



ANALYSIS OF ENERGY SYSTEM VULNERABILITY DUE TO THREATS REALISATION

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ABSTRACT

Every energy system is surrounded by a variety of threats. A threat could be defined as any potential danger that exists within or outside the energy system and that has a potential to result into some kind of obstruction of that system. The origins of threats are various. They depend on the country where the energy system exists, its geographic and political region/context. Threats can realize in each energy sector (electricity, heat, gas, oil etc.).

The paper presents a methodology which enables the investigation of energy system vulnerability due to threats realisation. Threats depending on their realisation probabilities can turn to one or another energy system disturbance, such as fuel supply and electricity import restriction or termination, sudden prices increase of energy sources, etc. A disturbance formed from a threat starts to affect energy system and makes system vulnerable. Threats realisation influence to energy system is assessed calculating amount of unsupplied energy to consumers and increase of energy prices. Both combined effects are analysed as well. Vulnerability of energy system is analysed in terms of these two measures. The most severe threats to energy system are pointed out. Probabilistic model of threats realisation to disturbances is presented in the paper as well. An example application of the reference energy system is made to illustrate proposed models.

Keywords: threats, disturbances, energy system, energy security