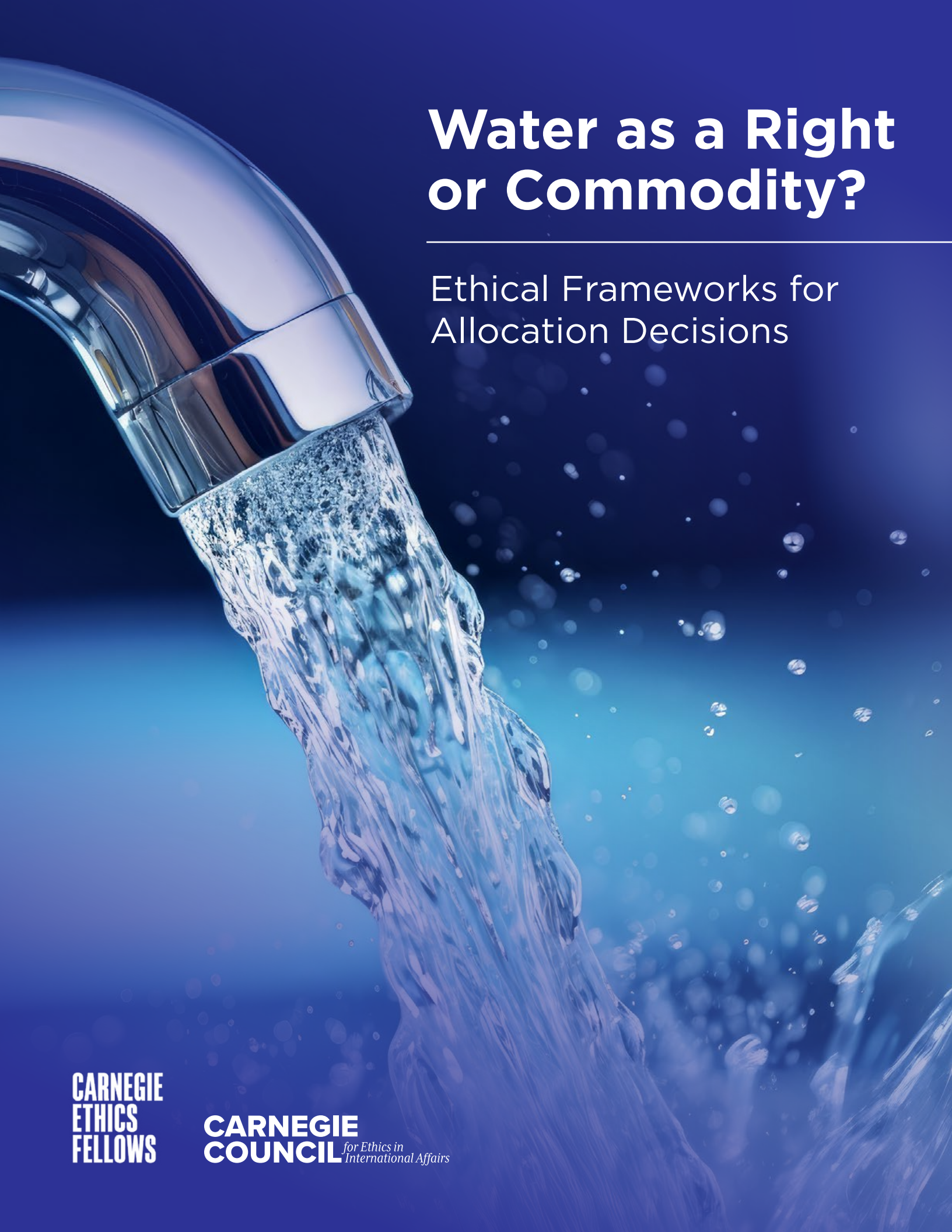

Water as a Right or Commodity?

Ethical Frameworks for Allocation Decisions

CARNEGIE ETHICS FELLOWS

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Contents

The following project was produced by a working group from the second Carnegie Ethics Fellows cohort reflecting nearly two years of convenings, collaboration, and research. Each report in this special series examines a critical issue at the intersection of ethics and international affairs. The Carnegie Ethics Fellowship aims to develop the next generation of ethical leaders across business, government, academia, and non-governmental organizations.

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Summary

Water is essential for human life and global development. However, about 4 billion people face severe water shortages for at least one month each year, and 2.1 billion people still do not have safe drinking water (UN-Water, 2024; WHO/UNICEF, 2025).

Meanwhile, access to safe, affordable, and reliable water is increasingly threatened by the combined pressures of climate change, rapid urbanization, population growth, infrastructure underinvestment, the expanding demands of water-intensive industries, and most recently—data centers.

Data centers can use up to 300,000 gallons of water each day for mid-sized sites and up to 5 million gallons for large ones. By 2028, AI-related data centers in the United States could need up to 32 billion gallons each year (WRI, 2026). At the same time, the Environmental Protection Agency (EPA) estimates that 12.1 million to 19.2 million U.S. households cannot afford water services (EPA, 2024).

These pressures reveal a central ethical problem in contemporary water governance: How should societies allocate a finite and life-sustaining resource when commercial development, public welfare, ecological sustainability, and intergenerational equity come into conflict?

This report provides an ethical analysis of water allocation and governance in light of data centers' rapid expansion in the United States and globally.

We recognize the critical role of data centers in the growth of frontier technologies such as artificial intelligence and cloud computing, as well as the broader digital economy. Simultaneously, these facilities also require significant inputs of water, energy, and land, and already impact local communities' access to these essential resources. Many are facing public pushbacks and, in some cases, a real physical threat to their operations.

By examining case studies from other extractive industries, and examples of mining companies, governments, and local communities navigating water access and distribution questions, we explore the moral complexity of water as both a human right and an economic input and commodity. In addition, we call out more recent instances where such tensions have led to real consequences and impacted communities' access to safe water, and have disrupted data center operations and long-term strategy.

As a path forward, we offer a framework for public decision-making and corporate water responsibility, grounded in equity, accountability, and sustainability. This three-pillar framework carries distinct implications for local governments, water utility regulators, and companies.

Competing Values & Ethical Trade-offs

The governance of water in an era of scarcity involves genuine value conflicts rooted in one foundational premise: Water has no substitute; we are running out of it; and our personal and economic need for it is rapidly increasing.

In *The Three Ages of Water: Prehistoric Past, Imperiled Present, and a Hope for the Future*, Peter H. Gleick (2023) points out that for fossil fuels, for example, there are alternatives capable of providing comparable benefits: solar for electricity, electric motors for transportation, heat pumps for heating. For water, there are none.

The UN World Water Development Report on Valuing Water discusses the imbalance between water's price, cost, and value given conventional accounting often excludes domestic, ecological, cultural, public-health, and rights-based functions (UNESCO/ UN-Water, 2021). Water ethics scholarship similarly argues that allocation decisions embed judgments about productivity, ecology, culture, fairness, and participation, even when presented as technical management (Groenfeldt & Schmidt, 2013; Schmidt & Shrubsole, 2013).

Even the instruments most associated with a rights-based reading of water do not resolve this tension so much as encode it. The Dublin Statement (1992), often cited as an early articulation of water as a human right, in fact opens by declaring water an economic good, and only from that premise argues that essential household use should be priced, if priced at all, to protect affordability.

The United Nations General Assembly recognized safe and clean drinking water and sanitation as a human right in Resolution 64/292. The scale of the current crisis makes the ethical trade-off urgent. The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) reported in 2025 that 2.1 billion people still lack safely managed drinking water, including 106 million people who drink directly from untreated surface water.

Against this backdrop, the rapid expansion of the digital economy is manifesting itself in a physical dimension—data centers, and their resource consumption.

This is not to say that data centers are to blame for water scarcity worldwide, or that technology and artificial intelligence (AI) companies are to solve this issue alone. Rather, it is an opportunity to learn from past and recent examples on how involved parties can use an ethical lens to water governance and resource management.

In this context, it is also important to acknowledge the potential economic benefits of AI-related scaling and competition for mega-sites, grid access, and permits, and how data centers can operate as regional tech ecosystem hubs. Data centers can contribute to local economic development by generating meaningful tax revenues, construction and site operation job creation, and other indirect activity such as local services and retail sales.

Recent research by the Brookings Institution titled *Turning the Data Center Boom into Long-term, Local Prosperity* suggests that in order to reap these economic benefits, regions should treat data center development not as "isolated real estate transactions but as ecosystem-shaping moments that trade infrastructure access for commitments to advance local innovation, talent, and industry strengths."

Economic Efficiency vs. Human Need

When water is treated primarily as an economic input, productivity gains in industry, agriculture, and digital infrastructure are achieved, but at times this occurs at the expense of affordable access for households and marginalized communities. In water-scarce settings, efficiency metrics can override basic human needs.

A data center that secures water at below-market rates to sustain operations is functioning efficiently in a narrow economic sense, but if that arrangement is achieved through opaque contracting while nearby residents face rising costs and restricted access, it raises questions about fairness, dignity, and the minimum standards of access that any society owes its members.

Corporate Certainty vs. Democratic Accountability

Private investors require predictable, long-term water access to underwrite major capital investments. Governments seeking to attract that investment may respond by offering preferential tax rates, long-term exemptions, or other benefits. These arrangements can severely limit public scrutiny and weaken democratic participation in decisions about a shared resource.

The result is a structural trade-off between attracting private capital and preserving the accountability of governments to the citizens they serve. When siting and permitting decisions for major water users are made without transparency, as has occurred repeatedly in data center development across the United States, public trust erodes and the legitimacy of both the company and the government is damaged.

Short-Term Development Gains vs. Long-Term Ecological Sustainability

Water-intensive activities can generate rapid economic returns, tax revenues, employment, and infrastructure investment. They can also degrade aquifers, rivers, and ecosystems that are the foundation of future water security for entire regions.

The ethical tension arises when policy choices shift environmental costs to future generations and to communities with limited adaptive capacity.

Resource Management: Lessons from Extractive Industries

The mining sector offers instructive precedents for how extractive industries should, and should not, engage communities over water and address the ethical complexities of water allocation. Research by Avant, Finn, and Olsen (2023) on two Peruvian mines, Cerro Verde and Yanacocha, illustrates what it means to earn, or fail to earn, a social license to operate, with findings directly relevant to data center development.

Cerro Verde: Transformational Engagement and Earned Legitimacy

When Freeport-McMoRan's Cerro Verde copper mine near Arequipa announced a 2003 expansion requiring additional water rights, it faced organized opposition led by local civil society group FREDICON over water shortages and contamination. An initial transactional response, offering discrete project benefits, failed to build trust. Cerro Verde then shifted strategy, engaging broadly with community concerns as interrelated rather than as isolated complaints, and discovered that water access and basic services, not the mine itself, were residents' central concern.

The result was a wastewater treatment plant, built in partnership with the municipal utility, that delivered clean potable water to 95 percent of Arequipa while securing the water the mine needed for expansion and rehabilitating the Río Chili. In 2015, Cerro Verde completed a $4.6 billion expansion that tripled copper output, having earned community trust by treating the expansion as a contribution to shared development.

Yanacocha: Transactional Strategies and the Costs of Legitimacy Failure

Newmont's Yanacocha gold mine in Cajamarca followed the opposite trajectory. Community concerns over water contamination, intensified by a 2000 mercury spill in Choropampa, were met with a narrowly transactional corporate social responsibility (CSR) strategy—case-by-case grievance management rather than collective dialogue. When the International Finance Corporation (IFC) convened a multi-stakeholder process in 2001, local organizations rejected it as a "divide and conquer" tactic. Subsequent expansions triggered blockades, strikes, and violence, including the 2006 killing of farmer Isidro Llanos during protests. The proposed Conga expansion was halted entirely in 2011 after subsequent mass protests. Reactive measures like community-specific micro-reservoirs never addressed the broader water security problem, leaving lasting distrust.

Operating under the same regulatory framework with comparable resources, Cerro Verde and Yanacocha diverged on strategy and ethics: One treated community concern as inputs to a shared problem-solving process; the other as risks to be managed. For data centers navigating community opposition and water stress today, the lesson is clear: Companies that fail to genuinely earn their licenses to operate risk delays, pushback, and financial loss.

Data Centers: Implications of Water Consumption

Data centers are becoming significant industrial consumers of water, primarily for cooling for operational purposes. According to the World Resources Institute, a mid-sized facility uses up to 300,000 gallons daily, while large hyperscale centers consume 5 million gallons per day, equivalent to a town of 30,000 to 50,000 people. By 2028, the U.S. is projected to have over 5,500 data centers. These facilities will directly consume up to 73 billion gallons of water annually, which is the equivalent of the indoor water used by about 360,000 households.

Recent corporate disclosures illustrate the scale and opacity of this consumption. Google's 2025 sustainability report showed direct water consumption of 10.9 billion gallons, a 34 percent increase from 2024, driven almost entirely by data-center cooling.

Yet direct use tells only part of the story. Indirect consumption, the water required to generate the electricity powering these facilities, varies enormously by energy source and is rarely disclosed at all. Meta's own reporting showed indirect water use in 2024 reached 19 billion gallons, more than 20 times its direct consumption, underscoring how thoroughly current accounting standards understate the true water footprint of digital infrastructure.

Some technology companies such as Nvidia and Microsoft are beginning to address this issue by promoting a closed-loop cooling design that requires no additional water once filled, a solution that both eliminates direct water draw and reduces the energy needed for cooling. However, these innovations apply only to new construction, while most existing facilities still rely on evaporative cooling systems, which are energy-efficient but water-intensive.

Water serves fundamentally different purposes for private operators and surrounding communities. For data center operators, water is a prerequisite for operational continuity—without it, servers overheat and services fail. For surrounding communities, that same water source is the foundation of health, sanitation, and agricultural stability. The tension sharpens when data centers are sited in regions where electricity is cheap, but water is already stressed, resulting in rate hikes, and water supply disruption.

Contested Claims and Absent Planning

Not all data center water conflicts look the same. Some involve competing claims over scarce resources, while others expose failures of governance before communities ever have a chance to respond.

Canelones, Uruguay: A Disputed Water Claim

Google began building a data center in Canelones in 2021. Two years later, Uruguay faced its worst drought in decades, forcing Montevideo to blend seawater into the public supply while residents struggled to access safe drinking water. When Google's planned water use became public, protests erupted under the slogan: "This is not drought, it's pillage."

Yet the conflict was more complex than it appeared. Most of Uruguay's water is consumed not by households but by export-oriented industries such as soy, rice, and pulp production, which had strained the system for years with far less scrutiny. As the newest and most visible user, Google became the focal point for broader frustrations over water allocation.

Facing public pressure, Google reduced its projected water use and adopted air cooling, and the revised project was approved. The company stayed, the community won concessions, and the underlying scarcity remained unresolved. Canelones illustrates how a rights claim can secure meaningful changes without addressing the larger economic forces driving water stress.

Newton County, Georgia: Absent Planning

The Meta data center in Newton County presents a different problem: major industrial development without baseline studies, community engagement, or adequate planning.

After construction of the $750 million facility began in 2018, nearby residents who rely on wells reported significant water quality issues. The local development authority had conducted no pre-construction well water study, leaving no baseline data to determine whether harm occurred. Without that evidence, affected residents have little meaningful path to redress.

The consequences extend beyond individual wells. Meta's facility now uses roughly 10 percent of the county's daily water supply, while Newton County is projected to face a water deficit by 2030. Residents are expected to absorb steep water-rate increases to fund infrastructure upgrades, even as data center operators often disclose little about their water consumption.

These cases reveal opposite ends of the same governance challenge. Canelones shows what happens when a legitimate rights claim confronts a water system already shaped by larger commercial users. Newton County shows what happens when no meaningful planning or public accountability exists from the start.

Taken together, they underscore the importance of a more holistic and ethical approach to water governance.

A Values-based Framework for Ethical Data Center Management

Our analysis calls for a coherent set of prescriptive solutions. In this section, we offer a values-based framework that emphasizes democratic process, new measurement standards, and mandatory risk and impact assessment into the governance of data center water use. Our intention is to complement existing and emerging rules and regulations rather than calling for the development of new entities or treaties.

The three pillars of this framework are mutually reinforcing. Firstly, the democratic process creates accountability that makes measurement meaningful. Secondly, measurement creates an informational foundation that makes impact assessment honest and transparent. Thirdly, impact assessment creates the forward-looking discipline that gives democratic participation genuine stakes.

Pillar One: Democratic Process and Community Participation

The core lesson of Cerro Verde is that companies do not earn legitimacy by managing community relations; they earn it by genuinely participating in the governance of shared concerns. For data centers, this requires moving from the current model of ad hoc, post-controversy community outreach toward structured, rights-based participatory processes embedded in the permitting and siting framework from the outset.

Concretely, this means that before any major water use permit is granted, a structured community engagement process must be completed, not as a formality, but as a substantive dialogue with the capacity to influence project design and conditions. This process should include direct engagement with affected households. It should also include meaningful representation of marginalized groups and renters who lack the political capital to advocate through formal channels. Moreover, it should be a non-technical presentation of proposed water use data that is open to project modification based on community input.

As a condition of permitting, communities and companies should also agree on an emergency water use hierarchy—a binding protocol that ensures drinking water, sanitation, hospitals, schools, subsistence livelihoods, and ecological minimum flows take priority over discretionary industrial use during any period of drought or acute water stress.

For example, Virginia's Department of Environmental Quality issues water permits with drought triggers built into the permit and tied to a three-stage drought classification system. When a 2026 statewide drought hit, data centers in Henrico, Fairfax, and Loudoun counties faced the same mandatory restrictions as residential customers, with restrictions going in effect automatically once a drought stage is declared, rather than being negotiated ad hoc. Embedding this hierarchy in permit conditions before a crisis materializes is far more effective than attempting to negotiate it after one does.

The model of "local water councils," standing advisory bodies that include affected community members in ongoing oversight of water use by large industrial facilities, offers one vehicle for institutionalizing this engagement beyond the initial permitting phase.

Democratic process also requires transparency as a precondition. The current practice, documented in multiple U.S. jurisdictions, of data center companies obscuring their water use through aliases, confidential permitting processes, or simple non-disclosure, is fundamentally incompatible with democratic governance of a public resource.

Governments should require that water use data for large industrial facilities be disclosed publicly as a condition of permitting, with no exemptions for commercial confidentiality.

Companies, for their part, should adopt the approach demonstrated by Cerro Verde: treating democratic engagement not as a risk management exercise but as an operational necessity. When a data center enters a watershed, it enters a relationship with the people who depend on that water. The quality of that relationship, whether it is transactional and defensive, or transformational and collaborative, will determine whether the company can operate sustainably.

"When a data center enters a watershed, it enters a relationship with the people who depend on that water."

Pillar Two: New Ways to Measure & Report Water Impact

Effective governance requires transparent accounting and reporting. The current frameworks for measuring data center water use are systematically inadequate: They capture only direct operational consumption, ignore the substantially larger indirect water footprint from energy production, and rarely account for cumulative impacts when multiple large users share a stressed basin. In addition, companies are not required to report on their water usage and recycling rates either to regulatory bodies or to the public.

A values-based framework requires new measurement standards that reflect the full scope of water use and its distributional consequences. Full water footprint accounting should become standard for all major industrial water users. This means reporting not just gallons withdrawn from a specific source, but total water consumption including indirect use, incorporating the water embedded in electricity generation, construction, and supply chains. Given that indirect use may be 12 times higher than direct use, current disclosure standards are not a conservative underestimate; they are a fundamental misrepresentation of the true water cost of digital infrastructure.

Beyond volumetric accounting, measurement frameworks should incorporate equity metrics that assess distributional impacts. It must be consistent with emerging sustainability reporting approaches that require companies to disclose water-related impacts, dependencies, and management responses rather than only physical withdrawal volumes (GRI, 2018; TNFD, 2023). For instance, "water equity performance" could measure whether a company's water use is improving or degrading access, affordability, and reliability

for surrounding communities. (UN General Assembly, 2010; OHCHR, n.d.). To avoid becoming a self-reported public relations tool, such a metric should be defined by regulators or recognized sustainability standards. It must be independently audited by accredited third parties, and subject to public disclosure. Models such as the Alliance for Water Stewardship certification system, which provides external assurance for responsible water stewardship claims, could become a standard reporting practice alongside financial performance data. Extending this scrutiny to community-level water equity would create incentives for companies to internalize the social costs of their operations rather than externalizing them onto households and municipalities.

Promising models for developing such metrics are already emerging through academic-community partnerships. The University of Michigan Graham Sustainability Institute's partnership with the regional water utility offers an instructive example, bringing together researchers, local stakeholders, and industry actors to comprehensively measure how data center siting, design, and operations affect local communities. Such partnerships demonstrate that the informational infrastructure needed for honest water accounting is achievable and provides a replicable model for other regions navigating rapid data center expansion.

Measurement frameworks should also be prospective as well as retrospective. Basin-level stress projections, updated regularly and publicly available, should inform permitting decisions. When a county is projected to face a water deficit within a decade, that information should trigger automatic heightened scrutiny for new large-scale water use permits.

Pillar Three: Mandatory Risk and Impact Assessments

The most direct lesson of the cases documented in this report is the cost of proceeding without adequate pre-construction assessment. The Joint Development Authority in Newton County did not conduct a well water study before Meta broke ground. There was no baseline against which subsequent changes in groundwater quality could be assessed, no mechanism for identifying and remedying harm, and no community information that would have allowed residents to give informed consent to the development. This is not an isolated oversight; it is the prevailing norm, and it is ethically untenable.

Environmental impact assessments (EIAs), as deployed in the Cerro Verde case, proved critical in providing a formal locus for community engagement and a mechanism through which civil society could challenge inadequate planning. The same model should be applied systematically to large-scale data center development, with specific requirements for water-focused components:

1. **Baseline groundwater surveys** for all properties within a defined radius.
2. **Cumulative impact analysis** that accounts for existing and planned water users in the basin.
3. **Equity analysis** that examines differential impacts on households, particularly those relying on private wells.
4. **Contingency planning** specifies remediation obligations if harm to groundwater quality or availability is identified.

Risk assessments should be similarly mandatory, prospective, and enforceable. A risk assessment for a proposed data center in a water-stressed basin should model worst-case scenarios for groundwater drawdown and contamination, identify the populations most vulnerable to those scenarios, and specify the conditions under which the project should be modified, conditioned, or denied. Crucially, both the risk assessment and the EIA should be completed before permitting decisions are made, not filed after the fact as documentation of decisions already taken.

Accountability requires that these assessments be binding, not advisory. Companies should be required to post financial bonds against identified risks before construction begins, creating direct economic incentives for honest assessment and adequate mitigation planning. Where harm to community water access is later documented and traceable to a company's operations, the baseline data from the pre-construction assessment provides the evidentiary foundation for both regulatory enforcement and legal redress. Without such a foundation, affected communities are left without recourse.

The framework of mandatory pre-construction assessment, participatory engagement, and transparent disclosure is not a barrier to data center development. Cerro Verde's expansion, achieved after a genuine community engagement process that produced a shared water solution, nearly tripled the mine's copper output, and created lasting civic infrastructure that served the city of Arequipa for decades. Companies willing to do this work do not slow development; they build the foundations of durable operational legitimacy. Those that are not willing to do it should not be granted access to public water resources.

Conclusion

Water allocation is ultimately a question of values. Every permitting decision, infrastructure investment, and corporate siting choice reflects judgments about whose needs take priority, whose risks are acceptable, and what obligations the present owes to future generations. The rapid expansion of data centers has brought these questions into sharper focus, but the underlying challenge extends far beyond the technology sector.

The cases examined here demonstrate that water conflicts rarely arise from a single facility alone. They emerge when governance systems fail to account for cumulative impacts, exclude affected communities from decision-making, or treat water only as an economic input rather than a resource essential to human dignity, public health, and ecological stability.

Hence, the challenge facing governments, regulators, utilities, and companies is not to choose between economic development and water security, but to govern both responsibly.

“The rapid expansion of data centers has brought these questions into sharper focus, but the underlying challenge extends far beyond the technology sector.”

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