



**VERTIV**<sup>TM</sup>

TURNKEY SOLUTIONS FOR DC PLANTS

Creating Dependable  
Communications Networks



Engineering and installation services from Vertiv™ encompass all aspects of creating the most reliable, cost-efficient communications network possible.

### Installation & Material Management Services

Vertiv™ offers industry-leading experience and resources to proficiently and cost-effectively install network infrastructure facilities and equipment. Vertiv's field installation team is deployed throughout North America to provide "local knowledge" and quick response to project requirements. Installation services offer a variety of options to ensure the project is completed and tested per engineering specifications.

- Equipment staging, deployment, inventory and removal — control & monitoring products, power distribution bays, rectifiers, remote terminals (cabinets, CEVs, huts), transmission/transport equipment and radios

- Infrastructure solutions — cabling (fiber or copper) installation/splicing, cable racks, equipment mounting structures, fiber duct, overhead framework, etc.
- Material management — consolidation of materials/equipment from multiple sources, inside delivery, "real time" shipping status, trash removal
- Multi-vendor solutions
- Project management — single point of contact, contain costs, resource/equipment coordination and timeliness
- Site preparation for central offices and remote terminals

- Third party items such as AC distribution equipment, batteries, etc.
- Test & turn-up — verify proper equipment operation and alarming

At the start of each project, a Method of Procedure (MOP) is created, a thorough inventory of all equipment and materials is performed and the entire project is mapped out for planning purposes. Then, we proceed with the installation adhering to Vertiv, customer and/or industry standards. Upon project completion, the customer is provided with installer marked final prints, appropriate job completion forms and, where applicable, the final drawings are updated electronically.

**Total customer satisfaction is our measurement of success.**



Ranging from site planning to test and turn-up, our experience and dedicated approach to providing turnkey solutions will compliment your business investment.

## Engineering

Whether the installation is a single bay of equipment or a complete office build-out, all projects are managed to assure all aspects — engineering, materials and installation — are coordinated to meet the project timeline. Our on-site project management team will supervise all Vertiv™ personnel as well as sub-contracted trades and installation of auxiliary equipment to ensure quality work and conformity to the engineered design, customer specific standards, regulatory and industry standards. Vertiv’s team of project managers is focused on meeting customer expectations for turnkey solutions from project inception through job completion. Total customer satisfaction is always the measure of success. These services are performed at the central office, remote terminal, mobile switching center, cell site, headend, hub, cable landing station and customer premise.

When you rely on Vertiv for installation engineering assistance, you determine the skills you desire and the scope of our involvement. Engineering services involve all aspects of designing a solution to the needs and requirements of your infrastructure network. Vertiv installation engineering provides qualified specialists in all aspects of transmission, power and engineering — for copper, fiber and wireless-based networks:

- Access to all customer electronic drawing systems
- Adherence to customer internal specifications or Telcordia GR1275 standards
- Advanced CAD capabilities for complete documentation
- Bill of material (BOM) creation
- DC power capacity and site planning
- Core and access network infrastructure design and engineering
- Floor plans
- Full equipment specifications
- Grounding/bonding design
- Installation specifications with step-by-step detail
- Site audit drawings and updates



CORE SERVICES	ACCESS SITES SERVICES
Central Office & MTSO	Cell Sites, Edge Compute, Remote Terminals
Distributed DC	Cabinet stuffing and placements
Bulk DC to 15,000 amps	DC plant installs/upgrades
Power plant installs/upgrades	Rectifiers, inverters, BDFBs, converters, PDSCs
Rectifiers, inverters, converters, BDFBs, PDSCs	Battery swaps
Battery plant installs/upgrades/removals	Transmission/IT equipment install, test and turn-up
Overhead support structure	Radio equipment install and commissioning
Ladder racking, fiber , ducting, cabling	
Grounding design & remediation	
DWDM, server, router, multiplexer installation, test and turn-up	
Decommissioning	

Vertiv's team of project managers is focused on meeting customer expectations for turnkey solutions from project inception through job completion.

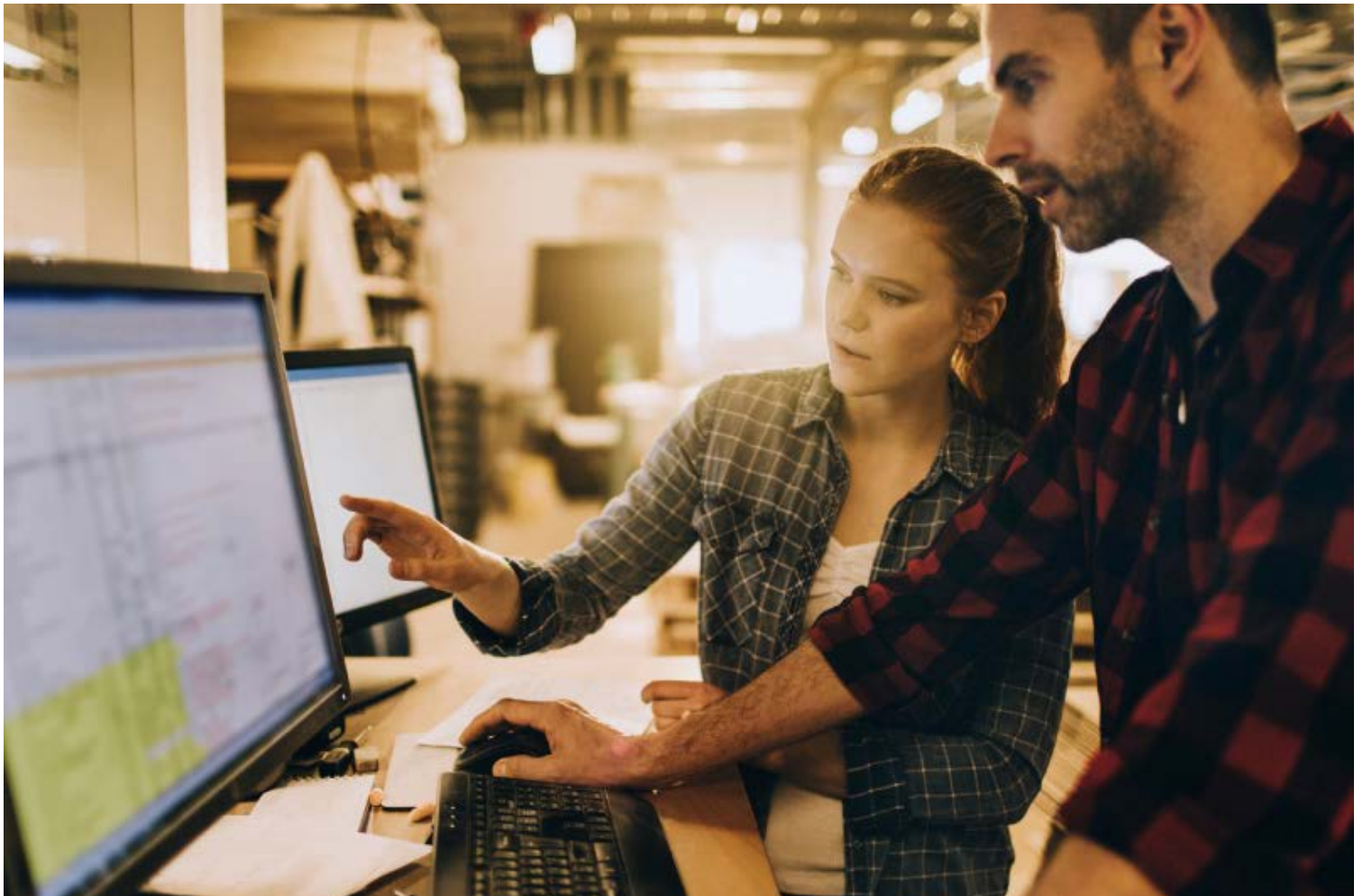
### Project Management

Whether the installation is a single rack of equipment or a complete off ice build-out, all projects are managed to assure all aspects — engineering, materials and installation — are coordinated to meet the project timeline. Our project management team will supervise all Vertiv™ and subcontracted personnel. We ensure quality installation of all Vertiv and

auxiliary equipment and conformity to the engineered design, as well as customer specific, regulatory and industry standards.

Vertiv's team of project managers is focused on meeting customer expectations for turnkey solutions from project inception through job completion. Total customer satisfaction is our measurement of success.

- A single point of contact to the customer for the project
- Management of all aspects of the project from beginning to end including engineering, material logistics, installation, acceptance testing and commissioning, customer acceptance
- Multi-vendor collaboration



Ranging from site planning to test and turn-up, our experience and dedicated approach to providing turnkey solutions will compliment your business investment.

## Turnkey Solutions

### Outside Plant

Vertiv™ offers a wide variety of capabilities to satisfy all of your engineering and installation requirements for remote terminals, outside plant cabinets, power transfer switches and cross connect cabinets.

- Staging, installation, inventory and removal
- Remote terminal staging, deployment, inventory and removal — cabinets, CEVs, gensets, huts

### Wireless

Vertiv can provide a wide variety of turnkey solutions to support your wireless deployment requirements. We will plan, engineer, equip, install and service all your wireless network facilities.

Vertiv engineers will ensure compliance with all customer standards, local and national regulations and industry technical standards for:

- Radio installation and commissioning — Ericsson, Nokia
- Staging, installation, documentation and removal
- Turnkey site power EF&I
- Testing, turn-up and maintenance

### Remote Terminals

- Turnkey new site installation
- Cabinet power retrofit offerings
- Remote power upgrades and modernizations
- Distributed to bulk power retrofit packages
- Battery system upgrades

Vertiv Project Services has a wide range of expertise and experience that enables us to support projects that require diverse types of equipment (servers, routers, switches and the like) from other industry suppliers as well. Vertiv engineers, install, connect and commission DC power and network/IT equipment in a wide array of facilities.

### Transmission/IT

Vertiv™ provides supplemental installation services to prepare a site for mounting and activating infrastructure and network equipment. While supporting Vertiv manufactured products is our primary charter. Our engineering experts are familiar with an extensive array of communications infrastructure and can readily support any type of network/IT equipment. Our experience has taken us into all types of facilities including central offices, video headend offices, mobile

telephone switching offices (MTSOs), cell sites, outside plant (OSP) locations, data centers and enterprise corporations.

- Capacity and site planning
- Core office and remote facility and design engineering
- Infrastructure planning
- Floor plans with cable tray/rack and fiber duct layout
- Equipment rack layout
- Intra-bay and inter-bay AC /DC power, copper and fiber optics signal cable connectivity drawing
- Complete bill of material (BOM) for hardware installations including:
  - Cable trays/racks
  - Fiber duct systems
  - Equipment racks and cabinets
  - Power systems
  - Copper and fiber optic signal cables
- Engineering specifications and/or method of procedure (MOP) with detailed installation instructions for field technicians
- Test and turn up procedures
- Preliminary IP configuration of network servers and equipment

Vertiv offers a wide array of turnkey power EF&I solutions to meet your needs.

## Additional Value-add Services

### Site Inventory and Documentation of Existing Facilities

Using laptops and specially programmed CAD software, Vertiv™ engineers will visit your core or access sites and quickly develop accurate drawings of existing equipment layouts and gather equipment data.

- Current, complete site inventory and status
- Detailed summary reports available online
  - Equipment condition, model & specifications
  - Power distribution
  - Battery status
  - Rectifier operation
  - Floor diagram
  - Capacity analysis
  - Simple floor plans
  - System wiring and termination diagrams

### Grounding Survey and Remediation

Vertiv grounding surveys and remediation services are cost-effective solutions for dealing with noisy circuits, avoiding equipment damage from lightning and protecting personnel. Poor grounding is a common cause of erratic operation and noisy circuits. Our experts can help solve grounding problems and, in turn, remove this as an optimum network performance issue.

Vertiv regional engineering specialists will perform a thorough survey of each piece of grounded equipment in your central office or remote site and evaluate your earth grounding system using:

- Latest detection equipment
- Detailed written report of all weak areas
- Recommendations for corrective action
- Firm cost and time-schedule estimates for remediation
- Qualified Vertiv technicians to implement all recommendations

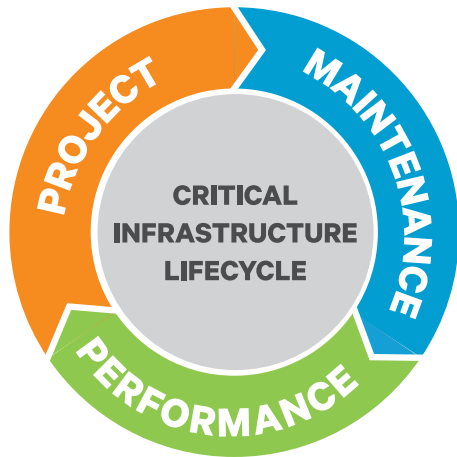
### Support and Maintenance

In addition to our EF&I deployment capabilities we also have a wide variety of Field Support Services to maintain and support your equipment investment after it has been installed. These services include:

- Advance equipment exchange
- Depot repair
- Preventive maintenance
- Spare parts/kits
- Technical support
- Training and education
- Field repair
- Battery capacity testing
- Thermography analysis
- Portable power



Whether it's engineering, on-site project management, energy-consumption monitoring, or something else, Vertiv supports your critical infrastructure needs.



**Vertiv takes a complete life-cycle approach to service, from project launch to ongoing maintenance and performance optimization**

We strive to keep your network infrastructure highly available, efficient and adaptable, so you can:

- Increase mean time between failure
- Decrease operating cost
- Implement future technologies while maximizing your resources

**PROJECT**

When launching new facilities or powering up new equipment, you want to do it right – right from the start

- Plan
- Design
- Engineer
- Integrate
- Commission
- Project management

**MAINTENANCE**

Services to ensure that your business-critical infrastructure operates reliably, safely and efficiently

- Preventive and corrective maintenance
- Remote services and monitoring
- Cap / fan / battery replacements
- Repair
- Spare parts

**PERFORMANCE**

Full range of services designed to optimize infrastructure performance and reduce complexity

- Assess
- Audit
- Model
- Configure
- Upgrade
- Train



To learn more about this service and other Vertiv solutions, visit [VertivCo.com](http://VertivCo.com) or call: 1 800 800 1280.



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