

Hard Bid

Voltage Infrastructure Upgrade



National Renewable Energy Lab: CGI2 Medium Voltage Infrastructure Upgrade
19001 W. 119th Avenue,
Arvade, CO 80007

Size: 65,000 SF

Construction:

Start: November 2021

Completed: Ongoing

Projected Completion: July 2023

Contract Price:

Initial: \$5,686,142

Change Orders: \$1,008,050*

Final: \$6,694,192

*Owner requested added scope

Delivery Method:

Hard Bid

References:

National Renewal Energy Laboratories

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Design Team:

RMH Group

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Key Staff:

Scott Solem, V.P. of Operations / Project Executive

John Steen, Project Manager

Judd Strickland, Superintendent

Antonio Soto, Field Engineer

Project Description

The construction of a new Second Controllable Grid Interface capability at NREL's Flatirons Campus including all the necessary civil, electrical, mechanical and equipment installation work. The Second CGI will be rated for 19.9 MW of power and will be interconnected to the Flatirons Campus internal electrical buses utilizing existing and new switches to enable parallel operations with the existing CGI as well as independent operations of each CGI simultaneously with various combinations of connected research articles and equipment.

Specific project requirements include:

- Development and implementation of EPA approved Storm Water Pollution Prevention Plan and installation of civil drainage swales and site reclamation requirements of disturbed areas for total restoration to native conditions.
- Installation of new precast concrete electrical vaults, including all trenching, excavation, hydrovac, and concrete encasement requirements for new electrical duct bank pathways for medium voltage power and tele-communication lines servicing new equipment.
- Provided new feeder conductors from Vista Switch to new research bus meter enclosure, to existing Building Bus meter enclosure, and form new meter enclosure to the research busmain.
- Furnishment and installation of 1200A Vista Switches and removal of existing sectionalizers.
- Construction of new structural concrete equipment pads and provision of all hoisting and rigging services required to unload and place all owner provided equipment including the E-House, three transformers, two fin fans, two 13.2 KV Nepsi & RC filters, and switch gear in power centers 130A and 130B.
- Installation, connection, and commissioning of HVAC systems associated with Owner provided equipment.
- Design, permitting, plan review, installation, connection to existing campus infrastructure, testing, and final inspection of fire alarm system associated with Owner provided equipment coordinated with the local fire authority having jurisdiction.
- Installation of lightning protection system and obtainment of certification per code requirements.
- Successful performance of all electrical testing for power and controls cables and terminations to all newly installed electrical equipment and integration into existing campus electrical system.

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Project Challenges

Material procurement prioritization was a critical obstacle that required diligent planning and projection for the entirety of the project to ensure these constraints would not negatively impact the delivery timeline. Although an ongoing challenge, sourcing electrical conduit, medium voltage wire, termination blocks, transformers and their components, and other pertinent materials, were intentionally evaluated independently in consideration with the project schedule sequence to maintain continuous installation.

Parallel to securing materials to arrive on site when scheduled, daily site logistics demanded considerable analysis to not impede productivity. Trenching and excavating, hydrovacating around numerous existing utilities, and installation of underground electrical rough-in happening concurrently, necessitated detailed coordination. These on-site conditions, coupled with extensive weather complications, magnified the need for heightened attention to all quality requirements, to purposefully eliminate potential re-work.

Project Accomplishments

Creative problem solving and adaptive resource allocation was a key success that resulted from our cohesive team responding collaboratively to continuous design oversights and unknown existing conditions. Regularly our team and trade partners promptly proposed alternative solutions to Ownership when additional design clarification was required, market constraints were unfavorable, or an unforeseen condition was identified. This repeated achievement cannot be understated when considering each resolution required a large group of stakeholders of separate interests to be mutually agreeable and equitably satisfied.