The thesis deals with modeling and forecasting of natural gas spot prices, consumption of natural gas and average daily temperature. We assume that these three variables are influenced by each other, because as temperature decreases, consumption increases, which in turn increases the price with the increasing demand. Therefore, we propose to model these variables by vector autoregression. We compare this model with one-dimensional models where for each one we build a model from the ARMA-GARCH class. Models are estimated using historic values and then designed models are used to simulate scenarios. Analysis of scenarios provides information to gas supply companies estimates of portfolio consumption and financial flows related to the purchase concerning natural gas.