

SYNC 3.0: Lake Tahoe Basin Emergency Containment Blueprint — Litigation-Hardened Review Draft

Counsel Review / Administrative Record Support Draft

Dated: July 1, 2026

Review Status Notice

This document is a policy-engineering concept paper prepared for legal and technical review. It is not a stamped engineering package, not a legal opinion, not a permit application, and not a representation that any described facility, control logic, fee structure, or entitlement path is presently approved, buildable, or legally defensible without additional evidence, independent professional review, and jurisdiction-specific findings.

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Executive Overview

This draft proposes a bounded municipal containment framework for evaluating whether a high-density compute installation could, under tightly conditioned circumstances, be made more compatible with Lake Tahoe Basin protection objectives than a conventional hyperscale data center model. The problem framing is basin-specific. The Tahoe region is environmentally sensitive, highly visible, operationally constrained, and subject to layered oversight including Tahoe Regional Planning Agency (“TRPA”) requirements, state and local permitting, utility interconnection procedures, and public scrutiny associated with water, wildfire, winter reliability, and landscape protection.

Unlike lower-sensitivity inland environments, the basin presents overlapping concerns: (i) periodic wildfire smoke and severe weather that stress public infrastructure and emergency

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The concept evaluated here therefore does not assume that “efficiency” alone resolves extractive impacts. Rather, it contemplates a 50 MW bounded node architecture, subject to local operating conditions, selective municipal control logic, and closed-loop thermal reuse requirements. It is intended to test whether a node can be conditioned to function as a constrained municipal utility-compatible load rather than as a single large, externally governed extraction point. That proposition would require independent verification across engineering, environmental, utility, and legal domains. This document does not assert that such verification has already occurred.

1. Purpose and Record Function

This draft is intended to support internal municipal review, outside counsel issue spotting, administrative record development, and early-stage coordination among legal, engineering, environmental, and utility advisors. Its function is not advocacy in the abstract. Instead, it is to identify the conceptual controls, factual assumptions, legal theories, and evidentiary gaps that would need to be evaluated before any jurisdiction could responsibly rely on the underlying approach.

For administrative-record purposes, the draft may be used to help structure requests for technical memoranda, utility studies, CEQA/TRPA analyses, nexus studies, and counsel review. It is written in a manner intended to withstand hostile scrutiny better than a promotional memorandum by distinguishing between conceptual elements, site-specific findings, and as-yet unverified assumptions. Where the source materials use categorical language, this draft restates those points in conditional form unless a proposition is independently supportable as a general engineering or land-use principle.

2. Defined Terms and Scope Limitations

50 MW Node. A proposed bounded compute and support-load configuration capped at approximately 50 megawatts of electrical demand, treated as the relevant operational and regulatory unit for control, interconnection, and conditioning purposes.

Exhaustion Budget. A proprietary conceptual term referring to a hard or contractually bounded operating limit, which may include instantaneous demand limits, energy-throughput limits, or other locally conditioned consumption thresholds. This is not an independent industry standard.

Terminal Governance Layer. A proprietary conceptual/control-framework term describing the governance and control architecture through which municipal authorities may obtain specified read, trip, ratchet, or compliance-verification capabilities over a bounded node. This is not an adopted regulatory standard.

Selective Tripping. The ability to disconnect or de-energize a defined electrical module or node without automatically propagating the event to unrelated modules or the full campus.

Ratchet. A staged reduction mechanism, whether temporary or contractual, through which allowed load or capacity may be reduced in response to environmental, reliability, or compliance triggers.

Thermal Offtake. The capture and productive use of waste heat through district heating

unlimited authority over utility operations or federal jurisdictional matters.

Closed-Loop Thermal Recycling. A design intent under which the primary cooling medium and secondary heat transfer systems are configured to avoid direct consumptive withdrawal and avoid direct thermal discharge to Lake Tahoe, subject to engineering validation and permit conditions.

Scope limitation: The foregoing terms originate from a proprietary conceptual framework reflected across the source materials. They should not be mistaken for independently established engineering standards, adopted statutory terms, or presumptively enforceable legal categories.

3. Consensus Architectural Findings from Source Materials

A review of the underlying source materials reflects recurring points of alignment despite differences in tone, emphasis, and numerical specificity. The most consistent findings are as follows:

- A bounded **50 MW node** is treated as the operative design unit, rather than a single 1 GW monolithic facility.
- The architecture rejects the idea of a **single 1 GW breaker** or equivalent single-point campus trip structure, on the stated rationale that a monolithic rejection event would present unacceptable grid, reliability, and liability concerns.
- The concept contemplates **municipal SCADA-linked trip or ratchet authority**, generally through hardwired or otherwise constrained safety logic interfaces, rather than relying solely on contractual promises.
- The water-management posture is consistently framed as **zero or near-zero consumptive water design intent**, typically using closed-loop, PFAS-free dielectric immersion cooling and non-lake thermal transfer pathways.
- Waste heat is consistently proposed for **district heating and snowmelt** or analogous municipal uses, especially in the Tahoe scenario.
- Enforcement theories are consistently rooted in **land-use conditioning, CUPs, development agreements, franchise terms, and utility-service conditions**, rather than direct regulation of wholesale electric rates.

These consensus points are useful as a record-development baseline. They do not, standing alone, establish technical feasibility, legal sufficiency, or permit eligibility.

4. Engineering Architecture Summary

4.1 Fractal Modularity

The central engineering premise is that a large compute campus should not function operationally as a single indivisible electrical load. Instead, the concept proposes a fractal modular structure in which each 50 MW node is a separately bounded unit capable of being controlled, isolated, or restored without requiring simultaneous action across the full installation. For Tahoe review purposes, this matters because the policy concern is not only total megawatts, but the manner in which electrical demand presents to the basin and to the serving utility.

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enable a defined node to be curtailed or shut down in response to environmental, thermal, or reliability conditions without producing an avoidable cascading event. This document does not certify islanding performance; it identifies the feature as one that would require utility review, relay study support, and protection-coordination validation.

4.3 Safety PLC Concept

The source materials repeatedly refer to a safety PLC or functionally equivalent logic solver that would receive specific municipal or supervisory inputs and execute bounded protective actions. In a litigation-hardened framing, the relevant point is not the branding of a controller but the legal and technical separability of local protective conditions from broader utility dispatch authority. Any actual implementation would require a documented logic narrative, fail-safe state definition, cybersecurity segregation, relay coordination, and utility concurrence where applicable.

4.4 Anti-Cascade Rule

A recurring control principle is that a trip in one module or node should not automatically propagate to adjacent modules absent a separately validated protective reason. This anti-cascade rule is significant because it addresses a foreseeable criticism that municipal control signals or local failures could themselves create reliability harms. If advanced beyond concept stage, the anti-cascade rule would need to be demonstrated through one-line diagrams, protection studies, cause-and-effect matrices, and trip-propagation testing assumptions.

4.5 Emergency Thermal Rejection Fallback

The Tahoe concept emphasizes beneficial thermal reuse, but a legally usable record would also require a credible fallback analysis for periods when thermal offtake is partially unavailable. Any such fallback must be evaluated against basin restrictions, no direct lake discharge assumptions, ambient winter conditions, and noise or visual implications. This draft therefore treats emergency thermal rejection not as a solved feature but as a necessary engineering study area with potential entitlement significance.

4.6 Black-Start and Staged Restoration Concepts

The source materials contemplate staged restoration rather than instantaneous re-energization of all loads. In practical terms, that would imply a documented sequence under which critical auxiliaries, thermal systems, controls, and compute loads return in a managed order. Counsel should view this not as a claim of black-start capability in the utility sense unless separately defined by the utility, but as a staged restoration concept relevant to reliability and public-safety review.

Core Design Controls			
Control Element	Conceptual Function	Record Significance	Validation Required
50 MW bounded node	Caps the relevant operational unit and avoids monolithic load treatment	Supports land-use conditioning and reliability framing	Interconnection studies, load definition, enforceable permit language

Core Design Controls			
Control Element	Conceptual Function	Record Significance	Validation Required
Selective tripping	Allows node-level disconnection without full-campus shutdown	Addresses cascading-risk concerns	Relay logic narrative, coordination study, fail-safe testing assumptions
Ratchet authority	Provides staged reduction of allowed load under specified triggers	Supports conditional compatibility rather than absolute approval	Contract language, operational protocol, utility compatibility review
Closed-loop PFAS-free dielectric immersion	Seeks low-water cooling with contained thermal transfer	Supports water-protection and source-reduction analysis	Stamped mechanical design, fluid specification, containment and spill plan
District heating / snowmelt offtake	Seeks productive use of waste heat	Supports public-benefit and no-direct-discharge framing	Seasonal demand curves, pipe routing study, O&M assumptions, host-site agreements
Emergency thermal fallback	Maintains safe operation during temporary offtake loss	Addresses feasibility and environmental risk criticisms	Thermal rejection analysis, noise study, winter scenario modeling

5. Lake Tahoe Basin Environmental and Utility Constraints

The Tahoe Basin presents a sensitivity profile unlike a generic industrial site. Any review of the concept would need to account for TRPA thresholds, scenic resources, watershed protection, winter operations, fire-related emergency conditions, and the reputational consequences of any avoidable environmental incident. A central premise of the Tahoe blueprint is that no design should rely on direct thermal discharge to the lake, and no permitting strategy should presume tolerance for new consumptive water demand that could reasonably be avoided.

The proposed cooling posture is therefore based on a closed-loop, PFAS-free single-phase dielectric immersion concept coupled to secondary thermal transfer equipment intended to route usable heat into district heating and snowmelt applications. That approach may improve compatibility if it is real, measurable, and seasonally supportable. It does not eliminate the need for hydrology review, spill prevention planning, emergency operations analysis, and lifecycle maintenance evidence.

On the electrical side, the utility context would likely involve Liberty, NV Energy, or another relevant serving or interconnected utility configuration depending on jurisdictional location and site boundaries. This document does not take a position on utility readiness or available interconnection capacity. It assumes only that no credible municipal record should rely on

operationally credible, and emergency fallback conditions do not introduce a hidden environmental or reliability externality.

6. Municipal Authorities and Legal Theories to Be Evaluated by Counsel

The following legal theories appear potentially relevant, but each would require independent review by qualified counsel in light of jurisdiction, factual record, and any applicable utility tariff or statutory constraints:

- **Local police power and land-use authority.** The municipality may evaluate whether operating conditions tied to land use, building safety, environmental compatibility, and local service burdens can be imposed without directly regulating wholesale electric rates or utility operations.
- **Conditional Use Permit / Development Agreement / Franchise / Utility Service Conditions.** The concept contemplates layered agreements and approvals through which physical design, control interfaces, and public-benefit commitments may be conditioned and documented.
- **Water and wastewater agreement authority.** If municipal systems are implicated, service terms may provide an additional lawful channel for conditioning facility operations, subject to non-discrimination principles and factual nexus.
- **Impact-fee nexus and rough proportionality considerations.** Any fee or mitigation structure would require careful analysis under applicable nexus doctrines, record support, and avoidance of punitive or pretextual design.
- **FERC / CAISO preemption risk.** Counsel should specifically test whether any proposed “Exhaustion Budget,” trip authority, or conditioning mechanism could be characterized by an opponent as an impermissible intrusion into federally regulated load-serving, interconnection, or wholesale market functions.
- **CEQA and TRPA record requirements.** The concept would likely stand or fall on the quality of environmental review, alternatives analysis, threshold findings, and evidence supporting claimed avoidance or mitigation of water, thermal, visual, and reliability impacts.
- **Avoidance of municipal rate-regulation framing.** To the extent possible, the record should distinguish local land-use and environmental conditioning from attempts to set or regulate electric rates, dispatch, or interstate market outcomes.

7. Anticipated Challenge Map

Because the underlying concept seeks to condition a politically sensitive infrastructure use through both technical controls and local legal instruments, it should be assumed that any serious implementation effort may attract coordinated challenge from multiple directions. The following matrix is offered as a disciplined challenge-preparation tool rather than as a prediction of outcome.

Challenge / Evidence / Mitigation			

Challenge / Evidence / Mitigation			
Likely Challenge	Potential Adverse Argument	Evidence Needed	Cautious Response Posture
	technologically pretextual	site-specific impacts, neutral criteria, technical basis memos	rationale and record-based tailoring
Utility challenge	Municipal controls interfere with protection systems or operational reliability	Utility-reviewed one-lines, coordination studies, control-boundary diagrams	Clarify that local conditions are subordinate to required utility protections and subject to utility review
Preemption argument	Local regime regulates electricity demand in a federally occupied field	Jurisdictional memo, permit-language review, case law analysis, agreements framed around land use and local service impacts	Avoid rate-setting language; tie conditions to local impacts and physical operating characteristics
Takings / exactions argument	Fees or conditions lack essential nexus or rough proportionality	Fee nexus study, alternatives comparison, burden analysis, findings record	Use evidence-based calibration and preserve administrative findings discipline
CEQA / TRPA attack	Environmental review understates water, thermal, visual, or operational impacts	Hydrology study, thermal analysis, alternatives analysis, threshold consistency memo	Do not overclaim mitigation; identify residual risks and enforceable conditions
Evidentiary attack	Concept relies on AI synthesis, speculative numbers, or unstamped assumptions	Independent expert memoranda, stamped engineering, counsel review, utility input	Concede conceptual status where appropriate and replace unsupported claims with validated studies
Technical infeasibility claim	Thermal reuse or zero-water posture is seasonally unrealistic	Seasonal load curves, fallback design, operating assumptions, maintenance analysis	Treat thermal offtake as contingent and demonstrate safe fallback conditions

response posture would be to avoid rhetoric and instead build a record showing that the concern is the basin impact of a monolithic, externally governed load profile, not the identity of any applicant.

7.2 Utilities and Grid Operators

Utilities may question whether municipal trip or ratchet concepts are operationally compatible with established protection and restoration schemes. The response cannot be abstract. It would require technical boundary definitions showing what is local, what is utility-controlled, what is fail-safe, and what is subject to separate interconnection approval.

7.3 Preemption, Takings, and Exactions

Opponents may characterize the proposal as an attempt to regulate electric service under the guise of zoning or as an excessive extraction of concessions from a permit applicant. Counsel should therefore test every proposed control and fee against nexus, proportionality, and preemption doctrines before such provisions are elevated into ordinance or permit text.

7.4 CEQA, TRPA, and Evidentiary Sufficiency

Environmental challengers may focus not on the theory but on the quality of the supporting record. That includes whether seasonal thermal-reuse assumptions are real, whether emergency fallback scenarios have been disclosed, whether fluid management and spill consequences are analyzed, and whether reasonable alternatives were studied. A litigation-hardened record should therefore assume close scrutiny of omissions as well as affirmative claims.

8. Administrative Record Checklist

The following evidentiary items appear necessary if a public agency intends to move from conceptual review toward actionable findings or draft conditions:

Record Item	Purpose	Minimum Responsible Author / Source
Electrical one-line diagrams	Establish load boundaries, trip domains, utility interfaces, and node separability	Licensed electrical engineer; utility review where required
Relay logic and cause-and-effect narrative	Explain selective tripping, anti-cascade protections, fail-safe state, and restoration sequence	Protection engineer; controls integrator; utility consultant
Seasonal thermal offtake curves	Test whether district heating and snowmelt uses can absorb projected heat across seasons	Mechanical engineer; district energy consultant
Hydrology / water balance memorandum	Substantiate zero or near-zero consumptive water claims and identify exceptions	Hydrologist; civil engineer; environmental consultant
Emergency thermal	Evaluate fallback operation	Mechanical engineer; consultant

Record Item	Purpose	Minimum Responsible Author / Source
Utility interconnection and protection studies	Assess reliability, fault duties, restoration logic, and operational compatibility	Serving utility and applicant-retained utility consultant
TRPA consistency memorandum	Address threshold, scenic, water-quality, and basin-compatibility implications	TRPA-experienced land-use and environmental counsel / consultant
Fee nexus and proportionality study	Support any impact-fee or mitigation payment framework	Municipal finance consultant; land-use counsel
Comparative alternatives analysis	Show why the bounded-node concept is being considered relative to conventional alternatives	Lead agency consultant team
Independent legal review	Evaluate preemption, exactions, franchise, service-condition, and permit-authority issues	Outside counsel / special counsel / city attorney

9. Validation and Professional Sign-Off Requirements

All numerical values, operational thresholds, heat-recovery assumptions, and legal-enforceability propositions in this draft should be treated as illustrative unless and until they are supported by competent evidence. At minimum, that means stamped engineering where required, utility-reviewed interconnection materials, hydrologic and environmental analysis, and written counsel evaluation of jurisdiction-specific legal risks.

This document should not be used as a substitute for:

- sealed electrical, mechanical, civil, or controls engineering;
- utility approval, tariff interpretation, or interconnection authorization;
- CEQA, TRPA, or analogous environmental review documents;
- a fee nexus or exactions analysis prepared for actual legislative or adjudicative use; or
- a formal legal opinion regarding preemption, takings, franchise authority, or permit defensibility.

To the extent the source materials assert categorical outcomes, those assertions should be translated into study questions, permit conditions, or evidentiary hypotheses rather than carried into the record as established facts.

10. Recommended Next Actions for Counsel and Staff

- Review proposed permit and agreement concepts for nexus, proportionality, and administrative-law vulnerability.
- Advise on drafting discipline to avoid inadvertent municipal rate-regulation framing.

10.2 City Attorney

- Identify available local police-power, zoning, and service-agreement authorities relevant to bounded-node conditioning.
- Develop a defensible findings framework that distinguishes conceptual review from final approval.
- Coordinate record-preservation standards for studies, consultant memoranda, and hearing materials.

10.3 Special Counsel (Land Use / CEQA / TRPA)

- Map likely CEQA and TRPA vulnerabilities, including cumulative impacts, alternatives, scenic issues, and basin-specific threshold concerns.
- Recommend the evidentiary record necessary to defend water, thermal, and visual impact findings.
- Advise whether phased review is appropriate before ordinance, permit, or agreement language is finalized.

10.4 Utility Consultant

- Translate the node, trip, and ratchet concepts into utility-readable one-lines and interface descriptions.
- Assess whether proposed local control concepts can coexist with utility protection and restoration protocols.
- Identify early fatal flaws, including fault-current, restoration, or load-ramping concerns.

10.5 Environmental Consultant

- Produce preliminary water-balance, fluid-management, and thermal-reuse feasibility memoranda.
- Evaluate emergency fallback operations for water-quality, noise, scenic, and operational impacts.
- Prepare an initial TRPA consistency screening to determine whether the concept warrants further advancement.

10.6 Staff

- Maintain a disciplined administrative record separating conceptual material from verified studies.
- Request neutral comparative analysis against conventional data-center configurations.
- Avoid public-facing summaries that imply approval, guaranteed legality, or completed technical validation.

This concept is best understood as a municipal containment and conditioning framework for evaluating whether a bounded compute node can be made compatible with Lake Tahoe Basin protection objectives under a materially narrower and more controllable operating profile than a conventional hyperscale data center. Its principal features include a 50 MW bounded node, a closed-loop PFAS-free dielectric immersion cooling concept, district heating and snowmelt thermal reuse, and municipal trip or ratchet controls that are intended to constrain rather than merely describe facility behavior.

Even if these features are conceptually promising, they are not self-proving. Compatibility with basin protection, utility reliability, and legal defensibility would depend on the quality of the administrative record, the credibility of the technical studies, the precision of the permit and agreement language, and the municipality's ability to demonstrate that any conditions imposed are evidence-based, jurisdictionally sound, and proportionate to site-specific impacts. For that reason, this draft should be used as a disciplined review instrument, not as a final position statement.

Administrative Record Use Note

If circulated beyond internal review, this document should be accompanied by a transmittal note clarifying that it is a counsel-review draft and that no numerical assumption, engineering feature, or legal theory should be treated as adopted agency fact absent independent validation and formal action.

Prepared as a litigation-hardened legal-technical review draft for counsel and administrative-record development.

Document posture: conceptual, conditional, and subject to independent professional validation.