TITLE 24, PART 6 | 2028 CODE CYCLE

# Welcome to the Statewide CASE Team's Utility Sponsored Stakeholder Meeting

Topics: Data Center Efficiency Improvements

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CALIFORNIA ENERGY CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM

# Agenda

- Proposal Description
- Market and Technical Consideration
- Technical Barriers and Solutions
- Per Unit Energy and Cost Methodology
- Compliance and Enforcement
- Discussion and Next Steps

# Proposal Description

- Code Change Proposal
- Benefits
- Background Information

# Proposed Code Changes

Sub measure 1 *General* – Adding **Definitions** to Section 100.1

- Define liquid-cooled ITE vs air-cooled ITE and clarify the meaning of integrated economizers for data centers.

Sub measure 2 *Mandatory* – Modifying **Fan control** requirements in Section 120.6(j)3 – Covered Processes:

- VAV is required at 60kBtuh --> proposal lowers to 30kBtuh
- Fan motor demand not to exceed 50% of design wattage --> proposal lowers to 40%
- Applies to additions and alterations

Sub measure 3 *Prescriptive* - Modifying **New Construction Economizer** requirements in Section 140.9(a)1 – Covered Processes:

A. Clarify not only the temperature for 100% economizer but what load fraction economizer must meet at higher temperatures

B. Eliminate the supply air temperature maximum threshold for water and air economizer

C. Raise the 100% drybulb economizer threshold from 65°F drybulb to up to 70°F drybulb air-cooled ITE

D. Raise the 100% wetbulb economizer threshold from 45°F wetbulb to 60°F wetbulb for air-cooled ITE

E. New economizer thresholds for >2MW liquid-cooled ITE loads – 100% economizing at 80°F drybulb or 85°F wetbulb → effectively requires two central plants and distribution systems for large data centers with both air-cooled and liquid-cooled ITE.

**See Title24stakeholders.com** for proposal description, justification, draft code language, and requested data https://title24stakeholders.com/wp-content/uploads/2025/09/2028_T24_Measure-Summary-Data-Centers-Efficiency-Improvements.pdf

# Proposed Code Changes

Sub measure 4 *Prescriptive* – Introducing a new **Computer Room Heat Recovery** requirement in 140.9(a)5 – Covered Processes:

- Buildings with > 100 kW (*TBD*) of computer rooms and > 35,000 ft2 (*TBD*) of non-computer rooms shall have heat recovery (effectively extends the T24-2025 140.4(s) Mechanical Heat Recovery to slightly smaller buildings).

Sub measure 5 *Prescriptive* – Modifying **Additions/Alterations Economizers** requirements in Section 141.1(b)1 – Covered Processes

- Raise air/water economizer thresholds from 55db/35wb to 70db/60wb
- Narrow economizer exception for computer room expansions from 50 tons to 20 tons

**See Title24stakeholders.com** for proposal description, justification, draft code language, and requested data https://title24stakeholders.com/wp-content/uploads/2025/09/2028_T24_Measure-Summary-Data-Centers-Efficiency-Improvements.pdf

**Proposed measures build on previous requirements in the 2013 and 2022 Part 6 Code Cycles.**

# Proposed Code Change Sub measure 1 - Definitions

*Add the following definitions in Section 100.1*

- **LIQUID-COOLED ITE:** components of ITE that are cooled by a fluid other than air and that do not use server fans to flow air across the components. Common liquid cooling fluids include water, glycol, and refrigerant. Individual servers can be partially liquid-cooled and partially air-cooled, with server fans serving the air-cooled components and pumps serving the liquid-cooled components.
- **WETBULB COMPUTER ROOM ECONOMIZER:** A computer room economizer that provides cooling by evaporating water (e.g. cooling tower, dry cooler with adiabatic assist).
- **DRYBULB COMPUTER ROOM ECONOMIZER:** A computer room economizer that either (1) provides cooling by directly supplying outside air or (2) provides cooling by transferring heat to the outside air with a sensible-only heat exchanger (e.g. dry cooler).

# Proposed Code Change Sub measure 1 - Definitions

*Add the following definitions in Section 100.1*

**COMPUTER ROOM ECONOMIZER:** A system by which heat from ITE is rejected to the environment without the use of a refrigerant compressor. If a computer room economizer is part of a cooling system that also includes a refrigerant compressor, then the system shall be fully integrated, meaning it shall be capable of providing partial economizer cooling without limiting the capacity of compressor cooling and without limiting the capacity of compressor-less cooling.

(continued)

# Proposed Code Change Sub measure 1 - Definitions

The following systems DO NOT meet the fully integrated criteria of a computer room economizer:

1. Waterside economizer heat exchangers that are piped in parallel with chillers on the chilled water side.
2. Air-cooled chillers with integrated economizer coils that are piped into the primary circuit of a primary/secondary system.
3. Air-cooled chillers with integrated economizer coils that are served by the same condenser fans that serve refrigerant condenser coils whose speed is limited by the need to maintain a minimum refrigerant head pressure.
4. Refrigerant economizer systems with one or more refrigerant circuits that must switch from refrigerant compressor operation to refrigerant pump operation.

The following systems DO meet the fully integrated criteria of a computer room economizer:

1. Waterside economizer heat exchangers that are piped in series with chillers on the chilled water side.
2. Air-cooled chillers with integrated economizer coils that are piped into the secondary circuit of a primary/secondary system.
3. Air-cooled chillers with integrated economizer coils that are served by dedicated economizer fans and not by condenser fans that serve refrigerant condenser coils.
4. Refrigerant economizer systems where 10-90% of the load on a refrigerant circuit can be met by a passive condenser or refrigerant pump, while the other 90% to 10% of the load is met by an active condenser or refrigerant compressor

# Proposed Code Change Sub measure 2 – Fan Control

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*Fan Control Section 120.6(j)3: Reduce the computer room design cooling load threshold to 30,000 Btu/hr for airflow control and reduce fan motor demand to 40 percent*

**Mandatory requirements for computer rooms.** Space-conditioning systems serving a computer room shall meet the following requirements:

- **Reheat.** Each computer room zone shall have controls that prevent reheating, recooling and simultaneous provisions of heating and cooling to the same zone, such as mixing or simultaneous supply of air that has been previously mechanically heated and air that has been previously cooled, either by cooling equipment or by economizer systems.
- **Humidification.** Humidification shall be adiabatic. Nonadiabatic humidification, including but not limited to steam and infrared, is prohibited.
- **Fan control.** Each computer room with design cooling load exceeding ~~60,000~~ 30,000 Btu/hr shall be served by fan system(s) designed to vary the airflow rate as a function of actual load. Fan motor demand shall not exceed ~~50~~ 40 percent of design wattage at 66 percent of design fan speed.

# Proposed Code Change Sub measure 3 - Economizers

*New Construction Economizer Section 140.9(a)1*

- *For both liquid-cooled and air-cooled ITE spaces, modify economizer requirement based on ITE load density, ITE part load condition, ITE cooling fluid, and economizer type*

**(a) Prescriptive Requirements for Computer Rooms.** Computer rooms with a power density greater than 20 W/ft$^2$ shall comply with this section.

**1. Economizers.**

A. Each individual cooling system primarily serving computer rooms shall include a *computer room air economizer capable of meeting the* "Percent of current ITE Load met by Economizer" at all of the conditions listed in Table A

B. All liquid-cooled ITE in buildings with a design liquid-cooled ITE load greater than 2 MW shall be served by a cooling system with a computer room economizer capable of meeting the "Percent of current ITE Load met by Economizer" at all of the conditions listed in Table B.

# Proposed Code Change Sub measure 3 - Economizers

Table A

| | If Drybulb Economizer is used | | | | If Wetbulb Economizer is used | | | |
|---|---|---|---|---|---|---|---|---|
| **outside drybulb** | < = 70F | < = 70F | 80F | 90F | Note 1 | Note 1 | Note 1 | Note 1 |
| **outside wetbulb** | Note 1 | Note 1 | Note 1 | Note 1 | < = 60F | < = 60F | 65F | 70F |
| **outside dewpoint** | <= 60F | <= 60F | <= 60F | <= 60F | Note 1 | Note 1 | Note 1 | Note 1 |
| **Current ITE Load Range** | 100% | 10%-99% | 10-100% | 10-100% | 100% | 10%-99% | 10-100% | 10-100% |
| **supply air/fluid temperature to the ITE** | design temp | design temp | design temp | design temp | design temp | design temp | design temp | design temp |
| **return air/fluid temperature from the ITE** | design temp | expected temp | expected temp | expected temp | design temp | expected temp | expected temp | expected temp |
| **Percent of current ITE Load met by Economizer** | 100% | 100% | >=50% | >=10% | 100% | 100% | >=50% | >=10% |
| **Note 1: Any outside temperature that is possible at the other outside conditions** | | | | | | | | |

# Proposed Code Change Sub measure 3 - Economizers

**Applicable to Liquid-cooled ITE buildings with design load > 2 MW**

Table B

| | If Drybulb Economizer is used | | | | If Wetbulb Economizer is used |
|---|---|---|---|---|---|
| **outside drybulb** | < = 80F | < = 80F | 85F | 95F | Note 1 |
| **outside wetbulb** | Note 1 | Note 1 | Note 1 | Note 1 | < = 85F |
| **outside dewpoint** | Note 1 | Note 1 | Note 1 | Note 1 | Note 1 |
| **Current ITE Load Range** | 100% | 10%-99% | 10-100% | 10-100% | 0-100% |
| **supply air/fluid temperature to the ITE** | design temp | design temp | design temp | design temp | design temp |
| **return air/fluid temperature from the ITE** | design temp | expected temp | expected temp | expected temp | expected temp |
| **Percent of current ITE Load met by Economizer** | 100% | 100% | >=50% | >=10% | 100% |
| **Note 1: Any outside temperature that is possible at the other outside conditions** | | | | | |

# Proposed Code Change Sub measure 3 - Economizers

*New Construction Economizer Section 140.9(a)1*

- *Modify Exception 2 for outdoor air dry-bulb and wet-bulb threshold temperatures*
- *Add Exception 3 for computer room heat recovery*

**EXCEPTION 2 to Section 140.9(a)1**: A computer room with an ITE design load less than 20 tons (70 kW) may be served by a second fan system without an economizer if it is also served by a fan system with an economizer that also serves other spaces within the building, provided that all of the following are met:

i. The economizer system is sized to meet the design cooling load of the computer room when the other spaces within the building are at 50 percent of their design load at outside air temperatures of ~~65°F~~ 70°F dry-bulb and below and ~~50°F~~ 60°F wet-bulb and below; and

ii. An economizer system that can stop service to other spaces in the building when those spaces are unoccupied and serve only the computer rooms.

**EXCEPTION 3 to Section 140.9(a)1:** Computer rooms that reject heat to a heat recovery system that is sized to accept at least 50% of the design computer room heat and is predicted to recover at least 25% of the annual computer room heat.

# Proposed Code Change Sub measure 4 – Heat Recovery

*Computer Room Heat Recovery Section 140.9(a)5*

- *Add new requirement to transfer recovered heat from the Computer Cooling system to space heating system and/or service hot water system*

5. **Computer Room Heat Recovery.** Building with a design computer room ITE load greater than 100 KW and a non-computer room area greater than 35,000 ft2 shall include a dual fan dual duct system, or a heat recovery chiller, or other means, capable of transferring the lesser of the following from the computer room cooling system to the space heating system and/or to the service water heating (SWH) system:

A. 0.25 times the peak heat rejection of the computer room system

B. 0.25 x (capacity of space heating system + capacity of SWH system)

# Proposed Code Change Sub measure 5 Economizers

*Existing Building Economizers  Section 141.1(b)1*

- *Modify the requirements for additions and alterations to reflect the New Construction requirements as stated in Section 140.9*
- *Modify Exception 2 to reduce the ITE load threshold to 20 Tons (~70 kW) for existing computer rooms*
- *Delete Exception 3 for new computer rooms ITE load threshold*

**(b) Computer Rooms.** All newly installed computer room cooling systems and uninterruptible power supply systems in additions/alterations shall meet the requirements of Sections 120.6(j), 140.9(a)2, and 140.9(a)4 and comply with item 1 below.

1. Economizers. Each individual cooling system primarily serving computer rooms in an existing building shall meet the requirements of Section 140.9(a)1

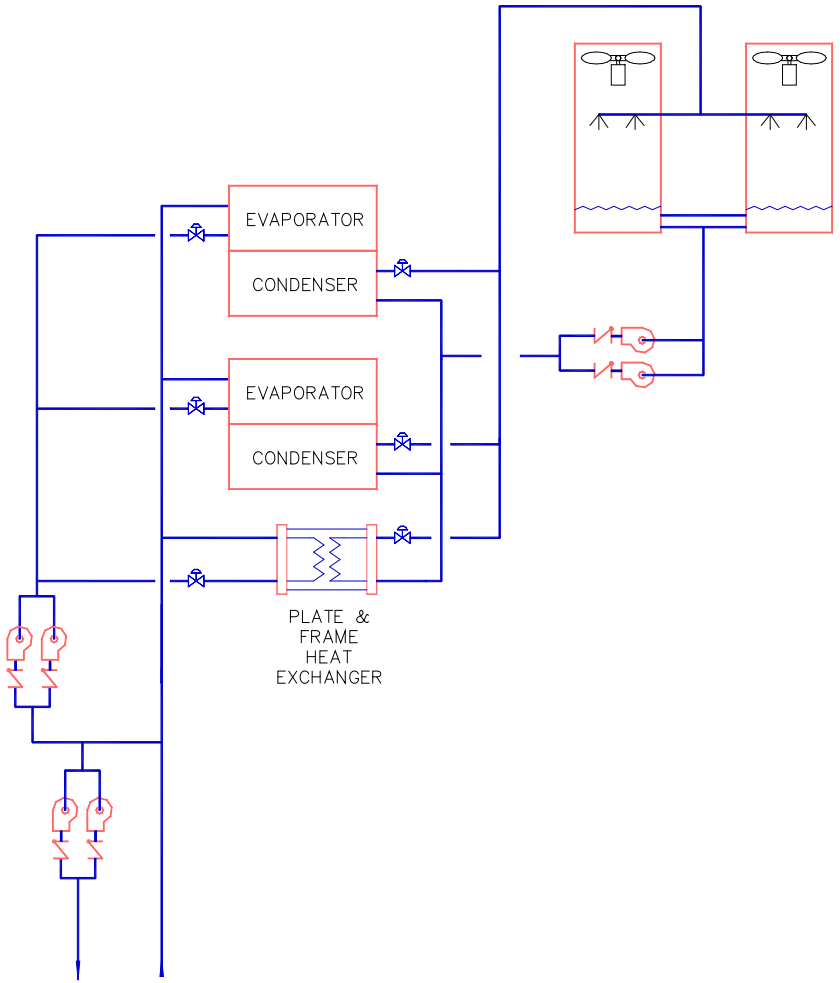
**EXCEPTION 1 to Section 141.1(b)1:** Individual computer rooms with an ITE design load under 5 tons (18 kW) in a building that does not have any economizers.

**EXCEPTION 2 to Section 141.1.(b)1:** New cooling systems serving an existing computer room in an existing building with an ITE design load up to a total of ~~50 tons (176 kW)~~ 20 tons (70 kW).

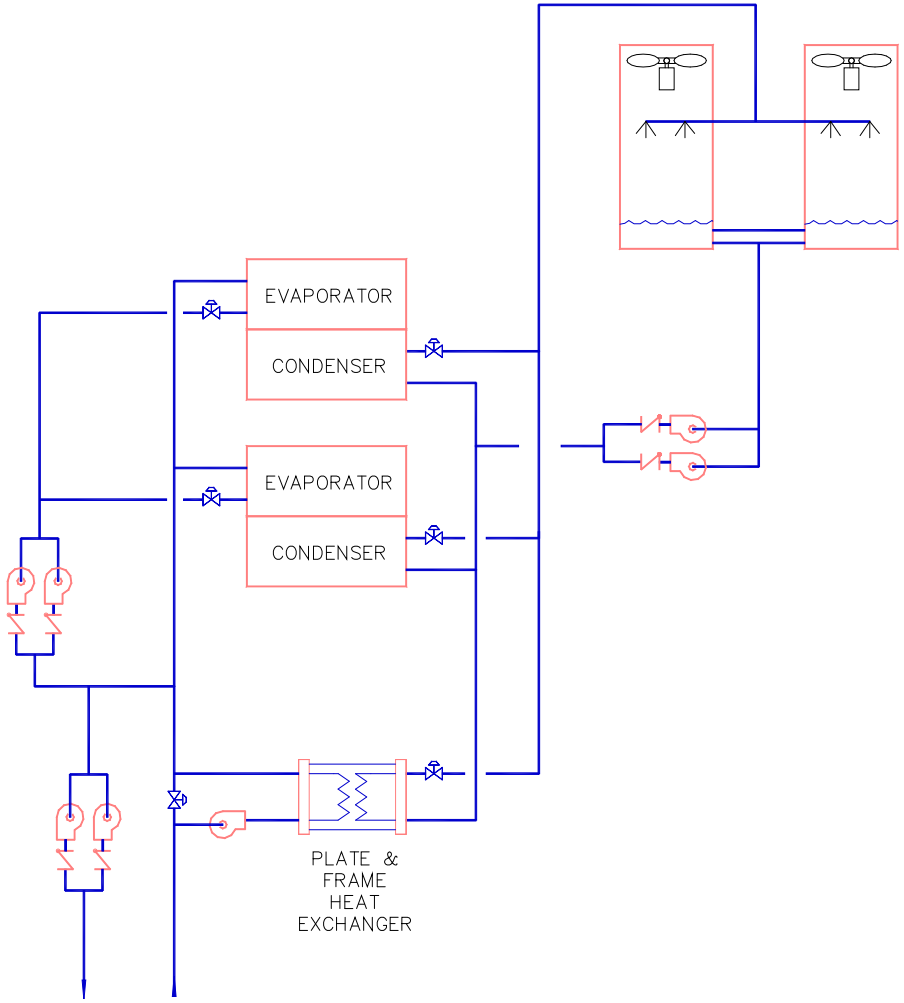
~~**EXCEPTION 3 to Section 141.1(b)1:** New cooling systems serving a new computer room in an existing building with an ITE design load up to a total of 20 tons (70 kW).~~

# Background Information: Wetbulb Economizer

Non-compliant (piped in parallel with evaporator)

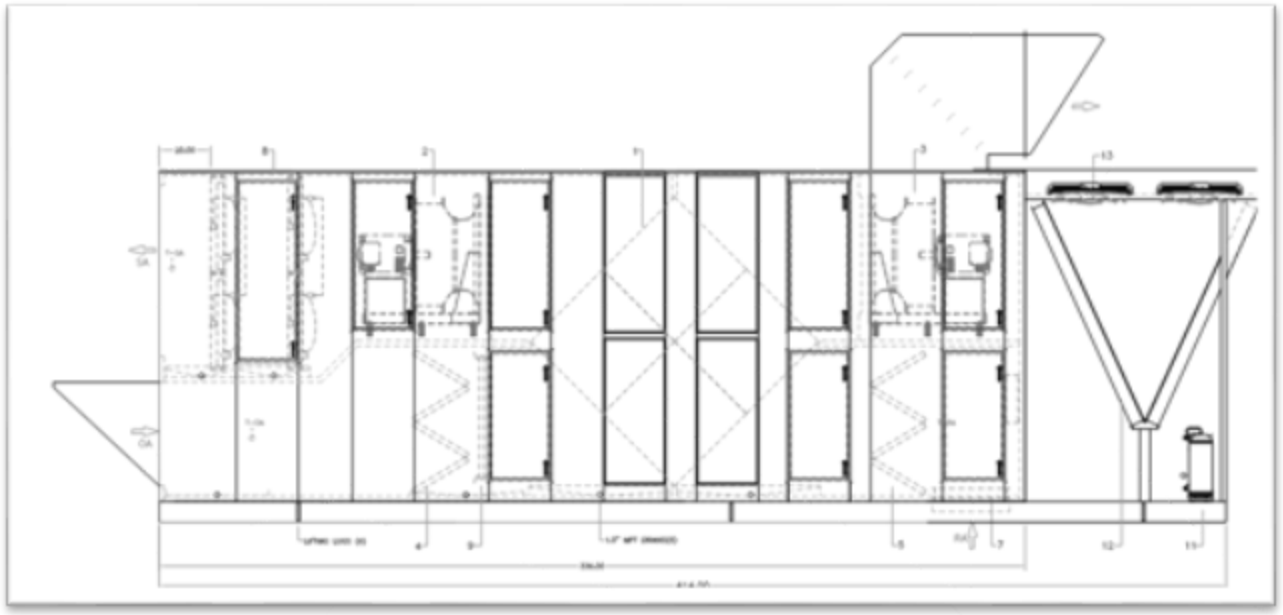



Compliant (piped in series with evaporator)

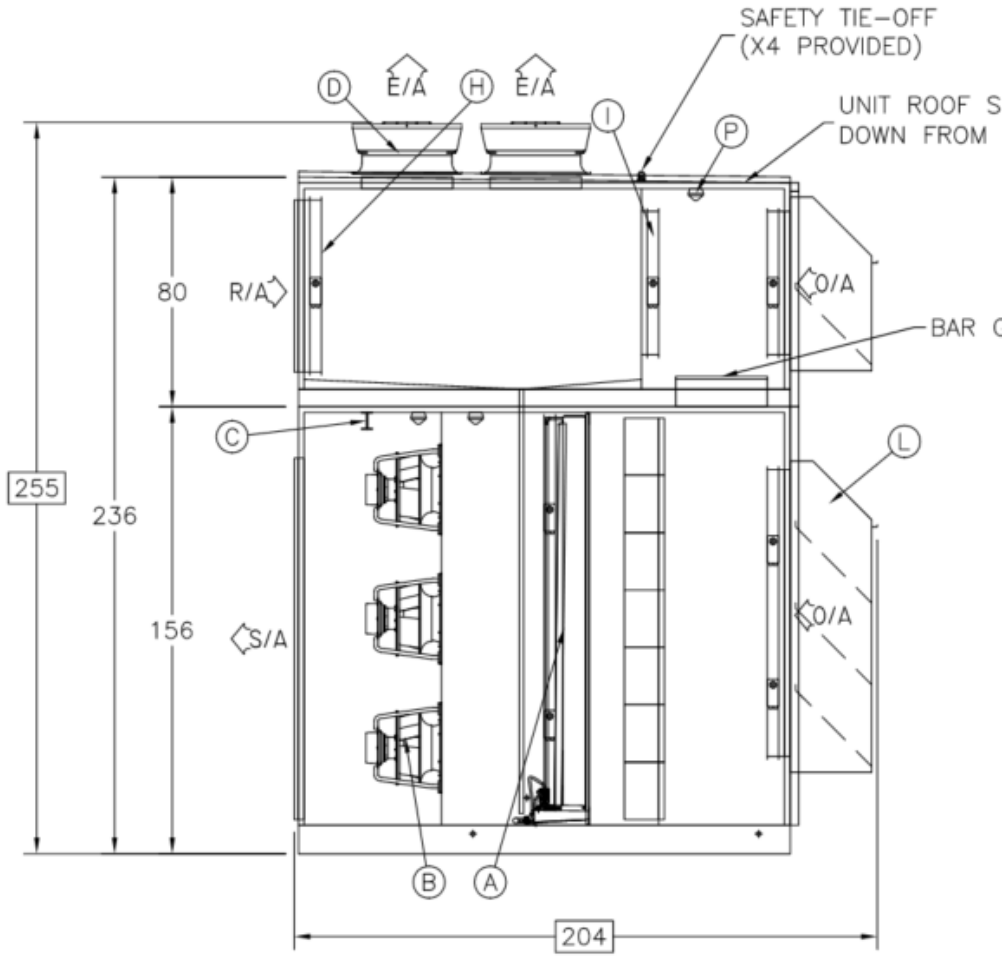


# Background Information: Drybulb Economizer

Likely non-compliant (indirect airside economizer)



Compliant (direct outside air economizer)

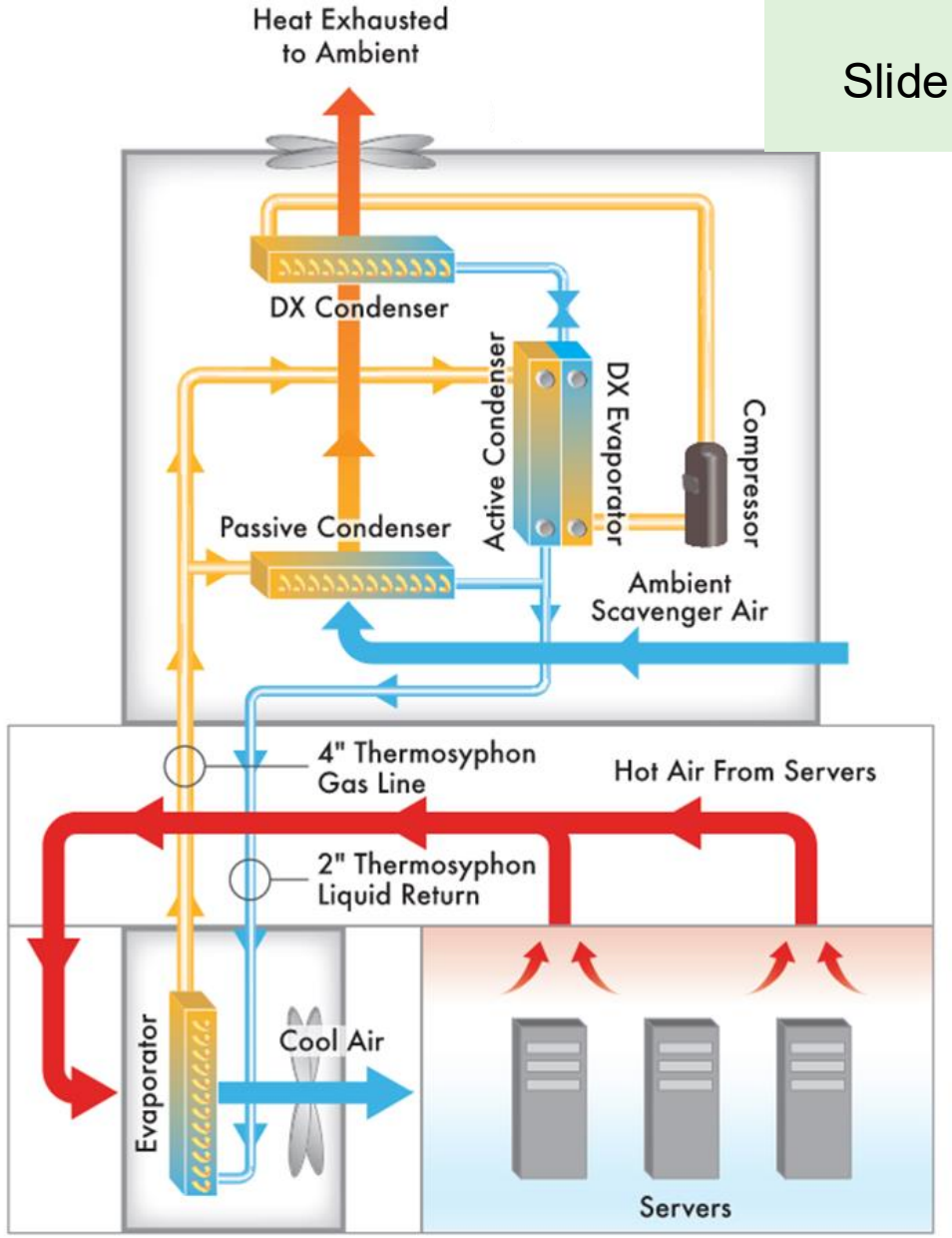


# Background Information: Refrigerant Economizer

Slide NOT shown

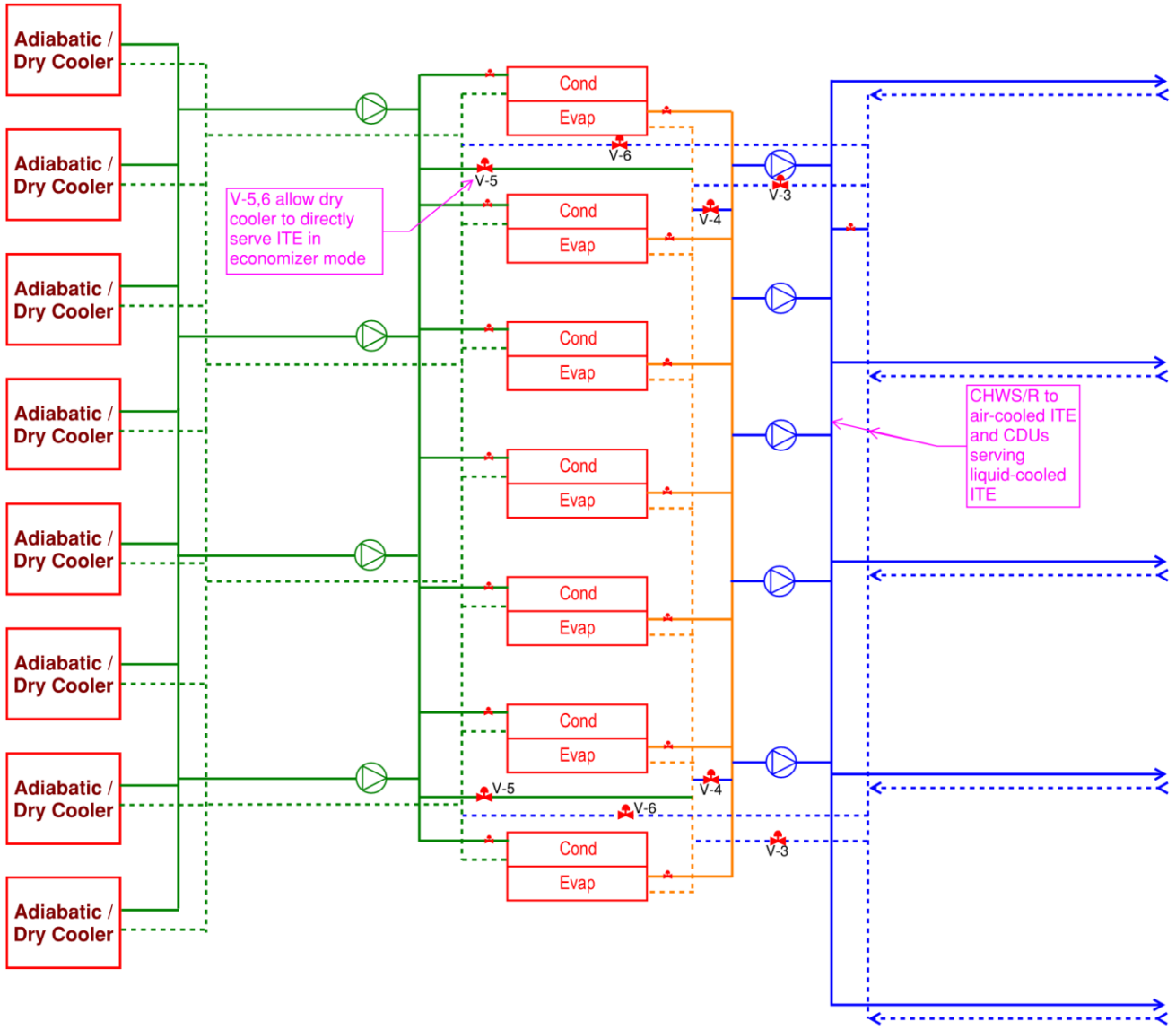
**Code compliant Refrigerant Economizer for Air-Cooled ITE**

NOTE: the computer room economizer definition will include descriptions of non-integrated refrigerant economizers that do not comply and descriptions of integrated refrigerant economizers that do comply.



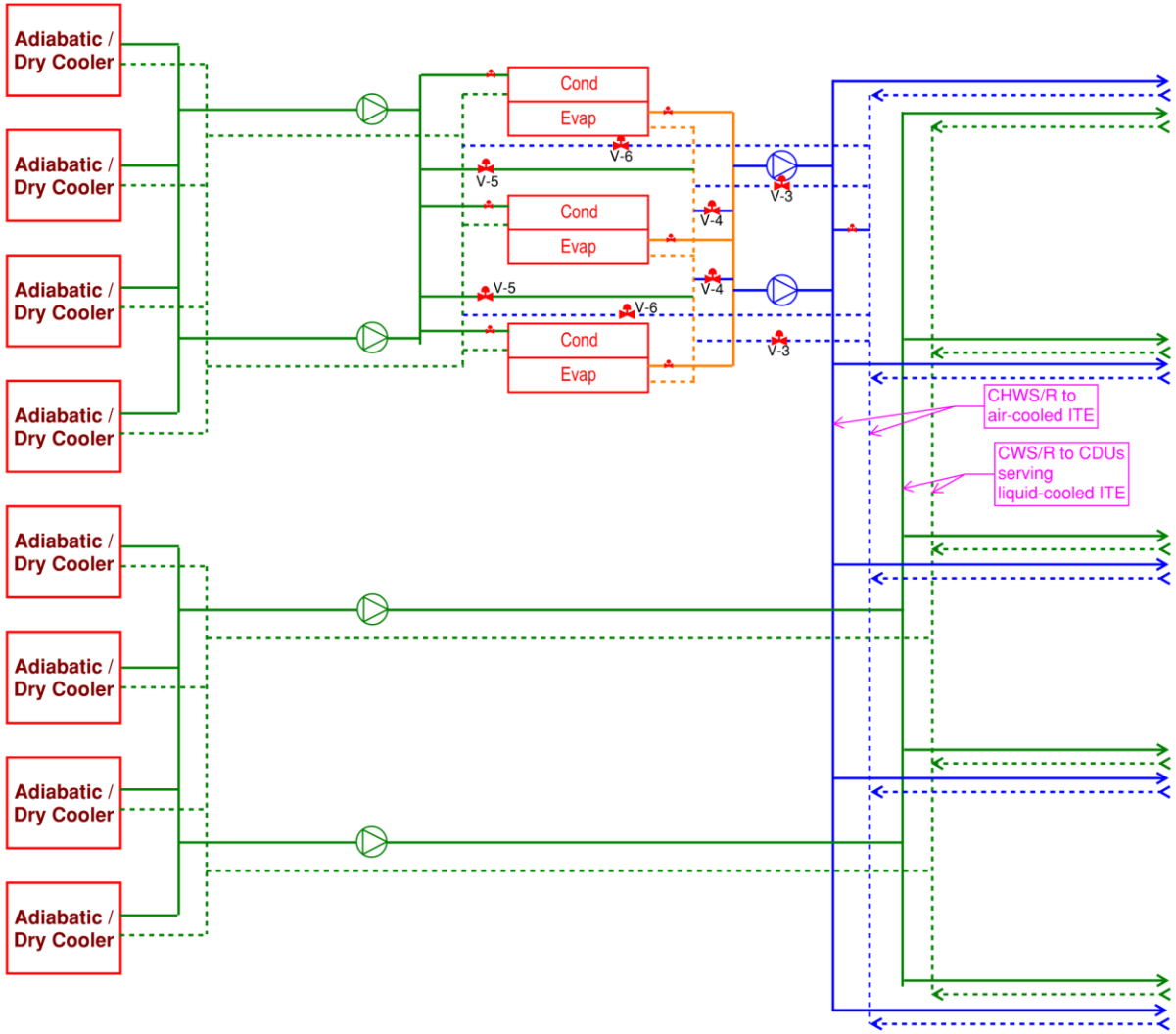
# Background Information: Economizer for Liquid-Cooled ITE

**NON-COMPLIANT chiller plant with wetbulb economizer that serves both air-cooled ITE and liquid-cooled ITE with chilled water**

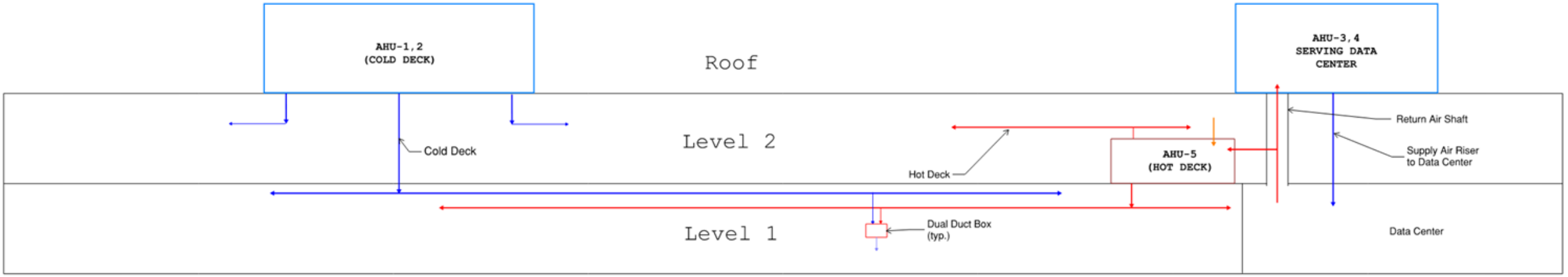


# Background Information: Economizer for Liquid-Cooled ITE

**Code compliant system with chillers and wetbulb economizer dedicated to air-cooled ITE and separate economizer-only plant dedicated to liquid-cooled ITE**



# Background Information: Computer Room Heat Recovery



# Benefits of the Proposed Change

## Emissions Reduction

- "U.S. data centers **produced 105 million tons CO2 equivalent gasses in the past year** with a carbon intensity 48 percent higher than the national average."(***2.18% of US emissions in 2023)***[1]

## Energy, Cost, Demand Savings

- Based on an LBNL report, data centers used **4.4 percent of the nation's electricity in 2022** and would use **6.7 to 12 percent by 2028**.[2]

## Water Savings

- IEA estimates that a 100 MW hyperscale data center in the U.S. **consumes around 500,000 gallons per day in total – equivalent to about 6500 households** – with over 60% of this being indirect water use.[3]

**Proposed measures would expand cost-effective and efficient design practices to more data centers, thereby reducing overall energy, costs, environmental, and grid impacts.**

1. Environmental Burden of United States Data Centers in the Artificial Intelligence Era, Harvard
2. https://www.energy.gov/articles/doe-releases-new-report-evaluating-increase-electricity-demand-data-centers, DOE
3. https://www.iea.org/reports/energy-and-ai, IEA

# Marked-up Code Language

**See Title24stakeholders.com** for marked-up code language

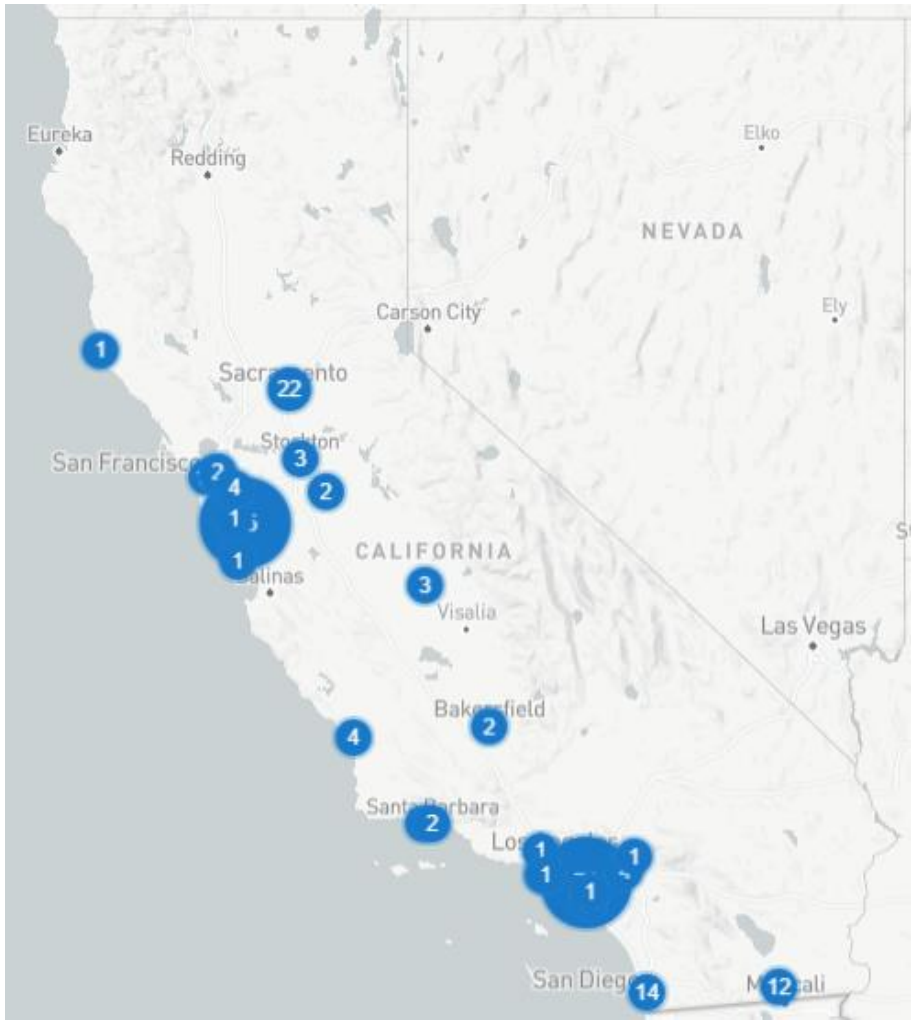
| Title 24, Part 1 | Title 24, Part 6 | Reference Appendices |
| --- | --- | --- |
| ▪ None | ▪ Definitions<br>▪ Mandatory Section 120.6(j)3<br>▪ Prescriptive Section 140.9(a)1<br>▪ Prescriptive Section 140.9(a)5<br>▪ Prescriptive Section 141.1(b)1 | ▪ JA6.3 |

# Market and Technical Considerations

- Current Conditions and Trends
- Potential Barriers and Solutions
- Technical feasibility

# Current Market Conditions

- California has over 300 data centers, with highest concentrations in Northern California and Los Angeles.
- Many data centers in CA serve both air-cooled and liquid-cooled ITE with the same chilled water plant.
- Some data centers have separate condenser water-only plants dedicated to liquid-cooled ITE.
- As computing chip technology advances, existing data centers are updating ITE which impacts overall cooling load.




[Thirsty for power and water, AI-crunching data centers sprout across the West, Stanford]

Datacentermap.com

# Poll

**What supply air temperature to the server racks is used in new data centers?**

# Poll

**For large new data centers, what percentage of the load is expected to be liquid-cooled ITE vs. air-cooled ITE?**

# Current Market Share

**Market share:** Estimated percentage of buildings that already use the proposed technology or design practice (at or above the proposed stringency level)

*This proposal primarily adjusts the threshold for efficiency requirements. We are seeking additional information to understand market penetration.*

## Current Market Share

| New Construction and Additions | TBD |
|---|---|

| Alterations | TBD |
|---|---|

# Technical Considerations: Separate Plants for Liquid-Cooled ITE

- The exact fraction of the total load that will be air-cooled ITE vs liquid-cooled ITE is not always known in the design phase.
- Owners want the flexibility to shift load from air-cooled ITE to liquid-cooled ITE and vice versa.
- Careful design of separate plants for air-cooled vs liquid-cooled ITE can minimize the cost of shifting load in the future.
- Another consideration is the design technology cooling system (TCS) fluid temperature to the ITE. Most liquid-cooled ITE can be cooled with W40 (104°F) or higher but new products and some future products may require lower temperature fluid.

# Technical Barriers and Solutions

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| Technical Barriers | Potential Solutions |
| --- | --- |
| 1. Lack of knowledge of ITE load during data center design phase | 1. Research and technical reports and case studies |
| 2. ITE technology lifecycle may not align with HVAC lifecycle | 2. Collect information about ITE equipment lifecycle through manufacturers and designers |
| 3. Change in percentage of whitespace and non-whitespace will impact the HVAC system and energy consumption of the building | 3. Coordinate with state and local jurisdictions to improve data collection on data centers |

# Poll

**What else should we know? Are there other market or technical barriers or solutions we should consider?**

# Per Unit Energy and Cost Impacts

***Methodology and Assumptions***

- Energy and Energy Cost Savings
- Incremental Costs

# Energy and Energy Cost Savings Methodology

Slide NOT shown

- The savings and cost analysis will be based on a hybrid calculation.
  - Custom calculation using a spreadsheet-based methodology validated against real world data centers for initial per-unit savings calculations (note that this will not include the impact of envelope)
  - Physics engine-based simulation using EnergyPlus 25.1.0 to validate the custom calculation results and identify CBECC enhancement for projects pursuing the performance path
- Using CEC's methodology and metrics as presented in the 2028 Energy Code Cost Accounting Workshop
- If the weather file and the CBECC 2028 Research version is not released before the draft CASE report, the CASE team will use the CBECC 2025 Research version 0.4

# Energy and Cost Analysis for Sub Measure 3 (Wetbulb threshold from 45F to 60F)

- **Building Type:** Data center (e.g., 10 MW capacity) with Air Cooled (A-C) ITE
- **Assumptions:**
  - A-C ITE with 75F design Supply Air Temperature (SAT) to the server for baseline and proposed
  - The approach from outdoor air wet bulb temperature (OAWB) to SAT is 30°F for baseline and 15°F for proposed
    - The approach is the sum of the approaches of the cooling tower (CT), the heat exchanger (HX), and the computer room air handler (CRAH) coil
  - The proposed design will have significantly greater hours of full and partial economizer operation
  - Adjust CHW/CW pump and supply fan pressure drop based on actual selections for CT/HX/Coil
- **Costs:**
  - **Equipment Costs:** Get pricing from reps and contractors for the baseline and proposed equipment selections
  - **Install costs:** Adjust a real design (e.g. adjust pipe sizes), work with a mechanical contractor to estimate full incremental cost including piping, rigging, etc.

# Energy and Cost Analysis for Sub Measure 3 (Liquid-Cooled ITE Economizer)

- Start with a real data center in CA designed with separate plants and distribution piping for A-C ITE and Liquid-Cooled (L-C) ITE.
  - Water-cooled chillers to chilled water loop to CRAHs, includes waterside economizer
  - Cooling towers to heat exchangers to condenser water loop to CDUs serving L-C ITE
  - Includes provisions to shift loads between chilled water loop and condenser water loop
- Redesign the plant to serve both A-C ITE and L-C ITE with chilled water, including:
  - Add chillers
  - Delete condenser water distribution loop
  - Upsize chilled water loop
  - Revised points list and sequences
- **Costs:**
  - Work with mechanical contractor and controls contractor to estimate incremental first cost and maintenance costs

# Energy and Cost Analysis for Sub Measure 4 (Computer Room Heat Recovery)

- **Proposed Case:** start with actual medium office building with 100 kW data center and heat recovery
  - DFDD (dual fan dual duct) system
  - Data center return air ducted to hot deck AHU mixing section
  - Air-to-water heat pump (AWHP) serves backup HW coil in hot deck (sized for full capacity)
- **Base Case:** redesign the actual design to delete heat recovery
  - Delete mixing section and duct from data center
  - AWHP unchanged
- Simulate medium office with VAV reheat, without heat recovery
  - export hourly heating load in btuh/ft2, AWHP heating energy in kW/ft2, and electricity cost
- Spreadsheet post-process the heating load, and heating energy
  - Evaluate different scenarios of data center size and load profile in terms of btuh/ft2 (e.g. 100 kW d.c. at 100% load for 35,000 ft2 building is 9.75 btuh/ft2).
  - Compare hourly heating load to d.c. heating capacity for each scenario calculate the hourly and annual energy cost savings.

# Energy and Energy Cost Analysis for Sub Measure 5

## Existing Building Economizers

Slide NOT shown

- **Building Type:** Analysis - medium office building (applicable to all NR Buildings)
  - **Baseline:** office with a DFDD (dual fan dual duct) system, hot deck = AHU with AWHP
  - **Proposed:** same as baseline but add ductwork from data center to hot deck AHU and mixing section in hot deck AHU.
- **Assumptions:**
  - **Baseline:** code requirements for existing data centers
    - Airside economizer maximum threshold is 55F dry-bulb
    - Integrated water economizer maximum threshold is 40F dry-bulb and 35F wet-bulb
  - **Proposed:** Based on code requirement for new construction in proposal (submeasure 3)
- **Cost:**
  - Contact manufacturers and installer to get additional costs

# Physics-based Energy Modeling Assumptions

- Simulating energy savings in EnergyPlus with CBECC rulesets
- Develop an archetype prototype to simulate a Data Center since there is no CBECC prototype
- For small computer spaces, a prototype with computer spaces in the new 2028 CBECC Research version will be used

## Prototypical Buildings

- A new 40,000 sq. ft. dedicated building with low, medium and high density ITE load
- Apply CBECC ruleset, including envelope requirements currently excluded via Section 120.7
  - **Exception to Section 120.7:** A dedicated building used solely as a data center that has a total covered process load exceeding 750 kW.

## Climate Zones

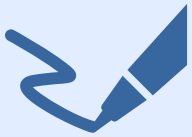
- The focus will be on climate zones with a large percentage of data centers compared to the rest of the state.
  - Climate Zone 4
  - Climate Zone 9
  - Climate Zone 12

# Key Physics-based Modeling Assumptions

**Prototype:** Data Center

**Standard Design**

1. Two Design prototypes (with and without T24 2025 envelope requirements)
2. CRAC units for smaller computer spaces (process load ≤ 800kW)
3. CRAH units for data centers with 20 W/sq.ft, 50 W/sq.ft. and 100 W/sq.ft (liquid-cooled servers)



**Proposed Design**

1. Same as baseline except for measure-specific parameters
2. The economizer and heat recovery requirement as discussed in the Custom Savings Calculation slides
3. Four parametric runs for data center per measure proposal for 3B, 3C, 4 and 5
4. Two parametric runs for small computer spaces (Measure 3B and 5)

# Approach for Gathering Costs

- **Primary Sources**
  - **Mechanical Contractor:** Get pricing from reps and contractors for the baseline and proposed equipment selections and system design
  - **Controls Contractor:** Get pricing from reps and contractors for the baseline and proposed controls selections
- **Other Sources**
  - **Other Codes & Standards Reports**
    - National Standards (ASHRAE 90.4)
    - Voluntary standards documents
  - **Cost Databases**
  - **Existing Data Center Designs**
  - **Stakeholder Outreach**
    - Equipment manufacturers
    - Data Center Design & Engineering Firms
    - Contractors & Skilled Trades

# Compliance Verification

- Key Aspects of Compliance Verification
- Barriers and Solutions
- Revisions to Compliance Software

# Key Aspects of Compliance Verification

| Construction Phase | Responsible Party | Verification Process | Specific Measures |
|---|---|---|---|
| **Design** | Project Team | Identify if project triggers new/updated requirements. | • **Fan control** -> VAV in CR w/ cooling load exceeding 30kBtuh<br>• **Economizers** -> % of cooling load met by economizer; New thresholds (i.e., 70°F dry-bulb, 60°F wet-bulb)<br>• **Heat Recovery** -> Req. in CR ITE load >100KW and non-CR area >35k $ft^2$ |
| **Permit** | Project Team & Plans Examiner | Submit design documents including specs that identify equipment that meet new requirements. Plans Examiner reviews. | |
| **Construction** | Project Team | Confirm that equipment indicated in compliance docs and design docs has been installed. | |
| **Inspection** | Building Official | Visually verifies that equipment is installed per permit documents. | |

# Compliance Barriers and Solutions

| Compliance Verification Barriers | Potential Solutions |
| --- | --- |
| 1. Market does not have a clear understanding of the interaction between ITE load and HVAC performance<br>2. The permit process may be delayed due to lack of local building department staff and time<br>3. Lack of understanding of new data center requirements | 1. New/modify Accepted Test Technicians requirements<br>2. Add modified requirements to the existing covered process compliance form (NRCC/LMCC-PRC).<br>3. Develop implementation resources and training |

# ACM Updates

- Modify existing ruleset to account for:
  - Liquid Cooling
  - Heat Recovery
  - Revised Economizer Thresholds

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More information on
CEC's 2028 proceeding website .

# We want to hear from you!

CALIFORNIA ENERGY CODES & STANDARDS
A STATEWIDE UTILITY PROGRAM

# Cost Effectiveness Results

Slide NOT shown

| Climate Zone | Benefits *30-year Energy Cost Savings + Other PV Savings* (2029 PV$) | Costs *Total Incremental PV Costs* (2029 PV$) | Benefit-to-Cost Ratio |
|---|---|---|---|
| 1 | $#,### – $#,### | $#,### – $#,### | #.# – #.# |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
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| 14 | | | |
| 15 | | | |
| 16 | | | |

Results vary by prototypical building

134.79

**Call out** – Lorem ipsum dolor sit amet.