High-Performance Measure Details

Measure Name	Use Category
Extended-Range Water-Source Heat Pump & VRF Systems with Decoupled Ventilation and Heat Recovery	HVAC – Space Heating Electrification
Effective Date	**Version**
November 16, 2026	1.3
Measure Code	**Measure Stage**
LM401	Early Adoption & High Priority Data Collection

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Technology Summary

Extended-range water-source heat pumps (WSHPs) and water-source VRF multi-split heat pumps provide room-air heating and cooling from a shared closed water loop. Individual WSHPs connect directly to the loop; water-source VRF modules connect to the loop and serve indoor units through refrigerant piping. A separately controlled DOAS, HRV, or ERV treats outdoor air for the same qualifying rooms. This separates ventilation-air treatment from room conditioning and permits heat sharing among zones with coincident heating and cooling loads.

For this HPM, qualifying equipment must operate at entering-fluid temperatures of 32°F or lower in heating and 105°F or higher in cooling. Compared with a conventionally controlled loop, commonly maintained around 60°F to 90°F, that capability can reduce supplemental heat addition or rejection. The limits are equipment capabilities, not preferred setpoints: control sequences should minimize combined compressor, pump, and source/rejection energy while meeting loads.

Candidate applications include high-rise multifamily and multi-zone nonresidential buildings with compatible heating, cooling, and ventilation needs. A shared loop can reuse heat rejected by cooling zones before central

equipment adds or rejects heat. Actual benefits depend on load diversity, fluid temperatures, equipment selections, and coordinated ventilation and loop controls.

The measure addresses standard-range equipment selection, overly narrow loop setpoints, premature backup heating or heat rejection, local resistance-heat fallback, and insufficient control-point visibility. Extended-range capability alone is not enough; the installed controls must use it appropriately.

Principal references are ISO 13256-1 and the applicable AHRI WSHP certification program; AHRI 1230 for water-source VRF; AHRI 920 for DX-DOAS; and AHRI 1060/1061 for air-to-air recovery equipment. Table 1 identifies the applicable efficiency and certification requirements. Code references and representative configurations follow later in this memo.

CEH room-air conditioning may qualify under ME 2. This does not add direct product/process-fluid loads or change the code classification of a CEH covered process. Decoupled cooling and dehumidification is not equivalent to decoupled outdoor-air ventilation.

The closed equipment loop may also connect to a **pool or service-water system through an isolation heat exchanger**, so the pool can act as a heat sink or source and loop heat can preheat water (ME 5). Claim boundaries with Refrigeration Heat Reclaim and other HPMs are covered in ME 4 and Exclusion 3.

Alignment with CEDA Program Goals

The **California Energy Design Assistance (CEDA)** program is a Market Support program intended to support the long-term success of California's nonresidential and high-rise multifamily new construction market by advancing decarbonization, accelerating adoption of emerging and high-performance technologies, informing future codes and standards, and helping project teams achieve deeper energy and operational performance. **High-Performance Measures (HPMs)** support these objectives by creating opportunities for projects to implement, evaluate, and build market experience with technologies and design practices that extend beyond conventional practice.

Projects seeking a CEDA HPM inducement must meet the applicable requirements identified in the following section. Where aligned with Code Readiness priorities, selected projects may also provide market, design, cost, operational, or metered performance information that can help inform future California Codes and Standards activities. This measure supports **CEDA's Market Support** objectives by:

- **Increasing market demand** by giving owners and design teams a pathway to specify extended-range water-source equipment and coordinated loop controls that keep systems in heat-pump operation across more hours, reducing reliance on backup heating and heat rejection.
- **Increasing market supply and delivery capability** by building designer, contractor, manufacturer, and operator experience with extended-range equipment, loop reset and staging sequences, and decoupled ventilation.
- **Building market partnerships and knowledge** by connecting project teams with technical guidance on loop design, controls coordination, and optional isolated pool or service-water connections, and by collecting feedback on design, installation, and cost barriers.
- **Advancing innovation and accessibility** by expanding practical electrification options for eligible multifamily, commercial, public, agricultural, and industrial projects, including qualifying CEH room conditioning.
- **Supporting Code Readiness and future market transformation** by documenting loop temperatures, backup operation, controls persistence, and installed costs at selected sites to inform future code, monitoring, and cost assumptions.

CEDA Inducement Requirements

This HPM supports the implementation premium for extended-range WSHP or water-source VRF systems paired with decoupled ventilation. Code-minimum ratings alone do not establish extended-range capability, appropriate loop sequencing, local resistance lockout, or the monitoring-point visibility required here.

Eligibility is determined by the Measure Eligibility (ME), System Design Level Requirements (SDLR), and Supporting Documentation Requirements (SDR). Existing project records may establish compliance; no independent engineering-review service or routine long-term metering study is required.

The HPM performance requirements are extended-range capability and coordinated implementation. The core IMC is normalized to qualifying nominal room-conditioning cooling tons, not building area, pool-heating capacity, or pool or water connection capacity. Final inducement treatment remains subject to CEDA program review.

WSHP and water-source VRF remain alternative equipment pathways under one requirement set. CEH and isolated pool/service-water connections are application clarifications, not additional performance tiers.

Measure Eligibility (ME) – All Projects

1. **Qualifying Scope and Equipment Pathways**
   - 1.1. The qualifying system shall provide both room-air heating and cooling using a closed-loop, extended-range WSHP or water-source VRF multi-split heat pump system paired with decoupled ventilation and heat recovery.
   - 1.2. Select either the closed-loop water-source heat pump (WSHP) pathway or the closed-loop water-source VRF multi-split heat pump pathway. The selected equipment shall meet all applicable SDLR requirements.
   - 1.3. The project shall include a DOAS, HRV, or ERV that meets the applicable 2025 Title 24 DOAS and exhaust-air heat-recovery requirements, serving the same qualifying room-air conditioning scope. Exhaust-air heat recovery is required **where Title 24 requires it** or where provided by the selected HRV/ERV; this HPM adds **no separate heat-recovery effectiveness threshold**. “Heat recovery” in the measure name also includes heat sharing among zones through the closed loop.
   - 1.4. Closed loop means the water or water-glycol circuit passing through the qualifying WSHP or water-source VRF equipment is recirculating, chemically controlled, and fluidly isolated from pool and potable water. A secondary pool circuit open to the atmosphere does not make the isolated equipment loop an open-loop system (ME 5).
2. **CEH Room-Conditioning Clarification**
   - 2.1. CEH room-air heating and cooling is not excluded solely because the conditioned environment supports a horticultural process. The system shall satisfy ME 1 and all SDLR requirements; this provision does not redefine CEH or covered-process classifications under Title 24.
   - 2.2. For CEH, identify normal room temperature/moisture conditions, sensible and latent loads, suitable manufacturer selections, and coordination with separate dehumidification equipment, where present. Existing design records may supply this information (SDR 1-3).
   - 2.3. Separate CEH cooling and dehumidification does not satisfy the decoupled ventilation requirement. The DOAS/HRV/ERV must serve the qualifying rooms under ME 1.3; equipment serving only support spaces does not qualify separate grow-room capacity. This is an HPM configuration requirement, not a blanket CEH code mandate.
3. **Code Compliance and Eligible Project Scope**
   - 3.1. All projects shall comply with applicable state and local requirements, including 2025 Title 24 equipment, controls, ventilation, and acceptance requirements. For CEH, identify applicable §120.6(h) and §141.1(c) requirements. HPM eligibility does not waive code obligations or establish compliance with a future CASE proposal.

3.2. Eligible climate zones, building types, and project scopes are listed in the corresponding section. Only the qualifying room-air conditioning equipment and associated scope may be claimed.

4. **Interaction with Other HPMs**
   4.1. Each piece of equipment, cost, and energy benefit may be claimed under **only one HPM** (see Exclusion 3).
   4.2. The core extended-range system may be claimed under this HPM while a separately eligible pool or water-heating connection is claimed under another HPM, as long as their equipment and costs are kept separate and CEDA approves. Sharing a loop does not, by itself, qualify or disqualify a project.
5. **Isolated Pool and Service-Water Connections (Optional)**
   5.1. The closed equipment loop may exchange heat with a pool/spa or service water through an **isolation heat exchanger**. Pool and potable water stay in their own circuits and **never pass through the heat pumps**.
   5.2. The pool may act as a **heat sink** in cooling or, where conditions allow, a **heat source** in heating. Loop heat may also preheat service water directly or feed a separate water-heating heat pump.
   5.3. All room-conditioning, extended-range, and ventilation requirements still apply. A connection does **not** add qualifying tons or a separate inducement, and pool-only or water-heating-only systems do not qualify under this HPM.
   5.4. Connections shall meet **SDLR 5**. If the same heat is also claimed under another HPM, such as Refrigeration Heat Reclaim, see Exclusion 3.

System Design Level Requirements (SDLR) – New Construction

The following common requirements apply to either equipment pathway and to CEDA-eligible additions and major alterations.

1. **Extended-Range Capability**
   1.1. Qualifying WSHP or water-source VRF equipment shall be specifically designed and documented to operate with entering water or water-glycol temperatures of 32°F or lower in heating mode and 105°F or higher in cooling mode.
   1.2. Local electric resistance heat shall not be enabled at the zone heat pump unit as the means of maintaining qualifying heating operation at the required low entering-fluid condition.
2. **Minimum Efficiency and Certification**
   2.1. All qualifying heat-pump and ventilation equipment shall meet the applicable full-load and part-load minimum efficiency requirements required by 2025 Title 24 or ANSI/ASHRAE/IES Standard 90.1-2022, as applicable to the project and equipment type. Provide the applicable certification/rating pathway in Table 1.

Table 1. *Equipment Efficiency and Certification References*

Equipment Type	Minimum Efficiency Reference	Required Certification / Rating Standard
Water Source Heat Pumps (WSHP)	2025 Title 24, Part 6, Table 110.2-B	AHRI certification under the applicable WSHP certification program, including ISO 13256-1 as applicable
Water Source Variable Refrigerant Flow (VRF) Multi-Split Heat Pump	2025 Title 24, Part 6, Table 110.2-G	AHRI 1230
DX-DOAS, where applicable	2025 Title 24, Part 6, Table 110.2-H	AHRI 920

Equipment Type	Minimum Efficiency Reference	Required Certification / Rating Standard
HRV / ERV, where applicable	2025 Title 24 DOAS and exhaust-air heat-recovery requirements	Applicable rating / certification path demonstrating compliance with 2025 Title 24 heat-recovery requirements; AHRI 1060/1061 where applicable

3. **Controls and Sequence of Operation**
   - 3.1. Provide sequences addressing:
     - 3.1.1. Closed-loop water temperature setpoints and reset logic.
     - 3.1.2. Enable/disable and staging of supplemental heat addition and rejection to minimize total system energy while meeting loads and equipment limits.
     - 3.1.3. Lockouts or other control logic preventing local electric resistance heat from serving as the qualifying low-temperature heating strategy.
     - 3.1.4. Coordination between the decoupled ventilation/heat-recovery system and the room-air conditioning system, including ventilation-air treatment and heat-recovery operation where applicable.
4. **Minimum Monitoring-Point Capability**
   - 4.1. The system shall be capable of providing the following monitoring points:
     - 4.1.1. Closed-loop supply water temperature.
     - 4.1.2. Closed-loop return water temperature.
     - 4.1.3. Operating status of the primary WSHP or water-source VRF system.
     - 4.1.4. Operating status of supplemental heat-addition equipment, where applicable.
     - 4.1.5. Operating status of heat-rejection equipment, where applicable.
     - 4.1.6. Operating status or lockout status of local electric resistance heat, where present.
     - 4.1.7. Operating status of the decoupled ventilation system.
     - 4.1.8. Heat-recovery enable/bypass status, where available.
   - 4.2. Where central closed-loop supply and return temperature points are unavailable, representative entering and leaving fluid temperatures at qualifying equipment are acceptable.

Note: Point capability is required; continuous research logging is required only for separately selected Code Readiness sites.

5. **Optional Pool / Service-Water Connection Safeguards**
   - 5.1. **Separation:** use an isolation heat exchanger and materials rated for the pool or potable water served. Potable-water connections follow plumbing code, including double-wall protection where required.
   - 5.2. **Capacity and backup:** confirm the pool or water load can absorb or supply the planned heat, and keep a normal source/rejection path (e.g., cooling tower, fluid cooler, boiler, or AWHP) for times when it cannot. A brief design narrative using existing selections is enough.
   - 5.3. **Controls:** transfer heat only when flow is proven and the transfer is useful; otherwise bypass and use the backup path. Keep normal pool and hot-water temperatures, and do not heat the pool, raise loop temperatures, or run cooling just to feed the connection.
   - 5.4. **Startup check:** confirm flow, bypass, and temperature limits during normal startup or controls checkout. No added metering or energy model is required.

Supporting Documentation Requirements (SDR)

Submit only the applicable evidence below. Drawings, schedules, selections, submittals, compliance documents, control records, or cost records already supplied to CEDA may be cross-referenced and used for more than one requirement. Request only missing information; no duplicate package, standalone report, or fully itemized invoice is required solely by this HPM.

1. **Product Specifications and Equipment Selection**
   1.1. Schedules/submittals and applicable certifications identifying the equipment pathway, capacity, efficiency, and extended-range capability. For CEH, include actual-condition manufacturer selections required by ME 2.2.
2. **Design Drawings and Served Loads**
   2.1. Plans/schematics identifying the closed equipment loop, claimed equipment and rooms, ventilation service zones, and any pool or service-water connection. For CEH, show load/setpoint information, separate dehumidification, and the applicable compliance pathway using existing design records.
3. **Controls and Sequence of Operations**
   3.1. A written sequence or controls submittal addressing SDLR 3 and, where installed, dehumidification coordination and pool/service-water connection controls (SDLR 5.3).
4. **Monitoring-Point Documentation**
   4.1. A point list, controller schedule, or equivalent record showing the required point capability. Provide no additional trend dataset solely to demonstrate that capability.
5. **Acceptance and Installation Verification**
   5.1. Applicable code acceptance records and existing startup, controls-checkout, or CEDA verification records confirming installed equipment and required settings. For a pool/service-water connection, include the SDLR 5.4 startup check in the same record.
6. **Pool / Service-Water Connection (where applicable)**
   6.1. Show the connection and its backup source/rejection path on existing drawings, with the brief design narrative (SDLR 5.2). If any part is claimed under another HPM, note the split on the schematic, scope note, or cost estimate.
7. **Cost Information**
   7.1. Provide equipment and installation costs **as available**, such as contractor estimates, quotes, invoices, pay applications, or schedules of values. Material/labor detail is helpful when available but not required.

Incremental Measure Cost

The IMC values below are **program calibration inputs** for the above-baseline extended-range implementation scope. They are **not** bids, project estimates, approved deemed values, or a price for converting an air-source design to a water-source system; actual costs depend on configuration, controls, procurement, and installation. Values will be **revisited as CEDA obtains participating-project cost data**.

No CPUC-approved deemed measure package covers water-source heat pumps or water-source VRF. Base Case material and labor costs therefore use the closest commercial heat pump packages as **proxies**, consistent with the Cold Climate VRF/MSHP HPM. The incremental values are retained CEDA calibration allowances; they are not derived from the proxy packages.

Base Case

The Base Case is a code-compliant, standard-practice water-source system of the **same pathway and capacity** serving the same loads, with conventional loop controls (approximately 60°F to 90°F), normal source/rejection and supplemental-heating equipment, standard controls and startup, and the same compliant DOAS/HRV/ERV architecture. The closed loop, source/rejection plant, and ventilation system are common to both cases and cancel, so Table 2 Base Case costs cover the heat pump equipment and its installation:

1. **WSHP:** SWHC014-09 packaged heat pump below 65,000 Btu/h, the size range of typical individual WSHP units: **$1,261/ton material** and **$1,201/ton labor**.
2. **WS-VRF:** SWHC013-08 packaged heat pump, 65,000 to 134,000 Btu/h (offering N), the size range of typical water-source VRF condensing modules and the same basis used in the Cold Climate VRF/MSHP HPM: **$1,267/ton material** and **$736/ton labor**.

Measure Case

The Measure Case adds the qualifying extended-range implementation scope to the Base Case:

1. **Material:** equipment selections suitable for the SDLR 1 entering-fluid range, plus sensors and communications or point-visibility hardware beyond the Base Case.
2. **Labor:** loop reset/staging, resistance-lockout, and ventilation-coordination setup and checkout beyond ordinary installation and startup.

Some product families already include extended-range capability or communications; the allowance covers the combined qualifying implementation, not an automatic surcharge for every unit.

IMC Values and Normalization

IMC values are normalized to **$/ton of qualifying nominal room-conditioning cooling capacity**, the claim unit of the proxy packages and the AHRI-listed capacity. Size classes are **total qualifying project capacity**, not individual unit sizes. Per-ton values decline with project size because much of the incremental controls and setup effort is fixed per project. Projects below 20 tons require program review.

***IMC** = (Measure Material + Measure Labor) − (Base Material + Base Labor)*

***Table 2.** Incremental Measure Cost by Equipment Pathway and Project Size*

Pathway / Project Size	Unit	Base Material[1]	Base Labor[1]	Measure Material[2]	Measure Labor[2]	Full Measure Cost	IMC
WSHP, 20–49 tons	ton	$1,261	$1,201	$1,417	$1,435	$2,852	**$390**
WSHP, 50–149 tons	ton	$1,261	$1,201	$1,341	$1,321	$2,662	**$200**
WSHP, 150+ tons	ton	$1,261	$1,201	$1,305	$1,267	$2,572	**$110**
WS-VRF, 20–49 tons	ton	$1,267	$736	$1,527	$1,126	$2,653	**$650**
WS-VRF, 50–149 tons	ton	$1,267	$736	$1,397	$931	$2,328	**$325**
WS-VRF, 150+ tons	ton	$1,267	$736	$1,341	$847	$2,188	**$185**

[1] Proxy costs as reported in SWHC014-09 (packaged heat pump below 65,000 Btu/h) for WSHP and SWHC013-08 offering N for WS-VRF, with no added markup or escalation. Proxy Base Case costs do not vary by project size class.

[2] Base Case plus the retained CEDA calibration allowance, allocated 40% to material and 60% to labor. This allocation is a proposed CEDA calibration assumption reflecting the controls- and setup-focused scope.

Values are rounded to the nearest dollar.

Note: Pool and service-water connection costs are not included in these values, and no separate connection cost is established. CEDA reviews any connection claimed under another HPM case by case.

Calculation basis:

1. **Base Case** costs are the proxy package costs listed above. Package labor is equal in both cases, so proxy labor is carried into the Measure Case before the incremental labor is added.
2. **Increments** are the retained allowances of **$390, $200, and $110/ton** (WSHP) and **$650, $325, and $185/ton** (WS-VRF). WS-VRF values are higher to reflect refrigerant-side controls integration and module communications. For a 20–49 ton WSHP project: material $1,261 + $156 = $1,417; labor $1,201 + $234 = $1,435; full measure cost $2,852; IMC **$390/ton**.
3. Air-source efficiency premiums in SWHC013-08 (offerings N, P, and R: about $361 to $392/ton) and SWHC014-09 (about $349/ton) provide an **order-of-magnitude check** on the smaller-project allowances. They are not used to price the extended entering-fluid range.

*Example: 60-ton WSHP project – 60 × $200 = **$12,000**; 60-ton WS-VRF project – 60 × $325 = **$19,500**.*

Sources

IMC values are informed by deemed measure package cost data, controls cost references, manufacturer information, and program experience, and are intended to reflect typical market conditions rather than project-specific pricing, including:

1. eTRM SWHC014-09, *Unitary Air-Cooled AC or HP, Under 65 kBtu/hr, Commercial* (2026), WSHP Base Case proxy: https://www.caetrm.com/measure/SWHC014/09/
2. eTRM SWHC013-08, *Unitary Air-Cooled Air Conditioner, Over 65 kBtu/hr, Commercial* (2026), WS-VRF Base Case proxy: https://www.caetrm.com/measure/SWHC013/08/
3. NREL, *Commercial Building Sensors and Controls Systems – Barriers, Drivers, and Costs* (NREL/TP-6A50-82117): https://www.nrel.gov/docs/fy22osti/82117.pdf
4. Communications interface price references: Mitsubishi Electric PAC-UKPRC001-CN-1 BACnet/Modbus interface; Trane BAYBCIR001A BACnet communication interface
5. Trane, *Energy-Saving Strategies for Water-Source Heat-Pump Systems*: https://www.trane.com/content/dam/Trane/Commercial/global/products-systems/education-training/engineers-newsletters/energy-environment/admapn024en_0507.pdf
6. Extended-range product examples: Daikin SmartSource WSHP; Trane Axiom WSHP; Mitsubishi Electric PQRY water-source VRF

Code Readiness Objectives

Selected-site research can test whether extended-range capability and coordinated controls reduce total HVAC energy and backup operation relative to otherwise comparable water-source systems. Research objectives do not add routine customer documentation or metering obligations. Priorities include:

1. **Field performance:** compare measured heating/cooling performance, loop temperatures, and unmet loads with manufacturer selections across climates and building types.
2. **Controls operation:** verify loop reset, source/rejection staging, resistance lockout, and heat-sharing operation; identify overrides and recurring control failures.
3. **Ventilation coordination:** evaluate ventilation and room-conditioning coordination, including unintended heating, reheat, or fan operation.
4. **Applications:** characterize seasonal load diversity and climate effects to identify practical and repeatable applications.
5. **Market readiness:** document installation and controls barriers, operator experience, and the minimum point set needed to verify performance.
6. **Costs:** collect equipment, controls, installation, and avoided-equipment costs to refine IMCs; distinguish core implementation from optional connections.
7. **Isolated connections:** assess useful heating versus heat rejection, pump and auxiliary energy, pool limits, unavailable periods, induced pool reheating, and indoor-pool humidity effects; keep modeled and measured results distinct.

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

The resulting evidence can refine future code proposals, minimum monitorability requirements, and CEDA cost/performance assumptions. The sample points below are a research menu, except for the capability explicitly required by SDLR 4 and 5.7.

Sample Data Points

Select research points for each site from the following menu; do not treat optional rows as additional routine eligibility requirements.

Data Points to Meter	Unit	Additional Specifications
Minimum Required Data Points		
Closed-Loop Supply Water Temperature	°F	Average or trended value. If a central loop point is unavailable, use representative entering fluid temperature at qualifying equipment.
Closed-Loop Return Water Temperature	°F	Average or trended value. If a central loop point is unavailable, use representative leaving fluid temperature at qualifying equipment.
Primary WSHP / WS-VRF Operating Status	Status	Minimum on/off or enable/run indication; heating/cooling/standby mode where available.
Supplemental Heat-Addition Equipment Status	Status	Boiler, AWHP, electric supplemental heater, or other heat-addition device; on/off and stage where applicable.
Heat-Rejection Equipment Status	Status	Cooling tower, fluid cooler, dry cooler, or equivalent heat-rejection device; on/off and stage where applicable.
Local Electric Resistance Heat Status / Lockout	Status	Where present, capture actual operating status and/or lockout proof.
Decoupled Ventilation System Status	Status	DOAS / HRV / ERV unit run status; supply and exhaust fan status are acceptable where a single unit status point is unavailable.
Heat-Recovery Enable / Bypass Status	Status	Where available, capture heat-recovery enabled/disabled, bypass open/closed, or equivalent wheel/core/bypass status.

Data Points to Meter	Unit	Additional Specifications
Optional – Space-Conditioning / Loop		
Representative Entering Fluid Temperature at Qualifying WSHP / WS-VRF Module	°F	Optional; one or more representative units or modules.
Representative Leaving Fluid Temperature at Qualifying WSHP / WS-VRF Module	°F	Optional; one or more representative units or modules.
Primary Heat Pump System Power	kW	Optional; interval average or trended value; separate from loop pump and ventilation power where possible.
Loop Pump Status or Speed	Status / % / Hz	Optional; on/off, VFD speed, or commanded speed.
Closed-Loop Water Flow	gpm	Optional; recommended if heat transfer rate or COP will be calculated from measured flow and delta-T.
Loop Pump Power	kW	Optional; recommended if whole-system COP will be reported.
Closed-Loop Water Temperature Setpoint / Reset Command	°F	Optional; BAS loop temperature setpoint and reset target used to verify control sequence performance.
Supplemental Heat-Addition / Heat-Rejection Stage or Enable Command	Status	Optional; BAS enable/disable or stage command for supplemental plant equipment.
Zone Heating/Cooling Mode or Diversity Indicator	Status / %	Optional; prefer an aggregate count or percent of zones/modules in heating versus cooling.
Optional – Ventilation / Heat Recovery		
Ventilation Airflow	cfm	Optional; measured or controller-calculated value where available.
Ventilation Fan Status	Status	Optional; recommended when measured airflow is unavailable or when separate supply/exhaust proof is needed.
Ventilation Supply-Air Temperature	°F	Optional; average or trended value.
Outdoor Air Dry-Bulb Temperature	°F	Optional; measured at heat pump, DOAS, or site.
Outdoor Air Dew Point	°F	Optional; measured directly or calculated from outdoor-air temperature and relative humidity.
Optional – Supplemental Heat / Context / Diagnostics		
Supplemental Heat-Addition Power	kW	Optional; electric supplemental heat only, where separately metered.

Data Points to Meter	Unit	Additional Specifications
Supplemental Heat-Addition Fuel Use	therm/h or kBtu/h	Optional; use when supplemental heat is fuel-fired.
Indoor Zone / Space Temperature	°F	Optional; one or more representative zones.
Occupied / Unoccupied Mode	Status	Optional; BAS schedule or occupied-mode flag.
Alarm / Fault Code	Status / Text	Optional; high-value troubleshooting point at system level or for representative modules.
Loop Differential Pressure	psid	Optional; useful for loop pump-control diagnostics.
Optional – Calculated KPIs		
Heat Pump / Closed-Loop Heat Transfer Rate	kBtu/h	Optional; derived thermal-transfer KPI. Calculate from measured loop flow and supply/return temperature differential, or use OEM/controller-derived heat pump thermal output where available. Define calculation method consistently across the project.
System COP	Unitless	Optional; calculated KPI; define whether this is heat-pump-only COP or whole-system COP including loop pumps and ventilation.
Optional - Pool / Service-Water Interface		
Pool or receiving-water temperature	°F	Normal limits and setpoints; checked at startup (SDLR 5.4); continuous logging optional.
Interface enabled/bypassed; flow proof	Status	Checked at startup where installed (SDLR 5.4); continuous logging only for selected sites.
Interface flow and entering/leaving temperatures	gpm; °F	Optional research measurement for heat-transfer calculation; define both fluid boundaries.
Interface/pool pump and auxiliary-heater energy	kWh; therms	Optional research measurement; separate incremental pumping and induced reheating from existing baseline operation.
Useful pool/service-water heat; fallback operation	Btu; status	Optional. Separate useful cooling-reject heat from simple heat rejection and other loop inputs; no duplicate avoided-heating claim.

Code Reference

Applicable Codes and Standards

The table below identifies the California and industry requirements relevant to the Base Case and Measure Case. Applicability depends on equipment pathway, building type, and project scope. Selected equipment-table excerpts are provided in the Appendices; they do not expand HPM eligibility to otherwise excluded equipment.

2025 Energy Code source: CEC-400-2025-010-F (July 2025)

CODE	APPLICABLE CODE REFERENCE	EFFECTIVE DATE	CODE REVIEW DATE
CA Building Energy Efficiency Standards - Title 24, Part 6	§110.2, Table 110.2-B: applicable water-source heat-pump minimum efficiency requirements.	January 1, 2026	November 2026
CA Building Energy Efficiency Standards - Title 24, Part 6	§110.2, Table 110.2-G: water-source VRF multi-split minimum efficiency requirements.	January 1, 2026	November 2026
CA Building Energy Efficiency Standards - Title 24, Part 6	§110.2, Table 110.2-H: DX-DOAS minimum efficiencies where that ventilation pathway is used.	January 1, 2026	November 2026
CA Building Energy Efficiency Standards - Title 24, Part 6	§120.1: applicable nonresidential ventilation and indoor air quality requirements.	January 1, 2026	November 2026
CA Building Energy Efficiency Standards - Title 24, Part 6	§120.2 and §120.5: applicable space-conditioning controls and mechanical-system acceptance requirements.	January 1, 2026	November 2026
CA Building Energy Efficiency Standards - Title 24, Part 6	§140.4(p): nonresidential DOAS fan power, air delivery, balancing, and supply-air temperature controls.	January 1, 2026	November 2026
CA Building Energy Efficiency Standards - Title 24, Part 6	§140.4(q), Tables 140.4-G, 140.4-J and 140.4-K: exhaust-air recovery applicability, performance, and bypass/economizer controls.	January 1, 2026	November 2026
CA Building Energy Efficiency Standards - Title 24, Part 6	§170.2(c)4N-O: applicable multifamily DOAS and exhaust-air heat-recovery provisions.	January 1, 2026	November 2026
CA Building Energy Efficiency Standards - Title 24, Part 6	§120.6(h) and §141.1(c): CEH covered-process requirements and applicability to newly installed HVAC/dehumidification in additions/alterations. The HPM room-conditioning clarification does not reclassify CEH.	January 1, 2026	November 2026
2025 Reference Appendices - Title 24, Part 6	JA1 definitions; NA7.5.4 air-economizer and exhaust-air heat-recovery acceptance; NA7.18.4 central multifamily HRV/ERV acceptance, where applicable.	January 1, 2026	November 2026

CODE	APPLICABLE CODE REFERENCE	EFFECTIVE DATE	CODE REVIEW DATE
CA Appliance Efficiency Regulations - Title 20	§1605.1(c)(1), Tables C-5 and C-8, where applicable: regulated WSHP and water-source VRF efficiency/certification requirements.	Equipment-specific compliance dates	November 2026
Federal equipment standards	10 CFR Part 431, Subpart F; 431.92, 431.96 and 431.97: equipment definitions, test procedures, efficiencies, and compliance dates.	Equipment-specific compliance dates	November 2026
ISO 13256-1 / AHRI WSHP certification	Performance rating and applicable certification for water-to-air WSHP equipment. Broader water-to-water ratings do not add an eligible equipment pathway.	Edition required by applicable code	November 2026
AHRI Standard 1230	Rating/certification framework for water-source VRF multi-split systems.	Edition required by applicable code	November 2026
AHRI Standards 920 and 1060/1061	DX-DOAS ratings and air-to-air heat/energy-recovery component ratings, as applicable.	Edition required by applicable code	November 2026
ANSI/ASHRAE Standard 62.1	Applicable commercial ventilation and indoor air quality reference.	Edition required by applicable code	November 2026
ANSI/ASHRAE/IES Standard 90.1	Applicable equipment-efficiency benchmark; does not supersede applicable Title 24 or federal requirements.	2022 edition (HPM reference)	November 2026
ASHRAE Guideline 36	High-performance HVAC sequences; technical reference for loop reset, staging, and coordination.	Applicable project edition	November 2026
CA Building Energy Efficiency Standards - Title 24, Part 6	§110.4(b)-(d), Table 110.4-A; §160.7(b) where applicable: pool covers, circulation controls, heating-source sizing, and supplemental heat controls. Recovery used for compliance remains in the baseline.	January 1, 2026	November 2026
CA Building Energy Efficiency Standards - Title 24, Part 6	§110.3 and §140.4(s), where applicable: service-water requirements and mandatory mechanical heat recovery. Identify the project-specific baseline before crediting an optional connection.	January 1, 2026	November 2026
California Plumbing / Mechanical Codes; public-pool requirements	Applicable fluid separation, potable-water protection, heat-exchanger installation, water quality, pool recirculation/safety, and local public-health approvals. These requirements are not waived by HPM eligibility.	Project-adopted editions	November 2026
Manufacturer application instructions	Actual entering/leaving fluid temperatures, water chemistry, glycol, flow, pressure drop, isolation, freeze protection, and approved uses. A technical reference does not certify every cited model as HPM-eligible.	Selected equipment instructions	November 2026

Eligible Climate Zones, Building Types, and 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**, including qualifying dwelling-unit, common-area, and central-loop room-conditioning systems.
- **Nonresidential: commercial, public, agricultural, and industrial** facilities (e.g., offices, lodging, education, healthcare, community/recreation/aquatic centers, and qualifying CEH room-conditioning areas).

A pool or service-water load may complement an eligible HVAC project under ME 5; it does not independently qualify a pool-only project or waive room-conditioning, ventilation, equipment, or program requirements.

Eligible Project Scopes

This high-performance measure applies to:

- **New construction**, including additions and major alterations eligible for CEDA participation, with qualifying room-conditioning and loop-integration scope. Routine equipment replacement or maintenance outside CEDA eligibility is not added by this HPM.

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

- **Low-rise residential** (single-family and multifamily with three or fewer habitable stories above grade).

Measure Exclusions

The following exclusions apply to the claimed scope. An exclusion here does not necessarily exclude the project from other CEDA offerings.

1. **Out-of-Scope Systems and Applications**
   - 1.1. Open-loop or once-through flow of pool, ground, or surface water through the heat pumps. The isolated connection in ME 5 is allowed.
   - 1.2. Air-source systems, packaged/split DX systems, or other non-water-source equipment offered as the qualifying pathway.
   - 1.3. Air-to-water or water-to-water systems serving rooms through hydronic terminals, and heat recovery chillers offered in place of qualifying water-to-air WSHP or water-source VRF equipment. Separate source-side equipment may support the loop, subject to non-overlap.
   - 1.4. Systems not providing both room-air heating and cooling, or not paired with qualifying DOAS/HRV/ERV serving the same claimed rooms. A support-space ventilation unit does not qualify separate grow-room equipment.
   - 1.5. Pool-only, service-water-only, direct product/process-fluid, or refrigeration equipment. Qualifying CEH room conditioning (ME 2) and isolated connections (ME 5) remain allowed.
2. **Nonqualifying Performance or Documentation**
   - 2.1. Equipment without documented SDLR 1 extended-range capability.
   - 2.2. Equipment not meeting applicable efficiencies or Table 1 certification/rating requirements.

2.3. Local electric resistance used as the normal qualifying low-temperature heating strategy.
2.4. Missing required controls, point capability, or applicable evidence under SDR. Information already supplied need not be duplicated.
2.5. Pool or service-water connections that do not meet SDLR 5, including capped or future connections. Such a connection is removed from the claim; it does not disqualify a compliant core system.

3. **Double Counting and Refrigeration Heat Reclaim**
   3.1. **One claim per item:** the same equipment, cost, or energy benefit cannot be claimed under more than one HPM.
   3.2. **Pool and service-water connections:** the heat exchanger, connection pumps, piping, and controls belong to one HPM. If they cannot be separated from the core system, choose one HPM for the connection; the core extended-range system may still be claimed here.
   3.3. **Refrigeration Heat Reclaim:** using the pool only to hold loop temperature is part of this HPM. When rejected cooling heat also meets a real pool or water-heating load, that heat may qualify under the Refrigeration Heat Reclaim HPM instead, even through an intermediate loop, if it meets that HPM's own requirements.
   3.4. **Not recovered heat:** heat pulled from a pool for room heating, heat from boilers, solar, or other non-cooling sources, and heat rejected to an unheated pool.
   3.5. **Source plant:** the same ground loop, loop heat pump, or HRC plant cannot also be claimed under the Ground Source, Hydronic Heat Pump, or Heat Recovery Chiller HPM.

CEDA determines the final allocation. An existing schematic, estimate, or short scope note is enough to document it.

Appendices

Appendix Section 1: Representative Source-Side Configurations

The following configurations illustrate source-side support for a qualifying closed equipment loop; they do not create alternative equipment or ventilation eligibility.

Source-Side Configuration	Primary Source-Side Elements	Description
Conventional Boiler / Tower	Boiler for loop heat addition and cooling tower or fluid cooler for loop heat rejection	A shared closed water loop serves WSHPs or water-source VRF modules; the boiler adds heat when needed, and the cooling tower or fluid cooler rejects excess loop heat.
Closed-Loop Geothermal	Vertical borefield, horizontal ground loop, or other closed-loop geo-exchange field	The ground loop acts as the primary heat source and heat sink for the shared water loop.
Hybrid Geothermal + Boiler/Tower Trim	Ground heat exchanger plus boiler trim, cooling tower trim, or fluid cooler trim	The ground loop carries part of the annual load; supplemental source-side equipment trims the remainder. This arrangement is commonly used where site area, borefield cost, or annual load imbalance makes a fully geothermal design impractical.
AWHP + Cooling Tower / Fluid Cooler	Air-to-water heat pumps plus cooling tower, dry cooler, or fluid cooler	AWHPs support the shared loop by adding heat during heating operation; the cooling tower, dry cooler, or fluid cooler rejects excess loop heat during cooling operation.
AWHP + Backup Boiler	Air-to-water heat pumps as primary heat-addition equipment plus boiler for trim, peak, or emergency conditions	AWHPs provide normal loop heat-addition operation; the boiler is reserved for peak, emergency, or low-ambient conditions as defined by the project sequence of operation.
Mixed-Source System	Any combination of geothermal, AWHP, boiler trim, cooling tower trim, fluid cooler trim, or similar source-side elements	Two or more source-side strategies are combined to widen the practical loop operating band, improve annual heat balance, reduce reliance on backup heat, or respond to project-specific constraints such as site area, first cost, phasing, or redundancy.
Pool-Coupled Closed Equipment Loop	Pool-side recirculation + isolation heat exchanger; loop-side pump/valves; alternate source/rejection path as needed	An isolation heat exchanger links pool circulation to the clean equipment loop (SDLR 5). If the pool also receives useful heating, see Exclusion 3.
Isolated Service-Water Heat Use	Potable-compatible preheat heat exchanger and/or separate water-heating heat pump; receiver-side controls	Uses available loop heat for real water-heating demand. Direct preheat requires adequate temperature difference; a separate heat pump can boost temperature. Receiving equipment and costs remain separately scoped (ME 5.3).

Ventilation Arrangement Note

All examples retain the qualifying decoupled DOAS/HRV/ERV service required by ME 1.3. Do not add unnecessary outdoor air solely to obtain an inducement.

Pool example: room-conditioning units exchange heat with the clean loop; an isolation exchanger couples it thermally to pool circulation. The pool may be a sink without being a suitable winter source. Bypass/fallback retains service when pool limits prevent transfer.

Evidence boundary: Harrington (UC Davis, 2024), Swimming Pools as Heat Sinks and Sources for Heat Pumps, evaluated an air-conditioner retrofit at two single-family sites; performance analysis focused on one site. Reported nine-week cooling-energy savings were 13%, or 7% when all coincident pool pumping was assigned to the system. Heating-mode use was simulated, not field demonstrated, and was not supported by the tested retrofit manufacturer. Those results support screening, not a guaranteed savings value or cost basis for commercial WSHP/WS-VRF loops. Research source

Manufacturer context: Mitsubishi Electric CITY MULTI water-source design guidance calls for a water-to-water heat exchanger and a closed air-conditioner-side circuit when an open storage tank is used. This supports the isolation principle only; actual products must independently meet the HPM operating-range, rating, and application requirements. Water-system guidance (p. 150)

Appendix Section 2: Complementary CEDA HPMs

Other HPMs may apply only to separately eligible, non-overlapping scope. This list is a screen, not automatic stacking approval; Exclusion 3 governs shared equipment and benefits.

1. **Very High Efficiency DOAS HPM:** where the claimed ventilation and heat-recovery scope is beyond code and distinct from the decoupled ventilation pathway required by this HPM.
2. **Building Management System / Energy Management System HPM:** for eligible buildings between 5,000 and 50,000 gross square feet classified under the California Building Code (CBC) as Group A (Assembly), B (Business), or M (Mercantile).
3. **Refrigeration Heat Reclaim HPM:** screen useful cooling-reject heat delivered to pool or service-water loads, including through an intermediate-loop interface. The V1.2 Advanced pathway accepts qualifying air-conditioning sources, and each contributing source must meet its 50,000 Btu/h design heat-rejection threshold. Do not apply that threshold to this HPM or sum undersized sources to bypass it; shared-loop claims require CEDA review of source attribution and non-overlap.
4. **Pool and Spa AWHP HPM:** screen separately installed qualifying pool heat pumps; an isolation heat exchanger alone does not qualify as a pool heat pump. Keep core HVAC and heat-reclaim costs separate.
5. **Central and Semi-Central HPWH System HPMs:** screen the separate qualifying water-heating system. Do not claim the same preheat exchanger, source-loop hardware, recovered energy, or equipment premium twice.
6. **Heat Recovery Chiller and Hydronic Heat Pump HPMs:** apply only to independently qualifying plant equipment and non-overlapping scope. A fluid-to-fluid pool interface does not reclassify WSHP or water-source VRF equipment as a heat recovery chiller or hydronic heat pump.

A site may provide useful BAS/BMS data for Code Readiness without qualifying for a separate BMS/EMS inducement.

Appendix Section 3: 2025 Title 24 Table 110.2-B

Selected source excerpts for WSHP rating context. Only the water-to-air pathway in Table 1 is eligible; water-to-water or other rows shown in the source do not create additional HPM pathways.

Cooling rows; source printed page 157.

TABLE 110.2-B HEAT PUMPS – MINIMUM EFFICIENCY REQUIREMENTS

Equipment Type	Size Category	Rating Condition	Efficiency [a]	Test Procedure[b]
Water source (cooling mode)	≥ 65,000 Btu/h and < 135,000 Btu/h	86ºF entering water	Federal Minimum EER	ISO-13256-1
Groundwater source (cooling mode)	< 135,000 Btu/h	59ºF entering water	18.0 EER	ISO-13256-1
Ground source (cooling mode)	< 135,000 Btu/h	77ºF entering water	14.1 EER	ISO-13256-1
Water source water-to-water (cooling mode)	< 135,000 Btu/h	86ºF entering water	10.6 EER	ISO-13256-2
Groundwater source water-to-water (cooling mode)	< 135,000 Btu/h	59ºF entering water	16.3 EER	ISO-13256-2
Ground source brine-to-water (cooling mode)	< 135,000 Btu/h	77ºF entering water	12.1 EER	ISO-13256-2

Heating rows and source footnotes; printed page 158.

Water source (heating mode)	< 135,000 Btu/h (cooling capacity)	68ºF entering water	Federal Minimum COP	ISO-13256-1
Water source (heating mode)	≥ 135,000 Btu/h and < 240,000 Btu/h	68ºF entering water	Federal Minimum COP	ISO-13256-1
Groundwater source (heating mode)	< 135,000 Btu/h (cooling capacity)	50ºF entering water	3.7 COP	ISO-13256-1
Ground source (heating mode)	< 135,000 Btu/h (cooling capacity)	32ºF entering water	3.2 COP	ISO-13256-1
Water source water-to-water (heating mode)	< 135,000 Btu/h (cooling capacity)	68ºF entering water	3.7 COP	ISO-13256-2
Groundwater source water-to-water (heating mode)	< 135,000 Btu/h (cooling capacity)	50ºF entering water	3.1 COP	ISO-13256-2
Ground source brine-to-water (heating mode)	< 135,000 Btu/h (cooling capacity)	32ºF entering water	2.5 COP	ISO-13256-2

a Deduct 0.2 from the required EERs and IEERs for units with a heating section other than electric resistance heat.
b Applicable test procedure and reference year are provided under the definitions.

Appendix Section 4: 2025 Title 24 Table 110.2-G

Water-source and related source-rating excerpts for VRF. Direct open-loop equipment-source arrangements remain excluded; the isolated pool allowance is defined in ME 5. Source table coverage does not determine HPM scope.

Water-source cooling; source printed page 165.

Equipment Type	Size Category	Heating Section Type	Sub-Category or Rating Condition	Minimum Efficiency	Test Procedure [b]
VRF Water source (cooling mode)	<65,000 Btu/h	All	VRF Multi-split systems [a] 86ºF entering water	12.0 EER Federal Minimum IEER [c]	AHRI 1230
VRF Water source (cooling mode)	≥65,000 Btu/h and <135,000 Btu/h	All	VRF Multi-split System [a] 86ºF entering water	12.0 EER Federal Minimum IEER [c]	AHRI 1230
VRF Water source (cooling mode)	≥135,000 Btu/h and < 240,000	All	VRF Multi-split System [a] 86ºF entering water	10.0 EER Federal Minimum IEER [c]	AHRI 1230
VRF Water source (cooling mode)	≥ 240,000 Btu/h	All	VRF Multi-split System[a] 86°F entering water	10.0 EER Federal Minimum IEER	AHRI 1230

Groundwater/ground-source rating context; source printed page 166.

Equipment Type	Size Category	Heating Section Type	Sub-Category or Rating Condition	Minimum Efficiency	Test Procedure [b]
VRF Groundwater source (cooling mode)	<135,000 Btu/h	All	VRF Multi-split System [a] 59ºF entering water	16.2 EER	AHRI 1230
VRF Groundwater source (cooling mode)	≥135,000 Btu/h	All	VRF Multi-split System [a] 59ºF entering water	13.8 EER	AHRI 1230
VRF Ground source (cooling mode)	<135,000 Btu/h	All	VRF Multi-split System [a] 77ºF entering water	13.4 EER	AHRI 1230
VRF Ground source (cooling mode)	≥135,000 Btu/h	All	VRF Multi-split System [a] 77ºF entering water	11.0 EER	AHRI 1230

Table 110.2-G: Water-Source Heating and Footnotes

Equipment Type	Size Category	Heating Section Type	Sub-Category or Rating Condition	Minimum Efficiency	Test Procedure [b]
VRF Water source (heating mode)	< 65,000 Btu/h (cooling capacity)	---	VRF Multi-split System 68°F entering water	Federal Minimum COP	AHRI 1230
VRF Water source (heating mode)	≥65,000 Btu/h and <135,000 Btu/h (cooling capacity)	---	VRF Multi-split System 68ºF entering water	Federal Minimum COP	AHRI 1230
VRF Water source (heating mode)	≥135,000 Btu/h and < 240,000 Btu/h (cooling capacity)	---	VRF Multi-split System 68ºF entering water	Federal Minimum COP	AHRI 1230
VRF Water source (heating mode)	≥ 240,000 Btu/h (cooling capacity)	---	VRF Multi-split System 68°F entering water	Federal Minimum COP	AHRI 1230
VRF Groundwater source (heating mode)	<135,000 Btu/h (cooling capacity)	---	VRF Multi-split System 50ºF entering water	3.6 COP	AHRI 1230
VRF Groundwater source (heating mode)	≥135,000 Btu/h (cooling capacity)	---	VRF Multi-split System 50ºF entering water	3.3 COP	AHRI 1230
VRF Ground source (heating mode)	<135,000 Btu/h (cooling capacity)	---	VRF Multi-split System 32ºF entering water	3.1 COP	AHRI 1230
VRF Ground source (heating mode)	≥135,000 Btu/h (cooling capacity)	---	VRF Multi-split System 32ºF entering water	2.8 COP	AHRI 1230

a. Deduct 0.2 from the required EERs and IEERs for Variable Refrigerant Flow (VRF) Multi-split system units with a heating recovery section.
b. Applicable test procedure and reference year are provided under the definitions.
c. IEERs are only applicable to equipment with capacity control as specified by AHRI 1230 test procedures.

Appendix Section 5: 2025 Title 24 Table 110.2-H

DX-DOAS rating context; source printed page 168.

TABLE 110.2-H DX-DOAS Units, Single-Package and Remote Condenser – Minimum Efficiency Requirements

Equipment Type	Energy Recovery	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure[a]
Air cooled (dehumidification mode)	Without energy recovery	NA	3.8 ISMRE2	AHRI 920
Air source heat pumps (dehumidification mode)	Without energy recovery	NA	3.8 ISMRE2	AHRI 920
Water cooled (dehumidification mode)	Without energy recovery	Cooling Tower Condenser Water	4.7 ISMRE2	AHRI 920
Water source heat pump (dehumidification mode)	Without energy recovery	Ground source, closed and open loop	4.6 ISMRE2	AHRI 920
Water source heat pump (dehumidification mode)	Without energy recovery	Water source	3.8 ISMRE2	AHRI 920
Air source heat pumps (heating mode)	Without energy recovery	NA	2.05 ISCOP2	AHRI 920
Water source heat pump (heating mode)	Without energy recovery	Ground source, closed and open loop	2.13 ISCOP2	AHRI 920
Water source heat pump (heating mode)	Without energy recovery	Water source	2.13 ISCOP2	AHRI 920
Air cooled (dehumidification mode)	With energy recovery	NA	5.0 ISMRE2	AHRI 920
Air source heat pumps (dehumidification mode)	With energy recovery	NA	5.0 ISMRE2	AHRI 920

Table 110.2-H: Continued

Source printed page 169.

CONTINUED: *TABLE 110.2-H DX-DOAS Units, Single-Package and Remote Condenser – Minimum Efficiency Requirements*

Equipment Type	Energy Recovery	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure[a]
Water cooled (dehumidification mode)	With energy recovery	Cooling tower condenser water	5.1 ISMRE2	AHRI 920
Water source heat pump (dehumidification mode)	With energy recovery	Ground source, closed and open loop	5.0 ISMRE2	AHRI 920
Water source heat pump (dehumidification mode)	With energy recovery	Water source	4.6 ISMRE2	AHRI 920
Air source heat pumps (heating mode)	With energy recovery		3.2 ISCOP2	AHRI 920
Water source heat pump (heating mode)	With energy recovery	Ground source, closed and open loop	3.5 ISCOP2	AHRI 920
Water source heat pump (heating mode)	With energy recovery	Water source	4.04 ISCOP2	AHRI 920

a Applicable test procedure and reference year are provided under the definitions.

Reviewer Checklist

HPM Reviewer Checklist: LM401 – Extended-Range WSHP / WS-VRF – V1.3

Checklist Description: Confirm the applicable ME, SDLR, and SDR requirements and identify projects for optional Code Readiness monitoring. The CEH application clarification does not waive the standard equipment or ventilation requirements.

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

Assessment:

☐ Approved

☐ Not approved

Notes:

Reviewer: _____ **Signature:** _____

Reviewer Checklist – High-Performance Measure Requirements

Verify only applicable scope; reuse evidence identified in SDR. This checklist adds no design or documentation requirements.

Project and Equipment

☐ Eligible project/building type and climate zone; qualifying equipment/capacity identified (ME 1, 3).

☐ Closed-loop WSHP or water-source VRF provides both room heating and cooling; qualifying DOAS/HRV/ERV serves the same rooms (ME 1).

☐ Manufacturer-supported entering-fluid capability: ≤32°F heating and ≥105°F cooling; applicable efficiency/certification verified (SDLR 1-2; Table 1).

☐ For CEH: actual-condition selections, sensible/latent loads, and dehumidification coordination; support-space ventilation not substituted for grow-room ventilation (ME 2; SDR 1-3).

Controls and Verification

☐ Loop reset/staging, resistance restriction, and ventilation/recovery coordination documented; total-system energy considered (SDLR 1.2, 3).

☐ Required temperature/status points available, with representative equipment temperatures allowed where central points are unavailable (SDLR 4).

☐ Installed equipment/settings and applicable acceptance/startup checks evidenced through existing records (SDR 5).

Optional Pool / Service-Water Connection

☐ Isolation heat exchanger, backup source/rejection path, and controls that keep normal pool and water temperatures (ME 5; SDLR 5.1–5.3).

☐ Flow, bypass, and temperature limits confirmed at startup or controls checkout (SDLR 5.4; SDR 5–6).

Evidence, Cost, and Claim Boundary

☐ Applicable schedules/submittals, drawings, sequences, points, acceptance/verification, and available cost records received once; only missing evidence requested (SDR 1-7).

☐ Qualifying cooling tons and project size class recorded for the Table 2 IMC; pool/service-water connection costs not included (IMC; SDR 7).

☐ Pool/service-water connection and any other HPM claim kept separate; one HPM per connection (ME 4; Exclusion 3).

☐ Equipment, costs, and energy benefits counted once (Exclusion 3).

Detailed research metering applies only to separately selected Code Readiness sites. Required monitoring-point capability remains part of qualification.

Version History Log

Version	Effective Date	End Date	Change Description
1.0	February 23, 2023	May 17, 2026	N/A
1.2	May 18, 2026	November 15, 2026	Updated measure to the current CEDA HPM format, technology summary, IMC, sample data points, code readiness objectives, code reference, measure exclusions, and added appendices & reviewer checklist
1.3	November 16, 2026	Active	Added targeted CEH room-conditioning and optional isolated pool/service-water connections, with **simplified connection safeguards** and documentation. Clarified Refrigeration Heat Reclaim routing and **condensed double-counting exclusions**; consolidated supporting evidence and reviewer checks; completed numbered ME/SDLR/SDR and exclusion structure. Clarified that exhaust-air heat recovery follows Title 24. Retained core thresholds and IMC values; rebuilt the IMC table in the current base/measure material and labor format using **SWHC014-09** and **SWHC013-08** proxy Base Case costs, with connection costs noted as excluded. Matched current HPM memo styling and code-reference format.

***Note**: 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.*