What if your building could sense its environment?

And respond not just to commands, but to the needs of its occupants in real-time?

Kūkisense

Imagine a space that actively enhances well-being and optimises performance.

What if you could...

boost cognitive function and productivity by managing CO_2 levels automatically?
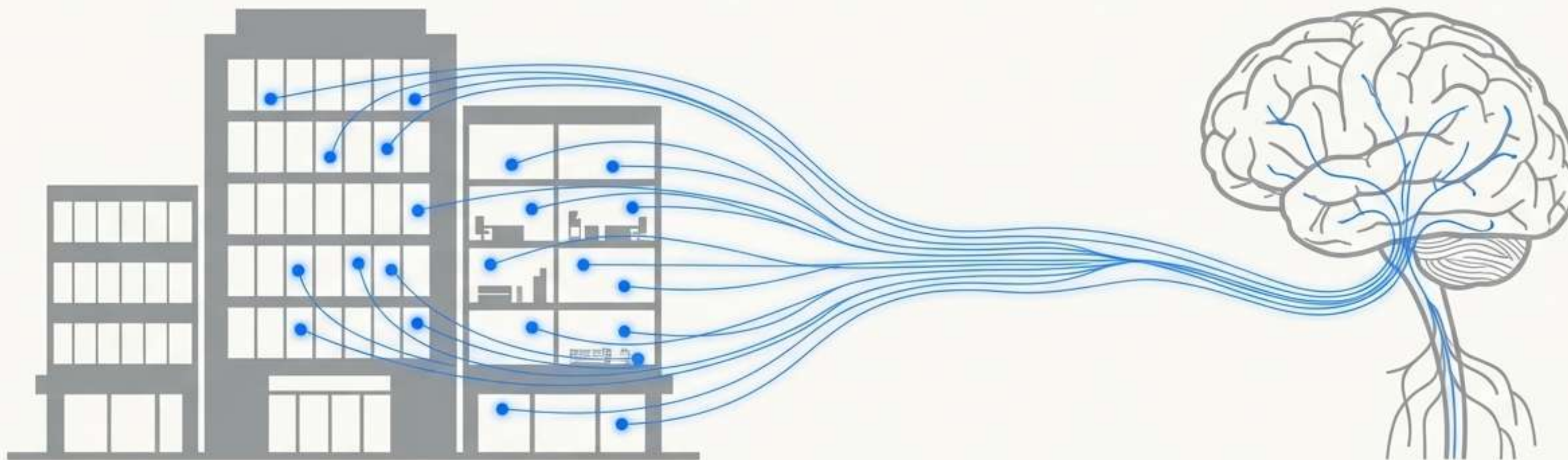

What if you could...

achieve sustainability goals by moving from scheduled ventilation to data-driven, on-demand air circulation?

What if you could...

create an environment so healthy it measurably improves occupant satisfaction and reduces absenteeism?

Kūkisense

# This requires a sensory nervous system for your building.

A building that can sense, understand, and act needs three things:

1. **Distributed Nerve Endings**: High-fidelity sensors to detect nuanced changes in the environment.
2. **Instantaneous Neural Pathways**: A reliable, resilient network to transmit information.
3. **An Intelligent Brain**: A central platform to interpret data and trigger automated responses.

Kūkisense

Introducing KūkiSense.


The Sensor: High-Fidelity Awareness.
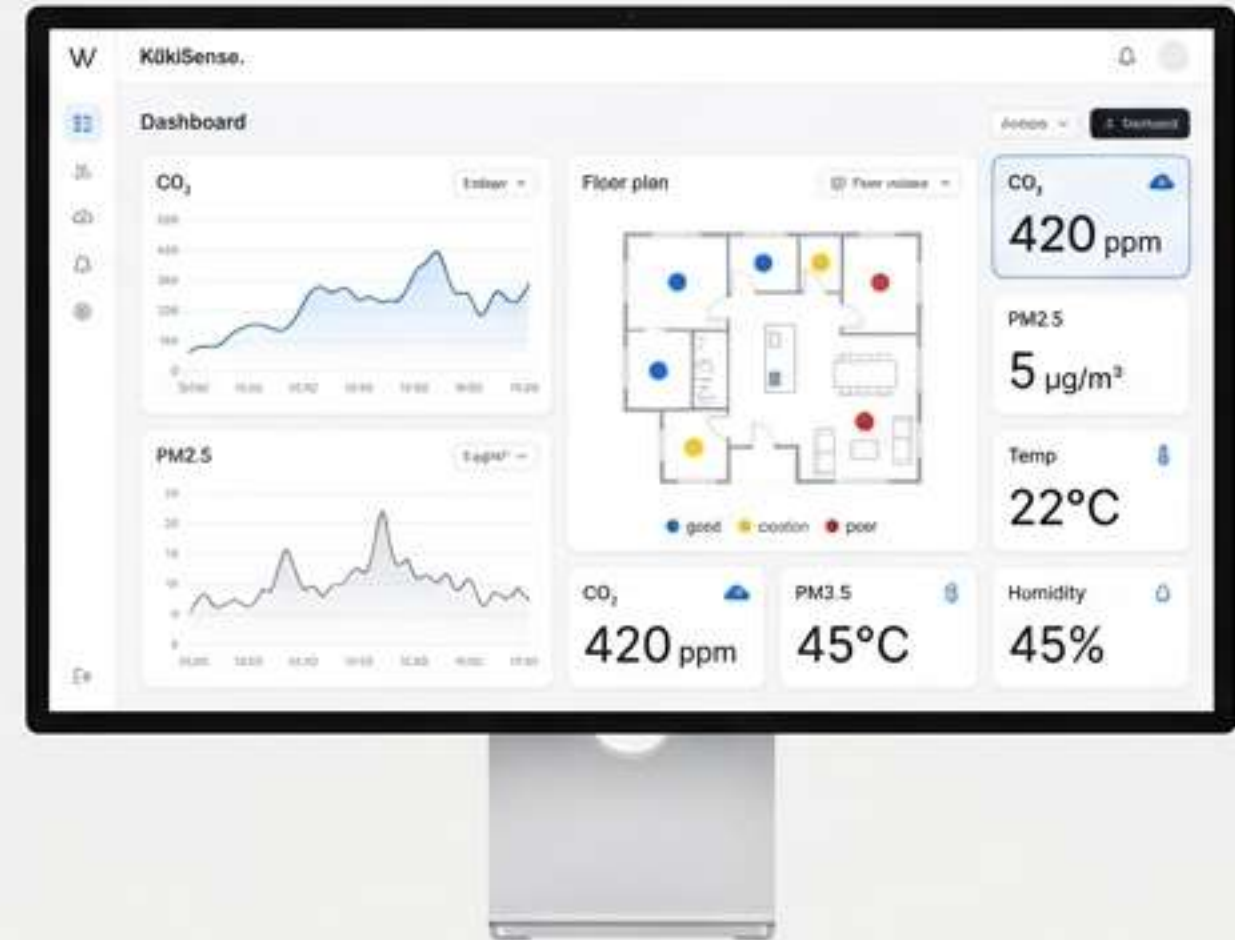
The Platform: Intelligence and Automation.

A comprehensive solution designed to give your spaces the ability to sense, understand, and automate. We provide the hardware and the intelligence to transform your building from a static structure into a responsive environment.

The Sensor: Comprehensive Environmental Awareness.

Precision-engineered hardware built for the demands of professional environments.

PM Sensor Array

TVOC & NOx

Formaldehyde (CH$_2$O)

PM Sensor

CO$_2$ Sensor
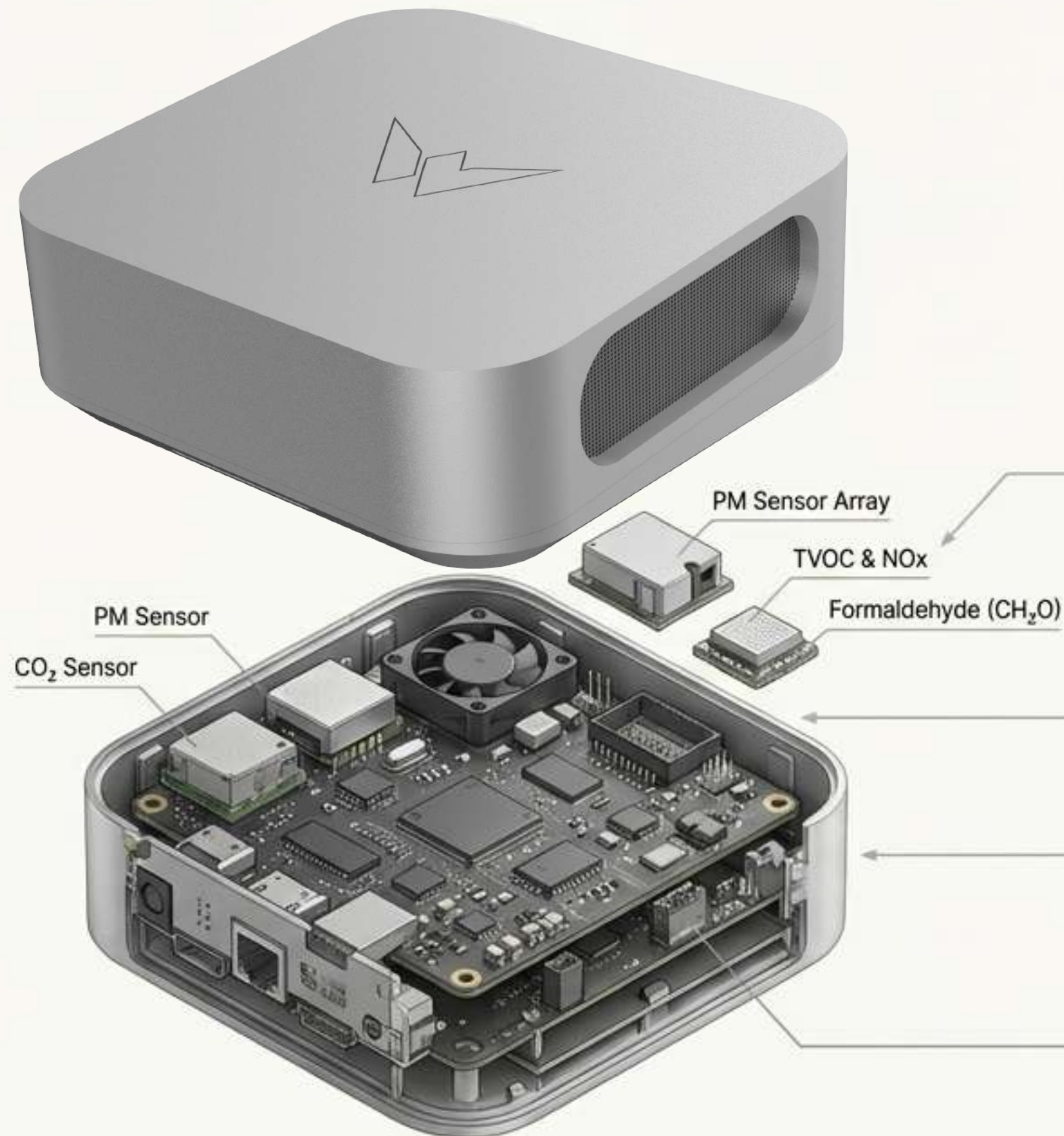
- **Comprehensive Monitoring:** Continuously tracks a full suite of IAQ parameters: Temperature, Humidity, CO$_2$, PM1, PM2.5, PM4, PM10, TVOC, NOx, and optional Formaldehyde (CH2O).

- **Premium Build:** Housed in a durable, sleek aluminium body (110x110x35mm).

- **Future-Proof Design:** Features an expansion slot for additional sensors and peripherals, ensuring the system evolves with emerging technologies and needs.

- **Quality Assured:** All sensors are compliant with global IAQ standards.

*Images shown are for illustration purposes only

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What if your building could heal itself? From Passive Monitoring to Active Automation.

KūkiSense uses Zigbee mesh connectivity to create a responsive ecosystem of smart devices, acting as a network coordinator for immediate, localized control—even without HVAC integration.

High TVOC Detected (>1000 ppb)
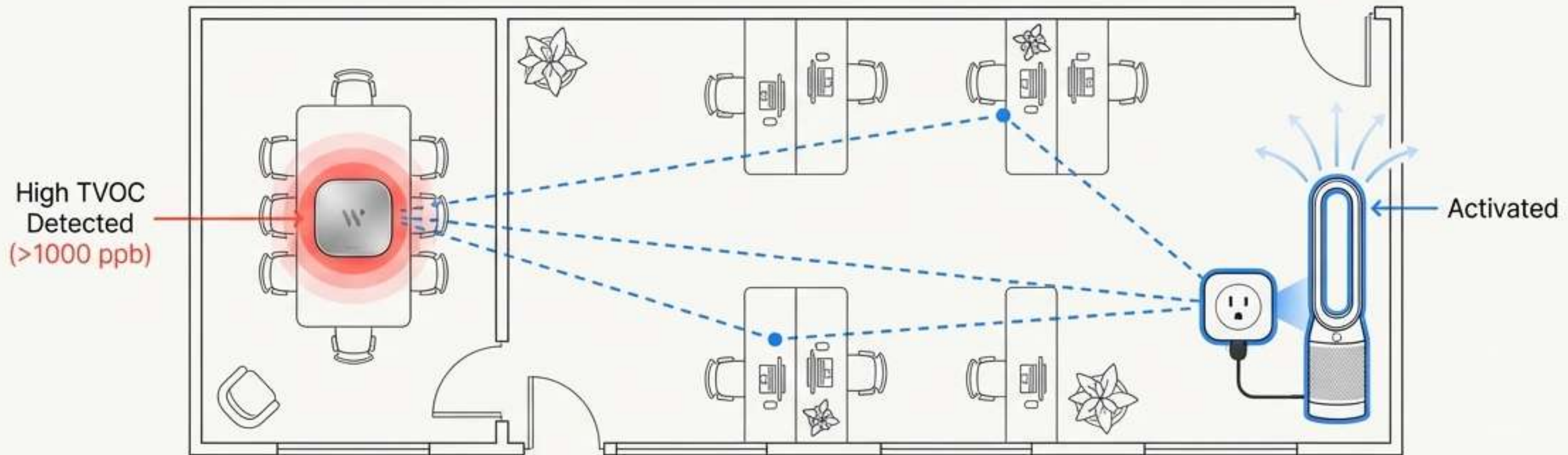
Activated

SENSE
KūkiSense detects elevated TVOCs from new furnishings.

→

COMMUNICATE
A signal is sent instantly over the resilient Zigbee mesh network.

→

ACT
The air purifier is automatically activated to mitigate pollutants.

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The Platform: Turning Raw Data into Actionable Intelligence.

Real-time Visibility

A clean, easy-to-read dashboard provides a live overview of your entire facility's air quality. Access it on any connected display, from a smart TV to your mobile phone.

## Historical Analysis & Export

Analyze historical data with graphical charts to identify trends and predict issues. Export raw data in CSV format for compliance reporting and in-depth analysis.

Configurable Automation & Alerts

Use an intuitive 'if trigger, then control' logic to create custom automation rules. Receive immediate pop-up notifications on your mobile device when critical thresholds are breached.

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Built for Integration, Not Isolation.

KūkiSense is designed to seamlessly connect with your existing infrastructure.
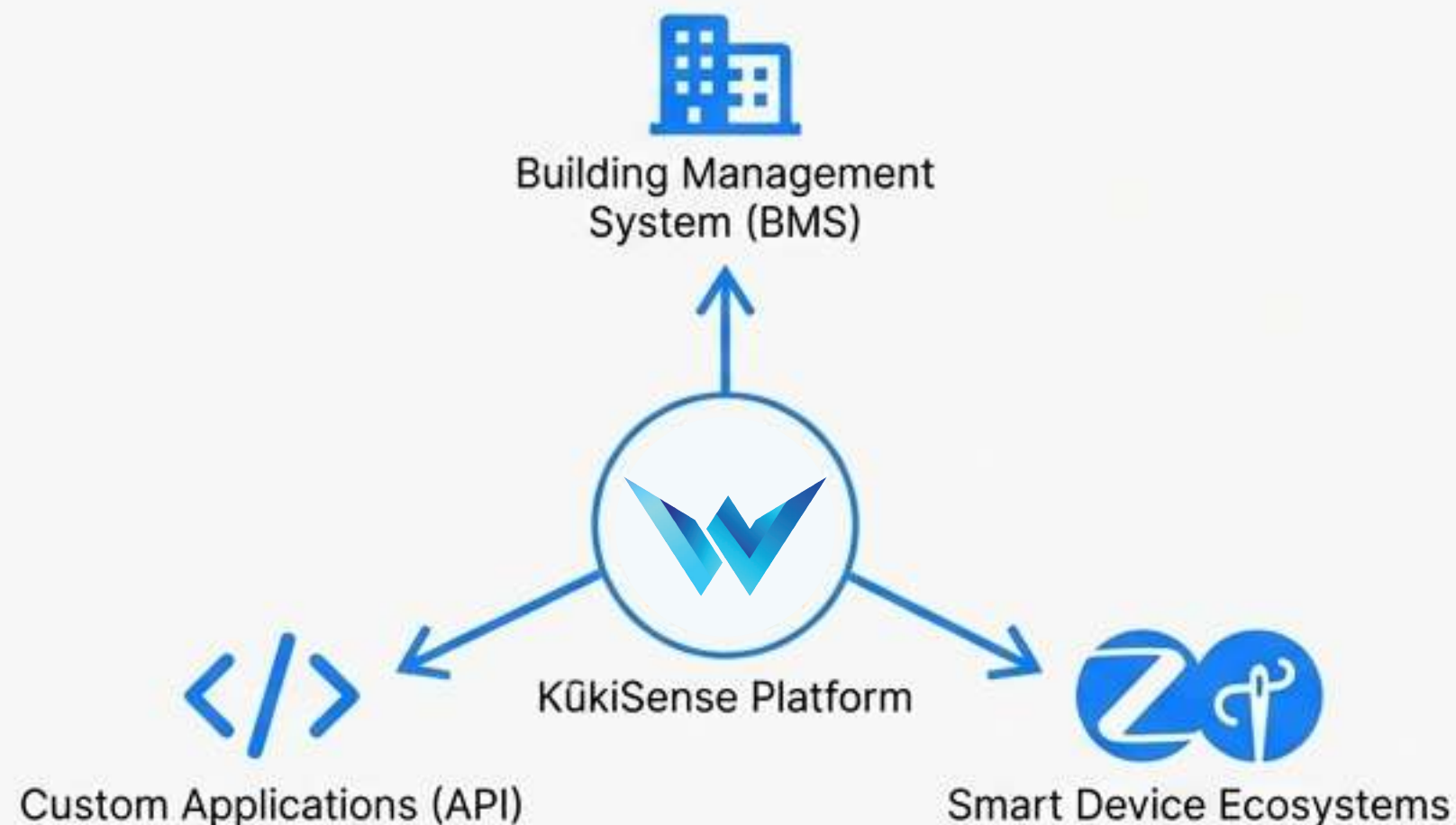
- **Building Management Systems (BMS)**: Flexible integration options using MQTT for local/cloud data access (ideal for sensitive locations with restricted internet) or via a standard Cloud API.
- **Custom Applications**: Leverage KūkiSense+ APIs to stream real-time IAQ data directly into your own software, dashboards, or mobile apps.
- **Smart Device Ecosystems**: Onboard Zigbee and Thread readiness allows direct control and integration with a wide range of compatible smart devices.

Enterprise-Grade Resilience and Security.

Continuous Monitoring, Uninterrupted Data

During network outages, KūkiSense stores up to 5 days of one-minute sensor data averages in its internal memory. Once reconnected, it automatically backfills the data to the cloud, ensuring no gaps in your trend lines.

Secure by Design

Your data is protected with end-to-end security, including HTTPS (TLS v1.2) protocol, XTS-AES encryption for data at rest, and SHA-256 checksums for data integrity.

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Proof in Action: Transforming a Learning Environment.

Client: Educational Institution, Singapore

Challenge: Post-renovation, high levels of CO_2 and Formaldehyde were impacting student concentration and health.

KūkiSense Action: Deployed KūkiSense sensors to provide real-time monitoring and integrated with the ventilation system via Wi-Fi and Zigbee.

The Quantified Result:
- **48% Reduction in Peak CO_2:** Levels dropped from 2100ppm to a healthier 1100ppm within 15 minutes during peak occupancy.
- **Formaldehyde Eliminated:** Levels brought below the safe limit of 0.1ppm within two weeks through automated ventilation.
- **Outcome:** Improved student concentration, positive feedback from staff, and a reduction in reported absenteeism.

Kūkisense

# What if you could diagnose invisible threats across your portfolio?

KūkiSense provides the high-fidelity data needed to identify and address unique environmental challenges.

- **In Corporate Offices**: Provided actionable data to achieve targeted thermal comfort goals, boosting employee satisfaction.

- **In Public Green Spaces**: Identified and tracked high pollen events impacting staff in adjacent administrative buildings.

- **In Educational Facilities**: Uncovered hidden mold issues by correlating humidity data with occupant feedback, preventing a larger problem.

- **In R&D Environments**: Paired with robotics, KūkiSense provides detailed, location-based IAQ mapping for sensitive and large-scale facilities.

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The Strategic Value of Superior Air Quality.

IAQ Investment

→ Productivity

→ ROI

→ Sustainability
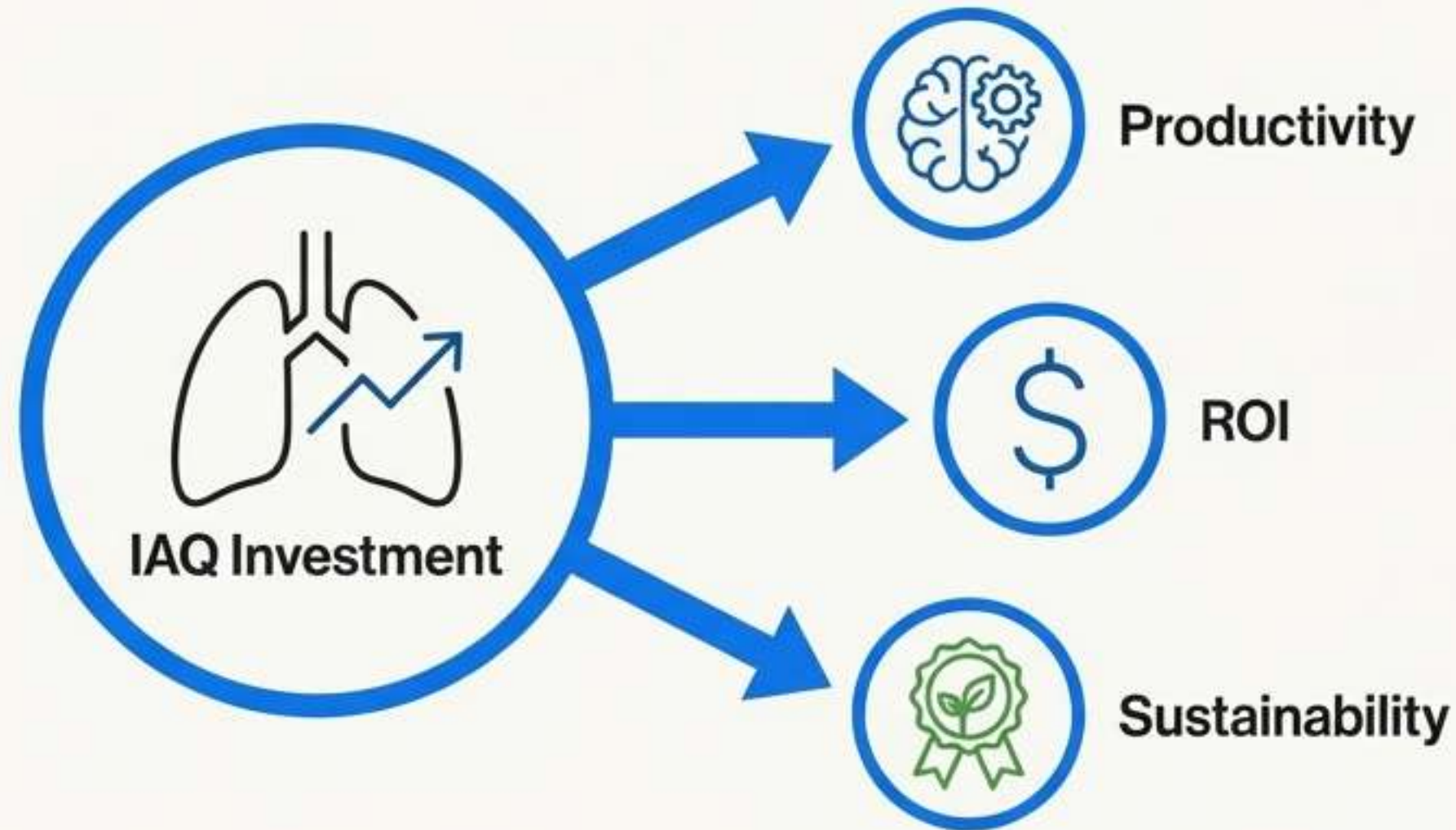
Enhance Human Performance

Studies show that elevated CO_2 levels (>1000 ppm) directly impair cognitive function and decision-making. Better air leads to better work.

Deliver Significant ROI

Research indicates that the benefits of IAQ improvements can far outweigh the costs, with returns estimated at up to 60 times when all benefits are combined.

Achieve Sustainability Goals

KūkiSense provides the continuous monitoring data required for leading green building certifications, helping projects meet preconditions and achieve up to 13 points for WELL and 10 points for LEED.

Kūkisense

Developed in Singapore

Developed in Singapore.

KūkiSense is a testament to Singaporean innovation and engineering excellence. Proudly developed from the ground up, it benefits from our nation's strong focus on technology, quality assurance, and our vision to build a truly Smart Nation.

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KūkiSense Technical Specifications

Sensor Performance

Parameter	Sensor Type	Range	Accuracy
Particulate Matter (PM2.5)	Laser Particle Sensor	0 to 1,000 µg/m³	±5µg/m³ & 5% m.v. (0-100µg/m³); ±10% m.v. (100-1000µg/m³)
Particulate Matter (PM10)	Laser Particle Sensor	0 to 1,000 µg/m³	±25µg/m³ (0-100µg/m³); ±25% m.v. (100-1000µg/m³)
Carbon Dioxide (CO_2)	Photoacoustic (PAS)	400 to 5,000 ppm	±(50 ppm + 3% m.v.) at 1001-2000ppm; ±(40 ppm + 5% m.v.) at 2001-5000ppm
Total Volatile Organic Compounds (TVOC)	Metal-Oxide (MOx)	1 to 500 (Index)	±15 or ±15% (whichever is larger)
Nitrogen Oxides (NOx)	Metal-Oxide (MOx)	1 to 500 (Index)	±50 or ±50% (whichever is larger)
Formaldehyde (CH_2O) (Optional)	Electrochemical	0 to 2,000 ppb	±20 ppb or ±20% (whichever is larger)
Temperature	Digital CMOS Sensor	-10 to 50 °C	±1 °C
Relative Humidity	Digital CMOS Sensor	0 to 90%	±5%

Hardware & Connectivity

Dimensions: 110 x 110 x 35 mm
Body Material: Aluminium
Power Supply: 5V/2A USB adapter and cable
Connectivity: 802.11 b/g/n @ 2.4GHz Wi-Fi, Zigbee

Processor: Dual-core 32-bit microprocessor
Security: HTTPS (TLS v1.2), XTS-AES encryption, SHA-256 checksum
Onboard Storage: Up to 5 days of data storage during network outages

Kūkisense

The Intelligent Choice for Indoor Air Quality Management

Website: https://kuki.what-if.sg
Email: kuki@what-if.sg

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Don't just manage your building
Give it a voice

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