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Environmental Alert—Data Centers and AI Infrastructure

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Water, air, and backup power: Permitting pinch points for AI facilities

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As stricter water, air, and cooling requirements reshape data center permitting, learn how developers can avoid costly delays and redesigns.

What's the impact?

- Data center developers face greater permitting risk concentrated in three areas: water conservation; air permits for backup power in nonattainment regions; and environmental review of cooling systems, chemicals, and spill control.
- Missteps that frequently trigger late-stage redesigns, additional offsets, financial penalties, or protracted appeals may be avoidable.
- Technology-agnostic alternatives analyses, regional permitting roadmaps, and community benefit packages can meaningfully mitigate the potential for costly risks.

With accelerating development of hyperscale and AI-driven data centers, regulators are tightening scrutiny of water consumption, backup generator emissions, and air quality impacts. Communities are demanding transparency, conservation, and benefits, while lenders and tax equity are underwriting environmental risk with growing rigor. Sustainable cooling choices and resiliency now shape permit-ability, construction schedule, and public acceptance. Managing approaches to permitting is critical to avoid late-stage redesigns, costly offsets, and protracted appeals.

Increasing resource demands

Across the US, states and localities are retooling permits and incentives to manage water stress, backup-power fleet emissions, and cumulative air impacts from large-scale facilities. Several jurisdictions are tightening permitting for multi-MW generator banks, with permittees considering factors traditionally associated with Clean Air Act (CAA) major source-style analyses (e.g., best available control technology, lowest achievable air emission rate, dispersion, and health-risk modeling), even when generator banks are classified as "emergency." This trend has been accompanied by some regulators promoting transitions to batteries, fuel cells, and hydrogen-ready systems. Permits increasingly condition approval on direct-to-chip or immersion liquid cooling, PFAS-free chemistries, and heat-reuse tie-ins. In water-scarce basins, regulators are insisting on increased water usage efficiency, non-potable supplies, and drought-contingent operating plans. Against that backdrop, early environmental strategy is no longer defensive—it is a competitive differentiator for site control, approvals, and financing.

Water: Pathways, metrics, and conservation conditions

Choosing and securing a defensible water pathway has become a gating decision for data center developers. Public utility service and private water rights each carry distinct risks and expectations. Where potable systems face scarcity, agencies are pressing applicants to secure alternative sources, demonstrate basin-neutrality, co-locate with wastewater treatment plants, or secure long-term reclaimed water service agreements. Although advantageous, these efforts require early interagency coordination, pretreatment design, and discharge planning.

Water usage effectiveness (WUE) is emerging as a tracked metric alongside power use effectiveness (PUE), with formal targets, third-party assurance, and public reporting. Members of the regulated community are coming to expect requests for water accounting tailored to their local watershed, seasonal use patterns, and step-down plans for cutting back during drought. Conservation and drought planning are becoming standard, at times requiring on-site storage to weather heat waves and operational flexibility during official droughts. Some utilities have also implemented systems imposing tiered pricing and surcharges, escalating rates or drought surcharges that create financial incentives (or penalties) beyond regulatory mandates, which may warrant inclusion in financial planning and risk assessments.

Water-scarce states and fast-growing data center hubs are advancing water stewardship requirements and transparency for appropriations and municipal service. Agency practice and legislative proposals point to earlier, more rigorous review of impacts on aquifers, competing users, and wastewater capacity. In parallel, tiered rate structures and drought surcharges create financial incentives that reinforce these regulatory trends, imposing escalating costs for high-volume consumption and penalty rates during declared water emergencies. Accordingly, developers should be prepared for pre-application technical consultations, aquifer testing where groundwater is contemplated, enforceable conservation conditions within operational parameters, and cost modeling that accounts for variable water pricing across drought scenarios.

Air: Backup power fleets under major-source lenses

Although widely regarded as one of the fastest and most reliable forms of backup power, diesel generator fleets present two converging risks—regulatory classification creep and community exposure—and are drawing closer scrutiny from air districts and state agencies. Where cumulative installed capacity, testing regimes, or simultaneous run times resemble traditional power generation facilities, agencies are evaluating fleets against best available control technology or, in nonattainment areas (i.e., geographic regions where air pollution levels exceed the Clean Air Act's National Ambient Air Quality Standards), lowest achievable emission rates, with rigorous dispersion modeling and health risk assessments.

In some jurisdictions, community-wide diesel risk assessments are informing permit thresholds and conditions. As an example, in connection with diesel backup power generation for a data center in Quincy, Washington, regulators required a community-wide diesel health risk assessment, which found that regional data centers accounted for approximately 12% of the city's allowable diesel particulate emissions, and used the results to inform permitting decisions and conditions. In connection with air permitting for associated diesel backup generators, air quality nonattainment risk is prompting tighter runtime and testing limits for facilities. Both prospective developments and those within the permitting process should expect greater emphasis on permit conditions including generator testing times (e.g., avoiding coincidence with daily nitrogen oxides [NOx] fluctuations), seasonal curtailments, scheduling to avoid inversion/ozone days, and enhanced notification requirements. Triggering major-source thresholds can impose offset obligations, add Clean Air Act (CAA) Title V complexity, and lengthen timelines.

Against this background, some developers are piloting and adopting natural gas reciprocating engines and aeroderivative turbines for on-site resiliency—for emergency backup power generation and in some cases for extended "prime" service until utility interconnections are ready. Within this context, natural gas based emergency power generation may be an attractive option for some data centers given its lower pollutant profile than diesel (e.g., particulate matter [PM] and some NOx), continuous pipeline fuel supply, and operational suitability for longer-duration outages; but they also introduce distinct permitting and infrastructure considerations and associated cost considerations, including gas interconnection and lateral pipeline siting, and potential major-source rule treatment where facilities operate beyond emergency-only use. Moreover, facilities using natural gas for prime or extended operation may face greenhouse gas reporting requirements under EPA's Greenhouse Gas Reporting Program (40 C.F.R. Part 98) and, depending on state, additional climate-related disclosure or mitigation obligations.

Additional alternatives such as batteries and fuel cells are gaining traction within some jurisdictions. Battery energy storage systems are increasingly approved as the "routine" resiliency layer, reserving liquid-fuel generators for true emergencies. Stationary fuel cells (natural gas, renewable natural gas, or hydrogen-ready) can mitigate criteria pollutants and some greenhouse gas emissions, but necessitate gas interconnection, hazardous materials management, spill controls, and lifecycle emissions disclosures. By leveraging experienced environmental counsel and consultants, data center developers can navigate current deregulatory opportunities for permitting, while also planning development and operations to account for potentially stricter regulation under future administrations.

Cooling technology in environmental review

Data centers' cooling architecture selection often drives water and air outcomes, from both an efficiency and discharge/emission perspective. Accordingly, design and selection of cooling systems features prominently in environmental review and permit conditions. According to some estimates, cooling alone can account for almost 40% of total energy consumption. Direct-to-chip and immersion cooling methods can reduce evaporative losses and enable heat reuse, but also raise chemical handling, storage, transportation, and disposal considerations.

Recent regulatory shifts concerning PFAS present an active area of policy development federally and at the state level, which can present wastewater permitting challenges when used within immersion cooling systems. With the assistance of counsel, applicants should evaluate local statutes and agency guidance regarding PFAS disclosure and reduction measures in order to coordinate industrial wastewater permitting for cooling, blowdown, and cleaning wastes.

Lastly, some developers are turning to heat-reuse integration as a method of mitigating greenhouse gas emissions by offering and integrating waste heat generated by servers as a form of district or campus energy, as well as heating for municipal or utility functions, such as sludge drying at wastewater treatment plants. Waste heat offtake to these uses is surfacing in NEPA analogues and local approvals, reducing fuel and power demands for heating, with conditions requiring interconnection readiness, minimum export temperatures, or good-faith negotiations with public utilities.

Challenges and opportunities for data centers

The regulatory landscape governing data center permitting continues to evolve, presenting unique challenges that range from securing defensible water pathways and navigating drought surcharges to managing backup generator fleets under tightening major-source lenses and addressing PFAS considerations in advanced cooling systems. Nixon Peabody's Environmental Team is prepared to navigate these permitting complexities, while proactively anticipating and managing the risks and financial considerations for data center development.

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