



TRANE[®]

Data Center Solutions

Increase reliability, control costs and maximize uptime



Begin with industry-leading cooling

Meeting the increasing heat loads associated with growing computing needs requires specialized, scalable and reliable heat management strategies. Hotspots and inadequate cooling cause costly disruptions and are daily concerns for data center owners and operators. As the modern data center evolves, so do the demands on airflow, cooling, and humidity control.

Server density in existing and newly constructed data centers is increasing to meet the surging demand for Internet, business applications, cloud computing and data storage requirements. These challenges are compounded by the trend toward facility consolidation. As power densities grow, thermal management is critical to optimize data center performance.



and operate at maximum efficiency

Maintain the best cost of ownership

Outlining the code of conduct on data centers energy efficiency, the European Commission Joint Research Centre (EC JRC) anticipates that data centers will contribute substantially to the UK and European Union (EU) commercial sector consumption in the coming years.

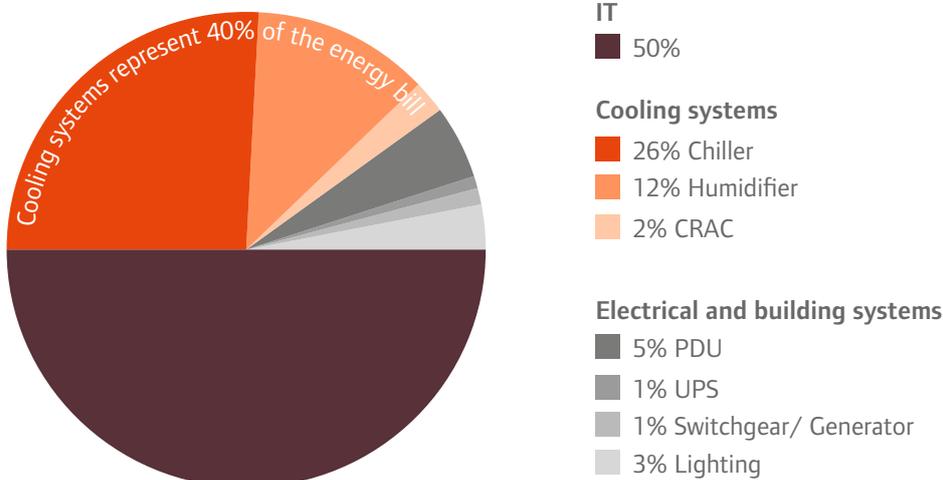
The EC JRC reports that the electricity consumption of data centers in Western Europe alone totaled 56 TWh in 2007 and this is projected to rise to 104 TWh in 2020.

In countries such as India, the increasing IT business process outsourcing from across the globe has resulted in phenomenal growth of data center facilities. The total data center capacity in India is expected to exceed 5.1 million square feet by 2012, which translates to a compounded annual growth rate of 25-30% in IT businesses.

Based on recent research conducted by Gartner, Inc. information technology advisory, servers consume only about 15% of the direct energy in data centers. Cooling constitutes an average of 40 to 45% of total operating costs for many data centers. Energy cost and availability is the #1 worry of data center operators.

While efficient design approaches and reliable cooling equipment will keep servers up and running, effective system lifecycle management strategies are essential to continuously improve performance, achieve energy efficiency and uncover potential cost savings.

Typical facility infrastructure and energy usage



Source: Gartner INC, Trane Internal estimates

Keep your cool with Trane expertise

A data center requires system know-how to ensure adequate, energy efficient on-demand cooling. Trane has delivered reliable, cost-effective HVAC solutions for different types of businesses. We understand that every data center is unique and that cooling strategies vary. In combination with high efficiency cooling equipment, **the use of solutions like ice storage and free cooling can bring your facility up to 60% in energy savings.**

Our comprehensive approach considers design, installation, commissioning, and operations to help you realize your business objectives.

- **Modular and scalable systems** including chilled water, airside, controls, and hybrid solutions
- **HVAC system controls** for reduced energy consumption
- Environmentally responsible solutions



Simplified hydraulic system to minimize energy costs

Trane helped set up a 12MW, 6000 square meter raised floor data center for a major Dutch telecommunications company in Almere, Netherlands.

The Solution:

Trane optimized the design of the hydraulic system to deliver high efficiency, reliability and controls capability. Trane delivered a system with 15MW cooling capacity that included:

- System design and analysis
- Ten RTHC chillers
- Ten closed cooling towers including free cooling
- Trane Select™ all inclusive service contract for best cost of ownership

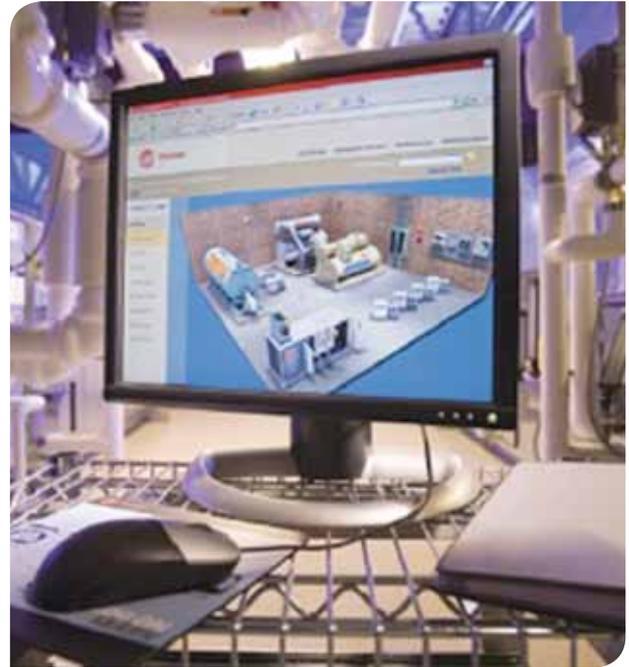
Integrated monitoring and control

Trane’s proven expertise in chillers has led to the development of advanced chiller plant control applications within its building management system. While allowing you to monitor temperature and humidity to maintain data center availability, Trane controls also enable continuous monitoring of energy efficiency.

Trane will help you select, design and document the best systems for your facility needs. Whether you are looking for a web-based, enterprise-wide, integrated control system for flexibility and reduced operating expenses, or a widely-compatible field controller for building renovation, Trane has the right controls that can optimize system performance throughout the facility lifecycle.

Trane controls are engineered to be user-friendly and help achieve the desired temperature, humidity and ventilation for the facility needs.

- Monitor and control critical subsystems and manage multiple facilities as a single enterprise with **Tracer ES™ building automation system**



- Optimize the system operations with **Trane Chiller Plant Control**
- Take control of your energy consumption with **Trane eView™ energy analysis and predictive management**
- Perform calculations to **measure your Power Usage Effectiveness (PUE)**

Upgrade building performance

Trane supported the world’s largest microprocessor and computing technology provider to set up 20,000 sq.ft of data center floor spanning two buildings at their 500,000 sq.ft Bangalore campus. With investment greater than 1.4 MW cooling capacity, the company chose Trane systems for one building and chose an alternative solution provider for the second building.

The Solution:

In the first building, Trane helped implement a chilled water buffer tank fully controlled by the Trane building management system. The solution included:

- Two water-cooled and two air-cooled chillers

- Tracer™ building management system to optimize chiller plant performance and back-up control
- Energy monitoring

In the second building with non-Trane systems, the company began to face operational issues with their variable air volume boxes and building management system. The customer sought Trane expertise to improve the performance. Trane enhanced the operational efficiency and reliability of the HVAC infrastructure of this second building by replacing the controls system and ensuring control system redundancy. The performance is sustained through a Trane maintenance contract and remote monitoring with SMS alerts to the facility operator’s mobile phone.

Services to achieve operational efficiency

The reliability and efficiency of your cooling system is directly related to how it is maintained and operated. A lack of proper care can lead to severe malfunctions and costly breakdown. Trane service and support capabilities span every step in your system's lifecycle, from initial start-up, through routine operation, monitoring and maintenance, to system upgrades and improvement. Trane Services offer solutions to ensure your HVAC system's reliable operation and optimal performance.

By addressing maintenance needs proactively, you can save significantly and virtually eliminate unscheduled downtime. Trane will help you define the service agreement level best suited to your needs. Whether you are addressing disaster management, equipment risk assessment or need help with contingency planning, Trane can help. Our commitment is to keep your system operating efficiently and effectively, enabling you to focus on maintaining availability and improving facility performance.



- Prolong system life and minimize downtime with **Trane Select™ comprehensive service contracts**
- Enhance system performance with **Trane Care™ Reliability, Energy and Environment proactive service offerings**
- Reduce risks with remote monitoring and analytics of **Trane Intelligent Services**
- Keep your business operational during emergencies or during planned shutdowns with **Trane Rental Services**

Chiller plant optimization

Trane recently worked together with Italy's biggest banking group to optimize their 25,000 sqm data center and building chiller plant operations in Parma. Faced with increasing energy costs, the customer sought Trane expertise.

The Solution:

Trane experts monitored the temperatures and chiller load for two months and concluded that poor chiller plant control was leading to chillers operating at 50% load.

Trane proposed Tracer™ chiller plant management to control 7500kW of cooling production and distribution. Our efficient control system reduced the number of chillers required to operate and optimize efficiency of the chiller plant. Since commissioning, the customer continues to reap significant savings in monthly energy consumption. Trane Care™ Energy Services maximize the system performance.

Total facility HVAC infrastructure management

Trane assisted a global Indian telecommunications company located in Mumbai and operating India's largest data center to sustain and optimize all their facility HVAC operations in four major locations across India.

The Solution:

- Ten centrifugal and seven air-cooled chillers
- Annual maintenance contract covering all HVAC infrastructure
- 24/7 operations monitoring

Trane takes care of the complete HVAC infrastructure in all the data center facilities in India through a dedicated team of service professionals.

The proof is in the savings

Trane has analyzed, optimized, designed and delivered high performance systems for data centers across industries. These projects have proven to deliver the best overall efficiency and high-end reliability in the market.



Specialized systems for superior performance

Trane assisted a major real estate investment company in Northern Netherlands to build a 28MW ultra-high density data center used by one of the biggest Internet search and advertising technology companies.

The Solution:

Trane delivered an optimized cooling system within ten months from design to operation that included:

- Ten centrifugal chillers
- Twelve closed cooling towers including free cooling
- Tracer™ building management system

The system achieved a lower PUE than the original project goal. Trane Care™ Environment Services and planned maintenance enhance the system performance.

Achieve PUE improvements and reduce costs

Trane helped a carrier-neutral data center in Toulon, France to achieve energy efficiency and better performance. The chiller plant with two 500 kW chillers and a building management system had inefficient PUE.

The Solution:

- 400kW capacity drycooler at 9°C ambient temperature delivering 3500 hours of free cooling
- Complete installation of HVAC system, electrical wiring and panel
- Controls with integration and update to existing building management system.

The addition of free cooling operation had high energy saving potential even in the South of France thanks to high chilled water production at 12°C. Trane helped the data center facility improve PUE by 33% to achieve industry average performance while reducing operation costs by over 25%.

Talk to Trane about your data center needs

If your goal is reliable uptime and lower operating costs, it's time to talk to Trane. To learn more or to find your local Trane representative, visit us online at www.trane.com



Upgrade cooling system for improved lifecycle cost performance

Trane supported one of the biggest data center operators in Europe to replace the cooling system of a 1.8 MW, 1200 square meter raised floor data center in Amsterdam.

The Solution:

Trane refreshed the cooling system to improve efficiency and reliability of the operation. The system with cooling capacity of 3.6MW included:

- Four RTHC chillers
- Ten dry coolers including free cooling
- Tracer™ chiller plant management with redundant control system

Trane Care™ Reliability, Energy and Environment Services sustain the overall investment.



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