

# ClimaMind Deployment Technical Overview

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ClimaMind deploys AI HVAC optimization as a staged engineering process. The work starts with approved site data, moves through model training and control strategy review, then proceeds to site commissioning, acceptance, and long term support.

The goal is to create a clear path from existing HVAC and BMS data to measurable optimization while preserving customer control, operator visibility, local BMS authority, and safety constraints specific to the site.

Most projects do not require replacing core mechanical equipment. ClimaMind is designed to work with existing BAS/BMS infrastructure, approved supervisory points, existing telemetry where available, and an operating boundary approved by the customer.

## Deployment principles

1. Define the deployment boundary approved by the customer before site activation.
2. Review data quality, point mapping, and meter boundaries before treating model outputs as actionable.
3. Start in read only advisory mode when the site needs staged confidence building.
4. Enable supervised BMS writes only after the approved write list, limits, fallback behavior, and manual override path are reviewed.
5. Tie savings claims to an agreed measurement boundary, evidence path, and M&V method.

ClimaMind does not replace the native BMS. The BMS remains the site control system. ClimaMind adds an optimization layer that reads approved data, recommends or executes bounded supervisory actions, and records evidence for customer review.

## 1. Deployment Path

The standard deployment path has five stages. Some review work can overlap when the project already has reliable data and a known BMS integration path, but the gates should stay explicit.

### 1.1 Data Intake

Data intake is the first execution step. It turns a customer conversation into a controlled technical intake package that ClimaMind can use for model training and deployment planning.

1. Confirm the site owner and project owner. The customer names the business owner, facility owner, BMS or SI contact, IT or OT contact, and the person who can approve data access. ClimaMind records these names before requesting site data.
2. Complete NDA or data sharing approval. If non public BMS exports, meter data, control sequences, floor plans, or operating records will be shared, the customer and ClimaMind complete the required NDA or customer data sharing process before file transfer.
3. Hold a technical scoping call. The call confirms building type, address or portfolio scope, major HVAC systems, BMS vendor, SI involvement, meter availability, utility tariff context, operating schedule, comfort constraints, known complaints, and the target deployment mode.
4. Define the initial measurement boundary. The team identifies which plant, air side systems, meters, and operating periods are inside scope. Systems outside the boundary are listed as exclusions.
5. Issue the data request. ClimaMind sends a site specific request for BMS trend exports, point list, equipment schedule, control sequence documents, meter interval data, weather or occupancy context if available, alarm or override history, and any known operating constraints.
6. Transfer the data through the approved channel. The customer or SI delivers files through the agreed secure path. Each file should include date range, source system, export time zone, units, and contact owner.
7. Review data quality. ClimaMind checks timestamps, units, missing periods, point naming, sensor ranges, equipment state alignment, meter coverage, and whether required setpoints or commands are available.
8. Close intake blockers. Missing points, unclear meter boundaries, bad timestamps, inaccessible trends, undocumented equipment modes, and unresolved permission issues are logged with an owner and next action.
9. Confirm intake readiness. ClimaMind marks the site ready for model training only when the available data can support baseline modeling, control strategy review, and a credible commissioning plan.

The stage output is a data inventory, owner list, point mapping draft, data quality summary, blocker list, measurement boundary draft, and model training readiness decision.

## 1.2 Model Training

Model training uses validated historical data and site constraints to build baseline behavior for the systems inside the agreed measurement boundary. Training inputs can include BMS data, meter data, weather, schedule, occupancy, and other operating context when available.

ClimaMind evaluates candidate control strategies offline before site activation. The review tests strategies against comfort constraints, equipment constraints, safety limits, existing BMS behavior, and customer approval boundaries. Strategies that depend on missing signals, unclear permissions, or unverified operating modes are held back.

The stage is complete when the customer and ClimaMind agree which optimization opportunities are technically supported. Typical outputs are a baseline model summary, candidate control strategy list, unsupported assumption list, and model readiness summary.

## 1.3 On Site Deployment

On site deployment connects the approved optimization boundary to the customer building. Site work should not start until data intake and model training have produced a measurement boundary, candidate control points, and commissioning plan.

1. Confirm pre site readiness. ClimaMind, the customer, and the SI review the measurement boundary, candidate points, unresolved blockers, approved deployment mode, security review status, and commissioning owner list.
2. Schedule site access and support coverage. The customer confirms maintenance windows, facility access, edge device location, power and cabling availability, network support, SI availability, and the people who can pause or override optimization.
3. Establish connectivity and edge placement. The SI or customer validates the BMS access path, network route, outbound communication, time sync, credentials or certificates, and remote support boundary. The customer BMS remains inside the site boundary.
4. Commission point mapping and telemetry. ClimaMind maps intake point names to live BMS objects, units, schedules, command semantics, alarms, and trends. Required points must show credible freshness, ranges, equipment state alignment, and stale point behavior.
5. Start read only advisory operation. ClimaMind reads approved site data and may produce recommendations for operator or SI review, but does not write to the BMS in this mode. This period catches naming mismatches, missing histories, seasonal modes, undocumented overrides, or abnormal equipment behavior.
6. Enable supervised control only after approval. Supervised writes require an approved write list, numeric limits, rate limits, schedules, fallback rules, manual override path, operator training, and escalation contacts. Rejected writes, fallback events, and operator overrides are logged.
7. Handoff to acceptance. ClimaMind prepares the commissioning record, validated point map, current operating mode, issue log, excluded periods, and recommendation on whether M&V reporting can start.

The stage is complete when the selected deployment mode is operating within the agreed boundary and operators understand how to monitor, pause, override, and escalate.

## 1.4 Acceptance

Acceptance closes the deployment phase with evidence that ClimaMind is operating inside the approved technical and operational boundary. Acceptance should wait if the validated point map, operating mode, issue log, or M&V inputs are missing.

1. Confirm acceptance prerequisites. The customer and ClimaMind review the on site handoff package, current operating mode, commissioning record, issue log, excluded periods, and any M&V plan fields.
2. Lock acceptance criteria before judging results. The team confirms comfort rules, reliability rules, control traceability requirements, savings or M&V thresholds when applicable, and the owner who can approve sign off.
3. Run the acceptance review window. ClimaMind and the customer review zone conditions, equipment constraints, uptime, control actions, operator overrides, rejected writes, stale telemetry, BMS alarms, maintenance windows, and open issues.
4. Evaluate savings evidence when in scope. ClimaMind compares reporting period performance to the approved baseline and measurement boundary, applies exclusion rules, documents uncertainty where applicable, and separates accepted measured savings from directional observations.
5. Close sign off. ClimaMind issues an acceptance memo with pass or fail status, approved operating mode, excluded periods, open items, and remaining risks. The customer confirms whether the deployment is accepted or must remain in staged operation.
6. Define ongoing service. The customer and ClimaMind confirm reporting cadence, escalation contacts, change control rules, data retention boundary, and the scope for ongoing optimization or M&V reporting.

The stage is complete when customer stakeholders accept the deployment evidence, open issue list, reporting cadence, and ongoing support plan.

## 1.5 Long Term Support

Long term support starts after acceptance when the customer wants ClimaMind to remain engaged with the site. Support can include approved data review, model updates, dashboard visibility, recurring reports, and tuning specific to the site.

ClimaMind can retrain models and adjust control strategies as weather, occupancy, tariffs, and equipment conditions change. The team can also support deeper tuning for priority systems or adjacent integration and reporting work when those items are inside the agreed service scope.

The stage is active when the customer and ClimaMind agree on support cadence, data retention boundary, reporting scope, and escalation path.

## 2. Roles and Handoff

Clear responsibility split matters because HVAC optimization touches energy goals, BMS integration, site operations, IT/OT approval, and measurement evidence.

Party	Responsibilities
Customer	Define business goals, operating constraints, comfort requirements, acceptance criteria, deployment boundaries, write permissions, fallback expectations, and final acceptance.
ClimaMind	Assess data quality, train and validate models, identify feasible strategies, prepare point mapping and risk registers, support commissioning, monitor performance, and produce reports that customers can read directly.
System Integrator / Controls Contractor	Confirm point names, trend configuration, BMS topology, equipment mapping, approved connectivity, read access, write paths, alarms, overrides, and fallback behavior.
Optional M&V Partner	Review baseline method, measurement boundary, adjustments, evidence requirements, and savings calculations when third party or contractual review is required.

The handoff should identify who can approve access, who can pause or override optimization, who owns BMS side changes, and who signs off on acceptance evidence.

### Operator handoff requirements

- The approved read scope must list the BMS points, meter data, schedules, alarms, and operating context available to ClimaMind.
- The read only advisory scope must define which recommendations ClimaMind may issue for operator or SI review.
- The supervised control scope, if enabled, must list the approved write points, numeric limits, schedules, and rate limits.
- Manual override must take precedence over ClimaMind recommendations or writes.
- Alarm review, stale point review, rejected write review, comfort feedback, and issue escalation must have named owners.
- Movement from read only advisory mode to supervised control must require customer approval.

## 3. Architecture and Security Boundary

This section is a deployment level outline. It is not the full security review packet. Detailed controls should be reviewed in the ClimaMind Customer Security Overview and the SOC 2-aligned security policy materials. ClimaMind is SOC 2-aligned for deployment security and readiness; this is not a third party audit statement.

A ClimaMind deployment separates local edge operation, customer BMS communication, cloud reporting, and customer user access.

Layer	Role	Boundary
Customer users	Access dashboards, reports, approval workflows, and operating evidence.	Access is controlled through approved authentication and role permissions.
ClimaMind cloud services	Receive telemetry, reports, configuration records, and operating evidence when connectivity is available.	Cloud connectivity supports reporting, updates, and review; it is not the default building control path.
Edge device	Runs the site deployment role locally and connects approved site telemetry, model logic, and BMS communication.	Local runtime continues operating inside the approved site boundary.
Customer BMS	Remains the native site control system.	BMS control paths stay inside the customer site boundary.
Approved write path	Optional path for supervised control actions.	Limited to approved points, ranges, rates, fallback behavior, and manual override procedures.

Deployment security review focuses on the approved site boundary: edge placement, BMS endpoints or gateways, read permissions, optional write permissions, operator override, fallback behavior, cloud reporting path, and remote support. Customer BAS sequences, operator actions, equipment safeties, lockouts, and life safety controls remain authoritative.

Normal deployment does not require a default standing VPN, SSH, or RDP path. Remote support, when required, must be customer approved, time bound, least privilege, and logged. Audit records cover the deployment actions that matter operationally: telemetry uploads, model or configuration versions, control decisions, allowlisted BAS write attempts, write results, and remote support activity.

## 4. Deployment Modes

The deployment mode defines how much authority ClimaMind has at the site. The selected mode must match the approved boundary, operator readiness, BMS permissions, and evidence available from commissioning.

- Read only advisory mode: ClimaMind reads approved site data and may produce analysis, dashboards, and recommendations for facility staff or controls partners to review manually. ClimaMind does not write to the BMS in this mode.
- Supervised control: ClimaMind may write approved commands or setpoints through an agreed BMS path, subject to limits, fallback behavior, alarms, and manual override procedures.

## 5. Fallback, M&V, and Readiness

Fallback behavior is fixed before supervised control is enabled.

- Internet or cloud connectivity loss: local edge operation continues inside the approved site boundary. Cloud dashboards, remote review, model update delivery, or report upload may be delayed until connectivity returns.
- BMS communication loss: ClimaMind uses the approved local fallback for the affected equipment and stops issuing new supervised writes for that control path. The customer BMS remains in control.
- Stale, missing, inconsistent, or out of range telemetry: ClimaMind treats the affected control path as unavailable and uses no-write behavior for that path.
- BMS command rejection: ClimaMind records the rejected write and does not retry with a weaker guardrail or an unapproved point.
- Operator override: the operator action takes precedence. ClimaMind logs the override and does not fight the local BMS or operator state.
- Abnormal equipment mode: ClimaMind exits supervised write behavior for the affected equipment until the mode is reviewed.
- Safety, comfort, or equipment constraint trigger: ClimaMind stops issuing new writes for the affected control path and leaves customer BAS safety, interlock, lockout, and life safety logic authoritative.

M&V requirements should be agreed before acceptance. Not every project requires a third party M&V partner, but every contractual savings claim needs a defined evidence path.

### Savings evidence should define

- Measurement boundary.
- Baseline method.
- Required data sources.
- Adjustment method, if applicable.
- Reporting cadence.
- Evidence requirements.
- Review owner.

**Common readiness blockers:** insufficient trend history, unclear meter boundary, inaccessible BMS points, incomplete equipment mapping, unresolved network approvals, no approved write path for supervised control, missing fallback definition, no agreed M&V plan for contractual savings, or unclear operator escalation.

## Readiness and Acceptance Checklist

Use this checklist before active deployment or customer acceptance:

- Customer: business goals, acceptance criteria, deployment mode, and operating constraints are defined.
- Customer / SI: required BMS and meter data are available or exportable.
- ClimaMind / SI: measurement boundary, point mapping, and telemetry quality are reviewed.
- Customer IT/OT / ClimaMind: network, access, edge placement, and remote support expectations are reviewed.
- Customer / SI / ClimaMind: write limits, fallback behavior, and operator override are approved if supervised control is used.
- Customer / M&V Partner / ClimaMind: M&V method and evidence path are agreed where savings claims are part of acceptance.

### Acceptance criteria

A deployment is ready for acceptance when the approved deployment mode is operating within the agreed boundary, required telemetry and point mappings have been validated, operators understand review and override procedures, open issues and excluded periods are documented, and savings evidence follows the agreed M&V method where applicable.