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NASA, ERDA SELECT TEAM TO BUILD LARGEST WINDMILL

The largest windmill in history will be built during the next two years, according to plans of the Energy Research and Development Administration (ERDA) and NASA. The two Federal agencies have recently chosen an industrial team to construct the system.

The team of General Electric Co., Valley Forge, Pa. and Hamilton Standard Division, United Technology Corp., Windsor Locks, Conn. has been selected for negotiating a contract for approximately $7 million to design, fabricate, assemble, install and test a 1.5 megawatt (1,500 kilowatt) wind turbine electrical generating system in 1978, at a site to be selected by ERDA. The project will be directed for ERDA by NASA's Lewis Research Center in Cleveland, Ohio. The 20-month contract includes an option to build a second wind turbine.

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Although experimental in nature, the system will be located at a utility company site and will supply electricity to the local electric system for public use. The purpose of this test system is to determine the economics and operating characteristics of large wind turbines when coupled to conventional power plants.

To be the largest ever built, the windmill will have two slender fiberglass rotor blades spanning 200 feet, perched on a 150-foot tower. The wind turbine will rotate at 30-40 revolutions per minute in winds of above 11 miles per hour and will reach its full power output at winds of 22 miles per hour. At a site with average wind speeds of 18 m.p.h., for instance, this machine could produce enough energy annually to supply more than 500 homes.

Most of the contract cost will cover design and engineering. General Electric Co. will be responsible for the overall system design and assembly while the subcontractor, Hamilton Standard will build the rotor blades and hub. Option to build a second 1.5 MV wind turbine is estimated at an additional $2.5 million. If these systems prove successful and can be produced in quantity in the future, their cost is expected to decrease significantly.

Two preliminary design studies performed by General Electric and the Kaman Aerospace Corp. during the past year examined the many concepts and configurations for wind power systems leading to the present design.

The experimental wind turbine (the name for modern electric power-generating windmills) is part of ERDA's program to develop wind energy systems and test their practicality as a source of energy. NASA's Lewis Research Center, Cleveland, Ohio, with expertise in aerodynamics and structures, directs this element of ERDA's wind energy program.

To identify favorable high wind locations for this wind turbine and two smaller ones that will precede it, ERDA recently selected 17 candidate sites across the nation. Sites were proposed and supplied by utility companies. Wind characteristics at the sites will be measured during the next year, with final selection set for late 1976 and during 1977.

When completed, the 1.5 MW wind turbine will be bigger than history's largest windmill -- the 1.25 megawatt 175-foot diameter Smith-Putnam system built in the 1940s at Grandpa's Knob near Rutland, Vt. That project encountered some structural problems. But, since it could not compete economically with the then low cost of fossil fuels, private funding was insufficient to perfect the system and it was abandoned.

Now, however, with rising fuel costs and the technological advances of the last 30 years, engineers believe significant improvements can be made in wind system capability, economics, and lifetime -- factors presently the major obstacles to practical use of wind energy. The first 1.5 MW systems are designed for locations with relatively high winds but research is underway to design future systems for areas with more modest winds.

Largest currently operating wind turbine is the 100-kilowatt 125-foot diameter system built for ERDA by NASA-Lewis Research Center at NASA's Plum Brook test area near Sandusky, Ohio. It is being used to identify and solve technical problems associated with large wind turbines. It will be used to test future advanced components. Two more powerful versions of this system are planned by ERDA and NASA at sites to be selected. Purpose of these systems will be to provide information to help design the larger machines, and to test their usefulness for smaller applications.

Besides testing large wind energy systems for electrical power generation, ERDA is investigating and developing small (5 to 10 KW) windmills that could be used by rural homes or farms, and performing research on advanced unconventional windmills. More research and development is anticipated before reliable, large-scale use of these systems can be considered.