Vortex wind power generator (VWPG)

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VWPG operation is based on the "vortex generator" that is a device transforming a regular wind flow into vortex-like jets. The vortex generator serves a power concentrator, that controls and accumulates the energy of wind and low-potential air, thermal flows just the same way as, in natural conditions, the kinetic energy of wind dispersed in a flow having a considerably large area is concentrated in a compact tornado core to reach extremely high values.

The ability of vortex jets to concentrate within their trunk the energy dispersed over the surrounding area using low-potential air flows moving in the atmosphere and over water areas at a speed of less than 3 m/s makes it possible to substantially increase the utilisation degree for thermal air flows thrown into the environment by industrial enterprises, enabling to utilise helioenergy in the form of the thermally induced ascending air flows and breeze energy, as well.

VWPGs have the following advantages over traditional wind power generators:

- 1.5 to 2 times decrease of operating speed of wind, weight and size,
- with the "rotor-generator" shafts are unnecessary, no need for wind direction tracking,
- the generator is intended for module design, the rated power is determined by the number of modules,
- rotation speed is controlled entirely through variation of the inlet nozzle width enabling to simplify the electric power generator design and structure,
- owing to original design the VWPG is resistant to wind splashes and hurricanes providing its operation at any speed of wind V_{nom},
- VWPG design provides a flexibility enabling to fit it to diverse application conditions including different wind loads.

The VWPG is untended to convert the energy of wind and that of induced ascending air flows into electric energy.

Application fields: power supply of electric appliances, communication equipment, electric pumps, lighting systems for private farms, summer houses, autonomous industrial sites, mobile sites, municipal economies, etc.

Analogues for this technology are, to a certain extent, tornado towers by Tauras (Belgium) and Grumman (USA). The power plants of this type use wind kinetic energy and potential energy of the pressure drop in front of the rotor and

behind it to produce electricity. In addition to these the VWPG uses wind potential energy.

VWPGs are more compact, mobile, can operate at lower wind potentials and are provided with rotors designed to operate in vortex flaws with optimal efficiency. They have aerodynamic system of rotation speed stabilisation providing their stable operation at any speed of wind exceeding V_{nom}.

This technology has been protected by five Russian patents.

In the course of the project small scale models and experimental samples of VWPGs were designed, manufactured and tested in TSAGI wind-tunnels.

The demand for wind power plants in industrial countries is rather high. In Denmark, for instance, up to 30 % of electric power is generated by wind power plants and in Germany – up to 17 %.

In Russia, power supply problem has been grown pressing in the course of the last decade, particularly in decentralised and remote areas. The need for autonomous power supply in Russia is high but there is a lack of investments for their development and purchasing.