Honeywell Forge Energy Optimization

Transforming the way you manage
building energy costs without sacrificing
occupant comfort

HONEYWELL
FORGE

Microsoft

Agenda

1. Energy optimization and HVAC systems

2. Optimization challenges

3. Introducing Honeywell Forge Energy Optimization

4. The power of end-to-end Azure solutions in the cloud

5. Opportunities

The quest for energy efficiencies begins with HVAC systems

40-60%
HVAC systems can account for 40-60% of energy consumption in most buildings[1]

3x
Global energy demand from air conditioners is expected to triple by 2050[2]

30%
Up to 30% of HVAC energy costs can be reduced using data analytics[3]

[1] "How to achieve energy efficiency in commercial buildings: IoT-enabled solutions for smart HVAC," waylay
[2] "How IoT is Changing the Commercial HVAC Industry," aeris
[3] "Big Data: Big opportunity for smart buildings," Smart Buildings Magazine

Building portfolio managers' challenges

Interpreting energy consumption, savings and occupant comfort

In order to maximize energy efficiencies, portfolio managers must be able to collect, connect, and interpret isolated data about weather, building occupancy, and energy costs.

Limited functionality

Fixed or scheduled setpoints and conservative building management systems (BMS) configurations can hinder efforts to reduce waste and maintain occupant comfort.

Complex decisioning

Teams of engineers are not capable of calculating zone dynamics plus changing occupancy, climate, and energy costs at the speed and precision required to optimize performance and comfort.

Introducing Honeywell Forge Energy Optimization

Transforming the way you manage energy costs without sacrificing occupant comfort

**Connect & collect** data

Optimize operations
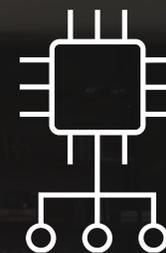
Deliver intelligence

Honeywell Forge Energy Optimization

Connecting data and systems to drive energy savings while protecting comfort

Easy deployment
The system-agnostic solution can auto-discover and seamlessly connect to any HVAC system or BMS within minutes

Smart connectivity
It also captures expected occupancy data, weather data, energy pricing, and comfort targets

Powerful cloud
Use machine learning to analyze and combine data with deep learning about building and system dynamics

Business optimization
Enable **autonomous control** by sending messages back to the BMS to make automatic adjustments at regular intervals (every 15 minutes, minimum)

Actionable insights
Generate and visualize meaningful insights in a web-based dashboard to drive centralized and remote data-driven decisions
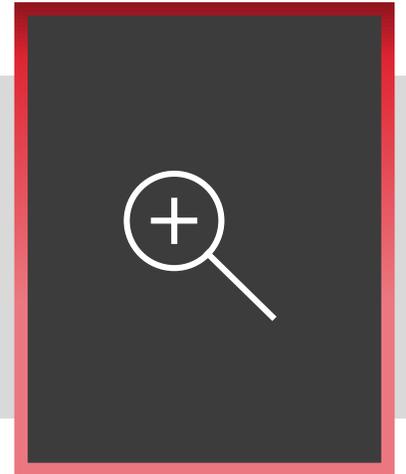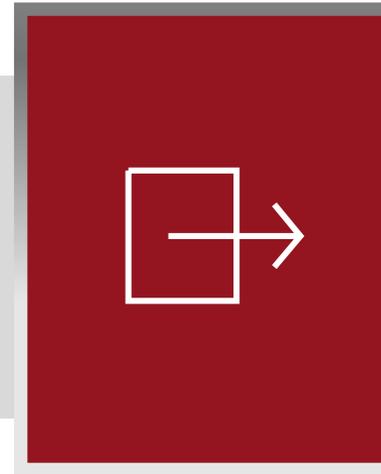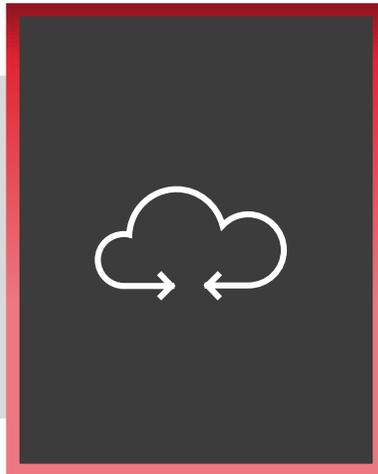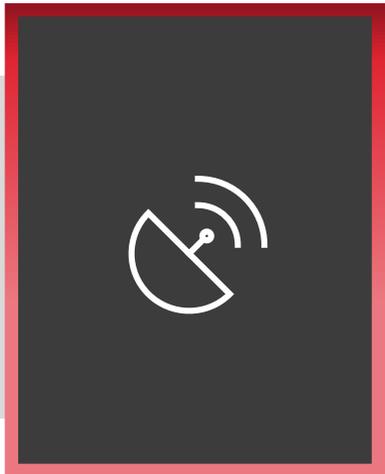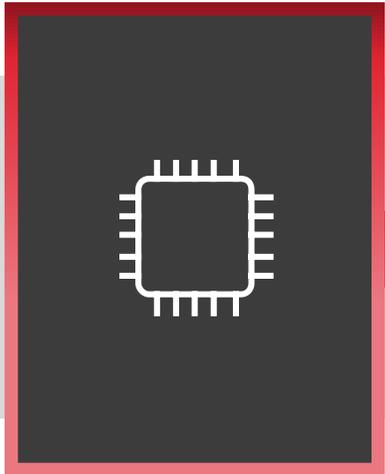
Connect & collect data

Establish a single, secured connectivity strategy between all systems and buildings.

Deploy a system-agnostic solution fast

Set up the system in just a few minutes, and the solution can auto-discover and connect with any HVAC or BMS on-site.

Adopt proven technology

Machine learning models are continually informed by Honeywell technologies used in millions of buildings worldwide.

Secure your platform

Protect business assets while reducing costs and complexity with Azure's enterprise-grade security controls—built-in from the ground up.
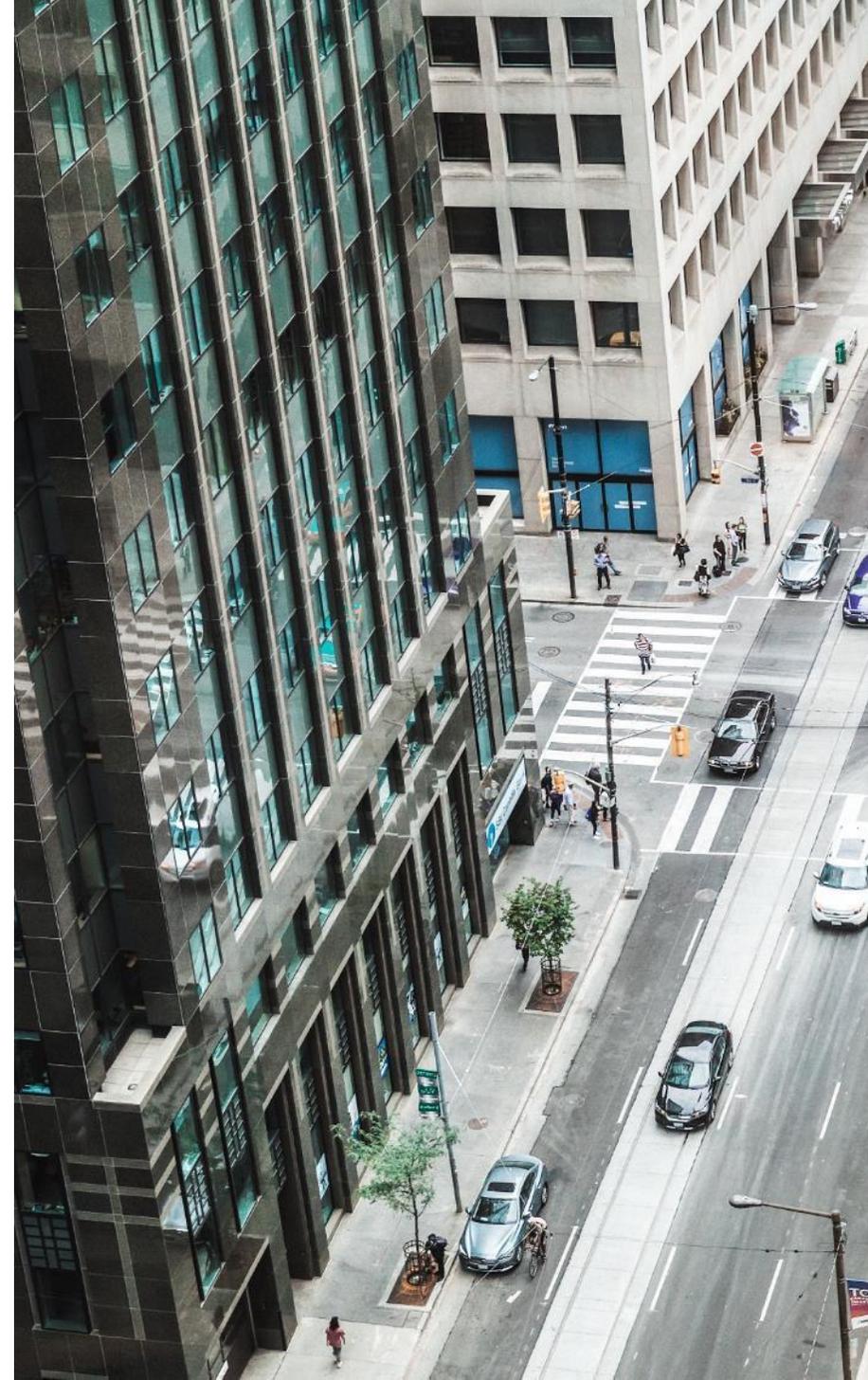
Optimize operations

Leverage centralized autonomous control to correct inefficiencies at scale.

Save time and money with autonomous asset control
Use AI to autonomously control HVAC systems—sending instructions through the BMS to continually adjust energy usage by zones without human intervention.

Measure performance
Objectively compare performance across your portfolio, and periodically run the original strategy to compare results using smart tools.

Employ a solution that scales
Evolve and build on the cloud-based solution as your needs change or your buildings or portfolios grow.
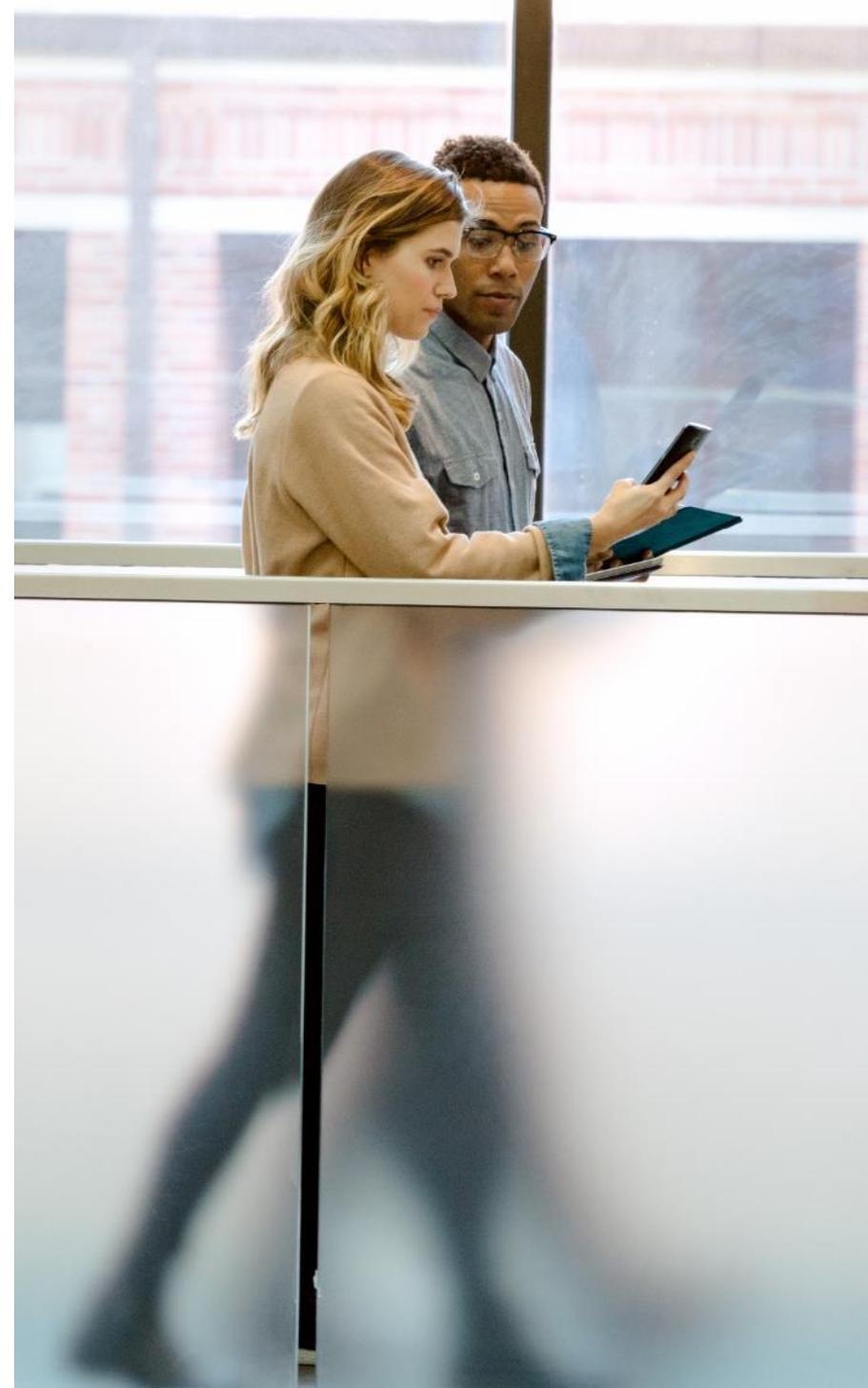
Deliver intelligence
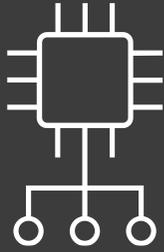
Visualize energy consumption, savings, and occupant comfort insights.

Understand energy use and comfort levels
Monitor and receive real-time 24/7 normalized energy and comfort metrics from systems in one or many buildings.

Gain visibility
Aggregate standardized data in a single, secure, cloud-based platform to gain a universal, 360-degree "truth" about energy consumption and comfort levels.

Receive real-time intelligence
Apply advanced machine learning models to identify opportunities to gain efficiencies by optimizing set-points.

Powered by Azure IoT Hub

Experience the simplicity of a scalable SaaS solution

Straightforward deployment

Connect devices at any scale

Consolidate data and visualize insights

Best-in-class security and enterprise-grade services

Full integration into business systems

10% energy savings achieved across campus

Hamdan Bin Mohammed Smart University (HBMSU), the first and only accredited smart university in the United Arab Emirates, sought to reduce energy consumption, carbon footprint, and operating costs across its smart campus. The management team's goal was to reduce their impact on the environment and save money while protecting occupant comfort levels. But they needed a solution that could integrate easily with existing third-party systems to minimize capital expenses. Honeywell Forge Energy Optimization enabled a quick and secured integration to a cloud-based, autonomous energy solution.

System-agnostic integration

Optimized to auto-discover all on-site systems, Honeywell Forge Connect connected easily, and immediately identified system mechanical issues requiring repair.

Robust analytics

The solution enabled cloud intelligence to analyze real-time weather, occupancy, and tariff data in order to calculate optimal HVAC settings.

Automated controls

The solution enabled continuous, autonomous adjustments to HVAC settings from the cloud-based application without the need for human decisioning or management.

Cost savings

The institution experienced energy savings of 10% enabled by Honeywell Forge Energy Optimization.

A smart university gets smarter with energy optimization

"At HBMSU, we are innovative in all our endeavors. We remain steadfast to our commitment to deploy the latest technological and smart innovations on our campus and ensure the provision of the highest levels of operational efficiency that matches the best in the world. We were pleasantly surprised by the positive results that we saw from Honeywell Forge, and we're excited for the energy savings it'll continue to harvest."

— **DR. MANSOOR AL AWAR**,
Chancellor, Hamdan Bin Mohammed Smart University

جامعة حمدان بن محمد الذكية
Hamdan Bin Mohammed Smart University

Next steps

→ Find out how easy it is to adopt Honeywell Forge Energy Optimization connectedbuildingforge@honeywell.com

→ Learn more about Honeywell Forge Energy Optimization

→ Learn more about Azure IoT Hub at azure.microsoft.com

Energy+Comfort Management for Buildings

Honeywell Forge Energy Optimization Reference Architecture

Honeywell
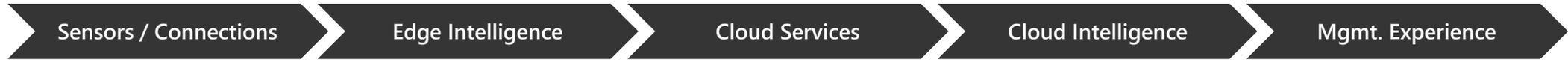
Sensors / Connections	Edge Intelligence	Cloud Services	Cloud Intelligence	Mgmt. Experience
This solution helps operations teams optimize energy usage and drive cost savings all while keeping occupant comfort at desired levels.	Custom logic analyzes thousands of data points and tags the most important info and control signals for an energy-focused digital twin.	Microsoft's Azure cloud offers a scalable, secure, resilient platform for your system data and for our solution components.	Cloud modules integrate telemetry with occupancy information and energy pricing to calculate optimal equipment settings every 15 minutes.	Your team uses our web-based app to optimize ongoing operations and review energy savings, space comfort, and equipment response.

Left sidebar:
- HVAC SYSTEM
- LIGHTING SYSTEM
- LIFTS AND ELEVATORS
- EMPLOYEES AND VISITORS

Sensors / Connections:
- BUILDING MANAGEMENT SYSTEM
- EQUIPMENT PLC DIRECT CONNECTION
- OTHER VENDOR SYSTEMS
- ADDITIONAL SENSORS AS DESIRED
- BACNET, MODBUS & 200+ OTHER DRIVERS

Edge Intelligence:
- CUSTOMER WAN OR CELL CONNECTION
- INDUSTRIAL PC AND GATEWAY WITH KUBERNETES AND CLOUD-SYNCED LOGIC CONTAINERS
- GET AND PROCESS DATA IN REAL TIME
- FILTER AND UPLOAD KEY DATA POINTS
- BUILD/MAINTAIN DIGITAL TWIN: ANALYZE DATA PROFILE, TAG KEY INFO AND CONTROL SIGNALS

Cloud Services:
- AZURE IOT HUB
- REST API ON AZURE APP SVC
- EVENT HUB + AZURE KUBERNETES: MANAGED MICROSERVICES IN DOCKER CONTAINERS
- CHECK DATA QUALITY AND ENRICH DATA WITH WEATHER + OCCUPANT EXPERIENCE RATING
- TIME SERIES DB IN DOCKER CONTAINER
- AZURE HD INSIGHTS + BLOB STORAGE

Cloud Intelligence:
- IMPORT EXPECTED OCCUPANCY, CALENDAR INFO, MGMT SYSTEMS (E.G. MES), ENERGY PRICING, ...
- ANALYZE COMFORT VS. ENERGY USAGE VS. PRICING WITH AZURE MACHINE LEARNING
- DETERMINE OPTIMAL SET POINTS EVERY 15MIN AND SEND TO EQUIPMENT VIA GATEWAY
- DETECT UNDERPERFORMING OR NON-RESPONSIVE ZONES AND NOTIFY CUSTOMER SERVICE

Mgmt. Experience:
- ENERGY SAVINGS DASHBOARDS
- COMFORT VS. SAVINGS ANALYSIS
- RESPONSIVE WEB APP (DSK/PHN/TAB)
- UNDERPER-FORMING ZONES
- NAVIGATE BLDGS, FLOORS & ZONES
- DISCUSS ANOMALIES W/ CUST SVC
- OVERRIDE IN UNEXPECTED SITUATIONS

Right sidebar:
- OPERATIONS MANAGER
- FACILITIES MANAGER
- MAINTENANCE ENGINEER
- WORKPLACE EXPERIENCE MGR
- BUSINESS PERF ANALYST

Legend:
- ✳ Partner component
- ⚙ Azure service
- 👤 Customer component