High-Performance Measure Details

Measure Name
Heat Recovery Chiller

Use Category
Space & Service Water Heating Electrification

Effective Date
March 16, 2026

Version
2.2

Measure Code
LM401

Measure Stage
Early Adoption

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Technology Summary

A heat recovery chiller (HRC) is a vapor-compression chiller capable of producing chilled water for space cooling while simultaneously capturing condenser heat to generate useful heating hot water. These systems operate primarily when a cooling load is present; the recovered heat is transferred to hydronic systems serving space heating and/or domestic or service hot water loads. When simultaneous cooling loads are insufficient to meet heating demand, supplemental electric heating sources—such as electric boilers or hydronic heat pumps—may provide trim heat.

HRCs are most effective in buildings with coincident cooling and heating loads, including applications with ventilation reheat, domestic hot water demand, or hydronic heating systems. Typical examples include multifamily, healthcare, higher education, hospitality, and mixed-use buildings. Because heating output is derived from

recovered condenser heat, HRCs differ from conventional heat pumps in that heating is generally a **secondary benefit of cooling operation**, rather than the primary operating mode.

For California's electrification and decarbonization pathway, HRCs provide a mechanism to displace fossil-fuel heating with electrically driven heat recovery. Instead of rejecting condenser heat to a cooling tower or ambient air, the system upgrades that heat to useful temperatures—often in the range of 95°F to 120°F—thereby reducing boiler runtime and associated emissions. When properly integrated into a central plant with appropriate hydronic temperatures and control strategies, HRCs can improve overall plant efficiency and reduce site greenhouse gas emissions.

The 2025 California Energy Code (Title 24, Part 6) now requires simultaneous mechanical heat recovery in certain nonresidential applications when capacity and load thresholds are met (§140.4(s)). Heat recovery chillers installed under this measure must meet the applicable minimum efficiency requirements for simultaneous heating and cooling operation defined in §110.2 Table 110.2-K, along with the relevant cooling and heating efficiency requirements in Tables 110.2-I and 110.2-J.

Despite these code advancements, performance gaps remain in practice. Common issues include underutilization of recovered heat, improper hydronic temperature design, oversized cooling capacity relative to heating demand, and inadequate control sequencing. This High-Performance Measure (HPM) is intended to encourage above-code design practices that maximize heat recovery utilization and ensure meaningful, sustained decarbonization benefits.

Relevant industry standards and certifications include AHRI 550/590, AHRI 551/591, ASHRAE Standard 90.1, California Title 24 Part 6 (2025), and ASHRAE Guideline 36.

Alignment with CEDA Program Goals

The CEDA program supports the implementation of energy efficiency measures that support Code Readiness' Long Term Tactical Plan (LTTP) to drive the goals of electrification, decarbonization, and load reduction.

Projects must meet the CEDA Inducement Requirements identified in the next section to receive an inducement on the equipment and will be evaluated for level of interest in metering to support Code Readiness Objectives.

This measure meets the CEDA program goals as follows:

- **Building partnerships with market stakeholders** by consulting on innovative technologies and best practices in energy efficiency which can lead to the development of more effective solutions and accelerate the adoption of new technologies. As teams adopt the measure, this increases the volume of engineers able to design the equipment, contractors capable of installing the equipment, and owners able to operate the equipment.
- **Increasing the supply of high-performance measures and all-electric buildings** by combining electrification with energy efficiency that can result in projects implementing measures to achieve greater energy savings, reduced emissions, and overall improved building performance. As more buildings specify and install heat recovery chiller technologies, this helps to increase the overall supply of heat recovery chiller technologies in the market for others to use, including beyond new construction.
- **Increasing the demand for high-performance measures and all-electric buildings** by pushing for electrification that drives the need for technological advancements, supporting economic growth opportunities through innovation, and raising awareness of the benefits of electrification to increase consumer adoption. As demand in the market increases for newer technologies, the long-term benefit is increased demand for manufacturers and suppliers to provide additional options available in the market.

- **Advancing new high-performance measure technology** by raising public awareness about new technologies and their benefits, helping build acceptance and demand through market support advocacy efforts that can influence stakeholder decisions that enables technological innovation.
- **Providing Codes & Standards with projects of interest** to collect metered data that will inform future California energy codes.

CEDA Inducement Requirements

Heat recovery chillers (HRCs) are incorporated into the 2025 California Energy Code when simultaneous heating and cooling thresholds are met. However, meeting the minimum code trigger alone does not ensure high heat recovery utilization, optimized hydronic temperatures, or sustained plant performance. In practice, projects may oversize cooling capacity relative to heating demand, operate at unnecessarily high heating water temperatures, or implement control sequences that underutilize recovered heat. The CEDA inducement addresses this performance gap by supporting projects that exceed minimum efficiency requirements, implement low-temperature hydronic design, and integrate mechanical heat recovery as an intentional component of central plant operation.

Inducement eligibility is based on compliance with the selected tier's **System Design Requirements** and **Supporting Documentation Requirements**. Projects must demonstrate compliance with the **simultaneous cooling and heating efficiency requirements in 2025 Title 24, Part 6, §110.2 Table 110.2-K** and document applicability of the mechanical heat recovery thresholds defined in **§140.4(s)**. Heat recovery chillers must also meet the applicable cooling efficiency requirements in **Table 110.2-I** and heating operation efficiency requirements in **Table 110.2-J**, depending on operating mode. The Premium tier applies only to projects that voluntarily install HRCs where mechanical heat recovery is not required by code.

Inducement levels (Essential, Advanced, and Premium) are determined by tier achievement and calibrated using projected heating therms avoided, modeled energy savings, and estimated CO_2e emissions reductions relative to a conventional boiler-based heating baseline. Required documentation includes engineering drawings, code applicability confirmation, equipment submittals, startup verification, and sequence

System Design Requirements

1. **Essential Level:** Above Code-Compliant Heat Recovery Chiller Installation
   - 1.1. Equipment Qualification
     - 1.1.1. Provide a heat recovery chiller (HRC) serving space heating and/or domestic/service hot water loads.
     - 1.1.2. Demonstrate that the HRC meets or exceeds the minimum simultaneous heating and cooling efficiency requirements in:
       - 1.1.2.1. 2025 Title 24, Part 6, Section 110.2, Table 110.2-K.
     - 1.1.3. The HRC shall also comply with applicable cooling and heating efficiency requirements in Tables 110.2-I and 110.2-J.
   - 1.2. Mechanical Heat Recovery Threshold
     - 1.2.1. The project shall meet at least one of the simultaneous heating thresholds defined in 2025 Title 24, Part 6, Section 140.4(s)1.B.
     - 1.2.2. The project shall provide documentation demonstrating applicability of Section 140.4(s), which may include one of the following:
       - 1.2.2.1. Title 24 compliance documentation indicating that Section 140.4(s) applies;
       - 1.2.2.2. Energy model summary report demonstrating compliance;
       - 1.2.2.3. Engineer-of-record certification confirming compliance with Section 140.4(s)1.A.i or 1.A.ii.

1.3. System Integration

1.3.1. HRC shall be integrated into the central plant such that recovered heat is utilized as the primary heating source during simultaneous heating and cooling operation.

1.3.2. Boiler-only operation during simultaneous load conditions is not permitted except as supplemental backup.

2. Advanced Level: Low-Temperature Optimized Heat Recovery Design

2.1. Project must **meet all Essential Level requirements**, plus the following:

2.2. Heating Water Temperature Optimization

2.2.1. Design leaving heating hot water supply temperature (HHWST) shall be **105°F or lower**.

2.2.2. Hydronic distribution systems and terminal equipment shall be designed such that required heating loads can be met with a leaving heating hot water supply temperature of 105°F or lower under design conditions.

2.2.3. If supplemental heating is required, it shall only be provided by:

2.2.3.1. Electric boiler, or

2.2.3.2. Air-to-water heat pump, or

2.2.3.3. Water-to-water heat pump

2.3. Control Strategy

2.3.1. Sequence of operations shall prioritize heat recovery before enabling supplemental heating.

2.3.2. Controls shall limit high-temperature reset that degrades HRC heating COP.

3. Premium Level: Voluntary Installation Beyond Code Trigger

3.1. This tier applies only to projects **not required** to install heat recovery under 2025 Title 24, Part 6, Section 140.4.

3.1.1. Premium eligibility applies only where mechanical heat recovery is not required by code and the project voluntarily installs a heat recovery chiller.

3.2. Voluntary Installation

3.2.1. Provide a heat recovery chiller serving space and/or domestic/service hot water loads where Section 140.4 does not mandate heat recovery.

3.3. Efficiency Compliance

3.3.1. HRC shall meet or exceed simultaneous heating and cooling efficiency requirements in:

3.3.1.1. 2025 Title 24, Part 6, Section 110.2, Table 110.2-K.

3.3.2. HRC shall also comply with applicable cooling and heating efficiency requirements in Tables 110.2-I and 110.2-J.

3.4. Functional Integration

3.4.1. HRC shall be configured to operate during any available simultaneous heating and cooling condition.

3.4.2. Controls shall enable measurable heat recovery contribution during applicable operating hours.

Supporting Documentation Requirements

All documentation must be submitted prior to inducement approval.

1. **Engineering Documentation**
   - 1.1. Construction Documents
     - 1.1.1. Engineered, stamped, and permitted construction drawings demonstrating:
       - 1.1.1.1. HRC integration
       - 1.1.1.2. Hydronic temperature design
       - 1.1.1.3. Plant configuration
       - 1.1.1.4. Compliance with state and local jurisdiction requirements
   - 1.2. Code Applicability Confirmation
     - 1.2.1. Provide documentation confirming whether the project meets the 25% threshold trigger under Section 140.4(s).
     - 1.2.2. One of the following forms of documentation is acceptable:
       - 1.2.2.1. Title 24 compliance forms;
       - 1.2.2.2. Energy model summary report;
       - 1.2.2.3. Engineer-of-record certification.
2. **Equipment Submittals**
   - 2.1. Efficiency Documentation
     - 2.1.1. Manufacturer submittals demonstrating compliance with:
       - 2.1.1.1. 2025 Title 24 Section 110.2 Tables 110.2-I, 110.2-J, and 110.2-K as applicable.
       - 2.1.1.2. AHRI 550/590 certification documentation.
   - 2.2. Approved Submittals
     - 2.2.1. Equipment submittals stamped and approved by the Engineer of Record (EOR).
3. **Commissioning & Startup**
   - 3.1. Startup Verification
     - 3.1.1. Documentation confirming startup performed by a manufacturer-authorized representative.
     - 3.1.2. Record of verified heating water supply temperature and flow conditions at system startup.
   - 3.2. Sequence of Operations
     - 3.2.1. Written sequence of operations (SOO) defining:
       - 3.2.1.1. Simultaneous heating/cooling logic
       - 3.2.1.2. Heat recovery priority
       - 3.2.1.3. Supplemental heating enable conditions
4. **Cost Documentation**
   - 4.1. Equipment Cost Data
     - 4.1.1. Itemized cost documentation for:
       - 4.1.1.1. Heat recovery chiller(s)
       - 4.1.1.2. Supplemental electric heating (if applicable)
       - 4.1.1.3. Controls integration
5. **Additional Premium-Level Documentation (if applicable)**
   - 5.1. Code Applicability Confirmation
     - 5.1.1. Written confirmation that the project is not required to install heat recovery under 2025 T24 Section 140.4.
   - 5.2. Operational Verification Plan
     - 5.2.1. Description of how simultaneous operation will be verified post-installation (e.g., BAS trending points, metering plan).

Incremental Measure Cost

The Incremental Measure Cost (IMC) represents the estimated additional first cost associated with implementing a CEDA-qualified Heat Recovery Chiller (HRC) system relative to a code-minimum baseline configuration. The IMC is used solely for program calibration, inducement setting, and cost-effectiveness screening. It is not intended to serve as a project-level cost estimator, bid comparison tool, or reconciliation mechanism for actual pricing.

IMC values are normalized to reflect typical new construction market conditions across representative California nonresidential building types. These values are derived from public cost references, manufacturer budget pricing, and statewide program experience. Actual project costs may vary depending on capacity, configuration, plant complexity, site constraints, procurement timing, and contractor markup.

IMC values are reviewed periodically to reflect market maturation, supply chain conditions, and code evolution. The purpose of this section is to transparently define the baseline assumption, the above-code delta, and the normalized cost used for inducement calibration.

Base Case

The Base Case reflects a **2025 Title 24 code-compliant central plant configuration**.

For projects where Section 140.4(s) requires mechanical heat recovery, the Base Case assumes installation of a **code-minimum heat recovery chiller meeting the heating operation efficiency requirements in Section 110.2 Table 110.2-K**, with conventional hydronic design temperatures (typically ≥130–160°F) and standard plant control sequences.

For projects where Section 140.4(s) does **not require mechanical heat recovery**, the Base Case assumes a **standard cooling-only chiller plant with a gas-fired hydronic boiler plant serving space heating and/or service hot water loads**.

This dual baseline ensures that incremental costs reflect:

- **Above-code HRC performance improvements** for required installations (Essential and Advanced tiers), and
- **Full HRC installation cost** for voluntary adoption (Premium tier).

Measure Case

For Essential and Advanced tiers, the incremental cost reflects the **above-code cost relative to a code-minimum heat recovery chiller installation required under §140.4(s)**. For the Premium tier, the incremental cost reflects the **additional cost of installing a heat recovery chiller relative to a conventional cooling-only chiller plant with boiler heating** where mechanical heat recovery is not required by code.

The Measure Case reflects compliance with the CEDA HPM requirements for Heat Recovery Chillers, including:

- Installation of a heat recovery chiller meeting or exceeding 2025 Title 24 Section 110.2 Table 110.2-K heating operation efficiency requirements
- Compliance with the 25% simultaneous heat recovery threshold under Section 140.4(s)
- Integration of HRC as primary heating source during simultaneous operation
- For Advanced tier: low-temperature hydronic design (≤105°F leaving heating hot water supply temperature)
- Controls configured to prioritize heat recovery

The incremental cost delta reflects the additional capital required for:

- Heat recovery condenser bundle and upgraded compressor selection
- Enhanced controls and sequencing
- Low-temperature hydronic system optimization (where applicable)
- Additional plant integration complexity

IMC Values & Normalization

Normalized Unit: $/MBH of rated heating output capacity (HEATING OPERATION mode)

For purposes of this HPM, MBH refers to the rated heating output capacity of the heat recovery chiller under heating operation conditions, consistent with the simultaneous heating and cooling performance requirements referenced in **2025 Title 24 §110.2 Table 110.2-K**.

The IMC is applied specifically to the rated heating output (MBH) used to serve space heating loads, not:

- Cooling tons,
- Combined simultaneous heating/cooling capacity,
- Or peak cooling output.

This ensures alignment with:

- The HPM's focus on space heating electrification,
- The heating performance compliance metric in Table 110.2-K,
- The avoided gas boiler baseline used for inducement calibration.

Representative Size Class & Pricing Anchors

Representative nonresidential central plant installation: HRC rated heating output capacity: 2,400 MBH

Market pricing anchors indicate:

- Standard cooling-only chiller installed cost: $2,500 per ton
- Heat recovery chiller installed cost: $3,200 per ton

Incremental delta (cooling-ton basis): $3,200 – $2,500 = $700 per ton

Capacity-unit conversion to heating capacity basis: $700 per ton ÷ 12 MBH per ton = $58 per MBH

To account conservatively for: additional control integration, heat recovery condenser bundle enhancements, and simultaneous heating plant integration.

Proposed IMC Values

IMC values differ by tier to reflect the applicable baseline.

- **Essential Level IMC = $5 per MBH of rated heating output capacity**
  Represents the incremental cost of selecting an HRC that **exceeds the minimum efficiency requirements of Table 110.2-K** relative to a code-minimum HRC installation.

- **Advanced Level IMC = $10 per MBH of rated heating output capacity**
  Represents the incremental cost of the Essential tier plus **low-temperature hydronic design (≤105°F HHWST)**, which may require larger terminal heating coils, minor hydronic distribution adjustments, and additional design coordination.

- **Premium Level IMC = $60 per MBH of rated heating output capacity**
  Represents the incremental cost of **voluntarily installing a heat recovery chiller relative to a conventional cooling-only chiller plant with boiler heating**, where mechanical heat recovery is not required by §140.4(s).

Essential and Advanced tiers represent above-code improvements on a code-required heat recovery chiller installation and therefore reflect only the incremental cost of higher-efficiency equipment selection and low-temperature hydronic design.

The Premium tier represents the full incremental cost of installing a heat recovery chiller where mechanical heat recovery is not required by code and therefore includes the broader capital delta between a conventional cooling-only chiller plant and an HRC-based plant configuration.

Example IMC Calculation: HRC serving 2,400 MBH rated heating output:

- ***Essential Tier**: 2,400 MBH × $5/MBH = $12,000 incremental cost*
- ***Advanced Tier**: 2,400 MBH × $10/MBH = $24,000 incremental cost*
- ***Premium Tier**: 2,400 MBH × $60/MBH = $144,000 incremental cost*

Sources

IMC values are informed by a combination of publicly available market pricing, industry cost references, and statewide program experience. Values reflect typical new construction market conditions rather than project-specific pricing. Sources include:

- RSMeans Building Construction Cost Data (2023–2025 editions) – Central plant and chiller pricing benchmarks
- AHRI 550/590 certified equipment manufacturer budget pricing (publicly available literature and representative quotations)
- Trane Engineers Newsletter, “What Drives Chiller Efficiency”
- ASHRAE Handbook – HVAC Systems and Equipment (Chillers and Heat Recovery)
- 2025 Title 24 CASE Reports – Mechanical Heat Recovery proposals
- California Statewide Utility Codes and Standards program implementation experience (internal benchmarking)

Code Readiness Objectives

Although the 2025 Title 24 Energy Code establishes minimum simultaneous heating and cooling efficiency requirements and mechanical heat recovery thresholds, uncertainty remains regarding real-world utilization, low-temperature design adoption, and overall performance of heat recovery chillers (HRCs). This HPM supports CEDA's Code Readiness efforts by collecting structured market and performance data to inform future code updates and strengthen electrified central plant requirements.

The following objectives define the primary data to be collected:

- **Quantify Heating Efficiency Margin:** Document installed HRC simultaneous heating and cooling efficiencies and the margin above 2025 Title 24 §110.2 Table 110.2-K minimum requirements to evaluate feasibility of tighter efficiency standards.
- **Measure Heat Recovery Utilization:** Track the percentage of annual heating load served by recovered heat and the frequency of simultaneous heating and cooling operation to assess effectiveness of the §140.4(s) mechanical heat recovery threshold.
- **Evaluate Simultaneous Performance Conditions:** Document operating conditions during simultaneous heating and cooling (temperatures, load ratios, COP) to better understand real-world performance of HRC systems relative to rated values.
- **Assess Low-Temperature Hydronic Adoption:** Identify projects designed at ≤105°F leaving heating hot water temperature and evaluate performance impacts to inform potential future low-temperature plant requirements.
- **Evaluate Climate Zone & Building Type Variation:** Compare performance across climate zones and occupancies to determine where mechanical heat recovery delivers the greatest decarbonization benefit.
- **Track Market & Contractor Readiness:** Document project counts, system configurations, commissioning quality, and cost drivers to assess whether broader or more stringent heat recovery requirements are supportable.

The data collected through this HPM will inform future Title 24 cycles by determining whether Table 110.2-K efficiency thresholds, simultaneous heat recovery requirements, or low-temperature hydronic design provisions should be strengthened to ensure measurable and sustained decarbonization outcomes.

Code Readiness Site Monitoring

If selected for Code Readiness monitoring, equipment energy consumption and mechanical system performance may be monitored on-site for a period of up to 24 months. To support performance evaluation and data collection, projects shall provide reasonable access for the installation and operation of metering, sensors, and communication equipment.

Projects equipped with a Building Automation System (BAS), Energy Management System (EMS), or equivalent platform should enable integration of advanced metering devices through the existing system to facilitate data collection and remote access. For projects without a BAS or EMS, the Code Readiness team may install temporary stand-alone data loggers, sensors, and communication equipment as needed to monitor system performance for the duration of the monitoring period.

Instrumentation may be installed or supplemented, where necessary, to measure key system and equipment parameters sufficient to evaluate system performance and operational characteristics. All monitoring equipment will be temporary and installed in a manner that minimizes disruption to normal building operations.

Data Benefits

Collected data will help support the following:

- The availability of higher-than-minimum efficiency heat recovery chiller equipment could demonstrate the opportunity to increase code-required efficiency levels.
- Demonstrate where all-electric designs and building topologies that utilize a low design leaving heating water temperature produce higher levels of efficiency compared to their medium and high design leaving hot water temperature counterparts.
- Demonstrate designs and building topologies that incorporate heat recovery chillers when not required by code. The data can be used to justify lower minimum capacity thresholds, thus requiring the heat recovery chiller technology for a broader scale of the new building stock.

Sample Data Points

A sample set of data points that would ideally be collected is provided below for reference. This list will be re-developed for each project based on the infrastructure and need of the monitoring effort:

Data Points to Meter	Unit	Additional Specifications
Heat Recovery Chiller Power	kW	Maximum and minimum values
Thermal Load Provided	BTU	Average and Peak values
Operational Efficiency	COP	Efficiency is measured at each instance
Operational Efficiency	TMCOP	Efficiency of temperature maintenance
Supply Water Flow	GPM	Average
Supply Water Supply Temp	°F	Average
Supply Water Return Temp	°F	Average
Supply Water Load	Btu/h	Average
Heat Recovery Water Flow	GPM	Average
Heat Recovery Water Supply Temp	°F	Average
Heat Recovery Water Return Temp	°F	Average
Heat Recovery Water Load	Btu/h	Average
Pump(s) Power	kW	Average
Outdoor Temperature	°F	Measured at the unit or site
Outdoor Air Moisture Level	% RH	Measured at the unit or site
Indoor Temperature	°F	Average
Building Mode (Occupied Unoccupied)	-	Flag indicating status

Code Reference

The following codes and standards are most relevant to this High-Performance Measure (HPM) and establish the regulatory and technical framework for heat recovery chiller performance and application.

2025 Title 24, Part 6 – Building Energy Efficiency Standards

Section 110.2 – MANDATORY REQUIREMENTS FOR SPACE-CONDITIONING EQUIPMENT

Table 110.2-I – Chiller Cooling Efficiency Requirements

This table establishes minimum cooling efficiency requirements for water-cooled and air-cooled chillers.

TABLE 110.2-I Heat Pump and Heat Recovery Chiller Packages, Cooling Operation - Minimum Efficiency Requirements

Equipment Type	Size Category Refrigerating Capacity[a], ton_R	Cooling Operation Efficiency[b,c,d,e], Air Source EER (FL/IPLV), Btu/W h, Liquid Source Power Input per Capacity (FL/IPLV), kW/ton_R Path A	Cooling Operation Efficiency[b,c,d,e], Air Source EER (FL/IPLV), Btu/W h, Liquid Source Power Input per Capacity (FL/IPLV), kW/ton_R Path B	Test Procedure
Air Source	< 150	> 5.595 FL > 13.02 IPLV.IP	> 9.215 FL > 15.01 IPLV.IP	AHRI/550/590
Air Source	> 150	> 5.595 FL > 13.30 IPLV.IP	> 9.215 FL > 15.30 IPLV.IP	AHRI/550/590
Liquid source electrically operated positive displacement	> 11.25[f] and < 150	< 0.7895 FL < 0.6316 IPLV.IP	< 0.8211 FL < 0.5263 IPLV.IP	AHRI/550/590
Liquid source electrically operated positive displacement	> 150 and < 300	< 0.7579 FL < 0.5895 IPLV.IP	< 0.7895 FL < 0.5158 IPLV.IP	AHRI/550/590
Liquid source electrically operated positive displacement	> 300 and < 400	< 0.6947 FL < 0.5684 IPLV.IP	< 0.7158 FL < 0.4632 IPLV.IP	AHRI/550/590
Liquid source electrically operated positive displacement	> 400 and < 600	< 0.6421 FL < 0.5474 IPLV.IP	< 0.6579 FL < 0.4316 IPLV.IP	AHRI/550/590
Liquid source electrically operated positive displacement	> 600	< 0.5895 FL < 0.5263 IPLV.IP	< 0.6158 FL < 0.4000 IPLV.IP	AHRI/550/590
Liquid source electrically operated centrifugal	> 11.25[f] and < 150	< 0.6421 FL < 0.5789 IPLV.IP	< 0.7316 FL < 0.4632 IPLV.IP	AHRI/550/590
Liquid source electrically operated centrifugal	> 150 and < 300	< 0.6190 FL < 0.5748 IPLV.IP	< 0.6684 FL < 0.4211 IPLV.IP	AHRI/550/590
Liquid source electrically operated centrifugal	> 300 and < 400	< 0.5895 FL < 0.5526 IPLV.IP	< 0.6263 FL < 0.4105 IPLV.IP	AHRI/550/590
Liquid source electrically operated centrifugal	> 400 and < 600	< 0.5895 FL < 0.5263 IPLV.IP	< 0.6158 FL < 0.4000 IPLV.IP	AHRI/550/590
Liquid source electrically operated centrifugal	> 600	< 0.5895 FL < 0.5263 IPLV.IP	< 0.6158 FL < 0.4000 IPLV.IP	AHRI/550/590

a. The size category is the full-load net refrigeration cooling mode capacity, which is the capacity of the evaporator available for cooling of the thermal load external to the chilling package.
b. Cooling rating conditions are standard rating conditions defined in AHRI 550/590 (I-P), Table 4, except for liquid cooled centrifugal chilling packages which can adjust cooling efficiency for nonstandard rating conditions using the K_{adj} procedure in accordance with Section 110.2(a).
c. For cooling operation, compliance with both the FL and IPLV is required, but only compliance with Path A or Path B cooling efficiency is required.
d. For units that operate in both cooling and heating, compliance with both the cooling and heating efficiency is required.

Table 110.2-J – Heat Pump Heating Operation Efficiency Requirements

This table establishes heating mode efficiency requirements for heat pump equipment.

TABLE 110.2-J Heat Pump and Heat Recovery Chiller Packages, Heat Pump, Heating Operation– Minimum Efficiency Requirements

Equipment Type: Air Source

Size Category Refrigerating Capacity[a], Ton_R	Heating Source Conditions (leaving liquid) or OAT (db/wb)[b], F	Heat Pump Heating Full Load Heating Efficiency (COP_H)[c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Low, 95 F/105 F	Heat Pump Heating Full Load Heating Efficiency (COP_H)[c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Medium, 105 F/120 F	Heat Pump Heating Full Load Heating Efficiency (COP_H)[c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, High, 120 F/140 F	Heat Pump Heating Full Load Heating Efficiency (COP_H)[c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Boost, 120 F/140 F	Test Procedure
< 150	47 db 43 wb	> 3.29	> 2.77	> 2.31	NA[j]	AHRI 550/590
< 150	17 db 15 wb	> 2.029	> 1.775	> 1.483	NA[j]	AHRI 550/590
> 150	47 db 43 wb	> 3.29	> 2.77	> 2.31	NA[j]	AHRI 550/590
> 150	17 db 15 wb	> 2.029	> 1.775	> 1.483	NA[j]	AHRI 550/590

(CONTINUED) TABLE 110.2-J Heat Pump and Heat Recovery Chiller Packages, Heat Pump, Heating Operation– Minimum Efficiency Requirements

Equipment Type: Liquid source electrically operated positive displacement

Size Category Refrigerating Capacity[a], Ton_R	Heating Source Conditions (leaving liquid) or OAT (db/wb)[b], F	Heat Pump Heating Full Load Heating Efficiency (COP_H)[c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Low, 95 F/105 F	Heat Pump Heating Full Load Heating Efficiency (COP_H)[c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Medium, 105 F/120 F	Heat Pump Heating Full Load Heating Efficiency (COP_H)[c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, High, 120 F/140 F	Heat Pump Heating Full Load Heating Efficiency (COP_H)[c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Boost, 120 F/140 F	Test Procedure
> 11.25[h] and < 150	44[i]	> 4.64	> 3.68	> 2.68	NA[j]	AHRI 550/590
> 11.25[h] and < 150	65[i]	NA[j]	NA[j]	NA[j]	> 3.55	AHRI 550/590
> 150 and < 300	44[i]	> 4.64	> 3.68	> 2.68	NA[j]	AHRI 550/590
> 150 and < 300	65[i]	NA[j]	NA[j]	NA[j]	> 3.55	AHRI 550/590
> 300 and < 400	44[i]	> 4.64	> 3.68	> 2.68	NA[j]	AHRI 550/590
> 300 and < 400	65[i]	NA[j]	NA[j]	NA[j]	> 3.55	AHRI 550/590
> 400 and < 600	44[i]	> 4.93	> 3.96	> 2.97	NA[j]	AHRI 550/590
> 400 and < 600	65[i]	NA[j]	NA[j]	NA[j]	> 3.9	AHRI 550/590
> 600	44[i]	> 4.93	> 3.96	> 2.97	NA[g]	AHRI 550/590
> 600	65[i]	NA[j]	NA[j]	NA[j]	> 3.9	AHRI 550/590

(CONTINUED) TABLE 110.2-J Heat Pump and Heat Recovery Chiller Packages, Heat Pump, Heating Operation– Minimum Efficiency Requirements

Equipment Type: Liquid source electrically operated centrifugal

Size Category Refrigerating Capacity[a], Ton_R	Heating Source Conditions (leaving liquid) or OAT (db/wb)[b], F	Heat Pump Heating Full Load Heating Efficiency (COP_H)[c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Low, 95 F/105 F	Heat Pump Heating Full Load Heating Efficiency (COP_H)[c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Medium, 105 F/120 F	Heat Pump Heating Full Load Heating Efficiency (COP_H)[c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, High, 120 F/140 F	Heat Pump Heating Full Load Heating Efficiency (COP_H)[c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Boost, 120 F/140 F	Test Procedure
> 11.25[h] and < 150	44[i]	> 4.64	> 3.68	> 2.68	NA[j]	AHRI 550/590
> 11.25[h] and < 150	65[i]	NA[j]	NA[j]	NA[j]	> 3.55	AHRI 550/590
> 150 and < 300	44[i]	> 4.64	> 3.68	> 2.68	NA[j]	AHRI 550/590
> 150 and < 300	65[i]	NA[j]	NA[j]	NA[j]	> 3.55	AHRI 550/590
> 300 and < 400	44[i]	> 4.64	> 3.68	> 2.68	NA[j]	AHRI 550/590
> 300 and < 400	65[i]	NA[g]	NA[g]	NA[g]	> 3.55	AHRI 550/590
> 400 and < 600	44[i]	> 4.93	> 3.96	> 2.97	NA[j]	AHRI 550/590
> 400 and < 600	65[i]	NA[j]	NA[j]	NA[j]	> 3.9	AHRI 550/590
> 600	44[i]	> 4.93	> 3.96	> 2.97	NA[j]	AHRI 550/590
> 600	65[i]	NA[j]	NA[j]	NA[j]	> 3.9	AHRI 550/590

Table 110.2-K – Heat Pump and Heat Recovery Chiller Packages, Simultaneous Cooling and Heating

This table establishes minimum efficiency requirements for heat recovery chillers operating in simultaneous heating and cooling mode. This is the primary performance reference for this HPM.

TABLE 110.2-K Heat Pump and Heat Recovery Chiller Packages, Simultaneous Cooling and Heating, Heating Operation– Minimum Efficiency Requirements

Equipment Type: Air Source

Size Category Refrigerating Capacity[a], Ton_R	Heating Source Conditions (leaving liquid) or OAT (db/wb)[b], F	Simultaneous Cooling and Heating Full Load Efficiency (COP_{SHC}) [c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Low, 95 F/105 F	Simultaneous Cooling and Heating Full Load Efficiency (COP_{SHC}) [c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Medium, 105 F/120 F	Simultaneous Cooling and Heating Full Load Efficiency (COP_{SHC}) [c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, High, 120 F/140 F	Simultaneous Cooling and Heating Full Load Efficiency (COP_{SHC}) [c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Boost, 120 F/140 F	Test Procedure
< 150	47 db 43 wb	NA[j]	NA[j]	NA[j]	NA[j]	AHRI 550/590
< 150	17 db 15 wb	NA[j]	NA[j]	NA[j]	NA[j]	AHRI 550/590
> 150	47 db 43 wb	NA[j]	NA[j]	NA[j]	NA[j]	AHRI 550/590
> 150	17 db 15 wb	NA[j]	NA[j]	NA[j]	NA[j]	AHRI 550/590

(CONTINUED) TABLE 110.2-K Heat Pump and Heat Recovery Chiller Packages, Simultaneous Cooling and Heating, Heating Operation– Minimum Efficiency Requirements

Equipment Type: Liquid source electrically operated positive displacement

Size Category Refrigerating Capacity[a], Ton_R	Heating Source Conditions (leaving liquid) or OAT (db/wb)[b], F	Simultaneous Cooling and Heating Full Load Efficiency (COP_{SHC}) [c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Low, 95 F/105 F	Simultaneous Cooling and Heating Full Load Efficiency (COP_{SHC}) [c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Medium, 105 F/120 F	Simultaneous Cooling and Heating Full Load Efficiency (COP_{SHC}) [c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, High, 120 F/140 F	Simultaneous Cooling and Heating Full Load Efficiency (COP_{SHC}) [c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Boost, 120 F/140 F	Test Procedure
> 11.25[h] and < 150	44[i]	> 8.33	> 6.41	> 4.42	NA[j]	AHRI 550/590
> 11.25[h] and < 150	65[i]	NA[j]	NA[j]	NA[j]	> 6.150	AHRI 550/590
> 150 and < 300	44[i]	> 8.33	> 6.41	> 4.42	NA[j]	AHRI 550/590
> 150 and < 300	65[i]	NA[j]	NA[j]	NA[j]	> 6.150	AHRI 550/590
> 300 and < 400	44[i]	> 8.33	> 6.41	> 4.42	NA[j]	AHRI 550/590
> 300 and < 400	65[i]	NA[j]	NA[j]	NA[j]	> 6.150	AHRI 550/590
> 400 and < 600	44[i]	> 8.9	> 6.98	> 5	NA[j]	AHRI 550/590
> 400 and < 600	65[i]	NA[j]	NA[j]	NA[j]	> 6.85	AHRI 550/590
> 600	44[i]	> 8.9	> 6.98	> 5	NA[j]	AHRI 550/590
> 600	65[i]	NA[j]	NA[j]	NA[j]	> 6.85	AHRI 550/590

(CONTINUED) TABLE 110.2-K Heat Pump and Heat Recovery Chiller Packages, Simultaneous Cooling and Heating, Heating Operation– Minimum Efficiency Requirements

Equipment Type: Liquid source electrically operated centrifugal

Size Category Refrigerating Capacity[a], Ton_R	Heating Source Conditions (leaving liquid) or OAT (db/wb)[b], F	Simultaneous Cooling and Heating Full Load Efficiency (COP_{SHC}) [c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Low, 95 F/105 F	Simultaneous Cooling and Heating Full Load Efficiency (COP_{SHC}) [c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Medium, 105 F/120 F	Simultaneous Cooling and Heating Full Load Efficiency (COP_{SHC}) [c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, High, 120 F/140 F	Simultaneous Cooling and Heating Full Load Efficiency (COP_{SHC}) [c,d,e,f,g], W/W, Entering/Leaving Heating Liquid Temperature, Boost, 120 F/140 F	Test Procedure
> 11.25[h] and < 150	44[i]	> 8.33	> 6.41	> 4.42	NA[j]	AHRI 550/590
> 11.25[h] and < 150	65[i]	NA[j]	NA[j]	NA[j]	> 6.150	AHRI 550/590
> 150 and < 300	44[i]	> 8.33	> 6.41	> 4.42	NA[j]	AHRI 550/590
> 150 and < 300	65[i]	NA[j]	NA[j]	NA[j]	> 6.150	AHRI 550/590
> 300 and < 400	44[i]	> 8.33	> 6.41	> 4.42	NA[j]	AHRI 550/590
> 300 and < 400	65[i]	NA[j]	NA[j]	NA[j]	> 6.150	AHRI 550/590
> 400 and < 600	44[i]	> 8.9	> 6.98	> 5	NA[j]	AHRI 550/590
> 400 and < 600	65[i]	NA[j]	NA[j]	NA[j]	> 6.85	AHRI 550/590
> 600	44[i]	> 8.9	> 6.98	> 5	NA[j]	AHRI 550/590
> 600	65[i]	NA[j]	NA[j]	NA[j]	> 6.85	AHRI 550/590

Section 140.4(s) – Mechanical Heat Recovery

Section 140.4(s) establishes the 25% simultaneous heating threshold and defines when heat recovery chillers are required based on system capacity and coincident load conditions. This HPM references these thresholds to ensure alignment with code-trigger applicability and above-code performance.

AHRI Standards

AHRI Standard 550/590 – Performance Rating of Water-Chilling and Heat Pump Water-Heating Packages

This standard defines rating conditions and certification procedures for water-cooled chillers and heat recovery chillers. It provides the heating and cooling performance metrics referenced for compliance with Title 24 efficiency tables.

ASHRAE Standards & Guidelines

ASHRAE Standard 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings

ASHRAE 90.1 provides national model code efficiency requirements for chillers and mechanical heat recovery provisions. It serves as a benchmark for California's Title 24 requirements and informs future tightening of performance thresholds.

ASHRAE Guideline 36 – High-Performance Sequences of Operation for HVAC Systems

This guideline establishes best-practice control sequences for central plant optimization, including heat recovery prioritization and low-temperature hydronic reset. It informs Advanced-tier control strategy expectations.

ASHRAE Standard 15 – Safety Standard for Refrigeration Systems

ASHRAE 15 governs refrigerant safety, equipment room requirements, and installation constraints that affect heat recovery chiller design and integration.

Eligible Climate Zones, Building Types, & Project Scopes

Eligible Climate Zones

This high-performance measure applies statewide in **California Climate Zones 1-16** (Title 24). Applicants must identify the project's climate zone in the submittal.

Eligible Building Types

This high-performance measure applies to:

- **High-Rise Multifamily**: Buildings with **four (4) or more habitable stories above grade**.
- **Nonresidential**: Commercial, public, agricultural, and industrial facilities (e.g., offices, retail, lodging, education, healthcare, food service, warehouses, manufacturing, civic buildings).

Eligible Project Scopes

This high-performance measure applies to:

- **New construction**, **additions**, and **major alterations/retrofits** to systems served by the measure.

This high-performance measure does not apply to (not in scope):

- **Low-rise residential** (single-family and multifamily ≤3 habitable stories above grade).

Measure Exclusions

The following systems and applications are not eligible under the Heat Recovery Chiller (HRC) High-Performance Measure.

1. **Out-of-Scope Systems**
   - 1.1. Cooling-only chillers that do not provide simultaneous heating capability.
   - 1.2. Heat recovery systems that do not serve space heating and/or domestic/service hot water loads.
   - 1.3. Systems serving only process heating, pool heating, or industrial loads without qualifying building heating loads.
   - 1.4. Installations required under 2025 Title 24, Part 6, Section 140.4 that only meet minimum code requirements without exceeding the HPM performance criteria.

2. **Efficiency & Certification Exclusions**
   - 2.1. Equipment that does not meet or exceed the simultaneous cooling and heating efficiency requirements in 2025 Title 24, Part 6, Section 110.2, Table 110.2-K. Heat recovery chillers must also comply with applicable cooling and heating efficiency requirements in Tables 110.2-I and 110.2-J, depending on operating mode.
   - 2.2. Equipment not certified in accordance with AHRI 550/590 (or applicable successor standard).
   - 2.3. Systems that include heat recovery hardware but do not integrate recovered heat as a primary source of heating during simultaneous heating and cooling operation.

3. **Anti-Double-Dip Provisions**
   - 3.1. The same HRC system may not claim inducements under more than one CEDA High-Performance Measure for the same equipment scope.
   - 3.2. Projects may not receive overlapping inducements under:

3.2.1. Hydronic Heat Pump HPM
3.2.2. Central Heat Pump Water Heater Systems HPM
3.2.3. Building Management Systems HPM (for the same equipment scope)

3.3. Incentive stacking with other programs for the same equipment scope is not permitted unless expressly allowed by CEDA program rules.

4. <u>Documentation</u>

4.1. Projects that fail to submit required supporting documentation are ineligible.

4.2. Material deviations from approved design temperature, efficiency, or sequence-of-operation requirements may result in inducement denial.

Appendices

Appendix Section 1: ASHRAE Standard 90.1-2007

6.5.6.2 Heat Recovery for Service Water Heating

6.5.6.2.1 Condenser heat recovery systems shall be installed for heating or preheating of service hot water provided all of the following are true:

a. The facility operates 24 hours a day.
b. The total installed heat rejection capacity of the water-cooled systems exceeds 6,000,000 Btu/h of heat rejection.
c. The design service water heating load exceeds 1,000,000 Btu/h.

6.5.6.2.2 The required heat recovery system shall have the capacity to provide the smaller of

a. 60% of the peak heat rejection load at design conditions or
b. preheat of the peak service hot water draw to 85°F.

Exceptions:

a. Facilities that employ condenser heat recovery for space heating with a heat recovery design exceeding 30% of the peak water-cooled condenser load at design conditions.
b. Facilities that provide 60% of their service water heating from *site-solar* or *site-recovered energy* or from other sources.

Appendix Section 2: ASHRAE Standard 90.1-2022

6.5.6.3 Heat Recovery for Space Conditioning. Where heating water is used for *space* heating, a heat-pump chiller meeting the requirements of Table 6.8.1-16 for heat recovery that uses the cooling *system* return water as the heat source shall be installed, provided all of the following are true:

a. The *building* is an acute inpatient hospital, where the *building* or portion of a *building* is used on a 24-hour basis for the inpatient medical, obstetric, or surgical care for patients.
b. The total design chilled-water capacity for the acute inpatient hospital, either air cooled or water cooled, required at cooling *design conditions* exceeds 3,600,000 Btu/h of cooling.
c. Simultaneous heating, including *reheat*, and cooling occurs above 60°F *outdoor air temperature.*

The required heat recovery *system* shall have a cooling capacity that is at least 7% of the total design chilled-water capacity of the acute inpatient hospital at peak *design conditions*.

Exception to 6.5.6.3: Buildings in Climate Zones 5C, 6B, 7, and 8.

Appendix Section 3: 2025 Title 24, Part 6; Section 140.4(s) Mechanical Heat Recovery

(s) **Mechanical heat recovery**

1. **Simultaneous mechanical heat recovery.**

A. Simultaneous mechanical heat recovery is required for newly constructed buildings that meet either i or ii:

i. CHL + 0.1 x CLL ≥ 200 tons and SWHCAP + HCAP ≥ 2200 kBtuh; or

ii. CCAP ≥ 300 tons and SWHCAP + 0.1 x HCAP ≥ 700 kBtuh

where:

CCAP = design capacity of all mechanical cooling systems.

CHL = coincident peak cooling load of all spaces with a design equipment power density > 5 watts/ft^2 and a minimum outdoor airflow requirement < 0.5 cfm/ft^2 (i.e., high load spaces).

CLL = CCAP - CHL. If the design includes capacity for future cooling systems, then assume 20 percent of future systems serve high load spaces.

SWHCAP = design capacity of all service water heating (SWH) systems, excluding systems expected to operate less than 5 hours per week, such as instant-hot water systems for emergency eyewash stations.

HCAP = design capacity of all space-heating systems.

B. The heat recovery system shall include a heat recovery chiller, or other means, capable of transferring the lesser of the following from spaces in cooling to spaces in heating and/or to the SWH system:

i. 25 percent of the peak heat rejection of the cooling system.

ii. 25 percent of (SWHCAP + HCAP).

EXCEPTION 1 to Section 140.4(s)1: Laboratory buildings with exhaust air heat recovery systems meeting Section 140.9(c)6.

EXCEPTION 2 to Section 140.4(s)1: Buildings in Climate Zone 15 with SWHCAP < 600 kBtuh.

2. **Heat recovery for service water heating.**

If the building is required to have simultaneous mechanical heat recovery by Section 140.4(s)1, and SWHCAP ≥ 500 kBtuh, then the heat recovery system shall also heat or preheat the service hot water. The heat recovery system shall have the capacity to transfer the smaller of:

A. 30 percent of the peak heat rejection of the cooling system; or

B. 30 percent of SWHCAP.

EXCEPTION to Section 140.4(s): Buildings with a computer room heat recovery system or wastewater heat recovery system capable of providing not less than 25 percent of SWHCAP + HCAP.

Reviewer Checklist

HPM Reviewer Checklist: LM401 – Heat Recovery Chiller – V2.2

Checklist Description: This checklist captures the elements that must be present in the project design to be eligible for the high-performance measure inducement or consideration for additional site metering.

Project Name: _____ **Review Date:** _____

Assessment:

- ☐ Approved
- ☐ Not approved

Notes:

Reviewer: _____ **Signature:** _____

High-Performance Measure Requirements	Comments

System Design Level

Essential Level: Above Code-Compliant HRC Installation

Equipment Qualification

- ☐ HRC provided serving space heating and/or domestic/service hot water loads (§1.1.1).
- ☐ HRC meets or exceeds minimum simultaneous heating and cooling efficiency requirements in 2025 Title 24, Part 6, Table 110.2-K (§1.1.2).
- ☐ HRC complies with applicable cooling and heating efficiency requirements in 2025 Title 24, Part 6, Tables 110.2-I and 110.2-J (§1.1.3).

Mechanical Heat Recovery Threshold

- ☐ HRC heat transfer rate meets at least one minimum 25% simultaneous heating threshold condition per 2025 Title 24, Part 6, Section 140.4(s)1.B (§1.2.1).
- ☐ Documentation provided confirming applicability of Section 140.4(s) (§1.2.2), including one of the following:
  - ☐ Title 24 compliance documentation (§1.2.2.1)
  - ☐ Energy model summary report (§1.2.2.2)
  - ☐ Engineer-of-record certification confirming compliance with Section 140.4(s)1.A.i or 1.A.ii (§1.2.2.3)

System Integration

- ☐ HRC integrated into central plant as a primary heating source during simultaneous heating/cooling operation (§1.3.1).
- ☐ Boiler-only operation during simultaneous load conditions limited to supplemental backup (§1.3.2).

HPM Reviewer Checklist: LM401 – Heat Recovery Chiller – V2.2

Advanced Level: Low-Temperature Optimized Heat Recovery Design

(Project must meet all Essential Level requirements.)

Heating Water Temperature Optimization

- ☐ Design leaving heating hot water supply temperature (HHWST) is ≤105°F (§2.2.1).
- ☐ Hydronic distribution system designed to operate at or below 105°F under design heating conditions (§2.2.2).
- ☐ Supplemental heating, if provided, limited to:
  - ☐ Electric boiler (§2.2.3.1)
  - ☐ Air-to-water heat pump (§2.2.3.2)
  - ☐ Water-to-water heat pump (§2.2.3.3)

Control Strategy

- ☐ Sequence of operations prioritizes heat recovery before enabling supplemental heating (§2.3.1).
- ☐ Controls limit high-temperature reset that degrades HRC heating COP (§2.3.2).

Premium Level: Voluntary Installation Beyond Code Trigger

Eligibility

- ☐ Project not required to install heat recovery under 2025 Title 24, Part 6, Section 140.4 (§3.1.1).

Voluntary Installation

- ☐ HRC provided serving space and/or domestic/service hot water loads where Section 140.4 does not mandate heat recovery (§3.2.1).

Efficiency Compliance

- ☐ HRC meets or exceeds simultaneous heating and cooling efficiency requirements in 2025 Title 24, Part 6, Table 110.2-K (§3.3.1).

Functional Integration

- ☐ HRC configured to operate during available simultaneous heating and cooling conditions (§3.4.1).
- ☐ Controls enable measurable heat recovery contribution during applicable operating hours (§3.4.2).

Supporting Documentation

Construction Documents

- ☐ Engineered, stamped, and permitted construction drawings provided (§1.1 Supporting Documentation), demonstrating:
  - ☐ HRC integration (§1.1.1.1)
  - ☐ Hydronic temperature design (§1.1.1.2)
  - ☐ Plant configuration (§1.1.1.3)

- ☐ Compliance with state and local jurisdiction requirements (§1.1.1.4)

Code Applicability Confirmation

- ☐ Documentation provided confirming whether project meets the 25% threshold trigger under Section 140.4(s) (§1.2 Supporting Documentation).
- ☐ Documentation includes one of the following (§1.2.2):
  - ☐ Title 24 compliance forms (§1.2.2.1)
  - ☐ Energy model summary report (§1.2.2.2)
  - ☐ Engineer-of-record certification (§1.2.2.3)

Equipment Submittals

- ☐ Manufacturer submittals demonstrate compliance with:
  - ☐ 2025 Title 24, Part 6, Section 110.2 Tables 110.2-I, 110.2-J, and 110.2-K as applicable (§2.1.1.1)
  - ☐ AHRI 550/590 certification (§2.1.1.2)
  - ☐ Equipment submittals stamped and approved by Engineer of Record (§2.2.1).

Startup Verification

- ☐ Startup performed by manufacturer-authorized representative (§3.1.1 Supporting Documentation).
- ☐ Record of verified heating water supply temperature and flow conditions provided (§3.1.2).

Sequence of Operations

- ☐ Written sequence of operations provided (§3.2.1), defining:
  - ☐ Simultaneous heating/cooling logic (§3.2.1.1)
  - ☐ Heat recovery priority (§3.2.1.2)
  - ☐ Supplemental heating enable conditions (§3.2.1.3)

Cost Documentation

- ☐ Itemized equipment cost documentation provided (§4.1.1), including:
  - ☐ Heat recovery chiller(s) (§4.1.1.1)
  - ☐ Supplemental electric heating, if applicable (§4.1.1.2)
  - ☐ Controls integration (§4.1.1.3)

Additional Premium-Level Documentation (*if applicable*)

- ☐ Written confirmation that project is not required to install heat recovery under 2025 T24 Section 140.4 (§5.1.1).
- ☐ Operational verification plan describing how simultaneous operation will be verified post-installation (e.g., BAS trending points, metering plan) (§5.2.1).

Version History Log

Version	Effective Date	End Date	Change Description
1	July 14, 2023	June 15, 2025	N/A
2	June 16, 2025	March 15, 2026	New format, requirements, and checklist
2.2	March 16, 2026	Active	Updated code references, formatting changes, revised checklist, and addition of incremental measure cost

The version identified as 'Active' is the current published version and remains in effect until superseded by a subsequent published version. CEDA may update, replace, or retire High-Performance Measures without prior notice. End dates are assigned to prior versions once superseded.