Mixed Use Buildings Market Bundle

Right Channel, Right Technology, Right Value Proposition

Chris Hollinger, CPS Business Line Manager
“A mixed-use development is a real estate project with planned integration of some combination of retail, office, residential, hotel, recreation or other functions. It is pedestrian-oriented and contains elements of a live-work-play environment. It maximizes space usage, has amenities and architectural expression and tends to mitigate traffic and sprawl.”
Source: BOMA
Mixed Use Definition

Mixed-use development is a multistory building typically with commercial uses on a ground floor or lower level floors, and an entry lobby with elevators and/or escalators, plus additional access areas such as hallways or stairways that lead to either commercial office space, and/or individual residential or hotel units above or behind the commercial uses. Parking is often shared, whether in a garage or parking court.
The Mixed Use Commercial/Residential Buildings Market can be Summarized by Key Characteristics

<table>
<thead>
<tr>
<th>Segments: Commercial Office, Residential and Mixed Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decision makers: Consultants/Contractors, Facility Managers, Real Estate Managers</td>
</tr>
<tr>
<td>Market challenges: Limited facilities personnel and budgets</td>
</tr>
<tr>
<td>Primary Goals: Enhance occupancy rates and satisfaction of tenants</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key Influencers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultants</td>
</tr>
<tr>
<td>Facility Managers</td>
</tr>
<tr>
<td>Real Estate Mgmt groups</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trends: Heavy focus on Sustainability Comfort &amp; Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Needs: HVAC, Lighting, Power and Energy, Fire</td>
</tr>
<tr>
<td>Controls trends: Bundled controls and equipment</td>
</tr>
<tr>
<td>Budgets: Cost sensitive/budget neutral improvements</td>
</tr>
</tbody>
</table>

**Key Differentiators**
- Tenant Comfort and Involvement
- Tenant Satisfaction and Retention
- Energy Efficiency

© Siemens AG 2016 All rights reserved.
Mixed Use Trends

Urban Communities
As the millennial generation takes the reins, their preference for a live/work/play urban community is driving commercial real estate development. Some of the most significant projects currently underway involve mixed-use properties that combine residential, retail, and workplace options that are mingled to create a walkable, 24/7 urban neighborhood. Considerations that are very important to this demographic include:
  • Convenience
  • Sustainability
  • Amenities
It feels like the commercial real estate industry is changing more rapidly than ever before, and this is due to our adoption of technology.

Source: RealConnex
What we offer:
Improved Tenant Experience + Lower Operating Cost and Improved Energy Savings = Value Creation

Vision:
Siemens and our VAPs can maximize tenant comfort and safety while helping real estate and property management organizations lower energy costs and meet their sustainability goals.

Tenant / Resident Comfort & Benefits
- Optimal comfort throughout the facility while providing advanced energy management and control of your utility costs
- Intuitive user interface and experience
- Effective training for building managers to run our intuitive systems and make changes as needed

Lowering Costs – 20–40%
- Facility-wide energy management results through monitoring and benchmark check points: 20–40% savings
- Energy efficiency strategies to reduce costs and meet sustainability goals
- Efficient, labor-saving BAS tools to support facility maintenance staff
- Integration capabilities into a number of critical applications (ex: power management and utility metering applications, lighting applications, fire life/safety solutions)
- Energy dashboard tools for use with staff to help manage energy spend and understand facility operations

One partner
- Bundled portfolio to suit your needs
- One resource, reducing your overall engagement costs

Differentiation

© Siemens AG 2016 All rights reserved.
Market data supports growth trends in commercial and multi family construction starts

- Double digit % growth in multi family residential buildings 2010-2016
- Double digit % growth in commercial buildings 2010-2016
- Both categories substantially outperformed total construction 2010-2016

**Multi Family Residential Construction Starts**

- Source: Dodge Report 2016

![Multi Family Residential Construction Starts Graph](image)

**Commercial Buildings Construction Starts**

- Source: Dodge Report 2016

![Commercial Buildings Construction Starts Graph](image)
Mixed Use Buildings Market Bundle

“A mixed-use development is a real estate project with planned integration of some combination of retail, office, residential, hotel, recreation or other functions. It is pedestrian-oriented and contains elements of a live-work-play environment. It maximizes space usage, has amenities and architectural expression and tends to mitigate traffic and sprawl.”
Source: BOMA

Contents

- Definitions of market and trends
- Example Projects
- Know the Customer Needs
- Product Solutions
Large-scale mixed-use projects were the hottest development trend in the mid-2000s, as the appeal of urban living and walkable communities was taking hold. But the double-punch of the recession and the realization that mixed-use was a complicated property type to execute successfully delayed some of the projects, while taking others off the board. However, judging by a list that was put together by CoStar, a Washington, D.C.-based research firm, mixed-use development is back in a big way. To look at some of the largest mixed-use projects currently in the works around the country, in ascending order, click through our slideshow.

Source: National Real Estate Investor
Example Projects

Buckhead Atlanta in Atlanta/800,000 sq. ft.
Developed by Oliver McMillan, this 800,000-sq.-ft.-plus Atlanta property will span several city blocks. It will be comprised of 400,000 sq. ft. of high-rise residential space, 300,000 sq. ft. of luxury retail and 100,000 sq. ft. of class-A office space.
Example Projects

Downtown East in Minneapolis/approximately 1.2 million sq. ft.
This $400 million project, encompassing five blocks in downtown Minneapolis, will combine 1.2 million sq. ft. of office space in two 17-story towers with 28,000 sq. ft. of retail on the ground level and 420 residential units delivered in two phases. Developed by the Ryan Cos. it will be connected via a skyway to the Vikings Stadium and is expected to spearhead the revitalization of Minneapolis’ Downtown East neighborhood.
Example Projects

Comcast Innovation and Technology Center in Philadelphia/1.57 million sq. ft.
The product of a collaboration between the Comcast Corp. and Liberty Property Trust, this $1.2 billion, 1.57-million-sq.-ft. Philadelphia development will include an office component, a 200-plus-room Four Seasons hotel and restaurants and shops on the ground level. Designed by Lord Norman Foster and rising 1,121 feet, it will be the largest private development project in the city’s history.
Example Projects

Wilshire Grand in Los Angeles/1.7 million sq. ft.
This Los Angeles redevelopment project by Korean Air will feature a 900-room luxury hotel, 400,000 sq. ft. of class-A office space and 45,100 sq. ft. of shops and restaurants. The $1 billion development is scheduled to open in 2017.
Example Projects

Avalon in Alpharetta, Ga./2.4 million sq. ft.
Scheduled to open in the second half of this year, North American Properties’ $600 million, 2.4-million-sq.-ft. project in Alpharetta, Ga. will feature 250 luxury rental units, 101 single-family homes, 750,000 sq. ft. of class-A office space, 570,000 sq. ft. of retail and a 300-room four-star hotel. When completed, Avalon should benefit from being located in one of the most affluent trade areas in the United States.
Example Projects

The result of a collaboration between Shorenstein Properties and Wright Runstad & Co., this 5.3-million-sq.-ft. development in Bellevue, Wash. will combine 3.7 million sq. ft. of office space with 1.2 million sq. ft. of residential space in 1,100 units and 365,000 sq. ft. of hotel and retail space. Construction on Phase I of the project, which includes 560 residential units, 1.5 million sq. ft. of office space and 31,000 sq. ft. of retail, started in the second quarter of 2013, with completion scheduled for 2018.
Example Projects Recently Announced

Location: Berkeley, CA
Developer: Pyramid Hotel Group
Building Type: 16 Story High Rise, LEED Gold
Building Use: Office/Hotel/Conference/Retail

Location: San Diego, CA
Developer: Zephyr Real Estate
Building Type: 21 and 41 Story Towers
Building Use: Residential/Hotel/Conference/Retail
Example Projects Recently Announced

Location: Memphis, TN
Developer: Belz Enterprises
Building Type: 4 Story
Building Use: Residential/Retail

Location: Boston, MA
Developer: Rafi Properties
Building Type: 21 and 41 Story Towers
Building Use: Residential/Office/Retail

Location: Chicago, IL
Developer: M&R Development/Bucksbaum Prop.
Building Type: 8 Story
Building Use: Residential/Retail/Entertainment
Example Projects Recently Announced

Location: Chicago, IL
Developer: Sterling Bay
Building Type: 9 Story
Building Use: Office/Retail

Location: Chicago, IL
Developer/Architect: MX3
Building Type: 9 Story
Building Use: Residential/Retail
Mixed Use Buildings Market Bundle

“A mixed-use development is a real estate project with planned integration of some combination of retail, office, residential, hotel, recreation or other functions. It is pedestrian-oriented and contains elements of a live-work-play environment. It maximizes space usage, has amenities and architectural expression and tends to mitigate traffic and sprawl.”
Source: BOMA
Learn from our Consulting and Specifying Engineer Customers

A series of interviews published in *Consulting - Specifying Engineer Magazine* provide a glimpse into the key issues related to designing and engineering a mixed use facility

http://www.csemag.com/
CSE: Have Energy Star, ASHRAE, U.S. Green Building Council, etc., affected your work on mixed-use building projects? What are some positive/negative aspects of these guides?

Ahuja: Many projects are requiring some sort of LEED certification, and so the U.S. Green Building Council and ASHRAE are used quite frequently on most projects. Many of the positive aspects are in relation to energy efficiency. As a brief example, the requirement to provide an energy-efficient building envelope leads to less heating and cooling loads, which leads to smaller equipment, which leads to more energy efficiency and less fuel consumption costs. Some of the downsides are upfront costs often outweigh payback, and costs of certification are often more than a client is willing to bear.

- Anil Ahuja, PE, RCDD, LEED BD+C, CxA, President, CCJM Engineers Ltd. Chicago

Best practices for mixed-use buildings: Codes and standards

Taking on a mixed-use structure—such as one that includes retail and residential portions—can be an engineering challenge. With all the different engineered systems involved, it can be like working on and integrating several different projects at once. Building codes and standards are key to the success of these projects.

Consulting-Specifying Engineer 09/29/2014
CSE Points of View

CSE: Which code/standard proves to be most challenging in such facilities?
Ahuja: Oftentimes it is the conflicting nature of multiple codes that creates the challenge. As an example, the City of Chicago requires that all occupied spaces be provided with a minimum of 33% direct outside air (OA) via the HVAC system. The IECC requires heat recovery on any HVAC system greater than 5 tons cooling capacity, and with more than 30% direct OA. In order to achieve the LEED enhanced ventilation credit, one must provide 30% more ventilation than required by ASHRAE, and have airflow measuring stations in the OA, return air (RA), and supply air (SA). In order to provide a system, all of these codes must be considered and applied, and equipment provided to accommodate all of the varying requirements. This, in many cases, is the greatest challenge of design.
- Anil Ahuja, PE, RCDD, LEED BD+C, CxA, President, CCJM Engineers Ltd. Chicago

Best practices for mixed-use buildings: Codes and standards
Taking on a mixed-use structure—such as one that includes retail and residential portions—can be an engineering challenge. With all the different engineered systems involved, it can be like working on and integrating several different projects at once. Building codes and standards are key to the success of these projects.
Consulting-Specifying Engineer 09/29/2014
CSE Points of View

CSE: When designing integration monitoring and control systems, what factors do you consider?  
Gerke: One thing we will typically consider is how systems will be integrated. The systems considered for this analysis include power and lighting, and HVAC controls in occupied/unoccupied spaces, back of house, utility rooms, parking garages, and other special spaces. Then a decision is required if these services will be integrated for full control, scheduling, or just monitored. Usually the driving factor for these decisions is cost. However, there are many owners interested in how these decisions will help them save money on future maintenance.
- Jason R. Gerke, PE, CxA, LEED AP BD+C, Mechanical and Plumbing Team Leader, GRAEF, Milwaukee

CSE: What are some common problems you encounter when working on building automation systems (BAS)?  
Ahuja: In many cases, the biggest problem is user interface, and lack of knowledge in regard to the system. Many engineers and maintenance staff have no working knowledge of the system, make changes without understanding the system effects, and eventually override the system manually because they cannot undo or do not understand the modifications that have been made. In many instances, changes in personnel also lead to issues because changes made by previous staff are not relayed to current staff.
- Anil Ahuja, PE, RCDD, LEED BD+C, CxA, President, CCJM Engineers Ltd. Chicago

Best practices for mixed-use buildings: Codes and standards  
Taking on a mixed-use structure—such as one that includes retail and residential portions—can be an engineering challenge. With all the different engineered systems involved, it can be like working on and integrating several different projects at once. Building codes and standards are key to the success of these projects.
Consulting-Specifying Engineer 09/29/2014
CSE Points of View

CSE: What unique HVAC requirements do mixed-use projects have that you wouldn’t encounter in other engineering disciplines?

Poole: Unique in the MEP/FP world is usually the singular application of proven systems for a unique environment. When designing HVAC systems, the key is determining the impact placed onto the facility’s infrastructure by the varying conditions that the facility will experience.

-Gary Poole, PE, Principal, Bury Inc., Houston

Smith: HVAC design is unique in mixed-use projects due to the various unknowns. Mixed-use projects are very fluid and the mechanical engineer must have the experience and foresight to anticipate the appropriate HVAC systems that may be installed during future tenant improvement work. Proper up-front space planning and coordination with the architect and developer are critical to a successful mixed-use project flexible enough to accommodate ever-changing tenant criteria.

-Andrew H. Smith, PE, CEM, LEED AP, Principal, Jordan & Skala Engineers, Dallas

Miller: Some of the unique challenges we encounter with mixed-use projects are the diversity of code requirements and HVAC systems required for mixed-use occupancy. Additionally, the need for independent temperature control, greater quantities of terminal equipment, and thorough reviews of outside-air ventilation strategies require that these projects receive more attention from the HVAC engineer. Where these facilities have restaurants, we focus our engineering on reducing the odor and noise into adjacent occupancies that can result from the restaurant kitchens.

-Donna Miller, PE, PEng, LEED AP, Vice President, Engineering, WD Partners, Dublin, Ohio

Getting it right in mixed-use buildings: HVAC

Mixed-use buildings—often a combination of retail and residential—are unique structures with varying needs. HVAC systems should be carefully considered.
CSE Points of View

CSE: What changes in fans, variable frequency drives (VFDs), and other related equipment have you experienced?
Smith: We are seeing more use of VFDs over the past several years due to affordability and desire for efficient monitoring, as well as the control of fan and pump systems.
Poole: The use of fan array, electronically commutated motors (ECM), and VFDs have greatly reduced the energy use of many of the HVAC motor loads.
- Gary Poole, PE, Principal, Bury Inc., Houston

Callan: The mechanical side of things tends to work predictably. As alluded to earlier, it is the electrical and electronic aspects of these systems that provide entertainment. We recently experienced a series of unexplained new-component failures on a project that stymied everyone, only to learn that the software within a single VFD on the system caused cascading failure. This isn't your father's centrifugal pump anymore.
- David P. Callan, PE, Vice President, McGuire Engineering, Chicago

Miller: The single-zone variable air volume (VAV), two-speed fan via VFD, and general exhaust fan direct-drive pseudo VFDs are becoming more common in our experience. Building owners have been requesting these systems in their facilities in part because they have noticed the benefit of energy savings and reduced costs as a result of having these systems.
- Donna Miller, PE, PEng, LEED AP, Vice President, Engineering, WD Partners, Dublin, Ohio

Getting it right in mixed-use buildings: HVAC
Mixed-use buildings—often a combination of retail and residential—are unique structures with varying needs. HVAC systems should be carefully considered.
CSE Points of View

SE: What indoor air quality (IAQ) or indoor environmental quality (IEQ) challenges have you recently overcome? Describe the project, and how you solved the problem.

Miller: When working with a very small mixed-use building, the need for continuous ventilation and the use of split-system HVAC can result in unacceptable indoor conditions of cold humid air, or moderate temperature-humid air. These conditions were resolved by adding reheat, a new terminal unit, and revising airflows to some of the spaces to reduce outside air percentage at each unit.

- Donna Miller, PE, PEng, LEED AP, Vice President, Engineering, WD Partners, Dublin, Ohio

Callan: IAQ and IEQ are fairly well-documented. Some of the biggest IEQ and IAQ issues stem from sources not often found in commercial buildings like large commercial kitchens and swimming pools, for instance. Many of the IEQ issues will stem from inadequate ventilation, poor pressurization control, or general lack of humidity control. In addition, the usual culprits, like cooling tower and air-intake proximity, are at play. Occasionally, we will run into special process uses where pollution containment is critical. In buildings that can house nearly any function, IEQ can be a challenge. For buildings with a residential or hospitality component, oftentimes developers will not invest in adequate HVAC for the common areas and corridors. Besides being comfortable, these areas of the building should be properly dehumidified. Modern building envelopes are tighter and do not breathe. Residential HVAC equipment is designed to primarily heat and cool, not dehumidify. The paradigm has shifted and designers and developers need to do a better job.

- David P. Callan, PE, Vice President, McGuire Engineering, Chicago

Getting it right in mixed-use buildings: HVAC
Mixed-use buildings—often a combination of retail and residential—are unique structures with varying needs. HVAC systems should be carefully considered.
CSE Points of View

CSE: Have you specified more alternative HVAC systems on mixed-use building projects recently? This may include displacement ventilation, underfloor air distribution, variable refrigerant flow (VRF) systems, chilled beams, etc.

Poole: VRF systems are a rising force in the HVAC world. There is still a lot more to learn in the next few years about the practical application of these systems.
- Gary Poole, PE, Principal, Bury Inc., Houston

Callan: We find it more acceptable to developers and owners to use alternative HVAC products and systems. Since every "new" technology has been applied in the field for at least 15 to 25 yr, the risk is acceptable. Many of our alternative HVAC applications are driven by end-user preferences or first-cost reduction.
- David P. Callan, PE, Vice President, McGuire Engineering, Chicago

Smith: VRF systems are finding their way into residential mixed-use projects, but mainly within the owner's scope of work where the energy savings will have a direct impact on operating costs. In our experience, developers are not willing to pay the premium for such systems in speculative tenant spaces with separate utility metering.
- Andrew H. Smith, PE, CEM, LEED AP, Principal, Jordan & Skala Engineers, Dallas

Getting it right in mixed-use buildings: HVAC

Mixed-use buildings—often a combination of retail and residential—are unique structures with varying needs. HVAC systems should be carefully considered.
CSE Points of View

CSE: What types of energy management systems are you specifying on mixed-use building projects? Are these part of full-building control systems?

Kearney: Generally, partial building control systems are designed for mixed-use projects. Public areas, office areas, conference space, central plants, and back-of-house areas are areas where BAS is typically designed. Many times for cost savings, condominium and hotel rooms are provided local control with minimal or no integration with the house BAS. Depending on the owner preference, a guest check-in system that transitions the room HVAC equipment from unsold, sold but unoccupied, and sold and occupied modes for the hotel rooms may be incorporated into the design. In addition, systems serving retail areas that are leased out are generally not tied to the BAS, with the exception of house HVAC equipment that provides ventilation.

- Christopher M. Kearney, PE, LEED AP, Project manager, exp, Maitland, Fla.

An overview: How to engineer systems in mixed-use buildings
When working on mixed-use buildings, engineers must address many needs in one building.
09/30/2012
CSE Points of View

CSE: What unique requirements do mixed-use building HVAC systems have that you wouldn’t encounter on other structures?

Crawford: Mixed-use buildings have unique user requirements that affect HVAC and plumbing system application and size. System diversity (and therefore peak load) will vary in the hotel tower based on the podium functions. For example, a convention center in the complex could drive the peak domestic hot water load to a short peak period during the week, and a heavy restaurant load may shift the load to weekends at night. As the balance of these loads varies, so does the load profile and plant sizing. There are great opportunities for innovative sustainable design in mixed-use facilities. Simultaneous heating and cooling is common, which may allow efficient use of technologies such as heat recovery chillers. Water reclaim may be more lifecycle effective because of the increased number and frequency of reuse options. The options are as varied as the mix of building occupancies that are put together.

- Mark Crawford, Principal engineer, Southland Industries, Las Vegas

An overview: How to engineer systems in mixed-use buildings
When working on mixed-use buildings, engineers must address many needs in one building.
09/30/2012
CSE Points of View

CSE: What unique requirements do mixed-use building HVAC systems have that you wouldn’t encounter on other structures?

McLaughlin: The challenge is not necessarily individually unique requirements but rather the confluence of the special requirements of each portion of the mixed-use building. Issues such as condensation, acoustics, security (biohazard/physical), natural life (insects/birds), controls for motorized equipment, lighting/mechanical system zoning, and smoke exhaust all need to be addressed in a cohesive manner to create an efficient building.

-Brian McLaughlin, Associate, Los Angeles, Arup

Kearney: Many different types of unique airside systems might be found in mixed-use venues. For example, fan coil units in apartments or hotel rooms, under-floor air in office areas, constant volume air handlers, and possibly central station VAV air handlers in public spaces with varying loads. Most mixed-use projects we are involved with include a central energy plant. A unique aspect of the HVAC systems in mixed-use buildings may also come from the use of different waterside systems. For example, chilled water for hotel, office, and public spaces; and condenser water heat pump systems in residential units to simplify HVAC metering requirements.

-Christopher M. Kearney, PE, LEED AP, Project manager, exp, Maitland, Fla.

An overview: How to engineer systems in mixed-use buildings

When working on mixed-use buildings, engineers must address many needs in one building.

09/30/2012

© Siemens AG 2016 All rights reserved.
CSE Points of View

CSE: How can automated features and remote system control benefit mixed-use building clients?

McLaughlin: Automation and remote control certainly assist with the optimization of mixed-use facilities by, for example, allowing motorized windows to open when the outdoor air temperature and humidity are ideal for thermal comfort. However, along with the automation, overrides would typically be incorporated in the design to enable the client to forego optimization temporarily for security or other specific needs.

-Brian McLaughlin, Associate, Los Angeles, Arup

Kearney: Automated features in a mixed-use building coupled with variable volume waterside systems help improve energy efficiency. With occupancy controls and time-of-day schedules, building tenants are able to limit unnecessary energy usage. On the owner’s side, understanding the planned building use and installing appropriate controls could allow for significant diversities in the central energy plant bringing first costing savings. The diversities could come from occupancies with opposite occupancy schedules (e.g., residential and office).

- Christopher M. Kearney, PE, LEED AP, Project manager, exp, Maitland, Fla.

An overview: How to engineer systems in mixed-use buildings

When working on mixed-use buildings, engineers must address many needs in one building.

09/30/2012
CSE Points of View

CSE: What factors do you need to take into account when designing building automation systems (BAS) for a mixed-use building?
Kearney: Numerous factors should be considered when designing a BAS. Generally, the first factor is the owner’s project requirements. Some owners desire to have many of their building systems, such as fire alarm, lighting control, miscellaneous equipment, etc., integrated with their BAS, while others may not. Integrated building management systems require a lot more coordination between the BAS design engineer and the product selection engineers to ensure the desired communication protocols (BACnet, LON, Modbus, etc.) are specified with the product as well as the communicated points. In the absence of strong owner requirements, the criticality of the facility should be considered. Critical facilities or portions of the facility that are considered critical that have low tolerance to equipment or system failures or environmental changes may require more monitoring from the BAS but possibly more or less sequence of operations complexity. The sophistication of the systems also can play a factor in designing the BAS. Unitary based systems generally have limited interface options with BAS, and the general system design may not warrant a sophisticated controls overlay. Budget will also come into play as the more equipment and systems integrated with the BAS, the more the installed BAS will cost.
- Christopher M. Kearney, PE, LEED AP, Project manager, exp, Maitland, Fla.

An overview: How to engineer systems in mixed-use buildings
When working on mixed-use buildings, engineers must address many needs in one building.
09/30/2012
CSE: What sorts of challenges do mixed-use buildings pose that you don’t encounter on other projects?
Mark Crawford: Mixed-use buildings create complexity at the interface between the occupancies. For example, high-rise hotel towers penetrating an entertainment podium with a basement-level garage require transitions from one building type to another. Structural systems usually change from steel to post-tension concrete. Plumbing may change from single-pressure zone domestic water distribution and traditional waste/vent to high-pressure domestic water with multiple pressure zones. HVAC will change, such as 100% outside air VAV with heat recovery to vertical fan coils and dedicated outdoor air system (DOAS). Utilities for one building are usually supplied from another instead of coming from the site. Code applications change from large assembly use to high-rise residential codes and must be combined into code. In short, one design concept is rarely maintained throughout a mixed-use facility.
- Mark Crawford, Principal engineer, Southland Industries, Las Vegas
CSE Points of View

CSE: What sorts of challenges do mixed-use buildings pose that you don’t encounter on other projects?

Chris Kearney: For building engineers, some of the biggest challenges that go into a mixed-use building include fire separations between different occupancies and smoke management. Other challenges include sound attenuation requirements or acceptable sound levels for different space types and how they may affect each other. In addition, there are many opportunities to help developers build cost-effective and operations-efficient properties that some might call a challenge.
- Christopher M. Kearney, PE, LEED AP, Project manager, exp, Maitland, Fla.

Brian McLaughlin: The biggest challenge encountered on mixed-use buildings is often related to designing for nonseparated mixed-use provisions. In achieving this design approach, the most restrictive life safety provisions of each of the occupancies must be met throughout the building. It is important to understand how the requirements for each occupancy will impact the design. Depending upon the variety of occupancies within a building, a separated mixed-use approach may be the best option to minimize excessively restrictive provisions being applied throughout.
- Brian McLaughlin, Associate, Los Angeles, Arup

An overview: How to engineer systems in mixed-use buildings

When working on mixed-use buildings, engineers must address many needs in one building.
09/30/2012
### Key Points of Design Emphasis for Mixed Use Buildings

Continuous occupancy with space demand and control variance

<table>
<thead>
<tr>
<th>Design Emphasis</th>
<th>BAS Controls Affected / Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke Control and Fire Barriers</td>
<td>UL864 listed Primary Controls; Terminal Controls; UL555-S Dampers/Actuators</td>
</tr>
<tr>
<td>Building Envelope Efficiency</td>
<td>Primary Controls; Terminal Controls; Damper Actuators</td>
</tr>
<tr>
<td>Demand and Usage Variations in Spaces</td>
<td>Primary Controls; Terminal Controls; Thermostats; VFDs</td>
</tr>
<tr>
<td>Space Ventilation and Humidity Control</td>
<td>Primary Controls; Terminal Controls</td>
</tr>
<tr>
<td>LEED and Energy Conservation</td>
<td>Integrated BAS, Lights, Blinds, Power Meters, Software</td>
</tr>
<tr>
<td>Multiple Codes and Standards by Space Type</td>
<td>Integrated BAS, Lights, Blinds, Power Meters, Software</td>
</tr>
</tbody>
</table>

© Siemens AG 2016 All rights reserved.

Page 35   August 2016   Part #: bt_us000377   Hollinger/CPS
Mixed Use Buildings

“A mixed-use development is a real estate project with planned integration of some combination of retail, office, residential, hotel, recreation or other functions. It is pedestrian-oriented and contains elements of a live-work-play environment. It maximizes space usage, has amenities and architectural expression and tends to mitigate traffic and sprawl.”

Source: BOMA
# Siemens Products for Mixed Use Building BAS

<table>
<thead>
<tr>
<th>Distributed HVAC Control Systems</th>
<th>BT300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Plant, Air Handling Units</td>
<td></td>
</tr>
<tr>
<td>Make-up Air Units, Rooftop Units</td>
<td></td>
</tr>
</tbody>
</table>

**BT300**

- BACnet MS/TP, IP or Modbus Network Support
- Small Footprint NEMA12 or NEMA1 enclosures
- Easy to Use Keypad Interface
- Motor Switch Ride Through
Siemens Products for Mixed Use Building BAS

<table>
<thead>
<tr>
<th>Zone and Room HVAC Control Systems</th>
<th>RDY2000 BN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone/Room HVAC; Lights</td>
<td></td>
</tr>
<tr>
<td>Unit Ventilators, Heat Pumps, Lights, Occupancy</td>
<td></td>
</tr>
</tbody>
</table>

Application Flexibility and Configurability
Built in IAQ Applications
HMI Configuration
One Part Number – Many Applications
### Siemens Products for Mixed Use Building BAS

#### Residential HVAC Control Systems
- **RDY2000 BN**
- **Smart Thermostat**

#### Residential HVAC; Lights; Occupancy

#### Conventional Units, Heat Pumps, Lights

<table>
<thead>
<tr>
<th>Smart Thermostat</th>
<th>Application Flexibility and Configurability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mobile App and Cloud</td>
</tr>
<tr>
<td></td>
<td>Wireless BACnet/IP</td>
</tr>
<tr>
<td></td>
<td>Default Graphics</td>
</tr>
<tr>
<td></td>
<td>User Friendly HMI Interface</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RDY2000 BN</th>
<th>Application Flexibility and Configurability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Built in IAQ Applications</td>
</tr>
<tr>
<td></td>
<td>HMI Configuration</td>
</tr>
<tr>
<td></td>
<td>One Part Number – Many Applications</td>
</tr>
</tbody>
</table>

**Coming soon!**
## Parking Garage HVAC Control Systems

<table>
<thead>
<tr>
<th>PPM</th>
<th>BT300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Vent; Exhaust Fans</td>
<td></td>
</tr>
</tbody>
</table>

### PPM
- Cost Effective MS/TP Network I/O
- Plenum Rated Enclosure
- Optional Removable Terminal Blocks

### BT300
- BACnet MS/TP, IP or Modbus Network Support
- Small Footprint NEMA12 or NEMA1 enclosures
- Easy to Use Keypad Interface
- Motor Switch Ride Through
Siemens Products for Mixed Use Building BAS

Power Metering

<table>
<thead>
<tr>
<th>MD-BMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD-BMED</td>
</tr>
</tbody>
</table>

Power Meters & Accessories

**MD-BMS**

- BACnet MS/TP, IP or Modbus TCP Network Support
- Measures over 75 electrical parameters
- Optional LCD display
- Bundled meter and CT
- Sub metering and cost allocation