Cooling Systems and Code Sections: A 103 Perspective on Data Center Projects

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What Are the Different Types of Data Centers?

1. Enterprise Data Center

2. Cloud Data Center

3. Colocation Data Center

4. Hyperscale Data Center

5. Edge Data Center

6. Modular Data Center

Governmental Bonds

Scenario 1: Green Bonds & the "REC" Paradox

A municipal utility issues $1 billion of tax-exempt energy bonds to finance a solar power generation facility. The bonds are secured by revenues of the project. A 300 MW data center campus, as one of the utility's largest retail customers, enters into a 15-year special renewable service arrangement under which it receives energy at posted rates but also receives 100% of the Renewable Energy Credits (RECs) generated by the project to support its "Net Zero" corporate mandates.

The Practitioner's Dilemma

Replacement Proceeds: Does the amount received by the municipal utility as a result of the sale of the RECs constitute replacement proceeds?

Private Use: Suppose that the utility offers a "Special Renewable Service Arrangement" only to customers with a load over 100 MW at an amount lower than otherwise applicable rates. Is this “generally applicable and uniformly applied”?

Scenario 2: The "Closed-Loop" Water System

A water district builds a $200 million recycled water plant. The pipeline is technically "available" to anyone along the 5-mile route, but the route was specifically designed to terminate at a "Data Center Alley." To ensure the project's viability, the district requires the data centers to sign a "Capacity Reservation Fee"—paying for the water capacity even during years when they use outside air cooling and zero water.

The Practitioner's Dilemma

The "Public Availability" Mirage: Under Section 142, a water facility must be available to the "general public." If the physical infrastructure could serve a residential subdivision, but the "Capacity Reservation Fee" creates a financial barrier to entry that only a hyperscaler can afford, is it still "publicly available"?

Private Payment: Does the "Capacity Reservation Fee" result in private payment/security? Does private payment support a finding of private use?

Reciprocal Services: If the data center returns the heated "blowdown" water to the municipality for use in heating a public greenhouse, how do we calculate private use?

Qualified 501(c)(3) Bonds

Scenario 3: AI Model Training

A 501(c)(3) hospital uses $200 million in tax-exempt bonds to build a data and advanced computing facility. It then enters into a 10-year "Data Science Partnership" with a private biotech firm. The hospital provides the firm with dedicated access to 20% of data and server capacity, as well as technical staff support and access to de-identified patient data to train the firm’s proprietary diagnostic AI. In exchange, the hospital receives a perpetual "royalty-free license" to use the finished AI tool, while the biotech firm retains the right to sell the AI globally.

The Practitioner's Dilemma

Types of Private Business Use: Third Party versus Unrelated Trade or Business.

Whether royalty payments (or the in-kind equivalent thereof) made to the hospital are considered unrelated trade or business income will depend on whether the use of the data center by the biotech firm is considered substantially related to the hospital's exempt purposes.

BUT, because the agreement with the biotech firm grants the firm a special legal entitlement to use of a bond-financed asset, the agreement gives rise to private business use, whether or not it constitutes an unrelated trade or business activity.

Scenario 4: The "ESG-Indexed" Management Contract

A 501(c)(3) university hires a global tech giant to manage its bond-financed High-Performance Computing (HPC) center. To align with the university's 2030 Net-Zero goals, the management contract includes a large incentive payment for each month in which the Power Usage Effectiveness (PUE) of the HPC stays below 1.5, or in which 50% of the load is consumed during off-peak hours to save the university money on utility demand charges.

The Practitioner's Dilemma

The Question: Do these bonus payments raise any concerns about payments based on net profits?

Discussion Point: If the monthly incentive payment is paid in carbon credits earned through achievement of the same efficiency metrics, rather than cash, does that change the analysis?

Scenario 5: The "Digital Twin" Research Sandbox

A research university uses tax-exempt bond proceeds to build a data center to host a "Digital Twin" of the city—a massive, real-time simulation used for urban planning. A private real estate developer pays for priority access to the simulation to test the impact of their new construction projects. The developer also provides data for use in the simulation, in exchange for a right of first refusal to license any proprietary algorithms developed by the university using that data.

The Practitioner's Dilemma

Special Legal Entitlement: Giving a private party a "first-look" or "exclusive right" to IP generated by or in tax-exempt financed assets is a special legal entitlement.

Non-Cash Compensation: How do you measure or quantify the value of priority access, rights of first refusal to speculative technology, and developer data?

Scenario 6: The "30-Year Building vs. the 3-Year Brain"

A 501(c)(3) research university wants to issue $100 million in tax-exempt bonds to finance an AI-driven genomic research facility.

Asset Breakdown:

- $50M: The physical building and lab space.
- $20M: Specialized "clean room" infrastructure and HVAC systems.
- $30M: A "Supercomputer Tier" of AI Graphics Processing Units (GPUs) and high-speed networking for genomic sequencing.

The Practitioner's Dilemma

Determining Useful Life of New Technology: Thow purpose-driven can a project be, while still keeping its "normal" economic life. If the GPUs have a 3-year useful life, and the building and equipment exists specifically to house and accommodate the data processing done by the GPUs, does the building truly have a 40-year expected useful life, or the HVAC systems a 15-20 year expected useful life?

Blend and Extend: Can the university issue these bonds together with a $100M new dorm financing, to allow for a longer combined useful life? If the university uses its own cash for the GPUs and uses the bond proceeds only for the building, does that eliminate the WAM issue entirely?

Questions