TOPIC: 4

Market potential for the introduction of hydrogen in stand-alone power systems

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Abstract

A large number of stand alone power systems (SAPS) are installed around Europe. These systems provide power to technical installations and communities in areas, which are not connected, to the regional or national power grid. An increasing number of SAPSs include renewable energy technologies, i.e. solar or wind power, most often in combination with diesel generators and/or batteries for backup power, but the majority of larger SAPS are still based on fossil fuel power generation. Replacing diesel generators and batteries in SAPS by fuel cells running on locally produced hydrogen would diminish fossil fuel dependence, improve environmental standards, and possibly reduce operation and maintenance costs. The fuel cell technology is developing fast and the SAPS market is believed to be a market segment where this new technology can be competitive in the near future. This work reports on the results of the project entitled "Market potential analysis for the introduction of hydrogen energy systems in stand alone power systems" (two year project, started Feb. 2002) which is part of the ALTENER programme within the EU. The project will first of all establish a broad understanding of the technical and economical market potential for hydrogen SAPS (HSAPS) based on local renewable energy sources. This will provide industry and governments with a base for promoting new technologies in the existing SAPS market. Secondly, one will identify and quantify the technological and practical issues relevant for the HSAPS market and draw the attention of related industry towards solving problems concerning component integration and the needs of the user market. Thirdly, the project will identify the legal, regulatory and administrative hurdles for HSAPS market development and will propose ways in which authorities may resolve such problems. Finally, the project will propose a demo-project plan for HSAPS installations based on the scientific results obtained during the project. In the work presented here, a technological status for hydrogen technology in relation to the specifics of small to medium sized stand-alone power systems, will be given. Furthermore, we will report on the preliminary results of the market study. Tools for the market study have been interviews with companies and organisations involved in the development of renewable based SAPS, hydrogen technology manufacturers, installers and owners of SAPS, consultancy companies and policy making organisations. These efforts have been backed up by a techno-economic analysis of the introduction of hydrogen in five representative existing SAPS. Some results from this work will be presented and preliminary conclusions on the potential for introduction of hydrogen in stand-alone power systems throughout Europe will be drawn.