High-Performance Measure Details

Measure Name
Space Heating Hydronic Heat Pump

Use Category
Space Electrification

Effective Date
February 09, 2026

End Date
N/A

Version
2

Measure Code
LM401

Measure Stage
Early Adoption & High Priority Data Collection

Table of Contents

Technology Summary

This High-Performance Measure (HPM) targets improved space-heating efficiency and electrification readiness through the use of hydronic heat pump systems, including air-to-water heat pumps (AWHPs) and water-to-water heat pumps (WWHPs). In hydronic heat pump systems, heating (and where applicable, cooling) is delivered through a water-based distribution loop rather than directly through air, enabling efficient heat transfer, stable comfort, and strong part-load performance across a wide range of operating conditions.

AWHP and WWHP technologies use the vapor-compression refrigeration cycle to move heat from a source (ambient air or a water loop) to a hydronic distribution system serving one or more building zones. Compared to unitary air-source heat pumps, hydronic heat pumps are typically centralized or semi-centralized, making them well-suited to commercial, multifamily, and mixed-use buildings where a central plant and hydronic distribution are already present or planned. The use of water as the thermal medium supports tight temperature control, quieter zone delivery, and improved system controllability—particularly in multi-zone applications.

When paired with complementary strategies such as thermal energy storage and controls that enable load management, hydronic heat pump systems can also provide added value beyond energy savings by improving load flexibility and supporting grid-responsive operation, aligning with California's broader goals for decarbonization and long-term building performance.

Qualifying Equipment

- **Two-Pipe Air-to-Water Heat Pump (AWHP)**
  - Provides either heating or cooling (not simultaneously).
  - Uses outdoor air as the heat source/sink.
  - Serves a hydronic loop with one supply and one return pipe.
- **Four-Pipe Air-to-Water Heat Pump (AWHP)**
  - Capable of simultaneous heating and cooling to different zones (as applicable).
  - Uses outdoor air as the heat source/sink.
  - Includes two pipes for heating and two pipes for cooling.
- **Water-to-Water Heat Pump (WWHP)**
  - Transfers heat between two water loops (source loop and load loop).
  - Can provide heating and/or cooling depending on system configuration.
  - Commonly applied with geothermal/ground loops, condenser-water loops, or thermal storage, where appropriate.

Excluded Equipment

Heat Recovery Chillers (HRCs) are excluded. HRCs are primarily cooling-driven systems that recover waste heat as a secondary function, which is fundamentally different from hydronic heat pump systems designed to provide space heating as the primary service.

Systems primarily serving pool heating, process heating, or domestic/service hot water (DHW/SHW) are excluded, as these end uses are addressed under other applicable CEDA High-Performance Measures.

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 hydronic heat pumps, this helps to increase the overall supply of hydronic heat pumps 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

The CEDA inducement for this HPM is intended to accelerate adoption of hydronic heat pump space-heating systems (air-to-water and water-to-water), supporting energy efficiency, reduced onsite fossil fuel use, and electrification readiness. Projects may participate under either the Advanced tier or the Premium tier. These tiers are independent pathways—a project qualifies by meeting the requirements of one selected tier. Eligibility requires compliance with the applicable System Design Requirements and submission of all required supporting documentation.

Inducements are calculated based on estimated annual natural gas space-heating therms avoided, compared to a conventional gas-fired hydronic space-heating system the project would otherwise install absent this measure. This approach provides a consistent, transparent basis for quantifying fuel-switching impacts across projects and code cycles and aligns with CEDA's objective to accelerate space-heating electrification where gas hydronic systems remain an allowable option.

Under the 2025 Title 24, Part 6 standards (effective January 1, 2026), hydronic space-heating requirements include items such as hot-water temperature limits (e.g., ≤130°F in applicable cases), but do not establish a universal statewide prohibition on gas-fired hydronic space heating across all nonresidential building types; therefore, the avoided-therms framework remains an appropriate inducement basis. Where other requirements (e.g., local ordinances) effectively preclude a gas baseline, CEDA will apply program eligibility and baseline treatment to avoid paying inducements for equipment that is already mandatory.

System Design Requirements

1. **Advanced Level:** High Efficiency Medium Temperature Space Heating Hydronic Heat Pump
   - 1.1. Peak Load Coverage
     - 1.1.1. Heat pump space-heating capacity shall be sized to meet ≥ 90% of the building peak heating load, based on design-day load calculations.
     - 1.1.2. Electric supplemental/backup heat (e.g., electric boiler, electric resistance trim, or redundant heat pump module) is permitted to serve the remaining ≤ 10% of peak load and/or extreme conditions.
   - 1.2. Hot Water Supply Temperature (HWST)
     - 1.2.1. Zones using hot water for space heating shall be designed for a maximum HW supply temperature ≤ 130°F, consistent with Title 24, Part 6 (2025), Section 120.2(l).
     - 1.2.2. The design shall include hot-water temperature reset (e.g., outdoor air reset or equivalent) to minimize HWST during part-load operation, unless manufacturer control sequences demonstrate equivalent performance.

1.3. Efficiency Criteria

1.3.1. All heat pump equipment shall meet or exceed the applicable minimum efficiencies in Title 24, Part 6 (2025), Table 110.2-J for the appropriate equipment type and rating conditions.

1.3.2. For the selected rating condition(s) applicable to the project design (e.g., hydronic heating liquid temperature condition consistent with the design HWST), the submitted full-load heating COP shall be ≥ 10% above the corresponding Table 110.2-J minimum.

1.3.3. Efficiency documentation shall be based on AHRI certification or manufacturer-rated performance data consistent with Title 24 referenced test procedures.

2. Premium Level: High Efficiency Low Temperature Space Heating Hydronic Heat Pump

2.1. Peak Load Coverage

2.1.1. Heat pump space-heating capacity shall be sized to meet ≥ 90% of the building peak heating load, based on design-day load calculations.

2.1.2. Electric supplemental/backup heat is permitted for the remaining ≤ 10% of peak load and/or extreme conditions.

2.2. Hot Water Supply Temperature (HWST)

2.2.1. Zones using hot water for space heating shall be designed for a maximum HW supply temperature ≤ 105°F under design conditions.

2.2.2. The design shall include hot-water temperature reset (e.g., outdoor air reset or equivalent) to minimize HWST during part-load operation.

2.3. Efficiency Criteria

2.3.1. All heat pump equipment shall meet or exceed the applicable minimum efficiencies in Title 24, Part 6 (2025), Table 110.2-J for the appropriate equipment type and rating conditions.

2.3.2. For the rating condition(s) applicable to the Premium design HWST (low-temperature hydronic heating condition consistent with ≤105°F supply), the submitted full-load heating COP shall be ≥ 10% above the corresponding Table 110.2-J minimum.

2.3.3. Efficiency documentation shall be based on AHRI certification or manufacturer-rated performance data consistent with Title 24 referenced test procedures.

Supporting Documentation Requirements

Projects must submit the documentation below to demonstrate compliance with the selected tier. Documentation shall be clear, internally consistent, and specific to the proposed design (equipment, capacities, temperatures, and control sequences). CEDA reviewers may request additional information as needed to confirm eligibility and tier compliance.

1. Required for All Projects (Advanced or Premium)

1.1. Peak Load and Sizing (supports § 1.1 / 2.1)

1.1.1. One-line diagram or schematic drawing of the hydronic system.

1.1.2. Design-day heating load calculation summary identifying the building peak heating load and design assumptions.

1.1.3. Equipment schedule and manufacturer data showing installed heat pump heating capacity.

1.1.4. A brief sizing summary (table or calculation) demonstrating the heat pump(s) provide ≥ 90% of peak heating load and identifying any electric supplemental/backup heat serving the remaining ≤ 10%, if applicable.

1.2. Hydronic Design Temperature (supports § 1.2 / 2.2)

1.2.1. Design criteria schedule or drawing note stating the maximum hot-water supply temperature (HWST) used for space heating:

1.2.1.1. Advanced: HWST ≤ 130°F

1.2.1.2. Premium: HWST ≤ 105°F

1.2.2. Terminal unit/coil selection evidence demonstrating feasibility at the proposed HWST.

1.3. Controls / Temperature Reset (supports § 1.2.2 / 2.2.2)
   1.3.1. Sequence of operation, controls narrative, or manufacturer controls description confirming hot-water temperature reset (e.g., outdoor air reset or equivalent), including the reset range or logic.
   1.3.2. Supplemental/backup heat control sequence (if included) showing trim/backup intent.
1.4. Efficiency Verification (supports § 1.3 / 2.3)
   1.4.1. AHRI certificate and/or manufacturer performance data showing the rated full-load heating COP at rating condition(s) consistent with the project's design HWST.
   1.4.2. A completed worksheet/table comparing the proposed COP to the applicable Title 24, Part 6 (2025) Table 110.2-J minimum, demonstrating the proposed COP is ≥ 10% above the minimum at the applicable condition(s).

Incremental Measure Cost

Incremental Measure Cost (IMC) represents the typical incremental first cost to implement this HPM relative to a comparable, code-aligned baseline design. Because this measure is design-driven and applied across a wide range of project sizes, IMC is provided as a single normalized cost that scales with system capacity. IMCs are intended to support inducement calibration and market transformation and are not intended for project-level cost reconciliation.

Base Case

The base case is a conventional gas-fired hydronic space-heating system that would otherwise serve the same building heating loads and distribution approach (e.g., condensing gas boiler plant with standard controls and hydronic distribution). This includes typical plant equipment, accessories, and standard sequences needed to provide hot water for space heating consistent with applicable code requirements.

Measure Case

The measure case is an all-electric hydronic heat pump space-heating system (AWHP or WWHP) designed and specified to meet the selected tier requirements. Incremental cost drivers relative to the base case generally include: (1) the heat pump plant equipment premium and related auxiliaries/controls, and (2) tier-dependent design choices that improve performance (notably lower hot-water supply temperature in Premium, which can affect terminal/coil sizing and distribution design).

IMC Values and Normalization

Normalized unit for this HPM: $/kBtuh of installed hydronic heat pump heating capacity (heating mode).

IMC is presented as a single representative incremental cost per tier, rolled up from typical incremental component premiums. Values below reflect best-known market pricing reasonableness for commercial-scale hydronic heat pump applications and are intended for use as program normalization values.

Advanced Level IMC

- **Advanced Tier IMC** (HWST ≤ 130°F): $120/kBtuh

Typical incremental elements captured in this value include:

- Heat pump plant equipment premium (AWHP/WWHP modules vs. gas boiler plant)
- Controls required to meet tier requirements (including hot-water temperature reset)
- Typical hydronic integration accessories and startup/commissioning effort attributable to the measure

Premium Level IMC

- **Premium Tier IMC** (HWST ≤ 105°F): $175/kBtuh

Includes all Advanced-tier incremental elements, plus typical incremental impacts associated with low-temperature hydronic design, such as:

- Incremental terminal/coil/emitter selection impacts (where needed) to maintain capacity at lower HWST
- Additional design/integration effort commonly required to achieve and document low-temperature operation

Sources

IMC values are informed by a combination of publicly available market pricing, industry cost references, and program experience, and are intended to reflect typical market conditions rather than project-specific pricing, including:

- California market context that identifies high first cost as a primary adoption barrier for commercial air-to-water heat pump applications, supporting the need for inducements and incremental cost treatment.
- https://calnext.com/wp-content/uploads/2023/12/ET23SWE0048_Commercial-Air-to-Water-Heat-Pump-Market-Study_Final-Report.pdf
- Industry-standard cost-estimating references and market pricing feedback used in program measure development (e.g., contractor/market checks and cost databases consistent with typical mechanical estimating practice).

Code Readiness Objectives

This measure supports CEDA's Code Readiness efforts by collecting performance and market data for future Title 24 improvements related to central hydronic heat pump systems. The data will help determine the most cost-effective, low-energy configurations of AWHP and WWHP systems compared to unitary heat pumps or boiler/chiller plants. The objectives include the following:

- Define prescriptive configurations suitable for inclusion in energy code.
- Evaluate control strategies and operational efficiencies under real-world conditions.
- Identify distribution system types and performance factors that most influence energy use.
- Assess market readiness, including equipment availability, cost, and contractor capability.
- Recommend enhancements to equipment test procedures beyond current standards.

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:

- Quantify operational COP and part-load performance under varying climate conditions.
- Document the distribution efficiency and parasitic energy use of hydronic pumps.
- Provide insight into system configuration impacts, costs, and market scalability.
- Support Title 24 prescriptive criteria for central heat pump systems in future code cycles.

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
HP Power	kW	Maximum and minimum values
Thermal Load Provided	BTU	Average and Peak values
Operational Efficiency	COP	Efficiency 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

Data Points to Meter	Unit	Additional Specifications
Supply Water Load	BTU	Average
Secondary Water Flow	GPM	Average
Secondary Water Supply Temp	°F	Average
Secondary Water Return Temp	°F	Average
Secondary Water Load	BTU	Average
Pump(s) Power	kW	Average
Outdoor Temperature	°F	Measured at heat pump or site
Outdoor Air Dewpoint	°F	Measured at heat pump or site
Indoor Air Temperature	°F	Average
Building Mode (Occupied Unoccupied)	-	Flag indicating status

Code Reference

2025 CA Title 24, Part 6 Section 120.2 – Required Controls for Space-Conditioning Systems

120.2(l) HVAC Hot Water Temperature:

Zones that use hot water for space heating shall be designed for a hot water supply temperature of no greater than 130 °F.

2025 CA Title 24, Part 6 Section 110.2 – Mandatory Requirements for Space-Conditioning Equipment

Specifies minimum efficiency requirements for AWHP and WWHP, including COP ratings at standardized entering/leaving water temperatures.

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

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[j]	AHRI 550/590
> 600	65 [i]	NA[j]	NA[j]	NA[j]	> 3.9	AHRI 550/590

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[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[j]	AHRI 550/590
> 600	65[i]	NA[j]	NA[j]	NA[j]	> 3.9	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. For air source heat pumps, compliance with both the 47 F and 17 F heating source outdoor air temperature (OAT) rating efficiency is required for heating.
c. Heating full load rating conditions are at standard rating conditions defined in AHRI 550/590 (I-P), Table 4, includes the impact of defrost for air source heating ratings.
d. For units that operate in both cooling and heating, compliance with both the cooling and heating efficiency is required.
e. For heat recovery heating chilling package applications where there is simultaneous cooling and heating, compliance with the heating performance heating recover COP_{HR} is only required at one of the four heating AHRI 550/590 (I-P) standard ratings conditions of Low, Medium, Hot-Water 1 or Hot-Water 2. Compliance with the cooling only performance is required as defined in footnotes b and c of Table 110.2-I.
f. For applications where the chilling package is installed to operate only in heating, compliance only with the heating performance COP_{HR} is only required at one of the heating AHRI 550/590 (I-P) standard rating conditions of Low, Medium, High, or Boost. Compliance with the cooling performance is not required.

g. For heat pump chilling package applications where the cooling capacity is not being used for conditioning, compliance with the heating performance COP_{HR} is only required at one of the heating AHRI 550/590 (I-P) standard rating conditions of Low, Medium, High, or Boost. Compliance with the cooling performance is required as defined in footnotes b and c of Table 110.2-I except as noted in footnote f.
h. Water to water heat pumps with a capacity less than 135,000 Btu/h are included in Table 110.2-B Heat Pumps, Minimum Efficiency Requirements.
i. Source leaving liquid temperature.
    1. The cooling evaporator liquid flow rate used for the heating rating for a reverse cycle air to water heat pump shall be the flow rate determined during the full load cooling rating.
    2. The cooling evaporator liquid flow rate for the simultaneous cooling and heating and heat recovery liquid cooled chilling packages rating shall be the liquid flow rates from the cooling operation full load rating.
    3. For heating only fluid to fluid chiller packages, the evaporator flow rate obtained with an entering liquid temperature of 54 F and a leaving liquid temperature of 44 F shall be used.
j. NA means the requirements are not applicable.

Eligible Climate Zones and Building Types

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 space heating hydronic HVAC 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

This high-performance measure applies to **hydronic heat pump systems primarily serving building space heating** (air-to-water or water-to-water). The following are excluded:

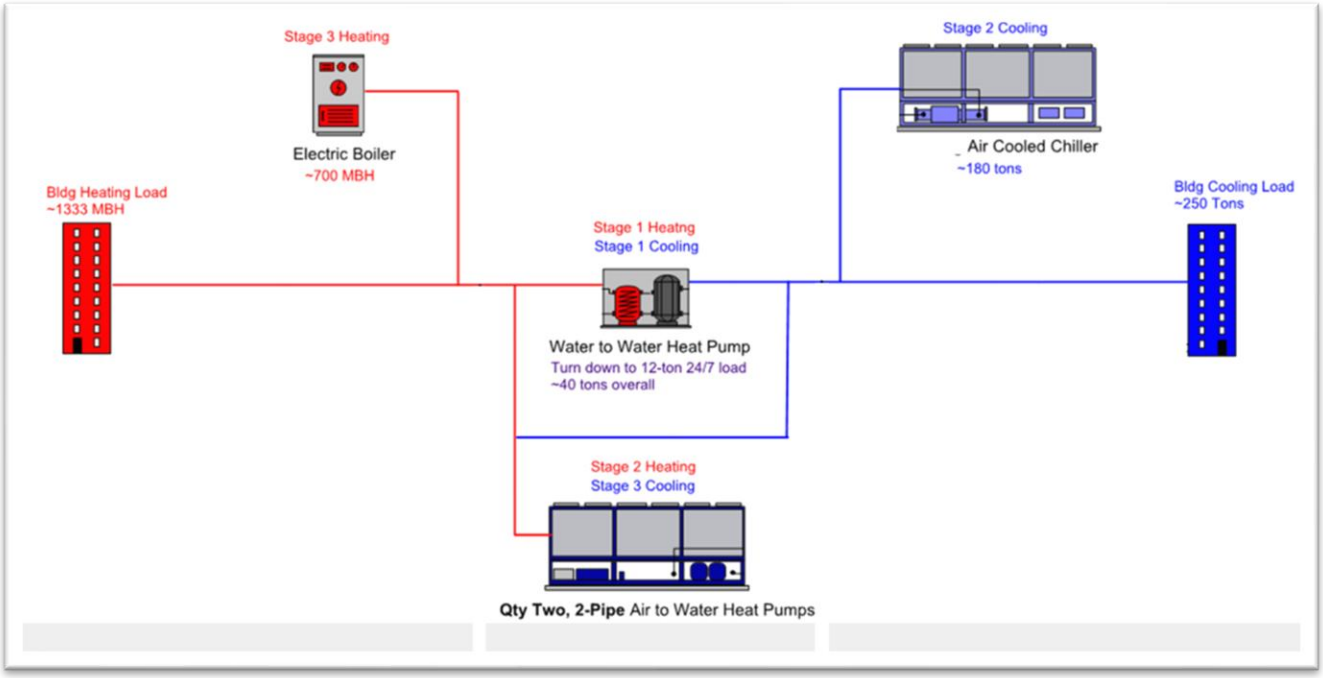
1. Insufficient Space-Heating Coverage
   1.1 Systems that do not meet the HPM minimum requirement to provide **≥ 90% of the building's peak space-heating load** with hydronic heat pump capacity (electric trim/backup serving the remaining ≤10% is allowed as defined in the System Design Requirements).
2. Non–Space-Heating End Uses
   2.1 **Domestic/service hot water (DHW/SHW)** heat pump water heating systems (addressed under other applicable CEDA high-performance measures).
   2.2 Heat pump systems primarily serving **process heating** or **pool/spa heating** (addressed under other applicable CEDA high-performance measures where available).
3. Heat Recovery–Driven Cooling Equipment
   3.1 **Heat recovery chillers** and other cooling-driven systems where space heating is provided primarily through **recovered waste heat** from chilled-water production or refrigeration processes (including refrigeration waste-heat recovery/reclaim to a dedicated hot-water loop) (addressed under other applicable CEDA high-performance measures). These systems differ from hydronic heat pumps designed and specified to provide **space heating as the primary service.**

Appendix A: AWHP and WWHP Example Configurations

The schematic below illustrates a central hydronic plant using a combination of air-to-water heat pumps (AWHPs) and a water-to-water heat pump (WWHP) to serve building space-heating loads (and where applicable, cooling loads as well). The example is shown as a staged configuration, where heat pumps provide the primary capacity for most operating hours and supplemental equipment is enabled only as needed for peaks or contingencies.

In this example, the WWHP is shown as Stage 1 equipment with strong turndown capability to efficiently track part-load conditions. AWHPs are staged to provide additional heating/cooling capacity as loads increase and/or ambient conditions reduce available output. Electric boilers and air-cooled chillers are included as trim/peak equipment to manage the remaining portion of the total load during extreme design conditions or abnormal operating scenarios. This aligns with the HPM intent: the hydronic heat pump system should serve the majority of peak space-heating load, with electric trim/backup used only for the balance.

Key concepts shown: staged operation, strong part-load performance, and central plant flexibility to support multi-zone buildings and a range of hydronic distribution strategies (2-pipe or 4-pipe), depending on project needs.



Reviewer Checklist

High-Performance Measure Review Checklist: Space Heating Hydronic Heat Pump

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:** _____

System Design Requirements – Advanced Level	Comments
☐ Peak Load Coverage (§ 1.1.1–1.1.2): HP system sized to meet ≥90% of peak heating load; electric trim/backup serving ≤10% only.	
☐ Hot Water Supply Temperature (§ 1.2.1–1.2.2): Space-heating HWST ≤130°F and HWST reset strategy included.	
☐ Efficiency Criteria (§ 1.3.1–1.3.3): Equipment meets Title 24 minimums and demonstrates ≥10% above Table 110.2-J COP at applicable rating condition(s).	

System Design Requirements – Premium Level	Comments
☐ Peak Load Coverage (§ 2.1.1–2.1.2): HP system sized to meet ≥90% of peak heating load; electric trim/backup serving ≤10% only.	
☐ Hot Water Supply Temperature (§ 2.2.1–2.2.2): Space-heating HWST ≤105°F and HWST reset strategy included.	
☐ Efficiency Criteria (§ 2.3.1–2.3.3): Equipment meets Title 24 minimums and demonstrates ≥10% above Table 110.2-J COP at applicable rating condition(s).	

Supporting Documentation Requirements – All Levels	Comments
☐ Peak Load and Sizing (§ 3.1.1–3.1.4): One-line/schematic; design-day heating load summary; equipment schedule + cut sheets; ≥90% coverage calc and trim/backup identification.	
☐ Hydronic Design Temperature (§ 3.2.1–3.2.2): Drawing note/schedule confirming HWST limit for selected tier; terminal/coil feasibility evidence provided.	
☐ Controls / Temperature Reset (§ 3.3.1–3.3.2): Sequence/control narrative shows HWST reset logic and (if applicable) supplemental/backup heat controls.	
☐ Efficiency Verification (§ 3.4.1–3.4.2): AHRI/manufacturer performance data with COP at applicable conditions; worksheet showing ≥10% above Table 110.2-J minimum.	

Reviewer Note: Confirm project is evaluated under either Advanced (Section 1.0) or Premium (Section 2.0) as an independent pathway, and that the submitted documentation aligns with the selected tier.

Version History Log

Version	Effective Date	End Date	Change Description
1	February 23, 2023	February 08, 2026	N/A
2	February 09, 2026	Current	Updated measure to the current CEDA HPM format and requirements, including a two-tier structure (Advanced and Premium), streamlined supporting documentation requirements, and added reviewer checklist, IMC normalization, and example configuration appendix for consistent project review