

Prospects for Biogas Sector in Ukraine

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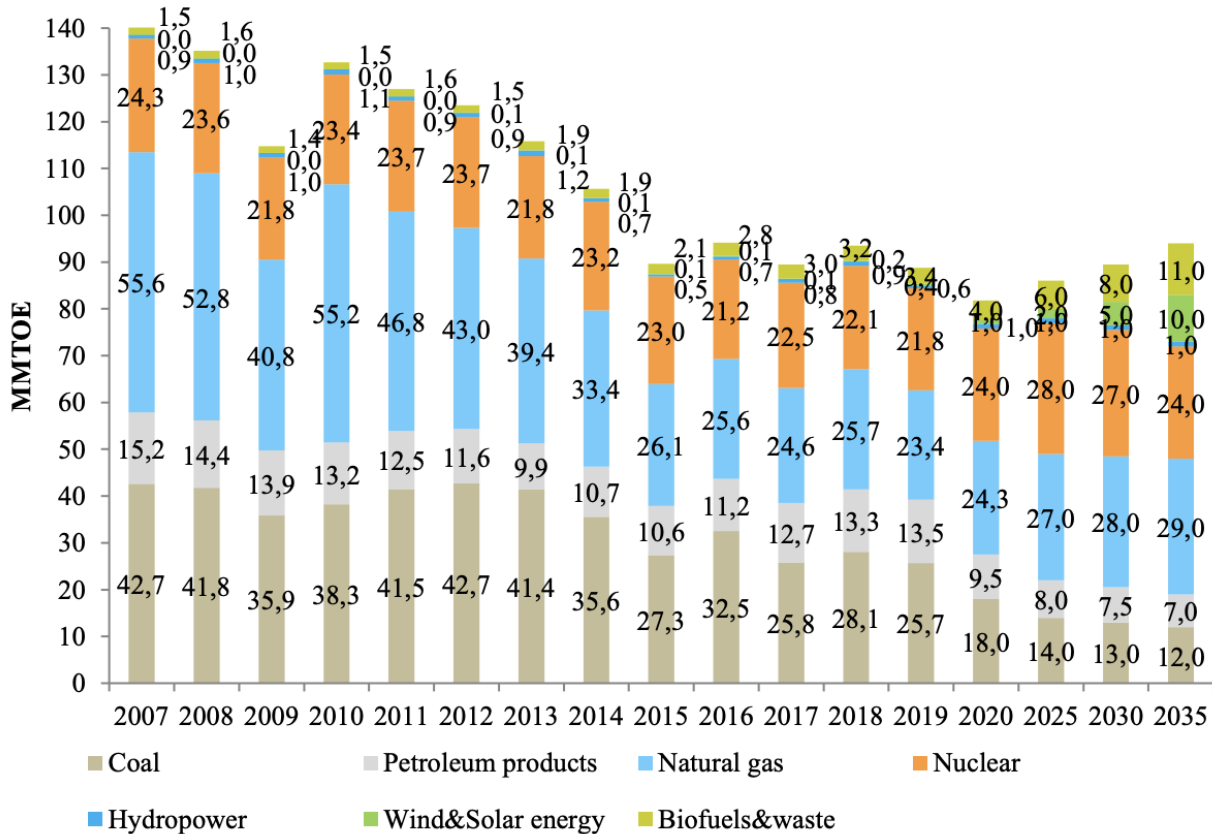
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Executive Summary

- The share of biofuels in the total supply of primary energy is 3.4% (over 70% of the total supply of renewable energy). The growth of the sector in 2010-2018 averaged 31% per year.
- Since the beginning of the war, biogas projects have become more popular, though they remain to be dragged by the lack of a holistic vision of sector development by the state
- In April 2023, the first biomethane plant was built in Ukraine with a production capacity of 3 mill m3 of biomethane/ year

	Biogas	Biomethane
Installed capacity, MWe	140 (33 MW for LFG)	3 mill m3/year
Generated electricity, GWh	505.4 (122.2)	-
Number of plants	3 (33 for LFG)	1
Gas networks (km)	33,400	
Gas refilling stations for CNG	~300	

The General Structure of Primary Energy Supply



Source: State Statistics Service of Ukraine, Cabinet of Ministers of Ukraine

SWOT Analysis of Biogas Development in Ukraine

Strengths	Weaknesses
<ul style="list-style-type: none"> • Availability of qualified workforce with experience in relevant projects • Developed energy infrastructure, Ukraine's gas network with three transit corridors and backup gas pipelines is connected to the European gas grid and is ready for biomethane injection. • Stable electricity generation from biogas vs solar and wind • Experience in feed-in tariff implementation • Availability of national policies to reduce greenhouse emissions • The need to substitute gas supply from Russia 	<ul style="list-style-type: none"> • Unreliable base of raw materials for biogas facilities • High cost of power production from biogas vs conventional energy production • Unfavourable investment climate due to the war • Shortcomings in the legislation, arrears regarding payments under the feed-in tariff
Opportunities	Threats
<ul style="list-style-type: none"> • Development of energy cooperatives for joint bioenergy projects • Development of new sectors of agriculture (energy crops); • Decentralisation of power and heat supply sources • Increase of agricultural and municipal waste processing, reduction of landfill areas • Ukraine can potentially provide up to 20% of the need under REPowerEU 	<ul style="list-style-type: none"> • The threat of destruction of existing bioenergy facilities and energy infrastructure due to the war • A high contamination with unexploded ordinance in forests and arable lands reduces the raw material base of biogas • Growing lack of workforce due to the ongoing hostilities • Priority for state incentives to stimulate wind and solar energy over biogas • Inefficient mechanisms for stimulating thermal energy and liquid biofuel production from bioenergy resources

Regulatory Landscape

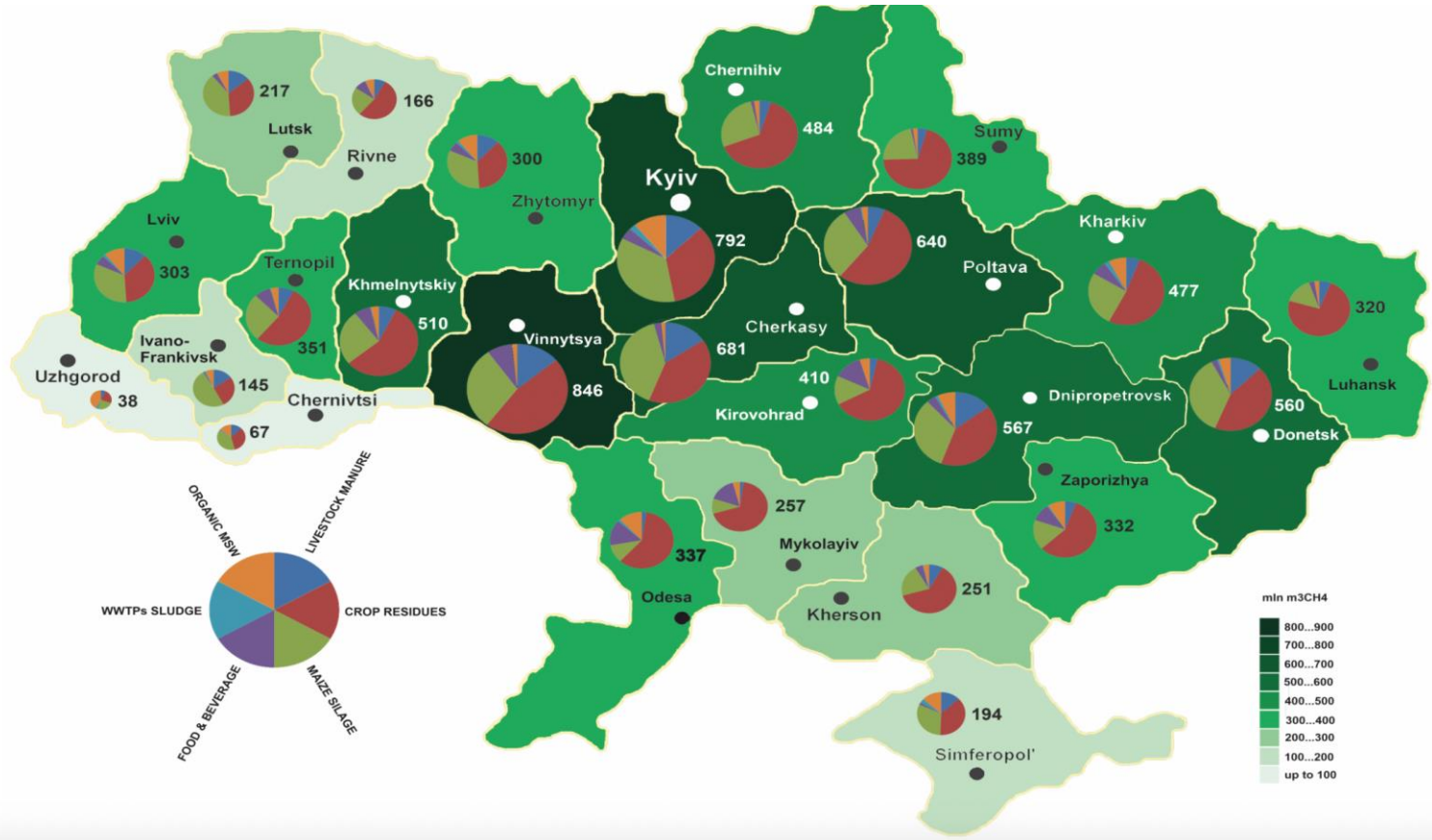
- [Law of Ukraine "On Amendments of some Laws of Ukraine regarding the development of biomethane production" № 1820-IX from 21.10.2021 p.](#)
Definition of the term "**biomethane**", establishment of the **biomethane register** and the **GoOsystem for biomethane**.
- [Law of Ukraine "On state support of investment projects with significant investments in Ukraine" No. 3311-IX dated August 9, 2023](#)
For projects on production of bioethanol, **biogas and biomethane** with total investments **more than 12 mill Euro**:
 - 1) exemption from payment of **certain taxes and fees**;
 - 2) exemption from import **duty taxation** of new equipment and accessories for it;
 - 3) the **predominant right to land use** of state or communal property;
 - 4) provision at the expense of **budget funds for the construction of engineering and transport infrastructure** or compensation for such construction;
 - 5) compensation of costs for **connection to engineering transport networks**;
 - 6) exemption from compensation for forestry production losses.
- [The Procedure of the functioning of the Biomethane Register](#) was adopted by the Resolution of the Cabinet of Ministers of Ukraine in July 2022 (Decree #823). **The Register should start operation till the end of 2023.**
- [NEURC \(the Regulator\) amendments on 8 June 2023 to a number of its resolutions aimed at supporting the development of the biomethane sector in Ukraine](#) The concept of a **Reverse Flow Compressors** has been introduced.

Biogas/Biomethane Production Potential in Ukraine

BIOGAS/BIOMETHANE resource base	billion m ³ CH ₄ /year
Biogas from animal waste	0,9
Biogas from harvest residues of agricultural crops	5,2
Biogas from by-products of the food processing industry	0,7
Biogas from solid household waste	0,5
Biogas from sewage sludge (municipal treatment plants)	0,1
Energy plants: biogas from corn silage (from 1 million hectares)	3,8
Biogas from cover crops (20% of arable land)	9,8
Biogas from BM obtained by thermal gasification (10%)	1,0

Source: UABIO association

Regional Structure of Biomethane Potential in Ukraine



Feasibility Study of Biomethane Production (10 mill m³/year)

Indicator		straw/corn stalks+ manure
Straw/Stalksand corn silage price	€/t	40
Biomethane price	€/MW*h	90
CAPEX	mill€	16,3
NPV	mill €	28,2
IRR	%	28,3
Simple paybackperiod	years	3,6
LCOE (biomethane)	€/MW*h	49,7

Organisation	Functions	WWW
Ministry of Energy of Ukraine	Formulation and implementation of state policy in energy sector	https://mev.gov.ua/en/home
National Commission for State Regulation of Energy and Public Utilities (NERC)	State regulatory, monitoring and control body over the market of energy and utility services	https://www.nerc.gov.ua/
State Enterprise “Energorynok”	State monopoly over procurement of all in-country generated electricity and its re-sales to utility companies	http://www.er.gov.ua/
National Energy Company “Ukrenergo”	Ukrenergo is an electricity transmission system operator in Ukraine and the sole operator of the country's high-voltage transmission lines	https://ukrenergo.in.ua/en
State Agency for Energy Efficiency of Ukraine	Formulation and implementation of state policy in efficient utilisation of energy resources, energy efficiency interventions and alternative sources of energy	https://sae.gov.ua/en

Notable Private Stakeholders

Organisation	Functions	WWW
Bioenergy Association of Ukraine (UABIO)	Nonprofit civic union, that unites business and experts for sustainable bioenergy development in Ukraine	https://uabio.org/en/
Scientific Engineering Centre “Biomass” Ltd (SEC Biomass)	A consulting and engineering company. Ukrainian leader in energy production from biomass	https://www.nerc.gov.ua/
European Ukrainian Energy Agency (EUEA)	A lobbying organisation that promotes the development of a modern and sustainable economic, political, and technological energy environment in Ukraine	https://euea-energyagency.org/en/
Pro Energy	Engineering and construction company active in bioenergy segment	https://www.pro-energy.com.ua/en/

Conclusion

- The optimistic scenario for Ukraine foresees the production of 20bcm/y of biogas by 2050
- Modest incentives for biogas production have been impeding the sector's development until the Russian invasion in 2021. The extraction of biogas remains a merit of large agricultural holdings
- Growing concerns about the energy supply pushed the stakeholders to implement market-stimulating interventions. In particular, the government introduced new policies while development banks started actively financing the development of biogas facilities in the agricultural sector.
- Despite the limited number of implemented agricultural biogas plants, their technical scope covers a wide range of industries and different types of feedstock.
- The abundance of up-to-date information about biogas in Ukraine corroborates assumptions about the significance of the market potential.
- Although the Ukrainian government agrees that biogas may become a means for energy independence and decarbonisation, much is yet to be done. Attracting investments and concessional financing, reducing the cost of connecting to networks and the cost of equipment, as well as reducing the cost of biomethane projects through consolidation and clustering are the challenges Ukraine needs to tackle with