

# Maine Captures The Wind

Sargent Corporation clears and prepares site for state's first large-scale windmill farm

By Paul Fournier



Photo taken from one windmill tower pad of ongoing excavation at a second pad illustrates the difference in elevation of the windmills.

**M**aine's first full-scale wind-energy project is under way in the northeastern part of the state, with earthmoving crews already preparing the pads for the 250-foot-tall windmills.

Sargent Corporation has the earthmoving contract for the Mars Hill windmill project, located roughly 20 miles north of Houlton near the Canadian border. Under the supervision of job superintendent Chris Lynch, crews of the Stillwater, Maine-based contractor have built five miles of new road across the top of Mars Hill. They installed culverts and drainage ditches for the road, are excavating and backfilling about four miles of conduit for the electric cables, and are excavating and grading the pads for the 28 giant windmills.

Owned by UPC Wind Management, headquartered in Newton, Mass., the windmill farm will generate anywhere between 40 megawatts and 45 megawatts. Manufactured by General



A Sargent Corporation worker uses Topcon HiPer+ survey rover to check grade of utility trench at windmill project in Mars Hill, Maine.



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Electric, each windmill has three, 125-foot blades and is capable of generating up to 1.5 megawatts. The blades were made in Brazil, while the 250-foot main tower sections were fabricated in Quebec.

Windmill power output estimates are based on three-year studies of the wind currents in this hilly area, where elevations vary more than 1,000 feet. Each windmill is to be located on its own, 1.5-acre site, and will be supported by a 50-foot by 50-foot by 8-foot-thick reinforced concrete slab.

Though the windmill turbines can reportedly withstand winds of more than 100 mph, they will be set to shut down automatically at wind speeds exceeding 55 mph. They are designed to produce maximum power in winds between 18 and 55 mph. In addition, the blades are fixed to spin no more than 22 times per minute, reducing the risk to migratory birds.

Work began in February 2006 with the clearing of more than 80 acres by the logging subcontractors. Sargent's excavating crews had to deal with cuts and fills of up to 40 feet. This was to accommodate the construction of the access road, which couldn't have a grade exceeding 15 percent. This ensured that trucks delivering such construction materials as ready mixed concrete for the tower pads would be able to negotiate the hills. What's more, the maximum tower pad grade was set at 5 percent.

One pad, #9, required a 135-foot-deep cut at 1.5-to-1 slope. There were about 40,000 cubic yards of cut and 44,000 cuts of fill on that tower pad alone.

Overall, Sargent is excavating some 300,000 cubic yards of material, with some 120,000 cubic yards of rock shot by Maine Drilling & Blasting. Remaining rock was torn up by Sargent's Komatsu 600 excavator and D-10 and D-8 Cat dozers equipped with a ripper tooth. Trench cuts and truck loading was accomplished by a 345, 330 and two 325 Cat excavators, while a



One of Sargent's Cat excavators digs trench for conduit that will carry generated power to utility grid.



With a Cat D10R equipped with a ripper tooth, at left, a Sargent surveyor uses a second Topcon rover to check road grade.



A stretched-out tractor trailer hauls two windmill blades to the job site.

couple of Volvo and two Cat off-highway haulers carried the material between cut and fill areas.

Global positioning satellite (GPS) instruments were employed by Sargent to establish clearing limits, construction layout and grading, blasting quantities, topographical mapping, and preparing the “as-built” drawings that

precisely locate installed conduits and other structures.

An initial survey traverse was performed by total station in the months leading up to construction by the surveying firm, Bridgham PLS. Sargent surveyors used the control points from this survey to localize their GPS instruments, two Topcon HiPer+ survey rovers, which

produce results within an inch horizontally and half an inch vertically.

Both rovers run from the same base at elevation 1589. One utilizes Pocket 3D software and the other uses Survey Pro software. The highest elevation achieved on the project is 1,744 feet and the lowest, located on the North Road, is 632 feet. Oftentimes a repeater or two are used because the rugged terrain of the mountain block radio signals.

Generally, the rovers employ 10 to 15 satellites consisting of both American GPS satellites and Russian Glonass satellites.

The Mars Hill project is expected to be completed by the last quarter of 2006. Owner/developer UPC Wind Management is part of the UPC Group, one of the largest wind power companies, which is currently developing more than 3,000 megawatts of wind power projects in North America. ■

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