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An engineer's perspective on adaptive reuse

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When it comes to buildings, it's what's inside that counts. Transforming old spaces can be particularly challenging as they typically require overhauls to ensure the best engineering solutions to function effectively and efficiently. It's vital to consider the design of the mechanical, electrical, plumbing, fire protection and structural systems to complement a project's larger vision.

There are several pieces of the puzzle to consider when planning, commissioning and controlling a building's systems and transforming old spaces.

Existing building commissioning

When transforming spaces, existing building commissioning should be the first option for smart savings. That means testing equipment and systems to verify functionality according to design objectives and specifications. A particular focus is placed on identification and implementation of low or no-cost and capital-intensive facility improvement measures. As most of these buildings have not undergone any type of commissioning process, many are performing well below their potential by using more energy than necessary.

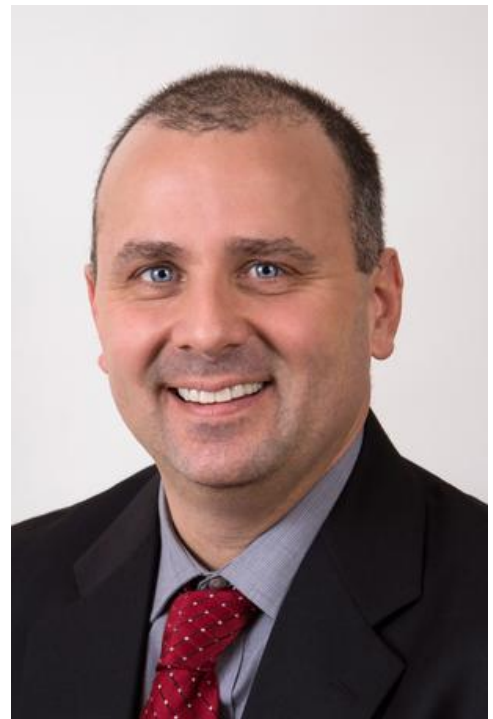
Integrated energy management

Effective energy management doesn't boil down to one simple tool or technology. Rather, understanding how the pieces of a building fit together will help create a comprehensive energy management plan.

Facility condition assessments

By conducting facility condition assessments, engineers gather insight on the age, design, construction methods and materials of the building to assist in finding solutions. Oftentimes, by simply correcting these deficiencies after an assessment, there are marked improvements in spaces that have reached the end of their useful life.

Creative reuse of space



Ron Turner

Thinking creatively with the end user in mind sets engineers apart and is critical to determining a creative reuse of the space. An important consideration with older spaces is the building's envelope – the elements of the outer shell that maintain a dry, heated or cooled indoor environment such as walls, roof, windows and doors. Most of the time, the windows, doors and walls need to be replaced and brought up to current energy code. My company, FTCH, recently undertook a project at Ohio State University's Pomerene Hall where we asked several questions regarding the fit of systems in the space. How do we keep the historical characteristics of the existing space? How does that fit with systems that are efficient and meet budget constraints? How does existing structure relate to new room layouts, e.g. where are elevator shafts in relation to mechanical shafts and rooms? These important considerations can lead to cost savings through reworking materials instead of demolishing and starting over.

Retrofitting

With a dated building, a retrofit can translate into more savings than replacing systems entirely. When equipment at the University of Cincinnati's Clermont Campus had reached the end of its useful life, engineers were able to use modern technology to design around the low ceilings and pipes. This retrofit of new HVAC equipment into existing spaces translated into energy savings for the university while simultaneously improving system reliability.

Putting the puzzle pieces together

When considering different engineering options for the phases of a building transformation, there's a variety of solutions for effective planning, commissioning and controlling of systems and spaces. An understanding of the facility design and implementation costs in addition to associated challenges ensures a successful project when it comes to making the right recommendations and transforming old spaces into ones we can use today.

Ron Turner is the Columbus regional director and mechanical engineer for FTCH, a company specializing in engineering and architecture.