

SYNC 3.0: Fresno County Agricultural Symbiosis Blueprint City Council / County Supervisor Review Edition

Conceptual Municipal-County Infrastructure Briefing

Prepared for Fresno County Supervisors, irrigation-district leadership, planning officials, and public works review

Westlands Water District / Fresno County context | 50 MW bounded-node concept | Subject to agency and licensed review

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1. Cover Page

This report presents a city-council and county-supervisor formatted version of the Fresno County Agricultural Symbiosis Blueprint previously developed under the SYNC 3.0 framework. It is intended as a sober, review-oriented document for local agencies evaluating whether emerging data-intensive infrastructure can be structured in a manner that protects groundwater, preserves agricultural pumping reliability, and converts unavoidable waste heat into local agricultural utility rather than externalized environmental burden.

2. Executive Memorandum to Fresno County Supervisors, Irrigation District Boards, Planning Commission, and Public Works

To: Fresno County Board of Supervisors; irrigation-district boards and executive staff; county planning officials; public works leadership; associated agency reviewers

From: SYNC 3.0 Fresno County review edition, prepared as a conceptual infrastructure and governance memorandum for agency consideration

Subject: Proposed bounded 50 MW immersion compute node with agricultural thermal reuse, non-potable water sourcing, and agricultural-grid protection controls

Purpose: To assist agencies in evaluating whether a compute-intensive facility can be conditioned as non-extractive local infrastructure rather than a conventional unmanaged large load

Fresno County and the broader Westlands-facing agricultural region are operating under converging constraints: SGMA-driven groundwater reduction obligations, increasingly stressed summer electricity conditions, and continued exposure of agricultural pumping systems to high-load periods and infrastructure bottlenecks. Conventional large-load development models may intensify these stresses by introducing substantial electrical demand with limited local utility return.

The proposed SYNC 3.0 response model is intended to alter that pattern. The concept centers on a **single bounded 50 MW compute node**, not an expandable or open-ended hyperscale campus. The node would utilize **PFAS-free single-phase dielectric immersion cooling**, operate under a **zero-groundwater-extraction objective**, prioritize **recycled municipal effluent or other approved non-potable sources**, and be required to deliver **100 percent of recoverable waste heat** to proximate agricultural or agro-industrial uses such as greenhouses, crop drying, soil warming, or adjacent process heat.

The proposal further contemplates an **“Ag-First” SCADA protection interlock** at the Level-1 safety layer, designed to reduce or disconnect compute load before agricultural pumping reliability is compromised during summer stress events. Governance concepts also include an **absolute 50 MW capacity cap**, an **exhaustion budget** and other permitted-capacity controls attached to land-use and service agreements, and a **hardware refresh capacity ratchet** proposed at years 3, 6, and 9, under which 33 percent of allowed capacity would be surrendered or re-evaluated at each interval.

The principal public question for agencies is not whether a compute facility can be built in the abstract, but whether local governments can require that such a facility be physically bounded, operationally governable, agriculturally useful, and non-extractive with respect to water and rural electrical infrastructure. This memorandum is intended to support that evaluation.

3. Purpose and Review Posture

This document is prepared for policy, permitting, and infrastructure review. It does not request immediate approval of a project. Rather, it outlines a framework by which local agencies may assess whether a proposed data-intensive facility can be conditioned to serve county priorities. The review posture is intentionally conservative. Where the underlying concept proposes enforceable controls, those controls are described as *proposed governance mechanisms* pending legal, utility, and engineering validation.

The intended audience includes:

- County supervisors evaluating land-use compatibility, public benefit, and infrastructure exposure;
- Irrigation-district boards assessing agricultural reliability, pumping impacts, and water-service implications;

- Planning officials reviewing zoning, CUP, development agreement, and CEQA pathways;
- Public works and utility reviewers considering service conditions, interconnection risks, and operational accountability.

4. County Conditions and Problem Statement

4.1 Groundwater and SGMA Context

Fresno County remains deeply affected by groundwater overdraft conditions and the implementation of the Sustainable Groundwater Management Act. New industrial or quasi-industrial loads that require new groundwater extraction, evaporative cooling, or indirect displacement of water-dependent agricultural activity may be difficult to justify in this context. A central premise of this blueprint is that any proposed compute development in the area should be conditioned to avoid new groundwater extraction and should preferentially use approved non-potable or recycled supplies.

4.2 Summer Grid Congestion and Agricultural Pumping Vulnerability

Agricultural pumping and rural electrical infrastructure are particularly exposed during summer heat periods, when irrigation needs, regional peak demand, and network constraints can align. Conventional high-density data center operations may aggravate those peak conditions if load is unmanaged or if the facility is permitted to function as a static, non-responsive demand block. The proposed SYNC 3.0 approach seeks to reverse that logic by making agricultural pumping a protected priority and compute load a controllable secondary use.

4.3 Need for Non-Extractive Infrastructure

County agencies increasingly face proposals for large infrastructure with limited local reciprocity. Under this review framework, a project would be evaluated not solely on private investment or tax receipt, but on whether it protects local water, protects grid reliability for agriculture, and turns unavoidable thermal output into a productive local resource. In that sense, the proposal is framed as a possible *agricultural symbiosis model* rather than a conventional stand-alone data center.

5. Proposed SYNC 3.0 Response Model

The proposed Fresno County response model is a **50 MW SYNC 3.0 immersion compute node** situated in a Fresno County / Westlands Water District context and designed from the outset as a bounded, reviewable, and condition-based load. The model does not assume an unrestricted hyperscale campus and should not be interpreted as authorizing indefinite expansion.

The proposal rests on the following core operating conditions:

- **Absolute capacity cap:** a hard 50 MW node limit enforced through safety PLC logic and related electrical protections;
- **Water protection:** zero groundwater extraction objective, with recycled municipal effluent or other approved non-potable sources preferred for ancillary needs;
- **Thermal reciprocity:** 100 percent of recoverable waste heat to be directed to agricultural or adjacent process uses as a condition of operation;
- **Agricultural reliability priority:** compute load reduction or trip capability if agricultural pumping conditions require protection;

- **Permitted-capacity governance:** exhaustion budget and service-condition controls tied to land-use, utility, and development instruments;
- **Refresh-era accountability:** a proposed capacity ratchet at years 3, 6, and 9, with 33 percent capacity surrender or renegotiation associated with hardware refresh cycles.

6. Technical Architecture Summary

6.1 Bounded 50 MW Node Concept

The proposed node is a single 50 MW compute installation structured as a fixed-capacity unit rather than an expandable campus block. The purpose of the bounded-node approach is to support transparent interconnection studies, clearer public review, and direct operational accountability. Under the concept, facility growth beyond the approved node would require separate review and could not be treated as an automatic extension of the original approval.

6.2 Cooling Method

The base technical concept utilizes **PFAS-free single-phase dielectric immersion cooling**. This method is presented as a means to reduce dependence on water-intensive cooling strategies and to generate a stable low-grade thermal stream suitable for secondary agricultural use. Final technology selection, fluid characteristics, containment standards, fire and life safety measures, and environmental handling requirements would all remain subject to detailed engineering, code review, and agency approval.

6.3 Operational Logic

The technical premise is that compute efficiency alone is not sufficient public justification. The facility is therefore conceptualized as a controlled infrastructure node whose operating envelope is defined by water source restrictions, capped electrical demand, agricultural-first protection logic, and thermal offtake obligations. Any loss of required thermal offtake or violation of service conditions would need to be addressed through planned ramp-down, derate, or trip logic developed in coordination with utilities and public agencies.

7. Water Protection and Non-Potable Supply Strategy

7.1 Zero Groundwater Extraction Goal

The proposal adopts a **zero groundwater extraction goal** for facility operation. This goal is material to the public case for the project. In a groundwater-constrained county, a compute facility should not compete with agricultural, domestic, or ecological needs through direct extraction. Agencies may wish to translate this goal into enforceable permit language, service conditions, and monitoring provisions.

7.2 Preferred Water Sources

To the extent non-dielectric ancillary water needs exist, the preferred approach is the use of **recycled municipal effluent or other approved non-potable supplies**. Any proposed water source would require verification of quantity, quality, treatment compatibility, conveyance feasibility, and regulatory approval. This review edition assumes that potable water or groundwater should be avoided except where specifically justified and separately approved.

7.3 Water Review Considerations for Agencies

- Compatibility with SGMA implementation and local groundwater sustainability objectives;
- Consistency with recycled water availability, quality, and discharge constraints;
- Assessment of spill prevention, fluid containment, emergency response, and wastewater handling;
- Verification that project approvals do not create indirect pressure for new groundwater pumping elsewhere in the service area.

8. Agricultural Thermal Offtake Plan

8.1 Conceptual Thermal Mandate

A central feature of the proposed model is a **100 percent waste-heat mandate** for recoverable thermal output, directed toward industrial agriculture and adjacent process uses. In this context, “100 percent” should be read as a required operating condition for the recoverable thermal stream contemplated by the approved design, subject to engineering definition and seasonal validation. The policy purpose is to prevent the facility from operating as a large electrical load while rejecting useful heat as wasted externality.

8.2 Potential Thermal Uses

The base Fresno blueprint identifies the following conceptual agricultural offtake uses:

- **Greenhouse climate support**, including root-zone heating and cold-season stabilization;
- **Crop drying** for nut, seed, and other agricultural products where low- to medium-grade heat can offset fossil or electric process demand;
- **Soil warming** or adjacent controlled-environment agricultural applications;
- **Other proximate process heat uses** subject to engineering compatibility and zoning review.

8.3 Thermal Dependency Consideration

The feasibility of the project is materially dependent on durable thermal offtake arrangements. Agencies should treat thermal reuse not as an aspirational co-benefit but as an operating requirement that affects land-use findings, utility assumptions, and environmental review. If the thermal sink fails, the facility may require temporary curtailment, alternate approved heat-handling measures, or operational suspension depending on final permit conditions.

9. Grid Protection and SCADA Governance

9.1 Ag-First Protection Interlock

The proposed governance architecture includes a **Level-1 SCADA “Ag-First” protection interlock** intended to preserve agricultural pumping reliability during summer stress conditions. Conceptually, the interlock would allow the facility to reduce, ratchet down, or trip compute load if electrical conditions indicate that agricultural pumping service is at risk. This places protected agricultural load ahead of discretionary compute demand.

9.2 Absolute Capacity Cap

The **50 MW capacity cap** is proposed as a physical and logical control rather than solely a paper covenant. The concept contemplates enforcement through safety PLC logic, interconnection protection architecture, and permit-linked operating conditions. The local public rationale is

straightforward: if the community is reviewing a 50 MW project, it should not become a larger load through silent equipment densification or refresh-cycle expansion.

9.3 Exhaustion Budget and Permitted-Capacity Controls

The blueprint also contemplates an **exhaustion budget** and related **permitted-capacity controls** attached to land-use approvals, development agreements, and service contracts. These mechanisms are presented as proposed local governance tools to define the facility's allowed operating envelope over time. Agencies should obtain legal review regarding the relationship between such controls and state or federal energy jurisdiction.

9.4 Hardware Refresh Capacity Ratchet

The concept includes a **proposed hardware refresh capacity ratchet** at years 3, 6, and 9, with a **33 percent surrender concept** associated with each interval. The public-policy premise is that more efficient future hardware should not automatically be converted into additional net extraction from the local grid. Instead, a portion of the efficiency gain could be recaptured for local reliability, public benefit, or reduced total demand. This mechanism would require detailed legal, contractual, and technical validation before use.

10. Land-Use, Permitting, and Interagency Governance Pathway

10.1 Local Land-Use Tools

The review edition contemplates several local tools that may be considered, alone or in combination:

- **Agricultural Symbiosis Overlay** or similar zoning framework to define eligibility criteria and operational conditions;
- **Conditional Use Permit (CUP)** establishing enforceable performance conditions;
- **Development Agreement** for long-term obligations, phasing, and public benefit commitments;
- **Water, wastewater, or utility service agreement** to bind source restrictions and operating limits;
- **Interagency coordination provisions** involving county, irrigation districts, utility providers, and environmental review authorities.

10.2 CEQA and Agency Review

Depending on final project specifics, CEQA analysis would likely need to address energy demand, water sourcing, wastewater, thermal infrastructure, traffic and construction, hazardous materials and coolant handling, cumulative impacts, and alternatives. This report does not assume entitlement eligibility and should not be read as a substitute for environmental review.

10.3 Jurisdictional and Preemption Considerations

A recurring legal question is the extent to which local agencies may govern operational conditions of a load-serving facility without impermissibly entering a domain reserved to state or federal energy regulators. The blueprint is framed so that key controls are attached to local land use, water service, thermal management, and site operations rather than wholesale rate-setting. Even so, agencies should treat legal preemption risk as a major review issue and obtain specialized counsel.

11. Public Benefits and County Evaluation Criteria

For local agencies, the most useful evaluation framework may be a simple question: does the project create reciprocal local utility commensurate with its infrastructure burden? The proposed model attempts to do so by combining a bounded electrical load, non-potable water sourcing, agricultural heat reuse, and local operational controls.

Proposed Public Benefit	Agency Review Concern Addressed	Review Questions for Agencies
Zero groundwater extraction goal	SGMA compliance, groundwater protection, public water equity	Can the applicant demonstrate durable non-potable supply without indirect groundwater displacement?
Ag-First SCADA interlock	Agricultural pumping reliability during summer stress	Is the load-shed or trip logic technically credible, utility-reviewed, and enforceable?
Absolute 50 MW capacity cap	Uncontrolled load growth and interconnection exposure	What physical and contractual mechanisms prevent incremental expansion?
100 percent recoverable waste-heat mandate	Local utility return, avoided thermal waste, agricultural support	Are there binding offtake agreements, thermal demand studies, and backup procedures?
Permitted-capacity and exhaustion budget controls	Long-term accountability and operating-envelope enforcement	Can conditions be monitored, audited, and legally sustained?
Hardware refresh ratchet proposal	Capture of efficiency gains for public benefit rather than added extraction	Is the ratchet legally supportable and technically measurable over time?

12. Risks, Caveats, and Required Validation

While the concept may offer a structured public-interest model, it contains meaningful uncertainties. Agencies should require validation in the following areas before any formal adoption or entitlement:

- **Interconnection risk:** utility studies must confirm system effects, curtailment capability, and protective coordination;
- **Thermal offtake dependency:** agricultural heat reuse must be supported by demand analysis, conveyance feasibility, and enforceable counterparties;
- **Legal preemption risk:** outside counsel should review local authority over the proposed operating conditions;
- **CEQA and environmental review:** all relevant impacts, alternatives, and mitigations must be evaluated under applicable law;
- **Water and wastewater approvals:** source, quality, discharge, containment, and emergency handling must be validated by appropriate agencies;
- **SCADA and safety architecture:** control logic, fail-safe modes, cyber and physical security, and emergency operating states require independent engineering review;

- **Economic durability:** local agencies should test whether the claimed agricultural symbiosis remains viable under seasonal, market, and operating variability.

13. Recommended Next-Step Actions for Agencies

If agencies determine that the concept merits further exploration, the following sequenced actions are recommended:

1. Direct staff to prepare a preliminary interagency scoping memorandum involving county planning, public works, relevant irrigation districts, wastewater providers, and utility representatives;
2. Require a licensed engineering pre-feasibility package covering electrical interconnection, immersion cooling systems, thermal offtake networks, and non-potable water sourcing;
3. Obtain legal analysis regarding CUP, development agreement, service agreement, overlay zoning, and preemption exposure;
4. Request a thermal demand and beneficiary study identifying candidate greenhouse, drying, soil-warming, or process-heat users;
5. Establish a draft agency evaluation matrix tied to measurable public-benefit criteria rather than generic economic-development claims;
6. Determine whether a pilot-scale review framework should be adopted for bounded-node proposals before considering any broader policy changes.

14. Conclusion

The Fresno County Agricultural Symbiosis Blueprint proposes a model by which compute-intensive infrastructure could be reviewed as bounded, reciprocal, and locally governable infrastructure rather than as an unrestricted extractive load. Its public value, if any, depends on whether agencies can require real controls: a hard 50 MW ceiling, non-groundwater water sourcing, agricultural-first electrical protections, and mandatory local heat reuse. The concept should therefore be judged not by generalized claims of innovation, but by whether it can withstand engineering scrutiny, legal review, environmental analysis, and practical agency enforcement.

For that reason, this edition is framed as a review document, not an approval instrument. It is intended to help local decision-makers determine whether such a model is worth formal study and, if so, under what conditions it may be considered consistent with county water protection, agricultural reliability, and infrastructure governance priorities.

15. Appendix-Style Summary Table of Key Design Controls

Design Control	Conceptual Requirement	Public Purpose	Possible Local Instrument
Capacity Cap	Absolute 50 MW node limit enforced through safety PLC logic and interconnection controls	Prevent unmanaged load growth and maintain reviewable infrastructure scale	CUP conditions, interconnection commitments, development agreement

Design Control	Conceptual Requirement	Public Purpose	Possible Local Instrument
Water Source	Zero groundwater extraction goal; preference for recycled municipal effluent or other approved non-potable supply	Protect aquifers and align with SGMA-era constraints	Service agreement, water conditions, monitoring and reporting terms
Thermal Mandate	100 percent recoverable waste heat directed to agricultural or adjacent process uses	Create local utility from waste heat and reduce externalized thermal burden	CUP, development agreement, thermal offtake covenant
SCADA Interlock	Level-1 “Ag-First” protection logic to preserve agricultural pumping reliability during stress events	Prioritize irrigation and rural grid stability over discretionary compute load	Utility operating agreement, technical appendix, permit conditions
Exhaustion Budget	Permitted-capacity and lifetime-use controls attached to local approvals	Create measurable long-term operational accountability	Land-use conditions, development agreement, service terms
Refresh Ratchet	Proposed years 3, 6, and 9 review points with 33 percent surrender concept tied to hardware refresh	Recapture efficiency gains for public benefit rather than added extraction	Development agreement, service agreement, periodic compliance review
Permitting Tools	Agricultural Symbiosis Overlay, CUP, development agreement, and interagency service conditions	Align land use, utility service, and public-benefit enforcement	Zoning ordinance, CUP findings, development agreement, agency MOUs

Appendix note: all listed controls are conceptual unless and until adopted through valid local process and supported by licensed engineering, utility coordination, environmental review, and legal analysis.

Prepared as a conceptual review document for public-sector consideration.

Date: _____

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