United Rentals®
Work United™

# DRIVING EFFICIENCIES IN DATA CENTER CONSTRUCTION AND MAINTENANCE

The value of partnering with a one-stop equipment, services and solutions provider.

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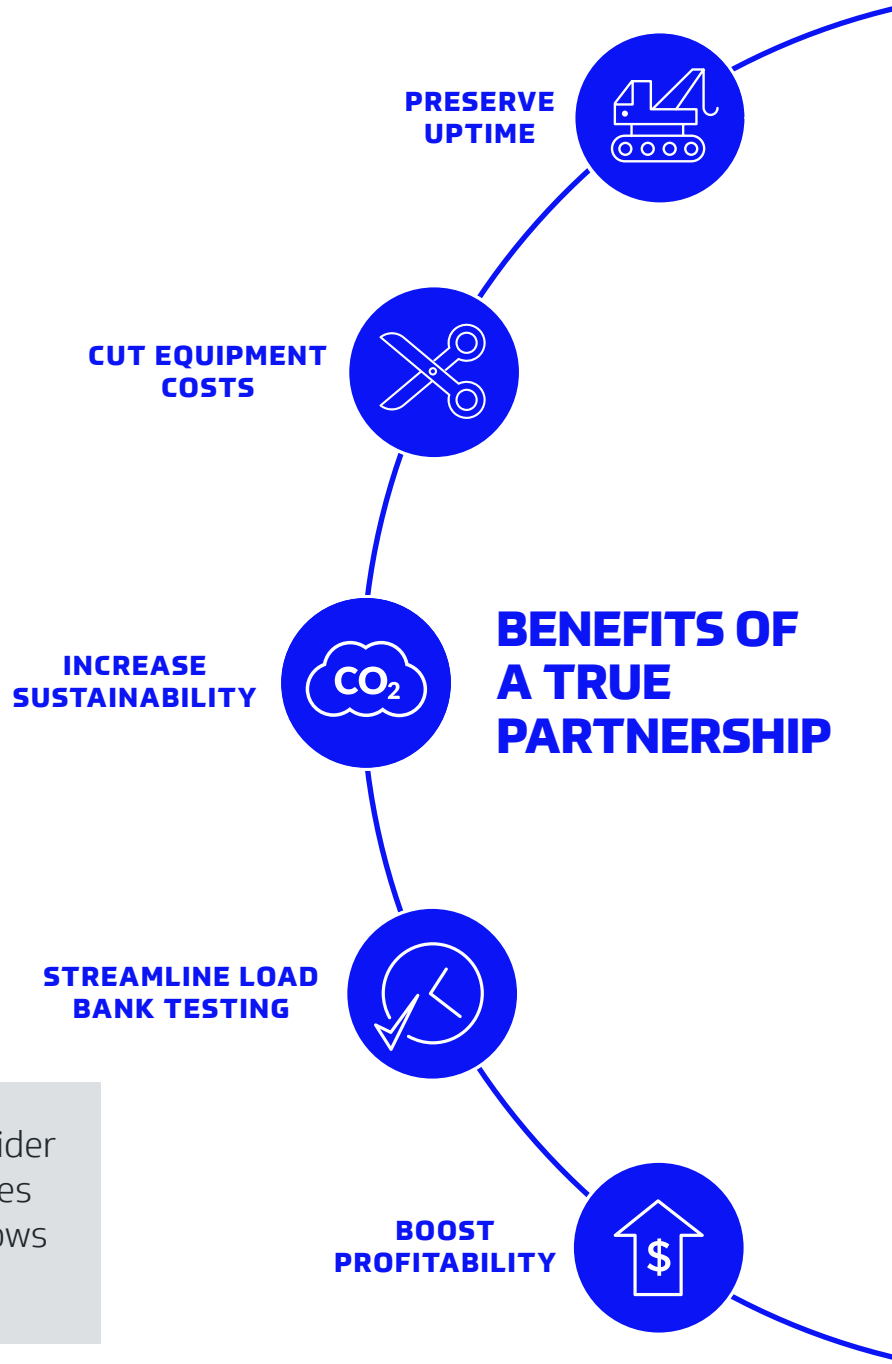
# INTRODUCTION

As the world's hunger for data continues to grow, so does the need for new data centers. In the United States, data center demand is expected to increase by roughly 10 percent a year until 2030 according to McKinsey & Company. The zettabyte age presents unprecedented opportunity for owners and construction firms—along with unprecedented challenges to build fast, build safely, protect budgets and meet sustainability goals.

Companies that win the data center construction game will rely on their own data, as well as advanced technologies and industry expertise, to streamline operations and shrink overspending. Bringing in a full-service temporary equipment provider who is deeply versed in helping major players plan and execute construction of these mission-critical facilities is one powerful secret to success.

A dedicated partner that offers the full gamut of construction equipment as well as specialty equipment, services and solutions can help companies right-size fleets, solve complex challenges, remove friction from processes and more. Leaning into the collaboration throughout the project unlocks more opportunities to streamline operations and reduce spending.




> Partnering with a one-stop equipment, services and solutions provider rather than contracting with a laundry list of specialty vendors drives efficiencies. More important, it enables a true collaboration that allows the vendor to add value at every project stage.

# 1.

## OPTIMIZE THE EQUIPMENT GAMEPLAN

Generating efficiencies in data center construction begins with rigorous planning and smart decision-making. Before ground is broken and throughout construction, an equipment and specialty solutions provider can set general contractors up for superior outcomes. Savvy equipment planning and management is key to reducing costs, minimizing equipment-related downtime and avoiding rework.

## PREDICT EQUIPMENT NEEDS AT EACH PROJECT STAGE

An equipment rental company with decades of data center construction experience can leverage proprietary historical data around equipment utilization to help contractors more accurately predict their equipment needs at each stage of the project. Right-sizing and right-typing fleets for each trade peak avoids money-wasting underutilization, schedule-busting overutilization and equipment-related downtime.

## ENSURE EQUIPMENT AVAILABILITY

Not having a piece of equipment when it's needed results in expensive and unnecessary downtime. Partnering with a vendor that has a massive inventory of equipment reduces equipment lead times.

Innovative approaches to equipment rentals yield further benefits. United Rentals can create and manage an onsite equipment yard with the exact equipment required at every stage of the project so equipment is within easy reach as soon as it's needed. This approach also reduces fuel-wasting trips to and from the local branch.

# GENERAL CONDITIONS

A one-stop, full-service partner can do more than provide the equipment required to build the data center. It can also supply other equipment and services needed to support successful project execution and a safe, secure, well-managed jobsite as outlined in the construction contract under General Conditions.

General Conditions costs may include temporary fences, smart turnstiles, portable restrooms, temporary power generation equipment, job trailers, storage containers and dumpsters. S afety training may be another line item.

Working with one vendor to meet all the needs of a project paves the way to safer, more sustainable, more efficient operations. Including all aspects of the project  under one, all-inclusive vendor agreement avoids the need for multiple agreements and helps companies get the best deal and the most value for every dollar.

## IDENTIFY THE OPTIMAL DEWATERING METHOD

Failure of a dewatering system can quickly flood a site in some cases, depending on the geography. Choosing the right dewatering method and designing a system based on site conditions prevents rework and yields the best results in the least amount of time. Geography reports and soil formations are crucial in determining the right dewatering solution. A partner with vast experience in dewatering can identify the optimal method, design the system and provide the necessary equipment.

A full-service vendor will perform the installation if desired and provide 24/7 support. If filtration is needed, a partner with in-house filtration engineers can customize a filtration solution based on bench tests to ensure contractors remain within discharge specifications.

## CHOOSE EFFECTIVE TRENCH PROTECTION

Sacrificing safety for speed isn't an option for reputable contractors. Trenches for sewer and electrical pipe installation must have adequate protection, but choosing a trench protective system isn't always straightforward. An off-the-shelf solution such as a trench box is suitable for many trenches, but the depth of the trench and the soil conditions may require a custom-engineered solution.

A partner with trench safety expertise and in-house Registered Professional Engineers can provide guidance, designs and equipment to properly protect trenches and workers.

## PLAN AND MANAGE EQUIPMENT MAINTENANCE

On multi-year projects such as data center builds, preventative maintenance is essential to maximizing equipment uptime. Some equipment vendors, including

United Rentals, offer a turnkey onsite maintenance service for both owned and rented equipment.

Having an onsite team of certified mechanics perform timely preventive maintenance, repairs and inspections guards against unplanned downtime, cuts repair costs and reduces the total cost of ownership. By right-sizing maintenance tasks through historical data collection and leveraging its ability to purchase parts at scale, United Rentals can save large customers as much as 20% on maintenance operations.

**Up to 20%**
Saving on maintenance operations through onsite fleet maintenance

## RIGHT-SIZE TOOL INVENTORIES

On large projects, contractors often significantly over-tool. After all, no builder wants to risk downtime to save a few dollars on hammers or air drills. Yet over-tooling costs more than a few dollars—typically a few hundred thousand.

One source of waste is renting or buying tools for the whole project upfront. This approach commonly leads to extreme underutilization as well as shrinkage. A vendor that offers custom tool solutions can advise on tooling levels based on detailed utilization data from similar projects and help plot tool needs against the expected craft bell curve. **A lean tooling approach can cut tool costs dramatically.**

To boost worker efficiency, United Rentals also offers customized, craft-specific pro boxes to be placed in strategic locations around the jobsite. For long and complex projects, a managed tool trailer can slash the overall tool spend and reduce or eliminate tool-related downtime.

## REAL-WORLD RESULTS

A national electrical contractor was over its tool budget three months into a data center build. United Rentals offered a managed tool trailer custom stocked with rental tools.

Against advice, the customer based the fleet on the number of tools it would need at peak, wanting extras “just in case.” This strategy left a large percentage of tools sitting idle. United Rentals reviewed the utilization metrics generated by the tool trailer solution line by line and convinced the contractor to right-size the fleet based on actual labor demands.

The approach resulted in a **savings of 43%** in total tool billing compared with what the customer would have spent if it had purchased the tools as it originally planned and a **savings of 28%** compared with the original rental tools budget.

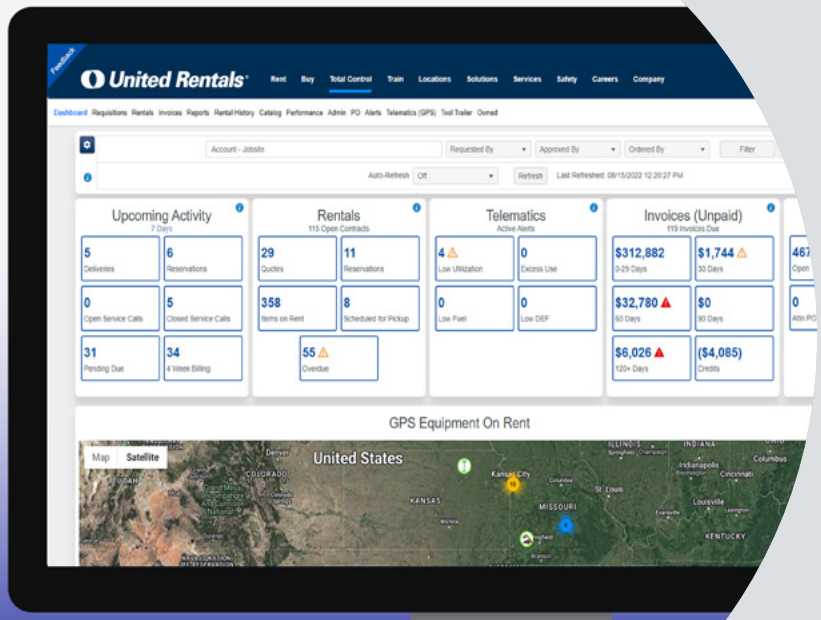
# OPTIMIZING DATA CENTER DESIGN WITH LOAD BANKS

An experienced power and HVAC partner can help optimize the design of the data center using load banks. In addition to stress-testing electrical systems, load banks can be used to mimic the heat generated by servers even before they are installed, revealing hot spots caused by airflow variations and other factors. These insights guide the placement of server racks for maximum efficiency and power savings.

# 2.

## REDUCE FLEET COSTS WITH DIGITAL TOOLS

Equipment is a significant line item on any large construction project budget. Digital fleet management tools change the game by making equipment work harder for every dollar spent. Cloud-based fleet management platforms such as Total Control® from United Rentals and the United Rentals Mobile App allow contractors to shrink costs by increasing utilization and managing rental equipment more efficiently.



## LOCATE EQUIPMENT

With a mobile app tied to a cloud-based fleet management system, managers can see on a map the real-time location of each telematics-enabled piece of equipment, owned and rented, from a phone or tablet. Finding “hidden” equipment reduces underutilization and hoarding, and it’s essential to right-sizing a fleet and ensuring that no piece of equipment goes to waste.

## MAXIMIZE UTILIZATION

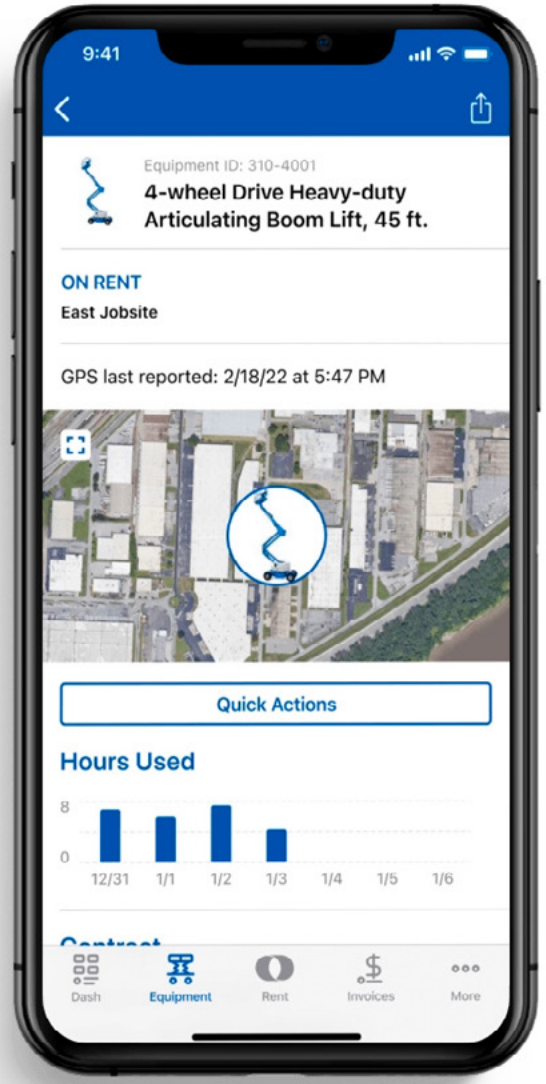
Underutilizing equipment is the equivalent of pouring money down the drain. But managing utilization requires tracking it, which many companies don’t do.

With cloud-based fleet management software, companies can easily generate utilization reports that show how efficiently every piece of equipment is being used and return or sell equipment that isn’t being used enough. Utilization reports from Total Control help managers reduce fleet as project phases are completed, shrink overall fleet costs and make smarter, data-driven buy vs. rent decisions.

## DIGITALLY TRACK TOOLS

Tools have a way of getting lost or walking off jobsites. Replacing those tools costs money, as does not having the right tool when it’s needed.

A managed tool trailer is the optimal solution. Another effective option for minimizing tool loss is tool tracking via Bluetooth tags. The United Rentals Asset Tracking System uses Bluetooth tags that send location data to a GPS device on a piece of equipment or a fixed GPS gateway. A glance at the Total Control dashboard reveals the location of any tagged tool, whether it’s rented or owned, as well as tool usage data. Overstocked item alerts point out instances of excess tooling.



## RETURN RENTED EQUIPMENT ON TIME

On large projects, companies often waste hundreds of thousands of dollars by keeping rental equipment past its due date. In fact, **24% of rental equipment is returned an average of 15 days late**, which can double the original cost estimate.

The United Rentals Mobile App features due-date alerts and enables fast, easy returns of pending due or underutilized equipment. It allows contractors to quickly extend rental durations and see opportunities to save via leniency windows. If a contractor has multiple scissor lifts or forklifts on rent, leniency windows help them decide which to return to lower their overall costs. The app also streamlines operations by allowing customers to pay multiple invoices at once with a few taps.

By helping companies increase utilization, avoid late fees, leverage payment leniency windows and more, Total Control and the United Rentals Mobile App help companies save 15% to 35% in annual rental costs.

**15% to 35%**
Annual rental cost savings with Total Control and the Mobile App

## SHARING FLEET WITH SUBCONTRACTORS

General contractors typically pay each subcontractor for the equipment they use on a job. By leveraging digital tools, they can take a more efficient approach: renting the equipment themselves and sharing it.

One data center contractor rented the equipment needed by its main trade partners from United Rentals and tracked its use with the help of Total Control and keypads installed on the equipment. The strategy allowed the GC to increase equipment utilization and derive the most value from each piece while helping the subs work more efficiently.

# 3.

## CURB FUEL USE AND EMISSIONS

More owners are setting sustainability goals for data center construction as well as data center operation. Contractors must carefully consider the impact of equipment selection and utilization on the project's sustainability, including fuel use and carbon emissions. A one-stop vendor with a strong focus on sustainability and the fleet to back it can help.

## ELECTRIC EQUIPMENT

Choosing electric equipment where possible is an obvious way to reduce equipment-generated jobsite emissions. Electric trucks, light towers, pumps and compressors may be no surprise, but electric heavy machinery options now available include 10-ton cranes, 12,500-pound forklifts, mini excavators and scissor lifts.

A one-stop vendor with a large inventory of electric equipment can not only supply these pieces but also help companies make equipment decisions based on range or battery run time and assess the readiness of their charging infrastructure.
**Electric or hybrid units make up more than 20% of United Rentals' fleet.**

## ALTERNATIVE-FUEL GENERATORS

Traditional diesel generators are major producers of jobsite emissions. Tier 4 Final generators improve on older diesel models, but other fuel options go further in helping companies meet emissions targets. When run on propane, the JuiceBox mobile power unit offered by United Rentals produces **17% lower greenhouse gas emissions** than Tier 4 Final generators, with an operating cost up to 40% less.

For zero emissions, contractors might consider a hydrogen fuel cell generator. The only byproduct is water. These generators work well for projects that have strict sustainability or noise restriction requirements and are located in an area where hydrogen is readily available.

## BATTERY ENERGY STORAGE SOLUTIONS (BESS)

Integrating a BESS with a generator dramatically curtails fuel consumption and emissions. Composed of high-density lithium batteries, inverters and load-sensing technology, a BESS is charged by the generator when the load is high and the

generator must run. During lower-load periods, the BESS provides the power. The result: **Fuel consumption is reduced by as much as 80%.**

By slashing generator run time, a BESS also cuts emissions. Adding a BESS to a diesel generator can reduce emissions by up to 50%. Adding a BESS to an alternative-fuel generator results in even lower emissions.

## EMISSIONS TRACKING TOOLS

You can't manage what you can't measure. Until recently, there's been no easy way to measure equipment emissions on construction projects, but new tools are making the impossible possible.

United Rentals customers can keep tabs on estimated greenhouse gas (GHG) emissions and source pollutants from specific pieces of telematics-enabled equipment by running reports using the Emissions Tracking feature of Total Control. Those reports reveal emissions estimates based on estimated fuel usage and a fuel type-dependent emission factor.

**Up to 50%**

Reduction in emissions by adding a BESS to a diesel generator

Soon, Total Control users will also be able to access visualized data to see at a glance which categories of equipment, and which jobsites, are generating the most emissions so they can focus their emission reduction efforts on the worst offenders.

## REMOTE ENVIRONMENT MONITORING

Heaters and dehumidifiers are often critical on data center jobsites, but running them continuously wastes fuel. Remote monitoring solutions such as WEDGE Environmental Monitoring, exclusively from United Rentals, allow contractors to remotely monitor temperature and humidity and receive alerts when measurements exceed preset thresholds.

By adding Smart Heater devices to owned or rented heaters, contractors can adjust the thermostat remotely, which saves labor. With Smart Control, they can have the system automatically maintain the target ambient temperature. Smart Control turns the heater off when the temperature in the area exceeds the target, saving energy.

# 4.

## REMOVE FRICTION FROM COMMISSIONING

Data center commissioning is a high-pressure, high-stakes endeavor. Owners want their facility to open as soon as possible to recoup their investment, but contractors must first flush the cooling system pipes and stress test the power system to ensure it will adequately protect the multi-million-dollar servers under real-life loads. The right partner can facilitate a faster, frictionless commissioning phase.

## MAKING LOAD BANK TESTING MORE EFFICIENT

When a new data center is built, load bank testing is critical to verifying the operational capacity and performance of the electrical systems, including the UPS system, the power distribution infrastructure and the backup generators. Partnering with the right one-stop equipment vendor can make a surprisingly big difference in the amount of time and money spent on this testing.

Some vendors, including United Rentals, can design and implement a plan for a fully networked load bank solution. Equipment that's connected to a central hub allows a single user to monitor and control all the equipment from a laptop and adjust each load bank to create hot spots as needed. **A networked solution can potentially free up dozens of engineers, reducing labor costs and speeding the testing process.**

## CUSTOM PIPE FLUSHING AND FILTERING SOLUTIONS

Clear pipes are essential to data center cooling. Flushing pipes to remove debris is a critical step in preparing a data center for commissioning. What gets flushed must also get filtered.

A partner with deep expertise in flushing and filtering can design and engineer a closed-loop flush system to effectively flush and filter piping as well as provide all necessary equipment, including specialty flushing pumps and VFDs, flanged hoses and 23 bag filters, all clean room certified. United Rentals can even bring in advanced measurement devices such as ultrasonic and Doppler flow meters to ensure every flush and filtration is done to spec.

# LEAPING SUPPLY CHAIN HURDLES

The soaring demand for data centers and the simultaneous growth of the solar and wind industries has put a strain on all commissioning resources. Supply chain problems can cause extended equipment lead times and delay data center commissioning.

A dedicated equipment partner will work with contractors to plan their equipment needs in advance and be better positioned to provide equipment when it's needed.

# 5.

## FACILITATE COST-EFFECTIVE MAINTENANCE

Once a data center is operational, regular maintenance is necessary to ensure reliable service and prevent unplanned outages at all costs. Load bank testing of stand-by power systems is essential to validate their readiness to provide power in an emergency. Also critical is keeping the environment within temperature and humidity specs when the cooling system underperforms or needs replacement. An equipment partner with data center maintenance experience can help.

## LOAD BANKS FOR BACKUP POWER TESTING

A serious unplanned outage can cost data center operators more than $100,000, topping $1 million in some cases. Backup diesel generators, and the battery-powered UPS systems that kick in automatically while the generators come online, are mission critical—but batteries and generators can and do fail.

Regular load bank testing of backup power systems and generators reveals risks and is a must-include item on every data center maintenance checklist.

Load bank test designs vary with each data center. Experienced load bank experts such as those at United Rentals can customize the load bank solution for the project. The success and efficiency of these projects depends on small but critical details. United Rentals project managers consider every particular, from cable lengths to facility access points to hot air discharge directions, when developing a bill of materials.

## TEMPORARY CLIMATE CONTROL FOR SERVERS AND WORKERS

Cooling system problems are the second leading cause of data center outages, after power losses. If the cooling system underperforms, a dedicated partner can provide, day or night, temporary cooling equipment to protect the multi-million-dollar servers and the data they contain.

A partner with an industry-leading inventory of temporary cooling equipment can design an effective cooling and dehumidification solution and provide the equipment to help keep servers, and workers, cool. United Rentals, for example, has the world's largest rental fleet of spot coolers for targeted cooling. Spot coolers represent a fast, portable solution for delivering cool, dehumidified air to critical equipment on short notice.

During cooling system maintenance and upgrades, a temporary cooling system is necessary to take over the job of chilling the cooling water and keeping the data center running optimally. A partner with deep expertise in industrial cooling systems and an expansive inventory of cooling towers and chillers can design a temporary system that's effective and efficient.

# CONCLUSION

More data center owners and investors are requiring increased sustainability for their projects, along with increased site safety and security. For general contractors, a collaborative partnership with a one-stop equipment, services and solutions provider paves the way to success. A dynamic partner who will challenge traditional approaches, deliver creative solutions and provide the right equipment at the right time can help put sustainability goals within reach while increasing speed to market.

The earlier the collaboration begins, the greater the potential benefits. From the start, the vendor can gameplan project equipment, offer tools for tracking and managing it and suggest ways to reduce carbon emissions. At each project stage, and with each new and unexpected challenge, an agile partner will work diligently to remove roadblocks and deliver fixes. Of course, not every vendor that has the power to transform projects and shrink budgets. The ideal partner has:

- The scale and breadth of inventory to meet equipment needs at every stage of the project with the most effective, efficient and sustainable choice
- Expertise in every aspect of data center construction and maintenance, from trench protection, dewatering and filtration to load bank testing and climate control
- Fleet management tools and apps that streamline equipment management and cut equipment costs
- Custom-engineered solutions that solve problems and drive efficiencies
- Value-add services such as staffed onsite equipment yards, managed tool trailers, Bluetooth tool tracking and turnkey onsite equipment maintenance

When the stakes are high, companies that succeed not only do things right but do them better. In the realm of data center construction, partnership with a world-class equipment provider offers a sure advantage.

# United Rentals®

**Work United™**

United Rentals is the equipment partner major data center players have chosen again and again for the unparalleled value it brings and its unmatched responsiveness.

**Contact United Rentals today to start a conversation about how to streamline and improve your next data center construction or maintenance project.**

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