Benefits of Building Automation Systems



Benefits of Building Automation Systems

<u>Lowers Utility Costs</u>: Building Automation Systems typically save 15% of the operating costs of the equipment. For most buildings, this results in savings that range from 0.20 to 0.40 ft².

<u>Maintains Measured Comfort</u>: Computerized controls help to maintain even temperatures and lighting levels within the facility to provide measured comfort. Maintaining consistent temperature and lighting levels cuts down on wasted energy.

Enhances Property Value: The value of most commercial buildings is related to the net operating income. Lowering utility costs increases the net operating income on a dollar for dollar basis. Every 0.10/ ft² saved in energy could increase the market value of the property by 0.80/ ft². A 100,000 ft² building could increase in value by \$120,000 by reducing energy costs 0.15/ ft².

<u>Reduces Occupant Complaints</u>: A more comfortable building means fewer occupant complaints. This means less time resolving complaints, happier occupants, and a more productive business environment.

Increased Productivity: Better ventilation and air quality improve greater worker productivity and less sick time. The value benefits average $\frac{25.00}{ft^2}$. With decreased sick days

translated into a net impact of about 5.00/ ft² and increased in productivity translated into a net impact of about 20.00/ ft².

<u>Simplifies Building Operation</u>: Computerized controls and real time graphical displays let you see exactly what is happening with the equipment in the building without having to go up on the roof or crawl up into the ceilings. This saves on costly troubleshooting visits, and simplifies operations.

<u>Reduces Maintenance Costs</u>: Running the equipment less and controlling it better reduces wear-and-tear and keeps maintenance costs down, and extends equipment life.

Avoids Business Interruptions: Unexpected equipment breakdowns can cause costly business interruptions. The cost of employees and/or processes in a building can be 75 to 100 times the facility operating cost on a square foot basis. The impact when customers are involved can be even more costly. Breakdowns and emergency repairs are very expensive. Computerized controls monitor equipment status and help you head-off unexpected problems.

<u>A Great Investment</u>: Most systems will pay for themselves in less than two years.

Typical numbers for an owner-occupied 100,000 ft² building would be as follows:

- Total system cost \$200,000 (\$2/ ft²)
- Utility Company rebate \$30,000 (15% rebate)
- Annual energy savings* \$15,000 (15% savings)
- Annual productivity loss avoidance * \$50,000 (1% savings)
- Annual 0 & M cost avoidance* \$10,000 (10% savings)
- Simple payback 1.3 years

*Annual cost avoidance year after year.

How Does Building Automation Work?

HVAC and Lighting Controls: Stand-alone computerized controllers are installed to take over the control of building HVAC (heating, ventilation, and air conditioning) systems and lighting. The building is not only scheduled more closely but it is also operated more intelligently and efficiently.

<u>Outside Air Optimization</u>: The proper control of outside air provides necessary inside air changes for occupant comfort and health, minimizes energy costs by space pre-conditioning, allows for enthalpy-based free cooling (Learn more about Enthalpy), and reduces the use of outside air when it is not needed.

<u>Coordinating Equipment</u>: Orchestrating the operation of building systems, so that equipment works together, saves energy and improves comfort. Individual control systems that are not centrally monitored and coordinated can fight each other or malfunction, causing comfort problems and wasting considerable energy. BACnet based BAS can interface to existing or planned systems so that the building will run smoothly and at peak efficiency without expensive duplication of controls or unnecessary complexity.

Graphical Operation: Simplifying facility operation and integrating data from various systems in a unified manner is best accomplished with a graphical user interface. This eliminates the need to memorize commands or point numbers, and allows the operator to take a walking tour of the facility from the console. Existing systems can be easily upgraded to add this powerful operational tool. Point and click graphics empowers management by letting everyone see what is going on and taking the mystery out of proper operations.

Direct Digital Controls (DDC): Upgrade older existing equipment to DDC to match new equipment functionality. These controllers come standard on most new mechanical equipment and

are more reliable, require less maintenance, provide more sophisticated control, and are less expensive to purchase and operate.

Tighter Scheduling: Conventional controls, such as analog time clocks, are inaccurate and are typically setup to run equipment longer than needed. By automating this function with computerized controls, the computer can predict the optimum time to start/stop equipment based on an astronomical smart schedule and eliminate waste caused by excessive runtime.

<u>Smarter Control</u>: HVAC equipment is typically sized to handle the building load under worst-case scenario (conditions). Most conventional controls are set up to always meet these design criteria. With the automation system, control set points and strategies can be adjusted to meet only the actual load, eliminating unnecessary waste.

Interested in implementing commercial building controls?

Lite Rite Controls specializes in lighting controls which can integrate into your building automation system. We have Lutron Vive and Crestron Zum, systems that are scalable and easy to use. Contact us to learn more.

Visit – Lite Rite Controls

Call us at (562)294-0660

or

Email at info@literitecontrols.com or jerimiah@literitecontrols.com

RESIDENTIAL LIGHTING - TEST, CERTIFY & COMPLY



In what will be our continuing effort to help contractors master the intricacies of code compliance, Lite Rite Controls will post handouts, slide decks, articles and PowerPoint presentation. Our goal is to disperse information on ever changing code requirements and give contractors a place to reference as they grow accustom to Title 24, ASHRAE 90.1, IECC or any other local code requirements they may deal with. This presentation is from March 2017.

Energy Code Ace presentation on T24 rules that went into effect January 1, 2017. In this presentation:

- Overview of Energy Code Ace
- Overview of California's New Lighting Requirement
- Overview of 2016 Title 24, Part 6 Reference Joint Appendix JA8
- Overview of 2016 Title 24, Part 6 Reference Joint Appendix JA10 for Flicker Testing
- How to comply with 2016 Title 24, Part 6 JA8

T24_Res-Ltg_Test-Certify-Comply_Session-handout

Energy codes and standards for every states in the US

Alabama

Current Code: ASHRAE Standard 90.1-2013

Approximate Energy Efficiency: Equivalent to ASHRAE 90.1-2013

Effective Date: Jan. 01, 2016

Code Enforcement: Mandatory

Current Code: 2015 IECC with Amendments

Approximate Energy Efficiency: Less energy efficient than 2015 IECC

Effective Date: Oct. 01, 2016

Code Enforcement: Mandatory

Alaska

Current Code: None Statewide

Effective Date: Jul. 01, 2013

Code Enforcement: Voluntary Current Code: None Statewide

Effective Date: Jul. 01, 2013

Code Enforcement: Voluntary

American Samoa

Current Code: None Statewide Current Code: None Statewide Arizona Current Code: None Statewide Current Code: None Statewide Arkansas Current Code: 2009 IECC Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Jan. 01, 2015 Code Enforcement: Mandatory Current Code: 2009 IECC with Amendments Approximate Energy Efficiency: Less energy efficient than 2009 IECC Effective Date: Jan. 01, 2015 Code Enforcement: Mandatory California Current Code: State Specific Approximate Energy Efficiency: More energy efficient than ASHRAE 90.1-2010 Effective Date: Jan. 01, 2014 Code Enforcement: MandatoryCurrent Code: State Specific Approximate Energy Efficiency: More energy efficient than 2012

IECC

Effective Date: Jan. 01, 2014 Code Enforcement: Mandatory Colorado Current Code: 2003 IECC Approximate Energy Efficiency: Equivalent to 2003 IECC Effective Date: Jan. 01, 2008 Code Enforcement: MandatoryCurrent Code: 2003 IECC Approximate Energy Efficiency: Equivalent to 2003 IECC Effective Date: Jan. 01, 2008 Code Enforcement: Mandatory Connecticut Current Code: 2012 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Oct. 01, 2016 Code Enforcement: MandatoryCurrent Code: 2012 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Oct. 01, 2016 Code Enforcement: Mandatory

Delaware

Current Code: ASHRAE Standard 90.1-2010

Approximate Energy Efficiency: Equivalent to ASHRAE 90.1-2010

Effective Date: May. 11, 2014

Code Enforcement: MandatoryCurrent Code: 2012 IECC with Amendments

Approximate Energy Efficiency: Less energy efficient than 2012 IECC

Effective Date: May. 11, 2014

Code Enforcement: Mandatory

Florida

Current Code: State Specific

Approximate Energy Efficiency: More energy efficient than 2012 IECC

Effective Date: Jun. 30, 2015

Code Enforcement: MandatoryCurrent Code: State Specific

Approximate Energy Efficiency: More energy efficient than 2012 IECC

Effective Date: Jun. 30, 2015

Code Enforcement: Mandatory

Georgia

Current Code: 2009 IECC with Amendments

Approximate Energy Efficiency: Equivalent to 2009 IECC

Effective Date: Jan. 01, 2011

Code Enforcement: MandatoryCurrent Code: 2009 IECC with Amendments

Approximate Energy Efficiency: More energy efficient than 2009 IECC

Effective Date: Jan. 01, 2011

Code Enforcement: Mandatory

Guam

Current Code: State Specific

Approximate Energy Efficiency: Equivalent to 2009 IECC

Effective Date: Oct. 01, 2010

Code Enforcement: MandatoryCurrent Code: 2009 IRC

Approximate Energy Efficiency: Equivalent to 2009 IECC

Code Enforcement: Mandatory

Hawaii

Current Code: 2015 IECC with Amendments

Approximate Energy Efficiency: Equivalent to 2015 IECC

Effective Date: Jul. 14, 2015

Code Enforcement: MandatoryCurrent Code: 2015 IECC with Amendments

Approximate Energy Efficiency: Equivalent to 2015 IECC

Effective Date: Jul. 14, 2015

Code Enforcement: Mandatory

Idaho

Current Code: 2012 IECC

Approximate Energy Efficiency: Equivalent to 2012 IECC

Effective Date: Jan. 01, 2015

Code Enforcement: MandatoryCurrent Code: 2012 IECC with Amendments

Approximate Energy Efficiency: Less energy efficient than 2012 IECC

Effective Date: Jan. 01, 2015

Code Enforcement: Mandatory

Illinois

Current Code: 2015 IECC with Amendments

Approximate Energy Efficiency: Equivalent to 2015 IECC

Effective Date: Jan. 01, 2016

Code Enforcement: MandatoryCurrent Code: 2015 IECC with Amendments

Approximate Energy Efficiency: Less energy efficient than 2015 IECC

Effective Date: Jan. 01, 2016

Code Enforcement: Mandatory

Indiana

Current Code: State Specific

Approximate Energy Efficiency: Equivalent to ASHRAE 90.1-2007

Effective Date: May. 06, 2010 Code Enforcement: MandatoryCurrent Code: State Specific Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Apr. 05, 2012 Code Enforcement: Mandatory Iowa Current Code: 2012 IECC Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Jun. 01, 2014 Code Enforcement: MandatoryCurrent Code: 2012 IECC with Amendments Approximate Energy Efficiency: Less energy efficient than 2012 IECC Effective Date: Jun. 01, 2014 Code Enforcement: Mandatory Kansas Current Code: None Statewide Effective Date: Apr. 10, 2007 Code Enforcement: Voluntary Current Code: None Statewide Kentucky Current Code: 2012 IECC

Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Oct. 01, 2014 Code Enforcement: MandatoryCurrent Code: 2009 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Oct. 01, 2014 Code Enforcement: Mandatory Louisiana Current Code: ASHRAE Standard 90.1-2007 Approximate Energy Efficiency: Equivalent to ASHRAE 90.1-2007 Effective Date: Jul. 20, 2011 Code Enforcement: MandatoryCurrent Code: 2009 IRC Approximate Energy Efficiency: Equivalent to 2009 IRC Effective Date: Jan. 01, 2015 Code Enforcement: Mandatory Maine Current Code: ASHRAE Standard 90.1-2007 Approximate Energy Efficiency: Equivalent to ASHRAE 90.1-2007 Effective Date: Dec. 01, 2010 Code Enforcement: MandatoryCurrent Code: 2009 IECC Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Dec. 01, 2010

Code Enforcement: Mandatory

Maryland

Current Code: 2015 IECC

Approximate Energy Efficiency: Equivalent to 2015 IECC

Effective Date: Jan. 01, 2015

Code Enforcement: MandatoryCurrent Code: 2015 IECC

Approximate Energy Efficiency: Equivalent to 2015 IECC

Effective Date: Jan. 01, 2015

Code Enforcement: Mandatory

Massachusetts

Current Code: 2012 IECC

Approximate Energy Efficiency: Equivalent to 2012 IECC

Effective Date: Jul. 01, 2014

Code Enforcement: MandatoryCurrent Code: 2012 IECC

Approximate Energy Efficiency: Equivalent to 2012 IECC

Effective Date: Jul. 01, 2014

Code Enforcement: Mandatory

Michigan

Current Code: 2012 IECC with Amendments

Approximate Energy Efficiency: Equivalent to 2012 IECC

Effective Date: Jun. 02, 2015

Code Enforcement: MandatoryCurrent Code: 2012 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Feb. 14, 2015 Code Enforcement: Mandatory Minnesota Current Code: 2012 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Jun. 02, 2015 Code Enforcement: MandatoryCurrent Code: 2012 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Feb. 14, 2015 Code Enforcement: Mandatory Mississippi Current Code: ASHRAE Standard 90.1-2010 Approximate Energy Efficiency: Equivalent to ASHRAE 90.1-2010 Effective Date: Jul. 01, 2013 Code Enforcement: MandatoryCurrent Code: None Statewide Missouri Current Code: None Statewide Current Code: None Statewide

Montana

Current Code: 2012 IECC

Approximate Energy Efficiency: Equivalent to 2012 IECC

Effective Date: Nov. 07, 2014

Code Enforcement: MandatoryCurrent Code: 2012 IECC with Amendments

Approximate Energy Efficiency: Less energy efficient than 2012 IECC

Effective Date: Nov. 07, 2014

Code Enforcement: Mandatory

Nebraska

Current Code: 2009 IECC

Approximate Energy Efficiency: Equivalent to 2009 IECC

Effective Date: Aug. 24, 2011

Code Enforcement: MandatoryCurrent Code: 2009 IECC

Approximate Energy Efficiency: Equivalent to 2009 IECC

Effective Date: Aug. 24, 2011

Code Enforcement: Mandatory

Nevada

Current Code: 2012 IECC

Approximate Energy Efficiency: Equivalent to 2012 IECC

Effective Date: Jul. 01, 2015

Code Enforcement: MandatoryCurrent Code: 2012 IECC Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Jul. 01, 2015 Code Enforcement: Mandatory New Hampshire Current Code: 2009 IECC Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Apr. 01, 2010 Code Enforcement: MandatoryCurrent Code: 2009 IECC Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Apr. 01, 2010 Code Enforcement: Mandatory New Jersey Current Code: ASHRAE Standard 90.1-2013 Approximate Energy Efficiency: Equivalent to ASHRAE 90.1-2013 Effective Date: Sep. 21, 2015 Code Enforcement: MandatoryCurrent Code: 2015 IECC Approximate Energy Efficiency: Equivalent to 2015 IECC Effective Date: Sep. 21, 2015 Code Enforcement: Mandatory

New Mexico

Current Code: 2009 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Jan. 01, 2012 Code Enforcement: MandatoryCurrent Code: 2009 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Jan. 01, 2012 Code Enforcement: Mandatory New York Current Code: 2015 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2015 IECC Effective Date: Oct. 03, 2016 Code Enforcement: MandatoryCurrent Code: 2015 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2015 IECC Effective Date: Oct. 03, 2016 Code Enforcement: Mandatory North Carolina Current Code: State Specific Approximate Energy Efficiency: More energy efficient than 2009 IECC Effective Date: Mar. 01, 2012 Code Enforcement: MandatoryCurrent Code: State Specific

Approximate Energy Efficiency: More energy efficient than 2009 IECC

Effective Date: Mar. 01, 2012

Code Enforcement: Mandatory

North Dakota

Current Code: None Statewide

Effective Date: Jan. 01, 2014

Code Enforcement: Voluntary Current Code: None Statewide

Effective Date: Jan. 01, 2014

Code Enforcement: Voluntary

Northern Mariana Islands

Current Code: Tropical Model Energy Code

Approximate Energy Efficiency: Equivalent to ASHRAE 90.1-2001

Current Code: Tropical Model Energy Code

Approximate Energy Efficiency: Equivalent to ASHRAE 90.1-2001

Ohio

Current Code: 2012 IECC with Amendments

Approximate Energy Efficiency: Equivalent to 2012 IECC

Effective Date: Jan. 01, 2017

Code Enforcement: MandatoryCurrent Code: 2012 IECC with Amendments

Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Jan. 01, 2017 Code Enforcement: Mandatory Oklahoma Current Code: 2006 IECC Approximate Energy Efficiency: Equivalent to 2006 IECC Effective Date: Jul. 15, 2011 Code Enforcement: MandatoryCurrent Code: 2009 IECC Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Nov. 01, 2016 Code Enforcement: Mandatory **Oregon** Current Code: State Specific Approximate Energy Efficiency: Equivalent to ASHRAE 90.1-2010 Effective Date: Jul. 01, 2014 Code Enforcement: MandatoryCurrent Code: State Specific Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Dec. 01, 2014 Code Enforcement: Mandatory Pennsylvania Current Code: 2009 IECC

Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Dec. 31, 2009 Code Enforcement: MandatoryCurrent Code: 2009 IECC Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Dec. 31, 2009 Code Enforcement: Mandatory Puerto Rico Current Code: None Statewide Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Feb. 24, 2011 Code Enforcement: MandatoryCurrent Code: None Statewide Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Feb. 24, 2011 Code Enforcement: Mandatory Rhode Island Current Code: 2012 IECC Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Jul. 01, 2013 Code Enforcement: MandatoryCurrent Code: 2012 IECC Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Jul. 01, 2013

Code Enforcement: Mandatory

South Carolina

Current Code: 2009 IECC

Approximate Energy Efficiency: Equivalent to 2009 IECC

Effective Date: Jan. 01, 2013

Code Enforcement: MandatoryCurrent Code: 2009 IECC

Approximate Energy Efficiency: Equivalent to 2009 IECC

Effective Date: Jan. 01, 2013

Code Enforcement: Mandatory

South Dakota

Current Code: None Statewide

Current Code: None Statewide

Approximate Energy Efficiency: Equivalent to 2009 IECC

Effective Date: Jul. 01, 2011

Code Enforcement: Voluntary

Tennessee

Current Code: 2012 IECC

Approximate Energy Efficiency: Equivalent to 2012 IECC

Effective Date: Aug. 04, 2016

Code Enforcement: MandatoryCurrent Code: 2006 IECC

Approximate Energy Efficiency: Equivalent to 2006 IECC

Effective Date: Jul. 01, 2011 Code Enforcement: Mandatory Texas Current Code: 2015 IECC Approximate Energy Efficiency: Equivalent to 2015 IECC Effective Date: Nov. 01, 2016 Code Enforcement: MandatoryCurrent Code: 2015 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2015 IECC Effective Date: Sep. 01, 2016 Code Enforcement: Mandatory U.S. Virgin Islands Current Code: 2009 IECC Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Jul. 01, 2009 Code Enforcement: MandatoryCurrent Code: 2009 IECC Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Jul. 01, 2009 Code Enforcement: Mandatory Utah Current Code: 2015 IECC

Approximate Energy Efficiency: Equivalent to 2015 IECC Effective Date: Jul. 01, 2016 Code Enforcement: MandatoryCurrent Code: 2015 IECC with Amendments Approximate Energy Efficiency: Less energy efficient than 2015 IECC Effective Date: Jul. 01, 2016 Code Enforcement: Mandatory Vermont Current Code: State Specific Approximate Energy Efficiency: Equivalent to 2015 IECC Effective Date: Mar. 01, 2015 Code Enforcement: MandatoryCurrent Code: State Specific Approximate Energy Efficiency: Equivalent to 2015 IECC Effective Date: Mar. 01, 2015 Code Enforcement: Mandatory Virginia Current Code: 2012 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Jul. 14, 2014 Code Enforcement: MandatoryCurrent Code: 2012 IECC with Amendments Approximate Energy Efficiency: Less energy efficient than 2012

IECC

Effective Date: Jul. 14, 2014 Code Enforcement: Mandatory Washington Current Code: State Specific Approximate Energy Efficiency: Equivalent to 2015 IECC Effective Date: Jul. 01, 2016 Code Enforcement: MandatoryCurrent Code: State Specific Approximate Energy Efficiency: Equivalent to 2015 IECC Effective Date: Jul. 01, 2016 Code Enforcement: Mandatory Washington, DC Current Code: 2012 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2012 IECC Effective Date: Mar. 28, 2014 Code Enforcement: MandatoryCurrent Code: 2012 IECC with Amendments Approximate Energy Efficiency: Less energy efficient than 2012 TFCC Effective Date: Mar. 28, 2014 Code Enforcement: Mandatory

West Virginia

Current Code: ASHRAE Standard 90.1-2007 Approximate Energy Efficiency: Equivalent to ASHRAE 90.1-2007 Effective Date: Sep. 01, 2013 Code Enforcement: MandatoryCurrent Code: 2009 IECC Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Nov. 30, 2013 Code Enforcement: Mandatory Wisconsin Current Code: State Specific Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Sep. 01, 2011 Code Enforcement: MandatoryCurrent Code: 2009 IECC with Amendments Approximate Energy Efficiency: Equivalent to 2009 IECC Effective Date: Jan. 01, 2016 Code Enforcement: Mandatory Wyoming Current Code: None Statewide Approximate Energy Efficiency: Less energy efficient than 2003 IECC Effective Date: Aug. 13, 2008 Code Enforcement: Voluntary Current Code: None Statewide

Approximate Energy Efficiency: Less energy efficient than 2003 IECC

Effective Date: Aug. 13, 2008

Code Enforcement: Voluntary