Bioenergy Development in Ukraine

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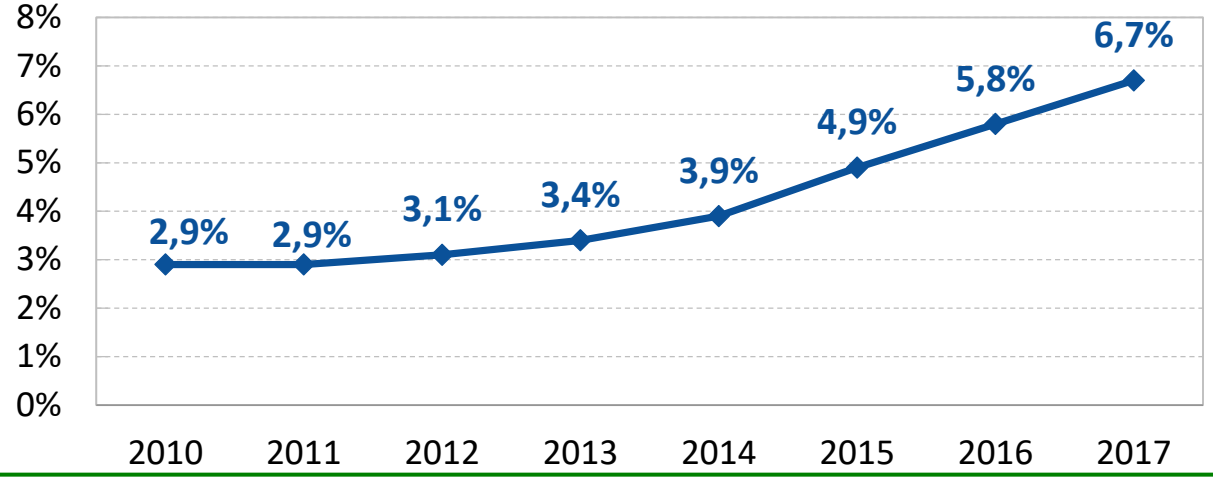
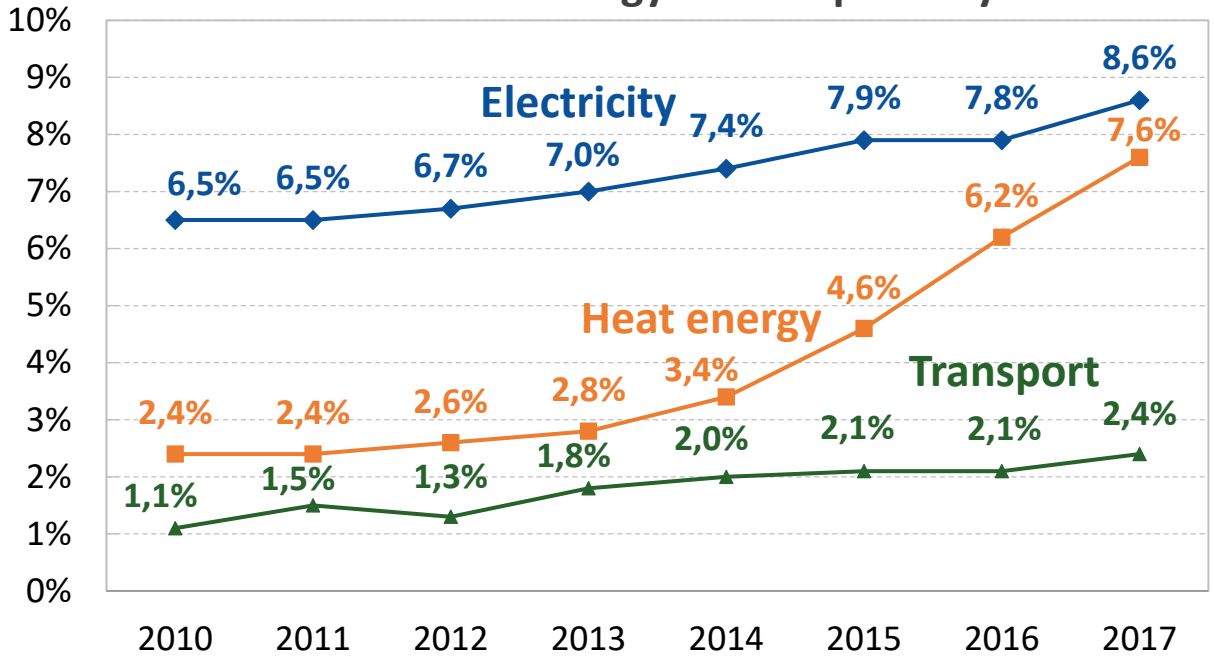
Production of Renewable Energy in Ukraine, according to official Energy Balances, in 2010-2017

RES share in total final energy consumption



RE share in final energy consumption by sectors



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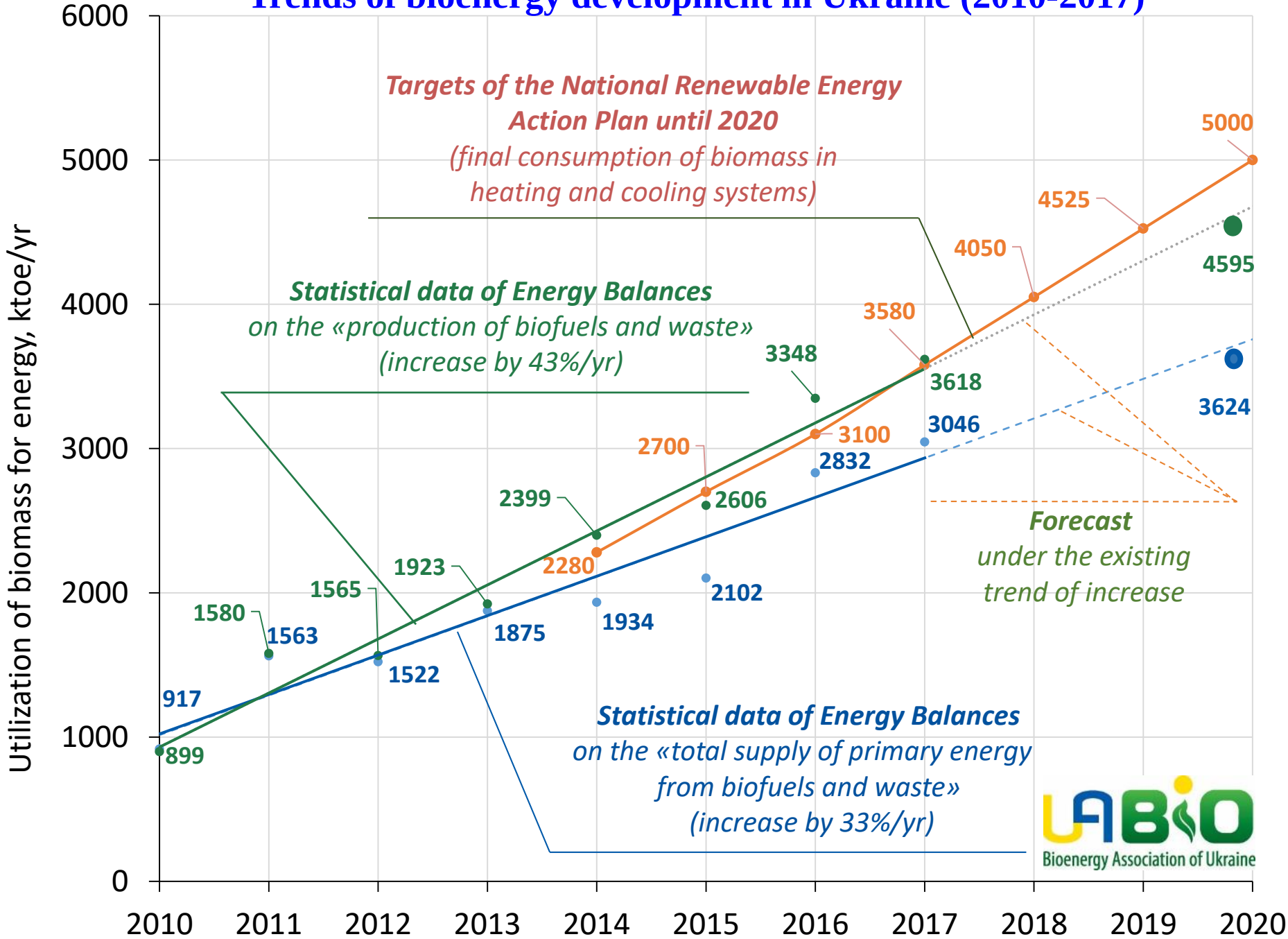
Trends of bioenergy development in Ukraine (2010-2017)



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
Biomass, Biofuels and Wastes	**2,1**	**4**	**6**	**8**	**11**
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
TOTAL, Mtoe	**90,1**	**82,3**	**87**	**91**	**96**

http://mpe.kmu.gov.ua/minugol/control/uk/publish/article?art_id=245234085&cat_id=35109

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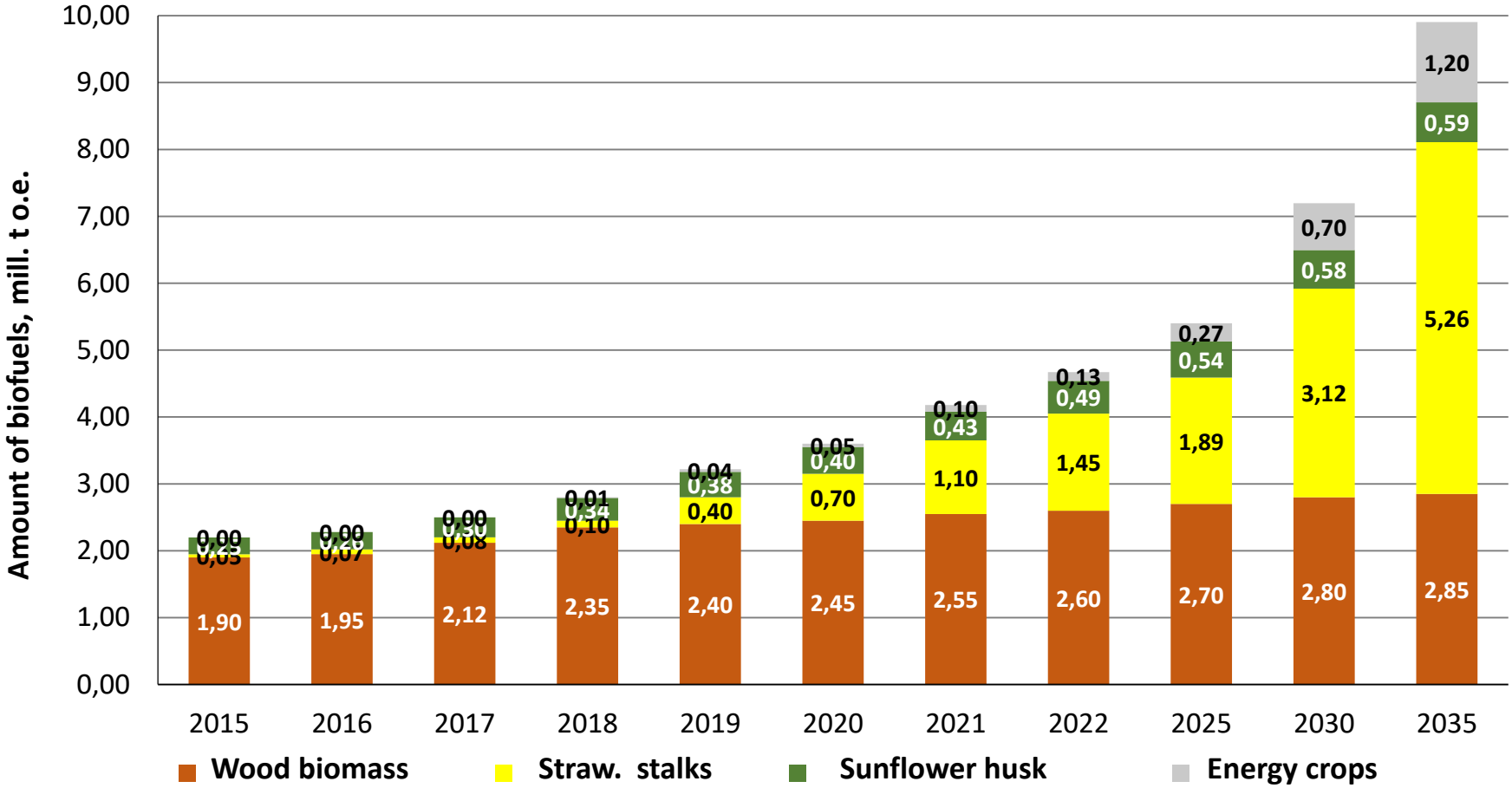
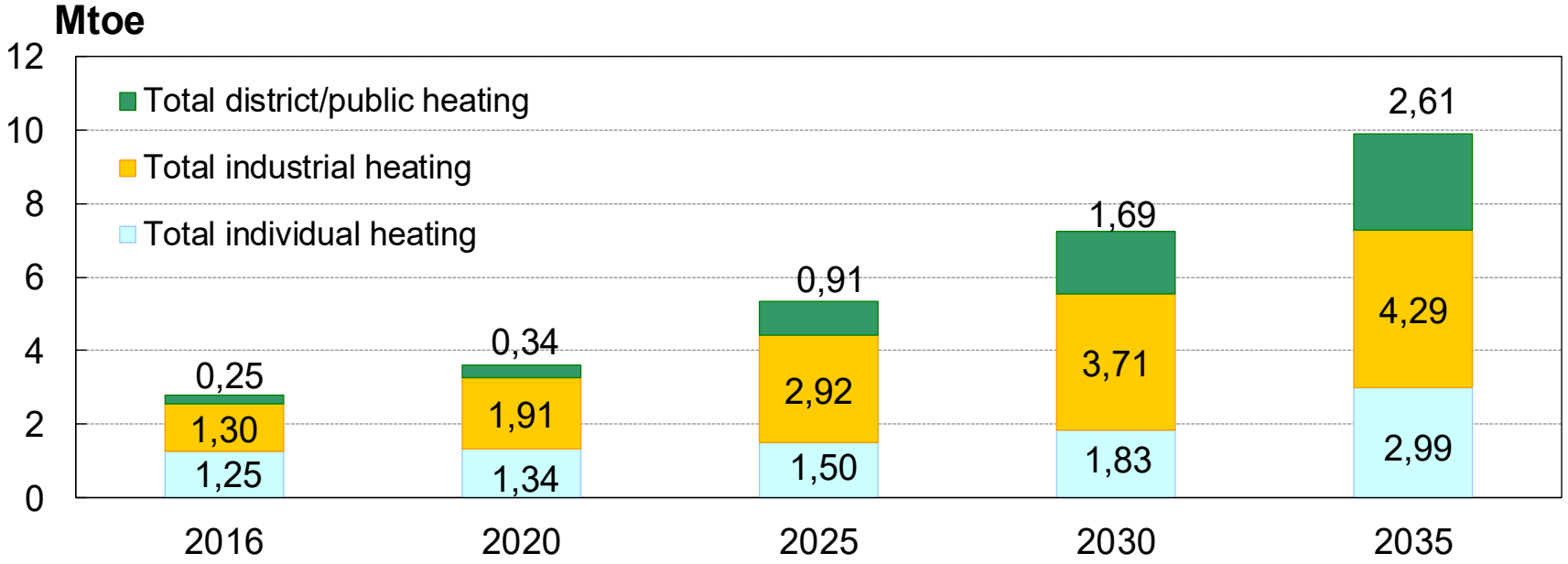
Forecast of total amount of consumption and structure of solid biofuels in Ukraine (2015 – 2035)

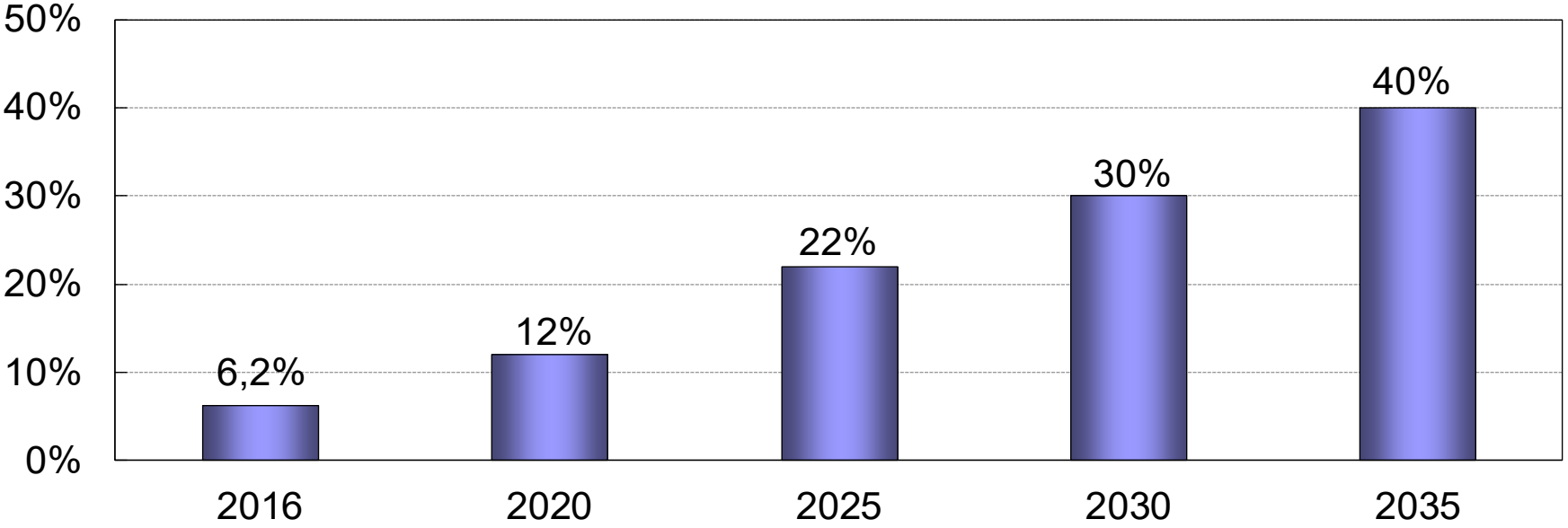


Type of biomass	2015	2016	2017	2018	2019	2020	2021	2022	2025	2030	2035
Wood fuels	1,90	1,95	2,12	2,35	2,40	2,45	2,55	2,60	2,70	2,80	2,85
Straw, stalks	0,05	0,07	0,08	0,10	0,40	0,70	1,10	1,45	1,89	3,12	5,26
Sunflower husk	0,25	0,26	0,30	0,34	0,38	0,40	0,43	0,49	0,54	0,58	0,59
Energy crops	0,00	0,00	0,00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

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_e	Mtoe	NG replacement, billion m^3	Share of RES	CO_2 reduction, $MtCO_2$/yr	Total investments, million Euro	Total new jobs
2016	5000	45	2,8	3,5	6,2%	6,2	1 000	13 000
2020*	7 000	250	3,6	4,4	12%	8,6	1 800	22 000
2025	11 250	800	5,3	6,6	22%	12,9	3 800	42 000
2030	16 200	1260	7,2	8,9	30%	17,5	5 700	64 000
2035**	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.

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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 subsides 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).

The price has been increased on 23.5% from 1 November 2018 (under IMF's request to Ukraine for next credit). 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 – needed 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. These sectors fall behind the electricity production from the sun and wind and trends of their development do not match the similar trends in EU countries.

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.* The competition introduction in the DH systems is scheduled for 2020.

Existing biomass TPPs/ CHPs in Ukraine

№	Company	Place	Fuel	Capacity, MW	Feed-in-tariff	Production in 2018, mil. kW*h	Load factor
1	PJSC "Kirovogradolia", CHP	Kropivnitsky	Sunflower husk	1,7	01.01.2010	7,46	0,50
2	"Smelyaenergopromtrans", CHPP	Smila	Wood chips	8,5	01.07.2010	25,07	0,34
3	"Combine Cargill", CHPP	Donetsk	Sunflower husk	2,0	27.12.2012	-	-
4	Biogasenergo, TPP	Ivankiv	Wood chips	18,0	28.11.2013	21,14	0,13
5	"Agroindustrial complex" Yevgroyl ", CHPP	Mykolayiv	Sunflower husk	5,0	19.12.2013	11,29	0,26
6	LLC "Claire Energy", Koryukivskaya TPP	Koryukivka	Wood chips	3,5	07.01.2016	21,23	0,69
7	Singa Energis Ltd.	Berezanka	Wood chips	5,1	30.01.2018	4,01	0,10
8	FOP Peresadko RV	Korolivka	Wood chips	0,1	09.10.2018	-	-
9	YPGG "Yugenergopromtrans", TPP	P-Khmelnytskiy	Wood chips	5,0	30.11.2018	0,92	0,25
10	LLC "Furniture-service", CHP	Polove	Wood chips	2,4	30.11.2018	-	-
11	"Bio-TPP"	Rakhiv	Wood chips	6,0	-	-	
12	"K-Podilskaya CHPP"	K-Podilskiy	Wood chips	1,8	-	-	
				59,1			

51,3 MW

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Potential biomass TPPs/ CHPs in Ukraine

№	Company/ city	Fuel	Capacity, MW
1	«Kernel»	Sunflower husk	5x10
2	Tokmak	Sunflower husk	8,6
3	Khmelnytskiy TPP	Straw	44
4	Zhitomyr	Wood chips	2,5+3,2+1,2
5	Korosten	Wood chips	3
6	Mykolayiv, “Orexim”	Sunflower husk	3
7	“Gradoliya”	Sunflower husk	3
8	Illichivsk	Sunflower husk	3
	TOTAL		**121,5**

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Biogas plants active in agriculture of Ukraine

#	Company	Location	Capacity, MW	Start of of Green Tariff	Power production in 2018 (I-XI), GWh
1	Oril-Lider (chicken farm), MKhP	Elizavetivka, Dnepropetrovsk region	5,692	21/11/13	39,1
2	Goodvalley (Danosha), pig farm	Kalush, I-Frankivsk region	1,166	07/08/14	6,0
3	Rokitne sugar factory	Rokitne, Kiev region	2,382	28/5/15	10,7
4	Komerzbudplast, egg farm	Beloozersk rayon, Kherson region	3,120	07/11/16	10,1
5	Teofipol energy company, sugar factory	Teofipol, Khmelnitskiy region	5,109	02/10/17	28,4
6	Ecoprod agrarian company	Volnovakha, Donetsk region	1,487	11/01/18	6,0
7	Gorodishe-Pustovarivska agrarian company (sugar)	Prilutskiy rayon, Khernihiv region	2,406	31/07/18	1,8
8	Trade house Vipexim	Okny, Odessa region	1,203	28/09/18	1,1
	TOTAL		**22,6**	**2013-2018**	**103,2**

Plans: MKhP- 20 MW (Vinnitsa region), Goodvalley – 1 MW (I-Frankivsk reg). Gals Agro – 4 MW (2 biogas plants – Kiev and Chernihiv regions)

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Landfill gas projects active in Ukraine

#	Company	Location	Capacity, MW	Start of of Green Tariff	Power production, GWh 2018 (I-XI)
1	LNK	Borispol	1,063	25/04/13	22,5
2		Kyiv (polygon#5)	2,126	17/10/13	
3		Brovary	0,885	17/04/14	
4		Zhitomir	1,063	09/12/14	
5		Mykolaiv	1,063	09/12/14	
6		Cherkassy	0,600	25/04/17	
7	Tis Eco	Mariupol	0,200	22/08/13	0,2
8	AUE Energo	Vinnitsa	0,999	26/11/15	5,4
9	Clear Energy	Ivano-Frankivsk	0,660	28/04/17	18,6
10		Kharkiv (I+II)	1,063+ 0,845	06/07/17/ - 12/10/17	
11		Kriviy Rig (I+II)	1,063+ 1,318	25/07/17 - 23/03/18	
12		Lutsk		11/01/18	
13	Clear Energy-Khremenchuk	Khremenchuk	0,845	11/01/18	3,3
14	Biogas Energy	Khmelnitskiy	0,659	11/01/18	2,4
15	Clear-Energy-Chernigiv	Chernigiv	1,131	11/01/18	4,1
16	Masterenergo Invest	Rivne	0,500	12/10/17	0,3
17	Intern/ center of gas technology	Kamenets-Podilskiy	0,630	09/10/18	0,1
	TOTAL		**16,7**	**2013-2018**	**56,9**
Plans: Kharkiv (Dergachi), Poltava, Lviv, Kropivnitskiy					

Options for business

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

- Boiler plant: 10 MW, CHP plant: 6 MW_e+18 MW_{th}, TPP: 6 MW_e, biogas plant: 3 MW_e (pulp), 10 MW_e (silage + manure), bioethanol production: 55 kt/yr

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Project «Promoting the penetration of agribiomass 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 agrobiomass**, empower local stakeholders to unblock the market and influence the development of the European and national framework in a way that is favourable to **agrobiomass heating solutions** market uptake. Actions will be mainly located in **6 European countries**: Greece, Spain, France, Romania, Croatia and **Ukraine.**

Contact person in Ukraine : Tetiana Zheliezna (UABio). T.: +30 44 453-28-56, zhelyezna@uabio.org

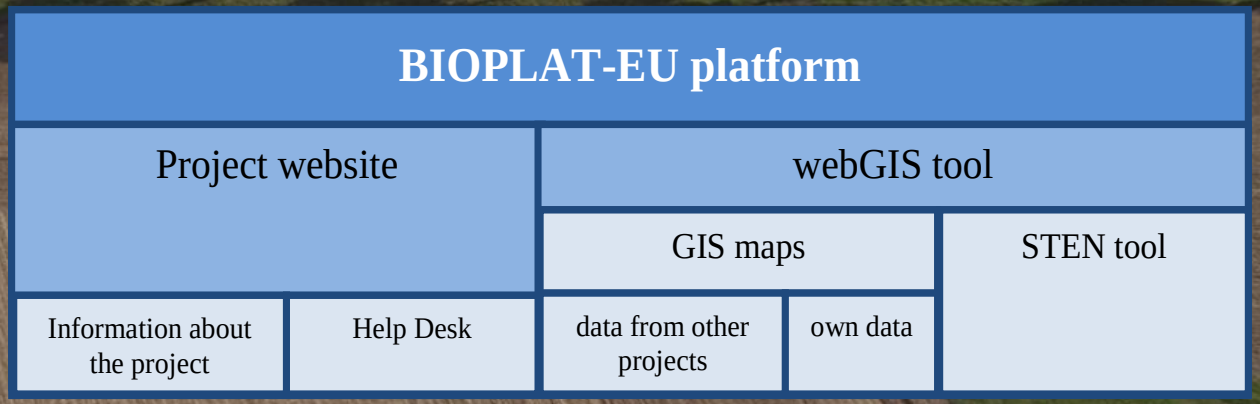
Horizon 2020 Project "Promoting Sustainable Use of Underutilised Lands for Bioenergy Production through a Web-Based Platform for Europe"

Duration: *1 Nov 2018 – 31 Oct 2021*

Consortium: 12 partners from 10 European countries (Germany, Italy, Hungary, Austria, **Ukraine**, Spain, Romania, Belgium, Netherlands, Finland).

Coordinator: WIP-Renewable Energies (WIP) Wirtschaft & Infrastruktur GmbH & Co Planungs KG

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 Ukraine.



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Thank you for attention!

Welcome to Ukraine and to UABio!

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We are greening the energy!

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