

Increasing the Efficiency of the Biomass Gasification Technology with Using the Organic Rankin Cycle

Authors : Jaroslav Frantík, Jan Najser

Abstract : This article deals with increasing the energy efficiency of a plant in terms of optimizing the process. The European Union is striving to achieve the climate-energy package in the area increasing of energy efficiency. The goal of energy efficiency is to reduce primary energy consumption by 20% within the EU until 2020. The objective of saving energy consumption in the Czech Republic was set at 47.84 PJ (13.29 TWh). For reducing electricity consumption, it is possible to choose: a) mandatory increasing of energy efficiency, b) alternative scheme, c) combination of both actions. The Czech Republic has chosen for reducing electricity consumption using-alternative scheme. The presentation is focused on the proposal of a technological unit dealing with the gasification process of processing of biomass with an increase of power in the output. The synthesis gas after gasification of biomass is used as fuel in a cogeneration process of reciprocating internal combustion engine with the classic production of heat and electricity. Subsequently, there is an explanation of the ORC system dealing with the conversion of waste heat to electricity with the using closed cycle of the steam process with organic medium. The arising electricity is distributed to the power grid as a further energy source, or it is used for needs of the partial coverage of the technological unit. Furthermore, there is a presented schematic description of the technology with the identification of energy flows starting from the biomass treatment by drying, through its conversion to gaseous fuel, producing of electricity and utilize of thermal energy with minimizing losses. It has been found that using of ORC system increased the efficiency of the produced electricity by 7.5%.

Keywords : biomass, efficiency, gasification, ORC system

Conference Title : ICBBP 2017 : International Conference on Bioenergy and Biofuel Production

Conference Location : Havana, Cuba

Conference Dates : November 23-24, 2017