

TECHNICAL DOCUMENT

Building the SYMPHONY SOLUTION

A comprehensive 18-Month HVAC Optimisation Programme

Symphony delivers a deeply technical, multi-stage transformation of existing HVAC infrastructure — integrating cloud analytics, IoT sensing, custom algorithms, and intelligent automation to achieve peak building performance, energy efficiency, and occupant well-being.

12

Work Stages

End-to-End Delivery

18

Months

Typical Project Duration

15,000+

BMS Data Points

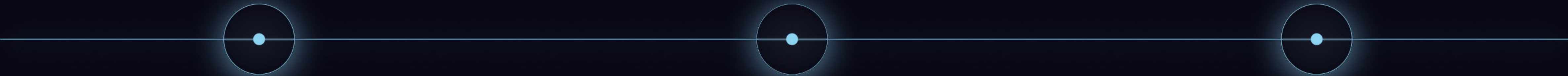
Integrated

TECHNICAL DOCUMENT

Project Timeline Overview

Three Distinct Phases of Delivery

The Symphony build programme is structured across three sequenced phases and a total of 12 work stages, each building on the last to deliver a fully automated, self-commissioning HVAC intelligence platform.



Phase 1 – Mechanics

Stages 1 - 7
First 4 months – concurrent engineering, programming, and site installation.

18

Months Total

Full project duration from physical works through to automated operation

Phase 2 – Fine Tuning

Stage 8
2 months of algorithm refinement and environmental signature capture.

12

Work Stages

Structured stages covering installation, algorithms, and commissioning

Phase 3 – Commissioning

Stages 9 - 12
12 months of seasonal commissioning and automated self commissioning.

15,000+

Data Points

Typical BMS data points mapped and integrated per project

PHASE 1

Mechanics

MONTHS 1-4 • STAGES 1-7

An extensive, concurrent programme of installation, cloud integration, engineering analysis, algorithm development and controlled deployment — delivered across site, engineering and programming teams.

PHASE 1 • STAGES 1-6

Project Timeline Overview

Infrastructure Installation & Integration

The foundation of every Symphony project. Symphony’s M&E sub-contractors install the hardware that enables full data visibility and intelligent control across the building’s HVAC infrastructure. Much of this work runs concurrently with engineering and programming teams.

- | | | | |
|---|--|---|---|
| 1 | Sub-Metering
Integration of available utility and HVAC metering into Symphony Cloud. Central plant sub-meters installed where missing. | 2 | Loytec (DELTA) automation server
Installed onsite and networked with the existing BMS to serve as the local intelligence hub. |
| 3 | BMS link & data mapping
Symphony works with the incumbent controls contractor to establish communication between the existing BMS and the Loytec device. Symphony then maps and processes the relevant BMS data points for visualisation within the Symphony Cloud platform. | 4 | Router & gateways
Secure SIM-based remote access installed where internet is unavailable. LoRaWAN gateways provide wireless communication to all installed devices. |
| 5 | Symphony WellTech IAQ sensors
Multi-sensor controllers with up to 10 sensor types, installed at strategic locations to maximise demand control, ventilation precision and space wellbeing. | 6 | IoT & WellTech data integration
Unify all data streams on one integrated platform: Symphony Cloud. |

Observation, Signature Mapping & Engineering Assessment

Stage 2 - Cloud Visualisation & Environmental Signature Mapping

Seeing the Building as a Living System

Symphony Cloud becomes the central user interface for data visualisation, interaction, and analytics. Symphony's analytics tools observe data streams and trends to devise a 'joined up interaction' of HVAC systems at component level.

- BMS, IoT, sub-metering, and IAQ data compiled and presented on a single platform.
- Building-specific patterns collated into a unique Environmental Signature.
- Observation period establishes baseline performance characteristics.

Stage 3 – Engineering Assessment & Solution Targeting

From Environmental Signature to Precision Control Architecture

The Environmental Signature sets the performance requirements for the building. A rigorous engineering exercise identifies the optimal plant operational combinations to fulfill each part of that signature.

- Assessment of suitability for the **2050 target efficiency grade** Symphony Cycle heat recycling process.
- A myriad of operational combinations are woven together to meet instantaneous load requirements.
- Cross-purpose behaviour between systems eliminated through careful coordination.

Design & Algorithm Development

Bespoke Intelligence for Every Building

With the Environmental Signature defined and engineering solutions targeted, Symphony moves into the design and automation phase translating engineered control sequences into intelligent, self adjusting algorithms.



Stage 4 — Plant Operational Match Design

Component 'micro symphony' plant operational control sequences are blended into one full 'symphony' that carefully aligns with the building's total Environmental Signature. Engineered control sequences are aligned precisely to the unique performance profile of the asset.



Stage 5 — Project-Specific Algorithm Development

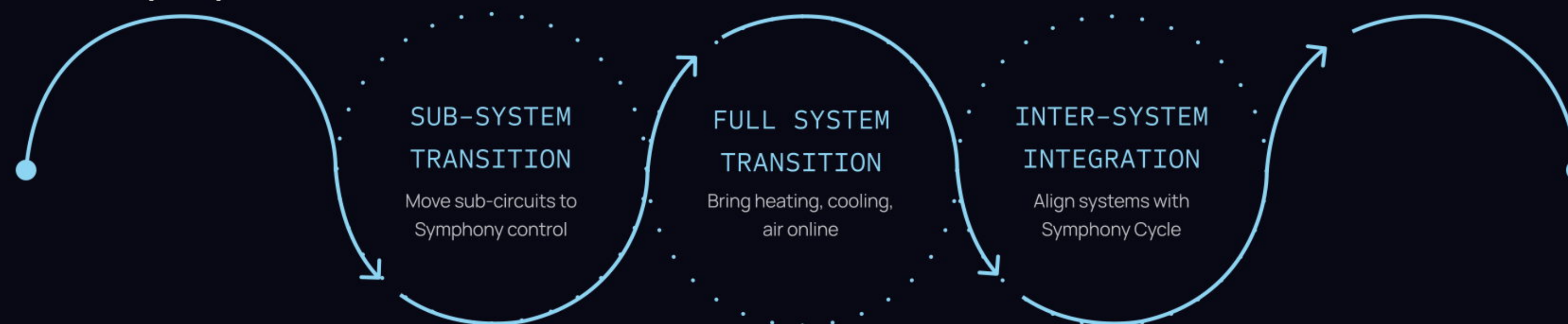
A closed loop control process the 'Automated Symphony' is applied so algorithms can automatically and seamlessly deploy each plant component individually and collectively. The result: comfortable, healthy spaces at minimal energy consumption, with plant operating in a less stressed, life extending manner.

Controlled Deployment & Initial Stabilisation

A Seamless Transition to High-Performance Operation

The transition from legacy control to Symphony's high-performance algorithms is carefully staged to ensure seamless operation throughout. Guard rails are progressively lowered as confidence in system behaviour grows.

Stage 6 — Controlled Deployment



Stage 6 progresses through three controlled levels beginning with sub circuits, expanding to full systems, and culminating in inter system integration where the patented Symphony Cycle process may be demonstrated.

Stage 7 — Initial Stabilisation

With continued stable operation, the 'guard rails' are gradually lowered so the high-performance characteristics of the algorithms take full effect. An intense period of observation and algorithm adjustment follows to dynamically align plant output with the building's Environmental Signature.

i Key Principle: The transition mechanism uses provisional 'stepped up' settings initially involving higher plant outputs than what will follow on full deployment - ensuring a seamless, risk-managed handover between old and new operating regimes

PHASE 2

Fine Tuning

MONTHS 5-6 • STAGE 8

With the system stabilised and running in high-performance mode, Symphony enters a focused refinement phase — capturing environmental signature nuances and perfecting algorithm behaviour for seamless ongoing performance

PHASE 2 • STAGE 8

Fine Tuning Algorithms

Capturing Every Nuance for Ongoing Smooth Performance

Following stabilisation, Symphony enters a dedicated fine-tuning period - typically two months - during which the algorithms are further refined to capture nuances of the building's behaviour that were not visible during the initial observation phase.

Post-Stabilisation Tuning

With algorithms operating in a stable mode, they are further tuned through ongoing observation. This phase captures the finer behavioural characteristics of the plant under real operating conditions

Environmental Signature Refinement

The fine-tuning period captures signature nuances not previously visible, manifesting as an additional tier of algorithm refinement. This does not require a meaningful rebuild of system logic - it leverages the algorithm's inbuilt flexibility for seamless redeployment

Seamless Redeployment

Refinements are deployed without disruption to building operations. The algorithm architecture is designed to absorb new behavioural data and adjust without requiring manual re-engineering of core logic

PHASE 3

Seasonal Commissioning & Intelligent Automation

MONTHS 7-18 • STAGES 9-12

The final and longest phase transforms Symphony from a high-performance system into a self-commissioning, self-alerting intelligence platform — continuously adapting, predicting, and collaborating with FM teams to maintain peak building performance year-round.

Seasonal Commissioning & Auto Self Commissioning

A System That Learns, Adapts and Commissions Itself

Stage 9 – 12 Months of Seasonal Commissioning

A lighter form of fine-tuning applied across a full year, with intensity increasing during periods of pronounced seasonal change. Seasonal nuances are observed and captured in the algorithms until the Environmental Signature is complete.

- Seasonal adjustments observed and embedded into algorithm logic
- Environmental Signature completed and validated across all conditions
- System transitions to automated self-commissioning mode

Stage 10 – Auto Self-Commissioning

Built into the algorithms from the outset, auto self commissioning activates once healthy plant operating ranges have been observed over a sufficient period – typically during the seasonal adjustment phase

- Algorithms auto-adjust plant settings to correct for normal equipment performance drift
- Less acceptable behaviour elevated to predictable alerts when key thresholds are crossed
- System becomes self-sustaining with minimal human intervention

Ongoing Plant Observations, Alerts & FM Collaboration

Predictive Alerting & Forensic-Level Plant Visibility

The final stages of the Symphony programme establish a long-term partnership between the platform and the Facilities Management team - turning data into actionable intelligence and legacy maintenance issues into resolved problems.

Stage 11 - Automated Alarms & Predictive Alerts

Plant alarms are presented on Symphony Cloud for easy access - no need to physically visit the BMS. Additional algorithms identify inconsistencies in plant response, generating automated alerts for immediate failures or predictive alerts triggered by performance creep before deterioration manifests as a building issue

Stage 12 - FM Collaboration & Maintenance Assistance

Symphony's forensic-level HVAC observation brings legacy maintenance issues into view - historically the root causes of comfort or unresolved energy problems. The FM team can troubleshoot plant items cost efficiently, with access to Symphony Cloud to view HVAC plant, track energy and IAQ, and run analytics. API arrangements can connect features to maintenance workflow platforms

Symphony Cloud - The FM Platform

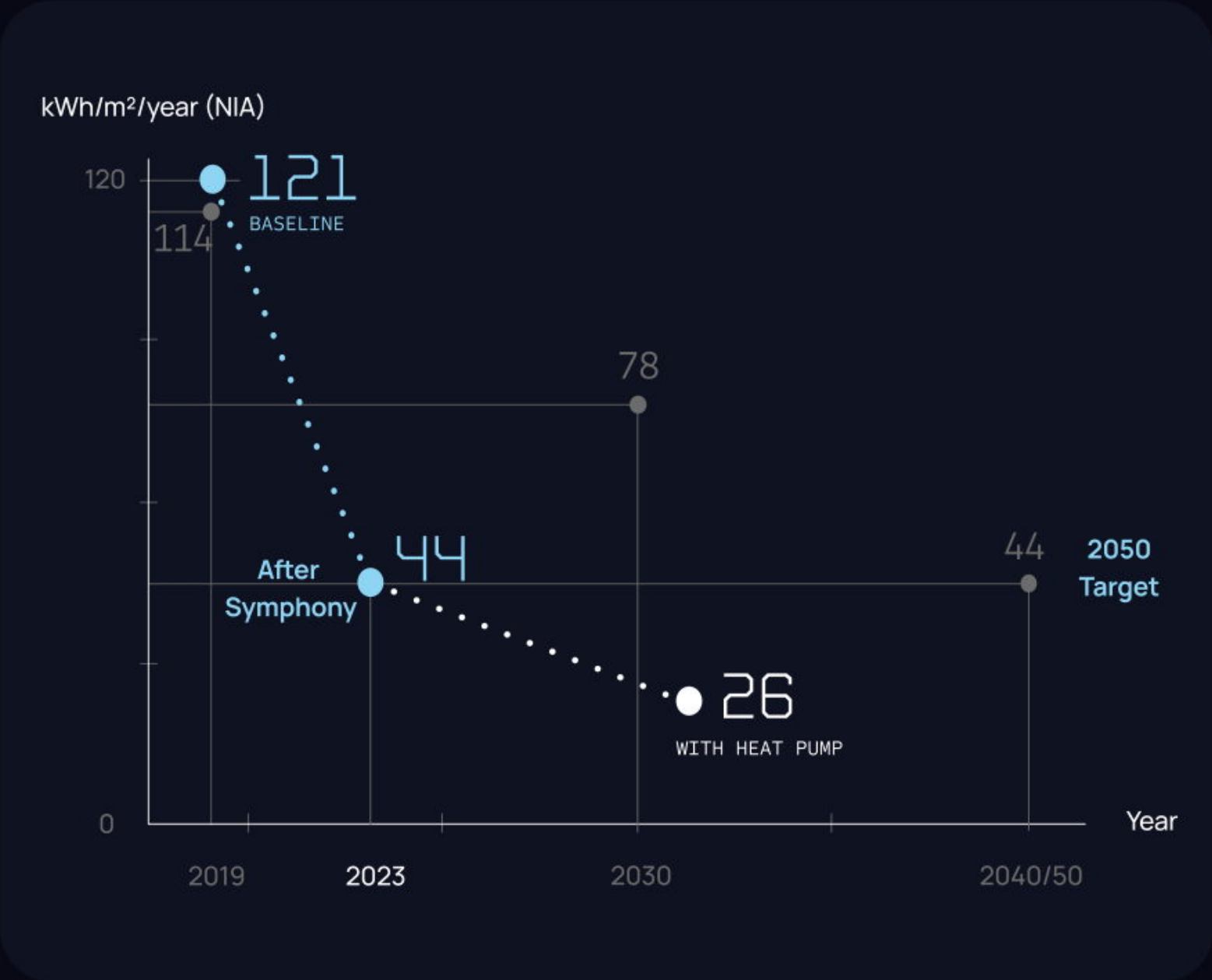
The FM team gains a powerful platform to be more proficient in maintenance activities: interact with HVAC plant, track energy consumption and IAQ performance, receive automated alerts on their phones, run data analytics, and troubleshoot systems in an unprecedented manner

SYMPHONY RESULTS

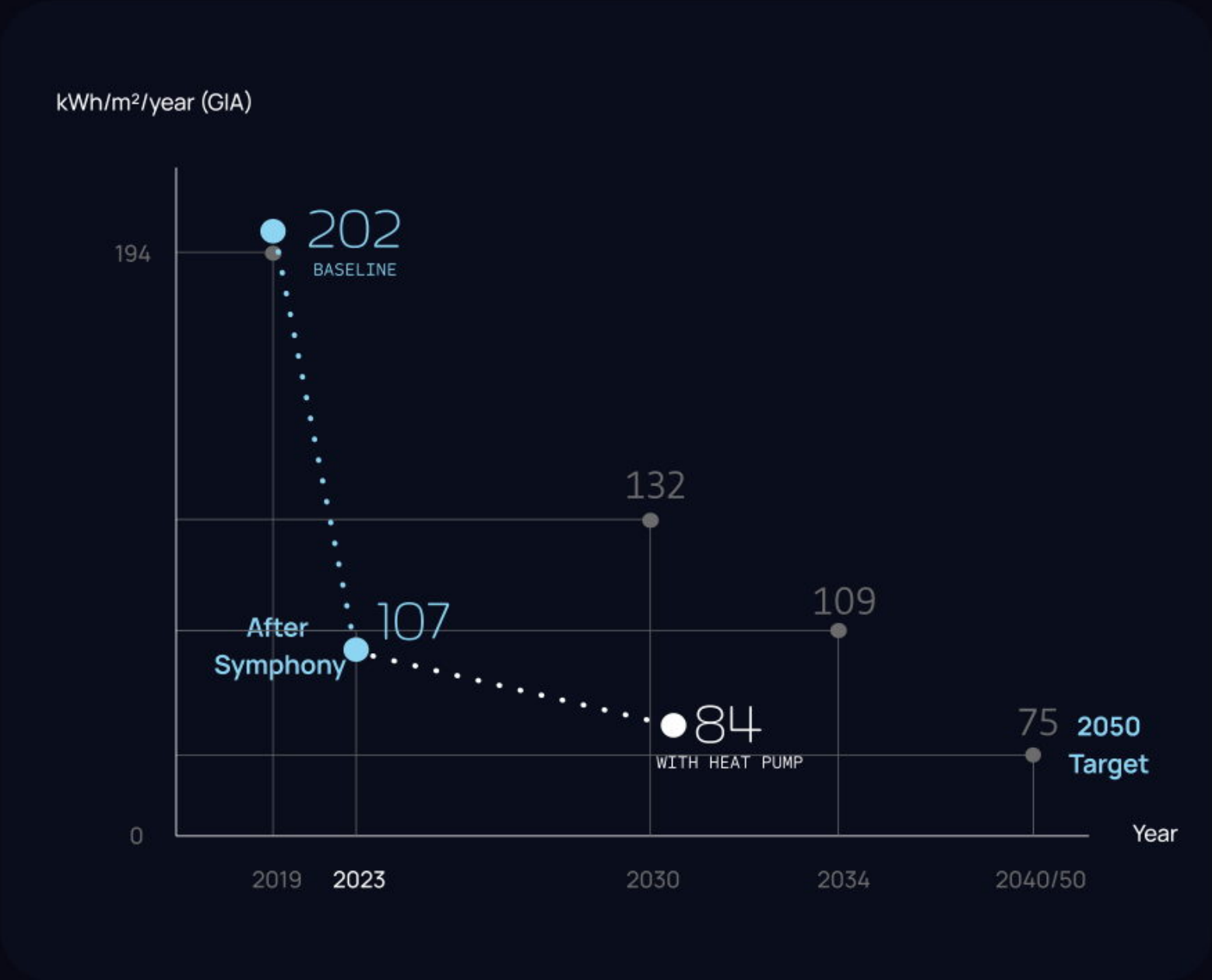
Impact of Symphony HVAC Optimisation

60%-80% reduction in HVAC energy consumption

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The Symphony Difference

Depth, Precision and Permanence

Symphony is more than an installation — it is a technical programme of engineering, data science and intelligent automation. Each stage builds on the last to create a building that performs at its best: efficient, occupant focused and self sustaining.

12 stages

End-to-End delivery

18 Months

Programme duration

15,000+

BMS data points

Self Commissioning

Continuous optimisation

Symphony turns buildings into intelligent, responsive environments — delivering enduring performance, wellbeing and efficiency through a comprehensive HVAC optimisation programme.

The greenest energy is
the energy we don't use.