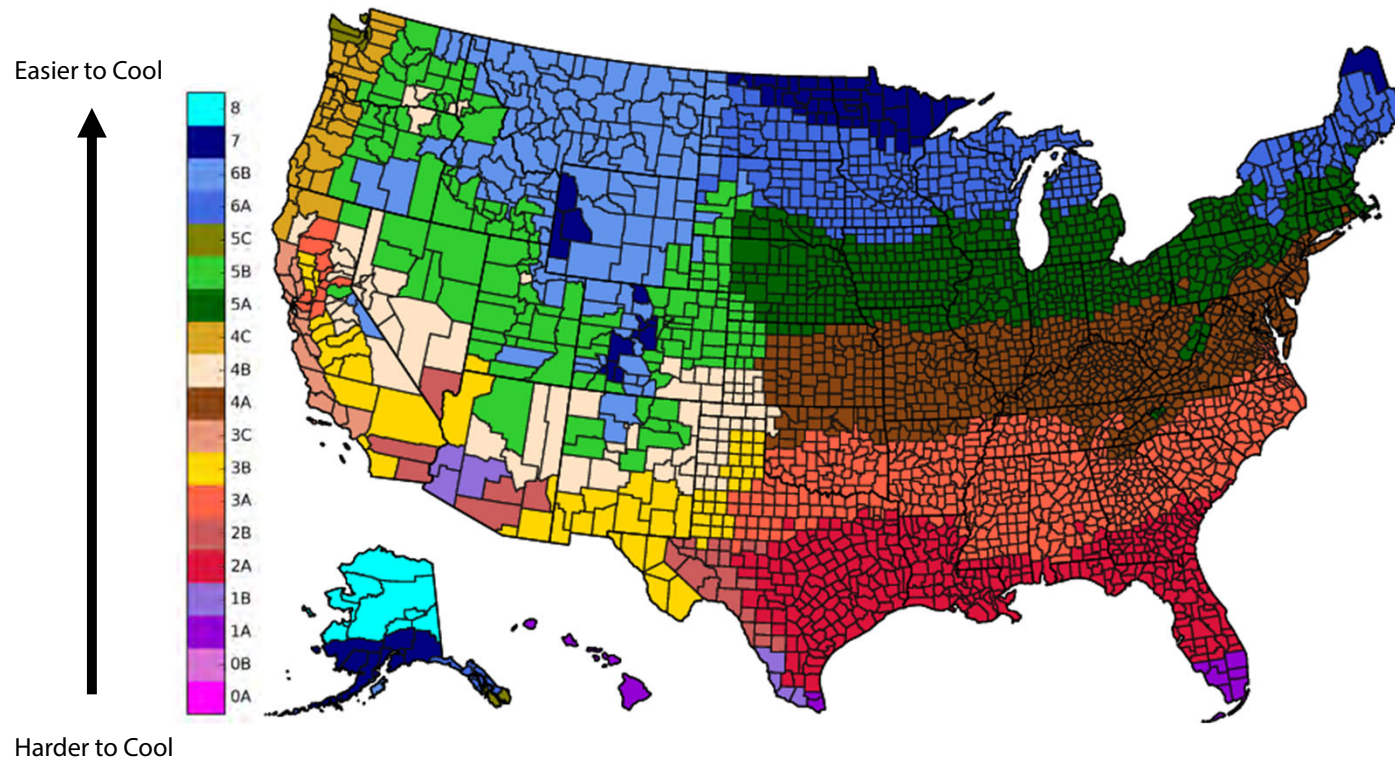
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**Early** and **regular** involvement of water professionals in data center projects is vital to maximize water efficiency.

# DATA CENTER WATER USE

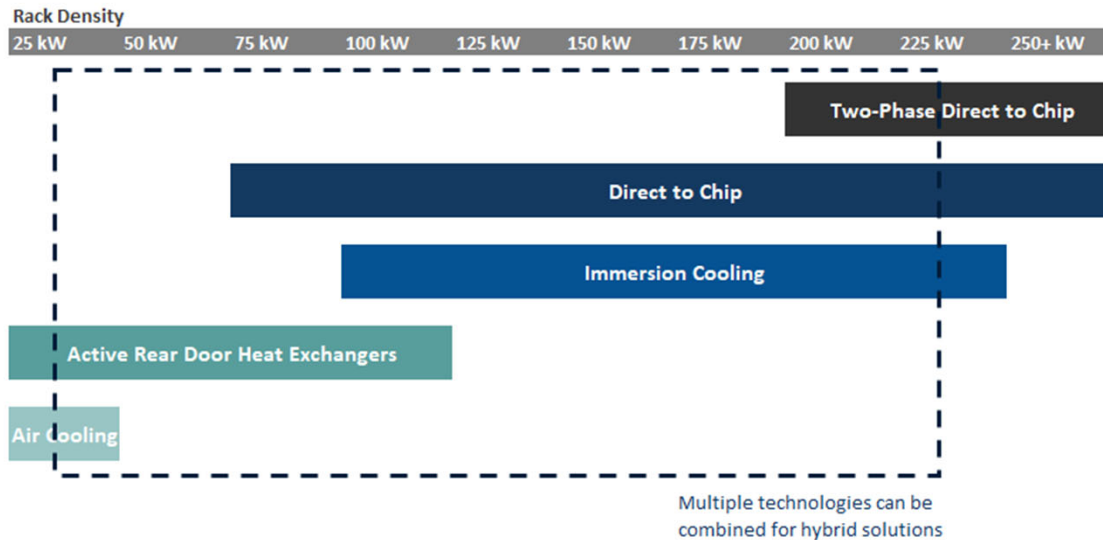


# CLIMATE AND COMPUTING CAPACITY: KEY DRIVERS OF COOLING NEEDS



Source: Jim Fukuda et al., *Data Center Resource Effectiveness (DCRE) Metric*, Information Technology Industry Council, 2025, <https://www.thegreengrid.org/resources/library-and-tools/wp93-data-center-resource-effectiveness-dcre-metric>.

# CLIMATE AND COMPUTING CAPACITY: KEY DRIVERS OF COOLING NEEDS



- Higher rack density requires more cooling capacity
- Liquid cooling technologies have higher cooling capacity

Sources: 2025 JLL Data Center Outlook Report, 2025; Devin Pellicone, "AI Rack Cooling: Applying Directed Energy Thermal Strategies to High-Density Data Centers (50 KW - 1 MW+)," Advanced Cooling Technologies, 2026, <https://www.1-act.com/resources/blog/ai-rack-cooling-data-centers/?srsltid=AfmBOoole-w1xtc6DS0vM7bL5vsNM89TW55Y2qxndcxR0-fs4xCfhRb>.

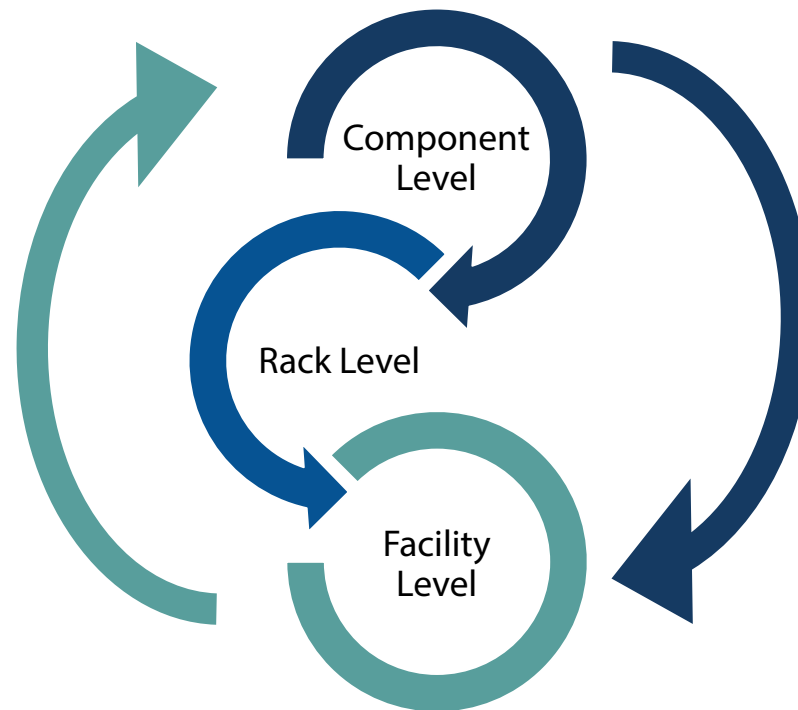
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# COOLING TECHNOLOGIES WORK TOGETHER



# COOLING TECHNOLOGY TRADEOFFS

Note: Higher efficiency doesn't always result in lower usage

Category	System Type	Cooling Capacity	Water Efficiency	Energy Efficiency
Mechanical Refrigeration (Facility-Scale)	Direct Expansion System	Lowest	Highest	Lowest
	Air-Cooled Chiller	Low	Highest	Lowest
Evaporative (Facility-Scale)	Water-Cooled Chiller (Includes Cooling Towers)	Medium	Lowest	Low
	Adiabatic Cooling Assistance	Medium	High	High
	Spray-Assisted Cooling	Medium	Medium	High
Free Cooling / Airside and Waterside Economization (Facility-Scale)	Dry Cooler	Medium	Highest	Medium
	Airside Economizer (Heat Pump)	Medium	Highest	Medium
	Waterside Economizer (Heat Pump)	Medium	Low	High

### Facility-Scale Cooling Technologies

- Lower cooling capacities
- Higher water efficiencies
- Lower energy efficiencies

### Component-Scale Cooling Technologies

- Higher cooling capacities
- Lower water efficiencies
- Higher energy efficiencies

Category	System Type	Cooling Capacity	Water Efficiency	Energy Efficiency
Liquid (Component-Scale)	Liquid Cooling, Rear-Door Heat Exchangers	High	Medium	Highest
	Liquid Cooling, Immersion	Highest	Medium	Highest
	Liquid Cooling, Direct-to-Chip Cooling	Highest	High	Highest

## KEY TAKEAWAYS

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**Early** and **regular** involvement of water professionals in data center projects is vital to maximize water efficiency.

## BENEFITS OF PROACTIVE PLANNING AND COORDINATION



Retrofitting existing data centers to meet new water efficiency goals is often difficult and costly.



Coordination among all stakeholders identifies key challenges up-front.



Stakeholders can align on a design that meets water efficiency and other project goals.



Transparency fosters public trust.



Data transparency allows you to verify assumptions to improve future planning.

# RECOMMENDATIONS OVER TIME

Project Phase	Pre-Planning	Project Planning and Design			Construction and Operations	
		Initial Site Proposal	Site Design	Final Site Approval	Construction	Operations
<b>Recommendations</b>				Construction Begins		Operation Begins
Make a Plan						
Identify Key Contacts						
Communicate Relevant Information						
Identify Project Constraints and Goals						
Align on Project Design						
Verify Water Use						
Community Engagement and Outreach						

Data Center Proposal Received

Construction Begins

Operation Begins

# IDENTIFY KEY CONTACTS

## Data Center Representatives\*

- Data Center Owners/Developers
- Data Center Designers/Engineers
- Data Center Operators

## Infrastructure and Regulatory Representatives\*

- Local Government Representatives
- Water Utilities / Providers
- Wastewater Utilities
- Energy Utilities
- Regional Planning Bodies
- Regulatory Agencies

## External Stakeholders

- Community Organizations
- Community Leaders
- General Public

\*Project Team

# COMMUNICATE RELEVANT INFORMATION

## Data Center Representatives

- Type and Number of Facilities
- Project Phases
- Project Address and Ownership
- Project Financing
- Design Uptime / ANSI-TIA Rating
- Design Water Use Efficiency (WUE)
- Design Power Use Efficiency (PUE)
- Rack Density
- Design Assumptions

## Infrastructure/Local Representatives

- Property Zoning
- Applicable Local Ordinances
- Applicable Water Regulations
- Available Potable/Raw Water Capacity
- Available Wastewater Capacity
- Water and Wastewater Transmission Capacity
- Available Alternative Water Sources
- Additional Infrastructure Needs
- Compliance Status

# RECOMMENDATIONS IN ACTION

Interactive PDFs streamline data compilation to ensure all relevant information is collected and addressed

1. Overview

2. Understanding Data Center Water Use

3. Evaluating Data Center Water Requests

4. Recommendations for Water Providers

5. Conclusion

Appendix A

Appendix B

## Appendix B

### Data Center Coordination Workbook

**Pre-Planning**

**RECOMMENDATION: MAKE A PLAN**

Proactive planning before receiving a data center proposal can empower a community to engage in informed discussion with data center developers and other stakeholders and ensure any future project aligns with an intentional vision for development and growth. This section walks through a series of land use, water, and community planning questions to consider. Note that this is not an exhaustive list, and there may be additional considerations unique to your community.

1. Are there existing ordinances or regulations (state or local) in-place that address data center sites or operations?  
 Yes  No  
 If yes, what do they require? \_\_\_\_\_  
 If no, consider the community's need to enact one.
2. Does your community have existing zoning or re-zoning requirements that would impact proposed data center projects?  
 Yes  No  
 If yes, what do they require? \_\_\_\_\_  
 If no, consider the community's need to enact one.
3. Has your community considered data centers in its comprehensive land use planning?  
 Yes  No  
 If yes, what do they require? \_\_\_\_\_  
 If no, consider the community's need to enact one.
4. Has your community conducted or participated in water resource planning (i.e. identified current and future water demands and infrastructure needs) and does it account for growth in water demands in your area?  
 Yes  No
5. Does your community have a Water Conservation, Comprehensive Plan, Climate Action and Resiliency Plan, Drought Contingency Plan, or any related type of plan that could be impacted by data center project developments?  
 Yes  No  
 If yes, do they need to be updated? \_\_\_\_\_
6. Would a Community Benefits Agreement (CBA) serve your community?  
 Yes  No  
 If yes, consider identifying specific water or infrastructure-related needs to include in future project-specific agreements.

A DATA CENTER PRIMER FOR WATER SERVICE PROVIDERS - APPENDIX B - 49

1. Overview

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Appendix A

Appendix B

### Initial Project Overview

Water Service Providers should request the following information from Data Center Stakeholders:

Phase No.	Data Center Building No.	Rack Density (kW/rack)	Total Capacity (kW)	Property Address	Property Owner	Planned Construction Start Date	Planned Operation Start Date	Planned Life Span (years)

**Initial Project Details (Data Center Design Parameters)**

For each Data Center building listed above, Water Service Providers should request that Data Center Stakeholders provide the following information:

Building Area (square feet)  
 Cooling Technologies Evaluated, Criteria, and Final Technology Section

Chosen	Loop	Open/Closed	Technology	Cooling Capacity (kW)	Water Demand	Power Demand	Operation Schedule (seasonal, daily, monthly, etc.)
<input type="checkbox"/>	Component						
<input type="checkbox"/>	Rack						
<input type="checkbox"/>	Facility						
<input type="checkbox"/>							
<input type="checkbox"/>							

Peak Day Water Demand (volume / day)  
 Average Month Water Demand (volume / day)  
 Anticipated Water Use Patterns (i.e. seasonal per cooling technology, peak demand before operation begins for liquid closed loop filling, etc.)  
 Water Source and Type (i.e. raw, potable, recycled, etc.)

*Note whether planning to purchase water from a water service provider or withdrawing directly from the environment (groundwater or surface water).*

A DATA CENTER PRIMER FOR WATER SERVICE PROVIDERS - APPENDIX B - 53

Appendix B walks users through recommended project planning and coordination steps



**THANK YOU!**

Contact: [johanna@a4we.org](mailto:johanna@a4we.org)

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