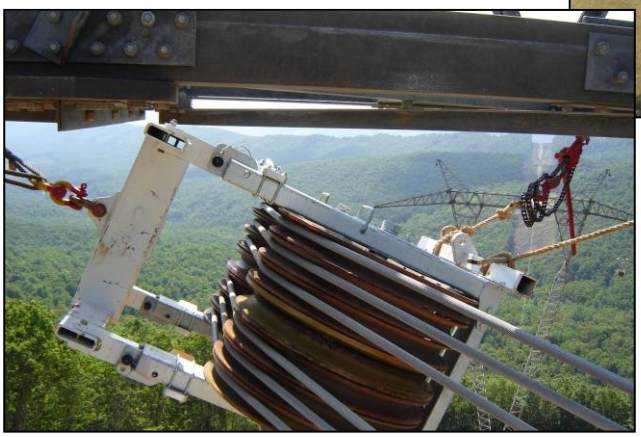
PAR ELECTRICAL CONTRACTORS, INC.
A QUANTA SERVICES COMPANY

Experience with 345kV and 500kV Lines

Sample Projects



PAR has constructed all sizes and types of transmission lines – from 765 kV, six-bundle, guyed V steel towers to 69 kV lines. PAR has the expertise and the equipment to get the job done safely. PAR — through Quanta Services — is the only electrical contractor qualified and certified to perform all aspects of transmission construction and maintenance while the system remains energized.

Allegheny Energy Service	Allegheny TrAIL project: Constructed approximately 150 miles of 500kV transmission line as well as two 500kV Switchyards; one in PA and one in VA	2010
	Masontown Re-route 500kV Transmission line: 2 bundle 2036 ACSR	2010
	Hatfield 500kV Power Station: Removed four lattice towers and installed six steel mono poles and related hardware; relocate three 500kV lines, 2 bundle 2032 ASCR	2006
Alliant Energy	Peetz Interconnect 345kV transmission line: Pulled nine miles of 795 bundle conductor	2007
American Electric Power	Sporn-Muskingum: 345kV change out, the 50 mile line traverses West Virginia and Ohio	2014
	West 345kV Bixby-Conesville - Installed structures, foundations, and conductor weights	2014
	Conesville-Bixby – Constructed 345kV and 138kV lines	2013
	Rockport-Jefferson 765kV Transposition - Provided supervision, personnel and equipment to install three 6-pole transposition structures and all associated conductor work	2012
	Single circuit 138kV wood H-frame line between Poston and Ross Substations, Ohio; approximate 43 mile line of rebuild, separated into six sections for construction; also removed existing wood poles and conductor and installed new steel (WPE) and reconductor	2011
	Wyoming-Jackson Ferry 765kV line - Constructed 90 miles, 6 bundle, 795 conductor, 111 lattice steel four-legged structures, 222 lattice steel guyed-V structures; experienced extreme terrain conditions, extensive use of helicopters for wire string and steel transport, more than 350 personnel at peak loading, completed on time	2004
	Rolling Hills - 1 mile, 765kV, 4 bundle 1351 ACSR, lattice towers	2002
American Transmission Company	Twenty Mile project: Reconstructed existing single circuit 345kV overhead transmission facilities, replaced wood k-frame structures with steel H-frame structures	2009
	Paddock-Rockdale Project: Approximately 34.3 mile reconstruction project of overhead transmission facilities to add an additional 345kV circuit to an existing double circuit 345kV/138kV corridor; conductor sizes are T-2 556.5 ACSR Dove, T-2 113.2 ACSR Blue Jay, and 2156 ACSR Bluebird; also included installation of a 12-Fiber and a 24-Fiber DNO OPGW circuit along the project route; the project involved work within environmentally sensitive areas including waterways and wetlands and was constructed under a compressed timeframe due to outage constraints.	2009

	Arpin-Rocky Run 345kV Project: Approximately 20 mile project that required the reconstruction of existing single circuit 345kV overhead transmission facilities to replace the wood k-frame structures with steel H-frame structures. Re-sagged the existing 2 bundle 795 ACSR Drake conductor to meet new circuit loading requirements as well as installed one 12 fiber DNO OPGW along the entire route; involved extensive amount of work within heavy wetlands and environmentally sensitive areas.	2009
	GCMW HWY 22: Provided labor, equipment, tools, material and supervision to perform construction services for the Highway 22 - White Clay project (installed poles, grounding and installed 345kV-static-OPGW)	2008
	GCMW-Caroline-Highway 22 below grade: Provided labor, equipment, tools, material and supervision to remove existing 345kV line	2008
	WHB-CAE 138/345kV T-Line: Provided labor, equipment, tools, material and supervision to perform removal, grounding and t-line construction (115kV, 345kV, static, OPGW) for the Whitcomb Substation to Caroline Substation project; Phase 1 Installed poles (16.1 miles) & 345kV/Static/OPGW	2008
	GCMW-CTV SS to WW SS 138/345kV: Installed 137 138/345kV steel mono poles and approximately 18.1 miles of T-2 1113 ACSR T-2 556 ACSR, shield wire and OPGW 12 fiber	2008
	GCMW-WW SS to RRN/WL: Temporary line construction, installed and removed 1.45 miles of temporary 138kV transmission line, also installed 1.95 miles 138/345kV mono steel structures	2007
	White Clay to Morgan GCMW demo 138kV H-frames – removed approximately 9.5 miles of 138kV line, consisting of 145 H-frames, hardware and conductor, 345kV, 138kV permanent lines, line removal/below grade	2007
Associated Electric Coop	Lutesville-New Madrid 345kV line ice storm restoration	2009
Arizona Public Service Co.	Panda: Constructed 40 miles of 500kV, 3 bundle 1780 ACSR transmission line on steel lattice towers	2002
	Southwest Valley: 38 miles 500kV steel pole/lattice tower on 500kV transmission line	2002
Bonneville Power Administration	Midway-Benton #1 and Benton-Othello #1 Rebuild Project: Scope included approximately 40 Miles of 115kV Rebuild from Midway substation to Benton substation including a 14-mile reroute, rebuild used H-frame wood pole construction with Toutle conductor	2013

	Benton-Othello #1, 115kV Rebuild: Rebuild line from Benton substation to structure 11/7 Scooteney Tap to Midway-Benton #1, 115kV Extension: Extended the line from its existing location to the Midway-Benton #1 reroute, extension used H-frame wood pole construction with Toutle conductor	
	Hot Springs 500kV spare transformer installation	2011
	Alvey 500kV spare transformer installation	2011
	McNary 500kV spare transformer installation	2011
	Schultz to Wautoma: Constructed 65 miles of 500kV, 3 bundle 1300 ACST/TW on lattice towers	2005
	Yakima River Crossing: Re-routed existing 230kV/500kV circuits	2003
	Hanford-John Day 500kV: Reconductor included a 4,100 foot river crossing	2004
Colorado Public Service	Installed 100 miles of 345kV 2 bundle 795 ACSR on wood poles with helicopter	2001
Con Ed/O&R	Ramapo-Sugarloaf 345kV: Reinforced approximately 11 miles of existing lattice steel towers and strung 11 miles of new 345kV bundle conductor on a previously vacant position	2011
	Constructed the 345kV Beaver-Greenfield Line Project	2003
Constellation Energy Group	Nine Mile Point Nuclear station: Constructed 345kV line	2005
	Repaired one 345kV switch connection *energized* at Nine Mile Point Nuclear Power Plant	2005
Elk River Wind Farm, LLC	Construction of Elk River 345kV transmission line	2005
Eversource (NU)	The Interstate Reliability Project consists of 38 miles of new 345kV overhead transmission line. Work performed in east CT. • Installed 79 drilled shaft foundations • Installed 613 direct embedded foundations • Installed 337 steel pole structures • Installed 38 circuit miles of 345kV conductor • Cut-overs to three new structures on two adjacent circuits (345kV and 69kV) • 31 guy relocations on the adjacent 345-kV line	2015
	Replaced 20 345 kV structures on the 307 Line. Drilling included on this project.	2015

	Replaced 37 345kV structures on the 354 line and five 345kV structures on the 393 line. Replacement of structures will be energized. Drilling to be included on this job.	2015
	345 kV storm hardening, lines 3424, 398	2015
	345 kV structure change outs, line 3041	2015
	The Greater Springfield Reliability Project: Required the construction or re-build of 27 circuits on the Northeast Utilities System; MA work was under the Western Mass Electric operating company (WMECO) and CT work was under their Connecticut Light & Power operating company (CL&P). • Installed 540 drilled shaft foundations (largest is 11'diam x 71' deep – 300 CY) • Installed173 Direct Embedded Foundations • Installed 714 steel pole structures (tallest is 195') • Installed 98.7 circuit miles of conductor (63.4 mi of 115kV and 35.3 mi of 345kV)	2013
	Worked within urban area challenges with approximately 22 major interstate crossings of the MA. Turnpike, I-91 and I-391	
	345kV structure replacement: 4 phases	2010
	Middletown-Norwalk 345kV transmission line: Approximately 90 miles of 345kV overhead lines and various 115kV circuit rebuilds, structure heights ranged between 30 ft. and 195 ft., approximately 760 miles of wire strung and nearly 3,000 truckloads of concrete poured; helicopter use was critical to completing much of the project's overhead line, it reduced construction time and mitigated environmental impacts and helped complete the project ahead of schedule and under budget	2007
	345kV live sleeve replacement: provided services for 2,156 slice and dead-end replacement for several lines in Meriden, CT; work performed *energized*	2007
	345kV polymer insulator replacement for various lines while *energized*	2007
	345kV live line sleeve replacement - purchased materials only for splice and dead-end replacement project	2007
	Bethel-Norwalk 345kV/115kV double circuit, approximately 31 miles	2007
First Energy	Handsome Lake-Homer City 345kV Loop: The new 345kV loop will be approximately 1.5 miles of double circuit steel monopole construction, there are nine single poles and one six pole tap structure	2014
	Avon Beaver #1 and #2 - Removed two 345kV lattice towers and installed four steel poles including transfer of existing conductors	2014

	Davis Besse-Hayes 29 mile, 345kV transmission line: Added 345kV circuit to existing towers	2013
	Doubs-Mt. Storm 500kV - Project consisted of rebuilding 2.9 miles of existing 500kV transmission line from Potomac Edison's Doubs Substation to the Potomac River. Work included removal/salvage of existing structures, insulator and hardware assemblies, overhead ground wire, conductor and the installation of new foundations, structures, conductor and optical ground wire. Wire will be strung from the Doubs Substation deadend structure to deadend structure number 551/457 located on the West side of the Potomac River; this structure and its foundation will be installed by Dominion. Also included in the work will be the receiving of owner furnished materials as well as sorting, loading, transporting and off-loading material from owner's storage yard at 502 Junction Substation located near Mt. Morris, PA. All existing OHGW, conductor, insulator and hardware assemblies, vibration dampers, spacers and sixteen lattice tower structures comprising the 2.9 mile portion of line to be reconstructed will be removed and salvaged, includes disposal of conductor reels.	2013
	Beaver Carlisle 345kV Relocate: Relocated existing 345kV single bundle transmission line, erected anchor-bolted steel poles, installed new conductor and removed and salvaged existing poles	2005
	Beaver-Greenfield 345kV Project: Constructed transmission line	2003
Georgia Power	McGrau Ford-Mostellar Springs: 35 miles of 500kV, 3 bundle 113 ACSR, lattice towers	2006
Kansas City Power & Light	The Iatan-Nashua Project required the construction of a new 345kV transmission line in northwest Missouri, the transmission line will extend approximately 31 miles from an existing substation at the Iatan power plant near Weston, Missouri (Iatan Substation), to the Nashua 161kV substation near Smithville, Missouri (Nashua Substation); the 161kV Nashua Substation will be expanded and upgraded by others to accommodate both the new 345kV Iatan-Nashua line, and the connection with the existing St. Joseph-Hawthorn 345kV transmission line by installing a new 345/161kV autotransformer between the existing 161kV substation and the 345kV facilities at the Nashua Substation	2014
	U-KCP and LaCygne 345kV Line: Nine drilled piers for transmission line	2013

	LaCygne Generating Plant 345kV transmission line: Provided labor, tools, equipment, supervision and certain materials to build .33 miles of 345kV, single pole, double circuit, vertical I-String transmission line this includes eight structures with two 48 fiber OPGW and 3 bundled 795 ACSR "Drake" phase conductors; the new transmission line was constructed from the existing switchyard to a new transformer within the LaCygne plant	2013
	Re-conductor 40.9 miles of 345kV 2 bundled line from LaCygne to W. Gardner; installed 954MCM Cardinal ACSS/TW conductors and removed 954MCM Rail ACSR conductors	2005
	Reconductored 40.9 miles of 345kV 2 bundle, de-energized transmission line from La Cygne to West Garden, wood H-frame	2003
	Reconductored *energized* line, 30 circuit miles of 345kV, 954 rail, 2 bundle conductor on wood H-frame	2003
MidAmerican Energy	345kV Containment Structure A11, A23	2012
	Crawford County and Atchison 345kV Rebuild	2011
	Storm rebuild of 15 miles of 345kV, H-frame construction	1998
	North loop and Bondurant: Constructed 20 miles of 345kV/161kV in Des Moines; used steel poles and drilled pier foundations 60 ft. deep	1995
Minnkota Power	30 miles, 500kV, 3 bundle ACSR, lattice towers	1976
NPPD	Grand Island to McCool Junction - 345kV storm restoration	2008
Nevada Power Co.	Alturas, CO and Reno, NV: Alturas 345kV Intertie - 171 miles of 345kV steel pole transmission line with two 345kV substations, bundled 954 ACSR on steel tubular H-frames and single pole structures including foundations	2008
	Lenzie 500kV - Interconnection at Lenzie generating plant 3 bundle, 1590 ACSR, steel poles; all involved installation and/or removal of steel poles and triple bundle conductor, only 2 to 4 spans in and out of the Lenzie Generating Plant Switchyard; included OPGW work	2005
NV Energy	Moapa 500kV Interconnect: Excavation and foundations, installed reinforced concrete foundation with anchor bolts, installed two steel foundation poles, installed additional ground rod, Installed one overhead ground wire complete, installed one circuit of 6-1590 MCM lapwing ACSR bundled conductors complete, installed all NVE supplied fiber optic cable, Installed NVE supplied pole mounted splice box.	2014

	Harry Allen to Mead: 500kV, 3 bundle 1590 ACSR, intersect one lattice tower	2006
OG&E	Muskogee to Pittsburg 345kV: Installed 20 miles of bundled 7995 Single Circuit with 2 statics	2012
	Hugo-Calliant 345kV Transmission Line, 20 anchor bolt foundations for transmission line near Hugo, OK	2011
ONCOR	Central Bluff-Bluff Creek 345kV project is a 345kV transmission line constructed on lattice steel V towers	2012
	Texas Utilities transmission project: Constructed 80 circuit miles of 345kV 1590 ACSR 2 bundle conductor on approximately 55 lattice steel towers, used helicopter to set towers; weather delays made this an especially challenging project, which was completed before deadline	2001
PacifiCorp	Malin Re-route of 500kV double circuit, 2 bundle 2500 AAC, 3 Lattice Towers	2009
	Oquirrh 345kV-138kV substation: moved existing 345kV transmission line for new substation	2008
	Relocated 138kV/345kV line	1996
Pacific Power & Light Company	Alvey to Dixonville 500kV: Installed 58 miles of 500kV line on lattice steel towers: clearing, roads, foundations; towers set by helicopter; triple bundle 1272 ACSR conductor; removed 58 miles of 230kV wood pole line	1993
PPL	The Susquehanna (Berwick, PA) to Roseland (NJ) project consists of 101 miles of new 500kV overhead transmission line. The existing right-of-way required expansion from a single 230kV electric transmission line to replacing the existing towers with new, taller tower structures, updating the 230kV to one that will carry 500kV and add an additional 500kV transmission line. In addition to the 101 miles of 500kV overhead transmission line, the project also includes: • One new Greenfield 500-Kv Substation • Seven substation upgrades • One 500-kV substation • Six 230-kV substations The expansion also required constructing new access roads	2015

	Northeast Pocono Reliability Project required the installation of approximately 68 miles of new 230kV and 138kV overhead transmission line, erection of steel transmission structures, installation of concrete foundations and the construction and maintenance of access roads	2015
	Susquehanna-Roseland Project B2-B4 Overhead Transmission: Installed new structures and foundation for B2 and B4 line segments in the Susquehanna Nuclear PP and T10 SS, string 230kV and 500kV conductor and replace static wire with OPGW	2012
Public Service Electric & Gas	SRP Segment 4: The Project consisted of approximately three miles of the 46 mile New Jersey portion of the S-R Project, designated as Segment 4. In addition, there are approximately seven miles of OPGW to be installed on the KI-HA transmission line over circuit K-1019 and one span over circuit T-2298	2013
Public Service Co. of Colorado	345kV intertie line: Installed 100 miles of wire on 345kV line using a helicopter	2001
Rocky Mountain Power	90th S to Camp Williams: Double circuit 345kV transmission line on steel poles	2009
Salt River Project	Springerville 4 Project: Construction 345kV switchyard and transmission line	2007
	Palo Verde to Kyreen (SRP): Constructed 50 miles of 500kV, 3 bundle 2312 ACSR, lattice towers	1986
	Constructed 50 miles of 500kV Lattice Tower Line	1982
San Diego Gas & Electric	The Sunrise Powerlink Project: New and modified electric transmission lines, a substation and related facilities, project consisted of approximately 120 miles of both overhead and underground transmission lines and 72 count OPGW, 90 miles of 500kV and 28 miles of 230kV and the Sun Crest Substation; the segment from the Sycamore Canyon Substitution through Alpine to the Sun Crest Substation is 28 miles; 6.2 miles of the 235kV line is underground and called “Alpine Underground Segment.”	2010
	Copper Mountain for Hampton Tedder on a Sempra Project in Nevada: Scope included a substation with approximately 1000’ of 138kV line at 1.5 miles of 34.5kV distribution and a small substation	2010
	Transmission lines 13813, 13814, 13815: Removed 18 bridge towers and lattice towers including Epic 2	2009

	Firestorm 2007: Designed/Rebuilt various transmission lines	2008
	Replaced wood poles with steel poles at various locations	2008
	Removed transmission line 13815 at 30th Street; Phase II 20SD Overhead	2008
Sho-Me Power	Thayer-Gobbler Knob: Constructed approximately 58 miles of 345kV transmission line, steel H-frames	2007
	Constructed 67 miles of 345kV transmission line, wood H-frame	1970
Sierra Pacific Power Company (NV Energy)	Alturas 345kV Intertie: Constructed 171 miles of 345kV steel pole transmission lines with two 345kV substations; bundle 954 ACSR on steel tubular H-frames and single pole structures including foundations	2005
	Built 179 miles of 345kV line, combination of direct buried and anchor bolt foundation structures; steel monopole and H-Frame structures installed, 954 ACSR bundle conductor	1998
Southern California Edison	Devers–Palo Verde 500kV No. 2 (DPV2) Transmission Line Project consists of a new 500kV transmission line including 111 miles of 96 count OPGW communication line, upgrades to the Valley and Devers substations, and the new Colorado River Substation. The DPV2 transmission line is located within SCE's right-of-way (ROW) parallel to the existing 500kV Devers-Palo Verde No. 1 (DPV1) Transmission Line. Because the ROW traverses multiple jurisdictions including private, Riverside County, California State Lands Commission (CSLC), and federal lands, PAR will use its years of experience to work with each landowner to ensure the project is completed on time, safely. The Project consists of the following: • Colorado River to Devers transmission line including the new series capacitor bank adjacent to the existing DPV1 series capacitor bank • Devers to Valley transmission line • New Colorado River Substation including dead-end structures, circuit breakers, and disconnect switches • Devers Substation expansion, including installation of a 500kV line shunt reactor bank, dead-end structures, circuit breakers, and disconnect switches • Valley Substation upgrade, including installation of a 500kV dead-end structure, circuit breakers, and disconnect switches • Distribution line extension for Colorado River Substation Worked with Bureau of Land Management (BLM), United States Forest Service (USFS), and United States Fish and Wildlife Service	2013

The Tehachapi Renewable Transmission Project (Segments 6 – 11): Segment 6 consisted of removing 32 miles of 220kV lattice steel towers (LSTs), conductor and associated hardware, and installing 32 miles of both new 500kV transmission line and 96 count OPGW on LSTs and tubular steel poles (TSPs). Segment 11 consists of removing approximately 19 miles of 220kV transmission line on LSTs, construction of 19 miles of 500kV transmission line on LSTs and TSPs, installation of 16 miles 220kV transmission line conductors on existing double circuit LSTs and rearrangement of 220kV lines and 220kV line-bus connections. Segments 6 and 11 of the Tehachapi project are located predominately in the Angeles National Forest and present significant environmental, biological and ANF constraints for construction.	2013
West of Devers Interim (WODI): Installed six towers 1590 2-bundle conductor, removed existing for new 230kV reactor site.	2013
WODUP Potholing – potholed underground facilities for 48 miles of transmission line	2013
Windhub Markers: Installed mile/tower identification signs removed existing, installed aerial crossing signs, installed marker balls on Antelope-Vincent #1 and #2 circuits	2013
Path 42 Civil Work: Installed foundations for three towers, using composite matts	2013
Distribution deteriorating pole evaluation and planning: Performed distribution deteriorated pole replacement design services	2013
TRTP Segments 7&8p4, Segment 7: Constructed 27 lattice 500kV and 230kV structures, 14 miles 2156 bundle Bluebird, with OPGW; Segment 8p4: constructed 16 lattice 500kV & 220kV structures, 15 miles 2156 bundle Bluebird, with OPGW	2013
CRS - Devers 500kV transmission line work	2011
Devers-Valley 500kV transmission line work	2011
Installed 34 miles of 500kV lattice and steel pole transmission line	2010
Relocated three 500kV structures and installed six, 500kV steel poles for new capacitor bank	2010
Tehachapi Renewable Transmission Project: Constructed 26 miles of both 500kV line and 48 count OPGW from Antelope Substation to Pardee Substation (Segment 1); 22 miles of both 500kV line and 48 count OPGW from Antelope Substation to Vincent Substation (Segment 2); and 25 miles of both 500kV line and 48 count OPGW from New Windhub Substation to Antelope Substation (Segments 3A); 2400 feet of 220kV line re-located outside of the Antelope Substation,	2010

	10 miles 220kV line from Windhub Substation to New Tehachapi Substation	
Texas Utilities	Installed 40 miles of 345kV 2/c bundle line and approximately 55 lattice steel towers; helicopters used to complete work, which began first week in February 2001 and completed all work 3 days before deadline	2001
TransElectric	PATH 15: Installed 84 miles of 500kV transmission line, 3 bundle 1590 ACSR on steel poles	2004
Transource	AEP & KCP&L: 676 direct embedded foundations and 186 anchor bolt foundations for 345kV transmission line	2015
Utah Power & Light	Constructed 116 miles of 345kV, used lattice H-frames	1980
Western Area Power Administration (WAPA)	Installed 82 miles of 500kV line on lattice steel towers: triple bundle 1565 ACSR conductor, new towers, existing tower modification; all materials provided by the contractor; removed 82 miles of conductor, foundations installed by the contractor, COPT Olinda to Tracy 500kV	1991
Westar Energy	Summit to Elm Creek: Installed 29 miles of 345kV transmission line	2015
	Built 57 miles of 345kV/115kV double circuit transmission line	2009
	Wichita to Reno County: Constructed 345kV line	2008
	Installed 82 miles of 500kV line on lattice steel towers: triple bundle 1565 ACSR conductor, new towers, existing tower modification; all materials provided by the contractor; removed 82 miles of conductor, foundations installed by the contractor, COPT Olinda to Tracy 500kV	1991
Xcel	Replaced 345kV structures	2006
	345kV structure replacement: Replaced existing 345kV wood H-frame structures with 345kV steel H-frame structures; line was *energized*	2005
	Green Valley to Spruce - Constructed 345kV transmission line	2004