

# Bioturbines – Challenge for a new Bioenergy Market

## **Abstract for the 2<sup>nd</sup> World Conference on Biomass, Rome, Italy – Topic 3**

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### **Abstract**

During the last few years micro-turbines with a power range of 30 – 150 kW have been developed as a promising technology for small-scale power generation, particularly for distributed power generation. Micro-turbine systems offer a number of potential advantages with respect to other technologies, such as their simplicity, compactness, modularity and low noxious emission levels, as well as their potential low investment and maintenance costs. Micro-turbines are well suited for the reliable provision of electricity and heat for stand-alone and grid-connected applications and they are a very attractive power supply option whenever co-generation (CHP) can be exploited. Finally, micro-turbines show a large flexibility to fuels so that they can be operated with natural gas, bio-gas, diesel, gasoline and liquid bio-fuels.

In spite of these obvious advantages of micro-turbine systems, today there is an uncertainty of the market potential of this innovative technology. This paper presents the results of a market assessment study for micro-turbine applications in the residential, commercial, industrial and distributed power sector performed for all countries of the European Union.

For this study, all relevant micro-turbine producers and a large number of distributors have been contacted and questionnaires on global and national sales figures as well as performance data of existing installations have been evaluated. The micro-turbine market in EU countries is currently in its early stages with sales figures in the range of a few hundred, whereas micro-turbine sales in the US today amount to several thousands. The micro-turbine market in EU countries varies significantly from virtual non-existence in Portugal, Finland and Belgium to the largest single market in the United Kingdom where micro-turbines are predominantly used in CHP applications replacing boilers for the production of hot water.

Both, in the EU and the US the market potential could increase substantially, if the cost, efficiency, durability, reliability and environmental emissions of the existing designs are improved and pushed closer to their technological limits. Thereby, the main performance targets for micro-turbines are a conversion efficiency for electricity generation of 40%, NO<sub>x</sub> emissions lower than 7ppm, maintenance intervals of 11.000 hours and a service life of at least 45.000 hours as well as system costs lower than 500 €/kW.

This study has been performed within the project 'Opportunities for Biofuel-driven Micro-turbines' which is co-financed by the European Commission in the framework of the ALTENER programme. Building upon the abovementioned market assessment and the fuel-flexibility of micro-turbines, this project will be engaged in the evaluation of the technological and economic implications for the use of bio-fuels to operate micro-turbines. Thereby, this efficient and environment-friendly technology will be actively promoted, fully in line with goals of the European Commission for the energy sector, such as the improvement of energy security, security of supply and environmentally friendly power and heat production.