



Reducing costs and optimizing efficiency at a Tier 3 Data Center

The Challenge

Seeking ways to increase efficiency and lower the operating costs of its Dallas-based Tier 3 data center, a Fortune 100 tech company reached out to CLEAResult's Design Build Solutions team for help. The team rose to the challenge, delivering on the full scope of the project, including design, engineering, project and construction management, commissioning, and utility incentive procurement.

Due to the nature of the facility, all work had to be performed while the data center was live and running, requiring extensive planning, precise communication, and constant engagement from everyone involved to successfully maintain a 100 percent up-time during all phases of the project.

Our Solution

At a massive 10 MW, the data center proved to be the perfect candidate for Design Build Solutions. After analyzing the cooling system's energy performance, the team designed a custom retrofit solution that reduced the total annual electric consumption by 8.5 percent.

The team installed a water-side economizer (WSE) designed by CLEAResult to maximize free cooling hours with seamless, automatic operation. To support the WSE, a 1,500-ton plate and frame heat exchanger was also installed, and the chiller plant systems were completely re-piped.

In addition, the team retrofitted 86 individual fifty-ton computer room air handling units (CRAHs) with variable-speed electronically commutated (EC) plug fans. To precisely monitor and control the data hall cooling equipment, the team installed a combination of hard-wired and wireless rack temperature and under-floor pressure sensors, which reduced fan energy usage by over 80 percent.

Other energy-saving improvements included:

- ✓ Installing variable frequency drives on the condenser water pumps
- ✓ Modifying the cooling tower operation
- ✓ Reprogramming the chiller plant control sequence

Project by the numbers

\$575,000

total annual energy cost savings

\$48,000

utility incentive

8.2M kWh

annual energy savings

\$1.9M

total project cost

1.38 PUE

(reduced from 1.68)

30 months

simple payback period

0.25 kW/ton

average chiller plant efficiency when free cooling

80%

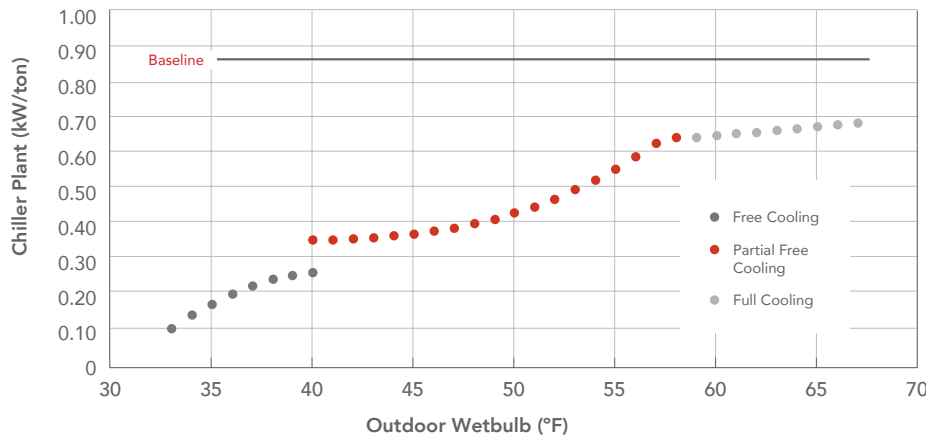
CRAH fan energy reduction



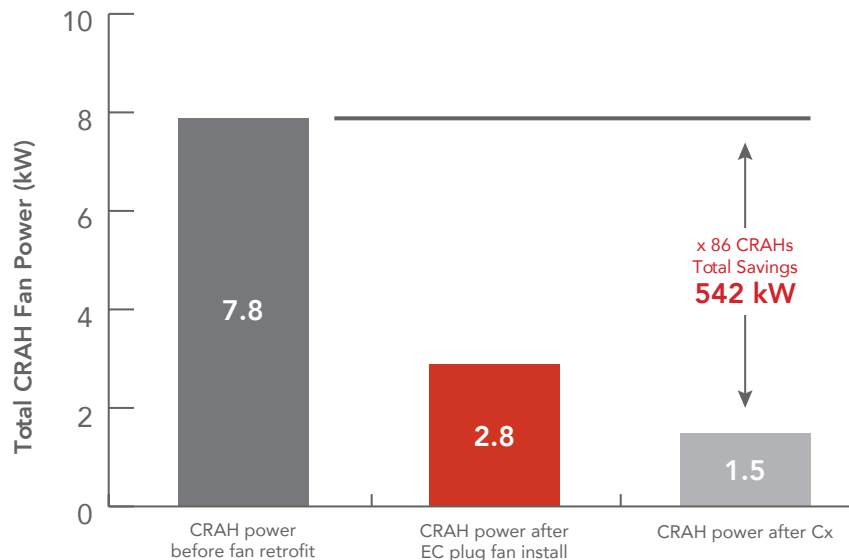
Our Results

This Design Build Solutions project saved the data center \$575,000 in annual energy costs, with an estimated payback of two-and-a-half years. Even in the Texas heat, CLEAResult's WSE saved nearly three times more energy than traditional WSE designs. In addition, the EC plug fan retrofit and project commissioning lowered the average energy use of individual computer room air handlers (CRAHs) from 7.8 kW to less than 2 kW.

CLEAResult Water-side Economizer Performance Chiller Plant (kW/ton) vs. Outdoor Wetbulb (°F)



EC Plug Fan Retrofit CRAH Fan Performance



Project by the numbers

\$575,000
total annual energy cost savings

\$48,000
utility incentive

8.2M kWh
annual energy savings

\$1.9M
total project cost

1.38 PUE
(reduced from 1.68)

30 months
simple payback period

0.25 kW/ton
average chiller plant efficiency
when free cooling

80%
CRAH fan energy reduction