

## Edison Patent Award Recipient



Professor Alexander M. Gorlov of Northeastern University in Boston is the 2001 recipient of the ASME Thomas A. Edison Patent Award for his invention of the Gorlov Helical Turbine. The Edison Patent Award was established in 1997 to recognize the creativity of a patented device or process that has the potential of significantly enhancing some aspect of mechanical engineering. Professor Gorlov is a Professor Emeritus of mechanical engineering at Northeastern.

Gorlov has had a rich professional lifetime involved in mechanical invention. His main interest has been in harnessing low head hydropower, using naturally occurring river and tidal flows, and wind power for the direct, clean generation of electricity.

His initial efforts were with the Hydro-pneumatic Power Converter, a device that was able to use the energy in a flowing stream to compress air, which then was directed to an air turbine. In an attempt to improve the efficiency of this device, Gorlov investigated the use of the Darrieus Turbine to replace the conventional air turbine. Unfortunately, the Darrieus design suffers from dynamic instabilities that make it impossible to operate at high speed. In further research, Gorlov made a significant innovation. He replaced the straight blades of the Darrieus Turbine with blades curved in a helical shape, so that the air or water flow is always interacting with a fixed area of blade surface, thereby eliminating the near-destructive pulsations of the Darrieus design. This innovation, coupled with extensive optimization studies, led to a series of patents for the Gorlov Helical Turbine, the invention which currently shows promise for alleviating the worldwide crisis in energy use, and the one for which the Edison Patent Award was granted.

The Gorlov innovation makes possible the high efficiency conversion of kinetic energy from relatively slow-moving and multidirectional fluid flows (air or water) into electrical energy. The device is self-starting and always rotates in the same direction, independently of the fluid flow direction. In conjunction with an attached electric generator, it may be used to provide local power in remote areas or third-world countries. In addition, the devices may be used in large-scale power farms either for the direct clean production of electricity or for the electrolysis of water into hydrogen, in particular, using ocean currents. The turbine is being proposed for a massive development in Korea, and a small demonstration project is underway on Vinalhaven Island, Maine.

Double-Helix Turbine  
(for underwater installation)



Triple-Helix Turbine  
(generator above water)



Power systems for free flows with different helical turbines