Small Wind Turbines in Sustainable Urban Environment

ABSTRACT

In recent years, the importance of renewable energy such as solar, wind, biomass, small hydro, etc., has been increasing because of the need to prevent global warming and to reduce harmful substances in environment.

Especially, a cumulative capacity of large scale wind power plants are more than $5x10^4$MW(equivalent to 50 units of nuclear power plants!) in the world and 10^3MW in Japan. These wind turbines are installed mainly in strong wind areas. However, small wind turbines from 100W to 10kW classes are installed mainly in urban areas where wind blows not so strong. These small wind turbines are naturally entered into the urban environment as the symbol of "environmental era". There are more than six thousands systems operating in Japan. Moreover, to utilize complementary effect between solar and wind energy, many of these small wind turbines are used as hybrid power systems combined with wind turbines and PV panels. As the ultimate hybrid plant, even the triple hybrid system consist of solar, wind and biomass is installed at Ashikaga Institute of technology.

Our goal, a real sustainable society in future will be assured depending on real sustainable and proven energy, namely renewable energy. The small wind turbines are just fit in sustainable urban environment.

CURRICULUM VITAE

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Professional Experience

2002 to present: Professor, Graduate School of Engineering, Ashikaga Institute of Technology
1985 to 2002: Professor, Mechanical Engineering Department, Ashikaga Institute of Technology
1974 to 1985: Associate professor, Mechanical Engineering Department, Ashikaga Institute of Technology
1971 to 1974: Lecturer, Mechanical Engineering Department, Ashikaga Institute of Technology

Academic Background

1971: Doctor of Philosophy in Engineering, Sophia University, Tokyo, Japan
Title of the doctoral dissertation: "Theoretically Estimating the Performance of Gas Turbines under Varying Atmospheric Conditions."
1968: Sophia University, Tokyo, Japan
Bachelors of Technology in Mechanical Engineering, School of Science and Technology

Social Activities

Present: Chairman of Japan Wind Energy Association
A Board member of directors of Japan Solar Energy Society
Chairman of Wind Energy Committee in New Energy Foundation
Chairman of Wind Energy Committee in New Energy and Industrial Development Organization
Committee member of TC-88 WG-4 in International Electrotechnical Commission

Awards

2003: Award for Distinguished Service in Ministry of Education and Science
1999: Award for Distinguished Service in Solar and Advanced Energy Division of American Society of Mechanical Engineering
1998: Award for Distinguished Service in Japan Wind Energy Association
1998: Pioneer Award of World Renewable Energy Network