Analysis of the Possibility of Gas-Fueled Micro-Cogeneration Application in Single-Family Dwelling Buildings in Poland

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Abstract: Conditionings related to application of high-efficiency gas micro-cogeneration in single-family dwelling buildings were presented in this paper. Analyses of power and heat demand profiles in this type of buildings were shown and a selection process of micro-cogeneration system was conducted in two variants – devices with a Stirling type engine (1 kW electric and 3-5,8 kW heating capacity) and a piston internal combustion type engine (2,5-6 kW electric and 8-13 kW heating capacity). For both the variants technical and economical analyses of optimal application of this technology were performed. Low values of base-load consumption of heat and power in this type of buildings in a scale of a year, and hence a possibility of application of the smallest micro-cogeneration units available on the market only, significantly negatively influence an amount of running-cost savings obtained. Key-importance conditionings which should be fulfilled in the aim to obtain acceptable running-cost savings and return on investment periods were pointed.

Keywords: Gas micro-cogeneration, dwelling buildings, technical conditions, running-cost savings, return on investment period, prosumer energy system.