

BUILT WITH
OneCem[®]

Going Green in Stabilizing Access Roads for Wind Farms using OneCem[®] Portland Limestone Cement



The wind powered electric generation industry continues to flourish across the US and is a rapidly expanding segment of our nation's energy grid. This phenomenal growth is due in large part to state renewable electricity standards (RES) that require electric utilities to gradually increase the amount of clean renewable energy. Historically, wind energy has been the top renewable energy technology of choice to meet RES targets, accounting for 64 percent of renewable capacity additions to date.

Colorado was the first state to adopt an RES policy and has set in motion an ambitious roadmap to realize a 100 percent renewable energy future by 2040. In support of this climate action initiative, the largest electric utility in the state is increasing its wind portfolio by 70% to generate more than 40% of its power by 2022. Its recently completed 500 megawatt Cheyenne Ridge Wind Farm, the second largest single-phase wind project in Colorado, is a major first step in pursuit of this clean energy goal.

The Challenge

Even wind farm projects that run smoothly and on schedule encounter obstacles. There are challenges with unpredictable weather, geotechnical conditions, uncertainty around material deliveries, and environmental considerations—among other issues.

One of the first steps in the construction process is building access entryways to the site from public roadways and then spur routes off the main access roads to each turbine location. Surface conditions dictate road designs, and sustainable construction plans drive the approach to project execution. Properly considered construction methods can reduce quantities of costly aggregates, minimize waste production, and avoid delays in allowing access for wind turbine component deliveries. Landowners, particularly farmers, want minimal disruption in their fields.

As with all large wind farm projects in outlying areas, constructing the access roads for the Cheyenne Ridge Wind Farm on the Eastern Plains of Colorado faced significant challenges. Spanning 65,000 acres of pasture and wheat fields, the facility required an 85 mile long network of access roads to support the safe haulage of large equipment and materials needed to install the 300 foot high turbines. Access to all 229 turbine sites was essential for ongoing operation and maintenance.

Based on speed of construction, economics, and environmental considerations, it was determined that soil cement stabilization would be the best approach to achieving the geotechnical compressibility and strength performance properties needed for the roads. The use of cement to stabilize the soil rather than building 12 inch aggregate roads would also reduce soil disturbance and provide significant scheduling and cost-saving benefits. One of the biggest challenges would be the sourcing and supplying of the remote jobsite with the enormous volume of material needed to keep the project moving on schedule.

The Solution

In search of a solution that would provide the required strength and durability for the access roads, while minimizing environmental impact, the general contractor reached out to the experts at Rock Solid Stabilization & Reclamation, Inc. With a track record of treating more than 50 million square yards of soil, Rock Solid is an industry leader in providing full-service soil-stabilization services for wind farm access roads throughout the country. The company is also at the forefront of leading sustainable construction best practices in the soil-stabilization sector.

“Reducing the industry’s carbon footprint is a high priority and we knew that OneCem PLC would deliver the desired performance based on the product’s long history of success and the results from our test strips.”

Phil Dahm,
Material & Logistics Manager
Rock Solid

After developing various mix designs and conducting durability testing, the engineering team at Rock Solid locked in the ideal soil-stabilization solution using OneCem Portland Limestone Cement (PLC), which offers equivalent or better performance compared to Type I/II cements. Because it uses less clinker, carbon dioxide emissions are reduced by up to 10 percent per ton of cement.

According to Phil Dahm, material and logistics manager at Rock Solid, the decision to switch from ordinary Portland cement to PLC was made purely for sustainability reasons. “Reducing the industry’s carbon footprint is a high priority and we knew that OneCem PLC would deliver the desired performance based on the product’s long history of success and the results from our test strips,” explained Dahm.

Work on the Cheyenne Ridge project got underway with bulldozers removing vegetation and topsoil too rough in the roads. The team from Rock Solid next spread OneCem PLC uniformly on the soil and used a reclaimer to mix it into the soil at a depth of 12 inches. The road base was then compacted, graded, sealed with rollers, and left to cure for 48 to 72 hours.

“To support our crews working 12 hour shifts, six days a week, we needed a large supply of PLC and a partner that could adhere to our delivery schedule of 12 truck deliveries per day, separated by 45 minute intervals,” said Dahm. “Throughout the process in stabilizing 85 miles of access roads, Holcim supplied more than 20,000 tons (736 truckloads) of OneCem PLC like clockwork from its cement plant located more than 170 miles from the jobsite.”

The Result

By implementing a soil-stabilization treatment utilizing OneCem PLC, Rock Solid was able to build superior access roads on budget in a way that significantly reduced the environmental impact, and within a timeframe that accelerated access to the wind turbine installation sites. “We partner with companies like LafargeHolcim for these reasons,” said Dahm. “We know they have an outstanding service team and supply chain to make these types of projects successful, including innovative products like OneCem PLC that promote sustainability.”

The Cheyenne Ridge Wind Farm began operations in August 2020 and was constructed under budget and almost four months ahead of schedule. Extending nearly 300 feet in the air, the facility’s 229 Vestas turbines, which were manufactured within Colorado, are providing enough energy to power about 270,000 residential homes annually.

Due to the resounding success of the Cheyenne Ridge project, Rock Solid was awarded contracts to help build access roads at various wind farm projects in Texas, which is developing wind power capacity at a rapid pace. Remarkably, at more than 27 gigawatts of generation, Texas leads the country in installed wind energy capacity, which is offsetting more than 54 million metric tons of carbon dioxide emissions.

Based on the performance and sustainability advantages seen at Cheyenne Ridge, Rock Solid decided to use 5,200 tons of OneCem PLC to stabilize the access roads at the 243 megawatt El Campo Wind Park, which is now complete and providing clean energy to approximately 210,000 households every year.

Work on the access roads at the 336 MW TG East Wind Farm was just completed and required almost 6,500 tons of OneCem PLC for the soil-stabilization application. When the wind farm becomes operational by year-end 2021, it will produce enough electricity to power 115,000 households and will offset the equivalent of 604,000 tons of carbon dioxide annually.

