In March 2007 the European Council approved ambitious objectives of the EU climate and energy policies to be met by 2020, which were formally stated in the Europe 2020 Strategy (the strategy for smart, sustainable and inclusive growth - Communication from the Commission from 3rd March 2010). The strategic objectives of the EU policy (3x20) to be achieved by 2020 by all member states include: a 20% reduction in EU greenhouse gas emissions below the 1990 levels, raising the share of EU energy consumption produced from renewable resources to 20%, and a 20% improvement in the EU's energy efficiency.

The target of the Europe 2020 Strategy is to support changes directed at sustainable development, including low emission and more effective use of natural resources, and the objectives listed in '3x20' package should lead to conservation of natural resources (an increase in the share of renewable energy), climate protection (the reduction of CO2 emissions), and modernizing economies of the EU member states (an increase in their energy efficiency). The objectives should also counteract an increasing dependency of the EU member states on import of energy sources and improve their energy security.

However, realizing the objectives of the EU energy policy is not potentially neutral for economy. On the one hand, replacing relatively cheap non-renewable energy by renewable energy requires substantial financial investments, new technologies, and even special subsidies for renewable energy producers to stay competitive in the energy markets. Also, the reduction in CO2 emissions can have an adverse effect on competitiveness of economies resulting from increased production costs. On the other hand, supporting industries connected with renewable energy production and limiting CO2 emissions means new workplaces and innovations leading to faster economic development.

Thus, it seems sensible to ask whether positive results will outweigh the negative ones or vice versa and whether the EU economy will gain or lose as a result of the new climate and energy policy.

In the context of the planned EU climate and energy policy, other important questions should also be posed: is it possible, and if so, how is it possible to reconcile climate protection and economic competitiveness; to what extent does the EU energy policy affect competitiveness of European economy; or can member states increase their competitiveness and decouple economic growth from the consumption of natural resources and energy?

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During the first stage of the research we will assess the impact of the increase of the share of renewable energy by 20% by 2020 on economic growth in member states. We will verify the hypothesis that the increase of the share of renewable energy in the EU member states does not adversely affect their economic growth. During the second stage of the study we will investigate the influence of reducing CO2 emissions on economic development of member states. We will verify the hypothesis which assumes that the reduction of CO2 emissions in the EU member states does not have an adverse influence on their economic growth.

The analysis will be directed at empirical identification of causal relations between economic growth, the increase of the share of renewable energy and the reduction (or growth) of the greenhouse gas emissions in the EU member states.

Four arguments support the proposed project and prove its innovative nature.

Firstly, new panel models, that is Konya's approach (2006) and Pesaran's (2006) common correlated effects estimator, will be used to investigate the impact of the implementation of the EU energy policy on economic growth in its member states; the application of these models allows for inference on cross-sectional dependence and slope heterogeneity and have not been used in this context before. Additionally, both methods allow for inference on dependencies in particular countries, which gives a more detailed picture than a traditional panel approach.

Secondly, when long- and short-term causality is analysed, the novelty of the project will be observed in the division of countries into homogeneous groups. In previous studies countries are selected on the basis of their geographical location or belonging to a given economic or political organization, ignoring at the same time, for example, their major energy sources. In this project countries will be divided according to criteria connected with renewable energy or reducing CO2 emissions (e.g. energy intensity, industrial structure, energy prices, etc.).

Thirdly, other analysis take into account the volume of CO2 emissions linked with production in a given country, but ignored CO2 emissions linked with trade. In order to address this gap, the authors plan to include in the study consumption-based accounting of CO2 emissions (alongside with relations between CO2 emissions and economic growth with the Environmental Kuznets Curve), which should yield an adequate picture of dependencies between the pollution level and economic growth.

Fourthly, a new aspect in the analysis of relations between CO2 emission and economic growth in the EU member states will be seen in the inclusion of control variables, previously not used in this context. These variables will contain factors affecting CO2 emissions, such as energy efficiency and renewable energy consumption, which are considered to be indispensable solutions to controlling greenhouse gas emissions.

The proposed research has twofold practical applications. Firstly, the results obtained can serve as premises for future energy policy in the EU. Secondly, they can be of practical use for countries which do not belong to the EU, as they can emulate successful European solutions aimed at environmental protection, such as the reduction of greenhouse gas emissions, the introduction of environmentally-friendly changes in the structure of energy production and the improvement of energy efficiency.