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**Green to Gold: barriers to and driving forces for biogas investments in Ukrainian agribusiness sector**

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***Selected Paper prepared for presentation at the VI.Large Farm Management Conference,  
September 16-18, 2015, Kyiv, Ukraine***

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## 1. Introduction

Ukrainian agricultural sector has a significant renewable energy potential that can be deployed to enhance farm's competitiveness, sustainability and energy diversification during the time when the country is facing important economic challenges, geopolitical uncertainty and increased dependence in energy imports (International renewable energy agency (IRENA) 2015, S. 2). With a few exceptions, most RE are heavily reliant on direct subsidies, energy taxes or feed-in tariffs (Masini und Menichetti 2013, S. 511). In 1997-2009 Ukrainian government adopted a set of economic incentives that may help to accelerate the uptake of RE, to encourage natural gas substitution and to harmonize RE sector of Ukraine with the EU one (Arzinger 2009, S. 23). However, at present time only about 10 % of biomass potential are used for energy in Ukraine (Geletukha, G., et al. 2015, S. 7). This paper intends to investigate the existence and importance of barriers and driving forces and to better understand the decision-making behaviour of large-scale farms in the context of investments in biogas.

## 2. Data and Methods

The research design includes a combination of qualitative and quantitative methods (Black 1999; Snow und Thomas 1994) and was articulated in two phases. In the first step, documentary analysis and expert interviews were carried out to refine the conceptual model and assure content validity for the various constructs in the model. In the second phase, a web-based survey questionnaire was developed and will be pretested and administered to a sample of large scale agribusiness companies in Ukraine.

As a first step of the data collection process, a database of target respondents was developed. Additional information sources included several ratings of Ukrainian agroholdings (agronews.com 2014; Latifundist.com 2015). The administration of the qualitative survey took place in Mai-June 2014 in Ukraine. In this period we conducted 34 semi-structured face-to-face interviews with experts from different sectors of Ukrainian economy and built four groups (Figure 1): Large-scale farms that have already invested in RE (n=6), financial institutions that provide capital for RE projects (n=6); State authorities and NGOs that are working in the field of RE in Ukraine (n=12) and, finally, professional associations from the main RE sectors (n=10).

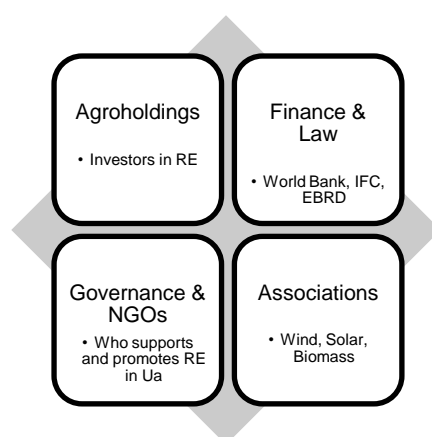


Figure 1: Structure of the qualitative survey<sup>1</sup>

<sup>1</sup> n=34

### 3. Results

The data collected was evaluated by the methods described by Gläser und Laudel 2008 and Mayring 2010. The results show that Ukrainian companies that have already invested in biogas technologies had similar incentives to invest in biogas. Figure 2 describes the main perceived advantages of biogas production for large-scale farms. It should be mentioned that feed-in tariff wasn't a deciding reason to invest in biogas. Far more important was the need to reduce the increased energy costs through the natural gas replacement. The second point was the necessity to recycle the production wastes and agricultural residues (from sugar and chicken meat production, animal husbandry, etc.). The interviewed companies gain to build sustainable relationships with the local communities where the production capacities are allocated and where the local people were protesting against farm 's smells, caused by farm's activities. Biogas production seemed to be an optimal solution of several problems. Another important issue is the processed biogas substrate can be used as high-quality fertilizer and substitute expensive imported one. Regarding the environmental aspects, they seemed to have played any role by their decision-making.

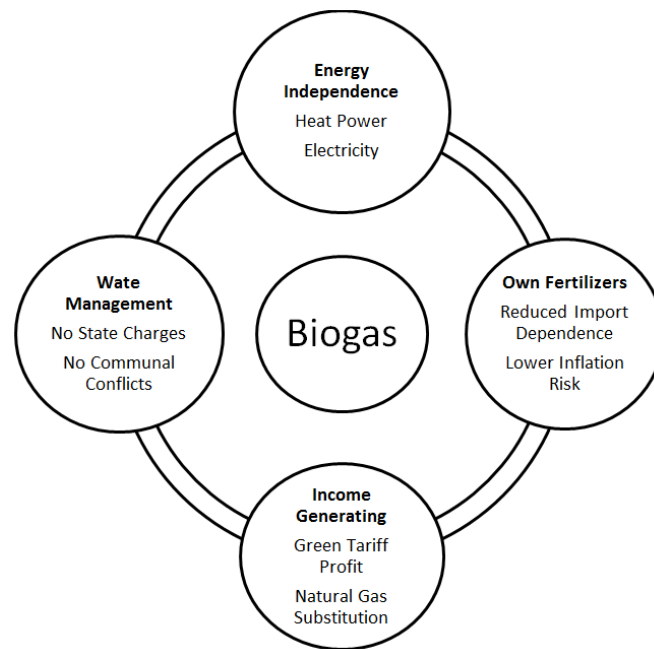


Figure 2: Driving forces for biogas investments<sup>2</sup>

Source: own findings

Despite these advantages systemic barriers remain that could inhibit the greater use of biogas in Ukraine. Figure 3 describes the main negative factors that have the most considerable impact on biogas investments. The geopolitical circumstances that influence the investment climate in Ukraine were mentioned by the respondents most of all. Under the current conditions companies are waiting till the announced system reforms will take into force and the military conflict in East Ukraine will be solved. Needless to say that typical factors of the Ukrainian economy such as corruption, bureaucracy and related problems with the obtaining of the feed-in tariff have been curbing the investments in biogas so far. Furthermore, since the

<sup>2</sup> n=34

financial crisis of 2008-2009 Ukrainian companies have been facing the lack of loan capital for new investments and this issue has also significant impact on the moderate development of biogas production.

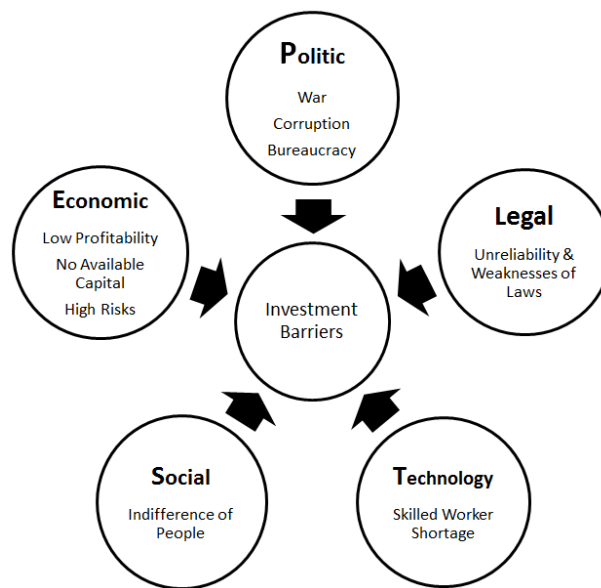


Figure 3: Investment barriers for biogas investments in Ukraine<sup>3</sup>

Source: own findings

Considering the results of the qualitative study we developed a theoretical model of company's propensity to invest in biogas technologies (Figure 4):

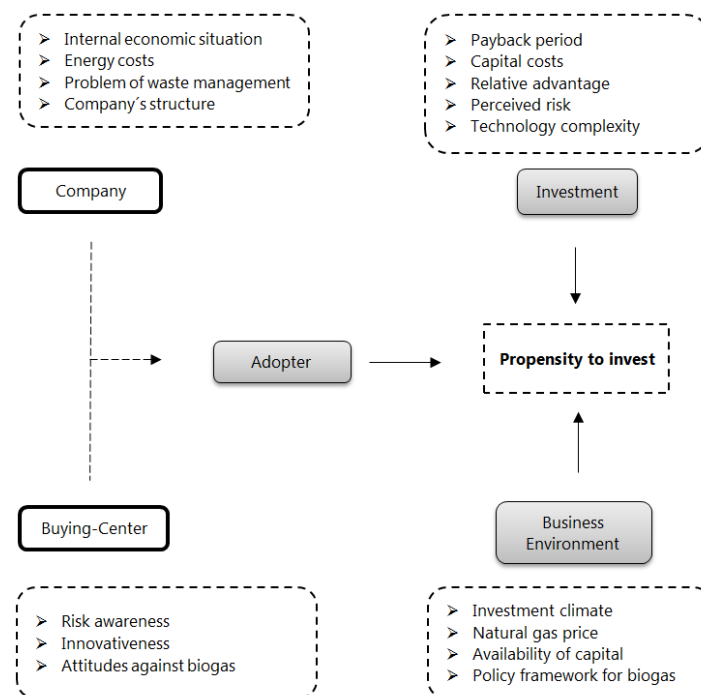


Figure 4: Theoretical model of organizations' propensity to invest in biogas

Source: author's representation based on Simon 1959, Cyert und March 1992, Rogers 2003, own findings

<sup>3</sup> n=34

#### 4. Conclusions

Our analysis has revealed that the feed-in tariff doesn't play the most important role by the investment decision regarding biogas. These results do not support the findings of many European studies (Granoszewski 2013; Sick 2014 etc.) that mention the feed-in tariff as the most important instrument in the expansion of RE. The paper makes a contribution to the research in the field of RE and energy policy in Ukraine and has some implications for the managerial practice and policy making. Our results also differ from findings of Ukrainian researchers (Geletukha, G., et al. 2013, 2013, 2014) that proclaim the necessity of the feed-in tariff increase as the most important reason of the medium current biogas production. Like most research, our survey is not exempt from limitations. A first limitation is that the results may be difficult to generalize because the study was restricted to a specific target group (Agroholdings that are already investors in RE). It is therefore important to stress that the conclusions may not hold outside this context (e.g. for smaller companies). A second limitation pertains to the fact that the sample is relatively small (n=34) due to the preliminary character of this qualitative survey. We expect to address some of these issues in follow-up works and in the main online survey that is to be done this year.

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