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		(71)Name of Applicant : 1)INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD Address of Applicant :Dhanbad - 826004, Jharkhand, India Dhanbad ----- -----
(51) International classification	:F03D3/00, F03D3/04, F03D7/04, G16Y40/10	Name of Applicant : NA Address of Applicant : NA
(86) International Application No	:NA	(72)Name of Inventor :
Filing Date	:NA	1)Dr. Tanmoy Maity Address of Applicant :Department of Electrical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad - 826004, Jharkhand, India Dhanbad -----
(87) International Publication No	: NA	2)Mr. Soumyadip Banerjee Address of Applicant :Department of Electrical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad - 826004, Jharkhand, India Dhanbad -----
(61) Patent of Addition to Application Number	:NA	3)Mr. Mihir Datta Address of Applicant :Department of Electrical Engineering, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad - 826004, Jharkhand, India Dhanbad -----
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(57) Abstract :

The present invention relates to a small-scale straight-blade Darrieus-Savonius hybrid vertical axis wind turbine (VAWT) for urban power generation, especially at low wind speeds. The said VAWT turbine is configured with a main shaft (17), which supports the entire structure (23) of the turbine. This turbine's main shaft transmits rotational energy from the blades (26) to a three-phase permanent magnet synchronous generator (PMSG) (27). The PMSG (27) is coupled with the turbine shaft (17) with a hexagonal shape solid metal bar (41). The Darrieus rotor features three straight blades (26) with a cross-section of NACA0018 airfoil (49) and is attached to the main shaft via support arms (12). The two-stage Savonius rotor (15) includes semi-cylindrical rotor blades. Blades are fabricated using a roller bending process to provide the blades with a semi-cylindrical shape. The Savonius rotors (15) are connected to a central plate (21) and end plates (11), which are spot-welded with a turbine shaft. A control panel (50) having various measurement units along with a microprocessor-based turbine controller 954) regulates the turbine operation, optimizing performance and ensuing safety. Fig. 2

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