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**INTERNATIONAL ECONOMIC RELATIONS  
AND SUSTAINABLE DEVELOPMENT**

**МІЖНАРОДНІ ЕКОНОМІЧНІ ВІДНОСИНИ  
ТА СТАЛИЙ РОЗВИТОК**

**MIEDZYNARODOWE STOSUNKI GOSPODARCZE  
I ZRÓWNOWAŻONY ROZWÓJ**

**МЕЖДУНАРОДНЫЕ ЭКОНОМИЧЕСКИЕ ОТНОШЕНИЯ  
И УСТОЙЧИВОЕ РАЗВИТИЕ**

Матеріали

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**РОЗДІЛ 2  
ЕКОНОМІКА ПРИРОДОКОРИСТУВАННЯ ТА СТАЛІЙ  
РОЗВИТОК**

**РАЗДЕЛ 2  
ЭКОНОМИКА ПРИРОДОПОЛЬЗОВАНИЯ И  
УСТОЙЧИВОЕ РАЗВИТИЕ**

**SECTION 2  
ENVIRONMENTAL ECONOMICS AND ECONOMICS OF  
SUSTAINABLE DEVELOPMENT**

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**THE TRENDS IN INTENSIFICATION OF BIOGAS PRODUCTION  
IN FRANCE, POLAND AND GERMANY\***

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Costs of substrates preparation for the methane fermentation are crucial for the commercial success of using lignocellulosic material for the production of biogas. Different procedural requirements exist for each substrate, which can reduce the economic success. Thus, the choice of the technique for pretreating substrate for different raw materials has basic meaning up in individual countries.

Authors described differences between the ways of preparing substrates for the fermentation, regarding the income success. The technical and economic trends in intensification of biogas production in France, Poland and Germany are learned.

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Authors also pay attention for the substrate preparation to lead to the intensification of the methane fermentation, with application for post treated biomass as eco-friendly fertilizer. In particular we will focus on the lignocellulosic biomass preparation, going through physical, chemical and biological methods. In all countries methods of physical grinding down are coming out to the first plan, with the steam explosion being a technique at the front.

## **LIFE CYCLE ASSESSMENT (LCA) OF ENERGY SAVING MEASURES IN BUILDINGS**

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The energy sector itself poses great challenges for most countries, especially with the present financial and environmental circumstances and the need to enhance economic development while meeting climate change goals.

2015 was a pivotal year in addressing climate change, with the adoption of the Sendai Framework for Disaster Risk Reduction, the 2030 Agenda for Sustainable Development and the Paris Agreement COP21. Now, in order to ensure successful implementation of national agendas and reach goals, it is crucial to conduct significant changes in the buildings.

The sector of residential and public buildings heating has one of the largest potentials for improving energy efficiency in Ukraine. The annual consumption of natural gas for heating purposes is estimated at 18.6 billion m<sup>3</sup> with the reduction potential of 11.4 billion m<sup>3</sup> of gas per year in case that Ukraine will reach EU standards in the resource efficiency in buildings (Miregion, 2016).

Solution of the problems related to a building heating requires the attraction of significant investments. But energy saving and environmental performance still appears irrelevant to investors. The provision of information about energy efficiency in Ukraine has been increasing for the last years, but has not resulted in significant increase of investments.

Financial gain alone is not always enough to drive investments in building energy efficiency. Decisions for significant works on buildings refurbishment are often motivated by numerous factors, including improvement in comfort and adaptation to the global challenges (GABC, 2016).

Current assessment of investment projects in energy saving in Ukraine does not really take into account environmental impacts. Also there is no standard monetary valuation method to calculate environmental costs