
TRIDIUM
NS2024
POWER OF PARTNERSHIP

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Exploring AI Use Cases in Building Automation & Facility Management - Part 2

Tech Track Session 2b

Michael Stabile, Tridium

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Today's Presenters

Haran Shivanan
Chief Executive Officer
Iviva

Brad Rittler
VP, Business Development
Encycle

Chad Langston
Portfolio Manager
ABB

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NIAGARA, AI, AND THE LOW CARBON ECONOMY

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Haran Shivanan
CEO

TRIDIUM

OUR MISSION

Accelerating the global transition to a
Low Carbon Economy through simplified and
more accessible Smart Workplace Technology

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iviva for System Integrators and Creators

Maximize the value of existing data

- Reduced implementation time - **10x faster, 5x lower cost**
- Up to **30-40% REDUCTION** in operations and maintenance costs
- Better use of manpower through **AI and ML**
- **Increase** asset value through enhanced user experience
- Achieve your corporate **ESG and Net Zero** targets
- Up to **15-20%** in energy savings

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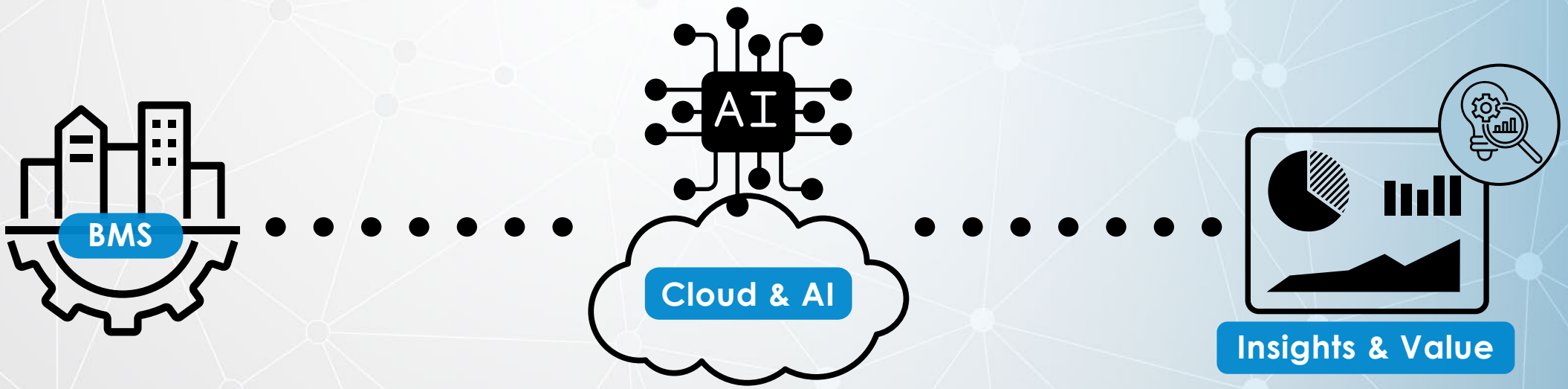
The Opportunity

Unlock greater value for your customers and maximize the returns on your existing efforts.



By making BMS data available on the cloud and leveraging AI, we unlock valuable insights from untapped data.

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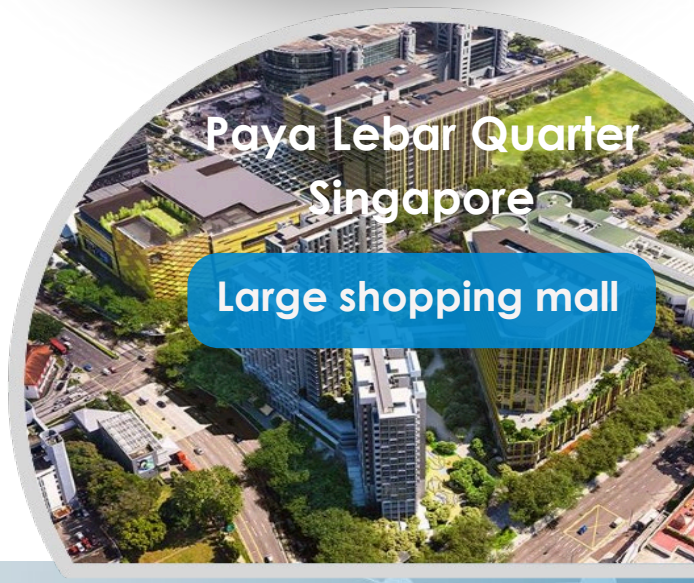
20+ years of Traction

Design | Implement | Operate
Commercial Buildings & Portfolios
Owners | Operators | Occupants
Airports | Hospitals | Universities
Precincts | Cities



OFFICES | RETAIL | MIXED USE | AIRPORTS

Public Investment Fund
Saudi Arabia

World's largest sovereign wealth funds

Cairo Festival City

Large-scale real estate development

EPF - Malaysia

Federal statutory body under Ministry of Finance

Colliers INTERNATIONAL

Colliers

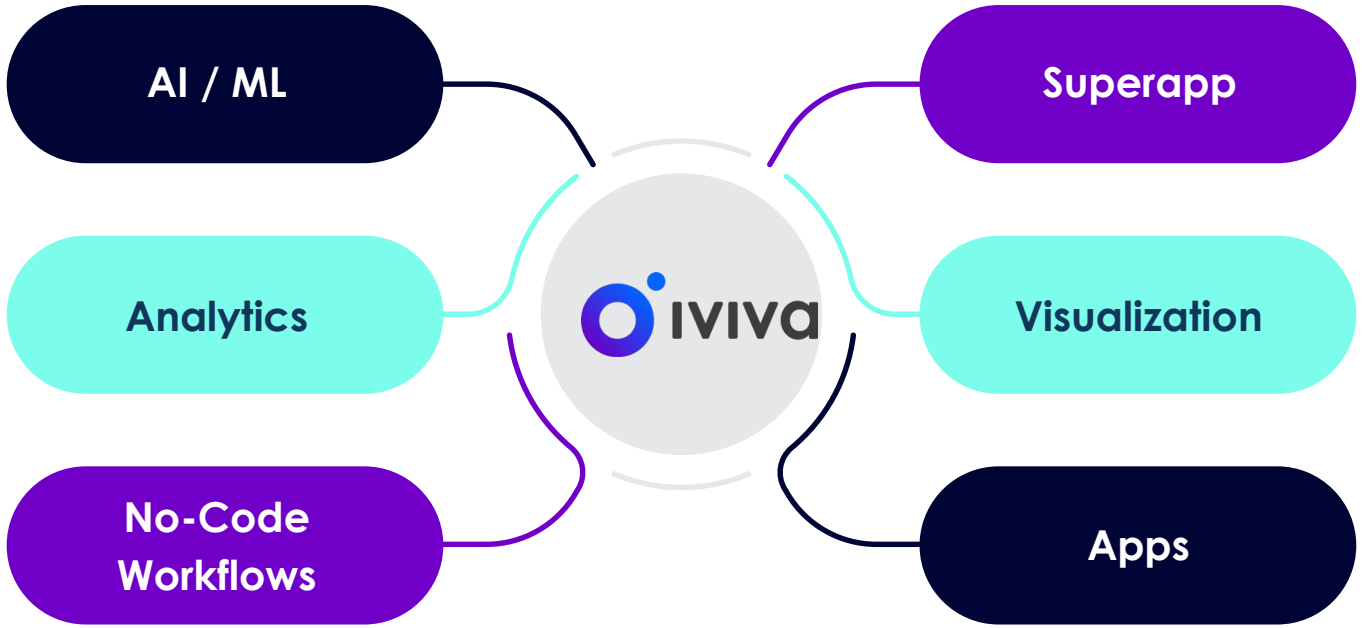
Leading commercial and residential real estate company

Malta Airport

Integrated city

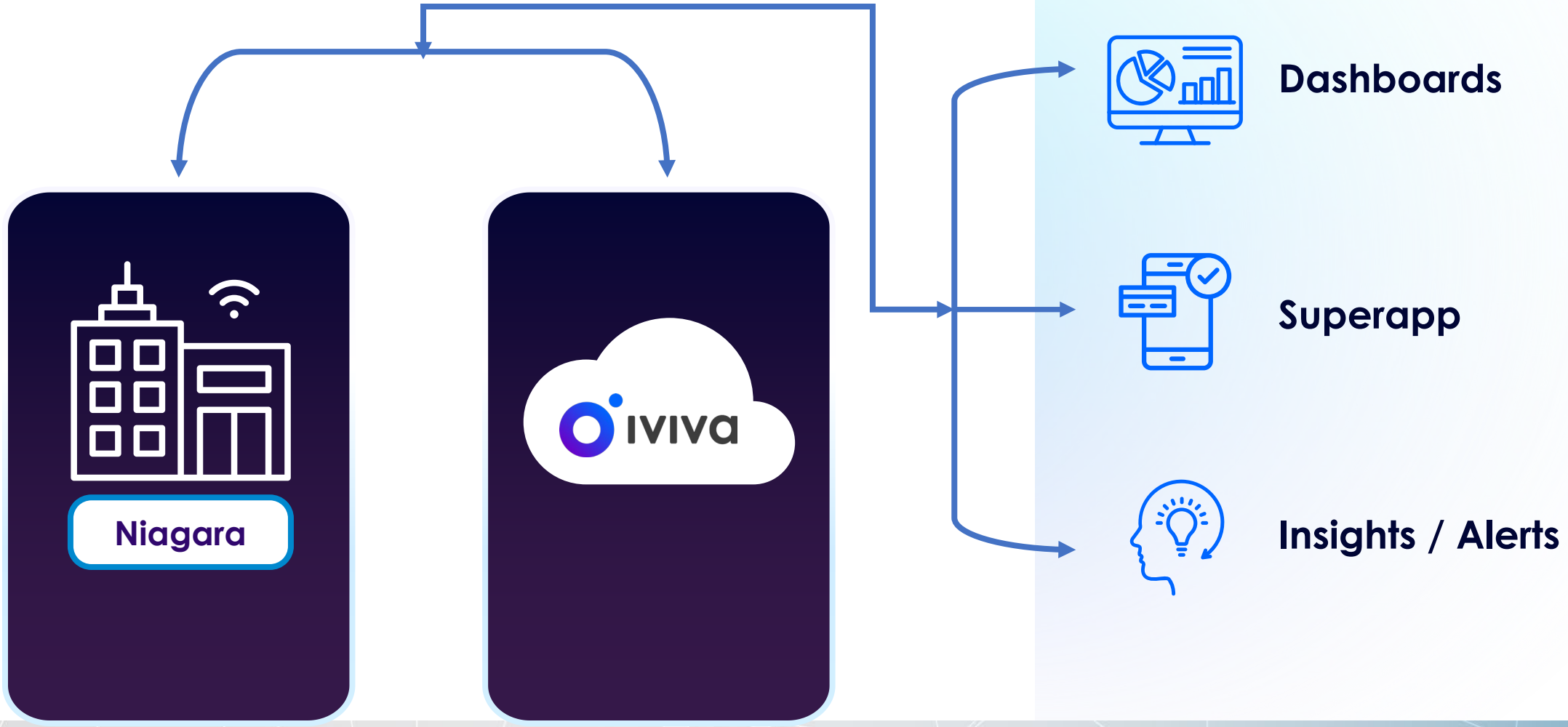
Msheireb Downtown Doha - Qatar

iviva Capabilities



- Pre-integrated with Niagara
- Cloud-Native
- End to end security
- Ease of implementation and delivery

Pre-integrated with Niagara



Carbon and Energy Reporting

UP TO **20% Energy Savings**

- Value add for SIs and Property Managers
- Complying with energy reporting regulations
- Measure and reduce scope 1, 2, and 3 carbon emissions
- Use AI for energy optimization and compliance - through better equipment performance and other energy-specific analytics

Save the planet!

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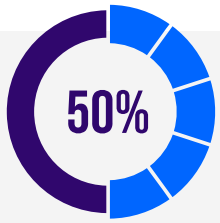
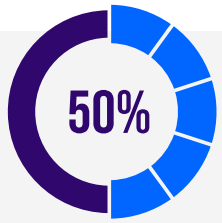
Environment and Comfort

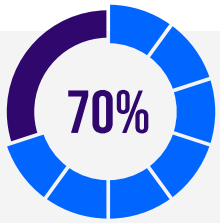
- Value add for SIs and Property Managers
- Occupancy / IAQ
- Provide data and control to occupants
- Health and safety measures, including touchless entry, crowd management, and air quality monitoring
- Instant access in real-time



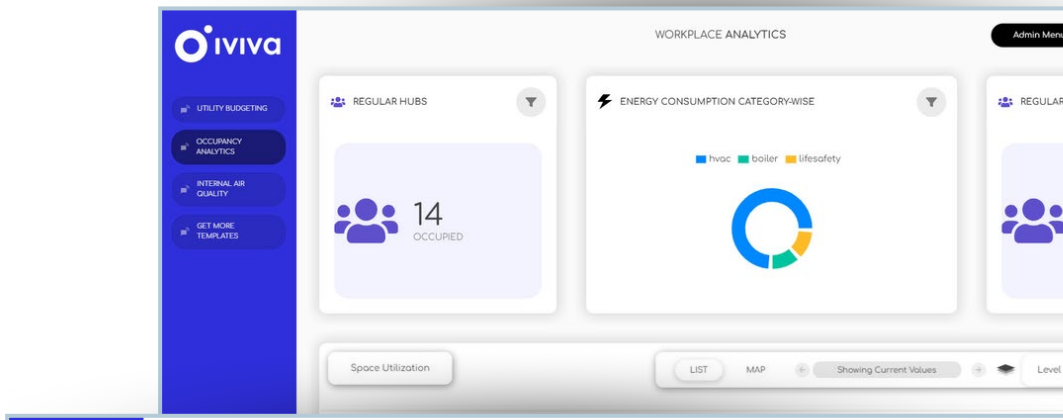
of employees say poor air quality makes them unproductive

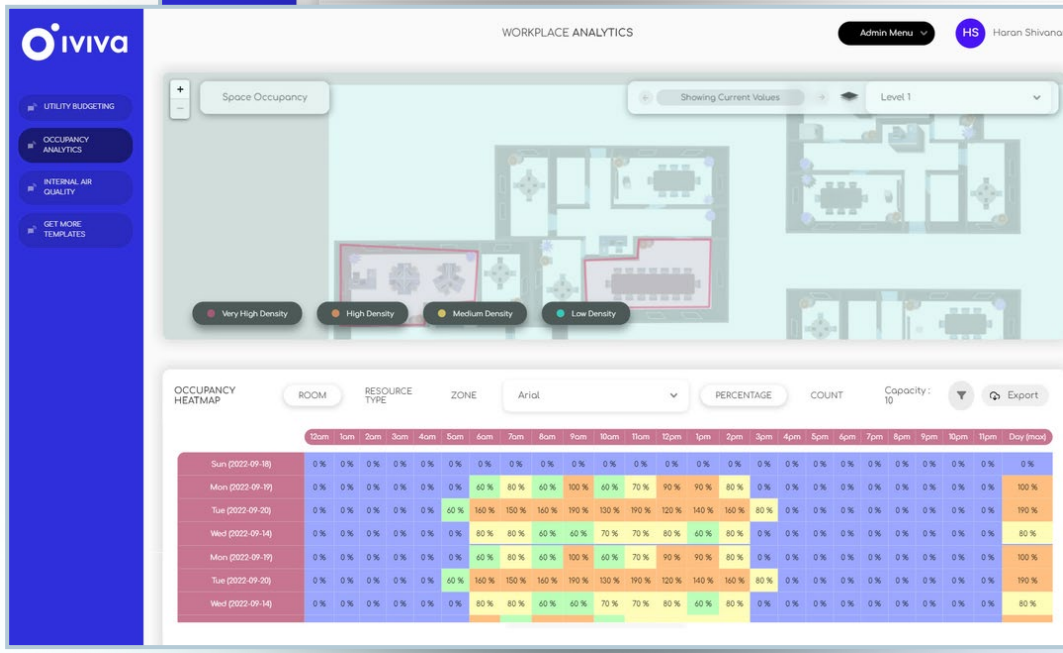


of employees want an app that will let them control their comfort



of companies try to accommodate hybrid work





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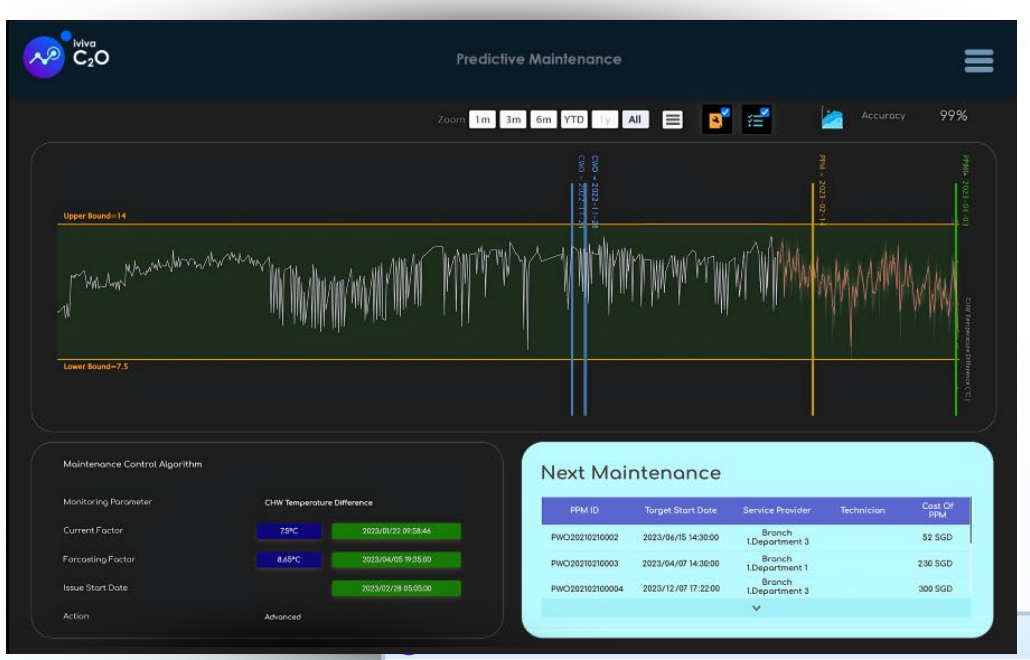
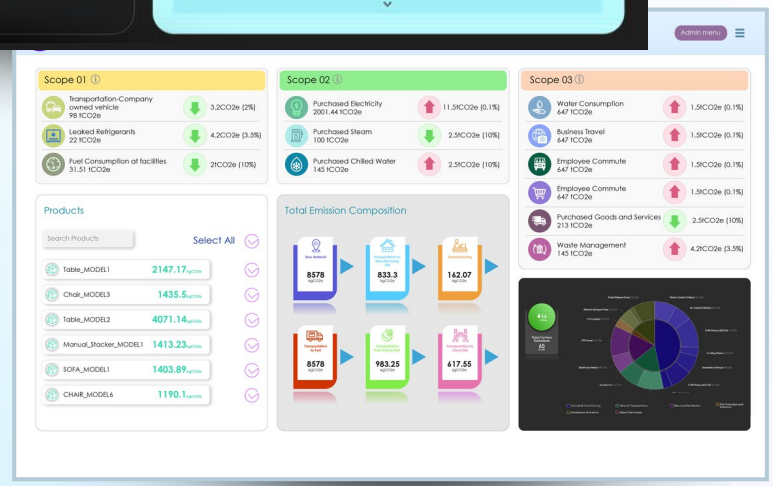
Fault Detection & Diagnosis, Root Cause Analysis, and Predictive Maintenance

- Optimization of manpower
- Improved accuracy for alarms
- Reduce wastage via AI/ML on Cloud





UP TO | **40% Savings in Manpower** | **40% Reduction in Operational Costs**

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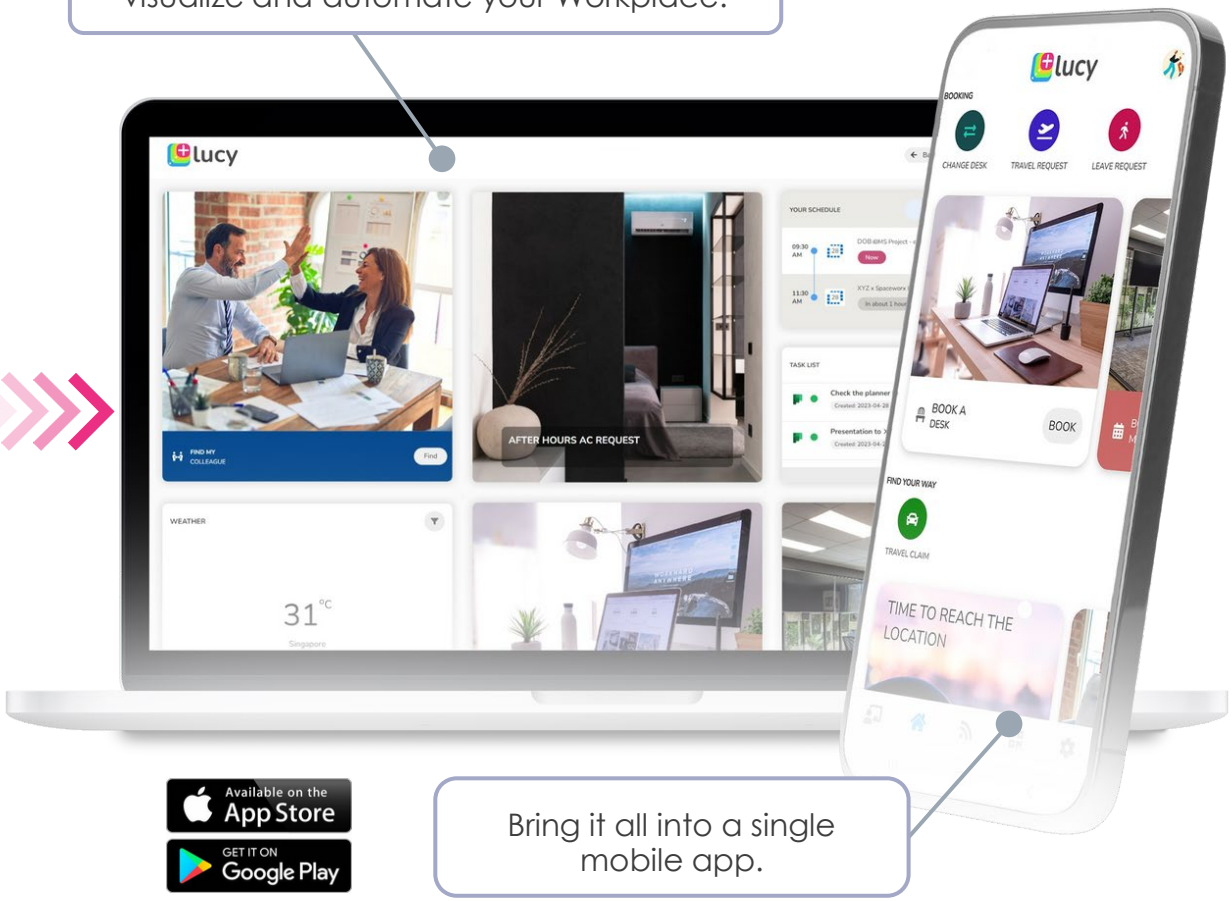
Superapp for the Low Carbon Economy

- Desk booking
- Room booking
- Visitor management
- Way finding
- Notifications & promotions
- Energy savings automations
- F&B ordering
- Carbon footprint calculator
- Expenses tracking
- Surveys, complaints, requests
- QR-Code based access control
- Emergency evacuations, fire drills

No-Code AI-driven Platform to design, visualize and automate your Workplace.



Available on the App Store

GET IT ON Google Play

Bring it all into a single mobile app.

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Why cloud, and how to move to cloud?

WHY?

- No infrastructure management
- Available to end users easily - web and mobile
- More resources for analytics and AI
- Engage with key stakeholders and showcase value faster
- Easy implementation and delivery
- Lower total cost of ownership

HOW?

- Addressing security and data privacy concerns (GDPR, ISO 27001 etc.)
- Getting the right stakeholders

Other Opportunities

Thank you

Haran Shivanan

CEO - iviva

haran@iviva.com

(+94) 77 527 2308

1 Science Park Road, #04-06,
The Capricorn, Singapore 117528

LinkedIn

iviva.com

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Using AI/ML to Improve Occupancy Comfort and Drive Carbon Reduction

Brad Rittler

VP, Business Development
Encycle

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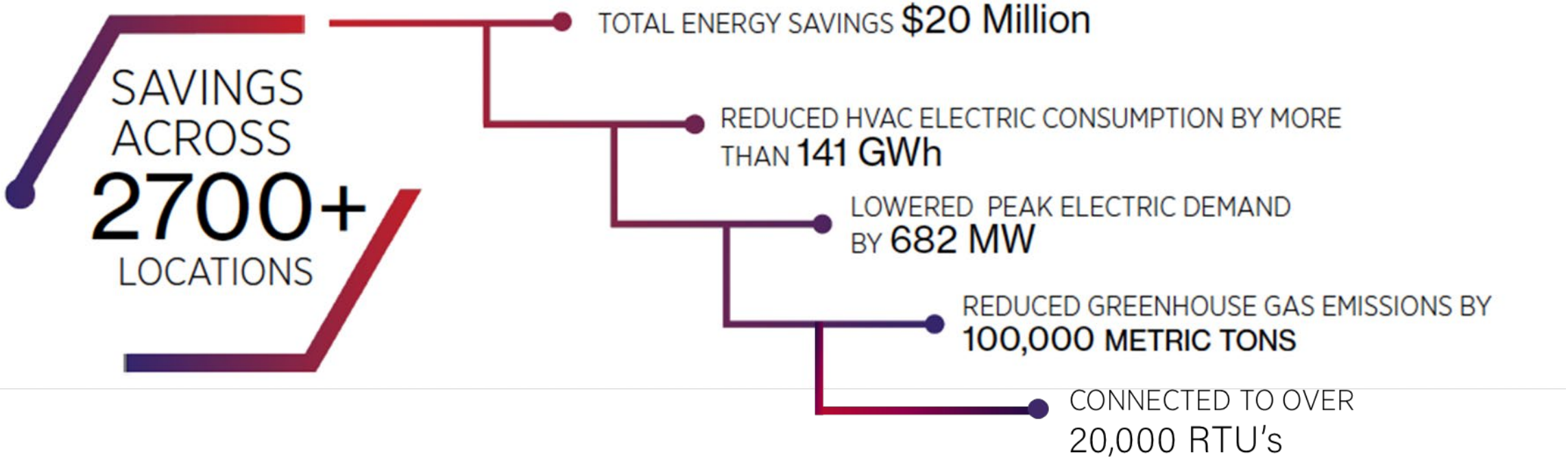
Encycle Achievements



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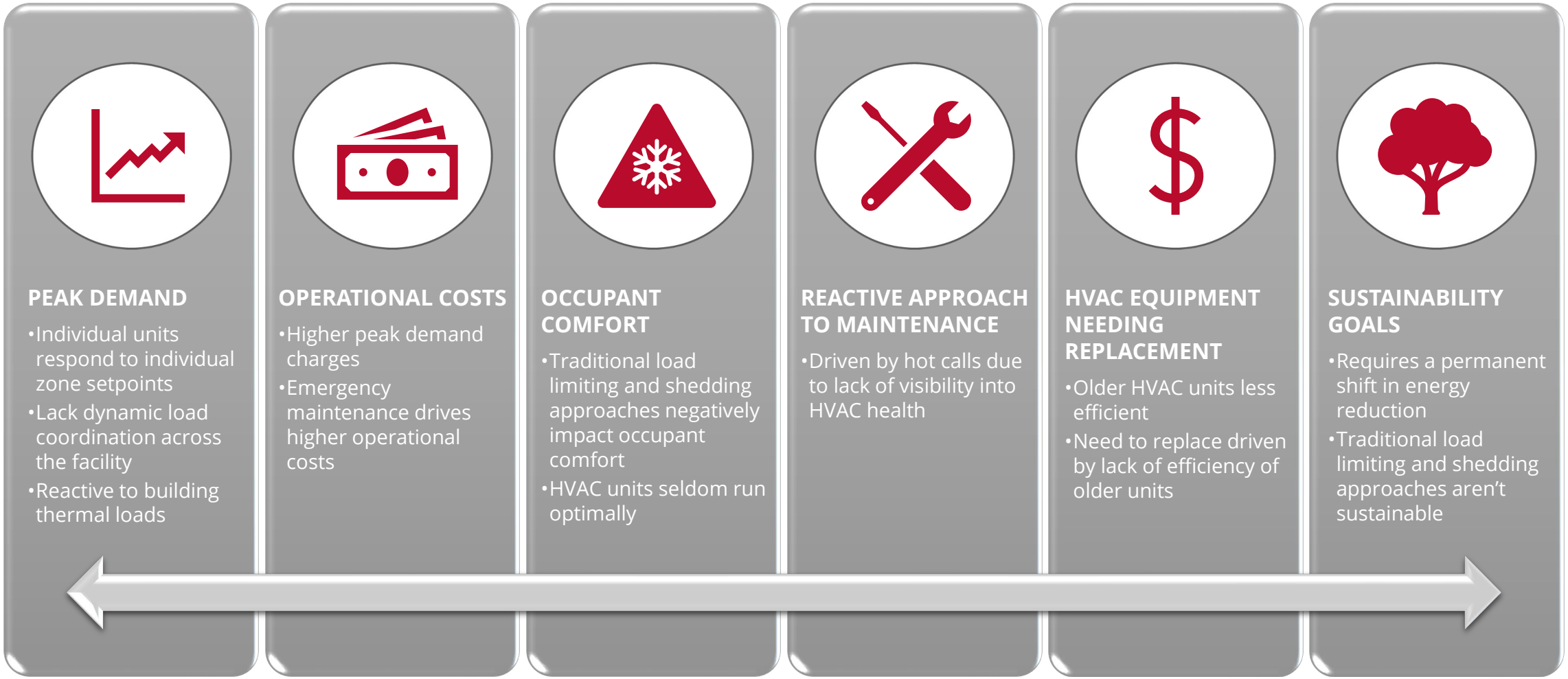
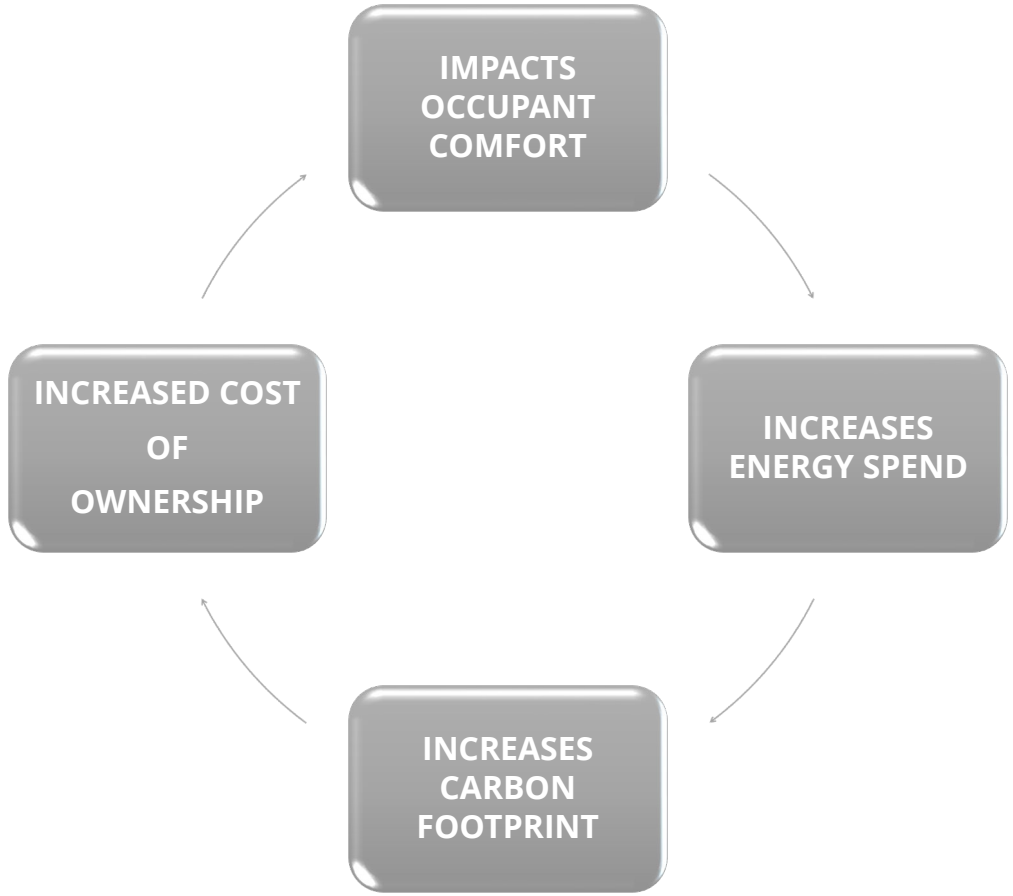
How HVAC Contributes to Business Challenges



Hot Calls and Alarm Chasing

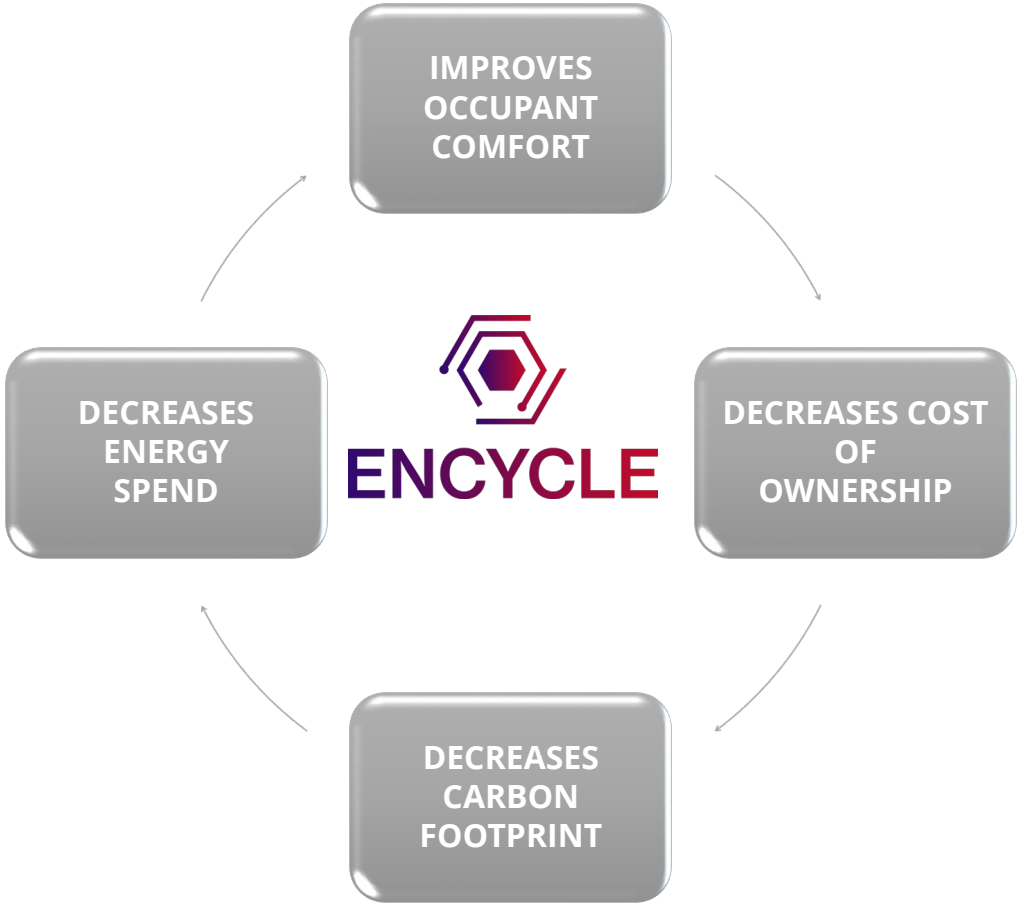
PROACTIVE — **REACTIVE**

- **40% To 60%** Of Building Load Is HVAC
- Entire Industry Is **Reactive To Hot Calls**. Customers Are Desperate To Move Away From This
- Broken HVAC Makes **Carbon Reduction Goals Harder** To Meet



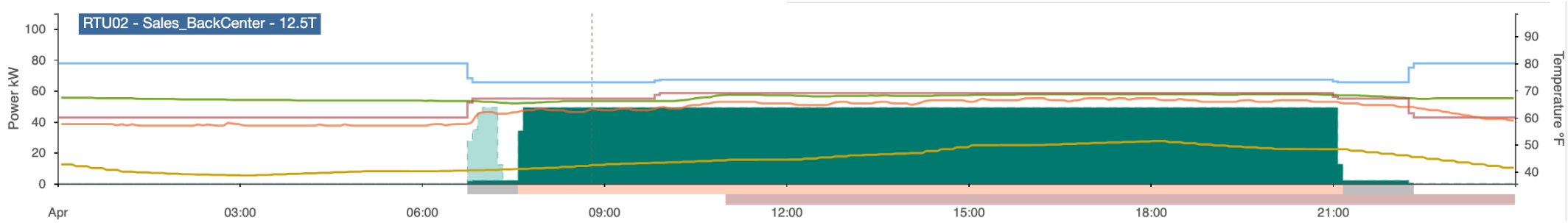
Machine Learning Driven Decisions

PROACTIVE — **REACTIVE**

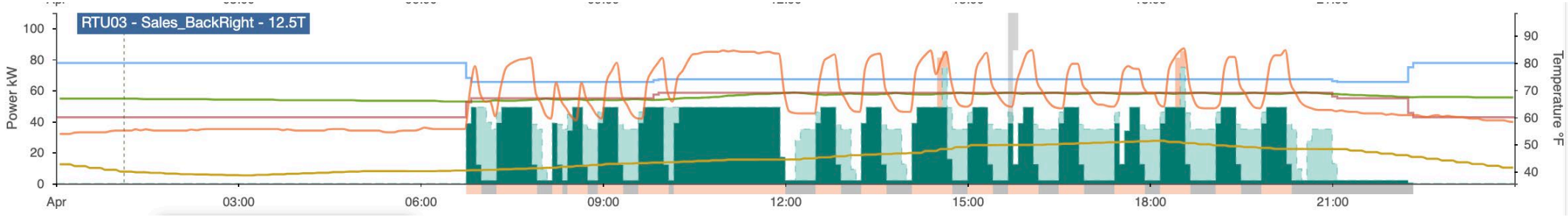


- **5% TO 10%** Reduction In Energy Spend And Carbon Footprint
- **UP TO 15%** Maintenance Cost Improvements
- As Hardware Becomes More Agnostic, Revenue Will Stay With Application Selection Options That Solve Problems

Impact of Mechanical Fault on RTU Performance



- Units suffering from mechanical failure continue to run and consume energy
- Significantly increasing energy costs and carbon footprint



- Healthy units draw less energy and have reduced carbon impact
- Unit performance directly impacts energy use and sustainability programs

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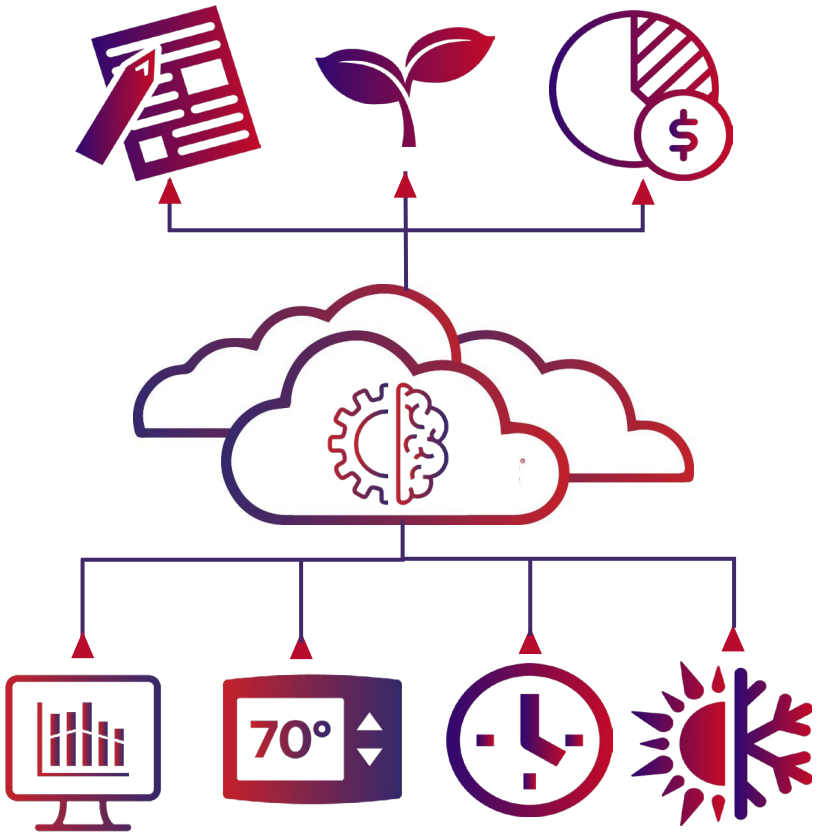
Impact of Mechanical Fault on RTU Performance

- Understanding load changes over time allows for enhanced predictive maintenance approach's
- Cloud based applications ensure data for AI applications can be easily acquired and grown over time, leading to a natural improvements in accuracy of HVAC issue identification
- Machine Learning can be used to detect anomalies in load draw as a unit begins to struggle
- Units that are struggling will draw more energy over time, unless the fault results in unit tripping
- Machine Learning can quickly assess the potential fault and the financial impact for repair
- Allows for quick justification of cost to repair vs. cost of energy waste
- The better the model the closer we come to significantly reducing hot calls



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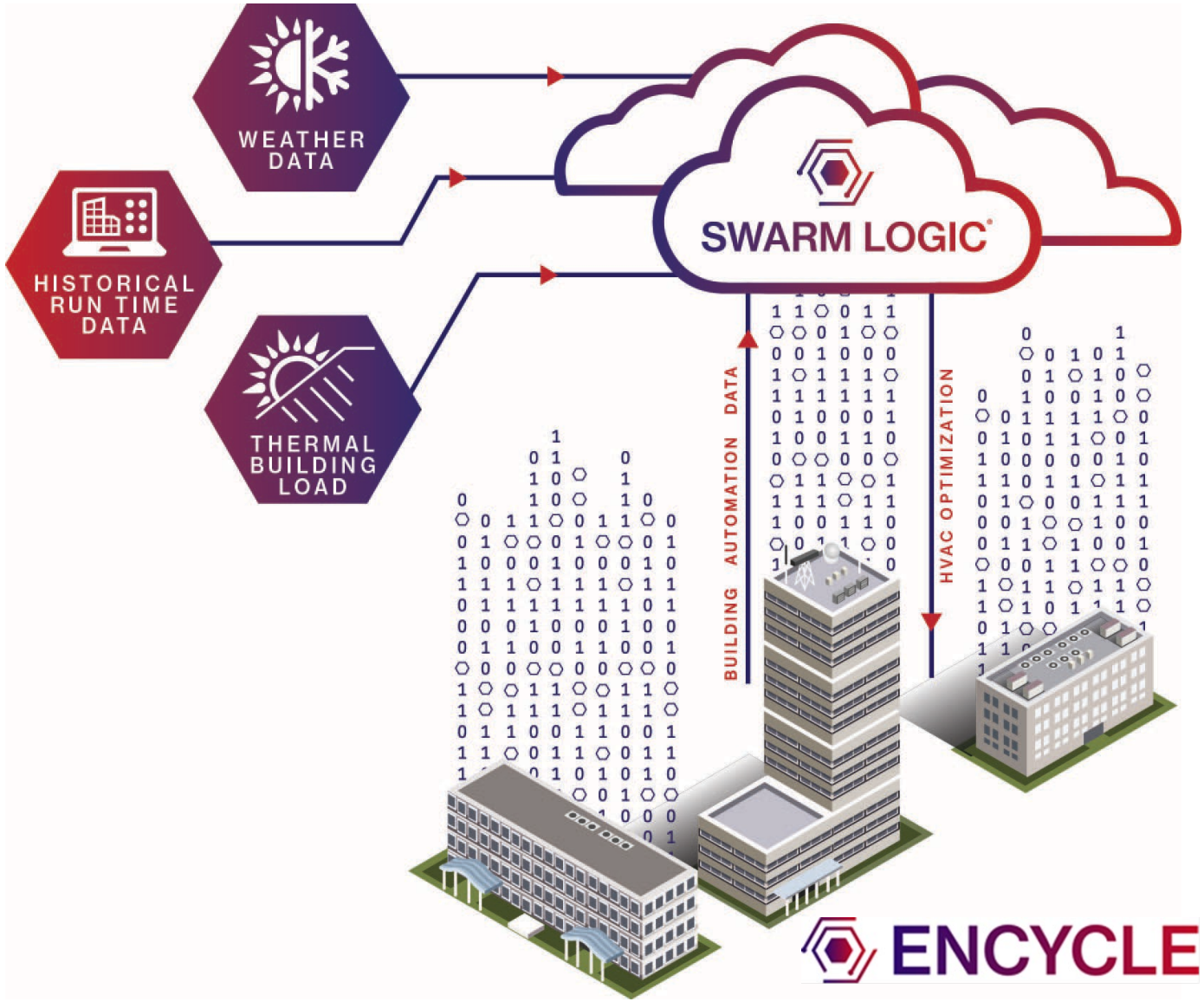
Building Connection

- BAS/EMS sends data to the Swarm Cloud
- Swarm Cloud pulls in additional data
- Swarm Logic analyzes data points and makes decisions on the best use of energy for heating and cooling
- Swarm Logic sends HVAC optimization recommendation back to the BAS/EMS
- BAS/EMS implements optimization decision made by Swarm



Niagara Service for Swarm Logic

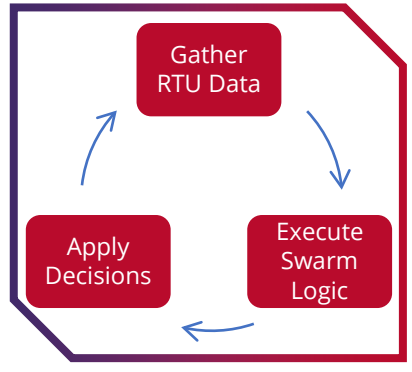
Niagara Station or Supervisor

Niagara Functionality

- Alarms
- RTU Controls
- Monitoring

Swarm Logic is deployed as a Niagara Service using standard Niagara functions to integrate

SWARM LOGIC®



EncycleSwarmLogicService
- statusDetails
- swarmLogicConfig
- loadConfig
- errorHistoryConfig
- responseHistoryConfig

Niagara Swarm Connector

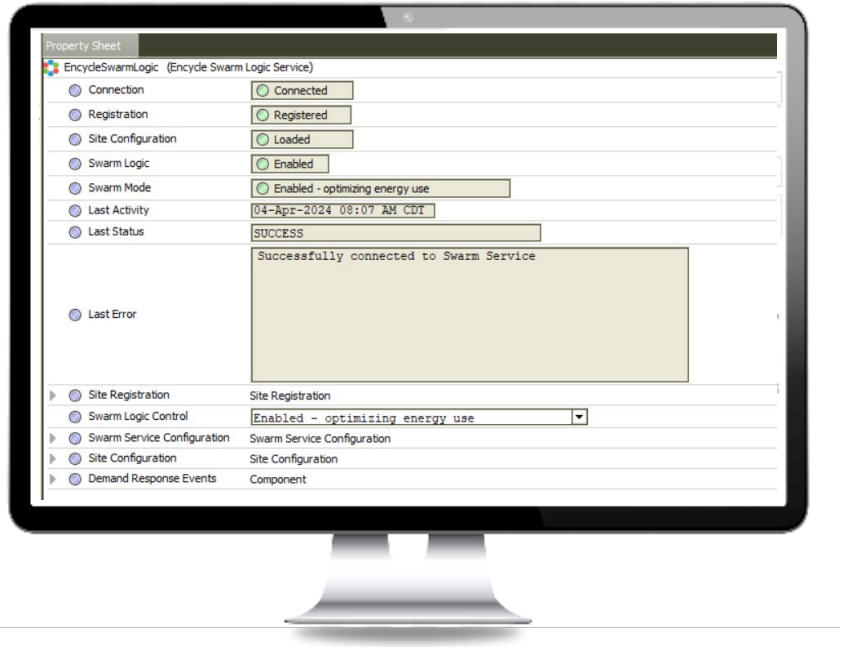
TRIDIUM

niagara4

niagaraAX

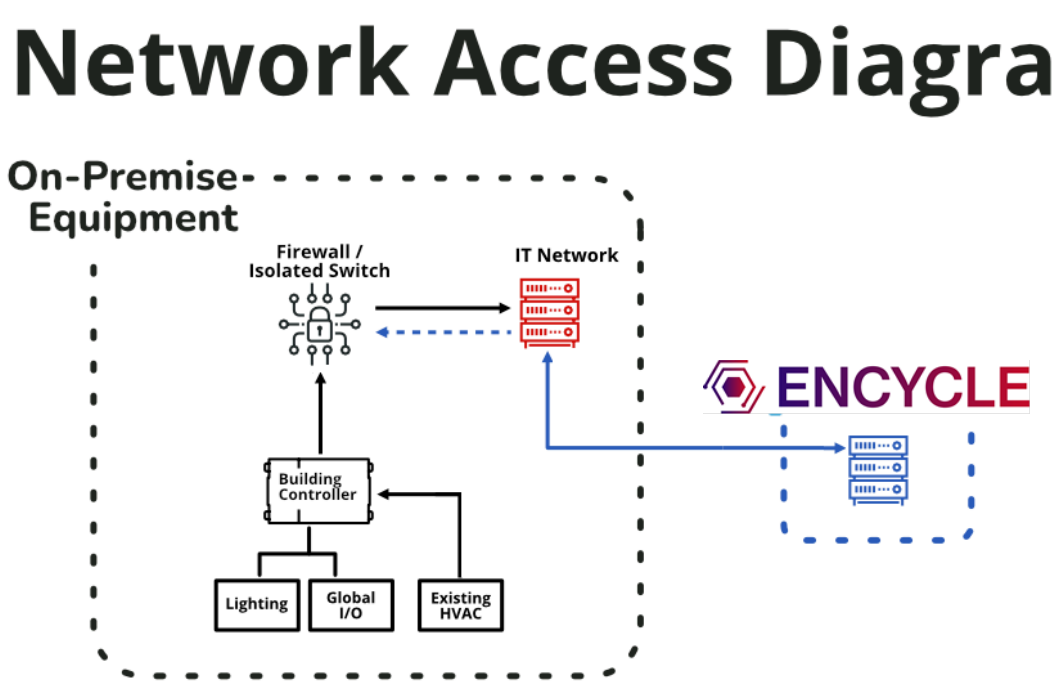
Encrypted, secure HTTPS outbound calls from Niagara to cloud every few minutes

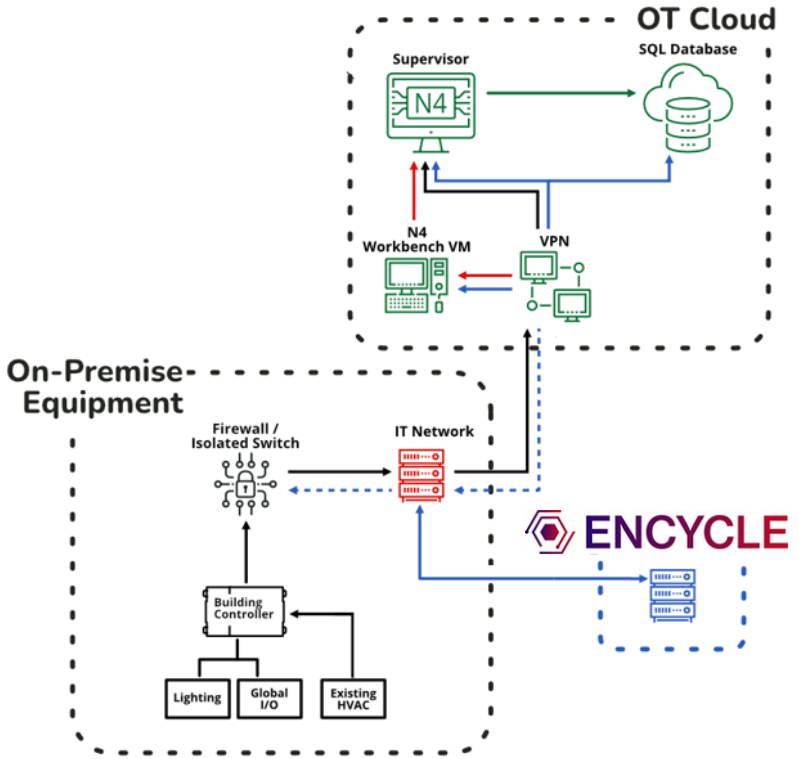
SWARM LOGIC®



Niagara Deployment Architecture

Network Access Diagram





EMC LEADING THE FUTURE OF LIGHTING + TECHNOLOGY

powered by niagara framework®

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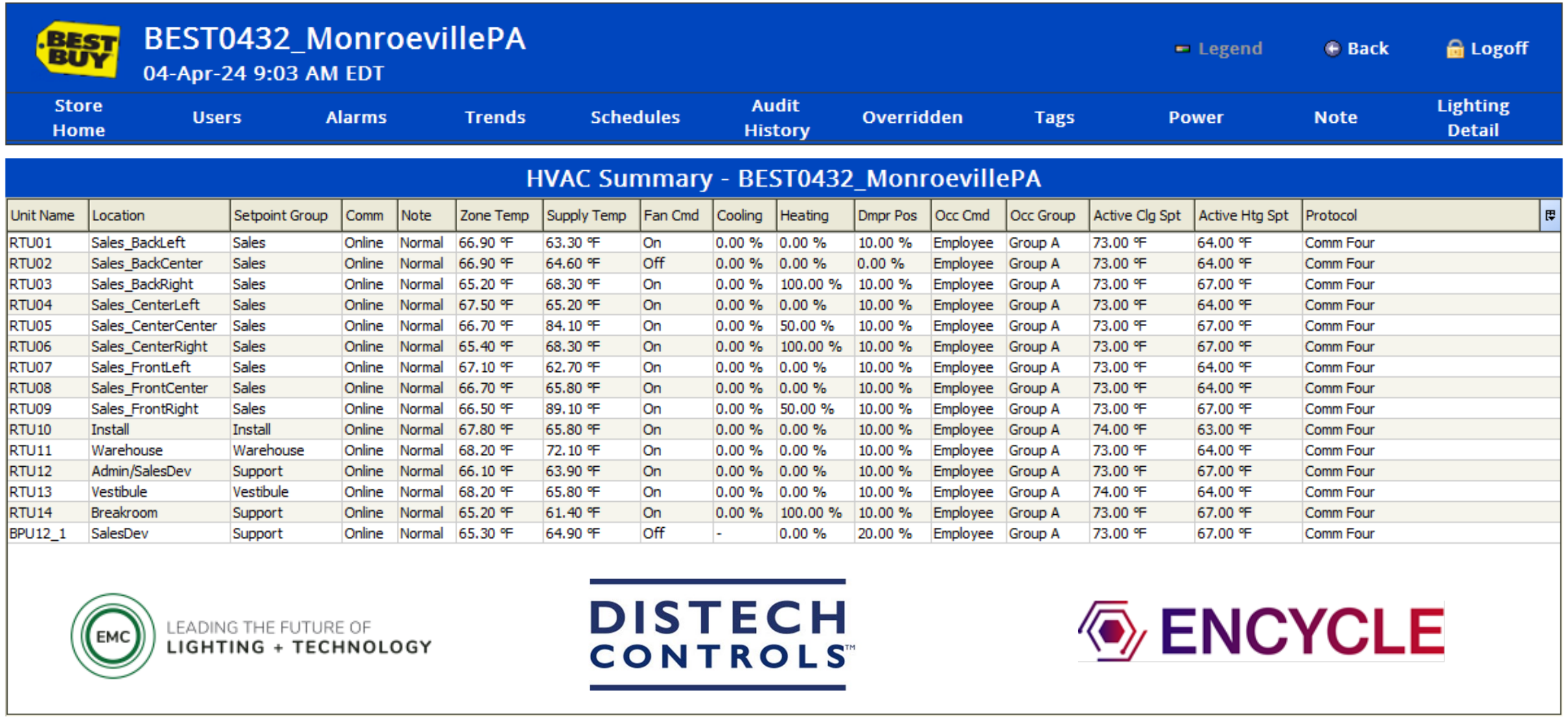
Best Buy – Niagara Deployment



BEST0432_MonroevillePA
04-Apr-24 9:03 AM EDT

Legend | Back | Logoff

Store Home | Users | Alarms | Trends | Schedules | Audit History | Overridden | Tags | Power | Note | Lighting Detail

HVAC Summary - BEST0432_MonroevillePA

Unit Name	Location	Setpoint Group	Comm	Note	Zone Temp	Supply Temp	Fan Cmd	Cooling	Heating	Dmpr Pos	Occ Cmd	Occ Group	Active Clg Spt	Active Htg Spt	Protocol
RTU01	Sales_BackLeft	Sales	Online	Normal	66.90 °F	63.30 °F	On	0.00 %	0.00 %	10.00 %	Employee	Group A	73.00 °F	64.00 °F	Comm Four
RTU02	Sales_BackCenter	Sales	Online	Normal	66.90 °F	64.60 °F	Off	0.00 %	0.00 %	0.00 %	Employee	Group A	73.00 °F	64.00 °F	Comm Four
RTU03	Sales_BackRight	Sales	Online	Normal	65.20 °F	68.30 °F	On	0.00 %	100.00 %	10.00 %	Employee	Group A	73.00 °F	67.00 °F	Comm Four
RTU04	Sales_CenterLeft	Sales	Online	Normal	67.50 °F	65.20 °F	On	0.00 %	0.00 %	10.00 %	Employee	Group A	73.00 °F	64.00 °F	Comm Four
RTU05	Sales_CenterCenter	Sales	Online	Normal	66.70 °F	84.10 °F	On	0.00 %	50.00 %	10.00 %	Employee	Group A	73.00 °F	67.00 °F	Comm Four
RTU06	Sales_CenterRight	Sales	Online	Normal	65.40 °F	68.30 °F	On	0.00 %	100.00 %	10.00 %	Employee	Group A	73.00 °F	67.00 °F	Comm Four
RTU07	Sales_FrontLeft	Sales	Online	Normal	67.10 °F	62.70 °F	On	0.00 %	0.00 %	10.00 %	Employee	Group A	73.00 °F	64.00 °F	Comm Four
RTU08	Sales_FrontCenter	Sales	Online	Normal	66.70 °F	65.80 °F	On	0.00 %	0.00 %	10.00 %	Employee	Group A	73.00 °F	64.00 °F	Comm Four
RTU09	Sales_FrontRight	Sales	Online	Normal	66.50 °F	89.10 °F	On	0.00 %	50.00 %	10.00 %	Employee	Group A	73.00 °F	67.00 °F	Comm Four
RTU10	Install	Install	Online	Normal	67.80 °F	65.80 °F	On	0.00 %	0.00 %	10.00 %	Employee	Group A	74.00 °F	63.00 °F	Comm Four
RTU11	Warehouse	Warehouse	Online	Normal	68.20 °F	72.10 °F	On	0.00 %	0.00 %	10.00 %	Employee	Group A	73.00 °F	64.00 °F	Comm Four
RTU12	Admin/SalesDev	Support	Online	Normal	66.10 °F	63.90 °F	On	0.00 %	0.00 %	10.00 %	Employee	Group A	73.00 °F	67.00 °F	Comm Four
RTU13	Vestibule	Vestibule	Online	Normal	68.20 °F	65.80 °F	On	0.00 %	0.00 %	10.00 %	Employee	Group A	74.00 °F	64.00 °F	Comm Four
RTU14	Breakroom	Support	Online	Normal	65.20 °F	61.40 °F	On	0.00 %	100.00 %	10.00 %	Employee	Group A	73.00 °F	67.00 °F	Comm Four
BPU12_1	SalesDev	Support	Online	Normal	65.30 °F	64.90 °F	Off	-	0.00 %	20.00 %	Employee	Group A	73.00 °F	67.00 °F	Comm Four

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DISTECH CONTROLS™

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Best Buy – Niagara Deployment

EMC LEADING THE FUTURE OF LIGHTING + TECHNOLOGY

DISTECH CONTROLS™

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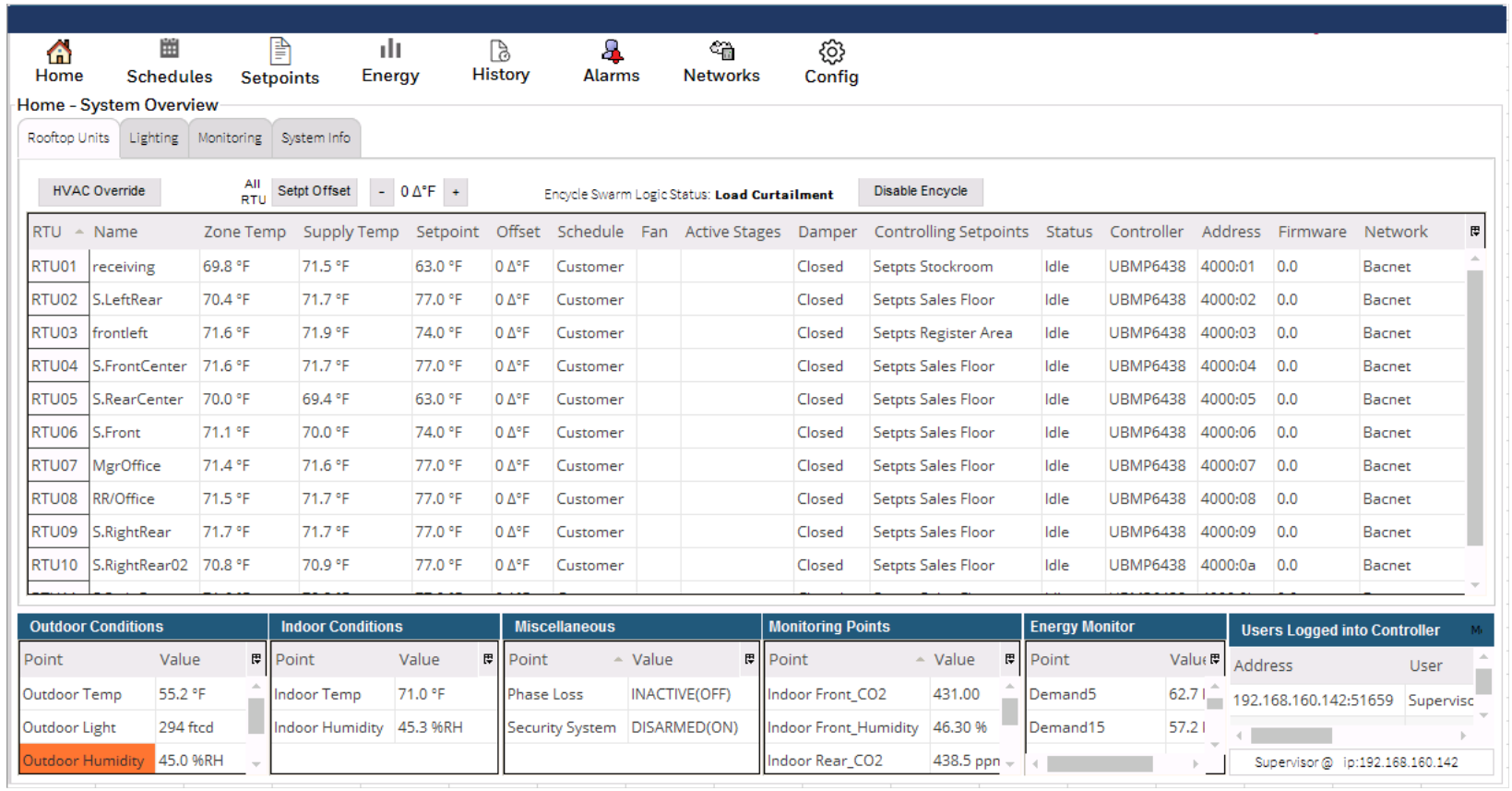
Best Buy – Swarm Logic Savings

Site Name	HVAC Load Savings therms/month	HVAC Load Savings %
Maplewood, MN	185	19%
Oakdale, MN	137	22%
Maple Grove, MN	146	24%
Yonkers, NY	26	4%
Middletown, NY	83	5%
Brick, NJ	95	20%
Watertown, MA	89	6%
Eden Prairie, MN	128	8%
Johnstown, PA	119	15%
Victor, NY	192	26%
Average	**120**	**15%**

Burlington – Niagara Deployment



Burlington

Honeywell

MULTISITE

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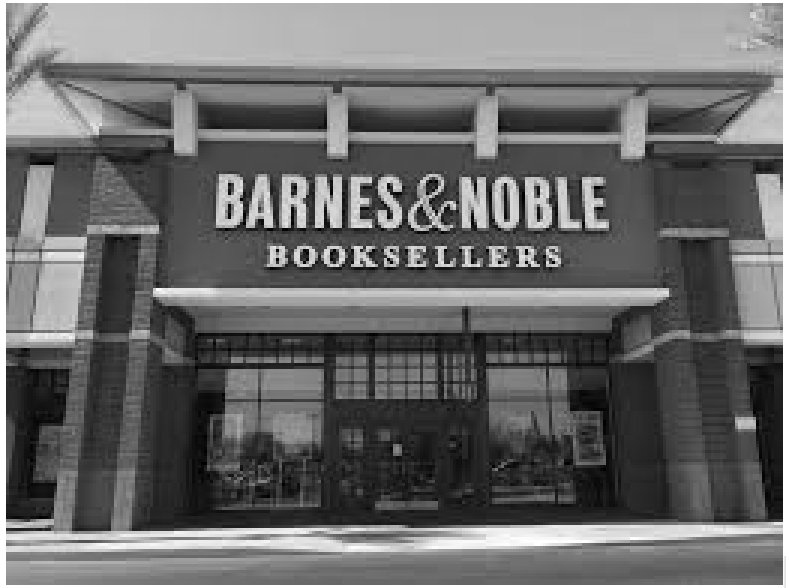
Mid-Box Retailer – Results



ANNUAL SAVINGS
500
STORES

- SAVED **$1,265,819** ON HVAC-RELATED ENERGY COSTS
- REDUCED HVAC ENERGY CONSUMPTION BY **7,430,000 kWh** ELECTRIC AND **21,449 MMBTU** NATURAL GAS
- LOWERED OVERALL PEAK ELECTRIC DEMAND BY **14%** AND REDUCED DEMAND BY MORE THAN **48 MW**
- REDUCED **6,386 METRIC TONS** OF CARBON EMISSIONS

Large Big Box Retailer - Results

ANNUAL SAVINGS ACROSS 200 STORES

- SAVED **$1,270,000** IN ENERGY COSTS – INCREMENTAL TO PREVIOUS BENEFITS ACHIEVED BY INSTALLING BUILDING AUTOMATION SYSTEMS
- LOWERED PEAK ELECTRIC DEMAND BY UP TO **3,300 kW PER MONTH** AND REDUCED ANNUAL ELECTRIC DEMAND BY **12.5%**
- REDUCED TOTAL HVAC ELECTRIC CONSUMPTION BY **16.2%** AND MORE THAN **7,000,000 kWh PER YEAR**
- ADDED **$650,000** IN DEMAND RESPONSE INCENTIVES IN FIRST YEAR – JUST FROM THE CALIFORNIA MARKET

Utility Incentives

- Swarm Logic has been tested by various utilities through extensive 3rd party M+V
- Encycle is the only prescriptive Machine Learning based software available today
- Encycle handles all incentive processing for partners and end users
- Encycle has secured substantial utility funding for our customers

Thank You!

SWARM LOGIC®

POWERED BY DATA. DRIVEN BY SUSTAINABILITY.

For more information visit
www.encycle.com

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Making AI a reality for your customers

Chad Langston

Global Portfolio Manager
HVAC Building Automation

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elipsa

FDD

PdM

IVIVA

Optimization

ML

Digital Twins

AI

Extended Reality

Adaptive Intelligence

COCHRANE SUPPLY

Auto-tagging

ENCYCLE

Chad Langston

Global Portfolio Manager
HVAC Building Automation

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