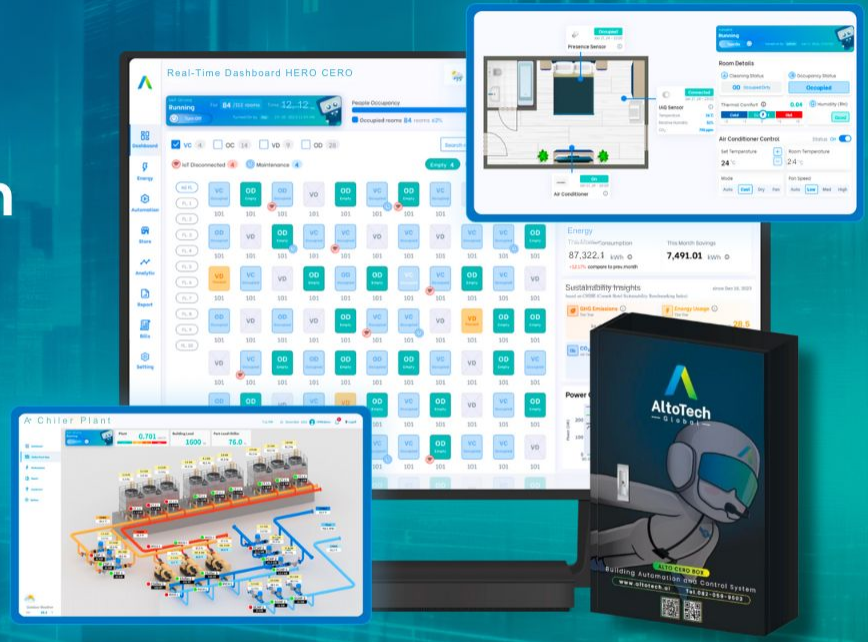
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ESG driven solutions

Alto CERO:
AI-Driven Building Automation & Control System

Revolutionizing property management with intelligent automation



Up to **40%**	Up to **300%**	Less than **3**
On Energy Savings	Increased Operational Efficiency	Years of Payback Period

Hotel | Building | Factory | Hospital | Retail | Smart City

Roadmap to Super Low Energy Buildings & Net Zero Buildings



Green building consultancy	High efficiency chiller plant	Chiller plant optimization (AI/ML)	Onsite renewable energy (solar)	Predictive maintenance (ePSA)
Solar shading	Advanced magnetic bearing chiller	Connected chillers	Fuel cells / battery storage	Scheduled maintenance
Natural ventilation	Low GWP refrigerants	Fault detection & diagnostics	Purchase of RECs	Corrective maintenance
Building orientation (sun-path)	Mechanical ventilation – DC Motors	Building management system		Maintenance process
Dynamic façade, Insulation & glazing (ETTV)	Airside solutions	Airside optimization		Skilled personnel
Daylighting / harvesting	Lighting management	O&M services (e.g. HVAC, controls)		Parts availability
Rainwater harvesting & recycling	Lift & escalator solutions	Plug load management		Continuous commissioning
	Water management solutions	IT load management		End of life cycle refresh
		Lighting optimization		

Net Zero Carbon - A highly energy-efficient building with all remaining operational energy use from renewable energy, preferably on-site but also off-site production, offset as a last resort to achieve net zero carbon emissions annually in operation

BCA WORLD GREEN BUILDING COUNCIL ADVANCING NET ZERO

AI-Driven Building Automation & Control System

Alto Applications

- Autopilot VRV
- Automated Report
- Analytic Dashboard
- Fault Detection & Diagnosis
- Chiller Energy Optimization
- Demand Ventilation Control



Alto Multi-property

Centralized platform for data-driven property management. Real-time monitoring, benchmarking, and analytics streamline operations with KPI tracking and automated reporting, enabling value-added activities.



Alto Vision

Smart security and building management system. Integrates with existing CCTV and BAS to provide real-time insights. Enhances property protection with intelligent monitoring, while providing data-driven insights to streamline building operations.



Alto CERO for Hotel

AI-driven hospitality management. Optimizes energy use in HVAC system, streamlines housekeeping operations, and enhances guest experiences through smart room controls. Supports sustainability certifications.



Alto CERO for Building

Intelligent building management solution. AI-driven automation optimizes HVAC, cutting energy use by up to 30% while enhancing comfort. Real-time monitoring boosts efficiency, supporting SmartScore and WiredScore certifications.



Alto CERO for Chiller Plant

AI enhanced by expert knowledge predicts building load and optimizes energy use. Utilizing advanced forecasting and adaptive control reduces costs while ensuring occupant comfort and extending equipment lifespan.



Hotel



Building



Factory



Hospital



Retail



Educational





The St. Regis Bangkok

St. Regis Hotel achieved 9% energy savings and reduced reporting time by automating chiller plant operations.



Thai first Net-Zero building

By integrating Alto CERO, DEDE's Net-Zero Building achieved 20% energy savings.



Bangkok's famous shopping mall

AI-driven chiller plant optimization achieved 15% energy savings, streamlined reporting, enhanced tenant satisfaction in mixed-use facility.



Smart Campus for leading University in Thailand

AI-powered Alto Vision enhances security at Chulalongkorn University with people counting, license plate recognition, and facial recognition.

Decarbonization Journey for Green & Sustainable Buildings

1. **Assess Carbon Footprint**

We assess your building's carbon footprint to establish a baseline for reduction. Our trusted partners ensure this step is carried out with expert precision.

2. **Develop Action Plan**

Using the carbon footprint data, we help you create a customized action plan for energy efficiency and carbon reduction, tailored to your building's needs.

3. **Improve for Carbon Reduction**

Our AIoT systems monitor and optimize energy use in real-time, providing insights to improve efficiency and reduce your carbon emissions.

4. **Compensate Emissions**

We connect you with trusted partners to purchase verified carbon credits, offsetting any remaining emissions and achieving full carbon neutrality.

5. **Disclose and Communicate**

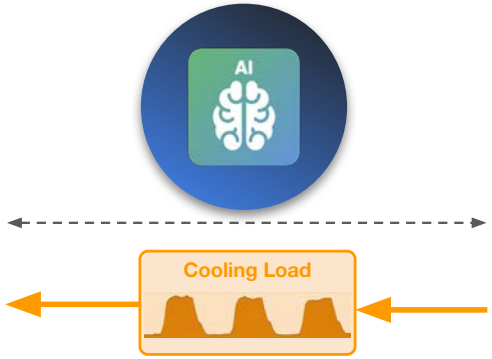
We offer digital tools to report and share your decarbonization progress, helping meet sustainability targets and comply with regulations.

Air-side Water-side Integration Building AI Optimization

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Water Side (Chiller Plant)





Air Side (AHU/Indoor)

Real-Time Efficiency Optimization
Real-time kW/RT optimization across all chillers, pumps, and coolant towers

Dynamic Setpoint Optimization
Continuously adjusts chilled & condenser water temperature based on load and weather

Intelligent Sequencing & Staging
Automated chiller staging with optimal combination selection for current demand

Unified Air–Water Integration

AI-powered cooling load prediction bridges air-side demand signals with water-side supply optimization — enabling real-time coordination across the entire HVAC system for maximum efficiency and comfort.

Zone-Level Comfort Control
Per-room temperature & humidity management wit guest comfort priority

Dynamic Supply Air Reset
Adaptive supply air temperature & pressure setpoints based on real-time zone demand

Demand-Driven Scheduling
Occupancy-based ventilation & HVAC scheduling to minimize energy waste during off-hours

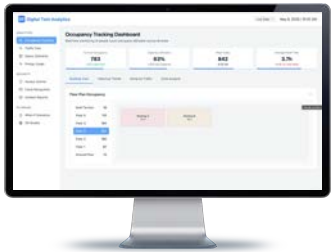
Layers of Alto Digital Twin Solution

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Digital Twin



3D User Interface & Simulation Input



Operational Dashboards & Analytics



What-if scenario planning

Apps

Use Cases for Digital Twin

HVAC Control & Optimization
HVAC System Monitoring & Control
Energy Savings Simulation

30%

IAQ Monitoring
Indoor Air-Quality Monitoring
Compliance thresholds verification
Indoor Air-Quality optimization simulation

50% faster response to tenant comfort complaints

Occupancy Tracking
Indoor Air-Quality Monitoring
Compliance thresholds verification
Indoor Air-Quality optimization simulation

20% space cost reduction

CMMS
Asset management system for minimized system downtime

10-50% reduced maintenance costs

Simulation & "What-if" Scenario Planning

BAS

Alto Operating System (Alto OS) | **Ontology** | **Continuous OTA update**

IoT & AI Gateway

Source of operational data

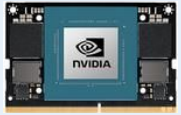


Alto CERO Box

AI Gateway
Selected based on requirements



NVIDIA® Jetson AGX Orin™ 64GB Developer Kit



NVIDIA® Jetson Orin™ NX 16GB



NVIDIA® Jetson Orin™ Nano 4GB

Other IoT
Identified based on required functionalities (add-on apps) for Digital Twin

AIM

Asset Information Model

BIM
BIM creation approach selected based on building condition & documentation maturity



Revit BIM model



Point Cloud Capture



360-degree camera capture

Operational Documentation
Including, but not limited to:
- Device Specifications
- Structural details
- Maintenance reports and etc.



Alto Digital Twin for Predictive 3D Simulation and Building-Aware Spatial Context

Advancing CPMS with Digital Twin Technology:
Engineering x PropTech = Smart Facility Management

HISTORY & LOGS

View asset history, logs, and operational context

UNIFIED PLATFORM

Create a single source of truth for building operations



Live 3D plant view, asset context, and AI-guided actions in one workspace

AI ENGINE

Extend AltoACE with building-aware context and guidance

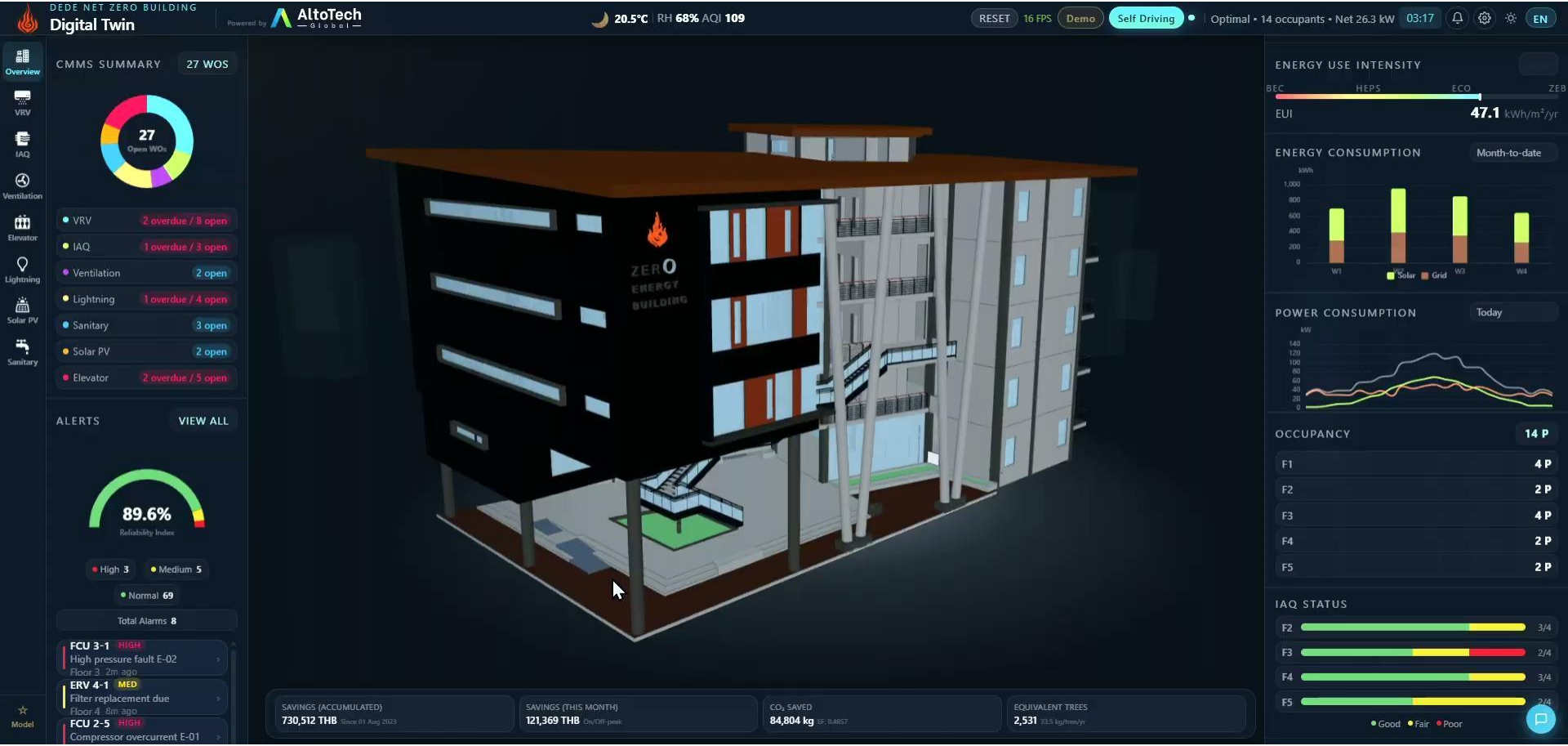
DOCUMENTS

Upload and access manuals, drawings, and related documents

NAVIGATION

Navigate directly to equipment, systems, and active issues

Alto Digital Twin for Predictive 3D Simulation and Building-Aware Spatial Context




AltoTech Global
Agentic AI for Building
App Solutions
Alto Multi-Property
Portfolio & Operations
AltoACE
AI Chief Engineer
Alto Digital Twin
Spatial Building Intelligence
Sustainability
Visitor Dashboard
Alto CERO
Net Zero Buildings
Nova
AI Building Assistant
Ask Nova about your building
Operations
Comfort
Sustainability
Maintenance
AltoACE
AI Chief Engineer
AltoACE orchestrates data, data, models, and workflows to deliver outcomes.
Diagnose
Optimize
Predict
Automate
Ontology / Building Knowledge Layer
Unifying data, systems, and semantics across the built environment.
Customer Stories
Chulalongkorn University
Bangkok, Thailand
VENCO Facility Management
Thailand
BHIRAJ Tower at EmQuartier
Bangkok, Thailand
HITACHI
Alto CERO Box
Net Zero Buildings
DGX AI Compute
IoT Sensors & Devices
Measurable Impact. Real Results.
7.33M
kgCO2 eq
Total CO2 Reduction
293K
Equivalent Trees Planted
6.12M m²
Total Area Managed
108
Properties Commissioned
14.67 GWh
Consumption Reduction

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"JOIN US IN PIONEERING THE FUTURE OF ENERGY WITH AI. TOGETHER, WE CAN ACHIEVE SUSTAINABILITY AND EXCEED NET-ZERO TARGETS"



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Thai ESCO Association สมาคมบริษัทจัดการพลังงานไทย