

Parallel Operation of Combined Heat and Power Plants and Wind Farms

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Abstract—The paper evaluates the potential for parallel operation of conventional power plants and wind farms. In this way it is possible to identify the best possible methods that would allow the integration of the wind turbines into the energy production mix. The paper shows that the parallel operation of wind turbines and conventional plants within a system is possible and reduces the negative effects of the integration of renewable sources in the energy system. In this case, if the conventional power plant compensates the power variations of the wind farm, then the specific investment necessary for the energy storage decreases thus leading to a smaller specific investment for the construction of the wind farms. The results reveal the necessity of a differentiated CO₂ emission tax calculated at system level and not at the level of the conventional power plants. This is important because sometimes the increased CO₂ emissions of the conventional power plants might lead to an overall decrease of the CO₂ emissions at system level (for example when conventional plants are operating at partial loads in order to allow an increased electricity production of the wind turbines). In this case calculating the CO₂ emissions for the entire system leads to a smaller increase of the price of the electrical energy, thus decreasing the negative effect of the construction of new wind farms.