

GUIDELINES for a potential briquette producer

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This paper can be used as didactical material in schools and universities to study relevant technical disciplines.

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1. Introduction

This paper was developed by IDIS „Viitorul” under the „Energy and Biomass in Moldova” project funded by the European Union, co-funded and implemented by UNDP Moldova. This paper provides some information and data about briquette and pellet equipment producers and current biomass briquette producers. It also highlights the potential briquette producers (identified in the survey), list of household preferences regarding the briquettes as fuel, household expectations regarding briquette prices, ranking of rayons by level of acceptance of briquettes by household users, etc. It also provides the reader with the ranking of rayons by biomass potential, willingness and readiness of households to purchase briquettes, initiatives of building public-private partnerships and offers a detailed description of stages of creation of a biomass production business. The results are based on the survey conducted at national level by IDIS„Viitorul”, in cooperation with “CIVIS”, from March to April 2012, on the study „Estimating the energy potential of biomass derived from agricultural crops, by region and rayon, for 2009-2010” carried out by IDIS„Viitorul” under the same project and on in-depth interviews with renowned briquette producers from the Republic of Moldova.

We hope that this paper will be useful and appreciated by potential briquette producers, local authorities interested in obtaining energy from biomass from local resources and by all those interested in renewable energy in our country.

2. Register of worldwide briquetting equipment producers

No.	Producer	Country of origin, contacts	Type briquetting technology	Type of input material	Productivity, kg/hour	Energy consumption, kWh	Details about the final product
1	Ekobrik	<u>Belarus</u> 220012 Minsk, Surganova str., 20 -1. Tel: (37529) 651-03-73 Fax: (37517) 227-53-48 E-mail: brikk@yandex.ru	Mechanical screw press	Soft or hard wood	150-800		Octagonal cylinder with holes, diameter = 70 mm
2	DIPIU	<u>Italy</u> Via dell'Innovazione, 11 - 36042 Breganze (VI) Tel +39 0445 300709 Fax +39 0445 307567 E-mail: info@di-piu.com Web: http://www.di-piu.com	Mechanical piston press	Wood waste, straw	700-1300	45/55	Cylinder, diameter = 70 mm or parallelepiped 70x70 mm Variable length Packed in bundles or bags.
3	COMERC	<u>Poland</u> UL. GDYŃSKA 31/33, 61-016 POZNAŃ, POLSKA TEL. +48 61 878 65 61 FAX +48 61 878 65 62 office@comerc.pl slawek@comerc.pl www.comerc.pl	Hydraulic press	Wood waste, straw	300-700		Cylinder, variable size
4	SCROFELIX UNIVERS SRL	<u>Romania</u> Str. Bobalnei Nr. 18, Cluj-Napoca Tel: +40 264 434172 Fax: +40 264 415263 e-mail: office@rofelix.ro Web: http://www.rofelix.ro	Hydraulic press	Sawdust	500-700	15	Cylinder, diameter = 60 mm and length = 25-200 mm

No.	Producer	Country of origin, contacts	Type briquetting technology	Type of input material	Productivity, kg/hour	Energy consumption, kWh	Details about the final product
5	SC KENOBI SRL	<u>Romania</u> Str. Aurel Vlaicu 74, RO-440122 Satul Mare; Tel/Fax:0261714820 E-mail: marketing@kenobi.ro Web: http://www.kenobi.ro	Hydraulic press	Sawdust	120-160	7.5/11	Cylinder, diameter = 70 mm
6	C. F. Nielsen A/S	<u>Denmark</u> Solbjergvej 19 DK-9574 Baelum Tel: +45 98 33 74 00 Fax: +45 98 33 72 26 http://www.cfnilsen.com	Hydraulic press and mechanical piston press	Wood waste, straw	80-1800		Cylinder, diameter = from 60-75 mm
7	GEM-EKO	<u>Poland</u> Białachówko 2A 83-210 Zblewo Tel: (+48) 507 015 014 Tel: (+48) 511 769 550 E-mail: biuro@gem-eko.pl http://www.gem-eko.pl	Hydraulic press	Wood waste, straw	300-500	2x22	Various shapes and sizes
8	RUF-Brikett	<u>Germany,</u> Branch office in Romania Global Consulting & Trading S.R.L. Str. W.A.Mozart Nr. 5, sector 2 714581 Bucuresti Tel: 0040-1-2319270 Fax: 0040-1-2319031 Mobile: 0040-745407425 gct@upcmail.ro roinfo@gct@upcmail.ro http://www.brikettieren.de	Hydraulic press	Wood waste, straw	100-1500		Shape: Parallelepiped, width and length may vary from 60 to 150 mm, height varies from 40 to 100 mm.

No.	Producer	Country of origin, contacts	Type briquetting technology	Type of input material	Productivity, kg/hour	Energy consumption, kWh	Details about the final product
9	Briklis	<u>Czech Republic</u> Briklis, spol. s r.o. Malsice 335 391 75 Phone : +420 381 278 050 +420 381 278 731 Fax: +420 381 278 325 e-mail: info@briklis.cz Web: www.briklis.cz	Hydraulic press and mechanical piston press	Wood waste, straw	200 -800		Shape: Cylinder and parallelepiped
10	Warfama SA	<u>Poland</u> ul. Fabryczna 21, 11-040 Dobre Miasto Tel. +48 089 615 34 00 Tel. +48 089 615 36 00 Fax +48 089 615 34 26 e-mail: warfama@warfama.pl http://warfama.pl	Mechanical piston press	Straw	1200-1600	175-250 (company total)	Various shapes and sizes
11	ASKET	<u>Poland</u> , Distributor of equipment in Moldova: Agreterra- LuxSRL tel. +373 69 776803 e-mail: radumae@yahoo.com http://www.asket.pl	Mechanical screw press	Straw	300-500-1000		Cylinder with holes, diameter = 70 mm
12	000 "ПК"ТрансТрейд Україна"	<u>Ukraine</u> Tel /fax: +38044-220-14-78 E-mail: office@transtrade.com.ua http://briket.net.ua	Mechanical screw press	Wood waste	350-800	40	Octagonal cylinder with holes, length = 100-300 mm, diameter = 60 mm
13	Filberis SRL	<u>Moldova</u> Tel/Fax: 023134069 M. 079922920 M. 069107575 E-mail: sainenco@mail.ru http://briket.ucoz.org	Mechanical piston press	Wood waste and straw	160-220		Cylinder, diameter = 41-43 mm, length = 100-300 mm

No.	Producer	Country of origin, contacts	Type briquetting technology	Type of input material	Productivity, kg/hour	Energy consumption, kWh	Details about the final product
14	Votecs	<p><u>Germany</u> Robert-Mayer-Strasse 5, 74360 Illsfeld. Tel: +49 (0) 7191 36 98 996 / +49 (0) 7191 36 98 997 · Fax: +49 (0) 7191 36 98 998 E-mail: info@votecs.de Web: www.votecs.de</p>	Hydraulic piston press	Wood chips and sawdust	40-200	4-11	Cylinder, diameter = 40-80 mm
15	Grupo Boieru	<p><u>Moldova</u> Burlaceni, Cahul, Tel: 29354363</p>	Mechanical screw press	Wood waste and straw	Up to 2000		Shape: hexagon with holes, diameter = 40-90 mm.
16	WEIMA Poland	<p><u>Poland</u> Legacz 1 05-304 Stanisławów Telefon: +48 (0)25 7525252 Telefax: +48 (0)25 7515125 E-mail: weima@weima. pl http://www.weima.com</p>	Hydraulic piston press	Wood waste and straw	70-400	4-30	Parallelepiped
17	CO.MA.FER. MACCHINE S.p.a	<p><u>Italy</u> Via de Gasperi Angolo Via Roma 25060 Collebeato- Brescia Italy Tel.: (0039) 030-2510405 Fax: (0039) 030-2511703 P.IVA 02776190981 E-mail: infomac@ comafer.it Web: http://www.comafermacchine.it</p>	Hydraulic piston press	Sawdust	70-350	7-20	Cylinder, 90-120 mm, variable length

No.	Producer	Country of origin, contacts	Type briquetting technology	Type of input material	Productivity, kg/hour	Energy consumption, kWh	Details about the final product
18	000 Черкаскы Елеватор Маш	<u>Ukraine</u> 7a Khimikov avenue, Cherkassy, Ukraine Tel.: +38 0472 642052, 642418, 642288, 326337 E-mail: bronto@bronto.ua Web: http://www.bronto.ua	Mechanical screw press and hydraulic piston press	Wood waste, reed and straw	350-500	30-40	Cylinder with/without holes, 60-120 mm, variable length.
19	000 «СПИКО»	<u>Russia</u> 180680, Pskov, Industrialnaya str. 9/1. tel/fax : +7 8112 52 07 07 E-mail: zavod@sp-co.ru http://www.sp-co.ru/	Mechanical screw press	Wood waste and straw	500-1500	100-260 (company total)	Cylinder with/without holes, variable size
20	ADM Agrotehnologii Service	<u>Moldovan Branch Office of ADM Russia</u> Tel: + 373 696-49-599; 0691-25-194 +373 69125918 E-mail: cubasov@gmail.com Web: http://www.adm-demetra.ru	Combined briquetting and pelletizing technology (available for sale from summer, 2012)	Straw	150-600		

3. List of household preferences regarding the briquettes as fuel (shape, dimensions, package)

1. Shape of briquettes

Based on the results of the survey, consumers prefer cylinder-shaped briquettes of 70-100 mm.

2. Dimensions of briquettes

Briquettes with a length of 300 mm and diameter of 70-100 mm are most popular due to their convenience.

3. Package

Polypropylene bags weighing 20-25 kg.

4. Trends and preferences

Under the project „RFP for the provision of market research on opportunities of biomass briquetting in Moldova and consumer acceptance as alternative fuel”, IDIS „Viitorul” distributed about 10 tons of briquettes to 100 households in 10 rayons. Following the evaluation of questionnaires filled in by household consumers completed by households, the following consumers’ conclusions can be highlighted:

- 4.1. Briquettes produced from straw and sunflower stalks were rated as high quality by about 24% of consumers, 62% say that they are of good quality and 13% – of average quality. Only one percent rated them as not too good. As shown, roughly about 86% gave a positive appreciation of the quality of briquettes.
- 4.2. About 76% of consumers think that briquettes could replace other means of heating, 8% think that this cannot happen, while 16% say they are not sure.
- 4.3. About 32% of consumers think that production of briquettes is very necessary in our country, 63% say it is necessary and only 4% think

that it is not really necessary. Thus, about 95% of consumers are for large-scale production of briquettes.

4.4. One of the most important conclusions is that about 77% of consumers are willing to buy briquettes and use them in the future. Only 8% of consumers would not like to do so, and 15% are not yet sure.

Key conclusion. After testing briquettes, more than 77% of household consumers are willing to buy them.

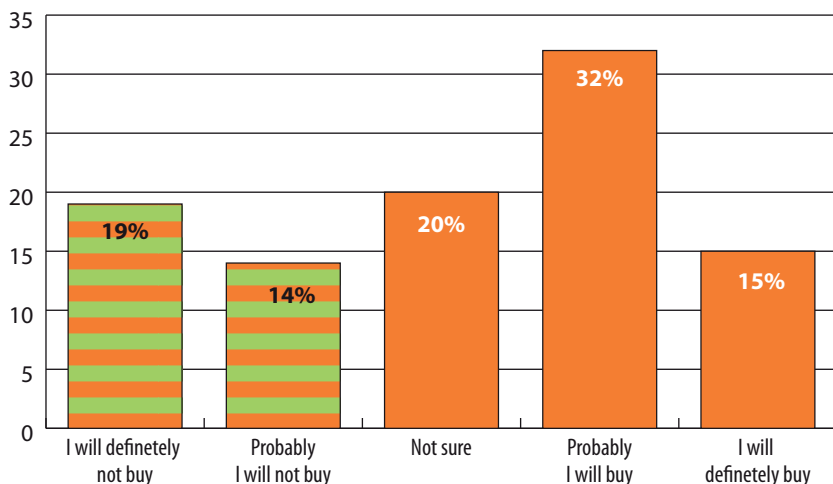
Comments

Consumer preferences are being developed, because this product is new on Moldovan market. According to the survey, some consumers reported that a large amount of wood is required in order to heat a household in winter. In addition, additional work is required to split the wood, while the burning time is much shorter than that of briquettes. The advantage of briquettes, in their opinion, as compared to firewood is obvious, since briquettes do not require a large room to store them and the volume of briquettes is several times smaller than that of wood.

4. Ranking of rayons by level of acceptance of biomass briquettes as alternative fuel. Household expectations regarding briquette prices.

These data were obtained as a result of the national survey among 882 households, except Ocnita, Glodeni and Sangerei rayons, with an error margin of $\pm 3.4\%$.

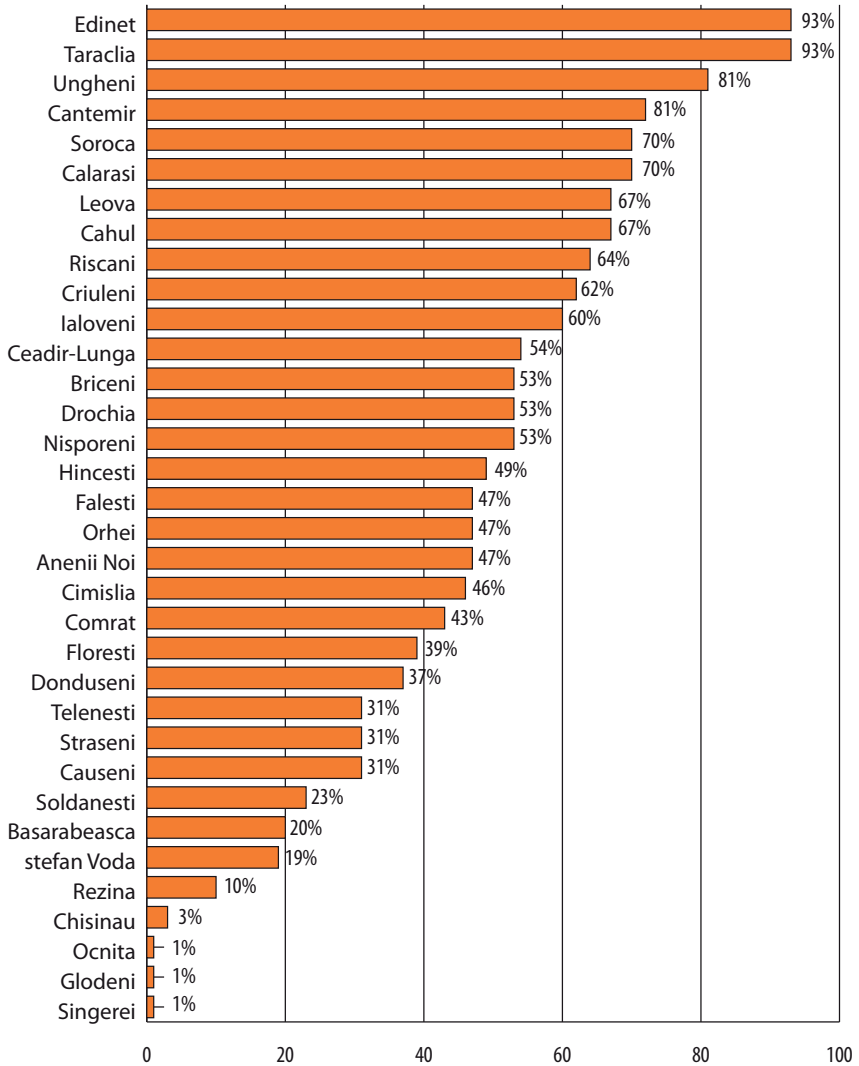
Figure 1. **Intention to buy briquettes**



Income per member	Low	18%	14%	18%	35%	15%
	Average	18%	14%	24%	30%	14%
	High	19%	13%	18%	32%	18%
Region	North	27%	13%	17%	19%	24%
	Centre	14%	12%	26%	38%	10%
	South	15%	20%	13%	41%	11%

Base: 882 households not using briquettes at present

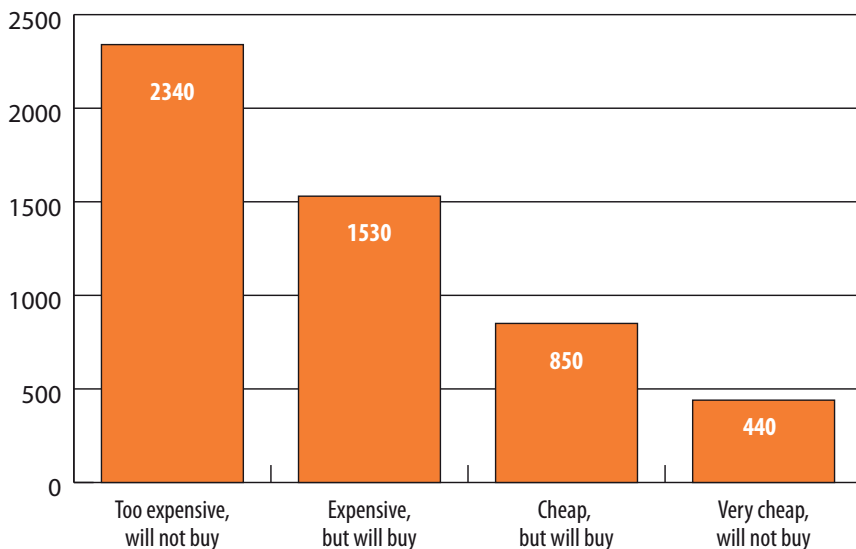
Figure 2. Rating of rayons by interest to buy briquettes (values “probably would buy/ definitely would buy”)



Base: 882 households not using briquettes at present

Note. It should be noted further that Ocnita, Glodeni and Sangerei rayons were not included in the nationwide survey. This had no effect on error margin of +/-3,4%.

Figure 3. **Sensitivity of briquette prices (average values)**



Base: 592 households that expressed their intention to buy briquettes (average values are shown)		What is the price for this product that makes you think it is too expensive, but you would still buy it?	What is the price for this product that makes you think it is so expensive that you would not buy it?	What is the price for this product that makes you think it is so cheap that you would not buy it because you doubt its quality?	What is the price for this product that makes you think it is too cheap, but you would still buy it?
Total		1530 MDL	2340 MDL	440 MDL	850 MDL
Income per member	Low	1457	2284	460	835
	Average	1587	2375	427	848
	High	1656	2480	458	930
Region	North	1329	2202	292	668
	Centre	1665	2450	493	925
	South	1507	2305	519	937

Base: 592 households that expressed their intention to buy briquettes

Conclusion. According to the above data, the price of 1530 MDL (average value) is rated as high, but would still motivate household consumers to buy briquettes. It should be noted that during the winter 2011-2012, the market price for briquettes ranged between 1600 and 2000 MDL.

5. Final ranking of „best in class” rayons, at regional level, that meet all applied criteria (availability of suitable biomass for briquetting, public private partnership initiatives, preparedness and willingness of households to use briquettes).

Note: This ranking was made according to the following three criteria:

1. availability of suitable biomass for briquetting at rayon level (based on results of the survey conducted by IDIS „Viitorul”, expressed in TJ);
2. preparedness and willingness of households to use briquettes (based on nationwide survey results, expressed as a percentage);
3. public private partnership initiatives
 - a. availability of suitable biomass for briquetting at rayon level (based on results of the survey conducted by IDIS „Viitorul”, expressed in TJ);
 - b. Note 1. Maximum score (0.7) was set for 1420.63 TJ (the maximum availability of biomass recorded in Drochia rayon).
 - c. willingness and preparedness of households to purchase briquettes (based on nationwide survey results, expressed as a percentage);
 - d. Note 2. Maximum score (0.2) was set for 93%, according to the survey (the maximum willingness of households to buy briquettes, recorded in Edinet rayon).
 - e. public private partnership initiatives (based on nationwide survey results and letters of intent from the rayon councils).

Note 3. Maximum score (0.1) was set for:

- a. availability of letter of intent from the rayon council to establish a public private partnership and

- b. willingness of the rayon council to launch a PPP based on nationwide survey results.

If one item ((a) or (b)) is missing, only 0.05 points shall be awarded.

After summarizing the above mentioned results, the following table was compiled

Table 1. **Criteria and their share**

No.	Criterion	Reference	Share						
1	Availability of biomass, TJ	1420.63	0.7						
2	Willingness and preparedness of households, %	93	0.2						
3	PPP initiatives reflected in letters of intent: 2-confirming availability of the letter, 1- not known.	2	0.1						
Total			1						
Table 2. Final ranking									
	Rayon	Criterion 1		Criterion 2		Criterion 3		Total	Rank
		TJ	Score	%	Score	1 or 2	Score		
NORTH	Drochia	1420,63	0,70	53	0,11	2	0,1	0,91	1
	Riscani	1331,34	0,66	64	0,14	2	0,1	0,89	2
	Edinet	1083,46	0,53	93	0,20	2	0,1	0,83	3
	Soroca	1022,03	0,50	70	0,15	2	0,1	0,75	4
	Floresti	1077,95	0,53	39	0,08	2	0,1	0,72	
	Falesti	792,01	0,39	47	0,10	1	0,05	0,54	
	Glodeni	949,39	0,47	1	0,00	1	0,05	0,52	
	Briceni	711,57	0,35	53	0,11	1	0,05	0,51	
	Donduseni	753,06	0,37	37	0,08	1	0,05	0,50	
	Ocnita	750,70	0,37	1	0,00	1	0,05	0,42	
	Singerei	725,68	0,36	1	0,00	1	0,05	0,41	
Balti **	29,78	0,01	0	0,00	1	0,05	0,06		

No.	Criterion				Reference	Share			
1	Availability of biomass, TJ				1420.63	0.7			
2	Willingness and preparedness of households, %				93	0.2			
3	PPP initiatives reflected in letters of intent: 2-confirming availability of the letter, 1- not known.				2	0.1			
CENTRE	Ungheni	538,42	0,27	81	0,17	2	0,1	0,54	1
	Orhei	438,61	0,22	47	0,10	2	0,1	0,42	2
	Hincesti	426,71	0,21	49	0,11	2	0,1	0,42	3
	Criuleni	364,03	0,18	62	0,13	1	0,05	0,36	4
	Soldanesti	405,65	0,20	23	0,05	2	0,1	0,35	
	Anenii Noi	331,71	0,16	47	0,10	1	0,05	0,31	
	Telenesti	338,55	0,17	31	0,07	1	0,05	0,28	
	Rezina	382,69	0,19	10	0,02	1	0,05	0,26	
	Ialoveni	130,58	0,06	60	0,13	1	0,05	0,24	
	Calarasi	66,51	0,03	70	0,15	1	0,05	0,23	
	Nisporeni	25,37	0,01	53	0,11	1	0,05	0,18	
	Straseni	89,62	0,04	31	0,07	1	0,05	0,16	
	Dubasari**	213,90	0,11	0	0,00	1	0,05	0,16	
CHISINAU*	112,07	0,06	3	0,01	1	0,05	0,11		
SOUTH	Cahul	880,87	0,43	67	0,14	2	0,1	0,68	1
	Stefan Voda	1056,30	0,52	19	0,04	2	0,1	0,66	2
	Taraclia	665,74	0,33	93	0,20	2	0,1	0,63	3
	Cantemir	649,11	0,32	72	0,15	2	0,1	0,57	4
	Causeni	679,99	0,34	31	0,07	2	0,1	0,50	
	Leova	485,19	0,24	67	0,14	1	0,05	0,43	
	Cimislia	482,37	0,24	46	0,10	1	0,05	0,39	
	Basarabeasca	134,46	0,07	20	0,04	1	0,05	0,16	
GAGAUZIA ATU ***	1503,20	0,74	48	0,10	1	0,05	0,89		
*	Data for Chisinau reflect the situation in the suburbs								
**	No data available as per criterion 2								
***	Was calculated based on data for Ceadir-Lunga and Comrat rayons								

Table 3. **Final ranking of all rayons, by 3 criteria, at national level.**

Rayon	Criterion 1		Criterion 2		Criterion 3		Total	Rank
	TJ	Score	%	Score	1 or 2	Score		
Drochia	1420,63	0,70	53	0,11	2	0,1	0,91	1
Riscani	1331,34	0,66	64	0,14	2	0,1	0,89	2
Edinet	1083,46	0,53	93	0,20	2	0,1	0,83	3
Soroca	1022,03	0,50	70	0,15	2	0,1	0,75	4
Floresti	1077,95	0,53	39	0,08	2	0,1	0,72	5
Cahul	880,87	0,43	67	0,14	2	0,1	0,68	6
Stefan Voda	1056,30	0,52	19	0,04	2	0,1	0,66	7
Taracia	665,74	0,33	93	0,20	2	0,1	0,63	8
Cantemir	649,11	0,32	72	0,15	2	0,1	0,57	9
Falesti	792,01	0,39	47	0,10	1	0,05	0,54	10
Ungheni	538,42	0,27	81	0,17	2	0,1	0,54	11
Glodeni	949,39	0,47	1	0,00	1	0,05	0,52	12
Briceni	711,57	0,35	53	0,11	1	0,05	0,51	13
Causeni	679,99	0,34	31	0,07	2	0,1	0,50	14
Donduseni	753,06	0,37	37	0,08	1	0,05	0,50	15
Leova	485,19	0,24	67	0,14	1	0,05	0,43	16
Ocnita	750,70	0,37	1	0,00	1	0,05	0,42	17
Orhei	438,61	0,22	47	0,10	2	0,1	0,42	18
Hincesti	426,71	0,21	49	0,11	2	0,1	0,42	19
Singerei	725,68	0,36	1	0,00	1	0,05	0,41	20
Cimisia	482,37	0,24	46	0,10	1	0,05	0,39	21
Criuleni	364,03	0,18	62	0,13	1	0,05	0,36	22
Soldanesti	405,65	0,20	23	0,05	2	0,1	0,35	23
Anenii Noi	331,71	0,16	47	0,10	1	0,05	0,31	24
Telenesti	338,55	0,17	31	0,07	1	0,05	0,28	25
Rezina	382,69	0,19	10	0,02	1	0,05	0,26	26
Ialoveni	130,58	0,06	60	0,13	1	0,05	0,24	27
Calarasi	66,51	0,03	70	0,15	1	0,05	0,23	28
Nisporeni	25,37	0,01	53	0,11	1	0,05	0,18	29
Straseni	89,62	0,04	31	0,07	1	0,05	0,16	30

Rayon	Criterion 1		Criterion 2		Criterion 3		Total	Rank
	TJ	Score	%	Score	1 or 2	Score		
Basarabeasca	134,46	0,07	20	0,04	1	0,05	0,16	31
Dubasari**	213,90	0,11	0	0,00	1	0,05	0,16	32
CHISINAU*	112,07	0,06	3	0,01	1	0,05	0,11	33
Balti **	29,78	0,01	0	0,00	1	0,05	0,06	34
GAGAUZIA ATU***	1503,20	0,74	48	0,10	1	0,05	0,89	
Data for Chisinau reflect only the situation in the suburbs								
No data available as per criterion 2								
Was calculated based on data for Ceadar-Lunga and Comrat rayons								

6. Final „best in class” ranking . Final report recommending, based on the gathered information, the rayons where deployment of a briquetting plant will become a sustainable business

Based on the study on estimating the biomass potential and the nationwide survey, the following criteria were defined to prepare the „best in class” ranking: availability of suitable biomass, willingness of households to use briquettes, public private partnership initiatives at rayon level. Thus the following ranking of rayons was developed:

Table 1. Final „best in class” ranking

	Rayon	Criterion 1		Criterion 2		Criterion 3		Total	Rank
		TJ	Score	%	Score	1 or 2	Score		
NORTH	Drochia	1420,63	0,70	53	0,11	2	0,1	0,91	1
	Riscani	1331,34	0,66	64	0,14	2	0,1	0,89	2
	Edinet	1083,46	0,53	93	0,20	2	0,1	0,83	3
	Soroca	1022,03	0,50	70	0,15	2	0,1	0,75	4
	Floresti	1077,95	0,53	39	0,08	2	0,1	0,72	
	Falesti	792,01	0,39	47	0,10	1	0,05	0,54	
	Glodeni	949,39	0,47	1	0,00	1	0,05	0,52	
	Briceni	711,57	0,35	53	0,11	1	0,05	0,51	
	Donduseni	753,06	0,37	37	0,08	1	0,05	0,50	
	Ocnita	750,70	0,37	1	0,00	1	0,05	0,42	
	Singerei	725,68	0,36	1	0,00	1	0,05	0,41	
Balti **	29,78	0,01	0	0,00	1	0,05	0,06		

	Rayon	Criterion 1		Criterion 2		Criterion 3		Total	Rank
		TJ	Score	%	Score	1 or 2	Score		
CENTRE	Ungheni	538,42	0,27	81	0,17	2	0,1	0,54	1
	Orhei	438,61	0,22	47	0,10	2	0,1	0,42	2
	Hincesti	426,71	0,21	49	0,11	2	0,1	0,42	3
	Criuleni	364,03	0,18	62	0,13	1	0,05	0,36	4
	Soldanesti	405,65	0,20	23	0,05	2	0,1	0,35	
	Anenii Noi	331,71	0,16	47	0,10	1	0,05	0,31	
	Telenesti	338,55	0,17	31	0,07	1	0,05	0,28	
	Rezina	382,69	0,19	10	0,02	1	0,05	0,26	
	Ialoveni	130,58	0,06	60	0,13	1	0,05	0,24	
	Calarasi	66,51	0,03	70	0,15	1	0,05	0,23	
	Nisporeni	25,37	0,01	53	0,11	1	0,05	0,18	
	Straseni	89,62	0,04	31	0,07	1	0,05	0,16	
	Dubasari**	213,90	0,11	0	0,00	1	0,05	0,16	
CHISINAU*	112,07	0,06	3	0,01	1	0,05	0,11		
SOUTH	Cahul	880,87	0,43	67	0,14	2	0,1	0,68	1
	Stefan Voda	1056,30	0,52	19	0,04	2	0,1	0,66	2
	Taraclia	665,74	0,33	93	0,20	2	0,1	0,63	3
	Cantemir	649,11	0,32	72	0,15	2	0,1	0,57	4
	Causeni	679,99	0,34	31	0,07	2	0,1	0,50	
	Leova	485,19	0,24	67	0,14	1	0,05	0,43	
	Cimislia	482,37	0,24	46	0,10	1	0,05	0,39	
	Basarabasca	134,46	0,07	20	0,04	1	0,05	0,16	
GAGAUZIA ATU***	1503,20	0,74	48	0,10	1	0,05	0,89		
*	Data for Chisinau reflect the situation in the suburbs								
**	No data available as per criterion 2								
***	Was calculated based on data for Ceadir-Lunga and Comrat rayons								

Based on information in Table 1, the ranking of the first four rayons from each region that meet the above criteria can be developed.

Table 2. **The first four rayons from each region included in the “best in class” ranking, meeting the above mentioned criteria to start a business for the production of biomass briquettes**

"Best in class" rank	Total biomass energy potential, TJ					
	North		Centre		South	
1	Drochia	1420,63	Ungheni	538,42	Cahul	880,87
2	Riscani	1331,34	Orhei	438,61	Stefan-Voda	1056,30
3	Edinet	1083,46	Hincesti	426,71	Taraclia	665,74
4	Soroca	1022,03	Criuleni	364,03	Cantemir	649,11

Source: calculated based on information from NBS

Final conclusions:

According to Table 2, rayons that meet the best conditions for starting a business for the production of briquettes are as follows:

- In the North:
 - Drochia and Riscani rayons are on the first place;
 - Edinet and Soroca rayons are on the second place.
- In the Centre:
 - Ungheni and Orhei rayons are on the first place;
 - Hincesti and Criuleni rayons are on the second place.
- In the South:
 - Cahul and Stefan Voda rayons are on the first place;
 - Taraclia and Cantemir rayons are on the second place.

7. Stages of creation of a biomass production business (PPP)

1. Select an ATU
2. Agreement/ Letter of intent on creating an economic entity for the production of briquettes between LPA and UNDP
3. Decision of the local council on establishing a public entity

Contract between local council and UNDP

1. UNDP transfers funds to the BATU

- a. Income:

type „100000 Income”

economic category „130000 Grants”

economic chapter „132000 Grants received from international organizations”

article „132200 Capital grants received from international organizations”

paragraph „132220 Capital grants received from international organizations for projects financed from external sources”

Purpose:

Contribution for establishing an economic entity for processing ... with subsequent transfer of these funds to the equity of this entity (public enterprise, public establishment/ Civil code)

- b. Financial assets

type „400000 Financial assets”

economic category „410000 Internal receivables”

economic chapter „415000 Shares and other forms of equity participation within the country”

article „415100 increase in the amount of shares and the share in the equity within the country”

paragraph „415120 purchase of the share in the equity”

The mayor’s office shows this entity as a PPP: contribution of the mayor’s office: land/ other fixed assets and UNDP funds

- the public partner identifies the purpose and objectives of the public-private partnership; the public partner, the expert group or the person designated by them develops a feasibility study to prove the purposefulness of establishing the public-private partnership – technical and economic assessment of the public-private partnership project, main characteristics, technical and economic indicators of the public-private partnership, identifies and analyzes risks (political, legal, financial, economic performance, and environmental risks);
- Public Property Agency of the Ministry of Economy (hereinafter the Agency) approves the feasibility study, as established by the Government;
- the public partner prepares and approves the documents required for the tender for selection of a private partner, which includes:
 - description of the purpose of the public-private partnership;
 - conditions to implement the public-private partnership;
 - sample public-private partnership contract;
- the public partner appoints the members of the committee for the selection of a private partner;
- a notice about the tender for selection of a private partner is published in the Official Gazette of the Republic of Moldova;
- submission for publication or publication on the Agency’s website of the documents required for the tender for selection of a private partner;
- receipt and review of tenders;
- adoption of decision on appointment of the private partner or rejection of all tenders received;

- conclusion of the public-private partnership contract.

Forms of public-private partnership:

- a. works contract / service contract;
- b. trust management contract;
- c. tenancy/lease agreement;
- d. concession agreement;
- e. company or civil society contract.

Concession is an agreement whereby the government or administrative-territorial units concede (transfer) to an investor (natural or legal person, including foreign persons), for a fee, the right to carry out prospecting, exploration, exploitation or restoration of natural resources in Moldova, to provide public services, to exploit movable and immovable public property of the government or administrative-territorial units, which, under the law, are fully or partially excluded from the civil circuit and the right to carry out certain activities, including those representing the state monopoly, by taking control of the concession object, presumptive risk and property liability.

Methods of implementation of public-private partnership contracts

- design-construction-operation, whereby the construction and operation of the public-private partnership object are transferred to the private partner for not more than 50 years. The public-private partnership project can be fully funded by the private partner. Upon expiry of the contract concluded with the public partner, the object of the public-private partnership shall be transferred free of charge to the public partner in good and operational condition and free of any burden or obligation.
- construction-operation-renovation, whereby the private partner undertakes to finance the construction of the object of public-private partnership and all its maintenance costs for a period not exceeding 50 years. The private partner is allowed to levy, under the current law, related charges for the use of public property in the established period. Upon expiry of the contract, the object of the public-private

partnership shall be transferred free of charge to the public partner in good and operational condition and free of any burden or obligation;

- construction-operation-transfer, whereby the private partner undertakes to build, finance, operate and maintain a public property. The investor is allowed to levy user charges to recover own investment, to cover maintenance costs and to derive a reasonable profit. Upon completion of the contract, the public property is transferred free of charge to the public authority in good and operational condition and free of any burden or obligation;
- construction-transfer-operation, whereby the private partner undertakes to build a property that is transferred to the public partner immediately after completion and the public partner, in turn, shall transfer for use to the private partner;
- lease-development-operation, whereby the private partner receives for temporary use or temporary possession and use a public property, undertaking to pay its cost in instalments over a period not exceeding 50 years. Unless otherwise specified in the contract, the public partner shall acquire the right to derive income from services provided by the private partner and, upon the completion of the contract, the public property shall be transferred to the public authority in good condition and free of any burden or obligation;
- rehabilitation-operation-transfer, whereby the public property is transferred to the private partner, who is required to rehabilitate, operate and maintain the public property for a period not exceeding 50 years. Upon expiry of the contract, the public property shall be transferred free of charge to the public partner in good and operational condition and free of any burden or obligation.

References:

1. Indicatii metodice privind aplicarea clasificatiei economice (Methodological guidance on the application of economic classification)
2. **Legea nr. 179** din 10.07.2008 cu privire la parteneriatul public-privat (Law no. 179 of 10.07.2008 on public-private partnership)
3. **Legea nr. 534** cu privire la concesiuni din 13.07.1995 (Law no. 534 of 13.07.1995 on concessions)

