SUSTAINABLE BUILDINGS
The Art of Building Sustainability

LEED® PLATINUM CERTIFIED
Reliable Controls HQ Annex Annual Review

www.reliablecontrols.com

RUNtime

The Official Quarterly Newsletter of Reliable Controls® Corporation

Q2- 2019

Introducing RC-Hospitality®

Integrated Guest-Room Control

Better by design™

ISO 9001 14001 QUALITY ENVIRONMENTAL ASSURANCE

Member of BACnet International

Reliable® controls

Reliable controls

INTRODUCING RCHospitality®

Integrated Guest-Room Control

Empower your front desk property management system to automatically assign comfort levels upon check-in and save energy, using RC-Hospitality®, the simple, flexible, and sustainable guest-room integration solution from Reliable Controls. RC-Hospitality automatically assigns the HVAC/lighting occupancy setting for any room upon guest check-in, enabling the MACH-System™ to improve guest-room comfort and operational efficiency, while delivering analytics for the entire facility.

RC-Hospitality provides an intuitive interface between a property management system (PMS) and BACnet devices that typically control HVAC, lighting, and security for rooms. The interface includes Menu Bar, Room List, Log List, and Status Bar. The Menu Bar contains Exit, View, Help, PMS connection status, and Language, supporting English, French, Spanish, and Turkish. The Room List screen shows the current configuration of rooms and their occupancy status according to the PMS. The screen displays the BACnet Object Properties for each room, in addition to the communication status of the BACnet device controlling the room. The Log List screen shows a running history of significant events that have occurred and the Status Bar at the bottom of the interface displays the copyright notice and current version of BACdoc file.

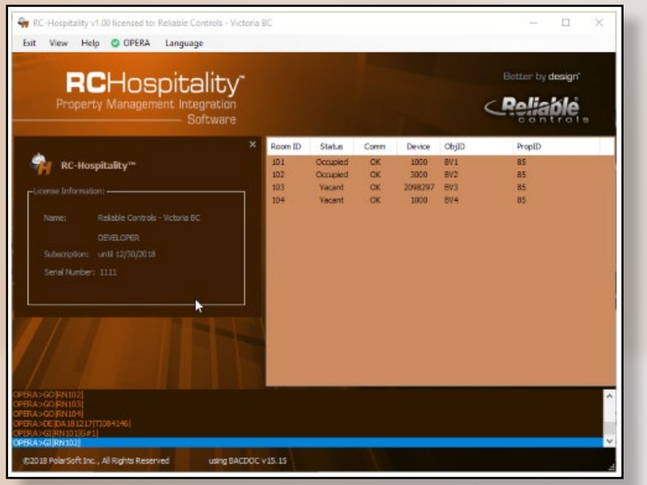
Features of RC-Hospitality include:

Property Management System Integration

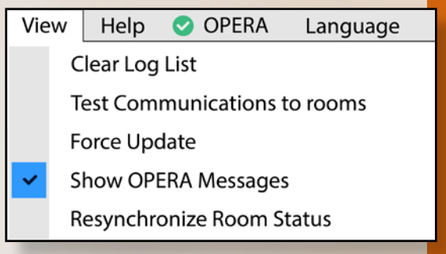
- Provides custom integration into OPERA property management systems (PMS).
- Networks into existing PMS using TCP/IP (Ethernet).
- Accommodates up to 2,000 rooms.
- Integrates into existing BACnet® HVAC, lighting, and security controllers using BACnet/IP (B/IP).
- Supports writing guest-room status to any of the following BACnet objects: AI, BI, MI, AO, BO, MO, AV, BV, MV.

Set and Forget Configuration

- Easy-to-configure using Notepad to edit files.
- Allows for configurable network information, room identifiers, and BACnet addresses.



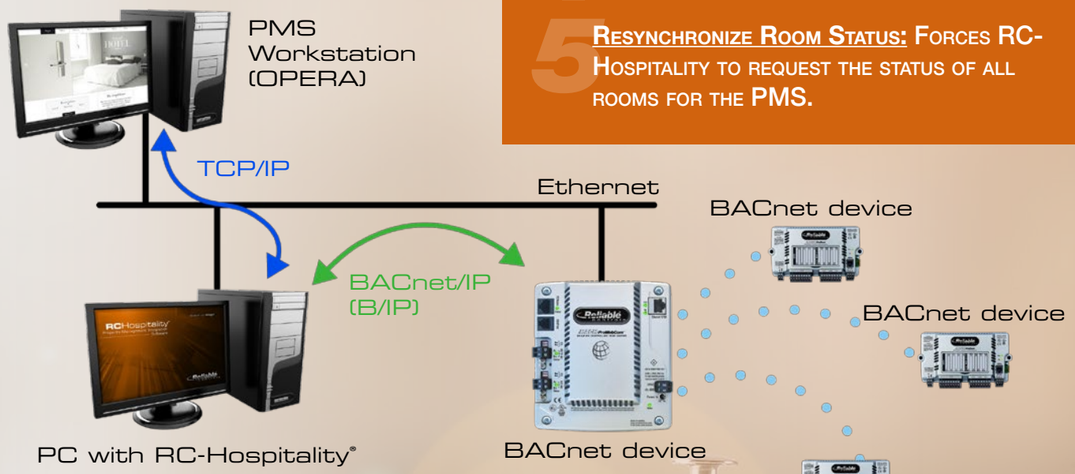
Main Window



View Menu

Enjoy Flexible Functionality with RC-Hospitality's View Menu

1. **Clear Log List:** Allows you to clear all messages from the Log List.
2. **Test Communications:** Sends a signal to each room's configured BACnet device and displays the results of the test in the Log List.
3. **Force Update:** Sends an immediate update to all occupancy object values.
4. **Show OPERA Messages:** Toggles the visibility of PMS messages in the Log List.
5. **Resynchronize Room Status:** Forces RC-Hospitality to request the status of all rooms for the PMS.



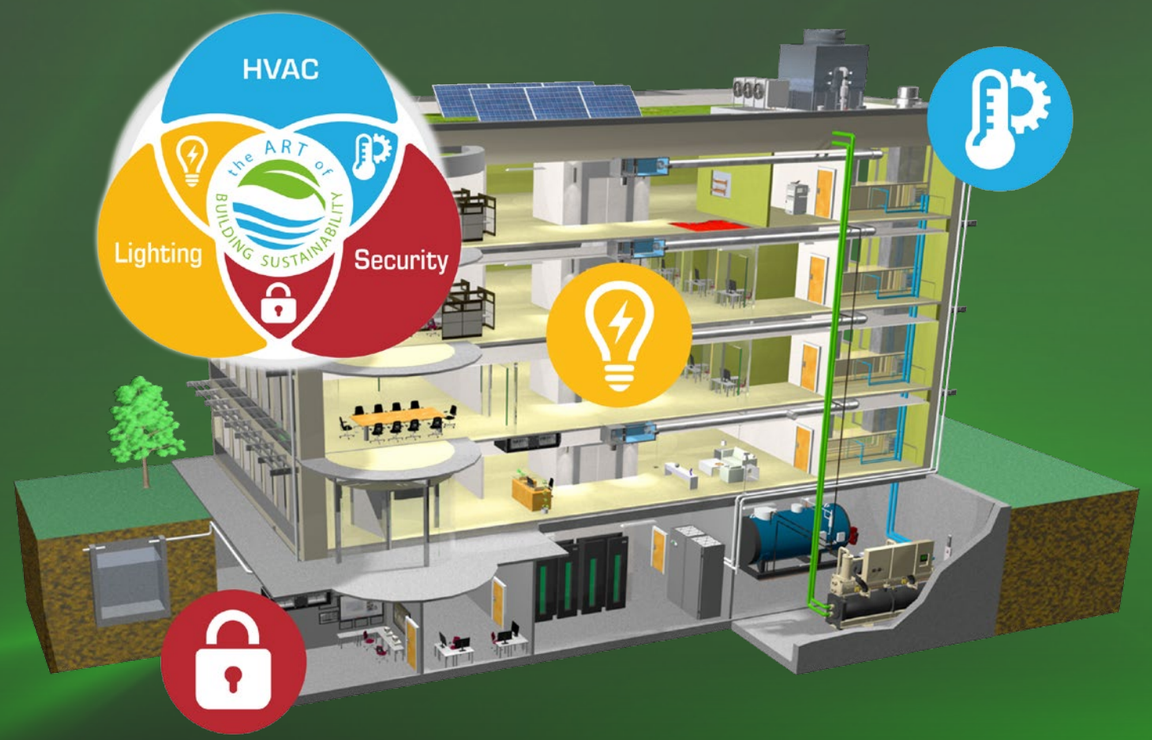
With **RC-Hospitality®** and the **MACH-System™**, integrating guest-room control, saving energy, and demonstrating greenhouse gas reductions has **never been easier.**

The Art of Building Sustainability

Regardless of how new technologies may impact the evolution of our building automation industry, the goals of industry stakeholders remain largely the same—to achieve sustainability in the built environment.

Those who have completed green building design certification, such as Leadership in Energy and Environmental Design (LEED), know an important first step towards sustainability is to understand the owner's needs and the goals for their building. This understanding can be clarified by participating in design charettes which result in high level discussions between the major design disciplines, who historically may have operated in varying degrees of isolation. The collaboration advocated by LEED during the design charettes is mirrored when it comes to designing the Building Automation System (BAS) for a sustainable building. The safe, productive, and energy efficient operation of the facility (typically the owner's goal), requires a high level of integration between the major Heating, Ventilation, and Air Conditioning (HVAC), lighting, and security systems (which requires collaboration between historically isolated networks).

Sustainability requires a high level of integration – the ability to detect who is in the building, where they are permitted to go, and how to optimize the lighting, HVAC and other systems based on occupant preference. Although achieving a high level of integration between HVAC, lighting, and security systems is a necessary condition for a sustainable building it is not sufficient. To truly create building sustainability, you need *more* from your technology. *You need...*



10 Technology that supports open standards which are certified by third-party listing laboratories.

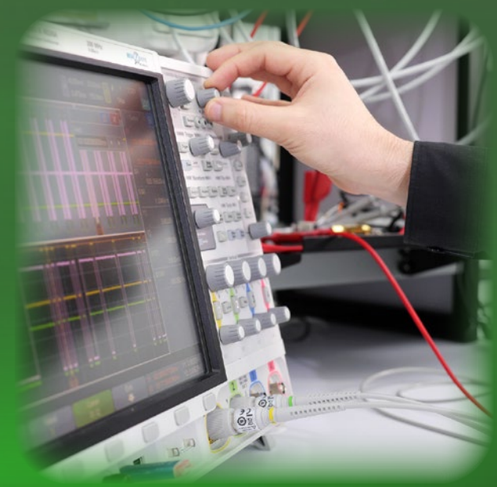
Open protocols allow different vendors to supply components of a control system that can effectively share information and services – to interoperate as a single system. To ensure a strong level of interoperability some open protocol associations use third-party listing laboratories to test and verify adherence to a protocol's form and function. Yet, a number of control vendors still refuse to adopt a common communications protocol, despite the existence of broadly-supported, open, and interoperable building automation control standards, such as BACnet®.

ASHRAE BACnet®

Since 1995 the BACnet protocol has delivered the promise of interoperability for building owners all around the world. Developed under the auspices of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), BACnet is an American national standard, a European standard, an ISO global standard, and a national standard in more than 30 countries. BACnet International complements the work of the

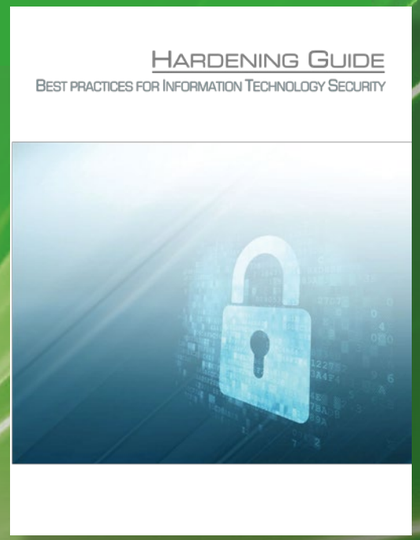
Is your IoT vendor making appropriate efforts and investments to have their products certified by a third-party laboratory?

ASHRAE standards committee and BACnet-related interest groups around the world. The association facilitates the successful use of the BACnet protocol in building automation and control systems through interoperability testing, educational programs, and promotional activities. Of equal importance, BACnet International also oversees the operation of the BACnet Testing Laboratories (BTL) and maintains a global listing of tested products. A virtual "who's who" of the building automation industry have certified product listings on BACnet International's BTL website with interoperability details for over 900 controls products which span almost every aspect of building control.



2 Technology that supports scalable and secure data communications.

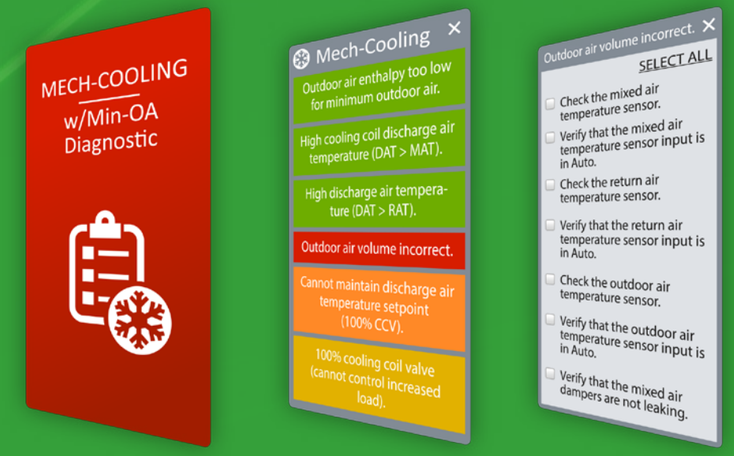
Perhaps more poignant than ever before in our industry is the need for improved information security and improved integrity of scalable network infrastructure. Highly integrated HVAC, lighting, and security solutions from a single vendor have the inherent advantage of being able to benefit from a consistent security-hardening strategy across all building systems. Multi-vendor designs, on the other hand, may introduce unintended systemic security weaknesses implemented in work-arounds used to bridge independent or isolated credentialing and encryption methods - silos of inconsistent security and credentialing processes. Improved solutions employ a single sign on (SSO) architecture with good compliance to IT best practices, implementing scalable credentialing architectures such as LDAP and SAML. Although new efforts such as BACnet's Secure Connect (BACnet/SC), are actively being developed to provide a standardized means to create secure communication connections across the internet and within buildings, other vendors have already developed and implemented effective solutions which resolve this connection issue today. These solutions create scalable and secure private networks which tunnel through public networks, using BACnet virtual private networks (B/VPN).



How will you enforce scalable and secure data communications with multiple isolated IoT vendors?

3 Technology that supports real-time FDD using existing network architectures.

BAS suppliers who deliver a high level of integration between HVAC, lighting, and security systems are ideally positioned to implement effective real-time fault detection and diagnostics (FDD), without third party involvement. The ability for building operators and energy managers to have real-time FDD integrated directly into existing networks is a significant and empowering step towards root-cause analysis and continuous commissioning. Sustainability-minded controls suppliers have already developed and released integrated FDD (IFDD) solutions which help maximize ROI by allowing stakeholders to have real-time fault reporting while using all their existing cabling structures, including twisted-pair networks. Real-time IFDD saves time by avoiding the delayed reporting which may exist with third-party reporting services and extends the expertise of your human capital to help you care for and improve your facility.

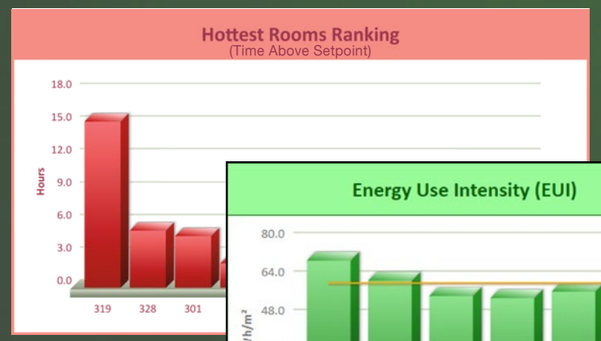


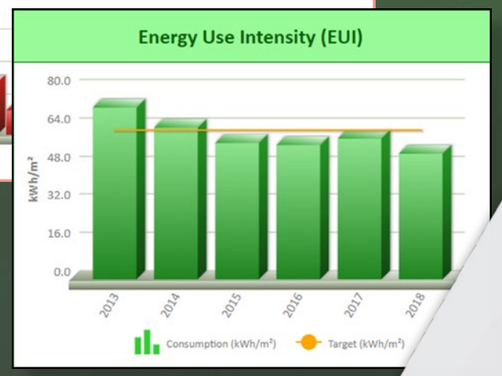
The depth of system knowledge cultivated by building operators empowered by a real-time IFDD solution will likely be far greater than a third party who only has cursory knowledge of your facility. Using existing cabling structures saves money by avoiding potentially costly cabling upgrades required to meet the specifications of vendors whose architectures will not perform acceptably on twisted-pair networks. Real-time IFDD is available from BAS suppliers today, using existing network architectures and onsite servers, avoiding unnecessary cabling upgrades and third-party analytics service providers.

Does your IoT vendor offer real-time FDD for devices on existing network infrastructure?

4 Technology that supports analytics for all stakeholders without relinquishing data ownership.

Analyzing mountains of building data and delivering clear insights which speak appropriately to all stakeholder levels requires a tool that is accessible, easy to use, and responsive to a wide range of stakeholder expectations. The activities which result in effective building performance and occupant comfort are best prioritized and driven by building owners, portfolio managers, energy managers, and building operators, who cannot be effective if they are locked out from changing digital media or held back by vendor-restricted licensing or copyrighted sequence of operations. These stakeholders expect their analytics to be formatted appropriately for their unique needs and distributed in a timely manner according to their diverse schedules. They need to turn information into knowledge and actionable insights. BAS suppliers who provide a high level of integration between HVAC, lighting, and security systems are ideally positioned to distribute effective and timely analytics that speak to all stakeholder levels, delivering clear intelligence. This is especially true when the stakeholders themselves can retain full control of selecting the data being gathered, and formatting and scheduling the reports, while retaining full ownership and control of the data and the reports being generated.





Does your IoT vendor deliver analytics which speak to all stakeholder levels, without relinquishing data ownership?

5 Technology that supports an app-centric building culture.

Buildings are designed and constructed to facilitate a safe and productive environment for their occupants. The occupants of sustainable buildings expect to be recognized by the building's control systems. They expect to be able to interact with their environment using their mobile devices. Parameters such as real-time occupancy, lighting and ventilation levels, thermal comfort levels, and actual or predicted consumption or costs, should be readily available on the occupant's mobile device, ideally delivered as a holistic, single-app experience. By using their mobile devices, the occupants have an opportunity to feel "better connected" with their space, and this, in turn, may develop the confidence needed to take control of their environment and foster accountability for their choices.

BAS suppliers who facilitate a high level of integration between HVAC, lighting, and security systems, are ideally positioned to create an effective occupant-centric user experience because the interface can be designed and delivered on a single app. The app should be widely deployed at minimal or no cost to occupants within a single building or across an enterprise. Mobile app services such as the iStore and Google Play would make the ideal distribution platforms.

How many different IoT apps will it take to control the HVAC, lighting, and security systems in your building?

6 Technology that minimizes waste over its life cycle.

The perception of today's emerging IoT technology can all too easily be paired with a cavalier attitude towards product life cycle. Smart thermostats and IoT sensors along with other edge and cloud computing peripherals such as edge-centric gateways, routers, and data storage units can be regarded as trendy commodities which are expected to be readily and repeatedly replaced due to their rapid technical evolution, with perhaps little or no regard to the environmental impacts of their life-cycle or proper disposal. Vendors who are committed to sustainability understand that carefully engineered designs and meticulous component selection will result in high quality electronic sensors and controllers. Such devices will endure for many years, often outlasting the environment they monitor and the equipment controlled.

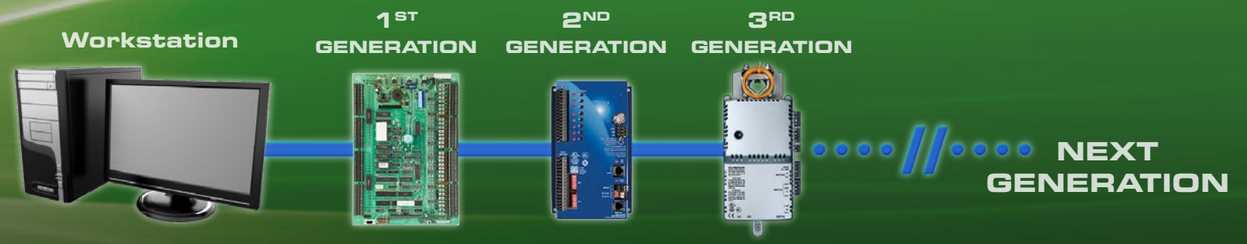
This long-term, better-by-design approach not only provides excellent ROI, but also mitigates the negative impacts of waste management. When electronic components fail or become damaged in the field, life-cycle-centric manufacturers are in an ideal position to offer repair services for those products, even if they have been in the field for decades. Whether the products are under warranty or not, providing effective long-term repair services extends the ROI of the owner's investment and minimizes waste. For situations in which devices are not repairable, manufacturers who are committed to sustainability should participate in environmentally-sound practices such as Waste of Electrical Electronic Equipment Directive (WEEE) and Restriction of Hazardous Substances Directive (RoHS). This reduces the volume of waste by recycling materials from electronic products prior to disposal, while minimizing the negative impacts to the environment by engineering out toxic components in the product design.

Does your IoT vendor offer long-term hardware warranties, repair services, and internationally-recognized cradle-to-grave disposal management?

7 Technology that supports backwards compatibility.

The way a vendor responds to new technologies might shine a light on a fundamental issue in our industry – planned obsolescence. Longevity in the controls industry can give rise to beneficial insights that might not be initially apparent to new stakeholders who are just beginning their careers. When the experience of a BAS supplier spans decades, it is likely the supplier will periodically be compelled to adopt emerging or fundamentally different technologies. The evolution from an older technology to a newer technology has implicit risks for all stakeholders. However, these transitions can present an important learning opportunity for end users and design professionals. It allows these stakeholders to observe how a supplier responds to the issue of backward compatibility with legacy systems and the migration path forward to new technologies. The decisions a BAS supplier makes at these vulnerable and cyclical periods, can be interpreted as a measurement of the "*good will*" that the supplier has or wishes to create, with its existing customer base. It can also be a key indicator of the fortitude the supplier has in its commitment to adhere to several key tenants of sustainability—resilience, waste reduction, and ROI. BAS suppliers who have a longstanding commitment to the benefits of backwards compatibility should be able to minimize the negative impacts of planned obsolescence and provide a migration path forward to new technologies without relying on the tradeoffs associated with third-party gateways or hardware replacement.

Will your IoT vendor orphan their legacy technology, or will they provide an equitable path forward that supports the benefits of backwards compatibility?



8 Technology supported by a broad array of technical services.

The computer industry continues to change with regularly occurring advances in performance, resolution, and applications. Within our controls industry, end user expectations are changing too. Many experienced facility managers are retiring, and with their departure, a good amount of expertise is leaving the industry. The next wave of industry operators has had the good fortune of growing up with the latest generations of computer technology, but are quite new to many fundamental concepts in the building automation industry. BAS suppliers who deliver a high level of integration between HVAC, lighting, and security systems are ideally positioned to help both the experienced and new end users alike, to keep up with the changes. BAS suppliers can provide end-users with a wide array of technical services hosted online, ideally accessible through secure web portals.

OPERATOR CERTIFICATION PROGRAM

Web portals could include links to services such as:

- Engineering materials such as hardening guides and open protocol resources.
- Official releases of software, software manuals, and authorization tools.
- Hardware user guides and troubleshooting tools.
- Operating certification programs which would include enrollment services to a variety of online educational videos and examinations, training manuals, and registration for advanced face-to-face classroom courses. The impact of educational videos would increase significantly when closed-captioned in multiple languages to accommodate a global technical audience.

Does your IoT vendor provide a broad array of online technical services?

Face-to-face class instruction.

9 Technology supported by a global network of local, factory-certified service partners.

Building owners and operators know the importance of having knowledgeable, local, service partners. Partners who are passionate about the quality of their services. Partners who understand that only repeat customers are true customers. Partners who are independently accountable for growing the integrity of their brand, and who understand the expectations of their local community. Great service partners invest in their people and ensure adequate training to maintain their technical knowledge and skill level. BAS suppliers who deliver a high level of integration between HVAC, lighting, and security systems, are ideally positioned to provide factory-certification and support to their authorized service partners. This results in long term, consistent, local support for you and your buildings.

DEALER™ CERTIFICATION PROGRAM

Does your IoT vendor provide a world-wide network of local, factory-certified service partners?

Sustainability requires a high level of integration between HVAC, lighting, and security systems. The art of building sustainability skillfully combines this integration with other technological and supporting elements that must endure over the long term. When these elements are maintained over the life of your building, true building sustainability emerges.

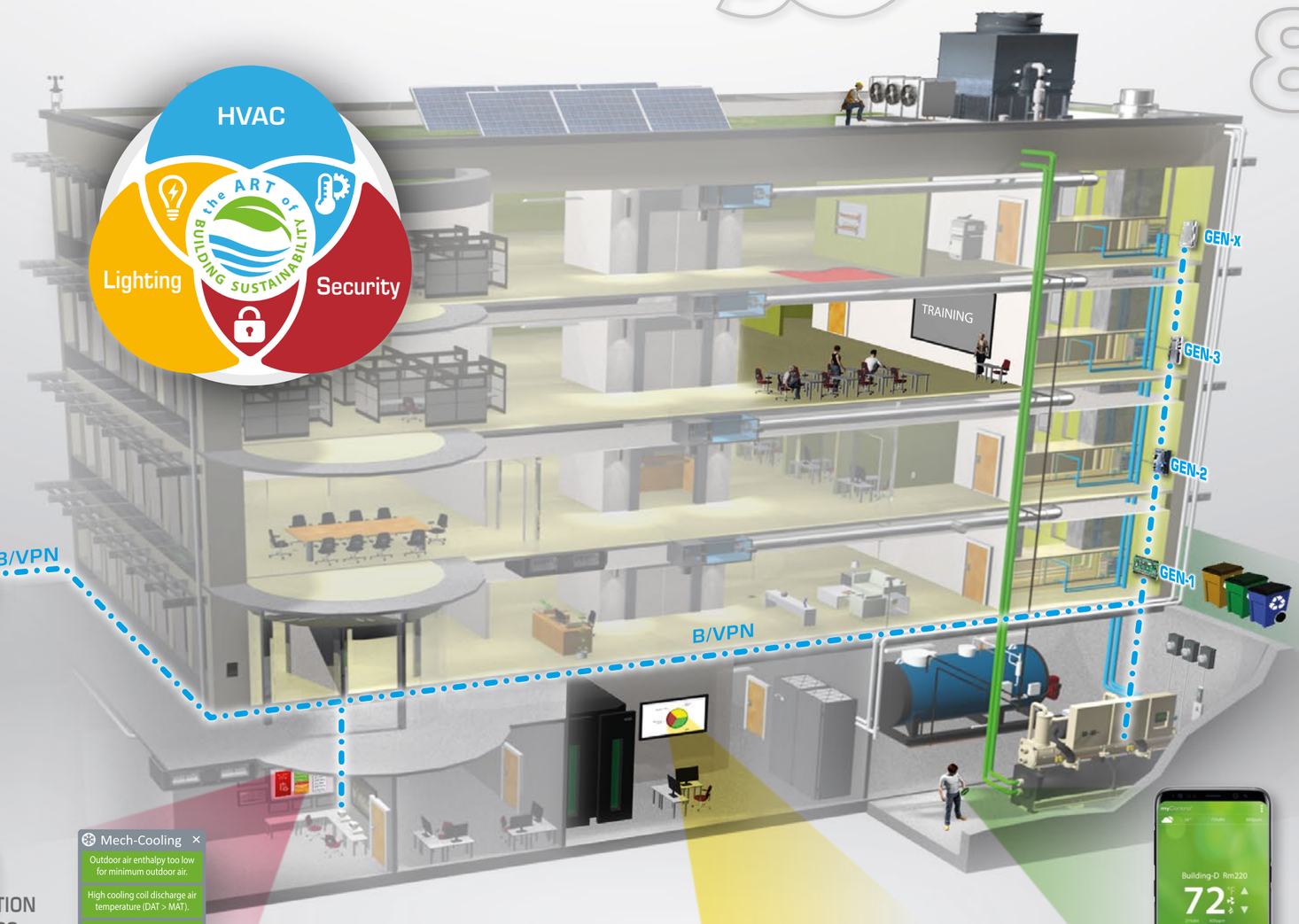
Will your IoT vendor provide effective technological support for the life of your building?

9 FACTORY-CERTIFIED SERVICE

8 OPERATOR TRAINING

1 CERTIFIED OPEN STANDARDS

BACnet® BTL TESTING LABORATORY



7 BACKWARD COMPATIBLE

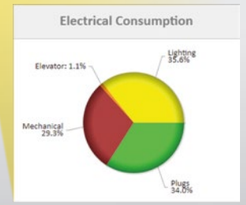
2 SECURE DATA

6 MIMIMAL WASTE

3 INTEGRATED FAULT DETECTION & DIAGNOSTICS

Mech-Cooling ×
- Outdoor air enthalpy too low for minimum outdoor air.
- High cooling coil discharge air temperature (DAT > MAT).
- High discharge air tempera-ture (DAT > RAT).
- Outdoor air volume incorrect.
- Cannot maintain discharge air temperature setpoint (100% CCV).
- 100% cooling coil valve (cannot control increased load).

4 OWNERSHIP OF ANALYTICS



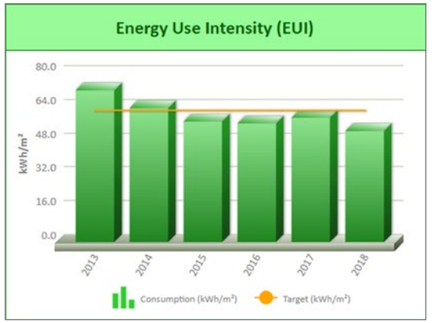
5 SINGLE-APP EXPERIENCE

Better by design™

Reliable Controls®
LEED® Platinum Certified HQ Annex
Annual Review

Continuing a Commitment to Building Sustainability

2018 was the sixth full year of operation for the Reliable Controls South Annex, and the best in terms of low resource consumption.



Full credit to Mother Nature, who delivered a year of mild temperatures… but she showed us her angry side, too with the worst forest fire season on record for our home province of British Columbia. Still, that dark pall of noxious smoke hanging over Victoria for much of August led to cooler outdoor temperatures and reduced energy consumption.

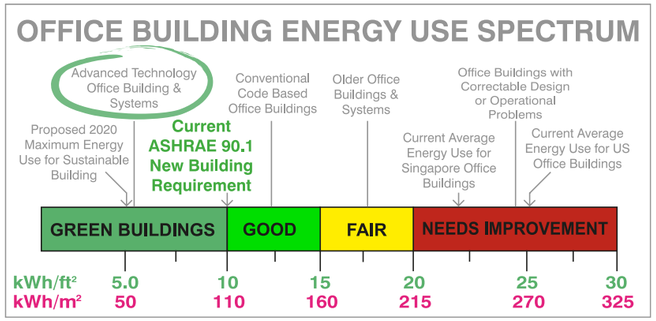
The year started off with higher than expected indoor rainfall, generated by two separate ruptures of our sprinkler system. Both leaks were attributed to poor installation quality of sprinkler modifications associated with an interior renovation project in 2017. After things dried out, we ran a tight ship for the rest of the year… at least according to RC-Reporter®!

The Reliable Controls HQ Annex completed 2018 with an

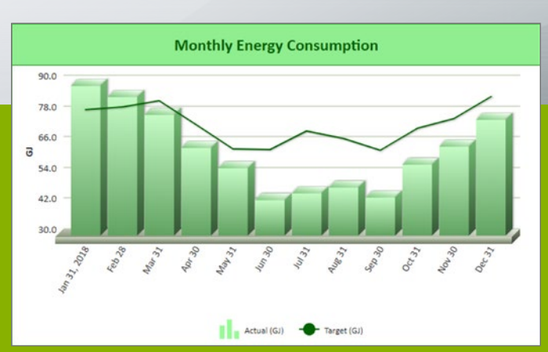
Energy Use Intensity (EUI) of 52.6 kWh/m², below 2016's EUI of 56.1 kWh/m² and nicely below the design target EUI of 58.8 kWh/m²

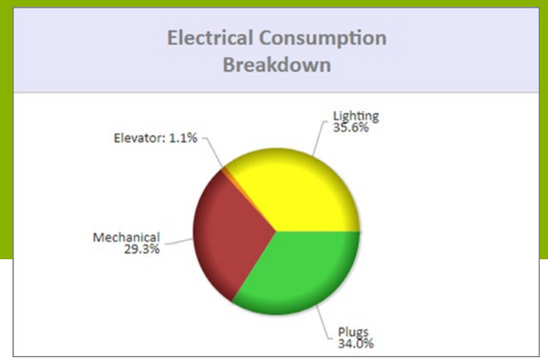
In a presentation by Thomas Hartman at the 2015 International Green Building Conference in Singapore, Mr. Hartman displayed the chart below to help stakeholders appreciate the spectrum of EUI in office buildings. A building designed to be ASHRAE 90.1 will result in an EUI of 110 kwh/m² (10 kwh/ft²). Do you know what the EUI is for your building?

At 52.6 kWh/m², the energy use spectrum chart continues to put the Reliable Controls HQ Annex well into green building territory. Reliable Controls has occupied this space for over six years. During that period, many improvements have been made to the sequence of operation of mechanical and electrical systems. The flexibility of the MACH-System™ means that changes are easy to implement and monitor.



In simple terms, the Reliable Controls HQ Annex uses less than one half of the energy of an energy efficient building!

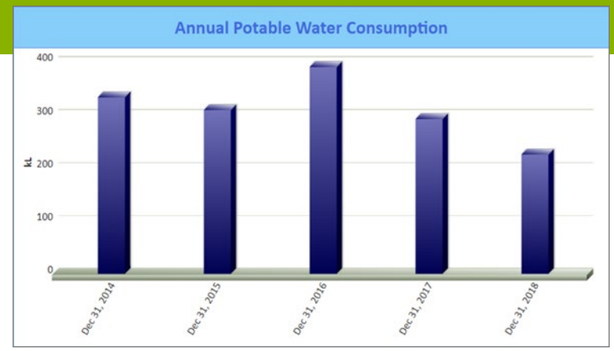




Monthly Energy Consumption

Typically, the South Annex performs better in the summer than the winter, but it hardly uses any energy at all when the outdoor air temperature is between 13 and 22 degrees Celsius. Our MACH-System™ calculates a daily energy target, based on 50% of the ASHRAE 90.1 standard in effect when the building was built, and incorporating actual outdoor temperatures. So, the mild outdoor air temperatures we experienced in 2018 also drove our target down… yet we still killed it!

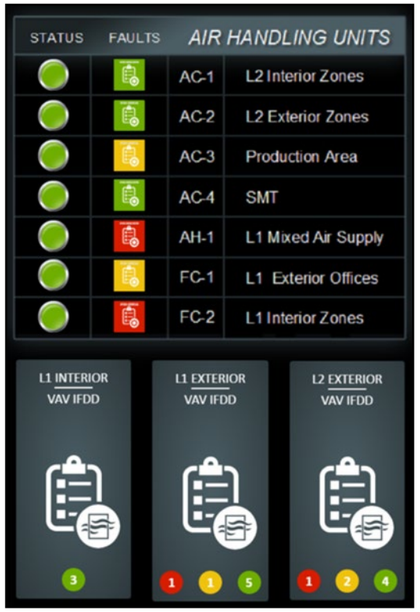
Lighting is still the greatest energy offender in the South Annex, despite integrating each separate fixture to occupancy, and full use of daylight harvesting. In 2019, we will consider upgrading our fluorescent fixtures to LED. We will also implement some level of plug-load control.

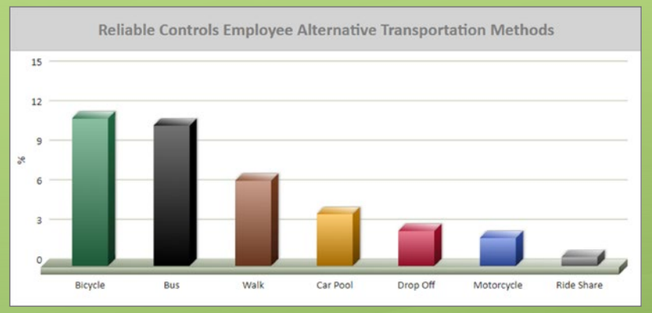


2018 was also a great year for water conservation in the South Annex, ending with the lowest water consumption yet. We managed to kill a few plants during a long summer drought, so we may have to irrigate a bit more in 2019. Still, there is room for improvement in our management of the irrigation system, and we are hopeful of lowering our annual consumption even further.

The facilities department focused more on the operator interface side of the MACH-System in 2018:

1. All system groups were upgraded to enhanced, with 50% of the work complete in the conversion of Flash animations to the newer HTML versions.
2. Reliable Controls implemented an Integrated Fault Detection and Diagnostics (IFDD) solution for all fan systems and VAV boxes (North building).
3. Color overlays were implemented for all floorplans, as the method for indicating the current status of zone air temperature, lighting, air quality, and radiant floor status.
4. The daylight harvesting PID loop used to control fluorescent fixtures was disabled in the fixture, and moved to the MACH-ProZone™, making it much more flexible and tunable.
5. Additional exhaust fans were installed in the conference rooms and server room, in an effort to improve air quality while minimizing the use of fan coils when free cooling is available.
6. RC-WebView® became the new standard operator interface, mainly due to the addition of the Program Editor. The ability to connect anywhere, anytime, from any browser is just too convenient to resist! Enterprise schedules are now used for all weekly and holiday scheduling.



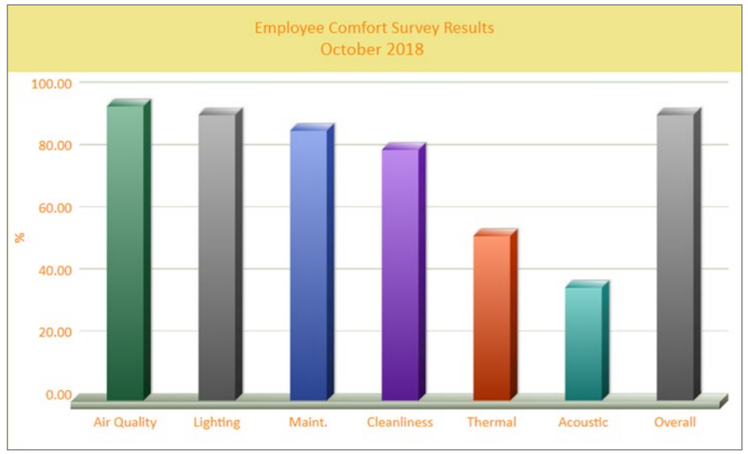


A little magic with the payroll system, and we were able to export data into RC-Reporter, showing how our employees travel to work each day. We discovered that on average, 38% of staff do not arrive at work as the only occupant of a motor vehicle! Also, the bicycle riders better 'mount up' if they hope to keep ahead of the bus riders, who really 'stepped up' last year. In January 2019, we added electric vehicles to the list of transportation methods, with a half dozen employees already invested in this technology.

In October 2018 Reliable Controls completed the results of its first occupant comfort survey. The overall satisfaction rating for the South Annex was 91.7%, which is excellent, and well above our goal of 80%.

With respect to thermal comfort, many employees reported discomfort due to cold drafts and generally cold temperatures in the winter months. In particular, Monday mornings in the winter are just too cold. Although the MACH-System is programmed to pre-warm the radiant floors prior to occupancy each morning, the air temperature is not warmed sufficiently by the floors, and the discrepancy is greatest on Monday mornings, after the building has been cold all weekend. It appears that we need to revise the sequence of operation and expend some energy to pre-warm the air Monday mornings.

As for acoustic comfort, we were disappointed to learn that employees are still not happy with ambient noise, even after Reliable Controls spent significant funds in the previous year to enclose all of the private offices. The remaining complaint is all about employees having audible conversations in the vicinity of other employees who are trying to focus. We are hoping to improve this situation with training distributed by the HR department. Employees need to carry out work and non-work related conversions in private offices and conference rooms away from those who are focusing on tasks at their workstations.



Better by design™

Welcome to New Dealers

New Reliable Controls Authorized Dealers

Advanced Energy Management Ltd.
Dartmouth, NS, Canada

Asesorias & Soluciones de Ingenieria SAS
Bogota, DC, Colombia

Automated Building Systems, Inc.
Glastonbury, CT, USA

Building Management Systems
Urbandale, IA, USA

CorpoSistemas
La Coruna, Spain

Gen-Tech Automation Pvt Ltd.
Hyderabad, India

Integrated Facility Services Inc.
Vichy, MO, USA

SmartSys Automation Ltd.
St. James, WI, Trinidad and Tobago

Systec Automation SA DE CV
Mexico City, Exatepec, Mexico

Youone Engineering Co. Ltd.
Seoul, South Korea

THE RISE

STATE COLLEGE, PA, USA

RESIDENTIAL

OVERVIEW

The Rise is a student housing facility that provides apartment-style living for students that attend Penn State University.

PROJECT DETAILS

Reliable Controls Authorized Dealer, Nexgen Automation Inc., successfully completed this new construction project for "The Rise". The Rise is a 12-storey building in downtown State College, PA - one of the largest and newest buildings in the downtown area. The building was designed to house 570 students in apartment-style living.

Networked hardware for this project includes MACH-ProWeb™ and MACH-Pro2™ controllers with expansion modules for the HVAC portion of the project, and MACH-ProSys™ UUKL-listed smoke controllers and expansion modules for the smoke control system.

Mechanical equipment includes a water source heatpump loop with variable speed loop pumps, cooling tower, variable speed pumps for the tower, and three boilers. The system maintains the temperature of the loop at the optimum setpoint to maximize efficiency for both the loop and the heatpumps it serves. Make-up air to the building is provided by six energy recovery units that are integrated into the system. In addition, the system monitoring the underground parking garage and controlling variable speed exhaust fans maintains safe carbon monoxide levels.

The smoke control system was a last-minute addition to the scope of work. A complex smoke evacuation sequence had to be implemented to achieve proper pressurization and smoke evacuation for the 12-storey building in the event of an emergency. All smoke control equipment, controls, panels, and wiring had to be procured and installed on an extremely tight schedule. In addition, complex custom software had to be written, tested, and validated to control the various exhaust fans, smoke dampers, and fire fighters' annunciator panel. Nexgen's team of professionals delivered a complete, operational, tested, and verified UUKL system and ensured the safety of the students in time for the start of the Fall semester.

This was a successful new construction project, which earned LEED® silver certification.

To learn more about projects using Reliable Controls® visit
www.reliablecontrols.com/projects/overview

PROJECT TYPE:
New Construction

INSTALLATION TYPE:
Boiler, Heatpump, HVAC, Smoke, Cooling Tower

TOTAL AREA:
27,884 m^2 (300,139 ft^2)

NETWORK:
EIA-485, BACnet®

POINTS:
224

EQUIPMENT INSTALLED:
MACH-ProWebSys™
MACH-Pro2™
MACH-ProSys™

RELIABLE CONTROLS® DEALER:
Nexgen Automation Inc.

www.reliablecontrols.com

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