

Supplement 3. Results of optimization supply chains of biomass in different scenarios of biomass availability and energy need

Scenario Ia

Available biomass: residues, stacked wood, straw

Energy E = 1 PJ

Total costs (€ 10³) 4079.38

Unit costs (€ /MJ) 4.08

ID	Unit	Biomass (ton 10 ³)		
		residues	straw	stacked wood
1	Mielec	3.29	6.42	0
2	Staszow	9.21	37.43	0
3	Tuszyna	5.47	0	0
4	N Deba	7.25	0	0
5	Chmielnik	4.48	0	0

Scenario Ib

Available biomass: residues, stacked wood, straw

Energy E = 5 PJ

Total costs (€ 10³) 22116.74

Unit costs (€ /MJ) 4.42

ID	Unit	Biomass (ton 10 ³)		
		residues	straw	stacked wood
1	Mielec	3.29	6.42	0
2	Staszow	9.21	60.45	0
3	Tuszyna	5.47	14.32	0
4	N Deba	7.25	54.58	0
5	Chmielnik	4.48	74.88	0
6	Dabrowa T	7.57	36.80	0
7	Łagow	6.37	0	0
8	Kolbuszowa	4.76	0	0
9	Debica	7.62	0	0
10	Glogow	5.96	0	0
11	Daleszyce	5.35	0	0
12	Ostrowiec	10.60	0	0
13	Pinczow	4.60	0	0
14	Rozwadow	7.42	0	0
15	Rudnik	6.47	0	0
16	Gromnik	5.97	0	0
17	Goscieradow	7.04	0	0
18	Strzyżów	8.71	0	0

Scenario Ic

Available biomass: residues, stacked wood, straw

Energy E = 10 PJ

Total costs (€ 10³) 47568.87

Unit costs (€ /MJ) 4.75

ID	Unit	Biomass (ton 103)		
		residues	straw	stacked wood
1	Mielec	3.29	6.42	1.12
2	Staszow	9.21	60.45	3.54
3	Tuszyna	5.47	14.32	1.93
4	N Deba	7.25	54.58	2.59
5	Chmielnik	4.48	74.88	1.62
6	Dabrowa T	7.57	89.59	2.81
7	Łagow	6.37	37.43	2.51
8	Kolbuszowa	4.76	11.03	0
9	Debica	7.62	21.82	0
10	Glogow	5.96	21.49	0
11	Daleszyce	5.35	12.41	0
12	Ostrowiec	10.60	50.55	0
13	Pinczow	4.60	21.51	0
14	Rozwadow	7.42	0	0
15	Rudnik	6.47	0	0
16	Gromnik	5.97	0	0
17	Goscieradow	7.04	0	0
18	Strzyżów	8.71	0	0
19	Starachowice	6.22	0	0
20	Suchedniow	5.65	0	0
21	Leżajsk	7.50	0	0
22	Jedrzejow	6.50	0	0
23	Zagnansk	4.05	0	0
24	Janow L	13.29	0	0
25	Końce	5.51	0	0
26	Brzesko	5.97	0	0
27	Kielce	6.99	0	0
28	Marcule	5.57	0	0
29	Krasnik	8.03	0	0
30	Skarżysko	6.25	0	0
31	Zwolen	8.43	0	0
32	Niepolomice	3.53	0	0
33	Biłgoraj	9.44	0	0
34	Gorlice	7.82	0	0
35	Miechow	6.15	0	0

Scenario IIa

Available biomass: residues, straw

Energy E = 1 PJ

Total costs (€ 10³) 4079.38

Unit costs (€ /MJ) 4.08

ID	Unit	Biomass (ton 103)	
		residues	straw
1	Mielec	3.29	6.42
2	Staszow	9.21	37.42
3	Tuszyna	5.47	0
4	N Deba	7.25	0
5	Chmielnik	4.48	0

Scenario IIb

Available biomass: residues, straw

Energy E = 5 PJ

Total costs (€ 10³) 22116.67

Unit costs (€ /MJ) 4.42

ID	Unit	Biomass (ton 103)	
		residues	straw
1	Mielec	3.289	6.42
2	Staszow	9.212	60.45
3	Tuszyna	5.474	14.32
4	N Deba	7.252	54.58
5	Chmielnik	4.479	74.88
6	Dabrowa T	7.573	36.789
7	Łagow	6.374	0
8	Kolbuszowa	4.761	0
9	Debica	7.617	0
10	Glogow	5.964	0
11	Daleszyce	5.346	0
12	Ostrowiec	10.601	0
13	Pinczow	4.596	0
14	Rozwadow	7.416	0
15	Rudnik	6.467	0
16	Gromnik	5.966	0
17	Goscieradow	7.041	0
18	Strzyżów	8.715	0

Scenario IIc

Available biomass: residues, straw

Energy E = 5 PJ

Total costs (€ 10³) 47588.37

Unit costs (€ /MJ) 4.76

ID	Unit	Biomass (ton 10 ³)	
		residues	straw
1	Mielec	3.289	6.42
2	Staszow	9.212	60.45
3	Tuszyna	5.474	14.32
4	N Deba	7.252	54.58
5	Chmielnik	4.479	74.88
6	Dabrowa T	7.573	89.59
7	Łagow	6.374	37.43
8	Kolbuszowa	4.761	11.03
9	Debica	7.617	21.82
10	Glogow	5.964	21.49
11	Daleszyce	5.346	12.41
12	Ostrowiec	10.601	50.55
13	Pinczow	4.596	41.067
14	Rozwadow	7.416	0
15	Rudnik	6.467	0
16	Gromnik	5.966	0
17	Goscieradow	7.041	0
18	Strzyżów	8.715	0
19	Starachowice	6.217	0
20	Suchedniow	5.653	0
21	Leżajsk	7.497	0
22	Jedrzejow	6.496	0
23	Zagnansk	4.052	0
24	Janow L	13.288	0
25	Kończyce	5.508	0
26	Brzesko	5.974	0
27	Kielce	6.993	0
28	Marcule	5.572	0
29	Krasnik	8.026	0
30	Skarżysko	6.255	0
31	Zwolen	8.434	0
32	Niepolomice	3.527	0
33	Biłgoraj	9.438	0
34	Gorlice	7.817	0
35	Miechow	6.147	0

Scenario III a

Available biomass: straw

Energy E = 1 PJ

Total costs (€ 10³) 4145.55

Unit costs (€ /MJ) 4.15

ID	Unit	Biomass (ton 10 ³) straw
1	Mielec	6.42
2	Staszow	60.45
3	Tuszyna	4.559

Scenario III b

Available biomass: straw

Energy E = 1 PJ

Total costs (€ 10³) 22859.35

Unit costs (€ /MJ) 4.57

ID	Unit	Biomass (ton 10 ³) straw
1	Mielec	6.42
2	Staszow	60.45
3	Tuszyna	14.32
4	N Deba	54.58
5	Chmielnik	74.88
6	Dabrawa T	89.59
7	Łagow	37.43
8	Kolbuszowa	11.03
9	Debica	8.443

Scenario III c

Available biomass: straw

Energy E = 10 PJ

Total costs (€ 10³) 5034525

Unit costs (€ /MJ) 5.03

ID	Unit	Biomass (ton 10 ³) straw
1	Mielec	6.42
2	Staszow	60.45
3	Tuszyna	14.32
4	N Deba	54.58
5	Chmielnik	74.88
6	Dabrowa T	89.59
7	Łagow	37.43
8	Kolbuszowa	11.03
9	Debica	21.82
10	Glogow	21.49
11	Daleszyce	12.41
12	Ostrowiec	50.55
13	Pinczow	80.63
14	Rozwadow	30
15	Rudnik	14
16	Gromnik	46.38
17	Goscieradow	40
18	Strzyżów	2
19	Starachowice	28.95
20	Suchedniow	17.356
21	Leżajsk	
22	Jedrzejow	