

ENERGY



DESIGNING A CARBON NEUTRAL ENERGY SYSTEM OF UKRAINE: INCREASING THE UPTAKE OF BIOFUELS AND BIOMASS IN UKRAINE



IMPROVING THE RESILIENCE OF ENERGY SYSTEMS
THROUGH ENERGY EFFICIENCY AND RENEWABLE ENERGY:
DEMAND-SIDE PERSPECTIVE AND CROSS-SECTORAL APPROACH

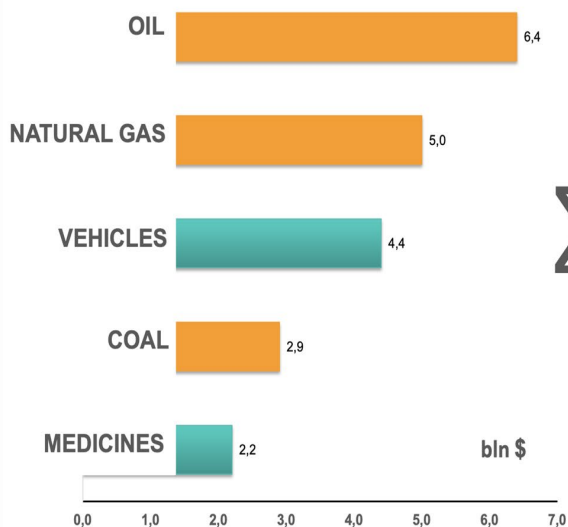
GROUP OF EXPERTS ON
ENERGY EFFICIENCY
3-4 OCTOBER 2022 | NINTH SESSION

JOINT THEMATIC
WORKSHOP
5 OCTOBER 2022

GROUP OF EXPERTS ON
RENEWABLE ENERGY
6-7 OCTOBER 2022 | NINTH SESSION

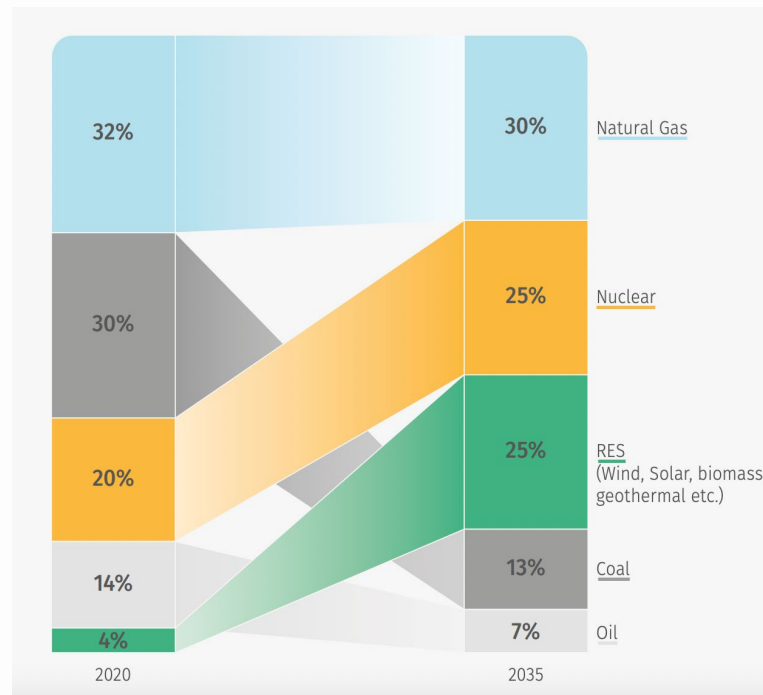


TOP 5 UKRAINIAN IMPORTS IN 2021



OIL, NATURAL GAS, COAL
 Σ **14,3 bln \$**
20 % funds total import

Energy Strategy of Ukraine forecasts by 2035 (primary energy supply structure)

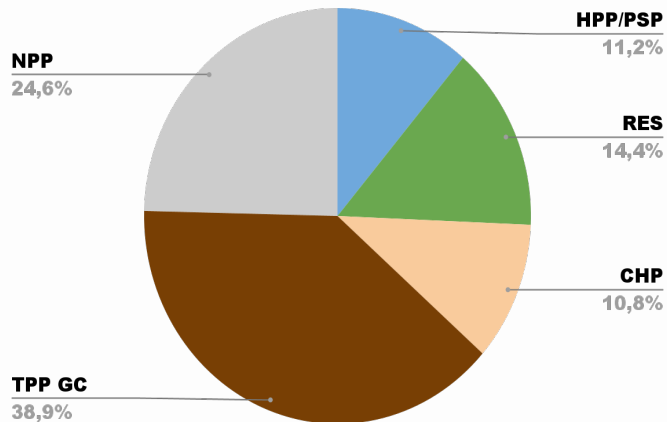




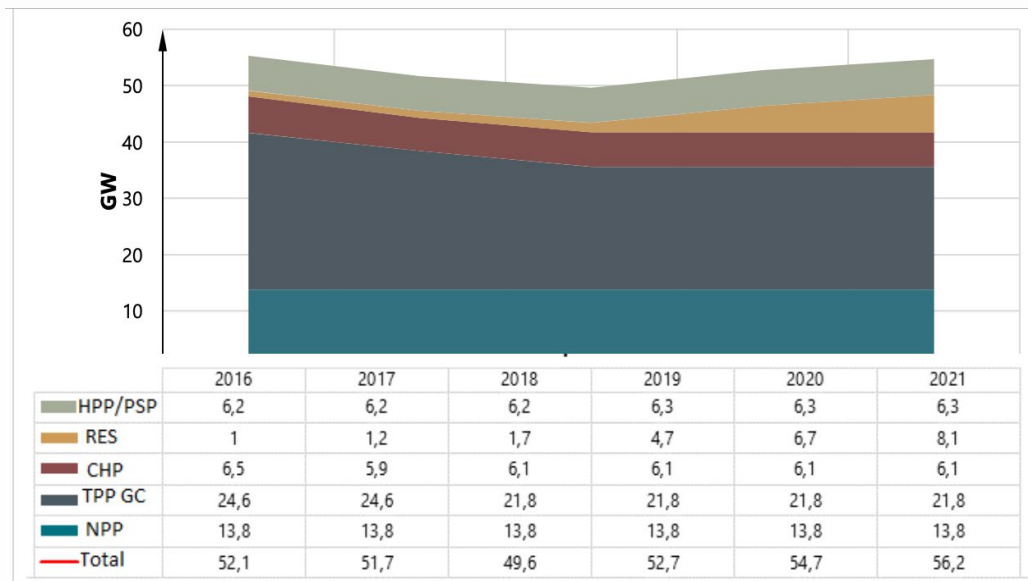
RENEWABLE ENERGY OVERVIEW

As of 31.12.2021, the installed capacity of RES in the Integrated Power System of Ukraine, which are connected to the grid and deliver electricity:

- WPP – 1,529 MW;
- SPPs – 6,365.3 MW (including 1,205.3 MW of household SPP);
- BioPP – 254.2 MW;
- Micro, mini and small HPP – 192.9 MW.



DYNAMICS OF THE INSTALLED CAPACITY MIX OF POWER PLANTS IN UKRAINE*



Note. *Excluding TNCT of AR of Crimea, Donetsk and Luhansk regions



BIOENERGY OVERVIEW

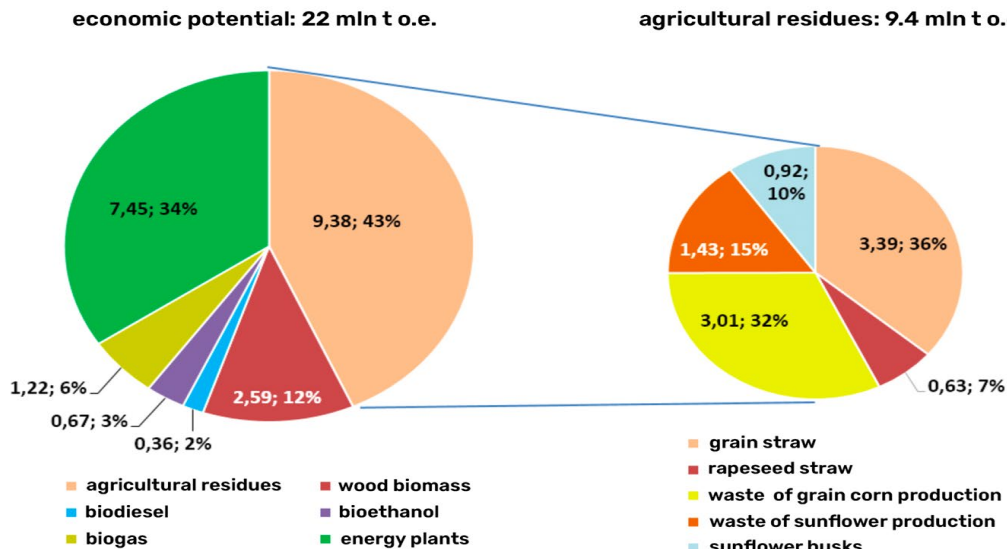
In Ukraine, through the construction and commissioning of new bioenergy capacities, the production of electricity from biomass can be increased to **6.6 TWh in 2030 (with a total capacity of 1.5 GW)**.

SOLID AGRO BIOMASS

Production potential of solid biomass for today is about **22 mln toe and may almost double by 2050**.

In Ukraine about **94 mln tons** of agricultural crop waste is generated annually.

Out of them, **37% (34 million tons)** is the share that is actually available and can be used in the energy sector.



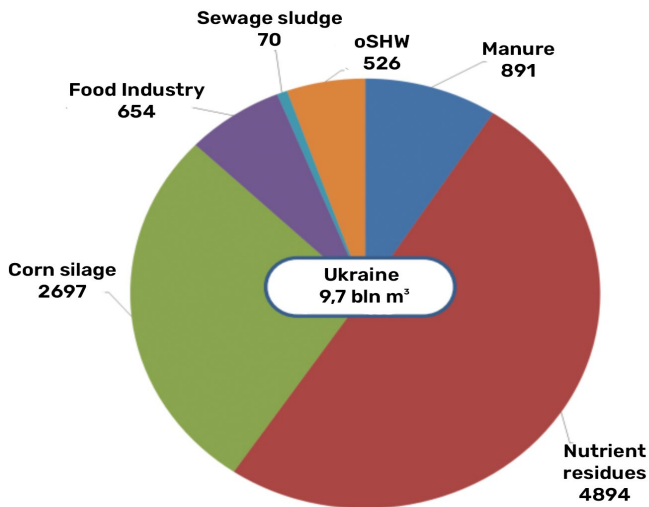


BIOMETHANE

According to the data of LLC "Gas TSO of Ukraine" in 2021, the total annual volume of natural gas consumption amounted about **27 bln m³**, imports - almost half of this amount (general expenses **\$ 5 bln**). This is the second place in the commodity structure of Ukraine's imports after oil and petroleum products.

The total potential of biomethane production in **2050** may increase at least 1.5 times compared to 2020 and reach about **15 billion m³/year**.

Potential of biomethane production per year, mln m³



On 21.10.2021 the Verkhovna Rada of Ukraine adopted the Law of Ukraine "On Amendments to Certain Laws of Ukraine Regarding the Development of Biomethane Production» No. 1820-IX, which aims to provide:

- verification of purified biogas (biomethane), the physical and technical characteristics of which meet the requirements of legal acts on natural gas;
- issuance of a "Guarantee of Origin" for the produced volumes;
- implementation of the Biomethane Register.

Full cost of commercial biomethane in Ukraine:

- **313-1136 euros/1000 m³**

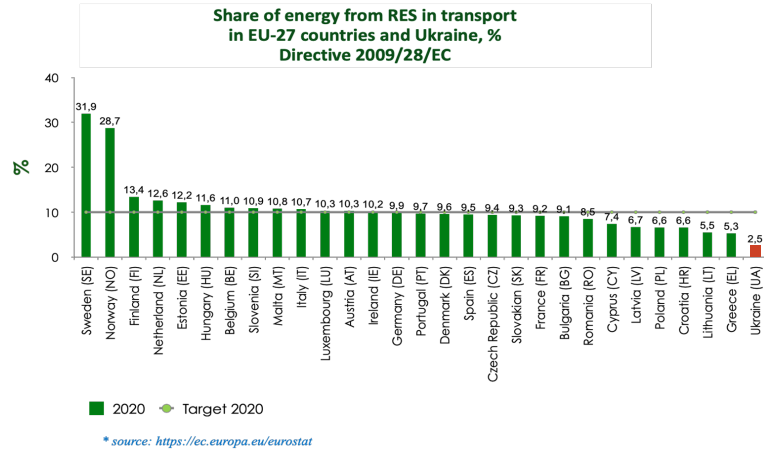
As of 2022, the average cost of natural gas in European hubs:

- **2,100 euros/1000 m³.**

The historical maximum of gas prices was observed on the end of August, 2022 and reached almost **3400 euros/1000 m³**.



BIOETHANOL

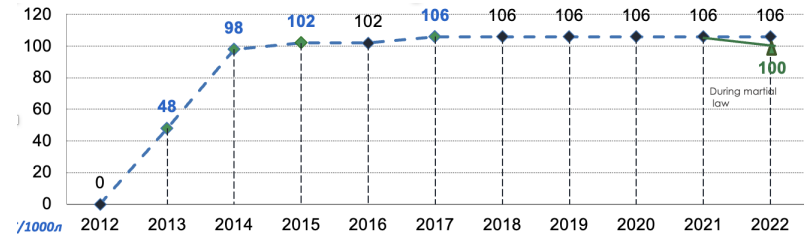


On June 30, 2021, Verkhovna Rada of Ukraine adopted in the first reading as a basis the draft law on the mandatory use of liquid biofuel (biocomponents) in transport (No. 3356-d).

The draft law envisages:

- establishment of a mandatory share of liquid biofuel (quota) in the total annual volume of gasoline sales of at least 5%;
- introduction of accounting and control of the content of biocomponents in gasoline;
- establishment of liability (fines) for non-compliance with quotas;
- introduction of requirements to comply with sustainability criteria for biofuels.

BIODIESEL



According to the State Customs Service, Ukraine exports up to 3 mln tonnes of rapeseed annually.

About 1 mln tonnes of biodiesel is produced outside of Ukraine every year (according to the "Alternative Fuels Research Institute" estimation, about 1 ton of biodiesel is obtained from 3 tonnes of rapeseed). This is about 15-20% of the total annual consumption of diesel in Ukraine.

By 2013 there were 55 enterprises engaged in the production of biodiesel in Ukraine. One of the main reasons for the activities cessation was the introduction of an excise tax on biodiesel.

	Barriers (Policy and legislation)	What needs to be done (regulatory part)
Solid Agro biomass	<ul style="list-style-type: none"> ● lack of a basis for the development of the solid biofuels market; ● presence of legislative barriers to the development of the cultivation of energy plants. 	<ul style="list-style-type: none"> ● adoption of the draft law on the introduction of a single electronic exchange for solid biofuel trade (draft laws reg. № 8052, 8053 from 21.09.2022); ● making amendments to a number of current legislative acts of Ukraine regarding the development of the cultivation of energy plants (draft laws reg. № 5227, 5228 from 12.03.2021); ● amending the legislation regarding the establishment of a zero rate of tax on CO2 emissions for plants burning biofuels.
Biomethane	<ul style="list-style-type: none"> ● during 2021 and 2022, the necessary legislative regulation for the development of biomethane production was introduced in Ukraine and the first biomethane plants are currently being under construction. Their launch is planned by the end of 2022. 	<ul style="list-style-type: none"> ● implementation of the biomethane Register (currently being developed, according to the Government Resolution on approval of the Procedure for the Register of Biomethane No. 823, the launch of the Register is planned in 2023).
Bioethanol	<ul style="list-style-type: none"> ● lack of a legal basis for the development of the use of sustainable liquid biofuel in transport; ● lack of technical regulations for alternative fuel with a bioethanol content of more than 10 per cent by volume. 	<ul style="list-style-type: none"> ● adoption of the draft law on the development of the liquid biofuels market (draft law reg. № 3356-d from 05.11.2020); ● development and adoption of technical regulations for alternative fuels with a bioethanol content of more than 10 per cent by volume.
Biodiesel	<ul style="list-style-type: none"> ● an excise tax on the production of biodiesel at almost the same level as petroleum diesel fuel; ● absence of technical regulations on alternative fuel with a biodiesel content of more than 7 per cent by volume. 	<ul style="list-style-type: none"> ● making amendments to the Tax Code of Ukraine regarding the establishment of a zero rate of excise tax on biodiesel; ● development and adoption of technical regulations for alternative diesel fuel with a biodiesel content of more than 7 per cent by volume.



Thank you for attention!

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