

AGRICULTURAL FEEDSTOCK FOR LIQUID BIOFUEL PRODUCTION

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According to statistics, the total Ukrainian consumption of primary energy totaled around 106 million tons of coal equivalent. Ukraine does not have enough fossil fuel reserves (crude oil, coal, and natural gas). There has been a decrease in production of Ukrainian energy resources, whereas, crop production is increasing. That is why, bioenergy is the sole indigenous resource, which can meet energy requirements. Using crop residues and energy crops can supply consumers with heat, electricity, and vehicle fuels. It is of great importance for the energy security.

A cluster analysis can be used for our exploration. This method can be used for simulation the optimal location for biofuel production. It help to determine the difference of regions.

Agriculture has different kinds of feedstocks for liquid biofuels such as sunflower, corn, wheat, etc. Feedstock for liquid biofuels was the subjects of our study. Liquid biofuels such as ethanol and biodiesel are prospect ones. Ukraine has enough feedstock to produce them.

Annual production of corn exceeds 25 million tons. Farmers produce around 10-15 million tons of sugar beets per year. These feedstocks may be used to refine ethanol. Ethanol yields are 100 l/t sugar beets and around 400 l/t for corn.

All regions of Ukraine have been divided into 4 clusters. The biggest cluster includes Vinnytsa and Chernigiv regions. Its energy potential is 35.6 PJ. The promising bioethanol belt includes 8 regions. Ethanol energy potential exceeds 9 % of total national energy consumption. Therefore, investment in ethanol production is attractive.

Ukrainian farmers produced around 2 million tons of rapeseed which is a feedstock for biodiesel production. This biofuel can cover up to 40 % of national diesel fuel consumption.

We have selected four clusters for rapeseed production. The first cluster includes five regions: Vinnytsa, Lviv, Khmelnytskyi, Odesa and Ternopil regions. Its potential is equal to 0.07 million ton per year of biodiesel. Dnipropetrovsk and Kherson regions are promising for biodiesel production. But due to higher than average feedstock potential, Cluster A is preferable. The rapeseeds belt is in the West of Ukraine..

Conclusions

Agriculture can cover up to 24 % of total national energy consumption. This sector of economy can produce fuels for spark ignition engines and compression ignition engines.

To select suitable regions for biofuels production, a cluster analysis has been made. We have selected the following promising areas for different biofuel production:

- bioethanol – Vinnitsya, Poltava, Chernigiv, Kyiv, Kirovohrad, Khmelnytskyi, Cherkasy, and Sumy regions;
- biodiesel – Vinnitsya, Lviv, Khmelnytskyi, Odesa, and Ternopil regions.

The resulting clusters can be used to create zones for biofuel production, as well as to plan strategic solutions for the development of energy supply in the regions of Ukraine.