**INTRODUCTION**

In recent years, the climate on Earth has changed markedly: some countries suffer from abnormal heat, others from too harsh and snowy winters, unusual for these places[1]. In addition to global warming, there is also an imbalance of all-natural systems. That leads to a change in the regime of precipitation, temperature anomalies, increasing the frequency of extreme events such as hurricanes, floods, and droughts. Human influence has been the dominant cause of observed warming since the mid-20th century. Continued greenhouse gas emissions will cause further warming and changes in all components of the climate system. Obstructing climate change requires substantial and sustained reductions in greenhouse gas emissions. A solution to climate change could be to reduce greenhouse gas emissions by renouncement of fossil energy sources. The ambitious goal to free the world from fossil fuels implies the broadest use of renewable energy sources.

Global progress in the development of renewable energy sources is very significant. The most actively developing areas of renewable energy are solar and wind generation. The spread of innovations in renewable energy is attracting increasing attention as the primary tool to combat climate change and an opportunity to increase the competitiveness of countries in the international market. Thus, the need for an accurate development evaluation tool is clear enough.

According to the BP statistical review of world energy [2], the global trend in wind energy (WE) deployment is quite optimistic (see Picture 1). Nevertheless, the share of WE is not so impressive and represents about 6% of total electricity production (see Picture 1).

*Picture 1. World’s wind energy generation and total electricity production (GWh) [2].*

The International Renewable Energy Agency (IRENA), in its “Future of the Wind” [3], claims about 35% of electricity consumption to be generated from wind by 2050. However, some other prognoses [4][5] are more pessimistic and predict up to 15%, which is still quite ambitious.

The forecasting methodology of IRENA [3] has not been described, and Schalk Cloete’s prognosis [4][5] only mentioned S-curves. Thus, there is still a question about wind energy development growth by 2050.

At the same time WE is often recognized as an ecological innovation (EI). “Diffusion of innovations” [10] is one of the main theoretical approaches to understanding how new ideas, products, or services are distributed in various social systems. Many scientists have used the theory for decades. Applying this theory at different levels of analysis allows a better understanding of specific innovation pathways. Simple “Diffusion of innovation” models work well [6] [7] [8][9]on the macro level.

The subject of this article is an analysis of three most popular models applied to the wind energy as one of the most promising renewable technology, which allows check the applicability of those models to evaluate the future trends in renewable energy development.

Thus, the first scope of this article is to check whether the diffusion of innovation models could reproduce the current growth process and whether some models describes the historical dataset better than the others do. The second question is to compare the results of the models with the real process for previous period of five years to see if it`s close enough to say that the model reflects the process good enough at least for historical values.