High Performance Buildings

Your Mission. Realized.

TRANE TECHNOLOGIES

The talk stops here. Let's get to work.

Today, one thing is clear: Buildings can support mission-critical objectives when they use resources efficiently and provide optimal conditions for occupant comfort and productivity. There has been plenty of talk about high performance buildings. Now it is time to get down to work.

A comprehensive approach

The Trane high performance buildings approach considers the whole building. It addresses the many integrated factors that contribute to organizational success. The ultimate goal: To achieve performance in the top ten percent of peer buildings in the same industry and region.

Process drives results

Innovative methodologies and tools raise building performance throughout a comprehensive process that, over time, enables any organization to achieve a high performance building. Measurement and validation prove out results and provide the basis for continuous improvement. These results are based on key performance factors.

Performance factors:

- Energy consumption
- Water consumption
- Temperature and humidity levels
- Sound and lighting levels
- CO_2 levels
- Operations and maintenance
- Waste and recycling
- Reliability and uptime

Every building can be better

A U.S. Department of Energy study of 643 new and existing commercial buildings nationwide found an average of 15 deficiencies per building—relating just to energy use. When these deficiencies were corrected, building owners realized an average 16 percent reduction in energy expenses and gained a full payback on the corrections within two years.[2]

Trane High Performance Buildings process

Understand the mission

Conduct critical systems audits and comprehensive facility assessment

Recommend improvements

Implement improvements

Provide continuous systems monitoring, periodic audits and ongoing assessment

Measure and validate

Operational goals. Achieved.

Trane addresses four key operational areas that contribute to the successful mission of any organization: water and energy conservation, sustainability, occupant comfort, health and welfare and system reliability and uptime.

Use less energy and water

High performance buildings use energy and water sparingly to reduce operational costs, while lightening the stress on natural resources and the environment. Trane utilizes proven methodologies for improving efficiency.

- Measures taken to reduce energy consumption can slash utility bills by 30 percent or more. That translates to approximately $25,000 in annual savings for every 50,000 square feet of office space.[1]
- Customers have realized $1 billion in energy and operational savings over the past 16 years by working with Trane.

Commit to sustainability

In addition to reducing the impact on the environment, a sustainable building contributes to positive public perceptions. It is a tangible expression of global concern.

- Sustainability is a long-term commitment. Maintenance best practices, plus ongoing measurement and validation, maintain the original efficiency levels that were established to reduce electrical demand and, subsequently, CO_2 emissions.
- Proper refrigerant management practices reduce ozone depletion potential.

Support health and welfare

Research links health and productivity with indoor environment qualities including temperature, air flow, humidity and lighting—factors that are addressed within the Trane approach to high performance buildings.

- Seventeen studies document a reduction in health issues when indoor air quality is improved. The positive health impacts concerning asthma, flu, respiratory problems and headaches range from 13.5 to 87 percent improvement.[3]
- Eleven studies document the impact of high performance lighting fixtures on productivity. Analysis finds productivity gains ranging between 0.7 percent and 26.1 percent, with an average of 3.2 percent.[4]

Raise system reliability and equipment uptime

Critical systems will continue to operate within set parameters under a proactive approach to service. Proper maintenance can save you an estimated 12–18 percent compared to a run-to-fail approach. Research shows that regular maintenance can:

- Cut unexpected equipment breakdowns by 70–75 percent
- Reduce downtime by 35–45 percent
- Lower equipment repairs and maintenance costs by 25–30 percent[5]

Professional Engineers, Certified Energy Managers and over 700 LEED® Accredited Professionals on staff at Trane bring a high level of technical and industry knowledge to high performance buildings.

A poorly designed building operated and maintained effectively will often outperform a well-designed building with poor operating and maintenance practices. (ASHRAE, 2009)[6]

Let's get to work.

Any building can be a high performance building—one that contributes to productivity gains, improves customer satisfaction and reduces operating costs.

Improvement actions	Typical savings
Lighting—implement solutions for maximum energy savings	10–15%
Building Automation/Controls	5–15%
HVAC upgrade—replace aging equipment with state-of-the-art models	5–15%
Plant upgrade—replace chillers/boilers with higher efficiency models	5–15%
Pumps and motors—replace with higher efficiency models	5–15%
Comprehensive energy savings projects—improve all of the above areas. Lighting solutions may account for as much as half of the savings in a comprehensive project.	20–30%

Trane implements energy conservation measures (ECMs) in buildings around the world. Making improvements in key areas results in the above savings.

Find out how to realize your mission through better building performance at www.trane.com/highperformancebuildings. Or contact your Trane Account Manager.

Case study

Carilion Roanoke Memorial Hospital

703-bed teaching hospital and Level1 trauma center

Mission: Provide quality patient care as efficiently as possible

This hospital could not control utility rates, but it realized it could control its energy use. Trane identified and implemented over twenty-five energy conservation measures (ECMs) to reduce energy use and carbon footprint, lower costs for patients and provide a positive ROI.

The ECMs delivered $273,778 in energy cost savings during the first year, and continue to deliver savings today. CO_2 has been reduced by 2,214 tons and carbon emissions have declined by 547,727 kg CO_2/Kwh.

Case study

ARRIS Group, Inc.

Global communications technology company

Mission: Offer customers consistent, instantaneous access to data

Reliability is critical to ARRIS Group. Within its 3,500 sq. ft. data center, HVAC system reliability is essential to maintain the environment that is required to sustain operations.

As a result of the integrated-system service solution delivered by Trane, downtime has been reduced by over 60 percent and service calls have been reduced by 50 percent. With Trane support, ARRIS is now delivering on its commitment to maintain 99 percent uptime.

[Footnotes]

1. Efficiency Partnership, "Flex Your Power," Best Practices Guide, Commercial Office Buildings, www.fypower.org, 2011.
2. Evan Mills, Ph.D., Building Commissioning: A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions, Report Prepared for California Energy Commission Public Interest Energy Research (PIER). Lawrence Berkeley National Laboratory, Berkeley, CA. July 21, 2009.

3,4. Gregory Kats, Greening America's Schools, Costs and Benefits, A Capital E Report, October 2006.

5. Federal Energy Management program (FEMP) Operations and Maintenance (O&M) Best Practices Guide , August 2010.
6. ASHRAE, The Decision-Maker's Guide to Energy Efficiency in Existing Buildings, Atlanta, GA, 2009. (ASHRAE is the American Society of Heating, Refrigeration and Air-Conditioning Engineers.)

TRANE

Trane – by Trane Technologies (NYSE: TT), a global climate innovator – creates comfortable, energy efficient indoor environments through a broad portfolio of heating, ventilating and air conditioning systems and controls, services, parts and supply. For more information, please visit *trane.com* or *tranetechnologies.com*.

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