



## **Bioenergy Development in Ukraine**

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***We are greening the energy!***

# UABio Members



Scientific-Engineering Centre  
"Biomass"



LLC "Boiler factory "Kriger"



LLC «Salix Energy»



LLC «Kyiv Green Energy»



NGO "Renewable Energy Agency"



LLC "Volyn Kalvis»



Ukrainian heat generating company  
"Ukrteplo"



LLC "Kotloturboprom"



LLC "Smilaenergopromtrans"



LLC "ENERSTENA Ukraine"



DP «Siemen



Foreign Enterprise "Agro-Wild  
Ukraine"



LLC "Metropoliya Science and  
Technology Company"  
s Ukraine»



Private Enterprise «Kramar»



Institute of Engineering  
Thermophysics of NAS of Ukraine



LLC «ACCORD-LTD»

Energy-Industrial Group  
«Yugenergopromtrans»



LLC "Ecodevelop"



LLC "NLM-GROUP"

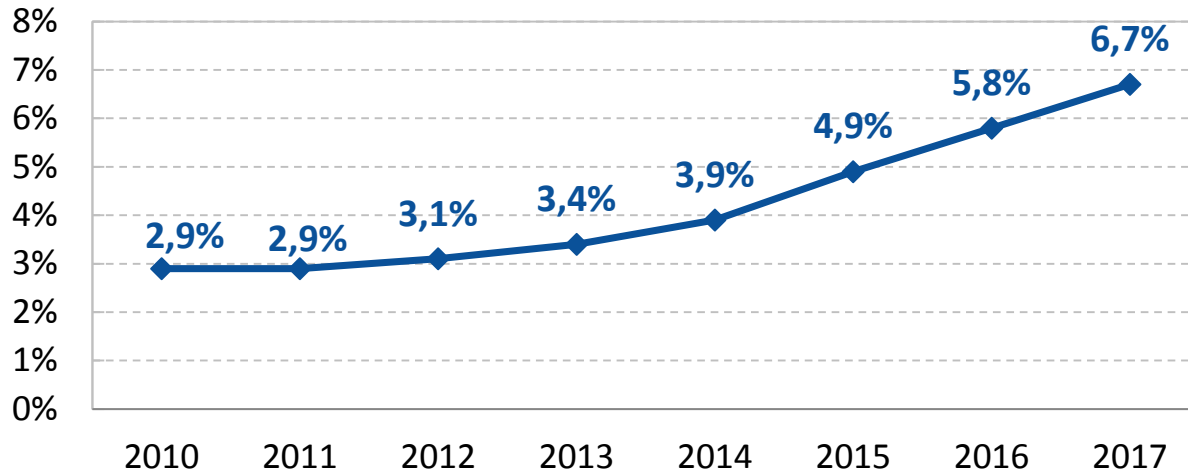


LLC "Ecoprod"

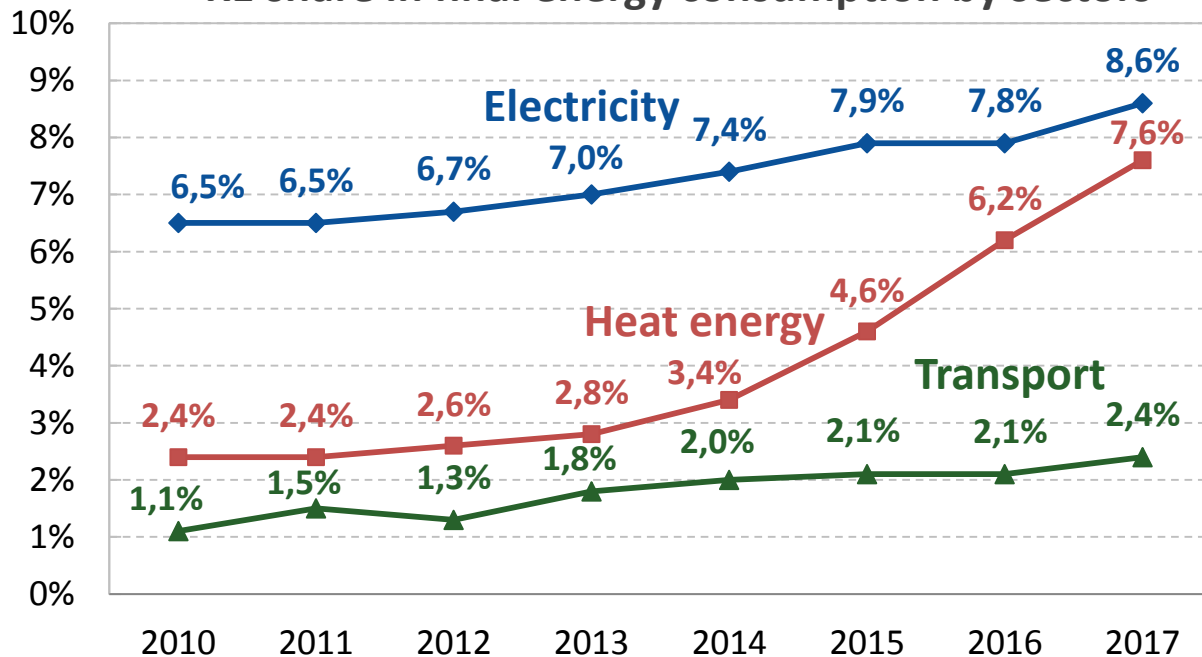
**Physical persons:** Maraykin R., Petrov Ya., Bereznytska M., Epshtein Yu., Galchynska Yu., Teush S., Gres O., Stupak S., Romanyuk O., Kotsar O., Moroz O.

# Production of Renewable Energy in Ukraine, according to official Energy Balances, in 2010-2017

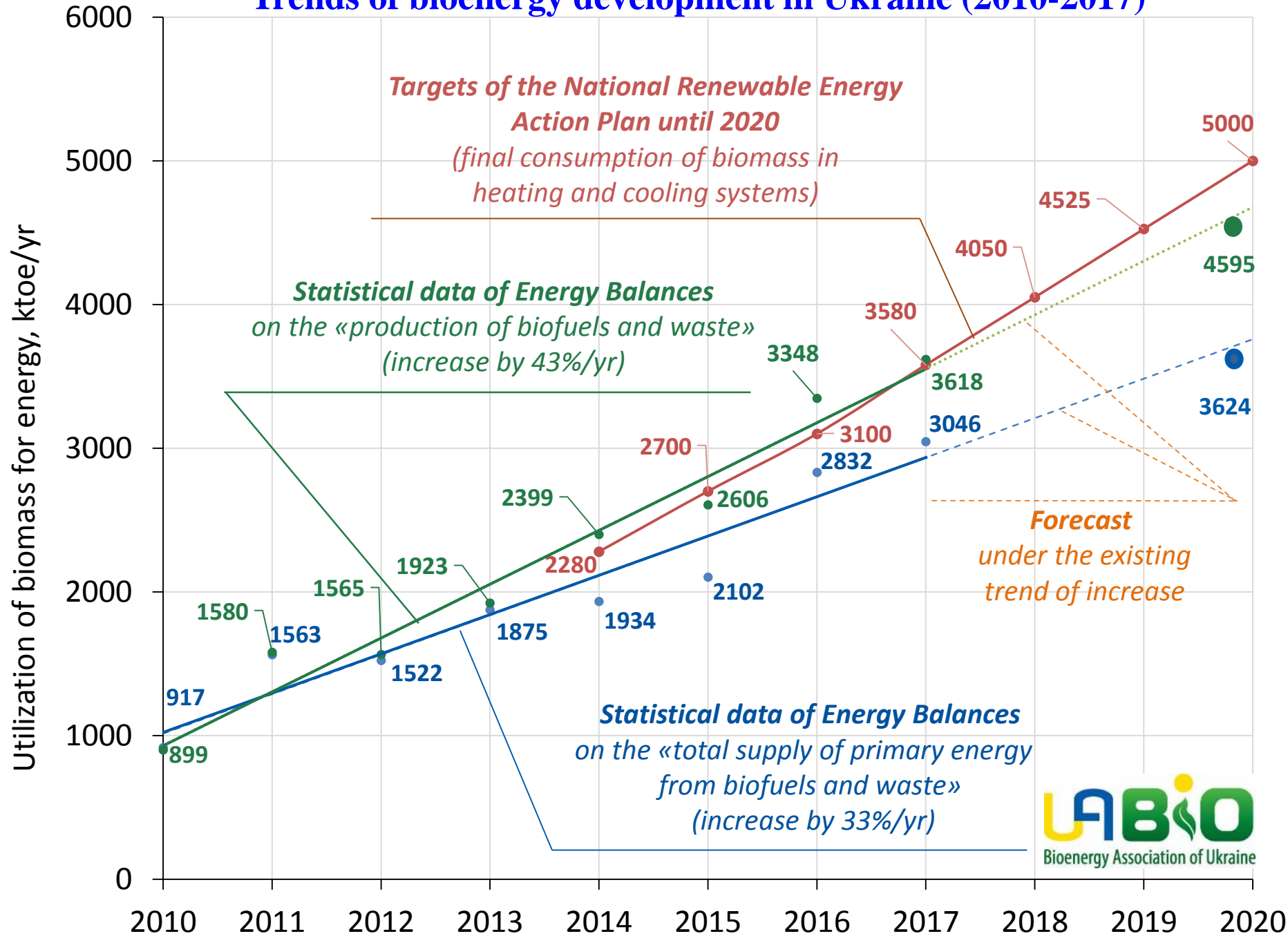
## RES share in total final energy consumption



## RE share in final energy consumption by sectors



# Trends of bioenergy development in Ukraine (2010-2017)



## Structure of Total primary energy supply according New Energy Strategy of Ukraine till 2035

Type of energy source	2015 (fact)	2020 (forecast)	2025 (forecast)	2030 (forecast)	2035 (forecast)
Coal	27,3	18	14	13	12
Natural Gas	26,1	24,3	27	28	29
Oil Products	10,5	9,5	8	7,5	7
Nuclear Energy	23	24	28	27	24
<b>Biomass, Biofuels and Wastes</b>	<b>2,1</b>	<b>4</b>	<b>6</b>	<b>8</b>	<b>11</b>
Solar and Wind Energy	0,1	1	2	5	10
Hydro Energy	0,5	1	1	1	1
Thermal energy	0,5	0,5	1	1,5	2
<b>TOTAL, Mtoe</b>	<b>90,1</b>	<b>82,3</b>	<b>87</b>	<b>91</b>	<b>96</b>

## Potential of biomass available for energy in Ukraine (2016)

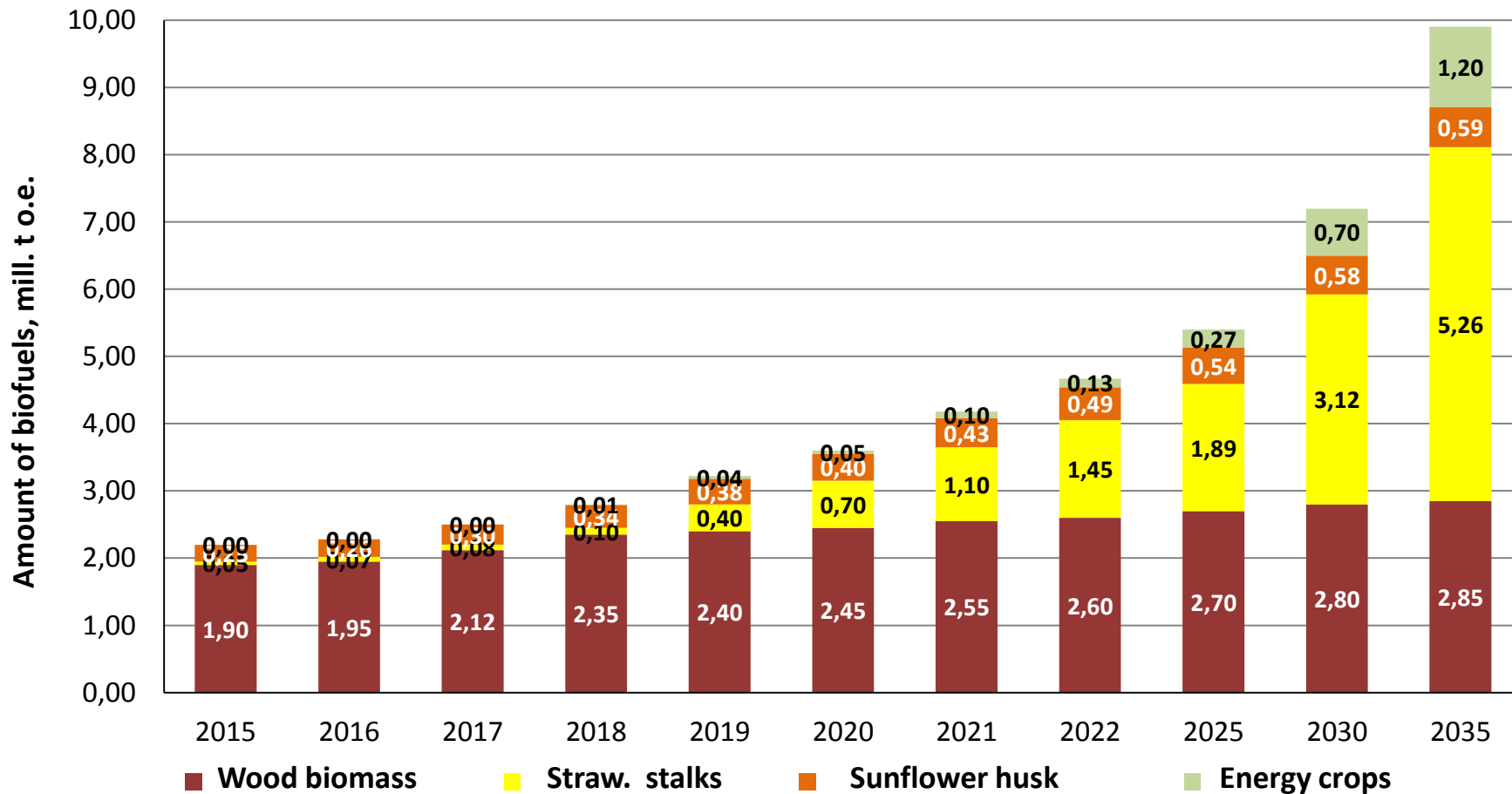
Type of biomass	Theoretical potential, Mt	Potential available for energy	
		Share of theoretical potential, %	Mtoe
Straw of grain crops	36.1	30	3.70
Straw of rape	2.1	40	0.28
By-products of grain corn production (stalks, cobs)	36.5	40	2.79
By-products of sunflower production (stalks, heads)	25.9	40	1.48
Secondary agricultural residues (sunflower husk)	2.0	86	0.84
Wood biomass (firewood, felling residues, wood processing waste)	6.6	94	1.55
Wood biomass (dead wood, wood from shelterbelt forests, pruning)	8.8	44	1.03
Biodiesel (rapeseed)	-	-	0.16
Bioethanol (corn and sugar beet)	-	-	0.66
Biogas from waste and by-products of agricultural sector	1.6 bln m <sup>3</sup> CH <sub>4</sub>	50	0.68
Landfill gas	0.6 bln m <sup>3</sup> CH <sub>4</sub>	34	0.18
Sewage gas (industrial and municipal wastewater)	1.0 bln m <sup>3</sup> CH <sub>4</sub>	23	0.19
<b>Energy crops:</b>			
- willow, poplar, miscanthus (1 mln ha*)	11.5	100	4.88
- corn for biogas (1 mln ha*)	3.0 bln m <sup>3</sup> CH <sub>4</sub>	100	2.57
<b>TOTAL</b>	-	-	<b>21.01</b>

43%

35%

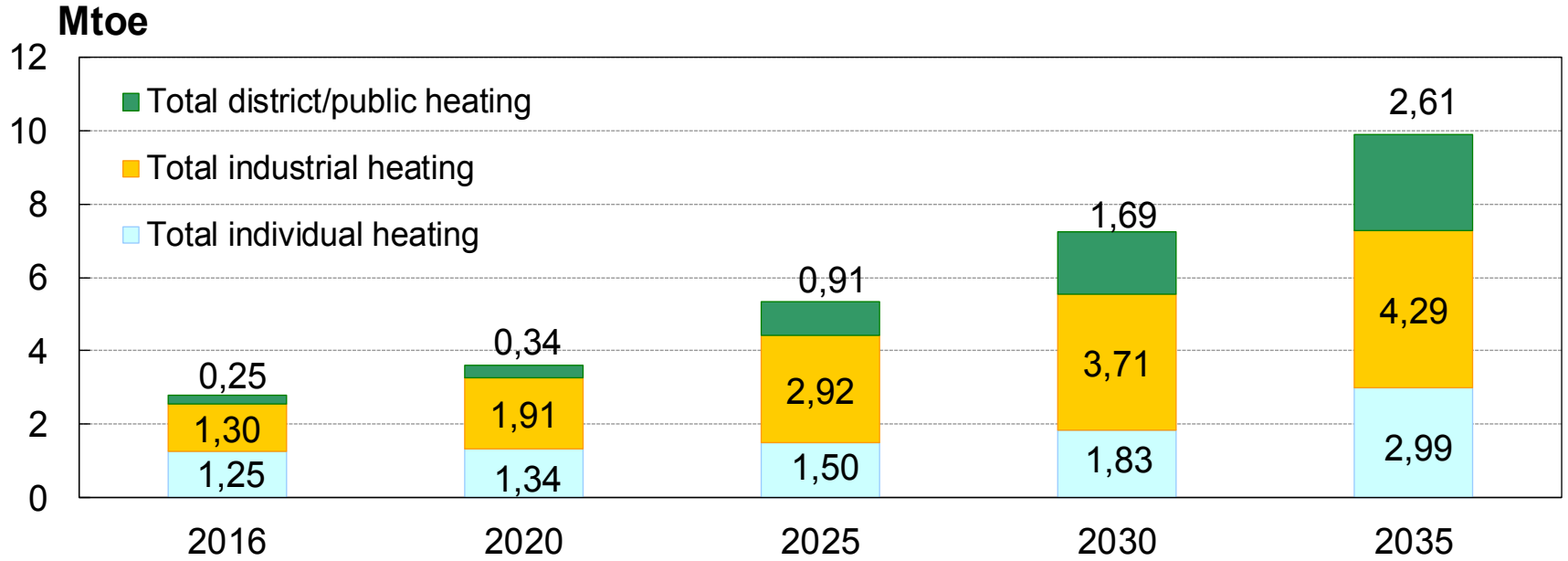
\* In case of growing on 1 mln ha of unused agricultural land.

# Forecast of total amount of consumption and structure of solid biofuels in Ukraine (2015 – 2035)

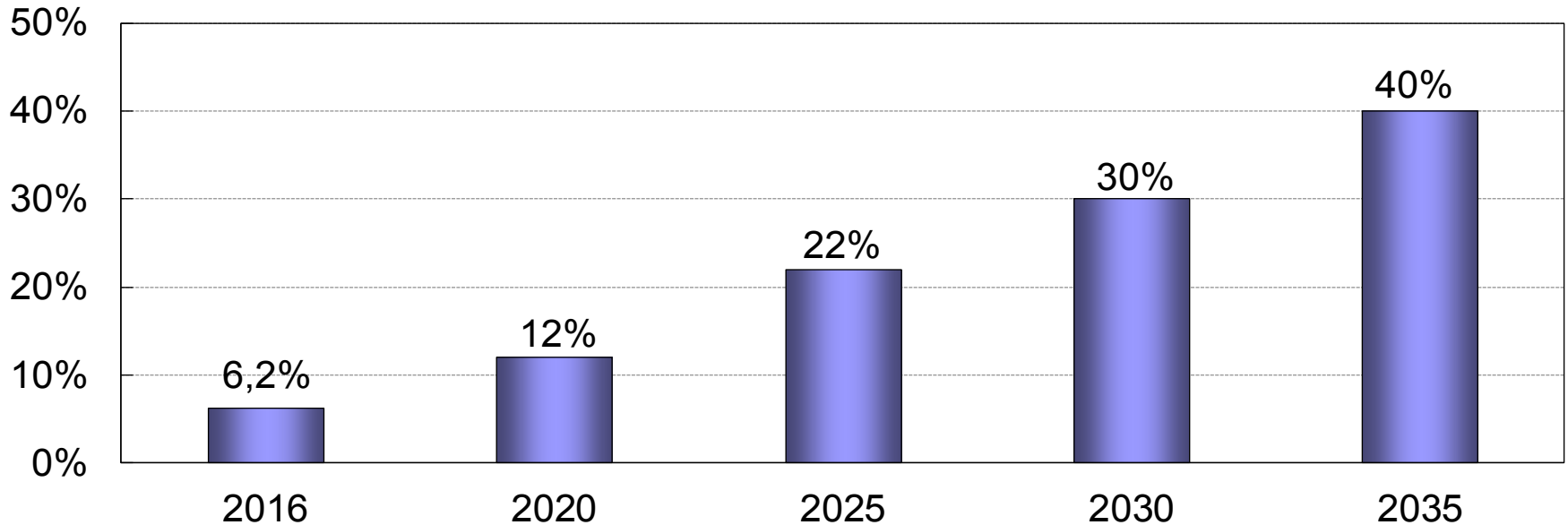


Type of biomass	2015	2016	2017	2018	2019	2020	2021	2022	2025	2030	2035
Wood fuels	1,90	1,95	2,12	2,35	2,40	2,45	2,55	2,60	2,70	2,80	2,85
Straw, stalks	0,05	0,07	0,08	0,10	0,40	0,70	1,10	1,45	1,89	3,12	5,26
Sunflower husk	0,25	0,26	0,30	0,34	0,38	0,40	0,43	0,49	0,54	0,58	0,59
Energy crops	0,00	0,00	0,00	0,01	0,04	0,05	0,10	0,13	0,27	0,70	1,20
<b>TOTAL, Mtoe</b>	<b>2,20</b>	<b>2,28</b>	<b>2,50</b>	<b>2,80</b>	<b>3,22</b>	<b>3,60</b>	<b>4,18</b>	<b>4,67</b>	<b>5,40</b>	<b>7,20</b>	<b>9,90</b>

# Forecast of Renewable Heat Production in Ukraine (2016-2035)



## Forecast of RES share in heat production (2016-2035), %





## Forecast of Renewable Heat Production in Ukraine (2016 – 2035)

Year	MW, heat	MW <sub>e</sub>	Mtoe	NG replacement, billion m <sup>3</sup>	Share of RES	CO <sub>2</sub> reduction, MtCO <sub>2</sub> /yr	Total investments, million Euro	Total new jobs
<b>2016</b>	5000	45	2,8	3,5	6,2%	6,2	1 000	13 000
<b>2020*</b>	7 000	250	3,6	4,4	12%	8,6	1 800	22 000
<b>2025</b>	11 250	800	5,3	6,6	22%	12,9	3 800	42 000
<b>2030</b>	16 200	1260	7,2	8,9	30%	17,5	5 700	64 000
<b>2035**</b>	24 000	1780	9,9	12,2	40%	24,0	8 000	97 000

\* according Renewable Energy Action Plan till 2020.

\*\* according Energy Strategy of Ukraine till 2035.

# Main drivers and barriers for bioenergy development

## Drivers:

1. **Market prices** on natural gas for industry and public organizations. Considerable increase of natural gas prices for population and for DH companies heating population from May 2015 (but they are ~40% less than current market prices yet).
2. **Improvement of tariff system** for heat energy from Alternative Energy Sources (AES incl. RE): transition from “self cost + 6%” model to new model from April 2017. Now tariff on heat energy from AES = tariff on heat energy from natural gas - 10%.
3. First steps in **monetization of subsidies for population** (from January 2018).

## Barriers:

1. **Natural gas prices for population and for DH companies heating population are not market ones** (~40% less than current market prices yet). *There is a schedule of equalizing of these prices with prices for industry till January 2020.*
2. **Lack of solid biofuels market development.**  
*Establishment of solid biofuel electronic trading system is in progress – draft legislation is developed and is under discussion at the moment (similar to Lithuanian Biofuel Exchange Baltpool).*
3. Stimulation of **electricity production from biomass and biogas** is insufficient.
4. **Imperfect model of DH supply** (monopoly position of DH companies, problems with third party access to heating networks). *Improvements are developed and they are under discussion.*

# Options for business

<b>Collection, treatment, sale of agro-biomass</b>	<b>1) Collection, baling, sale of wheat straw / maize stalks</b>		<b>2) Production and sale of pellets on Ukrainian market</b>		
<b>Investments</b>	581 th. EUR (productivity: 20-35 t/h)		2.6 million EUR (productivity: 5 t/h)		
<b>IRR</b>	<b>24.1%</b>		maize stalks: <b>6%</b> ; sunflower husk: <b>36%</b>		
<b>Simple payback period</b>	<b>4.1 years</b>		maize stalks: <b>9.6 years</b> sunflower husk: <b>2.8 years</b>		
<b>Production of energy from agro-biomass</b>	<b>3) Boiler plant on straw bales</b>	<b>4) CHP plant on straw bales</b>	<b>5) Boiler plant on maize stalks</b>	<b>6) CHP plant on maize stalks</b>	<b>7) Thermal power plant on maize stalks</b>
<b>Investments*</b>	2.5 mill EUR	23.1 mill EUR	2.2 mill EUR	16.2 mill EUR	15.9 mill EUR
<b>IRR</b>	<b>28%</b>	<b>17%</b>	<b>32%</b>	<b>26%</b>	<b>16%</b>
<b>Simple payback period</b>	<b>3.4 years</b>	<b>5.1 years</b>	<b>3.1 years</b>	<b>3.7 years</b>	<b>5.3 years</b>
	<b>8) Boiler plant on sunflower husk pellets</b>	<b>9) CHP plant on sunflower husk pellets</b>	<b>10) Biogas plant on sugar beet pulp</b>	<b>11) Biogas plant on maize silage (80%) and manure (20%)</b>	<b>12) Production of 2nd generation bioethanol from straw/stalks</b>
<b>Investments*</b>	1.4 mill EUR	16.2 mill EUR	11.2 mill EUR	25.9 mill EUR	101 mill EUR
<b>IRR</b>	<b>53%</b>	<b>26%</b>	<b>18.8%</b>	<b>21.8%</b>	<b>23%</b> (sale on European market)
<b>Simple payback period</b>	<b>1.9 years</b>	<b>3.6 years</b>	<b>5.2 years</b>	<b>4.5 years</b>	<b>4.5 years</b> (sale on European market)

- Boiler plant: 10 MW, CHP plant: 6 MW<sub>e</sub>+18 MW<sub>th</sub>, TPP: 6 MW<sub>e</sub>, biogas plant: 3 MW<sub>e</sub> (pulp), 10 MW<sub>e</sub> (silage + manure), bioethanol production: 55 kt/yr

# Horizon 2020 Project «Promoting the penetration of agri biomass heating in European rural areas»



*Funded through EU Program Horizon 2020  
Duration: January 2019 – December 2021*

**Consortium:** 13 partners from 9 European countries (Greece, Spain, Austria, Denmark, Belgium, Croatia, Romania, **Ukraine**, France).

**Coordinator:** Centre for Research and Technology Hellas (CERTH, Greece).

**Bioenergy Association of Ukraine** (UABio) is a project partner from Ukraine.

In AgroBioHeat, among others, UABio is Leader of Task 5.2 «National Strategic Plan», Task 5.3 «National policy workshops & Advocacy actions», and is primarily responsible for the preparation of a booklet on «**Maize Residues-to-Energy**».

Through its activities, AgroBioHeat aims **to raise confidence on agri biomass**, empower local stakeholders to unblock the market and influence the development of the European and national framework in a way that is favourable to **agri biomass heating solutions** market uptake. Actions will be mainly located in **6 European countries**: Greece, Spain, France, Romania, Croatia and **Ukraine**.

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# Horizon 2020 Project “Promoting Sustainable Use of Underutilised Lands for Bioenergy Production through a Web-Based Platform for Europe”



Funded through EU Program Horizon 2020. Duration: 1 Nov 2018 – 31 Oct 2021

CONSORTIUM:	Country
1. WIP-Renewable Energies (WIP) ( <b>Coordinator</b> )	Germany
2. Food and Agriculture Organization of the United Nations (FAO)	Italy
3. Geonardo Environmental Technologies Ltd (GEO)	Hungary
4. Joanneum Research Forschungsgesellschaft MbH (JR)	Austria
5. Forschungsinstitut für Bergbaufolgelandschaften e.V. (FIB)	Germany
6. Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria (CREA)	Italy
<b>7. Scientific Engineering Centre "Biomass" LTD (SECB)</b>	<b>Ukraine</b>
8. Universidad de Castilla La Mancha (UCLM)	Spain
9. Center for Promotion of Clean and Efficient Energy in Roumania (ENERO)	Romania
10. European Landowners Organization (ELO)	Belgium
11. 1to3 Capital (1 to3)	Netherlands
12. Neste Corporation (NESTE)	Finland



## BIOPLAT-EU platform

Project website		webGIS tool	
		GIS maps	STEN tool
Information about the project	Help Desk	data from other projects	own data

**BIOPLAT-EU** will produce a **comprehensive online web-based platform** for supporting the decision-making process for new bioenergy investment projects that rely on biomass from marginal, underutilized and contaminated lands in Europe and neighbouring countries.

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support



# BIOMASS for ENERGY

15th International Conference

# 2019

SEPTEMBER 24-25

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[www.uabioconf.org](http://www.uabioconf.org)

**Thank you for attention!**

**Welcome to Ukraine and to UABio!**

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*We are greening the energy!*