



Williams Notaro & Associates, LLC

MECHANICAL, ELECTRICAL, PLUMBING & FIRE PROTECTION CONSULTING ENGINEERS

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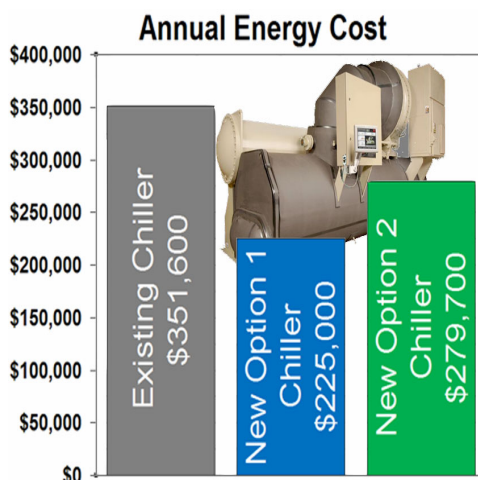
Simulate & Save by Brian Soskey, EIT

As utility and fuel prices rise, engineers, architects, owners, and facility managers are focusing on more energy efficient systems and operating practices to reduce building operating costs. Computerized building performance simulations are a valuable tool to analyze the energy consumption of mechanical, electrical, and plumbing (MEP) systems in your building.

Most building performance simulations are developed using specialized computer software due to the complexity of the calculations. Typically, building simulations are based on a 20+ year average weather history, and building specific data, including system efficiencies and operating parameters.

Building information such as the R-values of the walls, windows, and roof, internal equipment loads, heating and cooling system capacities, and the control sequencing of the heating, ventilating, and cooling (HVAC) systems, is incorporated into the simulation. The average weather conditions are first used to calculate hourly cooling and heating loads throughout the year. These loads are then used to determine the hourly energy consumption rates of the HVAC systems. The hourly energy consumption rates for the lights, of-

fice equipment, and other miscellaneous sources are calculated with diversity factors according to the hourly operating schedules. Finally, the hourly energy consumption rates are used to calculate the cumulative energy consumption.



Like any tool, energy simulations must be applied properly to achieve usable results. New designs are easier to model because the system parameters can be determined beforehand. Simulating existing systems, however, requires detailed information about the sizes, capacities, and operational history of the existing systems. To properly model an existing building, drawings, site visits, and detailed discussions with the facilities operations personnel are required. Meeting with op-

erations personnel is important because what may seem like minor operational details can have large cumulative effects on energy consumption. Accurately simulating an existing building requires multiple, detailed adjustments to ensure that the model is within approximately 10% of the average utility bills.

After the model is created, different parameters can be changed to determine the reduction in energy consumption for an upgraded chiller, streamlined operating sequence, or lighting system retrofit. Sources of excess energy consumption such as aging equipment or poor operational sequences are easier to identify with an accurate simulation. The ability of the building to comply with LEED or Energy Star requirements can also be evaluated. Additionally, energy simulations can help estimate the operating cost of current systems at future utility rates through the use of escalation estimating factors. Payback analyses can be performed to see if an upgrade will be cost effective.

Building performance simulations are a powerful tool that can aid in both the design and operation of a building. Please contact **Williams Notaro & Associates** for more information on how building energy simulations can benefit you.



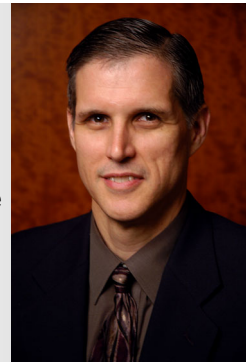
Brian Soskey, EIT
Mechanical Engineer

Mr. Soskey began his career as a mechanical engineer at **Williams Notaro & Associates, LLC** in 2005 as an intern. Brian joined the firm full time in 2006 after receiving a Bachelor of Science in Mechanical Engineering from Virginia Polytechnic Institute and State University. His attention to detail on central plant systems and data centers has resulted in successful projects for Beacon Capital Partners, Navy Federal Credit Union, Inter-American Development Bank, and DARPA.

Enter To Win \$100 Shell Gas Card

Every season we feature a photo on our web site that illustrates the importance of including Construction Administration in the engineering scope of work because even small, seemingly unimportant installation deficiencies can cause poor system performance, increased maintenance, or reduced equipment longevity. By visiting our web site at www.wnainc.com and correctly identifying the installation bloopers, you will be automatically entered to win a \$100 gift card to Shell Oil. Drawing will be held June 5, so enter today at <http://www.wnainc.com/contest.html>

Congratulations to Mr. Lee Dunfee, Site Manager with Jones Lang LaSalle in Washington, DC. He correctly identified the Winter 2009 installation bloopers and received a \$100 Shell Oil gift card.



What's Wrong With This Picture?



Our Winter 2009 bloopers showed improper support of large exterior ductwork. Proper support is critical to the safety of maintenance personnel and to the operation of the system and equipment as improper support can overstress the ductwork joints, flanges, and connections causing leaks in the system. This can result in loss of system capacity, an increase in energy costs, and temperature control problems in the building. Once again, this bloopers reaffirms the importance of Construction Administration in the engineering scope of work.

Did You Know?

That your UPS system could be releasing small quantities of Hydrogen into your data center?

Most new UPS systems use valve regulated lead acid batteries (VRLA) to provide backup to critical systems in case of a loss of normal utility power. These VRLA batteries, also known as "sealed batteries," contain a relief valve that releases hydrogen during system overcharging.

According to the UPS and battery manufacturers, the quantity of hydrogen produced is very small and is not generated under normal operating conditions. Regardless of the quantity of hydrogen produced, the building code still requires that it be addressed during the system design.

Hydrogen is flammable at approximately 4% by volume and is explosive at approximately 18% by volume. Section 502.4 of the International Mechanical Code requires that the ventilation system be designed either to limit the maximum concentration of hydrogen to 1.0% of the total volume of the room; or, to provide continuous ventilation at a rate of not less than 1.0 cfm per square foot of floor area of the room.

It is often preferable to ventilate UPS rooms by exhausting directly to the outside. However, it is likely that the hydrogen can be maintained below 1.0% by ventilating to adjacent spaces because the small quantity of hydrogen is not considered to be dangerous at these levels. The interpretation of the ventilation requirement is often different among jurisdictions and should be coordinated during the design.



The quantity of hydrogen released during overcharging is dependent on the size and brand of the specific battery and varies significantly. Therefore, each UPS and associated battery component should be evaluated when designing the ventilation system for rooms containing UPS systems with battery backup. Please contact **Williams Notaro & Associates** if you would like additional information or to discuss the information above.

- Steve Tekampe, PE

LEED Accredited

Enrique Rodriguez, EIT and electrical engineer with **Williams Notaro & Associates** recently earned his LEED Professional Accreditation.

LEED is the Leadership in Energy and Environmental Design Green Building Rating System, and managed by the Green Building Certification Institute (GBCI). Becoming a LEED AP distinguishes building professionals with the knowledge and skills to successfully steward the LEED certification process.

