

SWOT analysis of bioenergy development in Ukraine and recommendations for the post-war period

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Electricity generation from bioenergy in Ukraine

Source: SAEEU, 2022

Indicator	2015	2016	2017	2018	2019	2020
Electricity generation from agricultural and landfill biogas						
Number, units	11	12	21	33	49	53
Installed capacity, MW	17	20	34	46	86	103
Amount of electricity generation, million kWh	64	89	93	176	247	471
Electricity generation from solid biomass						
Number, units	5	6	6	10	15	18
Installed capacity, MW	35	39	39	51	95	109
Amount of electricity generation, million kWh	77	80	101	103	162	279

Total renewable electricity mix in Ukraine as of 2020

Renewable energy plants	Installed capacity		Amount of generated electricity	
	MW	%	million kWh	%
Solar power plants	6873	80,7	6725	61,4
Wind power plants	1314	15,4	3271	29,9
Small hydropower plants (<10 MW)	117	1,4	209	1,9
Bioenergy power plants	212	2,5	750	6,8
Total	8516	100	10955	100

Heat and biofuel production from bioenergy in Ukraine

Source: SAEEU, 2022; BAU, 2020

The indicators of the development of generating capacities producing heat energy from biomass in Ukraine	2016	2017	2018	2019	2020
Installed power, gcal/h	3606	4078	5626	5275	5524
The amount of heat energy produced, thousands of gcal	5131	6239	7637	7367	7463

Output and consumption of biofuels (bioethanol) in Ukraine in 2013-2020, ktons

	2015	2016	2017	2018	2019	2020
Output	16	6	21	4	70	C ¹
Import	46	58	54	56	70	77
Export	-9	-6	-4	-4	-7	0
Domestic supply	53	58	70	56	133	77

*C1 – Classified data; it means that the number of producers does not exceed two entities.

The potential of electricity generation from bioenergy is 6.5 TWh, with an installed capacity of 1.4 GW in 2030. The technically achievable potential of heat production is 1609 ktoe/year from biogas and 35.3 Mtoe/year from solid biomass. The liquid biofuels may constitute about 1.15 Mtoe in 2030 and 3.5 Mtoe in 2050.

SWOT-analysis: strengths (S)

- **significant unrealized bioenergy potential in Ukraine;**
- **qualified personnel to implement bioenergy projects;**
- **experience in successful pilot projects in the bioenergy sector;**
- **energy infrastructure for implementing bioenergy projects;**
- **high flexibility of bioenergy facilities in terms of installed capacity;**
- **stability of electricity generation based on bioenergy resources compared to solar and wind generation;**
- **need to replace fuels imported from Russia and Belarus;**
- **experience in using a feed-in tariff for electricity generation at bioenergy facilities;**
- **national goals for reducing greenhouse gas emissions**

SWOT-analysis: weaknesses (W)

- **unreliable base of raw materials for bioenergy facilities;**
- **high investment costs to construct bioenergy power plants;**
- **high cost of power production from bioenergy compared to conventional energy production technologies;**
- **unfavourable investment climate due to the war in Ukraine;**
- **unawareness of the population and businesses about economic, social and environmental benefits of bioenergy;**
- **shortcomings in the legislation, arrears regarding payments under the feed-in tariff to producers of electricity from biomass;**
- **availability of new promising bioenergy technologies that are not yet presented on Ukraine's market**

SWOT-analysis: opportunities (O)

- additional jobs in the bioenergy sector;
- development of the local economy and local fuel and resource base;
- development of energy cooperative networks for joint bioenergy projects;
- increase in the rate of agricultural and municipal waste processing, reduction of landfill areas;
- development of new sectors of agriculture (energy crops);
- reduction of dependence on fuel import in the electricity, heat and transport sectors, development of own production of biofuels;
- reduction of technical challenges related to balancing the national energy system;
- decentralization of power and heat supply sources, development of eco-transport based on biofuels;
- activation of the mechanism of green auctions;
- ensuring a green energy transition and achieving decarbonization goals

SWOT-analysis: threats (T)

- further destruction or the threat of destruction of existing bioenergy facilities due to the war;
- a high level of mine danger at the objects of agriculture and forestry, which reduces the raw material base of bioenergy;
- political and economic instability, additional restrictions on business caused by martial law, poverty of the population;
- deterioration of the investment climate, undermining of confidence of foreign investors, curtailment of their activities on the territory of Ukraine;
- lack of personnel for bioenergy projects implementation as a result of ongoing hostilities;
- priority state stimulation of solar and wind energy development ;
- inefficient economic mechanisms for stimulating thermal energy and liquid biofuel production from bioenergy resources

Strategic recommendations for the Ukrainian bioenergy sector development

- Improve strategic documents regarding the bioenergy development and the share of energy produced from bioenergy resources, specify national and regional goals for decarbonization regarding bioenergy contribution;
- Conduct negotiations with donors and international organizations regarding attracting foreign funding to implement bioenergy projects in Ukraine;
- Set transparent legal rules for the bioenergy sector and strictly follow them;
- Revise the annual quotas to determine the total capacity of bioenergy facilities, claiming state support under the green auction mechanism, launch green auctions for the bioenergy industry;

Strategic recommendations for the Ukrainian bioenergy sector development

- Extend the feed-in tariff, the green auctions mechanism, tax and customs benefits for thermal energy produced from biomass, liberalize the thermal energy market, introduce a blending mandate to stimulate the domestic liquid biofuels production;
- Improve methods to calculate the energy cost by considering externalities, reduce/cancel subsidies for fossil fuels;
- Inform territorial communities, businesses, and households about the benefits of using bioenergy technologies;
- Improve the legal for energy cooperatives, eliminate barriers to forming a cooperative model in the bioenergy sector;
- Create a single electronic platform for the biofuels trade in Ukraine.

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