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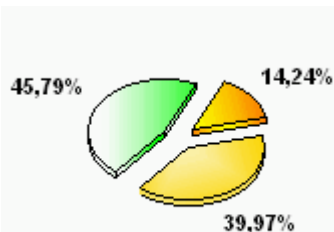
## Austria



### GENERAL INFORMATION

Population 8 mln  
Population density 99 person / km<sup>2</sup>

Total area 8387 1000 ha  
 Utilised agricultural area 3352 1000 ha  
 Wooded area 3840 1000 ha  
 Other 1194 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	1380	1000 ha	Cereal production (*)	4 732,08	1000 t
Fallow land	106	1000 ha	Oilseed production (*)	232,94	1000 t
Permanent crops	70	1000 ha	Maize production (*)	1 846,20	1000 t
Permanent grassland	1896	1000 ha	Cattle production	1 496,08	1000 LU
Number of agricultural holdings	173,47	1000 ton	Pig (*)	633,40	1000 LU
Average farm size	38,87	1000 ton	Sheep (*)	32,25	1000 LU

(\* average 2000-2004      LU Livestock Unit      EUROSTAT)

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	3 840,00	1000 ha
Area of forest available for wood supply	3 352,00	1000 ha
Area of coniferous forest available for wood supply	2 125,00	1000 ha
Area of broadleaves forest available for wood supply	1 227,00	1000 ha
Average volume of growing stock on forest available for wood supply	309,50	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	27 337,00	1000 t
Annual fellings overbark on forest available for wood supply	19 521,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	16 132,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	3 389,00	1000 t

*data for 2000, TBFRA*

#### MAIN ASSUMPTIONS

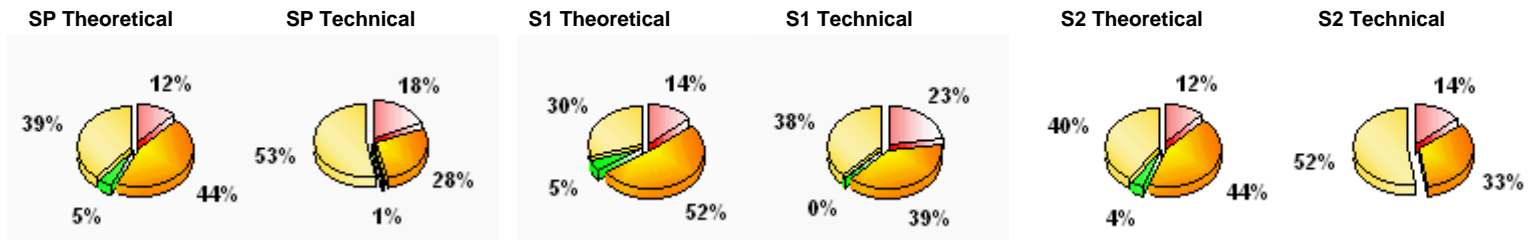
	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,20	0,25	0,20	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,55	0,37	0,50
Root biomass	0,50	0,50	0,50	0,80	0,69	1,00	0,70	0,94	0,74
Wood balance	0,65	0,65	0,65	0,20	0,15	0,30	0,13	0,11	0,12

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,19	1,13
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,83	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,35	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,67			
Share of pine in all species		0,16			

**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	20,49	24,38	23,15	5,74	8,53	4,72
Thinning wood	[PJ/a]	77,30	91,99	87,35	8,70	14,56	11,03
Roots	[PJ/a]	8,17	8,86	8,45	0,25	0,09	0,00
Wood balance	[PJ/a]	67,77	53,09	80,51	16,45	14,11	17,36
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>173,73</b>	<b>178,32</b>	<b>199,47</b>	<b>31,13</b>	<b>37,30</b>	<b>33,11</b>


**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

Share of wood by-products in sawmills	0,40	0,40	0,40	<table border="1"> <tbody> <tr> <td>Sawlogs and veneer logs</td> <td>9 174,40</td> <td>1000 m3</td> </tr> <tr> <td>Pulpwood group</td> <td>2 715,60</td> <td>1000 m3</td> </tr> <tr> <td>Other industrial wood group</td> <td>0,00</td> <td>1000 m3</td> </tr> <tr> <td>Wood fuel group</td> <td>3 135,20</td> <td>1000 m3</td> </tr> </tbody> </table> FAOSTAT	Sawlogs and veneer logs	9 174,40	1000 m3	Pulpwood group	2 715,60	1000 m3	Other industrial wood group	0,00	1000 m3	Wood fuel group	3 135,20	1000 m3
Sawlogs and veneer logs	9 174,40	1000 m3														
Pulpwood group	2 715,60	1000 m3														
Other industrial wood group	0,00	1000 m3														
Wood fuel group	3 135,20	1000 m3														
Share of wood by-products in board industry	0,20	0,20	0,20													
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30													
Share of wood by-products in other wood indust	0,30	0,30	0,30													
Wood density	0,6 t / m3															
Heat value	15 GJ / t															
		SP	S1	S2												
Production changes related to year 2004			1,20	1,00												
Utilisation of industrial by-products		0,95	0,95	0,95												

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	39,36	49,29	41,07	1,97	2,46	2,05

**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	8	8	8	
Meat consumption (**)	[kg / person * year]	602	616	642	
		91	93	97	(*) EUROSTAT; (**) FAO

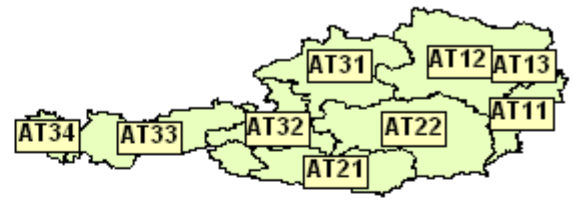
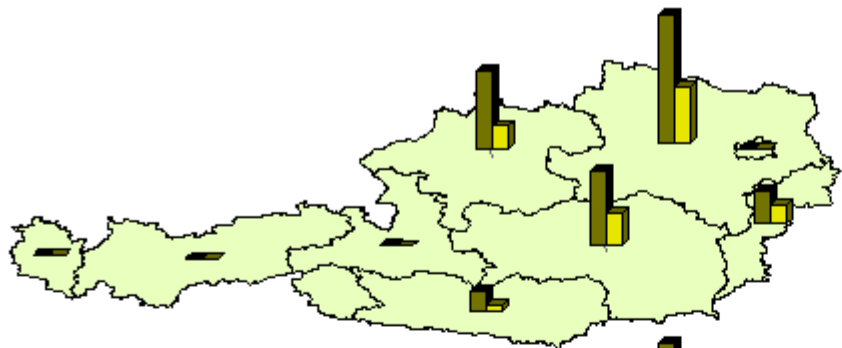
**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	1,70	1,40	1,40	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,70	0,60	0,70
				Share of pigs on straw (**)	0,60	0,60	0,70
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,20	0,20	0,20

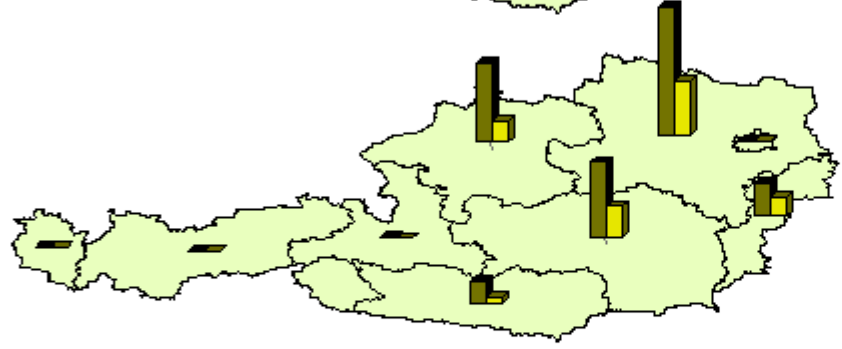
(\*) [t / LU \* year]; (\*\*) [% of total herd]; (\*\*\*) [% of total straw]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**

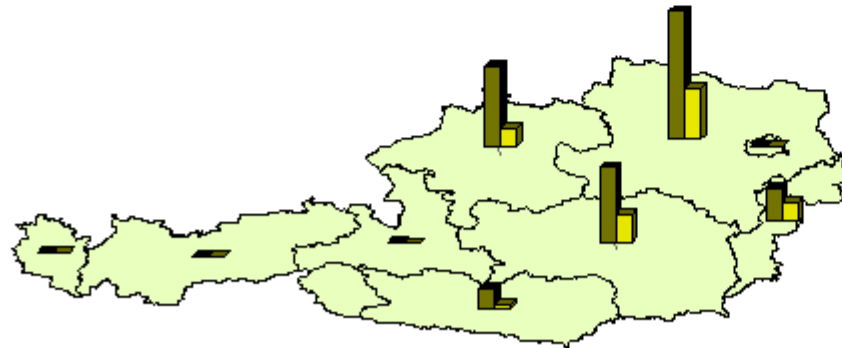
Starting Point SP



Scenario S1



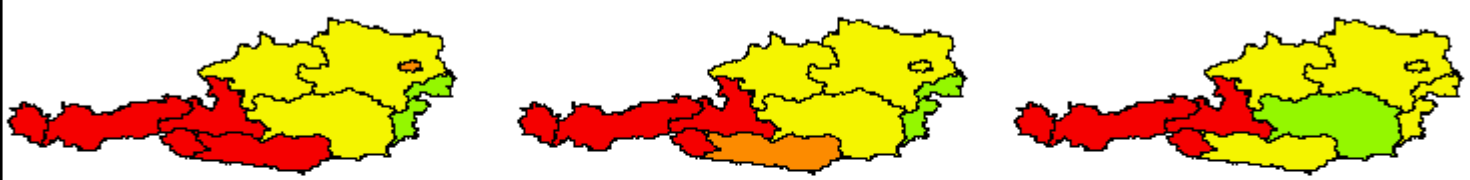
Scenario S2



- AT11, Burgenland
- AT12, Niederösterreich
- AT13, Wien
- AT21, Kärnten
- AT22, Steiermark
- AT31, Oberösterreich
- AT32, Salzburg
- AT33, Tirol
- AT34, Vorarlberg

Total straw from cereals, oilseeds and maize [PJ / a]      Total straw available excluding agricultural needs [PJ / a] (relevant figures in the next section)

STRAW POTENTIAL DENSITY FOR STARTING POINT



Straw GJ/ha\*year / Total area

0 - 2	10 - 15
3 - 5	16 - 32
6 - 9	

Straw GJ/ha\*year / Utilised agricultural area

0 - 4	20 - 33
5 - 10	34 - 77
11 - 19	

Straw GJ/ha\*year / Arable land

0 - 6	33 - 64
7 - 17	65 - 111
18 - 32	

**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2		
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	
	(1)	(2)	(1)	(2)	(1)	(2)	
<b>STRAW</b>	<b>91,06</b>	<b>36,67</b>	<b>84,10</b>	<b>32,33</b>	<b>84,10</b>	<b>30,14</b>	
AT11	Burgenland	8,90	4,99	8,21	4,59	8,21	4,55
AT12	Niederösterreich	34,78	15,08	31,87	13,36	31,87	12,75
AT13	Wien	0,21	0,12	0,19	0,10	0,19	0,10
AT21	Kärnten	5,55	1,56	5,17	1,31	5,17	1,09
AT22	Steiermark	19,94	8,51	18,64	7,62	18,64	7,11
AT31	Oberösterreich	21,46	6,41	19,82	5,35	19,82	4,54
AT32	Salzburg	0,10	0,00	0,09	0,00	0,09	0,00
AT33	Tirol	0,10	0,00	0,09	0,00	0,09	0,00
AT34	Vorarlberg	0,02	0,00	0,02	0,00	0,02	0,00
<b>FORESTRY</b>		<b>173,73</b>	<b>31,13</b>	<b>178,32</b>	<b>37,30</b>	<b>199,47</b>	<b>33,11</b>
	Logging residues	20,49	5,74	24,38	8,53	23,15	4,72
	Thinning wood	77,30	8,70	91,99	14,56	87,35	11,03
	Roots	8,17	0,25	8,86	0,09	8,45	0,00
	Wood balance	67,77	16,45	53,09	14,11	80,51	17,36
<b>WOOD INDUSTRY</b>		<b>39,36</b>	<b>1,97</b>	<b>49,29</b>	<b>2,46</b>	<b>41,07</b>	<b>2,05</b>
<b>TOTAL BIOMASS</b>		<b>304,15</b>	<b>69,77</b>	<b>311,71</b>	<b>72,09</b>	<b>324,64</b>	<b>65,30</b>

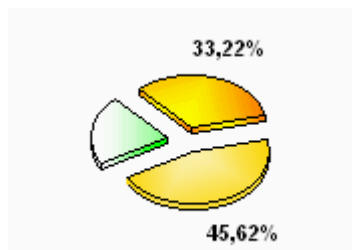
## Belgium



### GENERAL INFORMATION

Population 10 mln  
Population density 344 person / km<sup>2</sup>

Total area 3053 1000 ha  
 Utilised agricultural area 1393 1000 ha  
 Wooded area 646 1000 ha  
 Other 1014 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	843	1000 ha	Cereal production (*)	2 615,06	1000 t
Fallow land	26	1000 ha	Oilseed production (*)	18,12	1000 t
Permanent crops	21	1000 ha	Maize production (*)	516,30	1000 t
Permanent grassland	526	1000 ha	Cattle production	2 045,32	1000 LU
Number of agricultural holdings	54,93	1000 ton	Pig (*)	1 332,64	1000 LU
Average farm size	25,95	1000 ton	Sheep (*)	15,18	1000 LU

(\*) average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	646,00	1000 ha
Area of forest available for wood supply	639,00	1000 ha
Area of coniferous forest available for wood supply	272,00	1000 ha
Area of broadleaves forest available for wood supply	367,00	1000 ha
Average volume of growing stock on forest available for wood supply	218,80	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	5 137,00	1000 t
Annual fellings overbark on forest available for wood supply	5 638,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	4 036,30	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	1 601,70	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,20	0,25	0,20	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	1,00	1,00	1,00	0,40	0,88	0,42
Wood balance	0,70	0,70	0,70	0,20	0,15	0,30	0,14	0,11	0,12

#### CALCULATION PARAMETERS

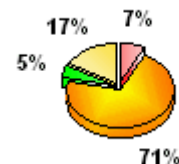
Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,12	1,13
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,72	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,13	(*) in relation to SP		
Logging residues factor for broadleaves species		0,13			
Root biomass ratio		0,25			
Share of spruce in all species		0,39			
Share of pine in all species		0,15			

## Deliverable D5.01.03 Residue biomass potential inventory results

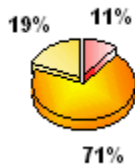
**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	2,28	2,56	2,58	0,64	0,90	0,53
Thinning wood	[PJ/a]	22,33	25,01	25,23	4,19	4,79	4,89
Roots	[PJ/a]	1,53	1,60	1,58	0,00	0,00	0,00
Wood balance	[PJ/a]	5,31	3,35	6,74	1,10	0,76	1,24
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>31,45</b>	<b>32,52</b>	<b>36,13</b>	<b>5,93</b>	<b>6,45</b>	<b>6,66</b>

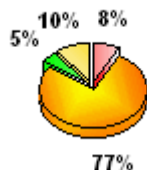
SP Theoretical



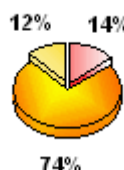
SP Technical



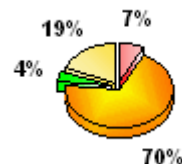
S1 Theoretical



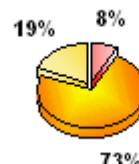
S1 Technical



S2 Theoretical



S2 Technical


**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

Share of wood by-products in sawmills	0,40	0,40	0,40	<table border="1"> <tbody> <tr> <td>Sawlogs and veneer logs</td> <td>2 597,00</td> <td>1000 m3</td> </tr> <tr> <td>Pulpwood group</td> <td>1 224,00</td> <td>1000 m3</td> </tr> <tr> <td>Other industrial wood group</td> <td>180,00</td> <td>1000 m3</td> </tr> <tr> <td>Wood fuel group</td> <td>550,00</td> <td>1000 m3</td> </tr> </tbody> </table> FAOSTAT	Sawlogs and veneer logs	2 597,00	1000 m3	Pulpwood group	1 224,00	1000 m3	Other industrial wood group	180,00	1000 m3	Wood fuel group	550,00	1000 m3
Sawlogs and veneer logs	2 597,00	1000 m3														
Pulpwood group	1 224,00	1000 m3														
Other industrial wood group	180,00	1000 m3														
Wood fuel group	550,00	1000 m3														
Share of wood by-products in board industry	0,20	0,20	0,20													
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30													
Share of wood by-products in other wood indust	0,30	0,30	0,30													
Wood density	0,6	t / m3														
Heat value	15	GJ / t														
	SP	S1	S2													
Production changes related to year 2004		1,37	1,00													
Utilisation of industrial by-products	0,95	0,95	0,95													

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	12,39	17,76	12,96	0,62	0,89	0,65

**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

		2005	2010	2020	
Population (*)	[mln]	10	11	11	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	602	616	642	
Meat consumption (**)	[kg / person * year]	91	93	97	
					(*) EUROSTAT; (**) FAO

**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	1,70	1,40	1,40	Straw for fodder (*)	0,10	0,10	0,10
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,40	0,40	0,50
				Share of pigs on straw (**)	0,30	0,30	0,50
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,05	0,05	0,05

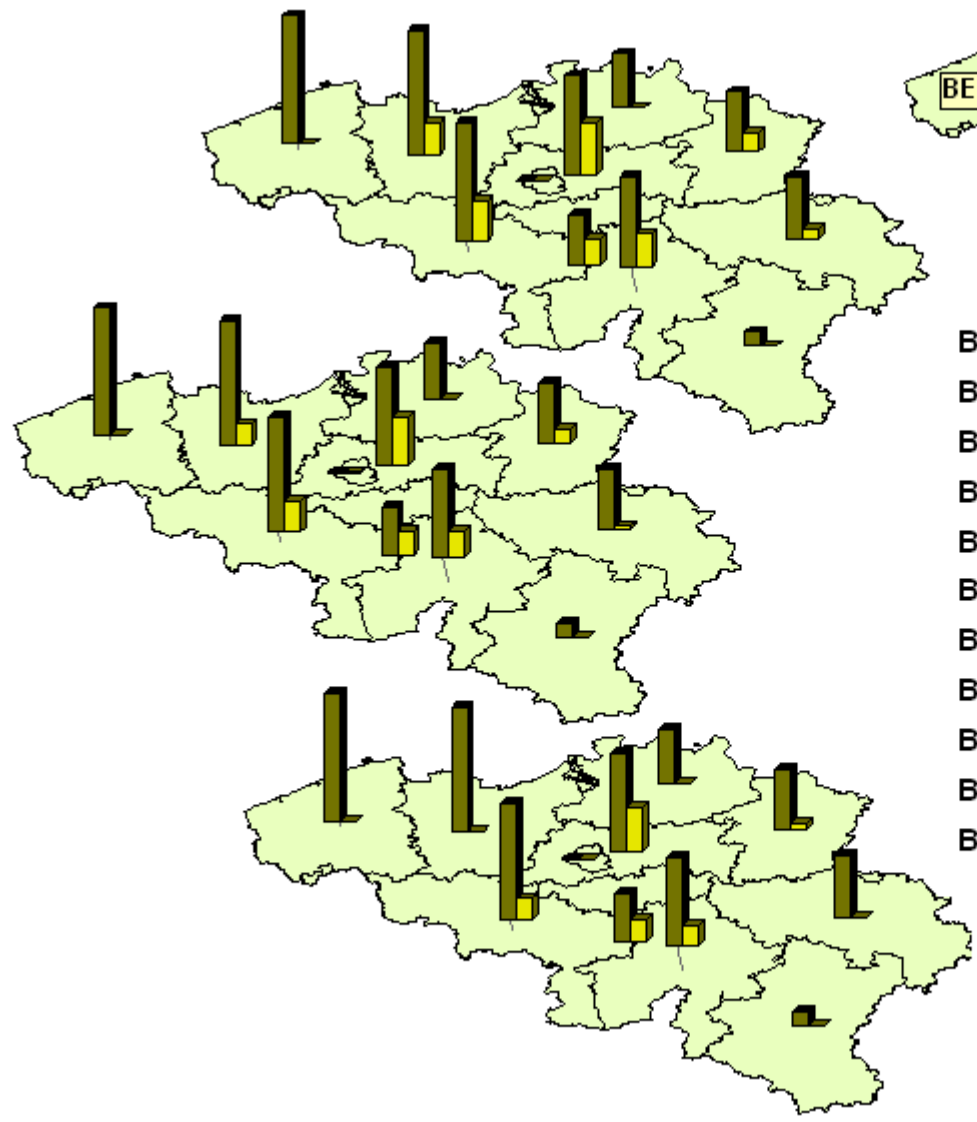
(\*) [t / LU \* year]; (\*\*) [% of total herd]; (\*\*\*) [% of total straw]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**

Starting Point SP

Scenario S1

Scenario S2

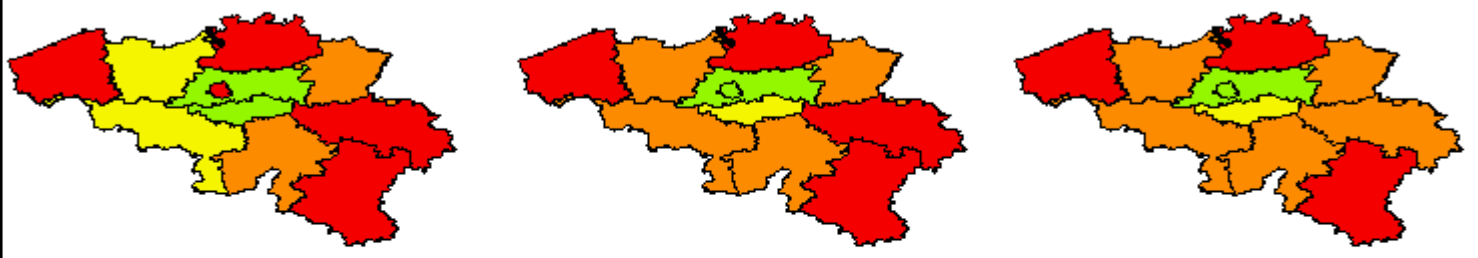


- BE10, Région de Bruxelles-Capitale
- BE21, Prov. Antwerpen
- BE22, Prov. Limburg (B)
- BE23, Prov. Oost-Vlaanderen
- BE24, Prov. Vlaams-Brabant
- BE25, Prov. West-Vlaanderen
- BE31, Prov. Brabant Wallon
- BE32, Prov. Hainaut
- BE33, Prov. Liège
- BE34, Prov. Luxembourg (B)
- BE35, Prov. Namur

Total straw from cereals, oilseeds and maize [PJ / a]

Total straw available excluding agricultural needs [PJ / a] (relevant figures in the next section)

STRAW POTENTIAL DENSITY FOR STARTING POINT



Straw GJ/ha\*year / Total area

Straw GJ/ha\*year / Utilised agricultural area

Straw GJ/ha\*year / Arable land

- 0 - 2
- 3 - 5
- 6 - 9
- 10 - 15
- 16 - 32

- 0 - 4
- 5 - 10
- 11 - 19
- 20 - 33
- 34 - 77

- 0 - 6
- 7 - 17
- 18 - 32
- 33 - 64
- 65 - 111

**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2		
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	
	(1)	(2)	(1)	(2)	(1)	(2)	
<b>STRAW</b>	<b>37,94</b>	<b>10,05</b>	<b>34,79</b>	<b>7,42</b>	<b>34,79</b>	<b>4,96</b>	
BE10	Région de Bruxelles-C	0,01	0,01	0,01	0,01	0,01	0,00
BE21	Prov. Antwerpen	2,57	0,00	2,41	0,00	2,41	0,00
BE22	Prov. Limburg (B)	2,85	0,89	2,63	0,63	2,63	0,24
BE23	Prov. Oost-Vlaanderen	5,86	1,49	5,45	0,94	5,45	0,00
BE24	Prov. Vlaams Brabant	4,70	2,48	4,34	2,16	4,34	1,97
BE25	Prov. West-Vlaanderen	6,10	0,00	5,63	0,00	5,63	0,00
BE31	Prov. Brabant Wallon	2,34	1,22	2,11	1,03	2,11	0,96
BE32	Prov. Hainaut	5,60	1,89	5,06	1,34	5,06	0,92
BE33	Prov. Liege	2,96	0,51	2,67	0,16	2,67	0,00
BE34	Prov. Luxembourg (B)	0,67	0,00	0,61	0,00	0,61	0,00
BE35	Prov. Namur	4,28	1,56	3,87	1,15	3,87	0,87
<b>FORESTRY</b>		<b>31,45</b>	<b>5,93</b>	<b>32,52</b>	<b>6,45</b>	<b>36,13</b>	<b>6,66</b>
	Logging residues	2,28	0,64	2,56	0,90	2,58	0,53
	Thinning wood	22,33	4,19	25,01	4,79	25,23	4,89
	Roots	1,53	0,00	1,60	0,00	1,58	0,00
	Wood balance	5,31	1,10	3,35	0,76	6,74	1,24
<b>WOOD INDUSTRY</b>		<b>12,39</b>	<b>0,62</b>	<b>17,76</b>	<b>0,89</b>	<b>12,96</b>	<b>0,65</b>
<b>TOTAL BIOMASS</b>		<b>81,78</b>	<b>16,60</b>	<b>85,07</b>	<b>14,76</b>	<b>83,88</b>	<b>12,27</b>

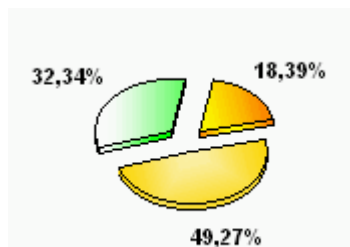
## Bulgaria



### GENERAL INFORMATION

Population 8 mln  
Population density 70 person / km<sup>2</sup>

Total area 11100 1000 ha  
 Utilised agricultural area 5469 1000 ha  
 Wooded area 3590 1000 ha  
 Other 2041 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	3330	1000 ha	Cereal production (*)	5 192,10	1000 t
Fallow land	454	1000 ha	Oilseed production (*)	726,75	1000 t
Permanent crops	235	1000 ha	Maize production (*)	1 111,20	1000 t
Permanent grassland	1794	1000 ha	Cattle production		1000 LU
			Pig (*)		1000 LU
Number of agricultural holdings	661,64	1000 ton	Sheep (*)	151,20	1000 LU
Average farm size	5,15	1000 ton			

(\* average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	3 590,00	1000 ha
Area of forest available for wood supply	3 124,00	1000 ha
Area of coniferous forest available for wood supply	746,00	1000 ha
Area of broadleaves forest available for wood supply	2 378,00	1000 ha
Average volume of growing stock on forest available for wood supply	128,40	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	10 236,00	1000 t
Annual fellings overbark on forest available for wood supply	4 852,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	1 772,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	3 080,00	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

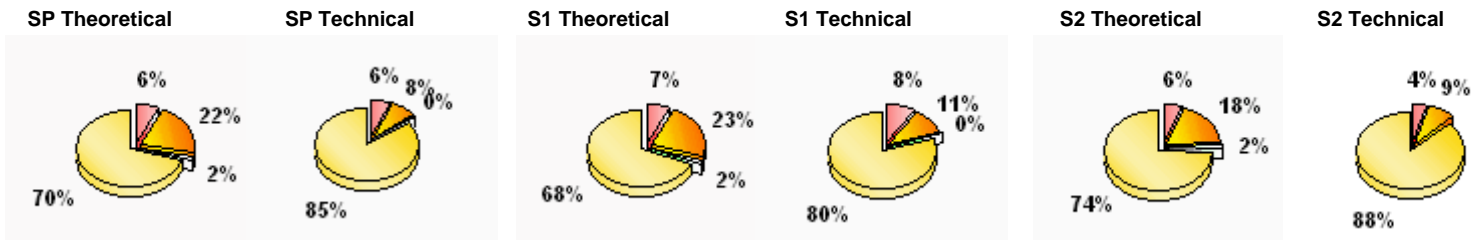
	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,10	0,13	0,10	0,30	0,30	0,40	0,60	0,40	0,69
Thinning wood	0,75	0,75	0,75				0,60	0,40	0,54
Root biomass	0,50	0,50	0,50	0,80	0,49	1,00	0,50	0,94	0,53
Wood balance	0,50	0,50	0,50	0,20	0,15	0,30	0,20	0,16	0,18

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9		SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)		1,10	1,00
Factor of final fellings		0,60	Change of net annual increment (*)		1,05	1,15
Factor of coniferous fellings		0,37	Factor of clear final felling	0,38	0,29	0,29
Logging residues factor for coniferous species		0,20	(*) in relation to SP			
Logging residues factor for broadleaves species		0,20				
Root biomass ratio		0,25				
Share of spruce in all species		0,12				
Share of pine in all species		0,34				

## FOREST BIOMASS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	4,19	4,61	4,19	1,06	1,69	0,70
Thinning wood	[PJ/a]	13,97	15,37	13,97	1,40	2,31	1,61
Roots	[PJ/a]	1,49	1,26	1,15	0,07	0,02	0,00
Wood balance	[PJ/a]	45,25	46,09	56,30	14,50	16,47	16,18
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>64,90</b>	<b>67,33</b>	<b>75,62</b>	<b>17,03</b>	<b>20,49</b>	<b>18,49</b>



## WOOD INDUSTRY BY - PRODUCTS POTENTIAL

### DATA, ASSUMPTIONS, PARAMETERS

Share of wood by-products in sawmills	0,40	0,40	0,40	<table border="1"> <tbody> <tr> <td>Sawlogs and veneer logs</td> <td>1 532,20</td> <td>1000 m3</td> </tr> <tr> <td>Pulpwood group</td> <td>968,42</td> <td>1000 m3</td> </tr> <tr> <td>Other industrial wood group</td> <td>93,67</td> <td>1000 m3</td> </tr> <tr> <td>Wood fuel group</td> <td>2 060,60</td> <td>1000 m3</td> </tr> </tbody> </table> <p>FAOSTAT</p>	Sawlogs and veneer logs	1 532,20	1000 m3	Pulpwood group	968,42	1000 m3	Other industrial wood group	93,67	1000 m3	Wood fuel group	2 060,60	1000 m3
Sawlogs and veneer logs	1 532,20	1000 m3														
Pulpwood group	968,42	1000 m3														
Other industrial wood group	93,67	1000 m3														
Wood fuel group	2 060,60	1000 m3														
Share of wood by-products in board industry	0,20	0,20	0,20													
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30													
Share of wood by-products in other wood indust	0,30	0,30	0,30													
Wood density	0,6 t / m3															
Heat value	15 GJ / t															
		SP	S1	S2												
Production changes related to year 2004			1,40	1,20												
Utilisation of industrial by-products		0,95	0,95	0,95												

## WOOD INDUSTRY BY-PRODUCTS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	8,41	12,82	10,99	0,42	0,64	0,55

## AGRICULTURAL BIOMASS POTENTIAL - STRAW

### MAIN ASSUMPTIONS

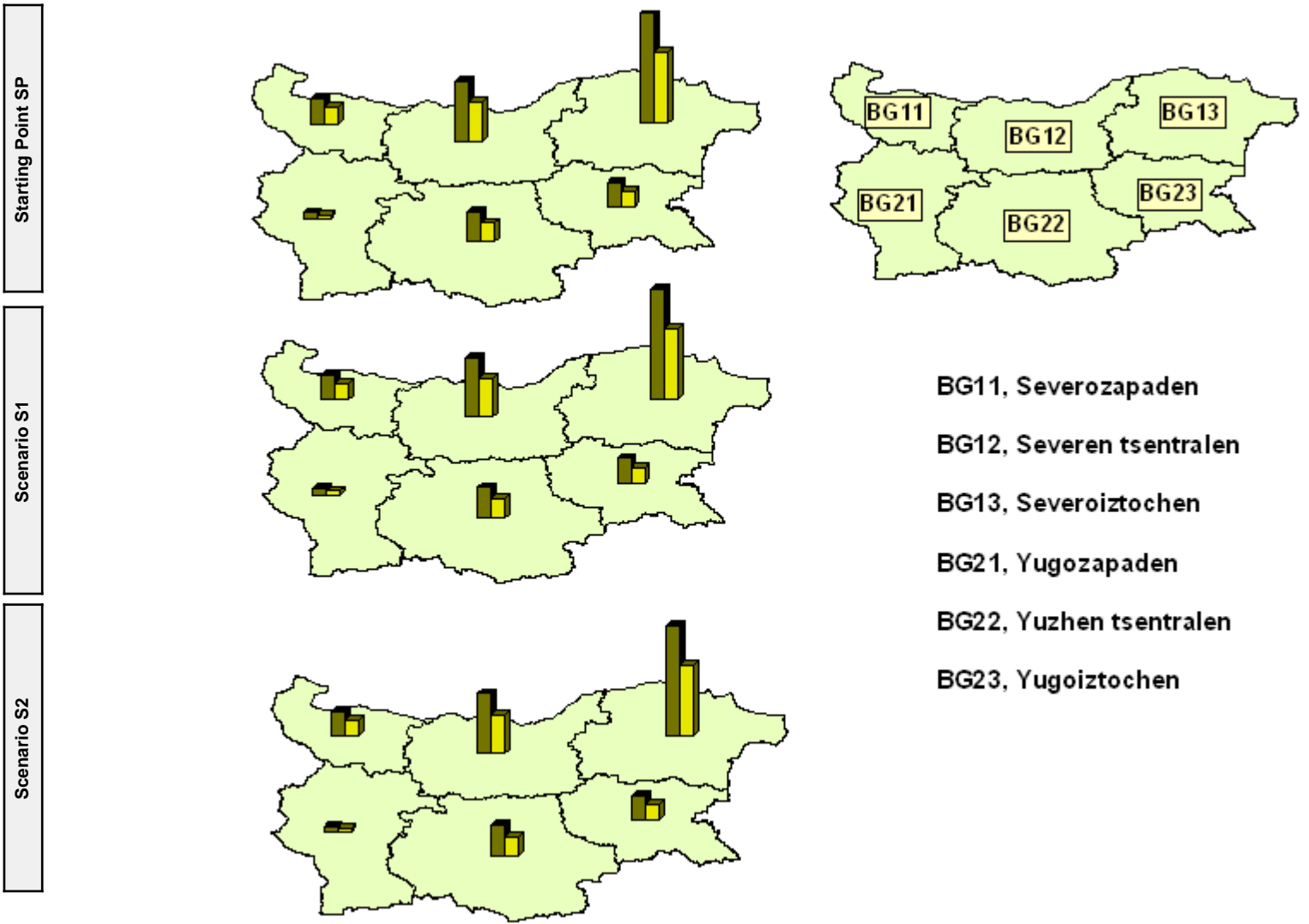
Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	8	7	7	
Meat consumption (**)	[kg / person * year]	539	567	626	
		49	51	56	(*) EUROSTAT; (**) FAO

### CALCULATION PARAMETERS

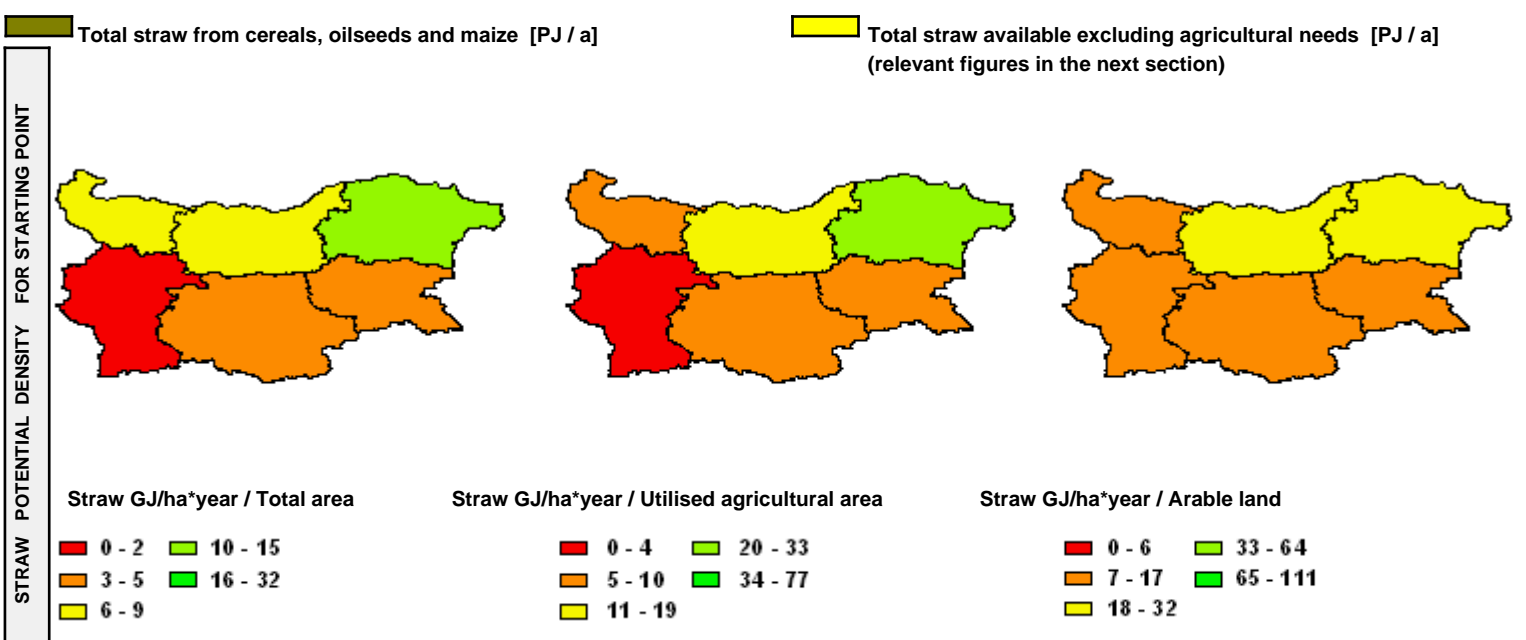
	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	2,00	1,50	1,50	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,40	1,00	1,00	Share of cattle on straw (**)	0,90	0,70	0,80
				Share of pigs on straw (**)	0,60	0,50	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,10	0,10	0,10

(\*) [t / LU \* year]; (\*\*) [% of total herd]; (\*\*\*) [% of total straw]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**



BG11, Severozapaden  
 BG12, Severen tsentralen  
 BG13, Severoiztochen  
 BG21, Yugozapaden  
 BG22, Yuzhen tsentralen  
 BG23, Yugoiztochen



**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2		
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	
	(1)	(2)	(1)	(2)	(1)	(2)	
<b>STRAW</b>	<b>93,92</b>	<b>60,31</b>	<b>74,98</b>	<b>47,96</b>	<b>74,98</b>	<b>47,96</b>	
BG11	Severozapaden	9,25	5,97	7,34	4,72	7,34	4,72
BG12	Severen tsentralen	22,10	14,29	17,57	11,31	17,57	11,31
BG13	Severoiztochen	40,56	26,26	32,17	20,74	32,17	20,74
BG21	Yugozapaden	2,22	1,40	1,79	1,13	1,79	1,13
BG22	Yuzhen tsentralen	11,11	6,98	9,02	5,65	9,02	5,65
BG23	Yugoiztochen	8,68	5,41	7,09	4,41	7,09	4,41
<b>FORESTRY</b>		<b>64,90</b>	<b>17,03</b>	<b>67,33</b>	<b>20,49</b>	<b>75,62</b>	<b>18,49</b>
	Logging residues	4,19	1,06	4,61	1,69	4,19	0,70
	Thinning wood	13,97	1,40	15,37	2,31	13,97	1,61
	Roots	1,49	0,07	1,26	0,02	1,15	0,00
	Wood balance	45,25	14,50	46,09	16,47	56,30	16,18
<b>WOOD INDUSTRY</b>		<b>8,41</b>	<b>0,42</b>	<b>12,82</b>	<b>0,64</b>	<b>10,99</b>	<b>0,55</b>
<b>TOTAL BIOMASS</b>		<b>167,23</b>	<b>77,76</b>	<b>155,13</b>	<b>69,09</b>	<b>161,59</b>	<b>67,00</b>

## Switzerland



### GENERAL INFORMATION

Population 7 mln  
Population density 185 person / km<sup>2</sup>

Total area 4128 1000 ha  
 Utilised agricultural area 1525 1000 ha  
 Wooded area 117 1000 ha  
 Other 2486 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	411	1000 ha	Cereal production (*)	1 081,00	1000 t
Fallow land	4	1000 ha	Oilseed production (*)	23,98	1000 t
Permanent crops	24	1000 ha	Maize production (*)		1000 t
Permanent grassland	1092	1000 ha	Cattle production	1 268,48	1000 LU
Number of agricultural holdings		1000 ton	Pig (*)	230,06	1000 LU
Average farm size		1000 ton	Sheep (*)	34,56	1000 LU

(\*) average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	117,00	1000 ha
Area of forest available for wood supply	43,00	1000 ha
Area of coniferous forest available for wood supply	43,00	1000 ha
Area of broadleaves forest available for wood supply	0,00	1000 ha
Average volume of growing stock on forest available for wood supply	70,70	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	9 160,00	1000 t
Annual fellings overbark on forest available for wood supply	7 076,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	0,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	7 076,00	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

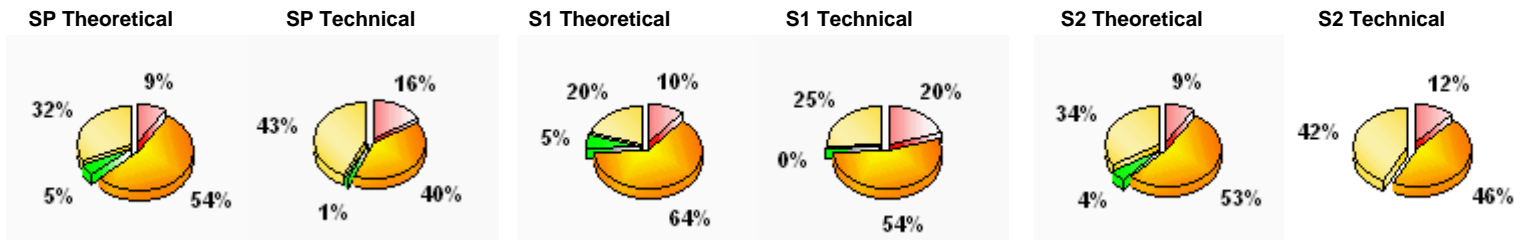
	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,20	0,25	0,20	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,55	0,37	0,50
Root biomass	0,50	0,50	0,50	0,80	0,69	1,00	0,70	0,94	0,74
Wood balance	0,65	0,65	0,65	0,20	0,15	0,30	0,27	0,22	0,24

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,19	1,13
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,00	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,35	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,62			
Share of pine in all species		0,09			

**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	4,59	5,46	5,18	1,28	1,91	1,06
Thinning wood	[PJ/a]	28,02	33,34	31,66	3,15	5,28	4,00
Roots	[PJ/a]	2,55	2,77	2,64	0,08	0,03	0,00
Wood balance	[PJ/a]	16,63	10,56	20,11	3,40	2,47	3,73
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>51,79</b>	<b>52,13</b>	<b>59,60</b>	<b>7,92</b>	<b>9,68</b>	<b>8,79</b>


**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

Share of wood by-products in sawmills	0,40	0,40	0,40	<table border="1"> <tbody> <tr> <td>Sawlogs and veneer logs</td> <td>4 093,60</td> <td>1000 m3</td> </tr> <tr> <td>Pulpwood group</td> <td>592,60</td> <td>1000 m3</td> </tr> <tr> <td>Other industrial wood group</td> <td>0,00</td> <td>1000 m3</td> </tr> <tr> <td>Wood fuel group</td> <td>1 169,20</td> <td>1000 m3</td> </tr> </tbody> </table> FAOSTAT	Sawlogs and veneer logs	4 093,60	1000 m3	Pulpwood group	592,60	1000 m3	Other industrial wood group	0,00	1000 m3	Wood fuel group	1 169,20	1000 m3
Sawlogs and veneer logs	4 093,60	1000 m3														
Pulpwood group	592,60	1000 m3														
Other industrial wood group	0,00	1000 m3														
Wood fuel group	1 169,20	1000 m3														
Share of wood by-products in board industry	0,20	0,20	0,20													
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30													
Share of wood by-products in other wood indust	0,30	0,30	0,30													
Wood density	0,6 t / m3															
Heat value	15 GJ / t															
		SP	S1	S2												
Production changes related to year 2004			1,20	1,00												
Utilisation of industrial by-products		0,95	0,95	0,95												

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	16,20	20,04	16,70	0,81	1,00	0,83

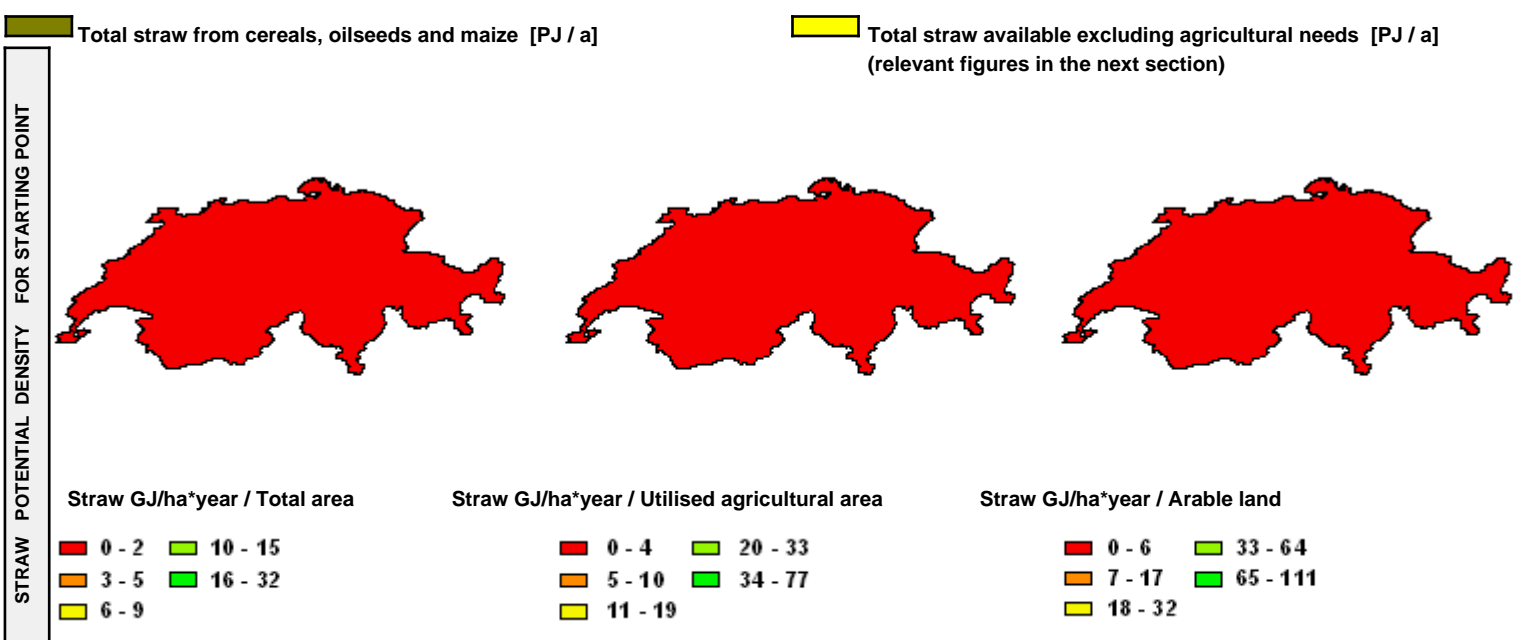
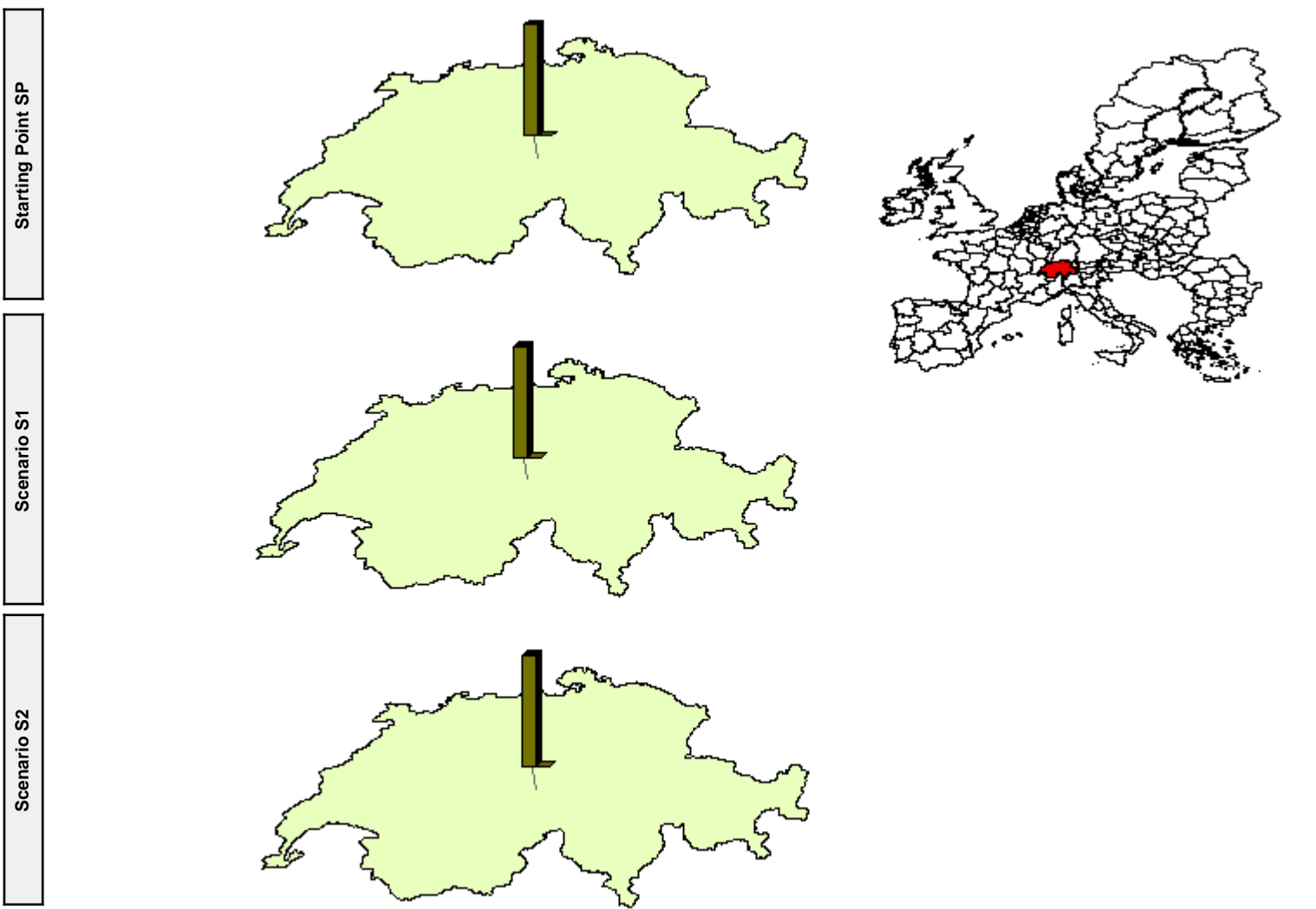
**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	7	7	7	
Meat consumption (**)	[kg / person * year]	602	616	642	
		91	93	97	(*) EUROSTAT; (**) FAO

**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,70	0,70	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	1,70	1,40	1,40	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,70	0,60	0,70
				Share of pigs on straw (**)	0,50	0,50	0,70
				Straw for soil (***)	0,10	0,10	0,10
				Straw for other purposes (***)	0,15	0,15	0,15

(\*) [t / LU \* year]; (\*\*) [% of total herd]; (\*\*\*) [% of total straw]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**


**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

		Starting Point		Scenario S1		Scenario S2	
		PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
		(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>		<b>15,48</b>	<b>0,00</b>	<b>15,43</b>	<b>0,00</b>	<b>15,43</b>	<b>0,00</b>
CH	Switzerland	15,48	0,00	15,43	0,00	15,43	0,00
<b>FORESTRY</b>		<b>51,79</b>	<b>7,92</b>	<b>52,13</b>	<b>9,68</b>	<b>59,60</b>	<b>8,79</b>
	Logging residues	4,59	1,28	5,46	1,91	5,18	1,06
	Thinning wood	28,02	3,15	33,34	5,28	31,66	4,00
	Roots	2,55	0,08	2,77	0,03	2,64	0,00
	Wood balance	16,63	3,40	10,56	2,47	20,11	3,73
<b>WOOD INDUSTRY</b>		<b>16,20</b>	<b>0,81</b>	<b>20,04</b>	<b>1,00</b>	<b>16,70</b>	<b>0,83</b>
<b>TOTAL BIOMASS</b>		<b>83,47</b>	<b>8,73</b>	<b>87,60</b>	<b>10,68</b>	<b>91,73</b>	<b>9,62</b>

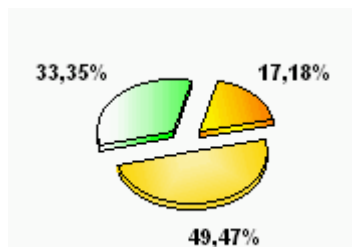
## Czech Republic



### GENERAL INFORMATION

Population 10 mln  
Population density 132 person / km<sup>2</sup>

Total area 7887 1000 ha  
■ Utilised agricultural area 3902 1000 ha  
■ Wooded area 2630 1000 ha  
■ Other 1355 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	2885	1000 ha	Cereal production (*)	7 021,76	1000 t
Fallow land	100	1000 ha	Oilseed production (*)	911,10	1000 t
Permanent crops	54	1000 ha	Maize production (*)	471,38	1000 t
Permanent grassland	900	1000 ha	Cattle production	1 043,80	1000 LU
Number of agricultural holdings	44,78	1000 ton	Pig (*)	668,30	1000 LU
Average farm size	116,32	1000 ton	Sheep (*)	9,83	1000 LU

(\* average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	2 630,00	1000 ha
Area of forest available for wood supply	2 559,00	1000 ha
Area of coniferous forest available for wood supply	786,00	1000 ha
Area of broadleaves forest available for wood supply	1 773,00	1000 ha
Average volume of growing stock on forest available for wood supply	261,10	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	20 355,00	1000 t
Annual fellings overbark on forest available for wood supply	16 200,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	14 810,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	1 390,00	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,15	0,19	0,15	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	0,60	0,39	0,75	0,40	0,88	0,42
Wood balance	0,85	0,85	0,85	0,20	0,15	0,30	0,20	0,16	0,18

#### CALCULATION PARAMETERS

	t / m <sup>3</sup>	0,9	SP	S1	S2
Wood density	t / m <sup>3</sup>	0,9			
Heat value	GJ / t	8			
Factor of final fellings		0,45		1,10	1,00
Factor of coniferous fellings		0,91		1,05	1,15
Logging residues factor for coniferous species		0,35			
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,64			
Share of pine in all species		0,20			

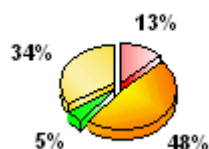
(\*) in relation to SP

## Deliverable D5.01.03 Residue biomass potential inventory results

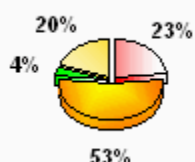
**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	17,70	19,46	17,70	5,26	7,38	3,84
Thinning wood	[PJ/a]	64,15	70,57	64,15	12,03	13,53	12,43
Roots	[PJ/a]	6,86	7,05	6,28	0,82	0,26	0,46
Wood balance	[PJ/a]	45,76	43,00	67,74	4,41	4,62	5,86
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>134,47</b>	<b>140,08</b>	<b>155,87</b>	<b>22,53</b>	<b>25,79</b>	<b>22,58</b>

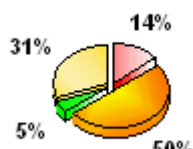
SP Theoretical



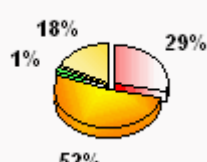
SP Technical



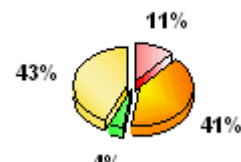
S1 Theoretical



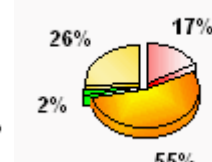
S1 Technical



S2 Theoretical



S2 Technical


**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

Share of wood by-products in sawmills	0,40	0,40	0,40
Share of wood by-products in board industry	0,20	0,20	0,20
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30
Share of wood by-products in other wood indust	0,30	0,30	0,30
Wood density	0,6 t / m3		
Heat value	15 GJ / t		
	SP	S1	S2
Production changes related to year 2004		1,40	1,20
Utilisation of industrial by-products	0,95	0,95	0,95

Sawlogs and veneer logs	8 209,20	1000 m3
Pulpwood group	5 154,80	1000 m3
Other industrial wood group	390,00	1000 m3
Wood fuel group	1 065,40	1000 m3

FAOSTAT

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	41,15	60,66	51,99	2,06	3,03	2,60

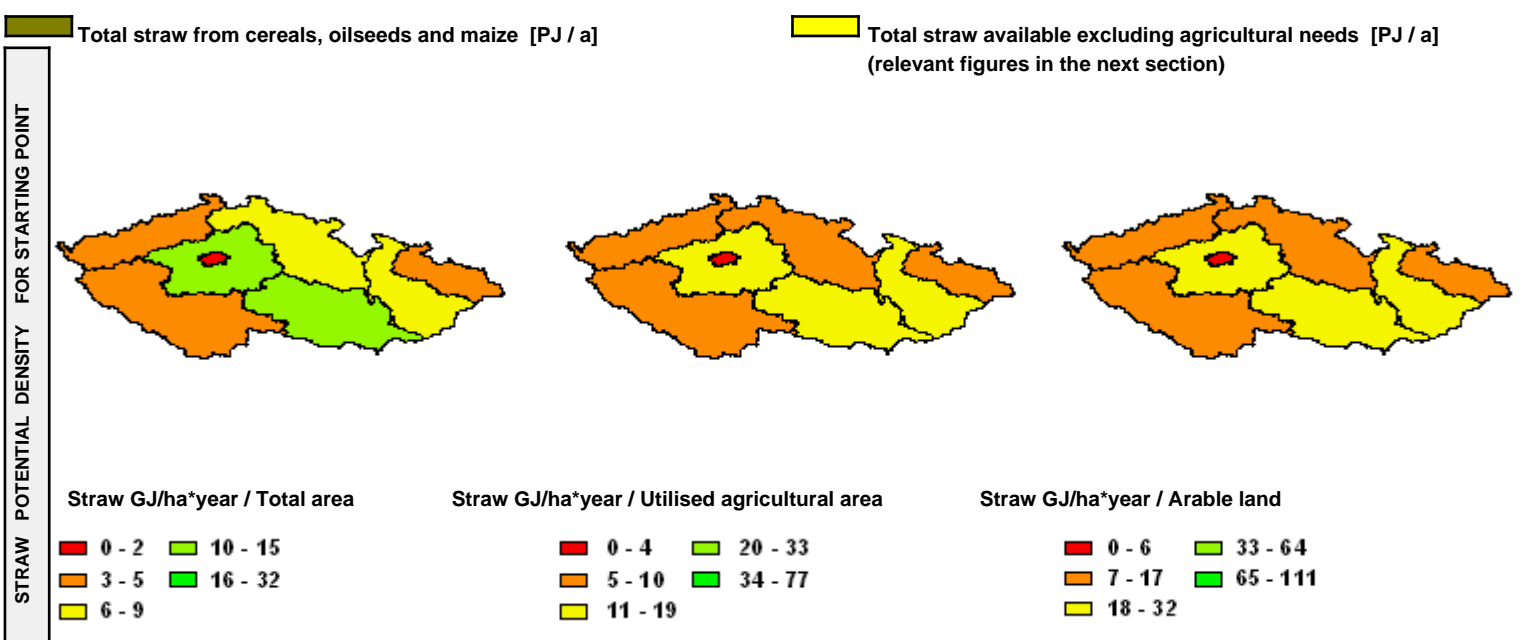
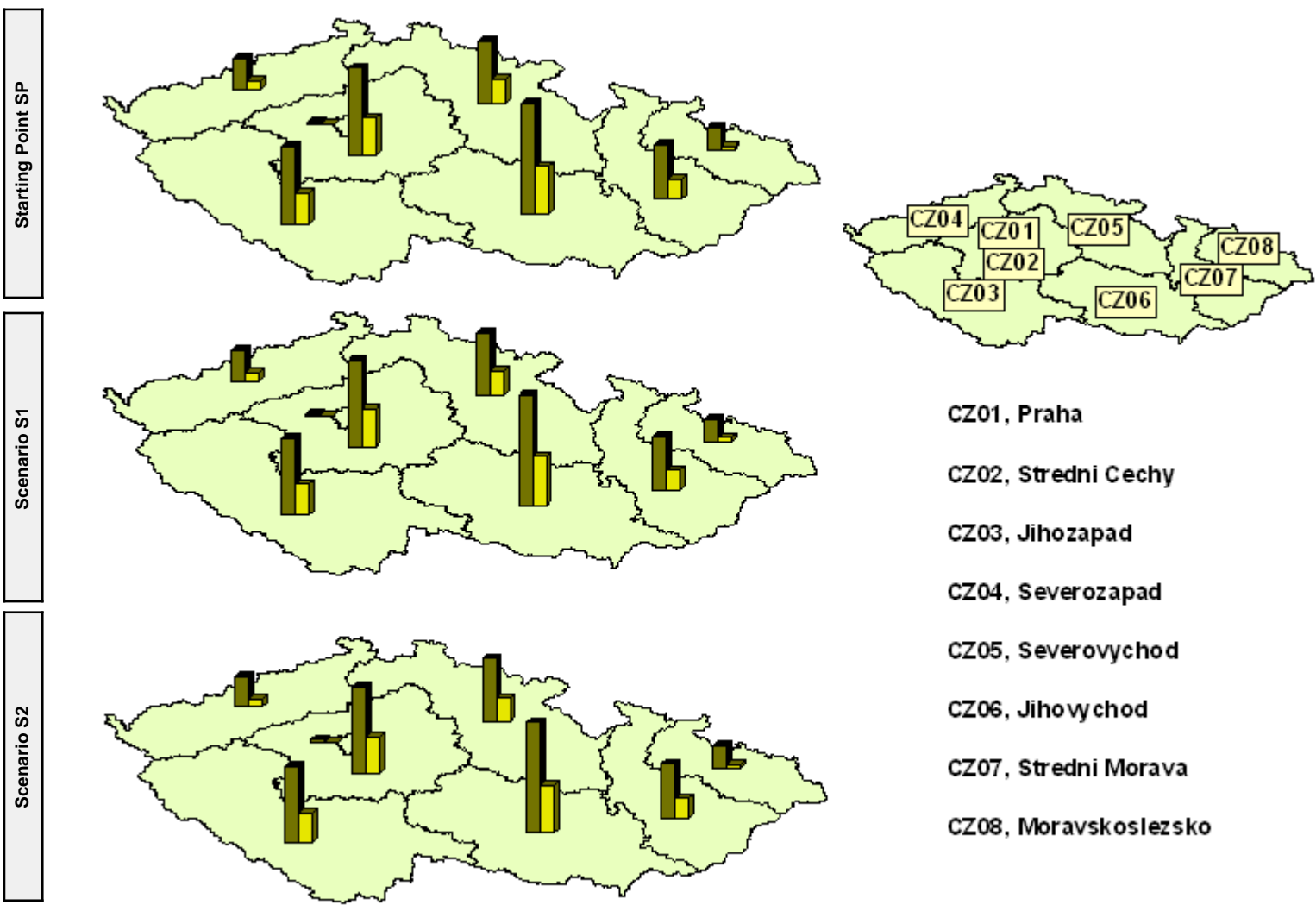
**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	10	10	10	
Meat consumption (**)	[kg / person * year]	539	567	626	
		49	51	56	(*) EUROSTAT; (**) FAO

**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	1,00	0,80	0,80	Straw for bedding (*)	1,00	1,00	1,00
Rape straw / grain ratio	1,70	1,50	1,50	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,90	0,70	0,80
				Share of pigs on straw (**)	0,70	0,50	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,20	0,20	0,20

(\*) [t / LU \* year]; (\*\*) [% of total herd]; (\*\*\*) [% of total straw]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**


**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2		
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	
	(1)	(2)	(1)	(2)	(1)	(2)	
<b>STRAW</b>	<b>121,54</b>	<b>46,79</b>	<b>112,19</b>	<b>44,33</b>	<b>112,19</b>	<b>41,99</b>	
CZ01	Praha	0,61	0,00	0,56	0,00	0,56	0,00
CZ02	Střední Čechy	23,74	10,16	21,91	9,57	21,91	9,23
CZ03	Jihozápad	20,86	8,27	19,24	7,83	19,24	7,45
CZ04	Severozápad	8,37	2,23	7,69	2,11	7,69	1,86
CZ05	Severovýchod	17,05	6,44	15,74	6,11	15,74	5,76
CZ06	Jihovýchod	30,08	13,04	27,82	12,38	27,82	11,91
CZ07	Střední Morava	14,68	5,49	13,55	5,19	13,55	4,89
CZ08	Moravskoslezsko	6,15	1,16	5,68	1,14	5,68	0,89
<b>FORESTRY</b>		<b>134,47</b>	<b>22,53</b>	<b>140,08</b>	<b>25,79</b>	<b>155,87</b>	<b>22,58</b>
	Logging residues	17,70	5,26	19,46	7,38	17,70	3,84
	Thinning wood	64,15	12,03	70,57	13,53	64,15	12,43
	Roots	6,86	0,82	7,05	0,26	6,28	0,46
	Wood balance	45,76	4,41	43,00	4,62	67,74	5,86
<b>WOOD INDUSTRY</b>		<b>41,15</b>	<b>2,06</b>	<b>60,66</b>	<b>3,03</b>	<b>51,99</b>	<b>2,60</b>
<b>TOTAL BIOMASS</b>		<b>297,16</b>	<b>71,38</b>	<b>312,93</b>	<b>73,15</b>	<b>320,05</b>	<b>67,17</b>

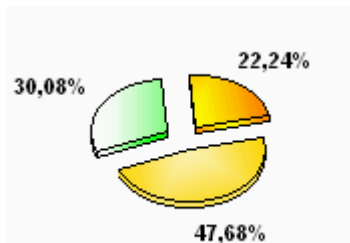
## Germany



### GENERAL INFORMATION

Population 83 mln  
Population density 231 person / km<sup>2</sup>

Total area 35703 1000 ha  
■ Utilised agricultural area 17022 1000 ha  
■ Wooded area 10740 1000 ha  
■ Other 7941 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	11827	1000 ha	Cereal production (*)	45 778,96	1000 t
Fallow land	846	1000 ha	Oilseed production (*)		1000 t
Permanent crops	206	1000 ha	Maize production (*)	3 637,68	1000 t
Permanent grassland	4982	1000 ha	Cattle production	10 047,68	1000 LU
Number of agricultural holdings	412,30	1000 ton	Pig (*)	5 000,84	1000 LU
Average farm size	45,73	1000 ton	Sheep (*)	249,98	1000 LU

(\* average 2000-2004      LU Livestock Unit      EUROSTAT)

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	10 740,00	1000 ha
Area of forest available for wood supply	10 142,00	1000 ha
Area of coniferous forest available for wood supply	5 852,00	1000 ha
Area of broadleaves forest available for wood supply	4 290,00	1000 ha
Average volume of growing stock on forest available for wood supply	278,10	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	88 998,00	1000 t
Annual fellings overbark on forest available for wood supply	49 354,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	37 768,24	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	11 585,76	1000 t

*data for 2000, TBFRA*

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,20	0,25	0,20	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	1,00	1,00	1,00	0,40	0,88	0,42
Wood balance	0,70	0,70	0,70	0,20	0,15	0,30	0,20	0,16	0,18

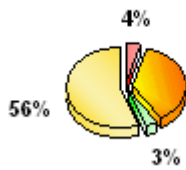
#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,19	1,13
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,77	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,13	(*) in relation to SP		
Logging residues factor for broadleaves species		0,13			
Root biomass ratio		0,25			
Share of spruce in all species		0,40			
Share of pine in all species		0,26			

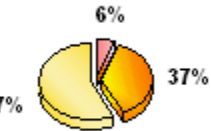
**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	19,99	23,79	22,59	5,60	8,33	4,61
Thinning wood	[PJ/a]	195,44	232,58	220,85	36,65	44,58	42,79
Roots	[PJ/a]	16,60	18,43	17,17	0,00	0,00	0,00
Wood balance	[PJ/a]	290,98	256,56	341,62	55,87	54,95	58,83
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>523,01</b>	<b>531,35</b>	<b>602,23</b>	<b>98,11</b>	<b>107,86</b>	<b>106,22</b>

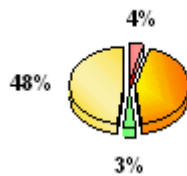
SP Theoretical



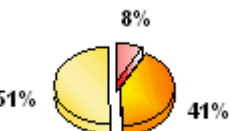
SP Technical



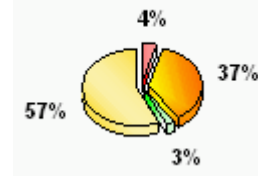
S1 Theoretical



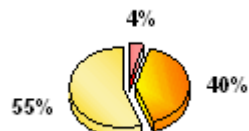
S1 Technical



S2 Theoretical



S2 Technical


**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

Share of wood by-products in sawmills	0,40	0,40	0,40	<table border="1"> <tbody> <tr> <td>Sawlogs and veneer logs</td> <td>29 254,00</td> <td>1000 m3</td> </tr> <tr> <td>Pulpwood group</td> <td>10 998,20</td> <td>1000 m3</td> </tr> <tr> <td>Other industrial wood group</td> <td>3 631,20</td> <td>1000 m3</td> </tr> <tr> <td>Wood fuel group</td> <td>4 368,40</td> <td>1000 m3</td> </tr> </tbody> </table> FAOSTAT	Sawlogs and veneer logs	29 254,00	1000 m3	Pulpwood group	10 998,20	1000 m3	Other industrial wood group	3 631,20	1000 m3	Wood fuel group	4 368,40	1000 m3
Sawlogs and veneer logs	29 254,00	1000 m3														
Pulpwood group	10 998,20	1000 m3														
Other industrial wood group	3 631,20	1000 m3														
Wood fuel group	4 368,40	1000 m3														
Share of wood by-products in board industry	0,20	0,20	0,20													
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30													
Share of wood by-products in other wood indust	0,30	0,30	0,30													
Wood density	0,6	t / m3														
Heat value	15	GJ / t														
Production changes related to year 2004	SP	S1	S2													
Utilisation of industrial by-products	0,95	0,95	0,95													

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	136,83	173,17	141,94	6,84	8,66	7,10

**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	83	83	83	
Meat consumption (**)	[kg / person * year]	602	616	642	
		91	93	97	(*) EUROSTAT; (**) FAO

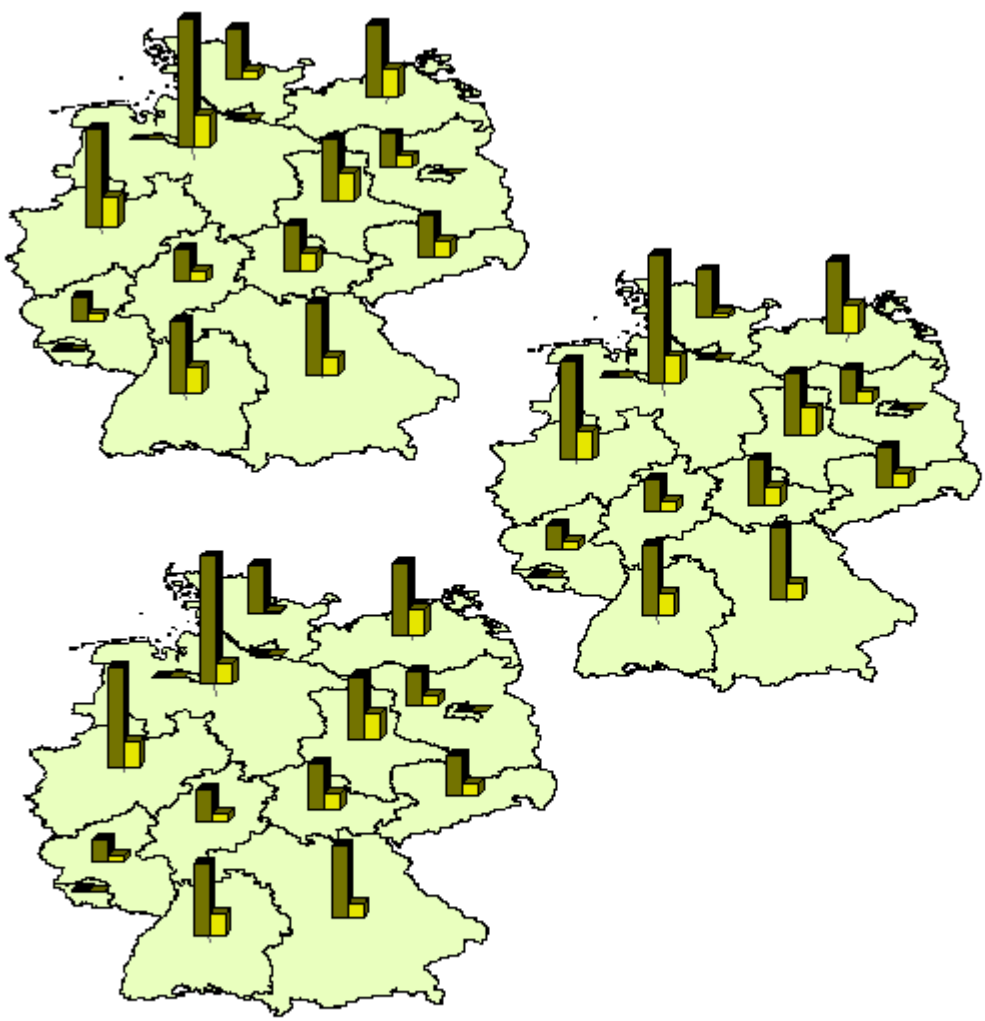
**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	1,70	1,40	1,40	Straw for fodder (*)	0,10	0,10	0,10
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,70	0,60	0,70
				Share of pigs on straw (**)	0,50	0,50	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,20	0,20	0,20

(\*) [t / LU \* year]; (\*\*) [% of total herd]; (\*\*\*) [% of total straw]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**

Starting Point SP  
Scenario S1  
Scenario S2

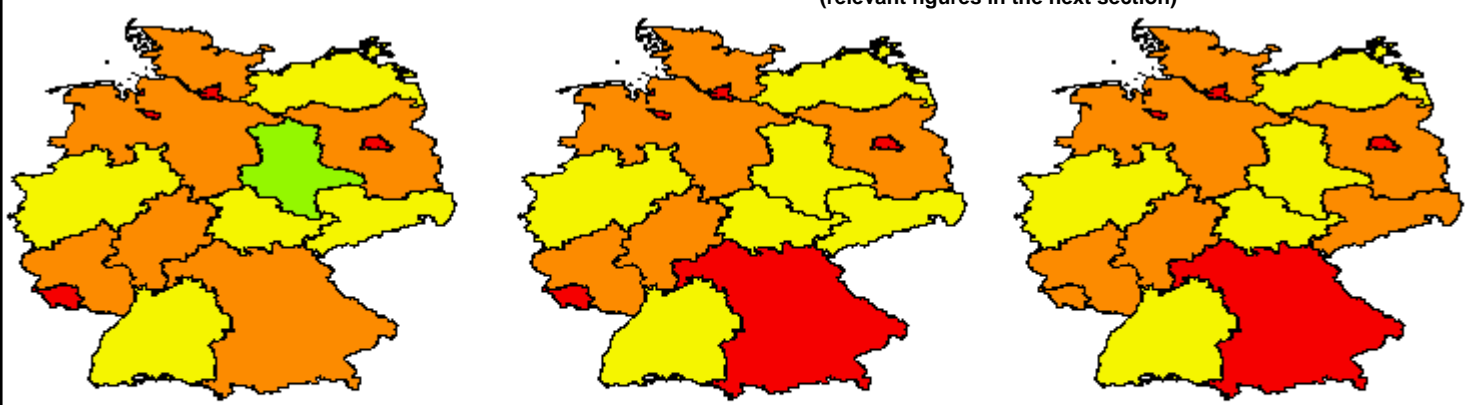


- DE1, Baden-Württemberg
- DE2, Bayern
- DE3, Berlin
- DE4, Brandenburg
- DE5, Bremen
- DE6, Hamburg
- DE7, Hessen
- DE8, Mecklenburg-Vorpommern
- DE9, Niedersachsen
- DEA, Nordrhein-Westfalen
- DEB, Rheinland-Pfalz
- DEC, Saarland
- DED, Sachsen
- DEE, Sachsen-Anhalt
- DEF, Schleswig-Holstein
- DEG, Thüringen

Total straw from cereals, oilseeds and maize [PJ / a]

Total straw available excluding agricultural needs [PJ / a] (relevant figures in the next section)

STRAW POTENTIAL DENSITY FOR STARTING POINT



Straw GJ/ha\*year / Total area

Straw GJ/ha\*year / Utilised agricultural area

Straw GJ/ha\*year / Arable land

- 0 - 2
- 3 - 5
- 6 - 9
- 10 - 15
- 16 - 32

- 0 - 4
- 5 - 10
- 11 - 19
- 20 - 33
- 34 - 77

- 0 - 6
- 7 - 17
- 18 - 32
- 33 - 64
- 65 - 111

**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

		Starting Point		Scenario S1		Scenario S2	
		PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
		(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>		<b>514,50</b>	<b>163,63</b>	<b>450,14</b>	<b>132,58</b>	<b>450,14</b>	<b>117,26</b>
DE1	Baden-Württemberg	49,89	17,31	44,00	14,40	44,00	12,99
DE2	Bayern	50,08	12,66	44,04	10,01	44,04	8,05
DE3	Berlin	0,00	0,00	0,00	0,00	0,00	0,00
DE4	Brandenburg	23,98	8,41	20,91	6,97	20,91	6,43
DE5	Bremen	0,00	0,00	0,00	0,00	0,00	0,00
DE6	Hamburg	0,00	0,00	0,00	0,00	0,00	0,00
DE7	Hessen	23,32	7,45	20,31	6,02	20,31	5,41
DE8	Mecklenburg-Vorpomm	51,36	20,46	44,61	17,25	44,61	16,50
DE9	Niedersachsen	89,77	22,28	78,71	16,77	78,71	12,90
DEA	Nordrhein-Westfalen	69,55	22,15	61,31	17,73	61,31	15,24
DEB	Rheinland-Pfalz	16,51	5,19	14,39	4,22	14,39	3,79
DEC	Saarland	1,44	0,28	1,25	0,20	1,25	0,15
DED	Sachsen	28,31	10,37	24,69	8,67	24,69	8,09
DEE	Sachsen-Anhalt	43,65	18,94	38,03	16,16	38,03	15,66
DEF	Schleswig-Holstein	34,17	5,58	29,66	3,67	29,66	2,10
DEG	Thüringen	32,47	12,55	28,23	10,51	28,23	9,95
<b>FORESTRY</b>		<b>523,01</b>	<b>98,11</b>	<b>531,35</b>	<b>107,86</b>	<b>602,23</b>	<b>106,22</b>
	Logging residues	19,99	5,60	23,79	8,33	22,59	4,61
	Thinning wood	195,44	36,65	232,58	44,58	220,85	42,79
	Roots	16,60	0,00	18,43	0,00	17,17	0,00
	Wood balance	290,98	55,87	256,56	54,95	341,62	58,83
<b>WOOD INDUSTRY</b>		<b>136,83</b>	<b>6,84</b>	<b>173,17</b>	<b>8,66</b>	<b>141,94</b>	<b>7,10</b>
<b>TOTAL BIOMASS</b>		<b>1 174,34</b>	<b>268,58</b>	<b>1 154,66</b>	<b>249,10</b>	<b>1 194,31</b>	<b>230,58</b>

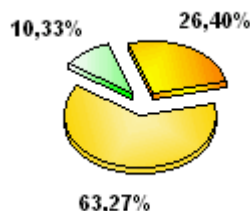
## Denmark



### GENERAL INFORMATION

Population 5 mln  
Population density 125 person / km<sup>2</sup>

Total area 4310 1000 ha  
 Utilised agricultural area 2727 1000 ha  
 Wooded area 445 1000 ha  
 Other 1138 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	2533	1000 ha	Cereal production (*)	9 172,60	1000 t
Fallow land	200	1000 ha	Oilseed production (*)	268,03	1000 t
Permanent crops	9	1000 ha	Maize production (*)	0,00	1000 t
Permanent grassland	184	1000 ha	Cattle production	1 270,54	1000 LU
Number of agricultural holdings	48,39	1000 ton	Pig (*)	2 202,30	1000 LU
Average farm size	59,78	1000 ton	Sheep (*)	10,24	1000 LU

(\*) average 2000-2004      LU Livestock Unit      EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	445,00	1000 ha
Area of forest available for wood supply	440,00	1000 ha
Area of coniferous forest available for wood supply	168,00	1000 ha
Area of broadleaves forest available for wood supply	272,00	1000 ha
Average volume of growing stock on forest available for wood supply	122,50	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	3 200,00	1000 t
Annual fellings overbark on forest available for wood supply	2 194,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	1 468,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	726,00	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,20	0,25	0,20	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	1,00	1,00	1,00	0,40	0,88	0,42
Wood balance	0,70	0,70	0,70	0,20	0,15	0,30	0,00	0,00	0,00

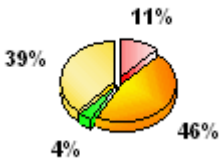
#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,19	1,13
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,67	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,35	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,51			
Share of pine in all species		0,10			

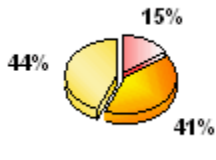
### FOREST BIOMASS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	2,14	2,54	2,41	0,60	0,89	0,49
Thinning wood	[PJ/a]	8,69	10,34	9,82	1,63	1,98	1,90
Roots	[PJ/a]	0,68	0,76	0,70	0,00	0,00	0,00
Wood balance	[PJ/a]	7,24	5,39	8,65	1,74	1,38	1,82
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>18,75</b>	<b>19,03</b>	<b>21,58</b>	<b>3,97</b>	<b>4,25</b>	<b>4,21</b>

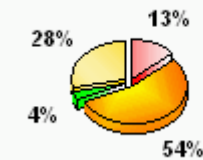
SP Theoretical



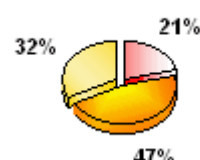
SP Technical



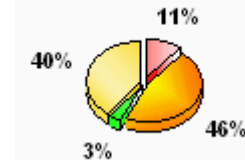
S1 Theoretical



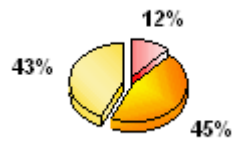
S1 Technical



S2 Theoretical



S2 Technical



### WOOD INDUSTRY BY - PRODUCTS POTENTIAL

#### DATA, ASSUMPTIONS, PARAMETERS

Share of wood by-products in sawmills	0,40	0,40	0,40	<table border="1"> <tbody> <tr> <td>Sawlogs and veneer logs</td> <td>651,58</td> <td>1000 m3</td> </tr> <tr> <td>Pulpwood group</td> <td>259,56</td> <td>1000 m3</td> </tr> <tr> <td>Other industrial wood group</td> <td>268,42</td> <td>1000 m3</td> </tr> <tr> <td>Wood fuel group</td> <td>673,46</td> <td>1000 m3</td> </tr> </tbody> </table> <p>FAOSTAT</p>	Sawlogs and veneer logs	651,58	1000 m3	Pulpwood group	259,56	1000 m3	Other industrial wood group	268,42	1000 m3	Wood fuel group	673,46	1000 m3
Sawlogs and veneer logs	651,58	1000 m3														
Pulpwood group	259,56	1000 m3														
Other industrial wood group	268,42	1000 m3														
Wood fuel group	673,46	1000 m3														
Share of wood by-products in board industry	0,20	0,20	0,20													
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30													
Share of wood by-products in other wood indust	0,30	0,30	0,30													
Wood density	0,6 t / m3															
Heat value	15 GJ / t															
		SP	S1	S2												
Production changes related to year 2004			1,20	1,00												
Utilisation of industrial by-products		0,95	0,95	0,95												

### WOOD INDUSTRY BY-PRODUCTS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	3,72	4,73	3,94	0,19	0,24	0,20

### AGRICULTURAL BIOMASS POTENTIAL - STRAW

#### MAIN ASSUMPTIONS

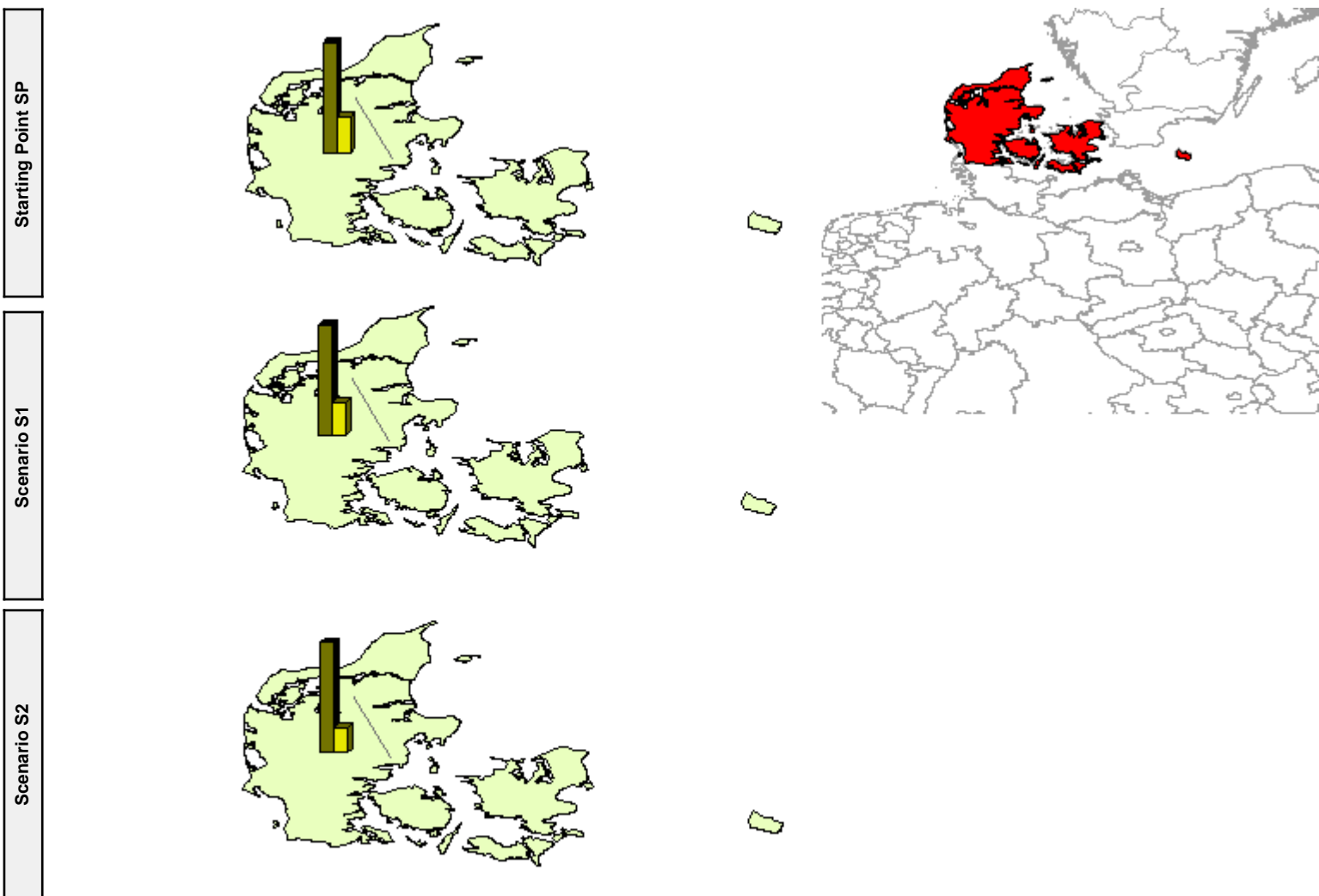
Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	5	6	6	
Meat consumption (**)	[kg / person * year]	602	616	642	
		91	93	97	(*) EUROSTAT; (**) FAO

#### CALCULATION PARAMETERS

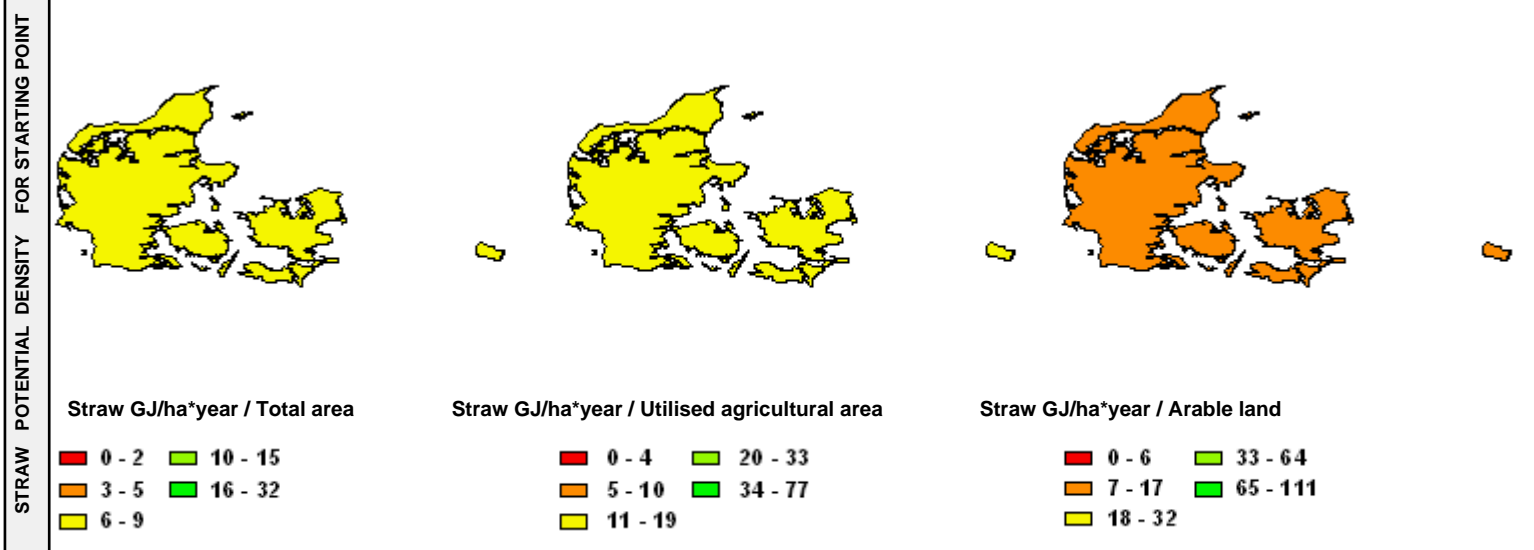
	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	1,70	1,40	1,40	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,60	0,50	0,60
				Share of pigs on straw (**)	0,30	0,30	0,50
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,20	0,20	0,20

(\*) [ t / LU \* year ]; (\*\*) [ % of total herd ]; (\*\*\*) [ % of total straw ]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**



Total straw from cereals, oilseeds and maize [PJ / a]      Total straw available excluding agricultural needs [PJ / a] (relevant figures in the next section)



**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

		Starting Point		Scenario S1		Scenario S2	
		PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
		(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>		<b>102,14</b>	<b>33,55</b>	<b>90,26</b>	<b>27,26</b>	<b>90,26</b>	<b>20,69</b>
DK	Denmark	102,14	33,55	90,26	27,26	90,26	20,69
<b>FORESTRY</b>		<b>18,75</b>	<b>3,97</b>	<b>19,03</b>	<b>4,25</b>	<b>21,58</b>	<b>4,21</b>
	Logging residues	2,14	0,60	2,54	0,89	2,41	0,49
	Thinning wood	8,69	1,63	10,34	1,98	9,82	1,90
	Roots	0,68	0,00	0,76	0,00	0,70	0,00
	Wood balance	7,24	1,74	5,39	1,38	8,65	1,82
<b>WOOD INDUSTRY</b>		<b>3,72</b>	<b>0,19</b>	<b>4,73</b>	<b>0,24</b>	<b>3,94</b>	<b>0,20</b>
<b>TOTAL BIOMASS</b>		<b>124,61</b>	<b>37,71</b>	<b>114,02</b>	<b>31,75</b>	<b>115,78</b>	<b>25,10</b>

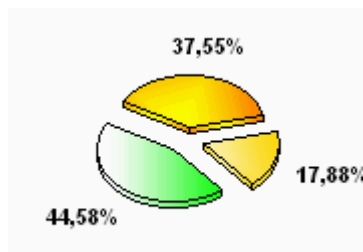
## Estonia



### GENERAL INFORMATION

Population 1 mln  
Population density 31 person / km<sup>2</sup>

Total area 4523 1000 ha  
 Utilised agricultural area 809 1000 ha  
 Wooded area 2016 1000 ha  
 Other 1698 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	639	1000 ha	Cereal production (*)	571,38	1000 t
Fallow land	28	1000 ha	Oilseed production (*)	54,08	1000 t
Permanent crops	13	1000 ha	Maize production (*)		1000 t
Permanent grassland	157	1000 ha	Cattle production	196,34	1000 LU
Number of agricultural holdings	36,85	1000 ton	Pig (*)	60,56	1000 LU
Average farm size	31,89	1000 ton	Sheep (*)	3,16	1000 LU

(\* average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	2 016,00	1000 ha
Area of forest available for wood supply	1 932,00	1000 ha
Area of coniferous forest available for wood supply	746,00	1000 ha
Area of broadleaves forest available for wood supply	1 186,00	1000 ha
Average volume of growing stock on forest available for wood supply	159,00	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	7 137,00	1000 t
Annual fellings overbark on forest available for wood supply	4 028,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	0,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	4 028,00	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

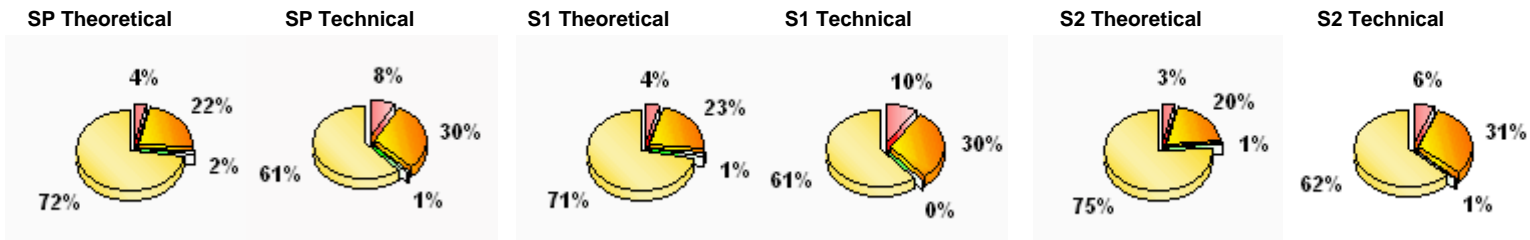
	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,15	0,19	0,15	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	0,60	0,39	0,75	0,40	0,88	0,42
Wood balance	0,85	0,85	0,85	0,20	0,15	0,30	0,00	0,00	0,00

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,10	1,00
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,00	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,20	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,25			
Share of pine in all species		0,28			

### FOREST BIOMASS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	2,61	2,87	2,61	0,78	1,09	0,57
Thinning wood	[PJ/a]	15,95	17,55	15,95	2,99	3,36	3,09
Roots	[PJ/a]	1,08	1,11	0,99	0,13	0,04	0,07
Wood balance	[PJ/a]	51,39	53,96	59,09	6,17	6,88	6,20
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>71,03</b>	<b>75,49</b>	<b>78,65</b>	<b>10,06</b>	<b>11,37</b>	<b>9,93</b>



### WOOD INDUSTRY BY - PRODUCTS POTENTIAL

#### DATA, ASSUMPTIONS, PARAMETERS

Share of wood by-products in sawmills	0,40	0,40	0,40	<table border="1"> <tbody> <tr> <td>Sawlogs and veneer logs</td> <td>3 720,00</td> <td>1000 m3</td> </tr> <tr> <td>Pulpwood group</td> <td>3 378,00</td> <td>1000 m3</td> </tr> <tr> <td>Other industrial wood group</td> <td>1 040,00</td> <td>1000 m3</td> </tr> <tr> <td>Wood fuel group</td> <td>1 944,00</td> <td>1000 m3</td> </tr> </tbody> </table> <p>FAOSTAT</p>	Sawlogs and veneer logs	3 720,00	1000 m3	Pulpwood group	3 378,00	1000 m3	Other industrial wood group	1 040,00	1000 m3	Wood fuel group	1 944,00	1000 m3
Sawlogs and veneer logs	3 720,00	1000 m3														
Pulpwood group	3 378,00	1000 m3														
Other industrial wood group	1 040,00	1000 m3														
Wood fuel group	1 944,00	1000 m3														
Share of wood by-products in board industry	0,20	0,20	0,20													
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30													
Share of wood by-products in other wood indust	0,30	0,30	0,30													
Wood density	0,6 t / m3															
Heat value	15 GJ / t															
		SP	S1	S2												
Production changes related to year 2004			1,40	1,20												
Utilisation of industrial by-products		0,95	0,95	0,95												

### WOOD INDUSTRY BY-PRODUCTS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	23,35	34,91	29,92	1,17	1,75	1,50

### AGRICULTURAL BIOMASS POTENTIAL - STRAW

#### MAIN ASSUMPTIONS

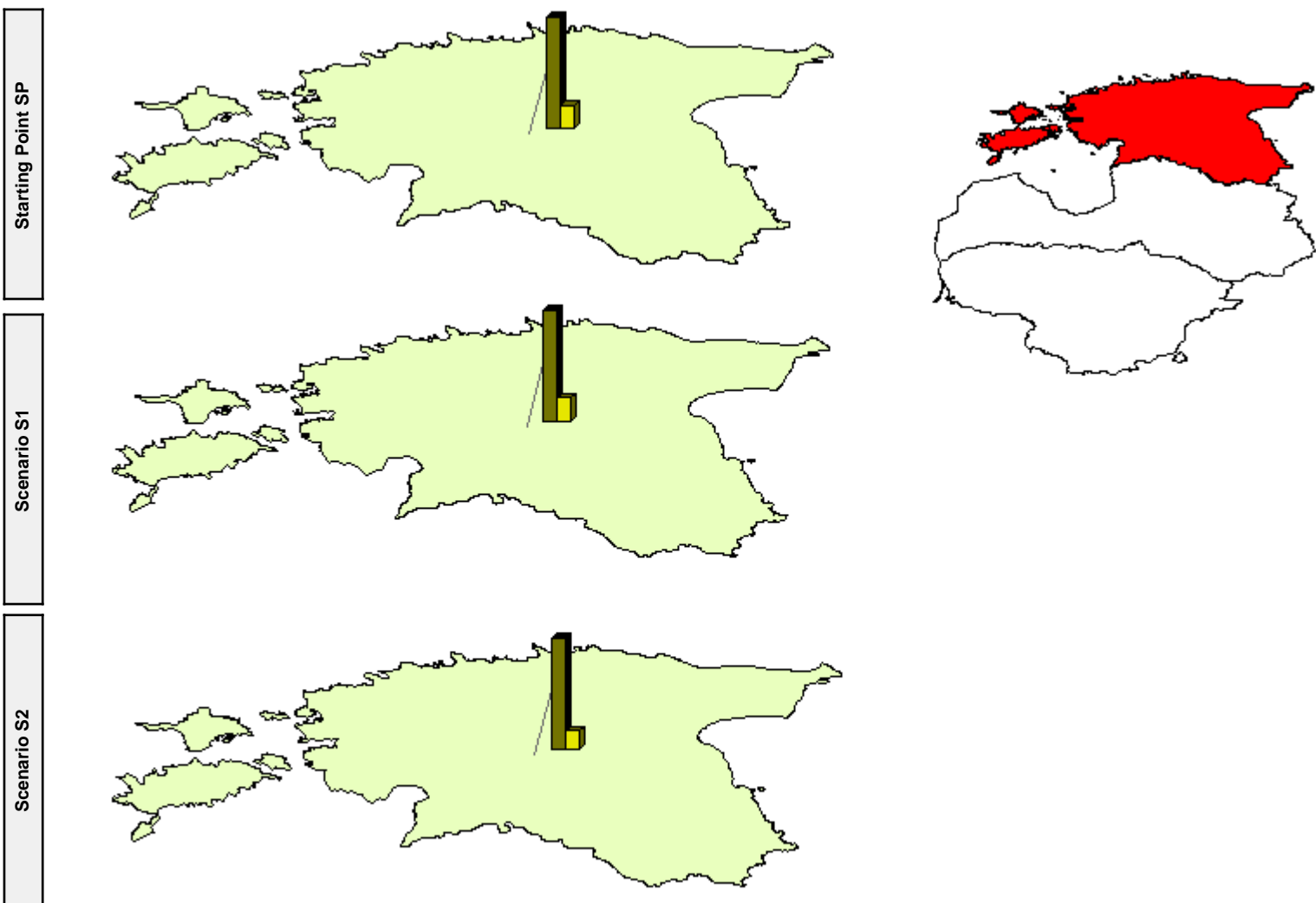
Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	539	567	626	
Meat consumption (**)	[kg / person * year]	49	51	56	

(\*) EUROSTAT; (\*\*) FAO

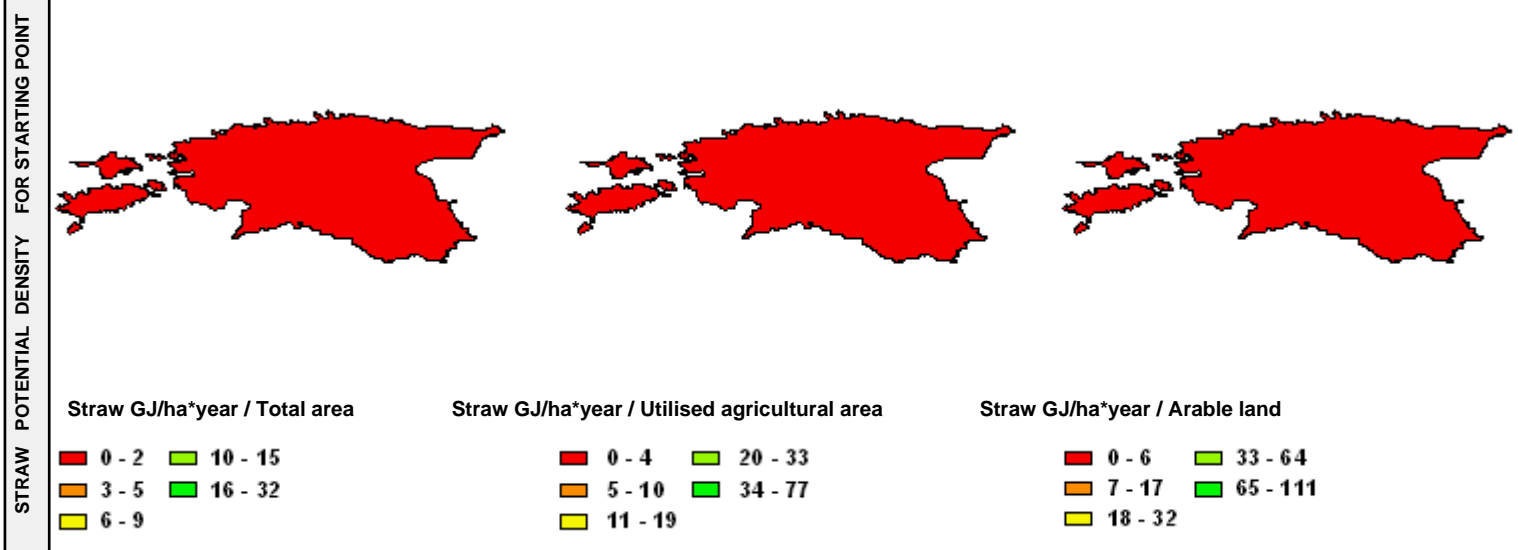
#### CALCULATION PARAMETERS

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	1,00	0,80	0,80	Straw for bedding (*)	1,00	1,00	1,00
Rape straw / grain ratio	1,70	1,50	1,50	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,90	0,70	0,80
				Share of pigs on straw (**)	0,70	0,50	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,10	0,10	0,10

(\*) [t / LU \* year]; (\*\*) [% of total herd]; (\*\*\*) [% of total straw]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**


■ Total straw from cereals, oilseeds and maize [PJ / a]
 ■ Total straw available excluding agricultural needs [PJ / a] (relevant figures in the next section)



**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

		Starting Point		Scenario S1		Scenario S2	
		PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
		(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>		<b>8,67</b>	<b>1,79</b>	<b>7,54</b>	<b>1,60</b>	<b>7,54</b>	<b>1,23</b>
EE	Estonia	8,67	1,79	7,54	1,60	7,54	1,23
<b>FORESTRY</b>		<b>71,03</b>	<b>10,06</b>	<b>75,49</b>	<b>11,37</b>	<b>78,65</b>	<b>9,93</b>
	Logging residues	2,61	0,78	2,87	1,09	2,61	0,57
	Thinning wood	15,95	2,99	17,55	3,36	15,95	3,09
	Roots	1,08	0,13	1,11	0,04	0,99	0,07
	Wood balance	51,39	6,17	53,96	6,88	59,09	6,20
<b>WOOD INDUSTRY</b>		<b>23,35</b>	<b>1,17</b>	<b>34,91</b>	<b>1,75</b>	<b>29,92</b>	<b>1,50</b>
<b>TOTAL BIOMASS</b>		<b>103,05</b>	<b>13,02</b>	<b>117,94</b>	<b>14,72</b>	<b>116,11</b>	<b>12,66</b>

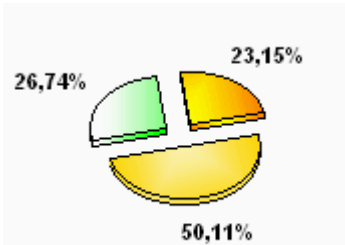
## Spain



### GENERAL INFORMATION

Population 43 mln  
Population density person / km<sup>2</sup>

Total area 50518 1000 ha  
 Utilised agricultural area 25314 1000 ha  
 Wooded area 13509 1000 ha  
 Other 11695 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	13266	1000 ha	Cereal production (*)	21 380,25	1000 t
Fallow land	3320	1000 ha	Oilseed production (*)	856,08	1000 t
Permanent crops	4956	1000 ha	Maize production (*)	4 438,53	1000 t
Permanent grassland	6990	1000 ha	Cattle production	4 470,06	1000 LU
Number of agricultural holdings	1 127,97	1000 ton	Pig (*)	4 703,94	1000 LU
Average farm size	29,53	1000 ton	Sheep (*)	2 385,12	1000 LU

(\*) average 2000-2004

LU Livestock Unit

EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	13 509,00	1000 ha
Area of forest available for wood supply	10 479,00	1000 ha
Area of coniferous forest available for wood supply	4 452,00	1000 ha
Area of broadleaves forest available for wood supply	6 027,00	1000 ha
Average volume of growing stock on forest available for wood supply	46,50	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	28 589,00	1000 t
Annual fellings overbark on forest available for wood supply	11 028,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	6 577,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	4 451,00	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

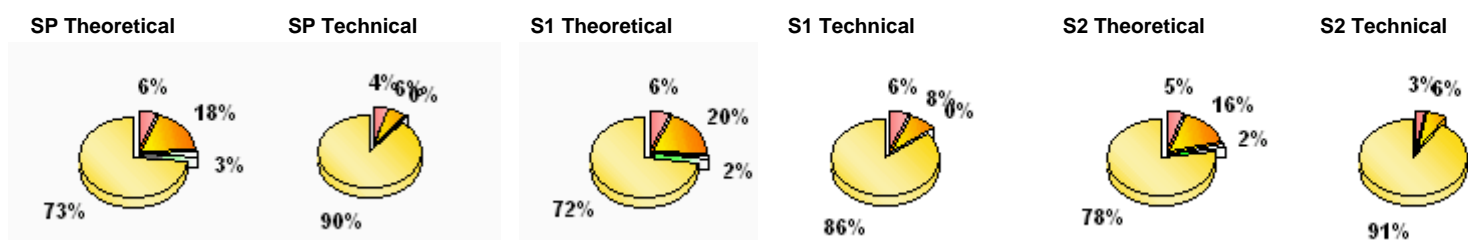
	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,10	0,13	0,10	0,30	0,30	0,40	0,60	0,40	0,69
Thinning wood	0,75	0,75	0,75				0,60	0,40	0,54
Root biomass	0,50	0,50	0,50	0,80	0,49	1,00	0,50	0,94	0,53
Wood balance	0,50	0,50	0,50	0,20	0,15	0,30	0,00	0,00	0,00

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,10	1,00
Factor of final fellings		0,60	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,60	Factor of clear final felling	0,38	0,29
Logging residues factor for coniferous species		0,20	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,05			
Share of pine in all species		0,57			

### FOREST BIOMASS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	9,53	10,48	9,53	2,40	3,85	1,60
Thinning wood	[PJ/a]	31,76	34,94	31,76	3,18	5,24	3,65
Roots	[PJ/a]	4,57	3,86	3,53	0,23	0,06	0,00
Wood balance	[PJ/a]	126,44	128,79	157,32	50,55	54,71	55,03
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>172,29</b>	<b>178,07</b>	<b>202,13</b>	<b>56,35</b>	<b>63,87</b>	<b>60,28</b>



### WOOD INDUSTRY BY - PRODUCTS POTENTIAL

#### DATA, ASSUMPTIONS, PARAMETERS

Share of wood by-products in sawmills	0,40	0,40	0,40	<table border="1"> <tbody> <tr> <td>Sawlogs and veneer logs</td> <td>7 379,20</td> <td>1000 m3</td> </tr> <tr> <td>Pulpwood group</td> <td>5 447,40</td> <td>1000 m3</td> </tr> <tr> <td>Other industrial wood group</td> <td>804,80</td> <td>1000 m3</td> </tr> <tr> <td>Wood fuel group</td> <td>1 905,80</td> <td>1000 m3</td> </tr> </tbody> </table> <p style="text-align: right;">FAOSTAT</p>	Sawlogs and veneer logs	7 379,20	1000 m3	Pulpwood group	5 447,40	1000 m3	Other industrial wood group	804,80	1000 m3	Wood fuel group	1 905,80	1000 m3
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Pulpwood group	5 447,40	1000 m3														
Other industrial wood group	804,80	1000 m3														
Wood fuel group	1 905,80	1000 m3														
Share of wood by-products in board industry	0,20	0,20	0,20													
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30													
Share of wood by-products in other wood indust	0,30	0,30	0,30													
Wood density	0,6 t / m3															
Heat value	15 GJ / t															
		SP	S1	S2												
Production changes related to year 2004			1,40	1,20												
Utilisation of industrial by-products		0,95	0,95	0,95												

### WOOD INDUSTRY BY-PRODUCTS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	40,08	59,47	50,98	2,00	2,97	2,55

### AGRICULTURAL BIOMASS POTENTIAL - STRAW

#### MAIN ASSUMPTIONS

		2005	2010	2020	Straw LHV: 13,1 MJ/kg
Population (*)	[mln]	43	45	46	
Cereal consumption (**)	[kg / person * year]	602	616	642	
Meat consumption (**)	[kg / person * year]	91	93	97	(*) EUROSTAT; (**) FAO

#### CALCULATION PARAMETERS

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,90	0,70	0,70	Straw for bedding (*)	1,00	1,00	1,00
Rape straw / grain ratio	1,70	1,50	1,50	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,80	0,70	0,70
				Share of pigs on straw (**)	0,60	0,50	0,60
				Straw for soil (***)	0,35	0,35	0,35
				Straw for other purposes (****)	0,20	0,20	0,20

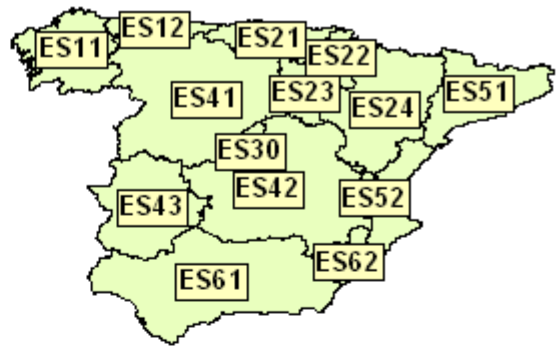
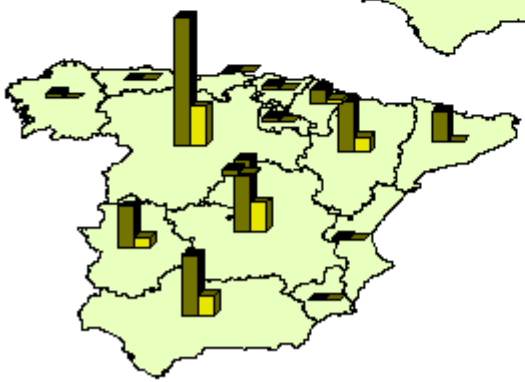
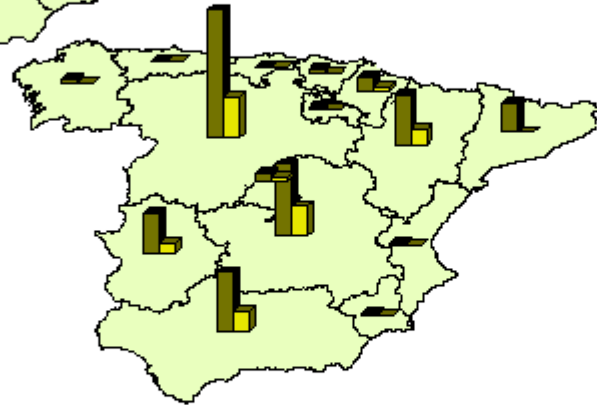
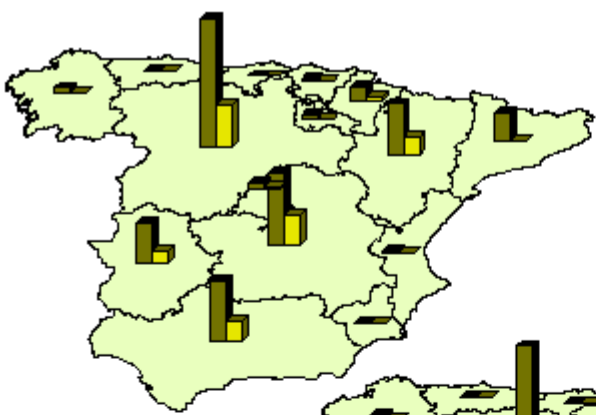
(\*) [ t / LU \* year ]; (\*\*) [ % of total herd ]; (\*\*\*) [ % of total straw ]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**

Starting Point SP

Scenario S1

Scenario S2

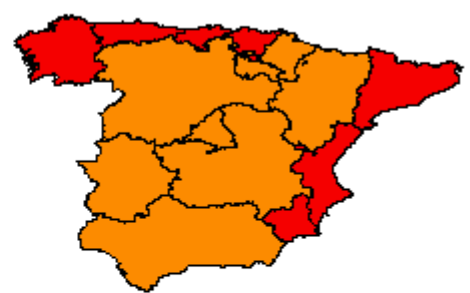
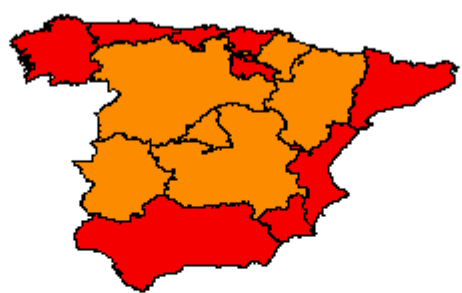
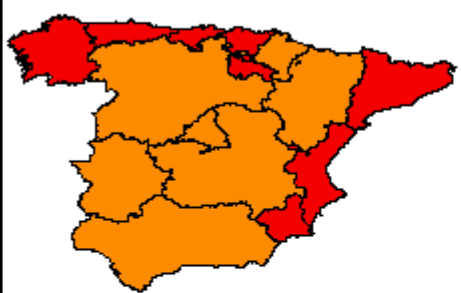


- ES11, Galicia
- ES12, Principado de Asturias
- ES13, Cantabria
- ES21, País Vasco
- ES22, Comunidad Foral de Navarra
- ES23, La Rioja
- ES24, Aragón
- ES30, Comunidad de Madrid
- ES41, Castilla y León
- ES42, Castilla-La Mancha
- ES43, Extremadura
- ES51, Cataluña
- ES52, Comunidad Valenciana
- ES61, Andalucía
- ES62, Región de Murcia

Total straw from cereals, oilseeds and maize [PJ / a]

Total straw available excluding agricultural needs [PJ / a] (relevant figures in the next section)

STRAW POTENTIAL DENSITY FOR STARTING POINT



Straw GJ/ha\*year / Total area

0 - 2	10 - 15
3 - 5	16 - 32
6 - 9	

Straw GJ/ha\*year / Utilised agricultural area

0 - 4	20 - 33
5 - 10	34 - 77
11 - 19	

Straw GJ/ha\*year / Arable land

0 - 6	33 - 64
7 - 17	65 - 111
18 - 32	

**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

		Starting Point		Scenario S1		Scenario S2	
		PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
		(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>		<b>358,31</b>	<b>111,30</b>	<b>327,11</b>	<b>98,59</b>	<b>327,11</b>	<b>94,57</b>
ES11	Galicia	4,10	0,00	3,82	0,00	3,82	0,00
ES12	Principado de Asturias	0,11	0,00	0,10	0,00	0,10	0,00
ES13	Cantabria	0,04	0,00	0,03	0,00	0,03	0,00
ES21	Pais Vasco	2,84	0,00	2,52	0,00	2,52	0,00
ES22	Comunidad Foral de N	12,22	4,03	11,04	3,50	11,04	3,35
ES23	La Rioja	3,06	0,83	2,72	0,68	2,72	0,65
ES24	Aragón	43,53	14,83	40,01	13,45	40,01	12,27
ES30	Comunidad de Madrid	5,80	2,28	5,34	2,05	5,34	2,04
ES41	Castilla y León	110,74	36,70	100,52	31,91	100,52	30,94
ES42	Castilla-la Mancha	62,17	25,91	56,32	23,32	56,32	22,79
ES43	Extremadura	34,28	9,49	31,72	8,23	31,72	7,79
ES51	Cataluna	24,96	0,00	22,85	0,00	22,85	0,00
ES52	Comunidad Valenciana	2,19	0,00	1,95	0,00	1,95	0,00
ES53	Illes Balears	0,71	0,00	0,64	0,00	0,64	0,00
ES61	Andalucia	50,72	17,23	46,78	15,45	46,78	14,74
ES62	Región de Murcia	0,84	0,00	0,75	0,00	0,75	0,00
ES70	Canarias (ES)	0,00	0,00	0,00	0,00	0,00	0,00
<b>FORESTRY</b>		<b>172,29</b>	<b>56,35</b>	<b>178,07</b>	<b>63,87</b>	<b>202,13</b>	<b>60,28</b>
	Logging residues	9,53	2,40	10,48	3,85	9,53	1,60
	Thinning wood	31,76	3,18	34,94	5,24	31,76	3,65
	Roots	4,57	0,23	3,86	0,06	3,53	0,00
	Wood balance	126,44	50,55	128,79	54,71	157,32	55,03
<b>WOOD INDUSTRY</b>		<b>40,08</b>	<b>2,00</b>	<b>59,47</b>	<b>2,97</b>	<b>50,98</b>	<b>2,55</b>
<b>TOTAL BIOMASS</b>		<b>570,68</b>	<b>169,65</b>	<b>564,65</b>	<b>165,43</b>	<b>580,22</b>	<b>157,40</b>

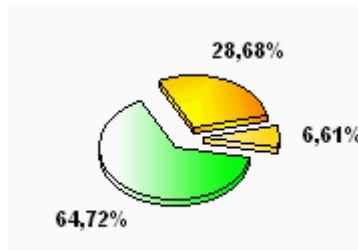
## Finland



### GENERAL INFORMATION

Population	5 mln
Population density	17 person / km <sup>2</sup>

Total area	33814	1000 ha
Utilised agricultural area	2235	1000 ha
Wooded area	21883	1000 ha
Other	9696	1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	2203	1000 ha	Cereal production (*)	3 814,54	1000 t
Fallow land	202	1000 ha	Oilseed production (*)	88,58	1000 t
Permanent crops	4	1000 ha	Maize production (*)	0,00	1000 t
Permanent grassland	27	1000 ha	Cattle production	705,60	1000 LU
Number of agricultural holdings	74,83	1000 ton	Pig (*)	288,22	1000 LU
Average farm size	88,12	1000 ton	Sheep (*)	5,20	1000 LU

(\*) average 2000-2004      LU Livestock Unit      EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	21 883,00	1000 ha
Area of forest available for wood supply	20 675,00	1000 ha
Area of coniferous forest available for wood supply	16 810,00	1000 ha
Area of broadleaves forest available for wood supply	3 865,00	1000 ha
Average volume of growing stock on forest available for wood supply	90,30	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	72 470,00	1000 t
Annual fellings overbark on forest available for wood supply	54 300,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	43 500,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	10 800,00	1000 t

*data for 2000, TBFRA*

#### MAIN ASSUMPTIONS

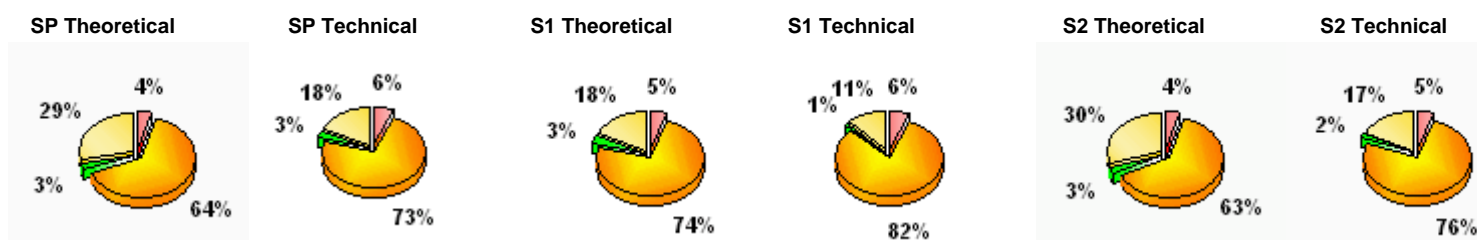
	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,50	0,63	0,50	0,30	0,30	0,40	0,30	0,20	0,35
Thinning wood	0,75	0,75	0,75				0,20	0,20	0,18
Root biomass	0,50	0,50	0,50	0,50	0,29	0,63	0,30	0,81	0,32
Wood balance	0,85	0,85	0,85	0,20	0,15	0,30	0,09	0,07	0,08

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,19	1,13
Factor of final fellings		0,25	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,80	Factor of clear final felling	0,16	0,17
Logging residues factor for coniferous species		0,20	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,33			
Share of pine in all species		0,48			

### FOREST BIOMASS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	19,55	23,26	22,09	4,79	4,89	4,34
Thinning wood	[PJ/a]	293,22	348,93	331,34	58,64	69,79	67,92
Roots	[PJ/a]	12,37	16,19	14,40	2,16	1,11	1,85
Wood balance	[PJ/a]	130,82	82,63	158,27	14,31	9,79	15,30
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>455,96</b>	<b>471,02</b>	<b>526,09</b>	<b>79,91</b>	<b>85,58</b>	<b>89,41</b>



### WOOD INDUSTRY BY - PRODUCTS POTENTIAL

#### DATA, ASSUMPTIONS, PARAMETERS

	SP	S1	S2		
Share of wood by-products in sawmills	0,40	0,40	0,40	Sawlogs and veneer logs	24 404,43 1000 m3
Share of wood by-products in board industry	0,20	0,20	0,20	Pulpwood group	24 581,56 1000 m3
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30	Other industrial wood group	0,00 1000 m3
Share of wood by-products in other wood indust	0,30	0,30	0,30	Wood fuel group	4 426,32 1000 m3
Wood density	0,6 t / m3				FAOSTAT
Heat value	15 GJ / t				
		SP	S1	S2	
Production changes related to year 2004			1,20	1,00	
Utilisation of industrial by-products		0,95	0,95	0,95	

### WOOD INDUSTRY BY-PRODUCTS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	139,24	179,18	149,32	6,96	8,96	7,47

### AGRICULTURAL BIOMASS POTENTIAL - STRAW

#### MAIN ASSUMPTIONS

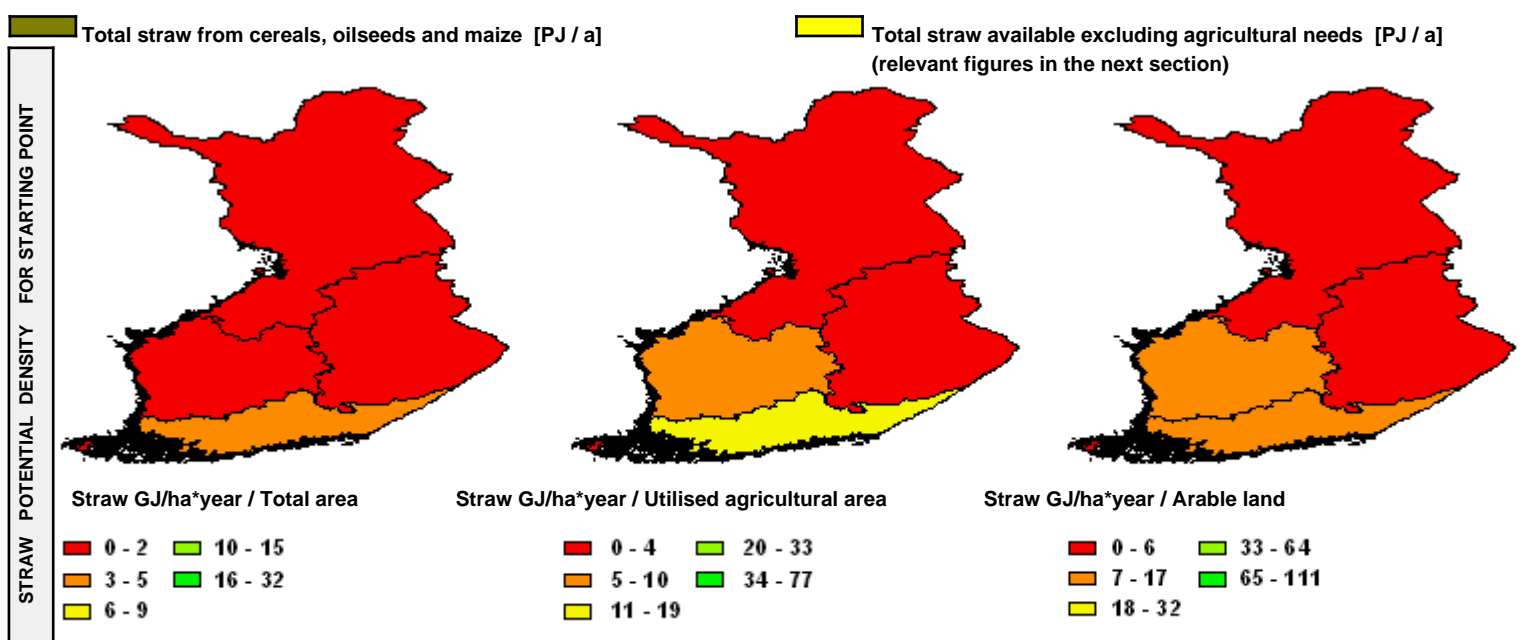
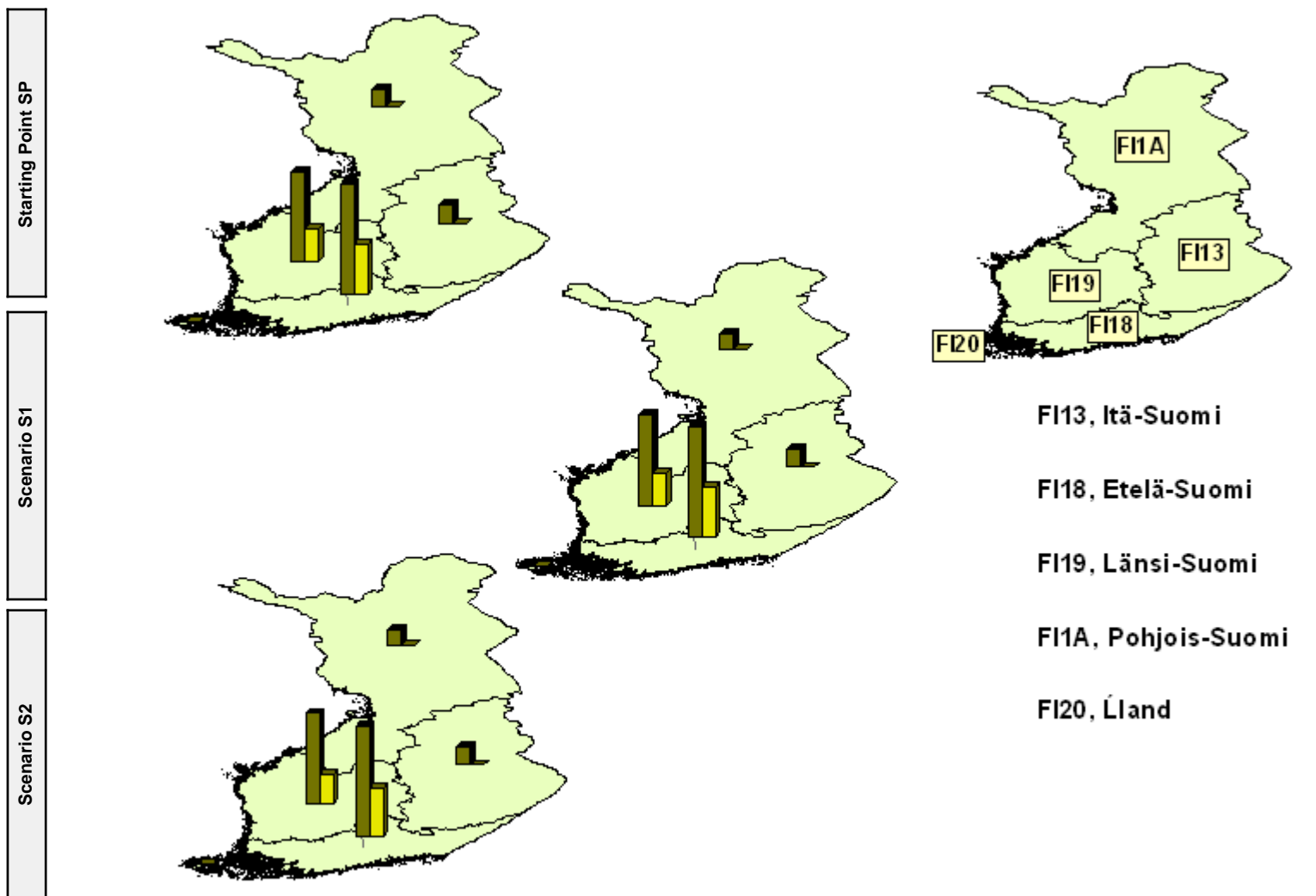
		2005	2010	2020	
Population (*)	[mln]	5	5	5	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	602	616	642	
Meat consumption (**)	[kg / person * year]	91	93	97	
					(*) EUROSTAT; (**) FAO

#### CALCULATION PARAMETERS

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	1,70	1,40	1,40	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,70	0,60	0,70
				Share of pigs on straw (**)	0,60	0,50	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,15	0,15	0,15

(\*) [ t / LU \* year ]; (\*\*) [ % of total herd ]; (\*\*\*) [ % of total straw ]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**



**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2		
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	
	(1)	(2)	(1)	(2)	(1)	(2)	
<b>STRAW</b>	<b>41,95</b>	<b>14,92</b>	<b>37,78</b>	<b>13,07</b>	<b>37,78</b>	<b>12,38</b>	
F113	Itä-Suomi	3,32	0,00	2,99	0,00	2,99	0,00
F118	Etelä-Suomi	19,58	8,96	17,64	7,93	17,64	7,65
F119	Länsi-Suomi	15,98	5,91	14,39	5,10	14,39	4,69
F11A	Pohjois-Suomi	2,88	0,00	2,59	0,00	2,59	0,00
F120	Aland	0,19	0,05	0,17	0,04	0,17	0,04
<b>FORESTRY</b>		<b>455,96</b>	<b>79,91</b>	<b>471,02</b>	<b>85,58</b>	<b>526,09</b>	<b>89,41</b>
	Logging residues	19,55	4,79	23,26	4,89	22,09	4,34
	Thinning wood	293,22	58,64	348,93	69,79	331,34	67,92
	Roots	12,37	2,16	16,19	1,11	14,40	1,85
	Wood balance	130,82	14,31	82,63	9,79	158,27	15,30
<b>WOOD INDUSTRY</b>		<b>139,24</b>	<b>6,96</b>	<b>179,18</b>	<b>8,96</b>	<b>149,32</b>	<b>7,47</b>
<b>TOTAL BIOMASS</b>		<b>637,15</b>	<b>101,79</b>	<b>687,98</b>	<b>107,61</b>	<b>713,19</b>	<b>109,26</b>

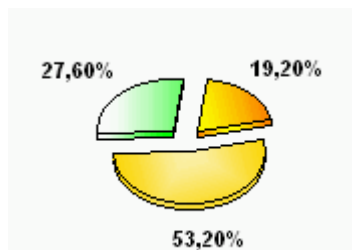
## France



### GENERAL INFORMATION

Population 60 mln  
Population density person / km<sup>2</sup>

Total area 54909 1000 ha  
 Utilised agricultural area 29212 1000 ha  
 Wooded area 15156 1000 ha  
 Other 10541 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	18245	1000 ha	Cereal production (*)	64 221,92	1000 t
Fallow land	1262	1000 ha	Oilseed production (*)	5 207,22	1000 t
Permanent crops	1133	1000 ha	Maize production (*)	15 457,88	1000 t
Permanent grassland	10021	1000 ha	Cattle production	14 268,86	1000 LU
Number of agricultural holdings	614,00	1000 ton	Pig (*)	2 832,68	1000 LU
Average farm size	48,19	1000 ton	Sheep (*)	910,56	1000 LU

(\*) average 2000-2004

LU Livestock Unit

EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	15 156,00	1000 ha
Area of forest available for wood supply	14 470,00	1000 ha
Area of coniferous forest available for wood supply	3 992,00	1000 ha
Area of broadleaves forest available for wood supply	10 478,00	1000 ha
Average volume of growing stock on forest available for wood supply	196,00	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	92 299,00	1000 t
Annual fellings overbark on forest available for wood supply	49 789,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	25 798,87	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	23 990,13	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

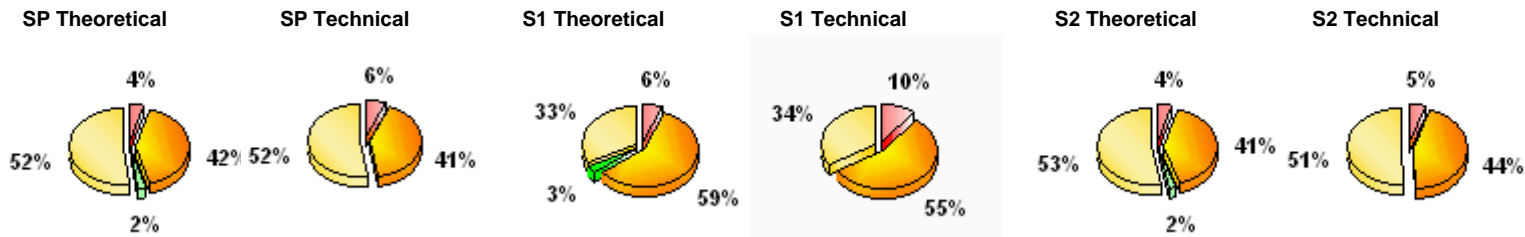
	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,20	0,25	0,20	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	1,00	1,00	1,00	0,40	0,88	0,42
Wood balance	0,70	0,70	0,70	0,20	0,15	0,30	0,21	0,17	0,19

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,32	1,13
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,52	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,13	(*) in relation to SP		
Logging residues factor for broadleaves species		0,13			
Root biomass ratio		0,25			
Share of spruce in all species		0,20			
Share of pine in all species		0,20			

**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	20,16	26,62	22,79	5,65	9,32	4,65
Thinning wood	[PJ/a]	197,16	260,26	222,80	36,97	49,88	43,17
Roots	[PJ/a]	10,16	12,52	10,51	0,00	0,00	0,00
Wood balance	[PJ/a]	245,79	145,02	291,04	46,67	30,80	49,63
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>473,28</b>	<b>444,41</b>	<b>547,13</b>	<b>89,29</b>	<b>90,00</b>	<b>97,45</b>


**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

Share of wood by-products in sawmills	0,40	0,40	0,40	<table border="1"> <tbody> <tr> <td>Sawlogs and veneer logs</td> <td>23 679,20</td> <td>1000 m3</td> </tr> <tr> <td>Pulpwood group</td> <td>11 187,00</td> <td>1000 m3</td> </tr> <tr> <td>Other industrial wood group</td> <td>461,20</td> <td>1000 m3</td> </tr> <tr> <td>Wood fuel group</td> <td>2 449,80</td> <td>1000 m3</td> </tr> </tbody> </table> <p style="text-align: right;">FAOSTAT</p>	Sawlogs and veneer logs	23 679,20	1000 m3	Pulpwood group	11 187,00	1000 m3	Other industrial wood group	461,20	1000 m3	Wood fuel group	2 449,80	1000 m3
Sawlogs and veneer logs	23 679,20	1000 m3														
Pulpwood group	11 187,00	1000 m3														
Other industrial wood group	461,20	1000 m3														
Wood fuel group	2 449,80	1000 m3														
Share of wood by-products in board industry	0,20	0,20	0,20													
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30													
Share of wood by-products in other wood indust	0,30	0,30	0,30													
Wood density	0,6 t / m3															
Heat value	15 GJ / t															
		SP	S1	S2												
Production changes related to year 2004			1,18	1,00												
Utilisation of industrial by-products		0,95	0,95	0,95												

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	109,30	134,72	114,17	5,46	6,74	5,71

**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	60	62	64	
Meat consumption (**)	[kg / person * year]	602	616	642	
		91	93	97	(*) EUROSTAT; (**) FAO

**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	1,70	1,40	1,40	Straw for fodder (*)	0,10	0,10	0,10
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,70	0,60	0,70
				Share of pigs on straw (**)	0,50	0,50	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,20	0,20	0,20

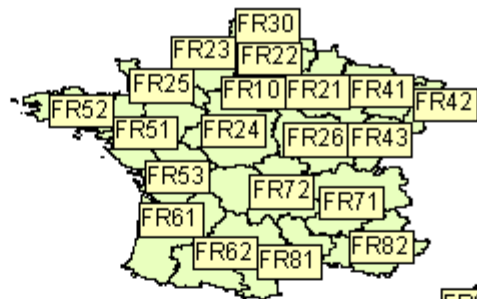
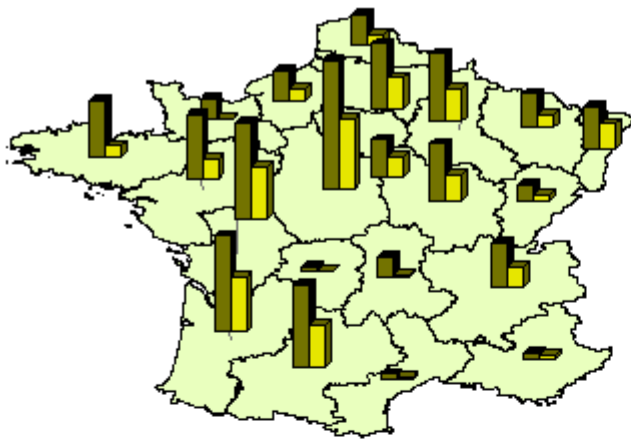
(\*) [t / LU \* year]; (\*\*) [% of total herd]; (\*\*\*) [% of total straw]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**

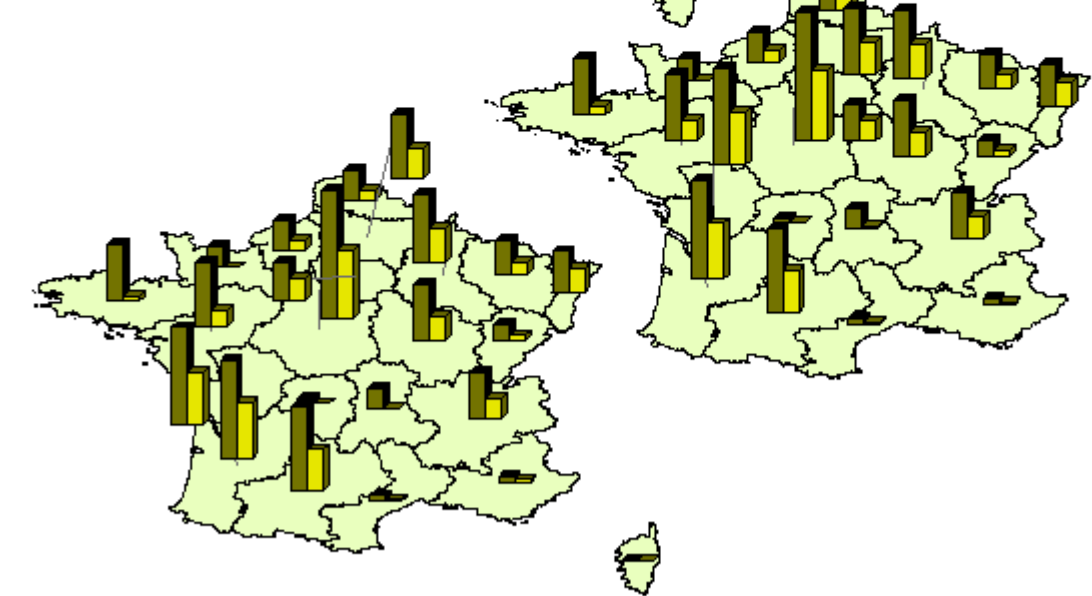
Starting Point SP

Scenario S1

Scenario S2



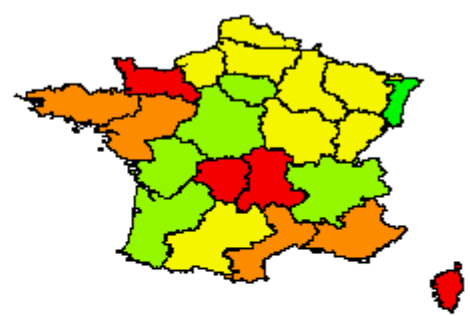
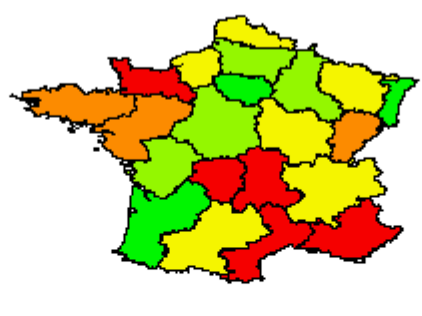
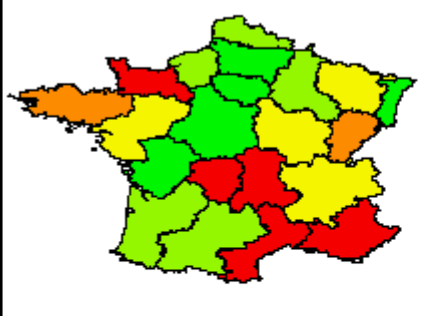
- FR10, Île de France
- FR21, Champagne-Ardenne
- FR22, Picardie
- FR23, Haute-Normandie
- FR24, Centre
- FR25, Basse-Normandie
- FR26, Bourgogne
- FR30, Nord - Pas-de-Calais
- FR41, Lorraine
- FR42, Alsace
- FR43, Franche-Comté
- FR51, Pays de la Loire
- FR52, Bretagne
- FR53, Poitou-Charentes
- FR61, Aquitaine
- FR62, Midi-Pyrénées
- FR63, Limousin
- FR71, Rhône-Alpes
- FR72, Auvergne
- FR81, Languedoc-Roussillon
- FR82, Provence-Alpes-Côte d'Azur
- FR83, Corse



Total straw from cereals, oilseeds and maize [PJ / a]

Total straw available excluding agricultural needs [PJ / a] (relevant figures in the next section)

STRAW POTENTIAL DENSITY FOR STARTING POINT



Straw GJ/ha\*year / Total area

Straw GJ/ha\*year / Utilised agricultural area

Straw GJ/ha\*year / Arable land

- 0 - 2
- 3 - 5
- 6 - 9
- 10 - 15
- 16 - 32

- 0 - 4
- 5 - 10
- 11 - 19
- 20 - 33
- 34 - 77

- 0 - 6
- 7 - 17
- 18 - 32
- 33 - 64
- 65 - 111

**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2		
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	
	(1)	(2)	(1)	(2)	(1)	(2)	
<b>STRAW</b>	<b>1 092,74</b>	<b>496,30</b>	<b>1 020,84</b>	<b>455,88</b>	<b>1 020,84</b>	<b>438,09</b>	
FR10	Île de France	40,68	22,42	37,77	20,87	37,77	20,84
FR21	Champagne-Ardenne	73,92	36,47	68,32	33,47	68,32	32,89
FR22	Picardie	71,35	34,44	65,88	31,59	65,88	31,06
FR23	Haute-Normandie	31,97	12,70	29,43	11,35	29,43	10,73
FR24	Centre	139,32	75,30	129,50	69,91	129,50	69,31
FR25	Basse-Normandie	22,96	1,04	21,20	0,09	21,20	0,00
FR26	Bourgogne	61,27	26,87	56,78	24,40	56,78	23,30
FR30	Nord - Pas-de-Calais	33,24	12,03	30,58	10,62	30,58	9,87
FR41	Lorraine	37,01	14,37	34,12	12,80	34,12	11,95
FR42	Alsace	44,26	26,30	42,16	25,11	42,16	24,94
FR43	Franche-Comté	17,19	5,94	16,08	5,32	16,08	4,74
FR51	Pays de la Loire	70,67	22,82	66,23	20,25	66,23	17,60
FR52	Bretagne	61,00	12,41	57,10	9,29	57,10	5,48
FR53	Poitou-Charentes	105,00	57,79	98,56	54,12	98,56	53,37
FR61	Aquitaine	104,52	59,58	99,53	56,71	99,53	55,89
FR62	Midi-Pyrénées	90,02	45,61	84,68	42,56	84,68	41,33
FR63	Limousin	5,05	0,00	4,68	0,00	4,68	0,00
FR71	Rhône-Alpes	48,84	22,52	46,16	21,01	46,16	20,01
FR72	Auvergne	21,43	2,32	20,01	1,56	20,01	0,17
FR81	Languedoc-Roussillon	6,63	2,39	6,12	2,11	6,12	1,94
FR82	Provence-Alpes-Côte d	6,16	2,98	5,71	2,74	5,71	2,67
FR83	Corse	0,25	0,00	0,24	0,00	0,24	0,00
<b>FORESTRY</b>		<b>473,28</b>	<b>89,29</b>	<b>444,41</b>	<b>90,00</b>	<b>547,13</b>	<b>97,45</b>
	Logging residues	20,16	5,65	26,62	9,32	22,79	4,65
	Thinning wood	197,16	36,97	260,26	49,88	222,80	43,17
	Roots	10,16	0,00	12,52	0,00	10,51	0,00
	Wood balance	245,79	46,67	145,02	30,80	291,04	49,63
<b>WOOD INDUSTRY</b>		<b>109,30</b>	<b>5,46</b>	<b>134,72</b>	<b>6,74</b>	<b>114,17</b>	<b>5,71</b>
<b>TOTAL BIOMASS</b>		<b>1 675,32</b>	<b>591,05</b>	<b>1 599,97</b>	<b>552,62</b>	<b>1 682,14</b>	<b>541,25</b>

## Greece



### GENERAL INFORMATION

Population 11 mln  
Population density person / km<sup>2</sup>

Total area 13196 1000 ha  
 Utilised agricultural area 3869 1000 ha  
 Wooded area 0 1000 ha  
 Other 9327 1000 ha



### MAIN AGRICULTURAL INDICATORS

Indicator	Value	Unit	Indicator	Value	Unit
Arable land	2216	1000 ha	Cereal production (*)	4 691,00	1000 t
Fallow land	468	1000 ha	Oilseed production (*)	24,63	1000 t
Permanent crops	1125	1000 ha	Maize production (*)	2 137,33	1000 t
Permanent grassland	148	1000 ha	Cattle production	434,20	1000 LU
Number of agricultural holdings	823,73	1000 ton	Pig (*)	190,93	1000 LU
Average farm size	5,22	1000 ton	Sheep (*)	912,83	1000 LU

(\*) average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	1000 ha
Area of forest available for wood supply	1000 ha
Area of coniferous forest available for wood supply	1000 ha
Area of broadleaves forest available for wood supply	1000 ha
Average volume of growing stock on forest available for wood supply	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	1000 t
Annual fellings overbark on forest available for wood supply	1000 t
Annual fellings overbark on coniferous forest available for wood supply	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues									
Thinning wood	<i>Lack of available data</i>								
Root biomass									
Wood balance									

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9		SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)			
Factor of final fellings			Change of net annual increment (*)			
Factor of coniferous fellings			Factor of clear final felling			
Logging residues factor for coniferous species						
Logging residues factor for broadleaves species						
Root biomass ratio						
Share of spruce in all species						
Share of pine in all species						

(\*) in relation to SP

## Deliverable D5.01.03 Residue biomass potential inventory results

**FOREST BIOMASS - RESULTS**

	[PJ/a]	Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]						
Thinning wood	[PJ/a]	<i>Lack of available data</i>					
Roots	[PJ/a]						
Wood balance	[PJ/a]						
<b>TOTAL</b>	<b>[PJ/a]</b>						
<b>SP Theoretical</b>	<b>SP Technical</b>	<b>S1 Theoretical</b>	<b>S1 Technical</b>	<b>S2 Theoretical</b>	<b>S2 Technical</b>		
<i>Lack of available data</i>							

**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

	SP	S1	S2		
Share of wood by-products in sawmills	0,40	0,40	0,40	Sawlogs and veneer logs      433,69   1000 m3 Pulpwood group                      112,57   1000 m3 Other industrial wood group      88,73   1000 m3 Wood fuel group                      1 245,10   1000 m3 <span style="float: right;">FAOSTAT</span>	
Share of wood by-products in board industry	0,20	0,20	0,20		
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30		
Share of wood by-products in other wood indust	0,30	0,30	0,30		
Wood density	0,6	t / m3			
Heat value	15	GJ / t			
	SP	S1	S2		
Production changes related to year 2004		1,40	1,20		
Utilisation of industrial by-products	0,95	0,95	0,95		

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

	[PJ/a]	Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	2,43	3,78	3,24	0,12	0,19	0,16

**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

		2005	2010	2020	
Population (*)	[mln]	11	11	11	Straw LHV: 13,1 MJ/kg  (*) EUROSTAT; (**) FAO
Cereal consumption (**)	[kg / person * year]	602	616	642	
Meat consumption (**)	[kg / person * year]	91	93	97	

**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	1,00	0,80	0,80	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	2,00	1,50	1,50	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,40	1,00	1,00	Share of cattle on straw (**)	0,50	0,50	0,50
				Share of pigs on straw (**)	0,50	0,50	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,05	0,05	0,05

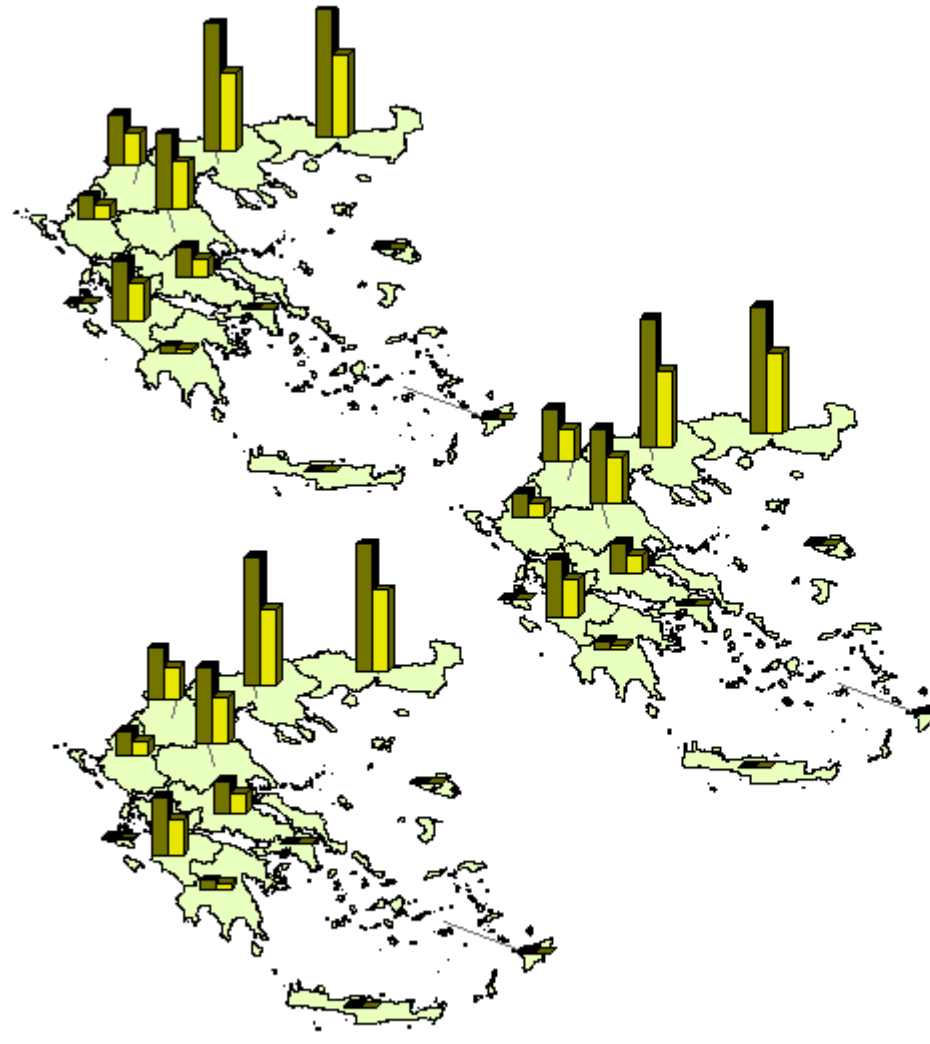
(\*) [ t / LU \* year ]; (\*\*) [ % of total herd ]; (\*\*\*) [ % of total straw ]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**

Starting Point SP

Scenario S1

Scenario S2



- GR11, Anatoliki Makedonia, Thraki
- GR12, Kentriki Makedonia
- GR13, Dytiki Makedonia
- GR14, Thessalia
- GR21, Ipeiros
- GR22, Ionia Nisia
- GR23, Dytiki Ellada
- GR24, Sterea Ellada
- GR25, Peloponnisos
- GR30, Attiki
- GR41, Voreio Aigaio
- GR42, Notio Aigaio
- GR43, Kriti

Total straw from cereals, oilseeds and maize [PJ / a]

Total straw available excluding agricultural needs [PJ / a] (relevant figures in the next section)

STRAW POTENTIAL DENSITY FOR STARTING POINT



Straw GJ/ha\*year / Total area

0 - 2	10 - 15
3 - 5	16 - 32
6 - 9	

Straw GJ/ha\*year / Utilised agricultural area

0 - 4	20 - 33
5 - 10	34 - 77
11 - 19	

Straw GJ/ha\*year / Arable land

0 - 6	33 - 64
7 - 17	65 - 111
18 - 32	

**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2		
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	
	(1)	(2)	(1)	(2)	(1)	(2)	
<b>STRAW</b>	<b>101,28</b>	<b>63,20</b>	<b>85,06</b>	<b>51,79</b>	<b>85,06</b>	<b>51,59</b>	
GR11	Anatoliki Makedonia, T	25,49	16,54	21,28	13,62	21,28	13,60
GR12	Kentriki Makedonia	25,26	15,43	21,31	12,62	21,31	12,59
GR13	Dytiki Makedonia	10,25	6,47	8,68	5,37	8,68	5,37
GR14	Thessalia	14,91	9,31	12,58	7,68	12,58	7,64
GR21	Ipeiros	4,82	2,85	3,97	2,23	3,97	2,20
GR22	Ionia Nisia	0,11	0,04	0,09	0,02	0,09	0,02
GR23	Dytiki Ellada	11,83	7,63	9,78	6,20	9,78	6,17
GR24	Stereia Ellada	6,14	3,75	5,26	3,13	5,26	3,09
GR25	Peloponnisos	1,59	0,94	1,34	0,76	1,34	0,75
GR30	Attiki	0,19	0,07	0,17	0,05	0,17	0,05
GR41	Voreio Aigaio	0,31	0,14	0,27	0,11	0,27	0,11
GR42	Notio Aigaio	0,25	0,02	0,22	0,00	0,22	0,00
GR43	Kriti	0,13	0,01	0,11	0,00	0,11	0,00
<b>FORESTRY</b>	<i>Lack of available data</i>						
	Logging residues						
	Thinning wood						
	Roots						
	Wood balance						
<b>WOOD INDUSTRY</b>	<b>2,43</b>	<b>0,12</b>	<b>3,78</b>	<b>0,19</b>	<b>3,24</b>	<b>0,16</b>	
<b>TOTAL BIOMASS</b>	<b>103,71</b>	<b>63,32</b>	<b>88,84</b>	<b>51,98</b>	<b>88,30</b>	<b>51,75</b>	

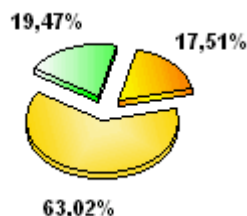
## Hungary



### GENERAL INFORMATION

Population 10 mln  
Population density 109 person / km<sup>2</sup>

Total area 9303 1000 ha  
 Utilised agricultural area 5863 1000 ha  
 Wooded area 1811 1000 ha  
 Other 1629 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	4511	1000 ha	Cereal production (*)	12 465,30	1000 t
Fallow land	205	1000 ha	Oilseed production (*)	1 084,42	1000 t
Permanent crops	194	1000 ha	Maize production (*)	6 365,48	1000 t
Permanent grassland	1059	1000 ha	Cattle production	582,60	1000 LU
Number of agricultural holdings	769,25	1000 ton	Pig (*)	979,00	1000 LU
Average farm size	8,06	1000 ton	Sheep (*)	121,22	1000 LU

(\*) average 2000-2004      LU Livestock Unit      EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	1 811,00	1000 ha
Area of forest available for wood supply	1 702,00	1000 ha
Area of coniferous forest available for wood supply	201,00	1000 ha
Area of broadleaves forest available for wood supply	1 501,00	1000 ha
Average volume of growing stock on forest available for wood supply	173,50	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	9 925,00	1000 t
Annual fellings overbark on forest available for wood supply	5 880,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	777,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	5 103,00	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

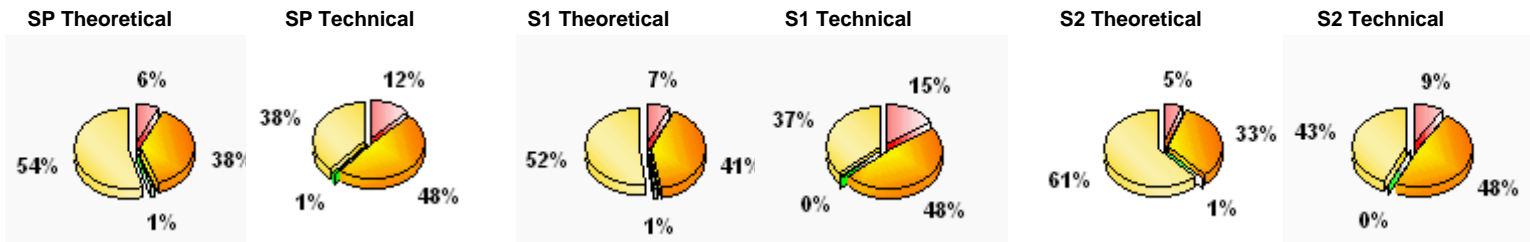
	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,15	0,19	0,15	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	0,60	0,39	0,75	0,40	0,88	0,42
Wood balance	0,85	0,85	0,85	0,20	0,15	0,30	0,12	0,10	0,11

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,10	1,00
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,13	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,20	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,03			
Share of pine in all species		0,17			

### FOREST BIOMASS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	3,81	4,19	3,81	1,13	1,59	0,83
Thinning wood	[PJ/a]	23,28	25,61	23,28	4,37	4,91	4,51
Roots	[PJ/a]	0,59	0,61	0,54	0,07	0,02	0,04
Wood balance	[PJ/a]	32,99	32,72	43,71	3,48	3,77	4,09
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>60,68</b>	<b>63,13</b>	<b>71,34</b>	<b>9,05</b>	<b>10,29</b>	<b>9,47</b>



### WOOD INDUSTRY BY - PRODUCTS POTENTIAL

#### DATA, ASSUMPTIONS, PARAMETERS

Share of wood by-products in sawmills	0,40	0,40	0,40	<table border="1"> <tbody> <tr> <td>Sawlogs and veneer logs</td> <td>1 563,06</td> <td>1000 m3</td> </tr> <tr> <td>Pulpwood group</td> <td>612,96</td> <td>1000 m3</td> </tr> <tr> <td>Other industrial wood group</td> <td>1 069,50</td> <td>1000 m3</td> </tr> <tr> <td>Wood fuel group</td> <td>2 553,42</td> <td>1000 m3</td> </tr> </tbody> </table> <p style="text-align: right;">FAOSTAT</p>	Sawlogs and veneer logs	1 563,06	1000 m3	Pulpwood group	612,96	1000 m3	Other industrial wood group	1 069,50	1000 m3	Wood fuel group	2 553,42	1000 m3
Sawlogs and veneer logs	1 563,06	1000 m3														
Pulpwood group	612,96	1000 m3														
Other industrial wood group	1 069,50	1000 m3														
Wood fuel group	2 553,42	1000 m3														
Share of wood by-products in board industry	0,20	0,20	0,20													
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30													
Share of wood by-products in other wood indust	0,30	0,30	0,30													
Wood density	0,6 t / m3															
Heat value	15 GJ / t															
		SP	S1	S2												
Production changes related to year 2004			1,40	1,20												
Utilisation of industrial by-products		0,95	0,95	0,95												

### WOOD INDUSTRY BY-PRODUCTS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	10,25	15,27	13,09	0,51	0,76	0,65

### AGRICULTURAL BIOMASS POTENTIAL - STRAW

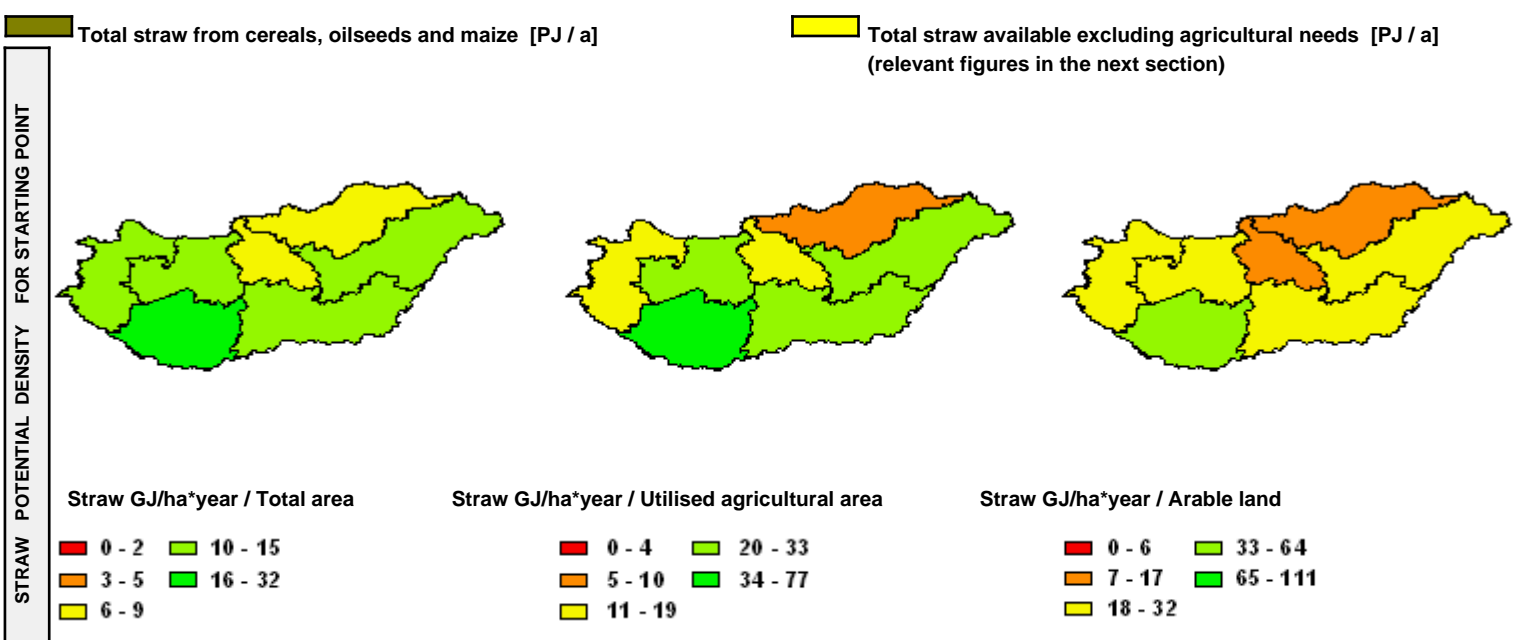
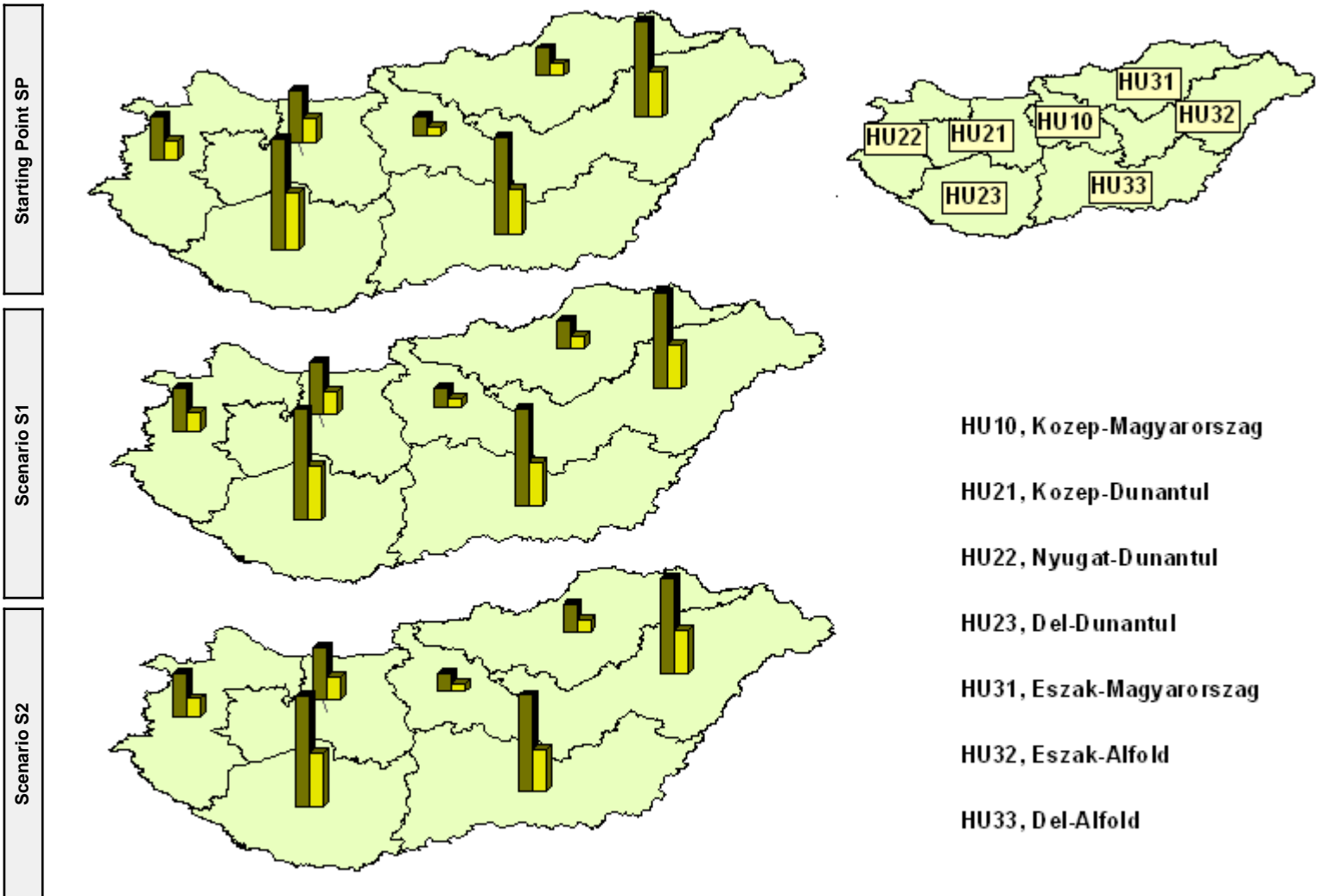
#### MAIN ASSUMPTIONS

Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	10	10	10	
Meat consumption (**)	[kg / person * year]	539	567	626	
		49	51	56	(*) EUROSTAT; (**) FAO

#### CALCULATION PARAMETERS

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	1,00	1,00	1,00
Rape straw / grain ratio	1,70	1,50	1,50	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,90	0,70	0,80
				Share of pigs on straw (**)	0,70	0,50	0,60
				Straw for soil (***)	0,35	0,35	0,35
				Straw for other purposes (***)	0,30	0,30	0,30

(\*) [ t / LU \* year ]; (\*\*) [ % of total herd ]; (\*\*\*) [ % of total straw ]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**


## RESIDUE BIOMASS POTENTIAL - FIGURES

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2		
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	
	(1)	(2)	(1)	(2)	(1)	(2)	
<b>STRAW</b>	<b>279,87</b>	<b>124,11</b>	<b>263,11</b>	<b>119,46</b>	<b>263,11</b>	<b>117,13</b>	
HU10	Közép-Magyarország	11,76	4,82	11,04	4,65	11,04	4,52
HU21	Közép-Dunántúl	32,40	13,85	30,43	13,35	30,43	13,04
HU22	Nyugat-Dunántúl	27,20	11,30	25,49	10,85	25,49	10,59
HU23	Dél-Dunántúl	69,70	33,66	65,66	32,27	65,66	31,91
HU31	Észak-Magyarország	17,51	7,28	16,43	7,01	16,43	6,85
HU32	Észak-Alföld	60,25	26,96	56,74	26,00	56,74	25,48
HU33	Dél-Alföld	61,05	26,24	57,32	25,33	57,32	24,74
<b>FORESTRY</b>		<b>60,68</b>	<b>9,05</b>	<b>63,13</b>	<b>10,29</b>	<b>71,34</b>	<b>9,47</b>
	Logging residues	3,81	1,13	4,19	1,59	3,81	0,83
	Thinning wood	23,28	4,37	25,61	4,91	23,28	4,51
	Roots	0,59	0,07	0,61	0,02	0,54	0,04
	Wood balance	32,99	3,48	32,72	3,77	43,71	4,09
<b>WOOD INDUSTRY</b>		<b>10,25</b>	<b>0,51</b>	<b>15,27</b>	<b>0,76</b>	<b>13,09</b>	<b>0,65</b>
<b>TOTAL BIOMASS</b>		<b>350,80</b>	<b>133,67</b>	<b>341,51</b>	<b>130,51</b>	<b>347,54</b>	<b>127,25</b>

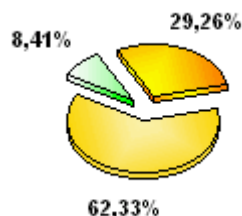
## Ireland



### GENERAL INFORMATION

Population 4 mln  
Population density person / km<sup>2</sup>

Total area 7027 1000 ha  
 Utilised agricultural area 4380 1000 ha  
 Wooded area 591 1000 ha  
 Other 2056 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	1172	1000 ha	Cereal production (*)	2 190,20	1000 t
Fallow land	14	1000 ha	Oilseed production (*)	7,32	1000 t
Permanent crops	2	1000 ha	Maize production (*)	0,00	1000 t
Permanent grassland	3206	1000 ha	Cattle production	4 482,30	1000 LU
Number of agricultural holdings	135,21	1000 ton	Pig (*)	314,80	1000 LU
Average farm size	34,84	1000 ton	Sheep (*)	481,98	1000 LU

(\*) average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	591,00	1000 ha
Area of forest available for wood supply	580,00	1000 ha
Area of coniferous forest available for wood supply	492,00	1000 ha
Area of broadleaves forest available for wood supply	88,00	1000 ha
Average volume of growing stock on forest available for wood supply	74,10	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	3 450,00	1000 t
Annual fellings overbark on forest available for wood supply	11 830,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	11 652,30	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	177,70	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

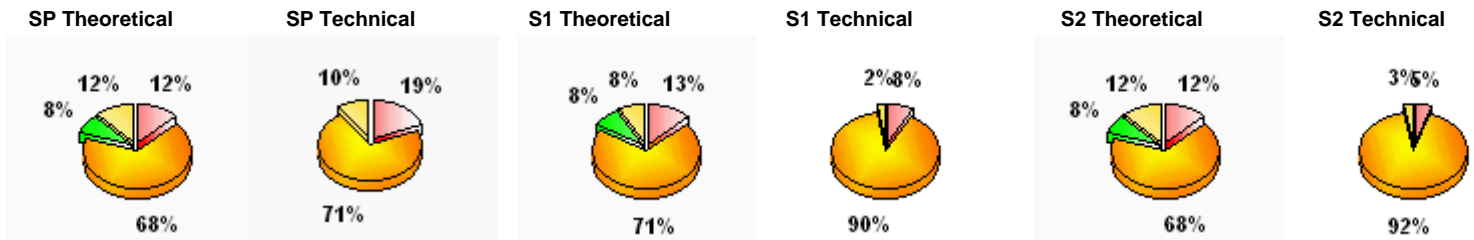
	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,20	0,25	0,20	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,04	0,04	0,04				0,80	0,23	0,23
Root biomass	0,50	0,50	0,50	1,00	1,00	1,00	0,40	0,88	0,42
Wood balance	0,80	0,80	0,80	0,20	0,15	0,30	0,00	0,00	0,00

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,19	1,13
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,98	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,23	(*) in relation to SP		
Logging residues factor for broadleaves species		0,15			
Root biomass ratio		0,25			
Share of spruce in all species		0,74			
Share of pine in all species		0,21			

### FOREST BIOMASS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	8,58	10,21	9,70	2,40	3,57	1,98
Thinning wood	[PJ/a]	46,85	55,75	52,94	9,04	41,24	39,59
Roots	[PJ/a]	5,70	6,33	5,89	0,00	0,00	0,00
Wood balance	[PJ/a]	8,06	6,12	9,61	1,29	1,04	1,35
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>69,19</b>	<b>78,40</b>	<b>78,13</b>	<b>12,73</b>	<b>45,86</b>	<b>42,91</b>



### WOOD INDUSTRY BY - PRODUCTS POTENTIAL

#### DATA, ASSUMPTIONS, PARAMETERS

Share of wood by-products in sawmills	0,40	0,40	0,40	<table border="1"> <tbody> <tr> <td>Sawlogs and veneer logs</td> <td>1 719,81</td> <td>1000 m3</td> </tr> <tr> <td>Pulpwood group</td> <td>773,86</td> <td>1000 m3</td> </tr> <tr> <td>Other industrial wood group</td> <td>120,85</td> <td>1000 m3</td> </tr> <tr> <td>Wood fuel group</td> <td>37,73</td> <td>1000 m3</td> </tr> </tbody> </table> <p style="text-align: right;">FAOSTAT</p>	Sawlogs and veneer logs	1 719,81	1000 m3	Pulpwood group	773,86	1000 m3	Other industrial wood group	120,85	1000 m3	Wood fuel group	37,73	1000 m3
Sawlogs and veneer logs	1 719,81	1000 m3														
Pulpwood group	773,86	1000 m3														
Other industrial wood group	120,85	1000 m3														
Wood fuel group	37,73	1000 m3														
Share of wood by-products in board industry	0,20	0,20	0,20													
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30													
Share of wood by-products in other wood indust	0,30	0,30	0,30													
Wood density	0,6 t / m3															
Heat value	15 GJ / t															
		SP	S1	S2												
Production changes related to year 2004			1,20	1,00												
Utilisation of industrial by-products		0,95	0,95	0,95												

### WOOD INDUSTRY BY-PRODUCTS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	8,01	9,99	8,32	0,40	0,50	0,42

### AGRICULTURAL BIOMASS POTENTIAL - STRAW

#### MAIN ASSUMPTIONS

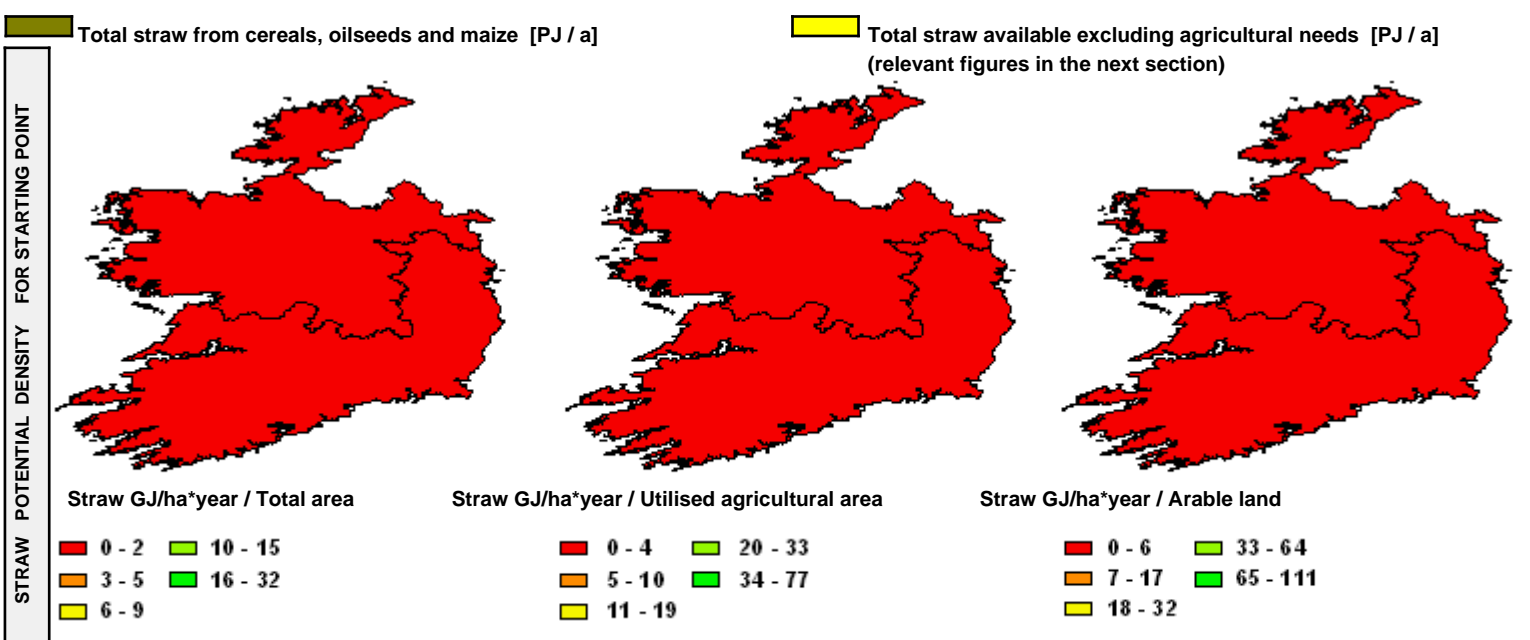
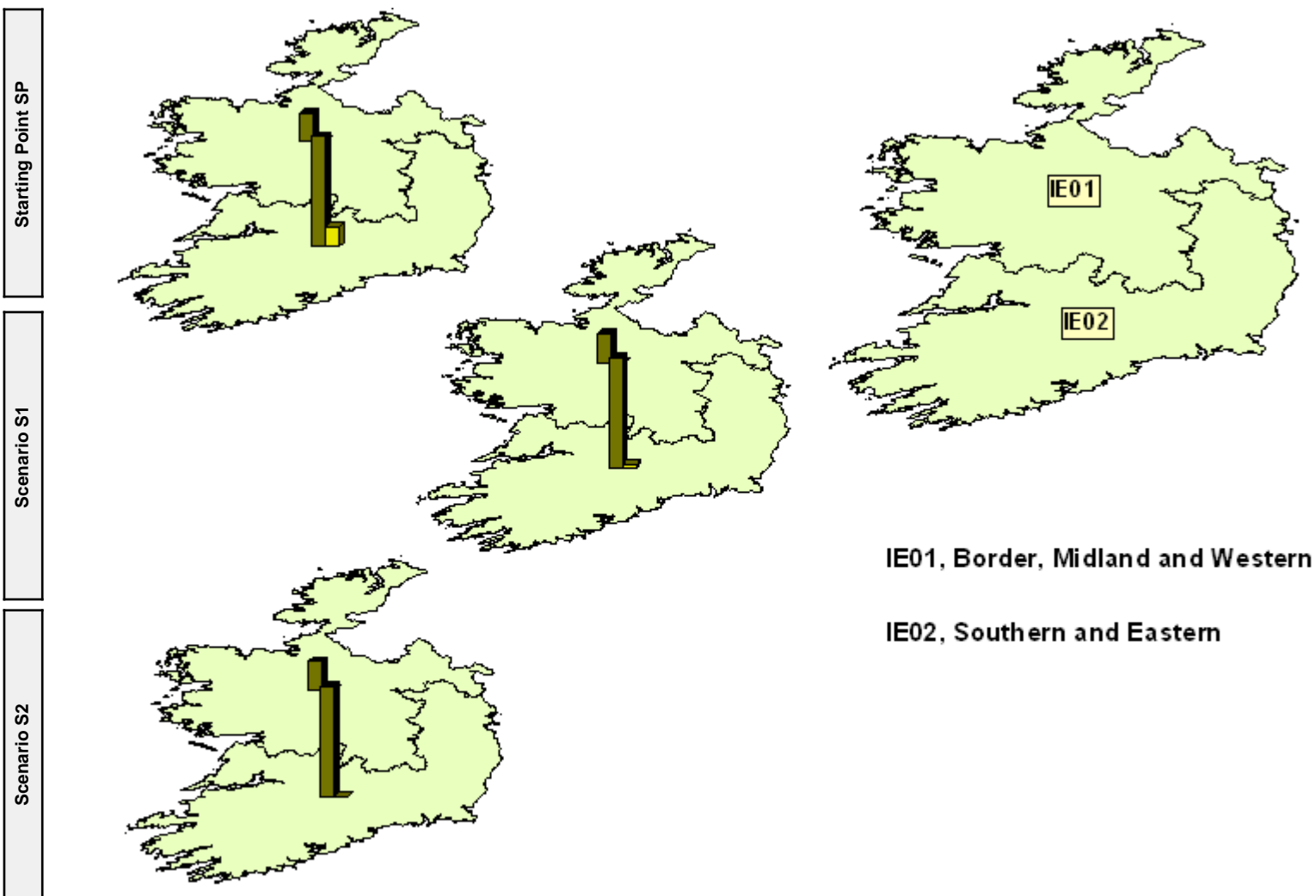
Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	4	4	5	
Meat consumption (**)	[kg / person * year]	602	616	642	
		91	93	97	(*) EUROSTAT; (**) FAO

#### CALCULATION PARAMETERS

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	0,50	0,50	0,50
Rape straw / grain ratio	1,70	1,40	1,40	Straw for fodder (*)	0,10	0,10	0,10
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,40	0,40	0,50
				Share of pigs on straw (**)	0,30	0,30	0,50
				Straw for soil (***)	0,10	0,10	0,10
				Straw for other purposes (***)	0,05	0,05	0,05

(\*) [ t / LU \* year ]; (\*\*) [ % of total herd ]; (\*\*\*) [ % of total straw ]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**



**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

		Starting Point		Scenario S1		Scenario S2		
		PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	
		(1)	(2)	(1)	(2)	(1)	(2)	
<b>STRAW</b>		<b>23,12</b>	<b>3,38</b>	<b>23,46</b>	<b>0,47</b>	<b>23,46</b>	<b>0,00</b>	
	IE01	Border, Midlands and W	4,74	0,00	4,81	0,00	4,81	0,00
	IE02	Southern and Eastern	18,38	3,38	18,65	0,47	18,65	0,00
<b>FORESTRY</b>		<b>69,19</b>	<b>12,73</b>	<b>78,40</b>	<b>45,86</b>	<b>78,13</b>	<b>42,91</b>	
		Logging residues	8,58	2,40	10,21	3,57	9,70	1,98
		Thinning wood	46,85	9,04	55,75	41,24	52,94	39,59
		Roots	5,70	0,00	6,33	0,00	5,89	0,00
		Wood balance	8,06	1,29	6,12	1,04	9,61	1,35
<b>WOOD INDUSTRY</b>		<b>8,01</b>	<b>0,40</b>	<b>9,99</b>	<b>0,50</b>	<b>8,32</b>	<b>0,42</b>	
<b>TOTAL BIOMASS</b>		<b>100,32</b>	<b>16,51</b>	<b>111,85</b>	<b>46,83</b>	<b>109,91</b>	<b>43,33</b>	

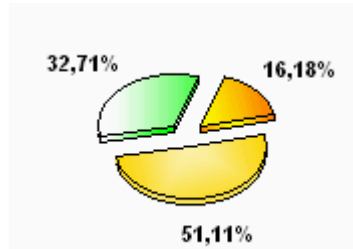
## Italy



### GENERAL INFORMATION

Population 58 mln  
Population density 197 person / km<sup>2</sup>

Total area 30133 1000 ha  
■ Utilised agricultural area 15400 1000 ha  
■ Wooded area 9857 1000 ha  
■ Other 4877 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	8252	1000 ha	Cereal production (*)	20 592,86	1000 t
Fallow land	655	1000 ha	Oilseed production (*)	1 019,20	1000 t
Permanent crops	2697	1000 ha	Maize production (*)	10 263,38	1000 t
Permanent grassland	4364	1000 ha	Cattle production	4 758,85	1000 LU
Number of agricultural holdings	1 963,25	1000 ton	Pig (*)	1 994,13	1000 LU
Average farm size	9,29	1000 ton	Sheep (*)	780,23	1000 LU

(\* average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	9 857,00	1000 ha
Area of forest available for wood supply	6 013,00	1000 ha
Area of coniferous forest available for wood supply	1 278,00	1000 ha
Area of broadleaves forest available for wood supply	4 735,00	1000 ha
Average volume of growing stock on forest available for wood supply	145,80	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	18 713,00	1000 t
Annual fellings overbark on forest available for wood supply	8 746,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	1 824,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	6 922,00	1000 t

*data for 2000, TBFRA*

#### MAIN ASSUMPTIONS

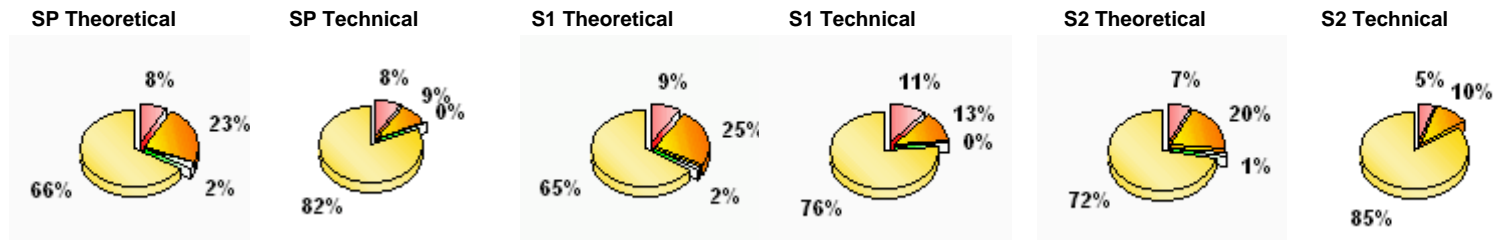
	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,10	0,13	0,10	0,30	0,30	0,40	0,60	0,40	0,69
Thinning wood	0,75	0,75	0,75				0,60	0,40	0,54
Root biomass	0,50	0,50	0,50	0,80	0,49	1,00	0,50	0,94	0,53
Wood balance	0,50	0,50	0,50	0,20	0,15	0,30	0,23	0,19	0,21

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,10	1,00
Factor of final fellings		0,60	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,21	Factor of clear final felling	0,38	0,29
Logging residues factor for coniferous species		0,35	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,21			
Share of pine in all species		0,21			

### FOREST BIOMASS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	8,74	9,61	8,74	2,20	3,53	1,46
Thinning wood	[PJ/a]	25,19	27,71	25,19	2,52	4,16	2,90
Roots	[PJ/a]	2,47	2,09	1,91	0,12	0,03	0,00
Wood balance	[PJ/a]	71,76	72,20	91,97	21,99	24,94	25,41
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>108,16</b>	<b>111,61</b>	<b>127,81</b>	<b>26,83</b>	<b>32,66</b>	<b>29,77</b>



### WOOD INDUSTRY BY - PRODUCTS POTENTIAL

#### DATA, ASSUMPTIONS, PARAMETERS

Share of wood by-products in sawmills	0,40	0,40	0,40	<table border="1"> <tbody> <tr> <td>Sawlogs and veneer logs</td> <td>1 671,48</td> <td>1000 m3</td> </tr> <tr> <td>Pulpwood group</td> <td>608,44</td> <td>1000 m3</td> </tr> <tr> <td>Other industrial wood group</td> <td>669,75</td> <td>1000 m3</td> </tr> <tr> <td>Wood fuel group</td> <td>5 421,42</td> <td>1000 m3</td> </tr> </tbody> </table> <p style="text-align: right;">FAOSTAT</p>	Sawlogs and veneer logs	1 671,48	1000 m3	Pulpwood group	608,44	1000 m3	Other industrial wood group	669,75	1000 m3	Wood fuel group	5 421,42	1000 m3
Sawlogs and veneer logs	1 671,48	1000 m3														
Pulpwood group	608,44	1000 m3														
Other industrial wood group	669,75	1000 m3														
Wood fuel group	5 421,42	1000 m3														
Share of wood by-products in board industry	0,20	0,20	0,20													
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30													
Share of wood by-products in other wood indust	0,30	0,30	0,30													
Wood density	0,6 t / m3															
Heat value	15 GJ / t															
		SP	S1	S2												
Production changes related to year 2004			1,40	1,20												
Utilisation of industrial by-products		0,95	0,95	0,95												

### WOOD INDUSTRY BY-PRODUCTS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	10,72	16,68	14,30	0,54	0,83	0,71

### AGRICULTURAL BIOMASS POTENTIAL - STRAW

#### MAIN ASSUMPTIONS

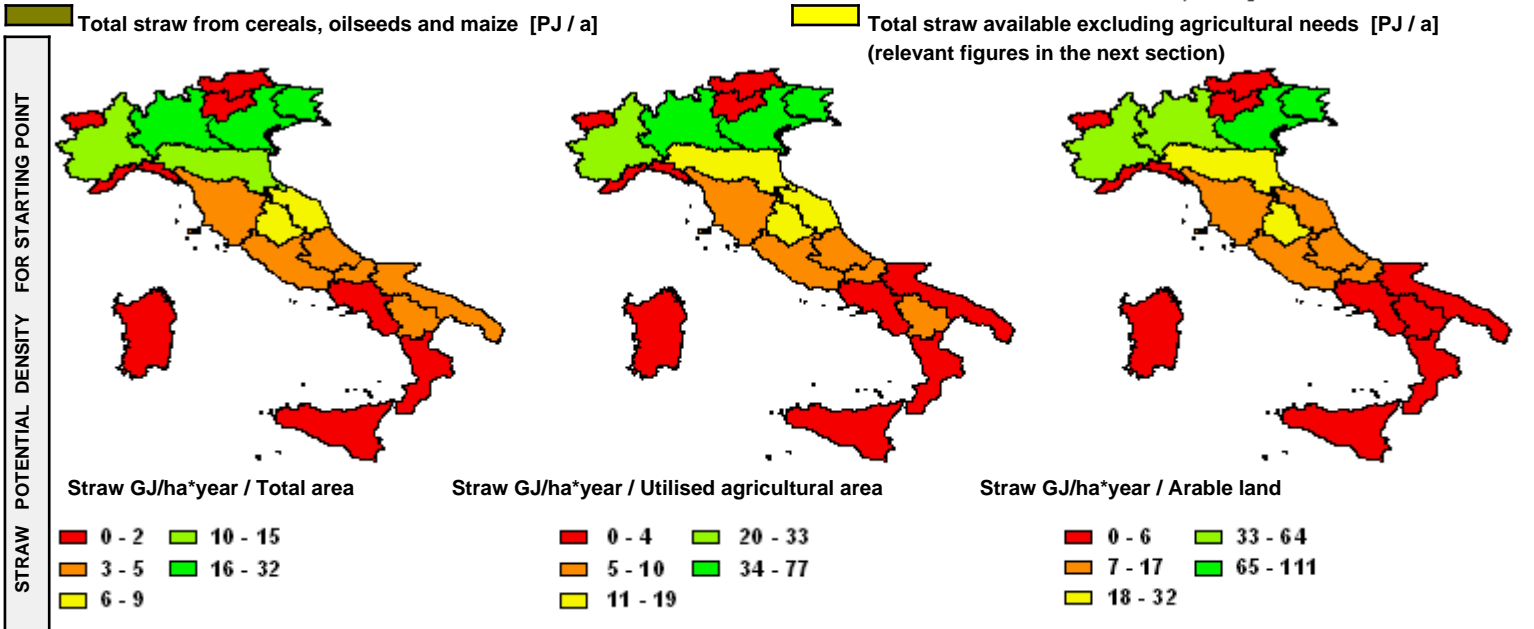
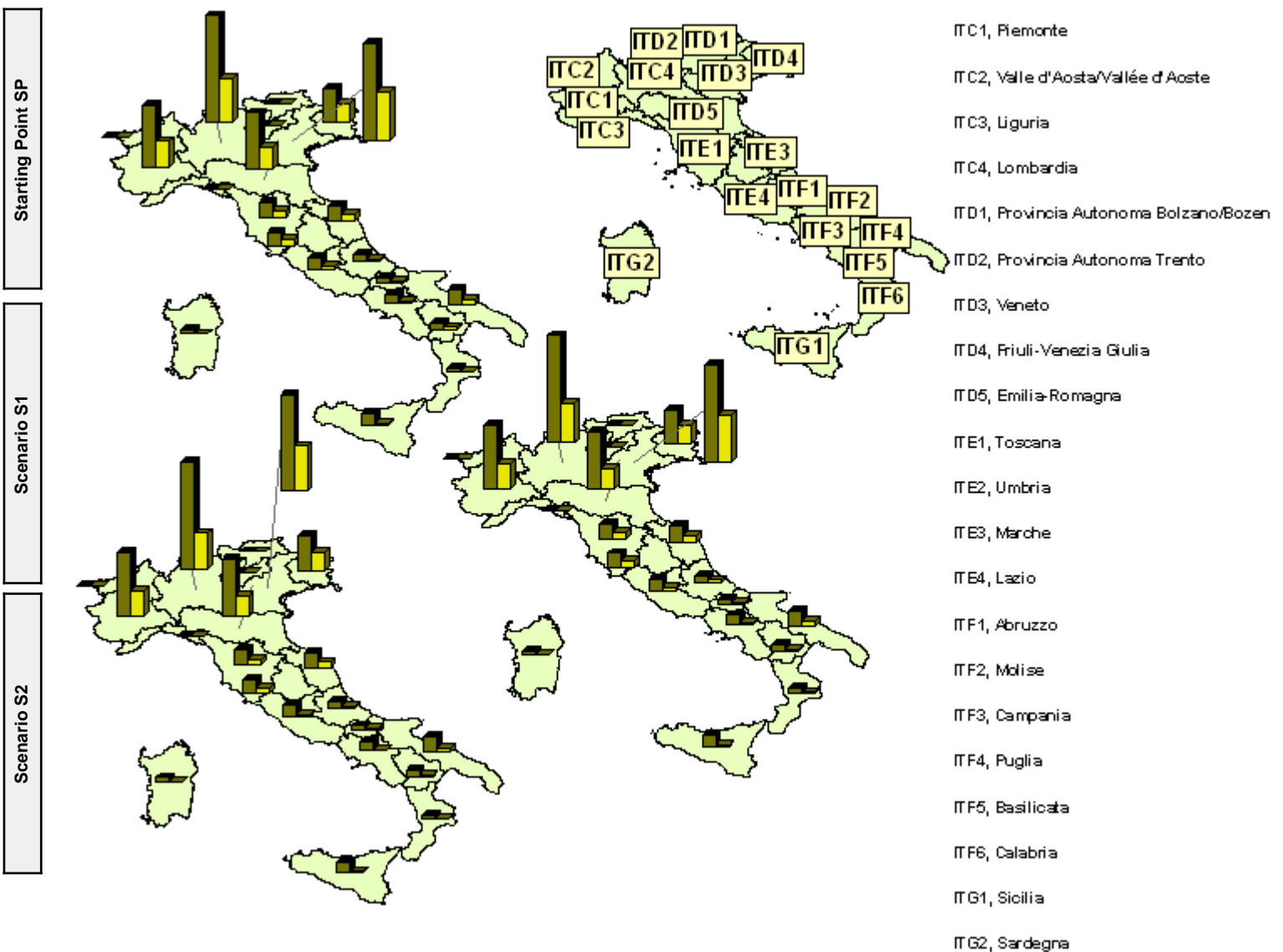
Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	58	59	58	
Meat consumption (**)	[kg / person * year]	602	616	642	
		91	93	97	(*) EUROSTAT; (**) FAO

#### CALCULATION PARAMETERS

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	1,00	0,80	0,80	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	2,00	1,50	1,50	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,40	1,00	1,00	Share of cattle on straw (**)	0,70	0,60	0,70
				Share of pigs on straw (**)	0,60	0,50	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,30	0,30	0,30

(\*) [ t / LU \* year ]; (\*\*) [ % of total herd ]; (\*\*\*) [ % of total straw ]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**



## RESIDUE BIOMASS POTENTIAL - FIGURES

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

			Starting Point		Scenario S1		Scenario S2	
			PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
			(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>			<b>484,70</b>	<b>199,48</b>	<b>395,77</b>	<b>152,04</b>	<b>395,77</b>	<b>144,96</b>
ITC1	Piemonte		64,76	27,19	52,81	20,74	52,81	19,83
ITC2	Valle d'Aosta/Vallée d'		0,01	0,00	0,00	0,00	0,00	0,00
ITC3	Liguria		0,14	0,00	0,11	0,00	0,11	0,00
ITC4	Lombardia		110,00	43,57	88,88	32,05	88,88	29,70
ITD1	Provincia Autonoma Bo		0,01	0,00	0,00	0,00	0,00	0,00
ITD2	Provincia Autonoma Tr		0,02	0,00	0,02	0,00	0,02	0,00
ITD3	Veneto		99,52	49,93	80,03	38,39	80,03	37,50
ITD4	Friuli-Venezia Giulia		35,40	19,44	28,42	15,22	28,42	15,08
ITD5	Emilia-Romagna		57,28	22,33	47,00	17,03	47,00	16,06
ITE1	Toscana		15,22	6,33	12,62	5,00	12,62	4,86
ITE2	Umbria		13,85	6,23	11,44	4,96	11,44	4,84
ITE3	Marche		15,82	6,53	13,27	5,32	13,27	5,21
ITE4	Lazio		12,21	3,59	10,05	2,50	10,05	2,22
ITF1	Abruzzo		6,36	2,01	5,33	1,55	5,33	1,45
ITF2	Molise		4,33	1,43	3,65	1,13	3,65	1,06
ITF3	Campania		9,07	1,45	7,51	0,76	7,51	0,42
ITF4	Puglia		15,16	4,76	12,93	3,89	12,93	3,73
ITF5	Basilicata		6,83	2,03	5,81	1,64	5,81	1,54
ITF6	Calabria		4,26	0,82	3,58	0,56	3,58	0,43
ITG1	Sicilia		10,67	1,84	9,12	1,30	9,12	1,03
ITG2	Sardegna		3,78	0,00	3,19	0,00	3,19	0,00
<b>FORESTRY</b>			<b>108,16</b>	<b>26,83</b>	<b>111,61</b>	<b>32,66</b>	<b>127,81</b>	<b>29,77</b>
	Logging residues		8,74	2,20	9,61	3,53	8,74	1,46
	Thinning wood		25,19	2,52	27,71	4,16	25,19	2,90
	Roots		2,47	0,12	2,09	0,03	1,91	0,00
	Wood balance		71,76	21,99	72,20	24,94	91,97	25,41
<b>WOOD INDUSTRY</b>			<b>10,72</b>	<b>0,54</b>	<b>16,68</b>	<b>0,83</b>	<b>14,30</b>	<b>0,71</b>
<b>TOTAL BIOMASS</b>			<b>603,58</b>	<b>226,85</b>	<b>524,06</b>	<b>185,53</b>	<b>537,88</b>	<b>175,44</b>

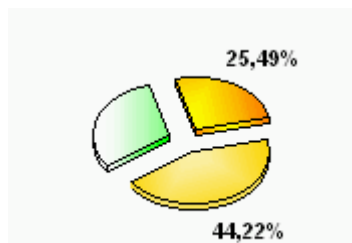
## Lithuania



### GENERAL INFORMATION

Population 3 mln  
Population density 53 person / km<sup>2</sup>

Total area 6530 1000 ha  
 Utilised agricultural area 2888 1000 ha  
 Wooded area 1978 1000 ha  
 Other 1664 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	1857	1000 ha	Cereal production (*)	2 542,55	1000 t
Fallow land	164	1000 ha	Oilseed production (*)	95,98	1000 t
Permanent crops	42	1000 ha	Maize production (*)	8,50	1000 t
Permanent grassland	970	1000 ha	Cattle production	628,88	1000 LU
Number of agricultural holdings	272,11	1000 ton	Pig (*)	218,84	1000 LU
Average farm size	10,42	1000 ton	Sheep (*)	1,54	1000 LU

(\* average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	1 978,00	1000 ha
Area of forest available for wood supply	1 686,00	1000 ha
Area of coniferous forest available for wood supply	752,00	1000 ha
Area of broadleaves forest available for wood supply	934,00	1000 ha
Average volume of growing stock on forest available for wood supply	186,50	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	8 504,00	1000 t
Annual fellings overbark on forest available for wood supply	5 240,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	3 410,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	1 830,00	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,15	0,19	0,15	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	0,60	0,39	0,75	0,40	0,88	0,42
Wood balance	0,85	0,85	0,85	0,20	0,15	0,30	0,15	0,12	0,14

#### CALCULATION PARAMETERS

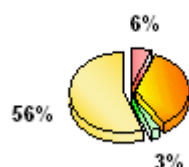
Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,10	1,00
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,65	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,20	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,23			
Share of pine in all species		0,42			

## Deliverable D5.01.03 Residue biomass potential inventory results

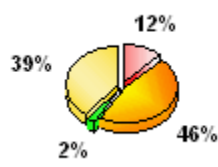
**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	3,40	3,74	3,40	1,01	1,42	0,74
Thinning wood	[PJ/a]	20,75	22,83	20,75	3,89	4,37	4,02
Roots	[PJ/a]	1,73	1,78	1,58	0,21	0,07	0,11
Wood balance	[PJ/a]	32,72	32,93	41,90	3,33	3,69	3,80
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>58,59</b>	<b>61,26</b>	<b>67,63</b>	<b>8,44</b>	<b>9,55</b>	<b>8,67</b>

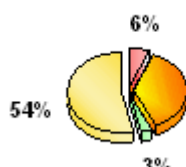
SP Theoretical



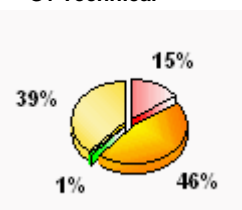
SP Technical



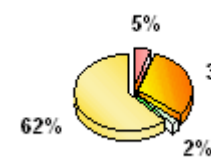
S1 Theoretical



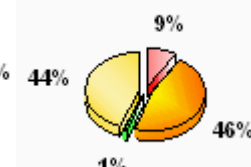
S1 Technical



S2 Theoretical



S2 Technical


**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

Share of wood by-products in sawmills	0,40	0,40	0,40
Share of wood by-products in board industry	0,20	0,20	0,20
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30
Share of wood by-products in other wood indust	0,30	0,30	0,30
Wood density	0,6 t / m3		
Heat value	15 GJ / t		
	SP	S1	S2
Production changes related to year 2004		1,40	1,20
Utilisation of industrial by-products	0,95	0,95	0,95

Sawlogs and veneer logs	3 122,00	1000 m3
Pulpwood group	1 434,00	1000 m3
Other industrial wood group	25,00	1000 m3
Wood fuel group	1 361,00	1000 m3

FAOSTAT

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	14,62	21,60	18,52	0,73	1,08	0,93

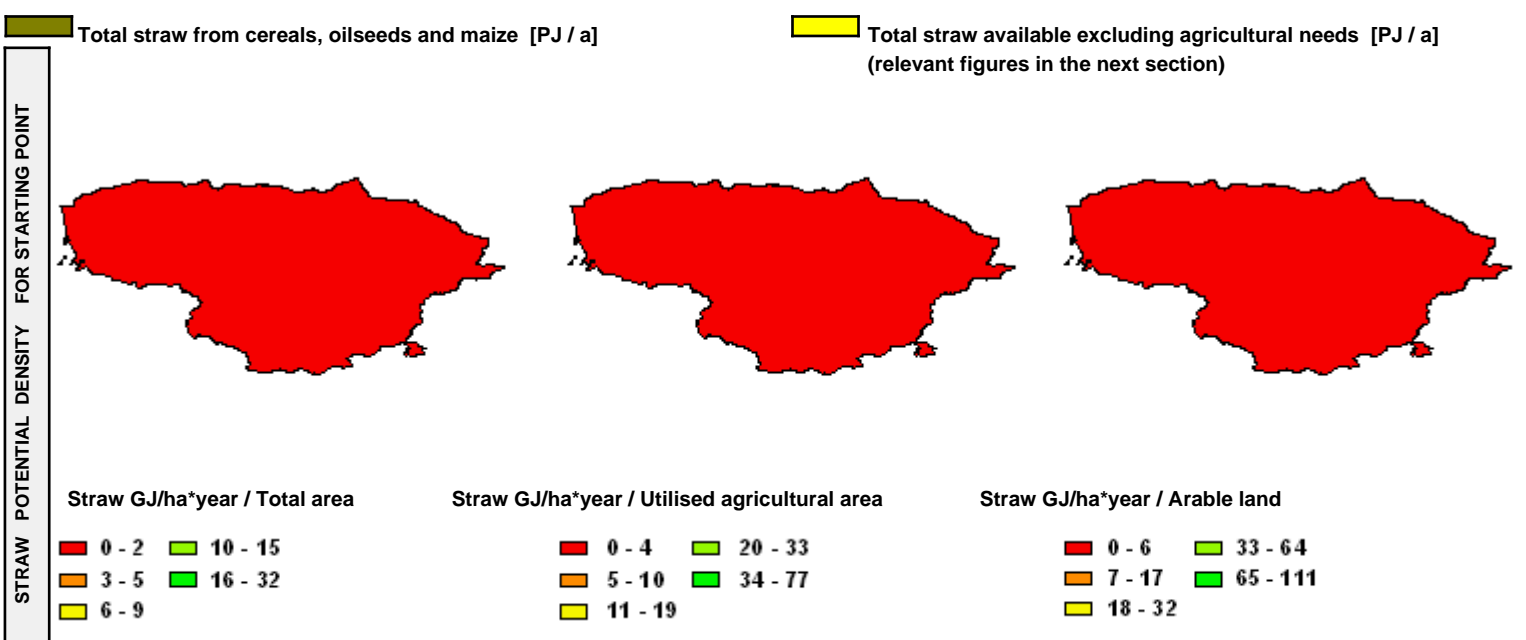
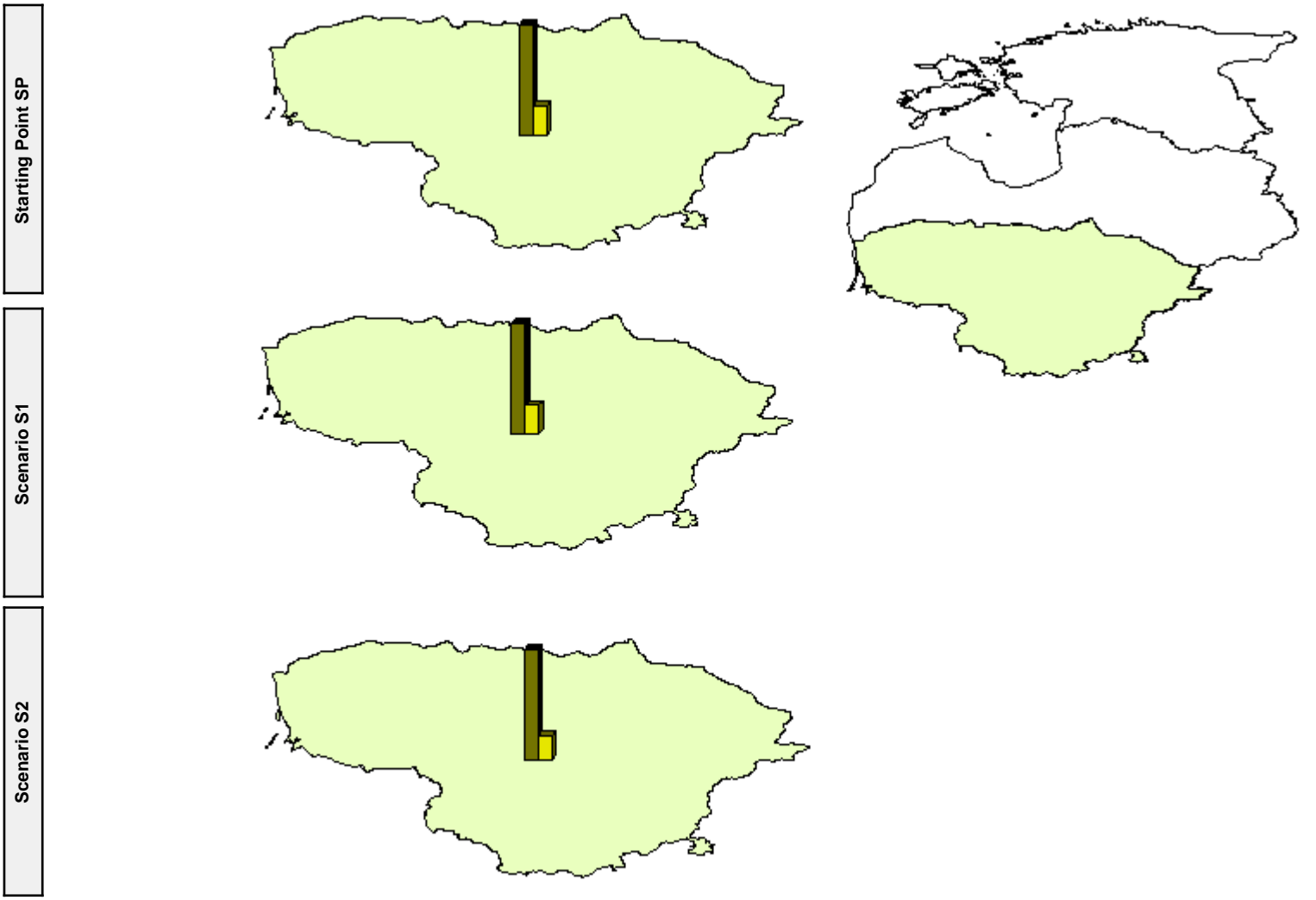
**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	3	3	3	
Meat consumption (**)	[kg / person * year]	539	567	626	
		49	51	56	(*) EUROSTAT; (**) FAO

**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	1,00	0,80	0,80	Straw for bedding (*)	1,00	1,00	1,00
Rape straw / grain ratio	1,70	1,50	1,50	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,90	0,70	0,80
				Share of pigs on straw (**)	0,70	0,50	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (****)	0,10	0,10	0,10

(\*) [t / LU \* year]; (\*\*) [% of total herd]; (\*\*\*) [% of total straw]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**


**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

		Starting Point		Scenario S1		Scenario S2	
		PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
		(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>		<b>35,60</b>	<b>9,38</b>	<b>31,34</b>	<b>8,21</b>	<b>31,34</b>	<b>6,97</b>
LT	Lithuania	35,60	9,38	31,34	8,21	31,34	6,97
<b>FORESTRY</b>		<b>58,59</b>	<b>8,44</b>	<b>61,26</b>	<b>9,55</b>	<b>67,63</b>	<b>8,67</b>
	Logging residues	3,40	1,01	3,74	1,42	3,40	0,74
	Thinning wood	20,75	3,89	22,83	4,37	20,75	4,02
	Roots	1,73	0,21	1,78	0,07	1,58	0,11
	Wood balance	32,72	3,33	32,93	3,69	41,90	3,80
<b>WOOD INDUSTRY</b>		<b>14,62</b>	<b>0,73</b>	<b>21,60</b>	<b>1,08</b>	<b>18,52</b>	<b>0,93</b>
<b>TOTAL BIOMASS</b>		<b>108,81</b>	<b>18,55</b>	<b>114,20</b>	<b>18,84</b>	<b>117,49</b>	<b>16,57</b>

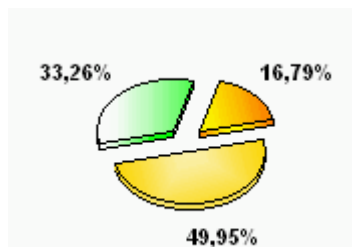
## Luxembourg



### GENERAL INFORMATION

Population 1 mln  
Population density 175 person / km<sup>2</sup>

Total area 259 1000 ha  
 Utilised agricultural area 129 1000 ha  
 Wooded area 86 1000 ha  
 Other 43 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land 63 1000 ha  
 Fallow land 2 1000 ha  
 Permanent crops 1 1000 ha  
 Permanent grassland 65 1000 ha  
 Number of agricultural holdings 2,45 1000 ton  
 Average farm size 56,38 1000 ton

Cereal production (\*) 157,50 1000 t  
 Oilseed production (\*) 10,40 1000 t  
 Maize production (\*) 2,63 1000 t  
 Cattle production 137,18 1000 LU  
 Pig (\*) 14,60 1000 LU  
 Sheep (\*) 0,72 1000 LU

(\*) average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area 86,00 1000 ha  
 Area of forest available for wood supply 86,00 1000 ha  
 Area of coniferous forest available for wood supply 31,00 1000 ha  
 Area of broadleaves forest available for wood supply 55,00 1000 ha  
 Average volume of growing stock on forest available for wood supply 237,50 m<sup>3</sup> / ha  
 Net annual increment on forest available for wood supply 667,00 1000 t  
 Annual fellings overbark on forest available for wood supply 325,00 1000 t  
 Annual fellings overbark on coniferous forest available for wood supply 162,50 1000 t  
 Annual fellings overbark on broadleaves forest available for wood supply 162,50 1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,20	0,25	0,20	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	1,00	1,00	1,00	0,40	0,88	0,42
Wood balance	0,70	0,70	0,70	0,20	0,15	0,30	0,00	0,00	0,00

#### CALCULATION PARAMETERS

	t / m <sup>3</sup>	0,9	SP	S1	S2
Wood density	t / m <sup>3</sup>	0,9			
Heat value	GJ / t	8			
Factor of final fellings		0,45		1,19	1,13
Factor of coniferous fellings		0,50		1,05	1,15
Logging residues factor for coniferous species		0,13	0,28	0,26	0,26
Logging residues factor for broadleaves species		0,13			
Root biomass ratio		0,25			
Share of spruce in all species		0,27			
Share of pine in all species		0,04			

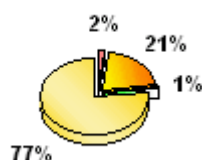
(\*) in relation to SP

## Deliverable D5.01.03 Residue biomass potential inventory results

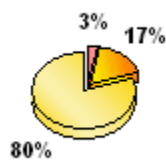
**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	0,13	0,16	0,15	0,04	0,05	0,03
Thinning wood	[PJ/a]	1,29	1,53	1,45	0,24	0,29	0,28
Roots	[PJ/a]	0,05	0,06	0,05	0,00	0,00	0,00
Wood balance	[PJ/a]	4,80	5,04	5,52	1,15	1,29	1,16
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>6,27</b>	<b>6,79</b>	<b>7,18</b>	<b>1,43</b>	<b>1,63</b>	<b>1,47</b>

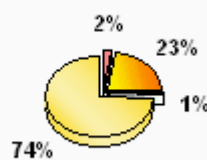
SP Theoretical



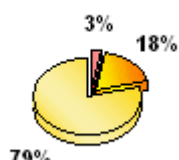
SP Technical



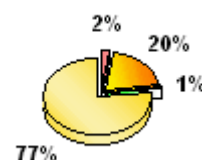
S1 Theoretical



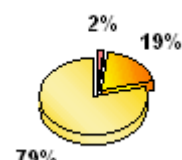
S1 Technical



S2 Theoretical



S2 Technical


**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

Share of wood by-products in sawmills	0,40	0,40	0,40
Share of wood by-products in board industry	0,20	0,20	0,20
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30
Share of wood by-products in other wood indust	0,30	0,30	0,30
Wood density	0,6	t / m3	
Heat value	15	GJ / t	
Production changes related to year 2004		SP	S1
			S2
Utilisation of industrial by-products	0,95	0,95	0,95

Sawlogs and veneer logs	133,02	1000 m3
Pulpwood group	90,77	1000 m3
Other industrial wood group	23,55	1000 m3
Wood fuel group	16,70	1000 m3
		FAOSTAT

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	0,72	0,76	0,76	0,04	0,04	0,04

**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	602	616	642	
Meat consumption (**)	[kg / person * year]	91	93	97	
					(*) EUROSTAT; (**) FAO

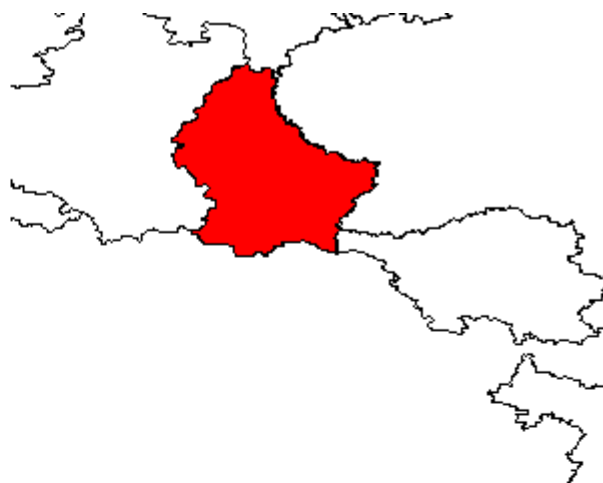
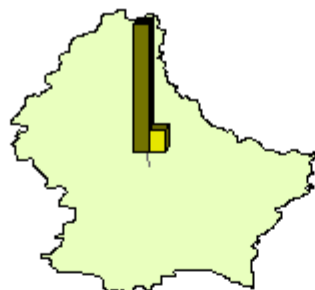
**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	1,70	1,40	1,40	Straw for fodder (*)	0,10	0,10	0,10
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,40	0,40	0,50
				Share of pigs on straw (**)	0,30	0,30	0,50
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,05	0,05	0,05

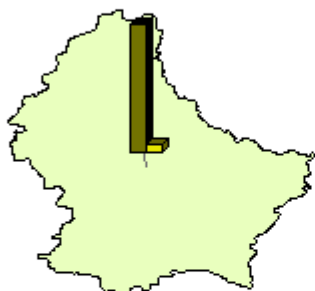
(\*) [t / LU \* year]; (\*\*) [% of total herd]; (\*\*\*) [% of total straw]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**

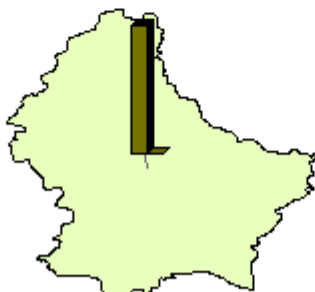
Starting Point SP



Scenario S1



Scenario S2



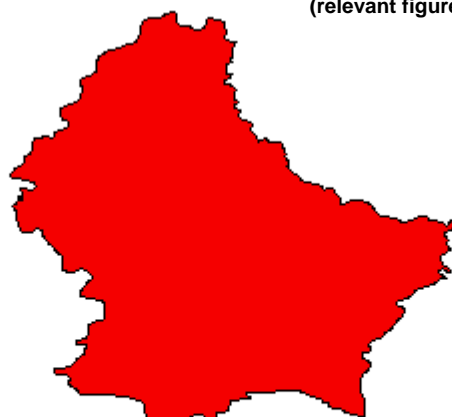
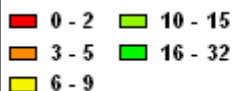
Total straw from cereals, oilseeds and maize [PJ / a]

Total straw available excluding agricultural needs [PJ / a] (relevant figures in the next section)

STRAW POTENTIAL DENSITY FOR STARTING POINT



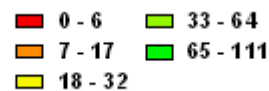
Straw GJ/ha\*year / Total area



Straw GJ/ha\*year / Utilised agricultural area



Straw GJ/ha\*year / Arable land



## RESIDUE BIOMASS POTENTIAL - FIGURES

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

		Starting Point		Scenario S1		Scenario S2	
		PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
		(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>		<b>1,93</b>	<b>0,35</b>	<b>1,68</b>	<b>0,12</b>	<b>1,68</b>	<b>0,00</b>
LU	Luxembourg (Grand-D)	1,93	0,35	1,68	0,12	1,68	0,00
<b>FORESTRY</b>		<b>6,27</b>	<b>1,43</b>	<b>6,79</b>	<b>1,63</b>	<b>7,18</b>	<b>1,47</b>
	Logging residues	0,13	0,04	0,16	0,05	0,15	0,03
	Thinning wood	1,29	0,24	1,53	0,29	1,45	0,28
	Roots	0,05	0,00	0,06	0,00	0,05	0,00
	Wood balance	4,80	1,15	5,04	1,29	5,52	1,16
<b>WOOD INDUSTRY</b>		<b>0,72</b>	<b>0,04</b>	<b>0,76</b>	<b>0,04</b>	<b>0,76</b>	<b>0,04</b>
<b>TOTAL BIOMASS</b>		<b>8,92</b>	<b>1,82</b>	<b>9,23</b>	<b>1,79</b>	<b>9,62</b>	<b>1,51</b>

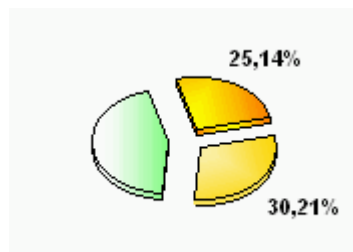
## Latvia



### GENERAL INFORMATION

Population 2 mln  
Population density 37 person / km<sup>2</sup>

Total area 6459 1000 ha  
■ Utilised agricultural area 1951 1000 ha  
■ Wooded area 2884 1000 ha  
■ Other 1624 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	1327	1000 ha	Cereal production (*)	953,13	1000 t
Fallow land	97	1000 ha	Oilseed production (*)	24,10	1000 t
Permanent crops	12	1000 ha	Maize production (*)		1000 t
Permanent grassland	612	1000 ha	Cattle production	293,26	1000 LU
Number of agricultural holdings	126,61	1000 ton	Pig (*)	89,10	1000 LU
Average farm size	22,00	1000 ton	Sheep (*)	3,36	1000 LU

(\* average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	2 884,00	1000 ha
Area of forest available for wood supply	2 413,00	1000 ha
Area of coniferous forest available for wood supply	907,00	1000 ha
Area of broadleaves forest available for wood supply	1 506,00	1000 ha
Average volume of growing stock on forest available for wood supply	169,60	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	11 050,00	1000 t
Annual fellings overbark on forest available for wood supply	6 570,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	3 610,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	2 960,00	1000 t

*data for 2000, TBFRA*

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,15	0,19	0,15	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	0,60	0,39	0,75	0,40	0,88	0,42
Wood balance	0,85	0,85	0,85	0,20	0,15	0,30	0,17	0,13	0,15

#### CALCULATION PARAMETERS

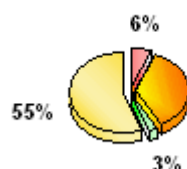
Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,10	1,00
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,55	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,20	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,17			
Share of pine in all species		0,43			

## Deliverable D5.01.03 Residue biomass potential inventory results

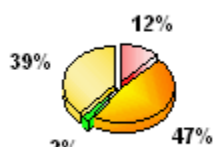
**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	4,26	4,68	4,26	1,27	1,78	0,92
Thinning wood	[PJ/a]	26,02	28,62	26,02	4,88	5,49	5,04
Roots	[PJ/a]	1,97	2,03	1,81	0,24	0,08	0,13
Wood balance	[PJ/a]	40,18	40,22	52,11	4,02	4,45	4,65
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>72,42</b>	<b>75,54</b>	<b>84,19</b>	<b>10,40</b>	<b>11,78</b>	<b>10,75</b>

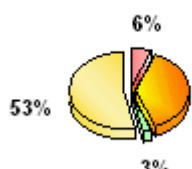
SP Theoretical



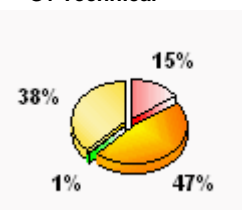
SP Technical



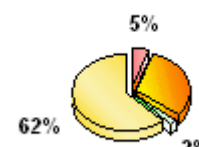
S1 Theoretical



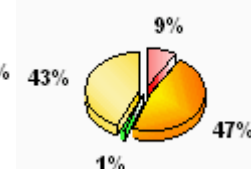
S1 Technical



S2 Theoretical



S2 Technical


**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

Share of wood by-products in sawmills	0,40	0,40	0,40
Share of wood by-products in board industry	0,20	0,20	0,20
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30
Share of wood by-products in other wood indust	0,30	0,30	0,30
Wood density	0,6 t / m3		
Heat value	15 GJ / t		
	SP	S1	S2
Production changes related to year 2004		1,40	1,20
Utilisation of industrial by-products	0,95	0,95	0,95

Sawlogs and veneer logs	7 960,14	1000 m3
Pulpwood group	3 463,80	1000 m3
Other industrial wood group	548,44	1000 m3
Wood fuel group	1 283,76	1000 m3

FAOSTAT

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	37,21	54,33	46,57	1,86	2,72	2,33

**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

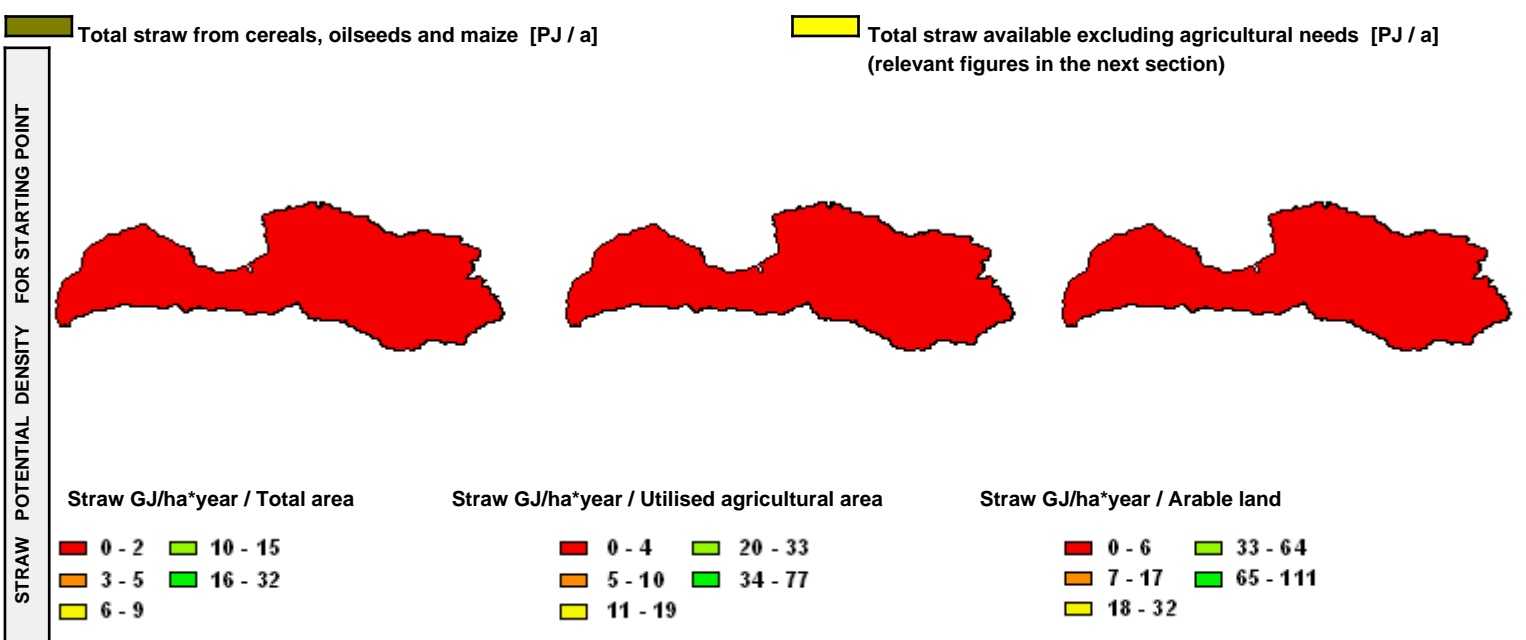
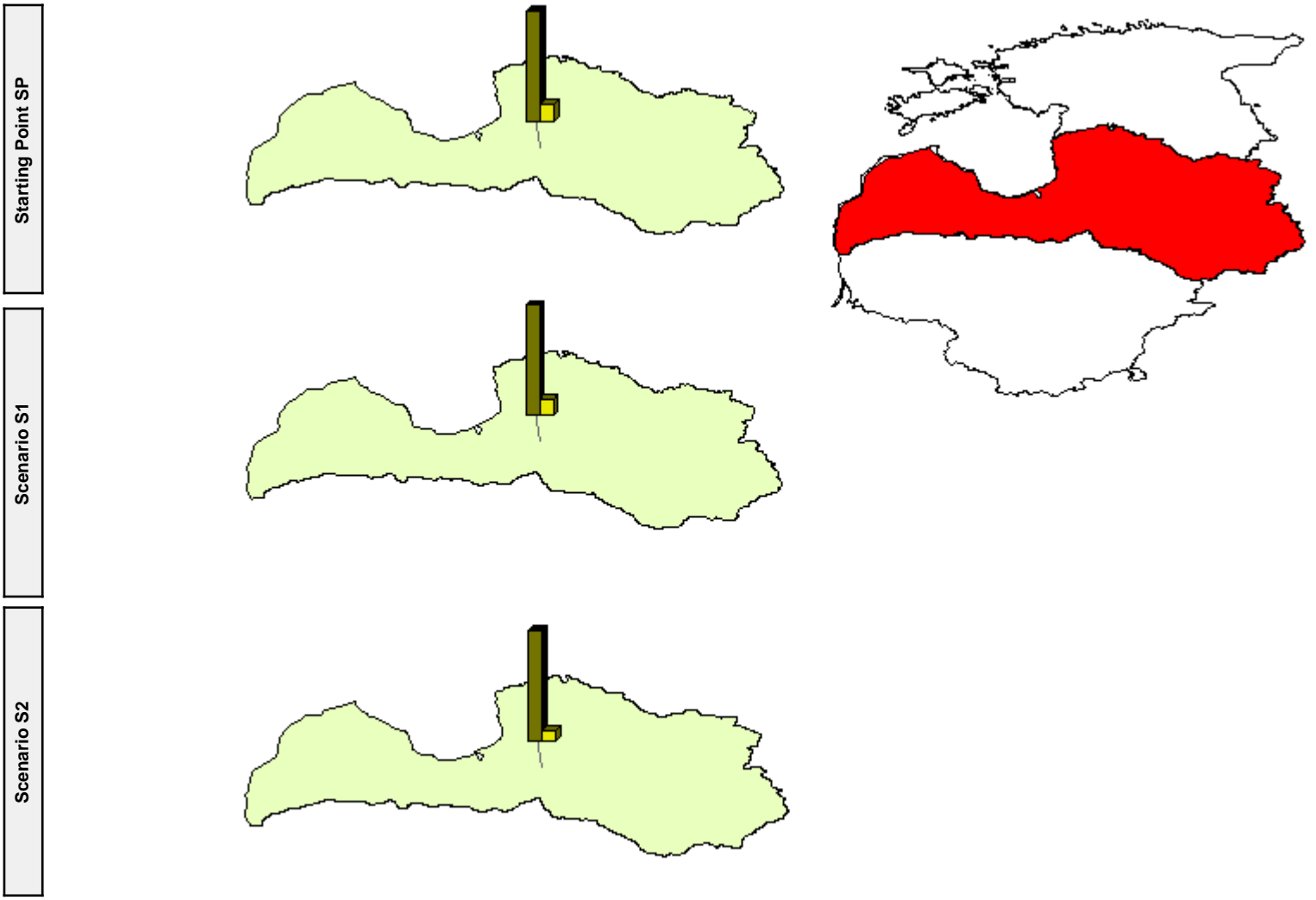
Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	539	567	626	
Meat consumption (**)	[kg / person * year]	49	51	56	

(\*) EUROSTAT; (\*\*) FAO

**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	1,00	0,80	0,80	Straw for bedding (*)	1,00	1,00	1,00
Rape straw / grain ratio	1,70	1,50	1,50	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,90	0,70	0,80
				Share of pigs on straw (**)	0,70	0,50	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,15	0,15	0,15

(\*) [ t / LU \* year ]; (\*\*) [ % of total herd ]; (\*\*\*) [ % of total straw ]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**


**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

		Starting Point		Scenario S1		Scenario S2	
		PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
		(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>		<b>13,03</b>	<b>1,90</b>	<b>11,10</b>	<b>1,61</b>	<b>11,10</b>	<b>1,07</b>
LV	Latvia	13,03	1,90	11,10	1,61	11,10	1,07
<b>FORESTRY</b>		<b>72,42</b>	<b>10,40</b>	<b>75,54</b>	<b>11,78</b>	<b>84,19</b>	<b>10,75</b>
	Logging residues	4,26	1,27	4,68	1,78	4,26	0,92
	Thinning wood	26,02	4,88	28,62	5,49	26,02	5,04
	Roots	1,97	0,24	2,03	0,08	1,81	0,13
	Wood balance	40,18	4,02	40,22	4,45	52,11	4,65
<b>WOOD INDUSTRY</b>		<b>37,21</b>	<b>1,86</b>	<b>54,33</b>	<b>2,72</b>	<b>46,57</b>	<b>2,33</b>
<b>TOTAL BIOMASS</b>		<b>122,66</b>	<b>14,16</b>	<b>140,97</b>	<b>16,11</b>	<b>141,86</b>	<b>14,15</b>

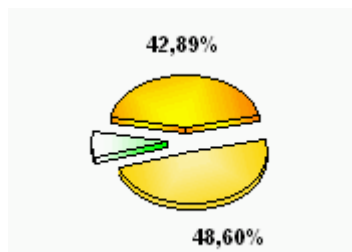
## Netherlands



### GENERAL INFORMATION

Population 16 mln  
Population density 482 person / km<sup>2</sup>

Total area 3986 1000 ha  
■ Utilised agricultural area 1937 1000 ha  
■ Wooded area 339 1000 ha  
■ Other 1710 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	1045	1000 ha	Cereal production (*)	1 811,30	1000 t
Fallow land	27	1000 ha	Oilseed production (*)	11,35	1000 t
Permanent crops	32	1000 ha	Maize production (*)	251,80	1000 t
Permanent grassland	845	1000 ha	Cattle production	2 795,68	1000 LU
Number of agricultural holdings	85,50	1000 ton	Pig (*)	1 958,24	1000 LU
Average farm size	25,62	1000 ton	Sheep (*)	124,22	1000 LU

(\*) average 2000-2004

LU Livestock Unit

EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	339,00	1000 ha
Area of forest available for wood supply	314,00	1000 ha
Area of coniferous forest available for wood supply	134,00	1000 ha
Area of broadleaves forest available for wood supply	180,00	1000 ha
Average volume of growing stock on forest available for wood supply	165,90	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	2 205,00	1000 t
Annual fellings overbark on forest available for wood supply	1 299,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	858,17	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	440,83	1000 t

*data for 2000, TBFRA*

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,20	0,25	0,20	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	1,00	1,00	1,00	0,40	0,88	0,42
Wood balance	0,70	0,70	0,70	0,20	0,15	0,30	0,15	0,12	0,14

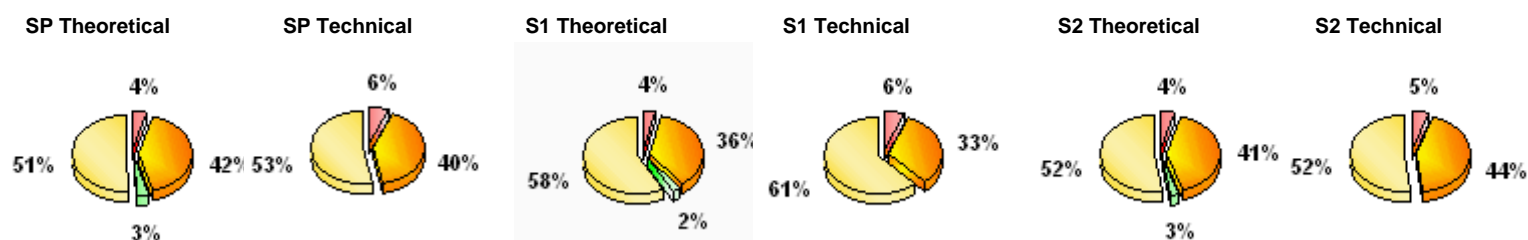
#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	0,93	1,13
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,66	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,13	(*) in relation to SP		
Logging residues factor for broadleaves species		0,13			
Root biomass ratio		0,25			
Share of spruce in all species		0,14			
Share of pine in all species		0,42			

## Deliverable D5.01.03 Residue biomass potential inventory results

**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	0,53	0,49	0,59	0,15	0,17	0,12
Thinning wood	[PJ/a]	5,14	4,78	5,81	0,96	0,92	1,13
Roots	[PJ/a]	0,37	0,32	0,38	0,00	0,00	0,00
Wood balance	[PJ/a]	6,24	7,71	7,37	1,27	1,73	1,34
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>12,28</b>	<b>13,30</b>	<b>14,16</b>	<b>2,38</b>	<b>2,81</b>	<b>2,58</b>


**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

Share of wood by-products in sawmills	0,40	0,40	0,40	Sawlogs and veneer logs      459,60   1000 m3 Pulpwood group                    182,40   1000 m3 Other industrial wood group      118,20   1000 m3 Wood fuel group                      202,40   1000 m3 FAOSTAT
Share of wood by-products in board industry	0,20	0,20	0,20	
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30	
Share of wood by-products in other wood indust	0,30	0,30	0,30	
Wood density	0,6	t / m3		
Heat value	15	GJ / t		
Production changes related to year 2004	SP	S1	S2	
Utilisation of industrial by-products	0,95	0,95	0,95	

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	2,36	2,32	2,47	0,12	0,12	0,12

**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

		2005	2010	2020	
Population (*)	[mln]	16	17	17	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	602	616	642	
Meat consumption (**)	[kg / person * year]	91	93	97	

(\*) EUROSTAT; (\*\*) FAO

**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	0,50	0,50	0,50
Rape straw / grain ratio	1,70	1,40	1,40	Straw for fodder (*)	0,10	0,10	0,10
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,30	0,30	0,50
				Share of pigs on straw (**)	0,30	0,30	0,50
				Straw for soil (***)	0,10	0,10	0,10
				Straw for other purposes (***)	0,05	0,05	0,05

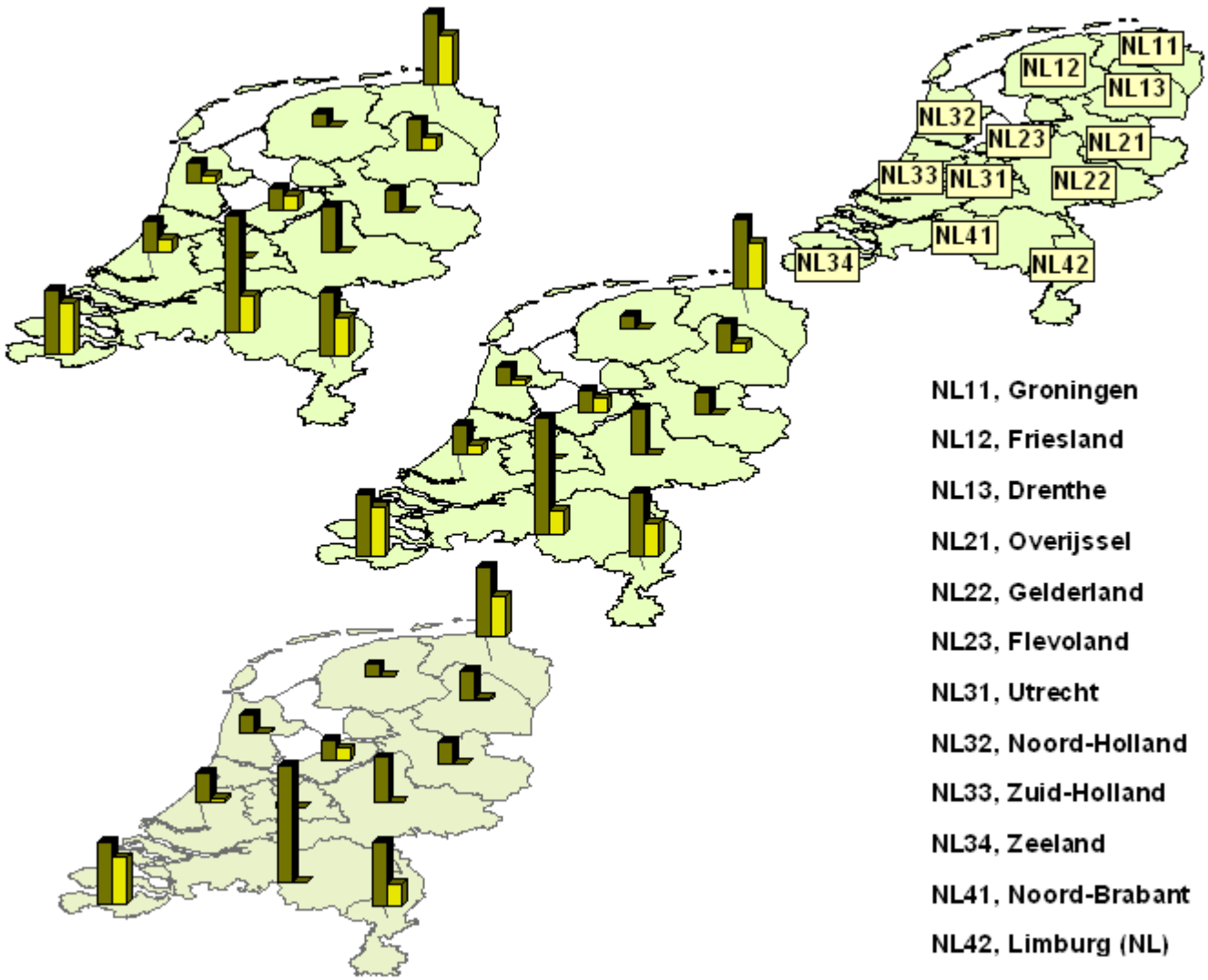
(\*) [t / LU \* year]; (\*\*) [% of total herd]; (\*\*\*) [% of total straw]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**

Starting Point SP

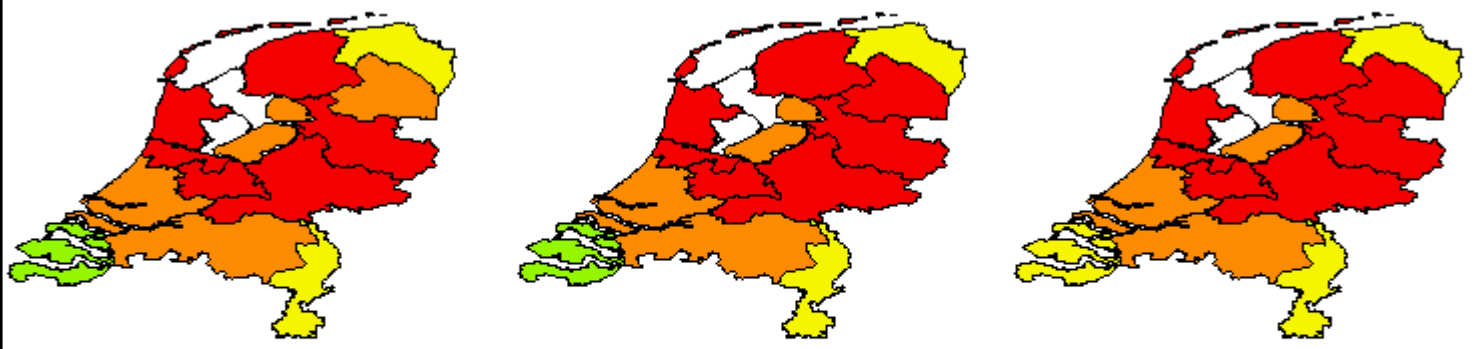
Scenario S1

Scenario S2



Total straw from cereals, oilseeds and maize [PJ / a]      Total straw available excluding agricultural needs [PJ / a] (relevant figures in the next section)

STRAW POTENTIAL DENSITY FOR STARTING POINT



Straw GJ/ha\*year / Total area

0 - 2	10 - 15
3 - 5	16 - 32
6 - 9	

Straw GJ/ha\*year / Utilised agricultural area

0 - 4	20 - 33
5 - 10	34 - 77
11 - 19	

Straw GJ/ha\*year / Arable land

0 - 6	33 - 64
7 - 17	65 - 111
18 - 32	

**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2	
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
	(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>	<b>23,92</b>	<b>10,54</b>	<b>22,20</b>	<b>8,41</b>	<b>22,20</b>	<b>5,70</b>
NL11 Groningen	3,40	2,36	3,11	2,04	3,11	1,80
NL12 Friesland	0,59	0,00	0,54	0,00	0,54	0,00
NL13 Drenthe	1,46	0,59	1,34	0,40	1,34	0,10
NL21 Overijssel	1,05	0,00	0,98	0,00	0,98	0,00
NL22 Gelderland	2,14	0,00	2,00	0,00	2,00	0,00
NL23 Flevoland	1,03	0,71	0,94	0,61	0,94	0,54
NL31 Utrecht	0,21	0,00	0,20	0,00	0,20	0,00
NL32 Noord-Holland	0,94	0,34	0,86	0,22	0,86	0,03
NL33 Zuid-Holland	1,43	0,61	1,31	0,42	1,31	0,15
NL34 Zeeland	3,04	2,43	2,79	2,19	2,79	2,12
NL41 Noord-Brabant	5,58	1,74	5,25	1,04	5,25	0,00
NL42 Limburg (NL)	3,05	1,76	2,88	1,49	2,88	0,96
<b>FORESTRY</b>	<b>12,28</b>	<b>2,38</b>	<b>13,30</b>	<b>2,81</b>	<b>14,16</b>	<b>2,58</b>
Logging residues	0,53	0,15	0,49	0,17	0,59	0,12
Thinning wood	5,14	0,96	4,78	0,92	5,81	1,13
Roots	0,37	0,00	0,32	0,00	0,38	0,00
Wood balance	6,24	1,27	7,71	1,73	7,37	1,34
<b>WOOD INDUSTRY</b>	<b>2,36</b>	<b>0,12</b>	<b>2,32</b>	<b>0,12</b>	<b>2,47</b>	<b>0,12</b>
<b>TOTAL BIOMASS</b>	<b>38,56</b>	<b>13,04</b>	<b>37,82</b>	<b>11,34</b>	<b>38,83</b>	<b>8,40</b>

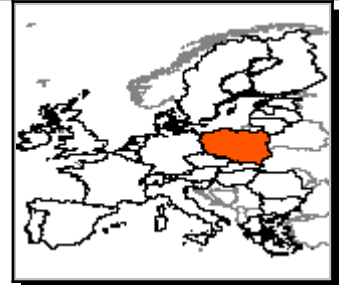
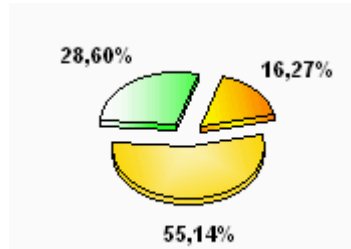
## Poland



### GENERAL INFORMATION

Population 38 mln  
Population density 122 person / km<sup>2</sup>

Total area 31269 1000 ha  
 Utilised agricultural area 17240 1000 ha  
 Wooded area 8942 1000 ha  
 Other 5086 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	13302	1000 ha	Cereal production (*)	25 840,82	1000 t
Fallow land	1761	1000 ha	Oilseed production (*)	1 103,20	1000 t
Permanent crops	275	1000 ha	Maize production (*)	1 694,98	1000 t
Permanent grassland	3671	1000 ha	Cattle production	4 328,52	1000 LU
Number of agricultural holdings	2 163,36	1000 ton	Pig (*)	3 125,86	1000 LU
Average farm size	7,87	1000 ton	Sheep (*)	32,84	1000 LU

(\*) average 2000-2004

LU Livestock Unit

EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	8 942,00	1000 ha
Area of forest available for wood supply	8 300,00	1000 ha
Area of coniferous forest available for wood supply	5 528,00	1000 ha
Area of broadleaves forest available for wood supply	2 772,00	1000 ha
Average volume of growing stock on forest available for wood supply	213,40	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	39 436,00	1000 t
Annual fellings overbark on forest available for wood supply	30 532,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	23 235,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	7 297,00	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

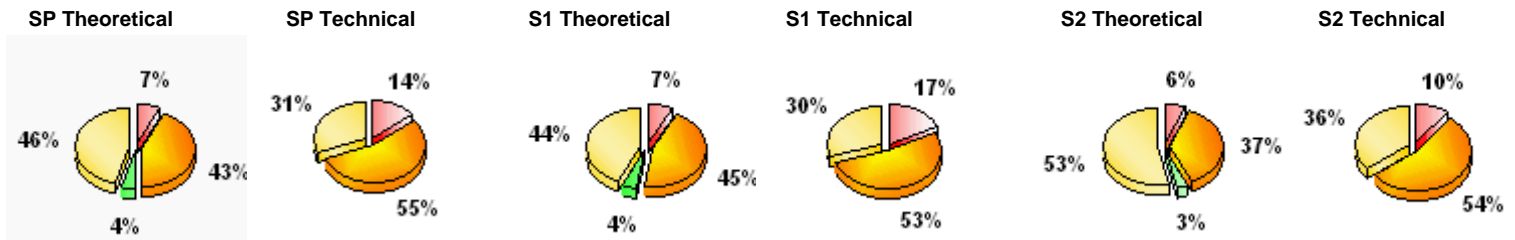
	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,15	0,19	0,15	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	1,00	1,00	1,00	0,40	0,88	0,42
Wood balance	0,85	0,85	0,85	0,20	0,15	0,30	0,17	0,14	0,15

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,10	1,00
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,76	Factor of clear final felling	0,25	0,26
Logging residues factor for coniferous species		0,20	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,09			
Share of pine in all species		0,69			

## FOREST BIOMASS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	19,78	21,76	19,78	5,89	8,25	4,29
Thinning wood	[PJ/a]	120,91	133,00	120,91	22,67	25,49	23,43
Roots	[PJ/a]	11,02	12,73	11,35	0,00	0,00	0,00
Wood balance	[PJ/a]	130,31	129,14	172,90	12,96	14,21	15,36
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>282,02</b>	<b>296,63</b>	<b>324,94</b>	<b>41,52</b>	<b>47,96</b>	<b>43,08</b>



## WOOD INDUSTRY BY - PRODUCTS POTENTIAL

### DATA, ASSUMPTIONS, PARAMETERS

Share of wood by-products in sawmills	0,40	0,40	0,40	<table border="1"> <tbody> <tr> <td>Sawlogs and veneer logs</td> <td>11 492,60</td> <td>1000 m3</td> </tr> <tr> <td>Pulpwood group</td> <td>12 420,80</td> <td>1000 m3</td> </tr> <tr> <td>Other industrial wood group</td> <td>1 966,60</td> <td>1000 m3</td> </tr> <tr> <td>Wood fuel group</td> <td>2 469,40</td> <td>1000 m3</td> </tr> </tbody> </table> <p>FAOSTAT</p>	Sawlogs and veneer logs	11 492,60	1000 m3	Pulpwood group	12 420,80	1000 m3	Other industrial wood group	1 966,60	1000 m3	Wood fuel group	2 469,40	1000 m3
Sawlogs and veneer logs	11 492,60	1000 m3														
Pulpwood group	12 420,80	1000 m3														
Other industrial wood group	1 966,60	1000 m3														
Wood fuel group	2 469,40	1000 m3														
Share of wood by-products in board industry	0,20	0,20	0,20													
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30													
Share of wood by-products in other wood indust	0,30	0,30	0,30													
Wood density	0,6 t / m3															
Heat value	15 GJ / t															
		SP	S1	S2												
Production changes related to year 2004			1,40	1,20												
Utilisation of industrial by-products		0,95	0,95	0,95												

## WOOD INDUSTRY BY-PRODUCTS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	72,06	107,93	92,51	3,60	5,40	4,63

## AGRICULTURAL BIOMASS POTENTIAL - STRAW

### MAIN ASSUMPTIONS

Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	38	38	37	
Meat consumption (**)	[kg / person * year]	539	567	626	
		49	51	56	(*) EUROSTAT; (**) FAO

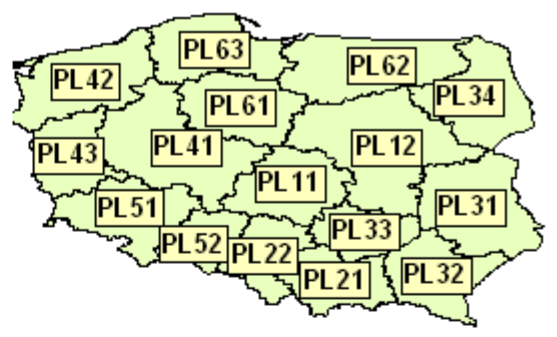
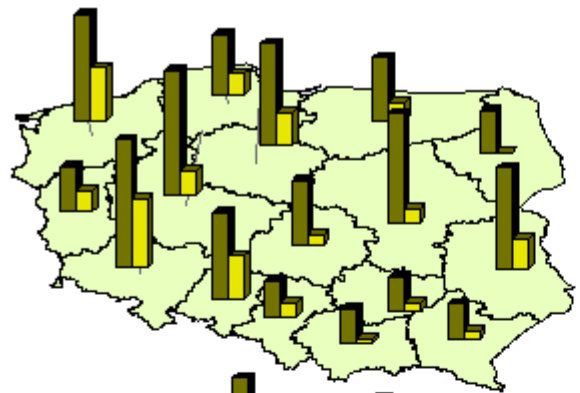
### CALCULATION PARAMETERS

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,90	0,70	0,70	Straw for bedding (*)	1,00	1,00	1,00
Rape straw / grain ratio	2,00	1,50	1,50	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,90	0,70	0,80
				Share of pigs on straw (**)	0,70	0,50	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,15	0,15	0,15

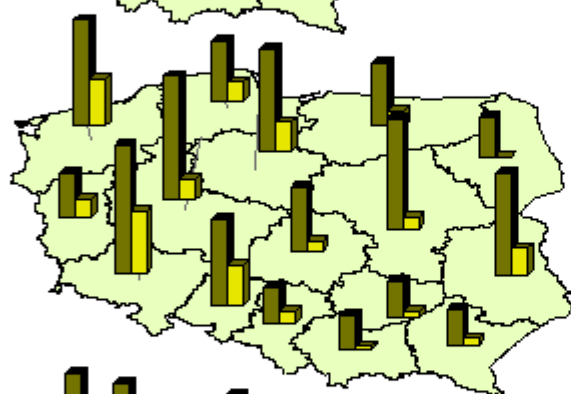
(\*) [ t / LU \* year ]; (\*\*) [ % of total herd ]; (\*\*\*) [ % of total straw ]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**

Starting Point SP

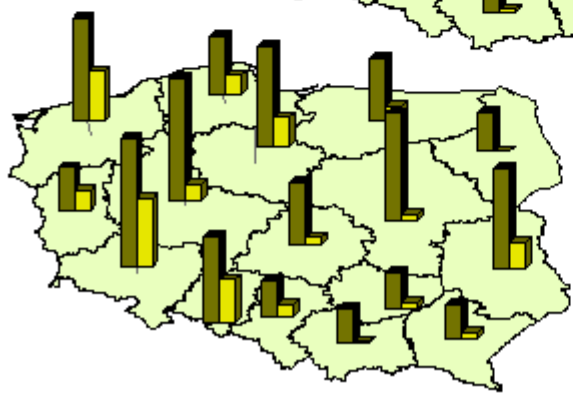


Scenario S1



- PL 11, Lodzkie
- PL 12, Mazowieckie
- PL 21, Malopolskie
- PL 22, Slaskie
- PL 31, Lubelskie
- PL 32, Podkarpackie
- PL 33, Swietokrzyskie
- PL 34, Podlaskie
- PL 41, Wielkopolskie
- PL 42, Zachodniopomorskie
- PL 43, Lubuskie
- PL 51, Dolnoslaskie
- PL 52, Opolskie
- PL 61, Kujawsko-Pomorskie
- PL 62, Warminsko-Mazurskie
- PL 63, Pomorskie

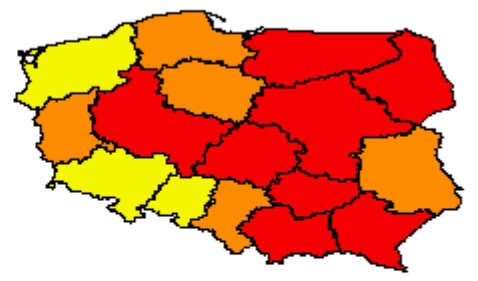
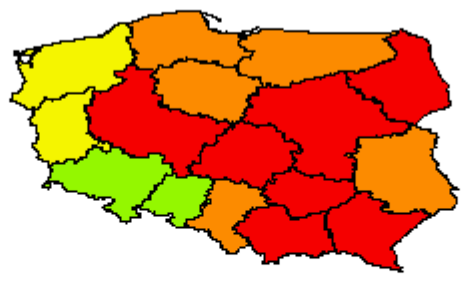
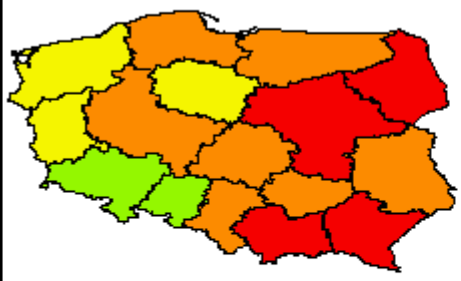
Scenario S2



Total straw from cereals, oilseeds and maize [PJ / a]

Total straw available excluding agricultural needs [PJ / a] (relevant figures in the next section)

STRAW POTENTIAL DENSITY FOR STARTING POINT



Straw GJ/ha\*year / Total area

0 - 2	10 - 15
3 - 5	16 - 32
6 - 9	

Straw GJ/ha\*year / Utilised agricultural area

0 - 4	20 - 33
5 - 10	34 - 77
11 - 19	

Straw GJ/ha\*year / Arable land

0 - 6	33 - 64
7 - 17	65 - 111
18 - 32	

## RESIDUE BIOMASS POTENTIAL - FIGURES

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2		
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	
	(1)	(2)	(1)	(2)	(1)	(2)	
<b>STRAW</b>	<b>366,88</b>	<b>115,79</b>	<b>325,17</b>	<b>101,96</b>	<b>325,17</b>	<b>91,85</b>	
PL11	Lódzkie	20,14	3,40	17,80	2,90	17,80	2,00
PL12	Mazowieckie	34,22	4,28	30,27	3,40	30,27	1,79
PL21	Malopolskie	10,76	1,09	9,58	0,81	9,58	0,30
PL22	Slaskie	11,27	4,11	10,06	3,66	10,06	3,39
PL31	Lubelskie	31,73	9,71	28,03	8,38	28,03	7,49
PL32	Podkarpackie	11,10	2,54	9,86	2,09	9,86	1,73
PL33	Swietokrzyskie	11,09	2,51	9,77	2,06	9,77	1,69
PL34	Podlaskie	12,76	0,00	11,25	0,00	11,25	0,00
PL41	Wielkopolskie	38,93	7,21	34,57	6,68	34,57	4,70
PL42	Zachodniopomorskie	33,21	16,52	29,12	14,47	29,12	14,15
PL43	Lubuskie	13,96	6,77	12,38	6,01	12,38	5,87
PL51	Dolnoslaskie	40,17	21,62	36,16	19,56	36,16	19,28
PL52	Opolskie	27,03	13,53	24,24	12,24	24,24	11,91
PL61	Kujawsko-Pomorskie	32,01	10,41	28,29	9,27	28,29	8,26
PL62	Warminsko-Mazurskie	19,73	5,39	17,32	4,58	17,32	3,92
PL63	Pomorskie	18,77	6,70	16,47	5,85	16,47	5,37
<b>FORESTRY</b>		<b>282,02</b>	<b>41,52</b>	<b>296,63</b>	<b>47,96</b>	<b>324,94</b>	<b>43,08</b>
	Logging residues	19,78	5,89	21,76	8,25	19,78	4,29
	Thinning wood	120,91	22,67	133,00	25,49	120,91	23,43
	Roots	11,02	0,00	12,73	0,00	11,35	0,00
	Wood balance	130,31	12,96	129,14	14,21	172,90	15,36
<b>WOOD INDUSTRY</b>		<b>72,06</b>	<b>3,60</b>	<b>107,93</b>	<b>5,40</b>	<b>92,51</b>	<b>4,63</b>
<b>TOTAL BIOMASS</b>		<b>720,96</b>	<b>160,91</b>	<b>729,73</b>	<b>155,32</b>	<b>742,62</b>	<b>139,56</b>

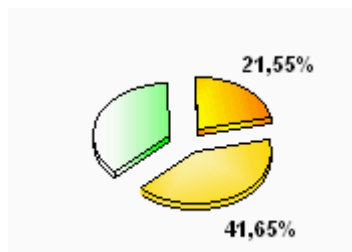
## Portugal



### GENERAL INFORMATION

Population 11 mln  
 Population density 114 person / km2

Total area 9191 1000 ha  
 Utilised agricultural area 3828 1000 ha  
 Wooded area 3383 1000 ha  
 Other 1980 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	1577	1000 ha	Cereal production (*)	1 390,30	1000 t
Fallow land	542	1000 ha	Oilseed production (*)	21,08	1000 t
Permanent crops	769	1000 ha	Maize production (*)	833,18	1000 t
Permanent grassland	1460	1000 ha	Cattle production	1 020,04	1000 LU
Number of agricultural holdings	359,25	1000 ton	Pig (*)	444,46	1000 LU
Average farm size	13,61	1000 ton	Sheep (*)	347,82	1000 LU

(\* average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	3 383,00	1000 ha
Area of forest available for wood supply	1 897,00	1000 ha
Area of coniferous forest available for wood supply	849,00	1000 ha
Area of broadleaves forest available for wood supply	1 048,00	1000 ha
Average volume of growing stock on forest available for wood supply	99,10	m3 / ha
Net annual increment on forest available for wood supply	12 900,00	1000 t
Annual fellings overbark on forest available for wood supply	11 200,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	6 200,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	5 000,00	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,10	0,13	0,10	0,30	0,30	0,40	0,60	0,40	0,69
Thinning wood	0,75	0,75	0,75				0,60	0,40	0,54
Root biomass	0,50	0,50	0,50	0,80	0,49	1,00	0,50	0,94	0,53
Wood balance	0,50	0,50	0,50	0,20	0,15	0,30	0,02	0,01	0,02

#### CALCULATION PARAMETERS

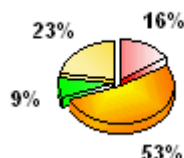
Wood density	t / m3	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,10	1,00
Factor of final fellings		0,60	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,55	Factor of clear final felling	0,38	0,29
Logging residues factor for coniferous species		0,20	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,01			
Share of pine in all species		0,68			

## Deliverable D5.01.03 Residue biomass potential inventory results

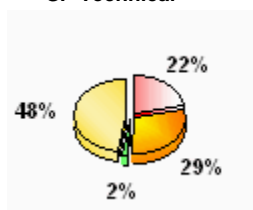
**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	9,68	10,64	9,68	2,44	3,91	1,62
Thinning wood	[PJ/a]	32,26	35,48	32,26	3,23	5,32	3,71
Roots	[PJ/a]	5,17	4,37	3,99	0,26	0,07	0,00
Wood balance	[PJ/a]	13,68	10,40	27,61	5,37	4,36	9,51
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>60,78</b>	<b>60,90</b>	<b>73,54</b>	<b>11,30</b>	<b>13,66</b>	<b>14,84</b>

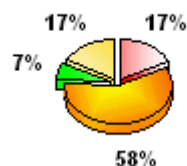
SP Theoretical



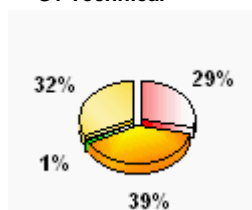
SP Technical



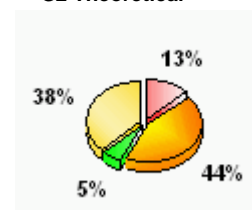
S1 Theoretical



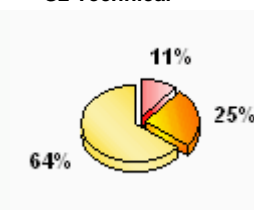
S1 Technical



S2 Theoretical



S2 Technical


**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

Share of wood by-products in sawmills	0,40	0,40	0,40
Share of wood by-products in board industry	0,20	0,20	0,20
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30
Share of wood by-products in other wood indust	0,30	0,30	0,30
Wood density	0,6 t / m3		
Heat value	15 GJ / t		
	SP	S1	S2
Production changes related to year 2004		1,40	1,20
Utilisation of industrial by-products	0,95	0,95	0,95

Sawlogs and veneer logs	2 580,00	1000 m3
Pulpwood group	6 589,00	1000 m3
Other industrial wood group	180,00	1000 m3
Wood fuel group	600,00	1000 m3

FAOSTAT

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	23,45	36,35	31,16	1,17	1,82	1,56

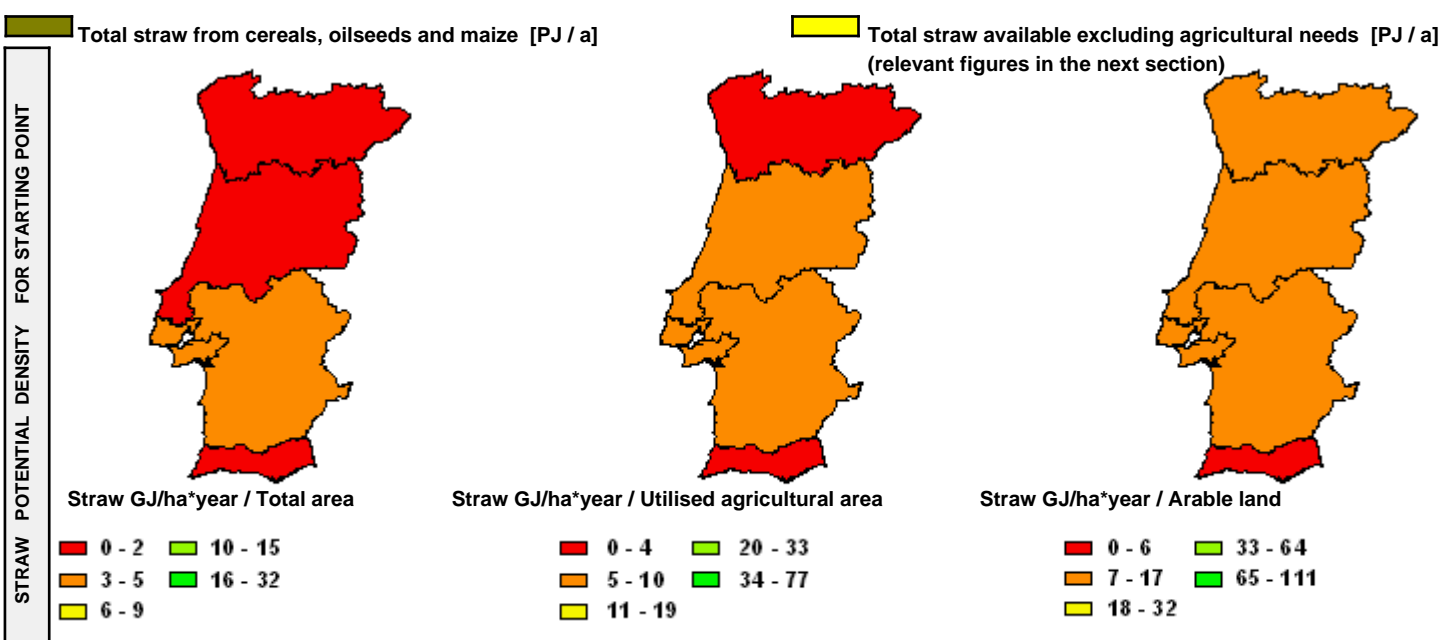
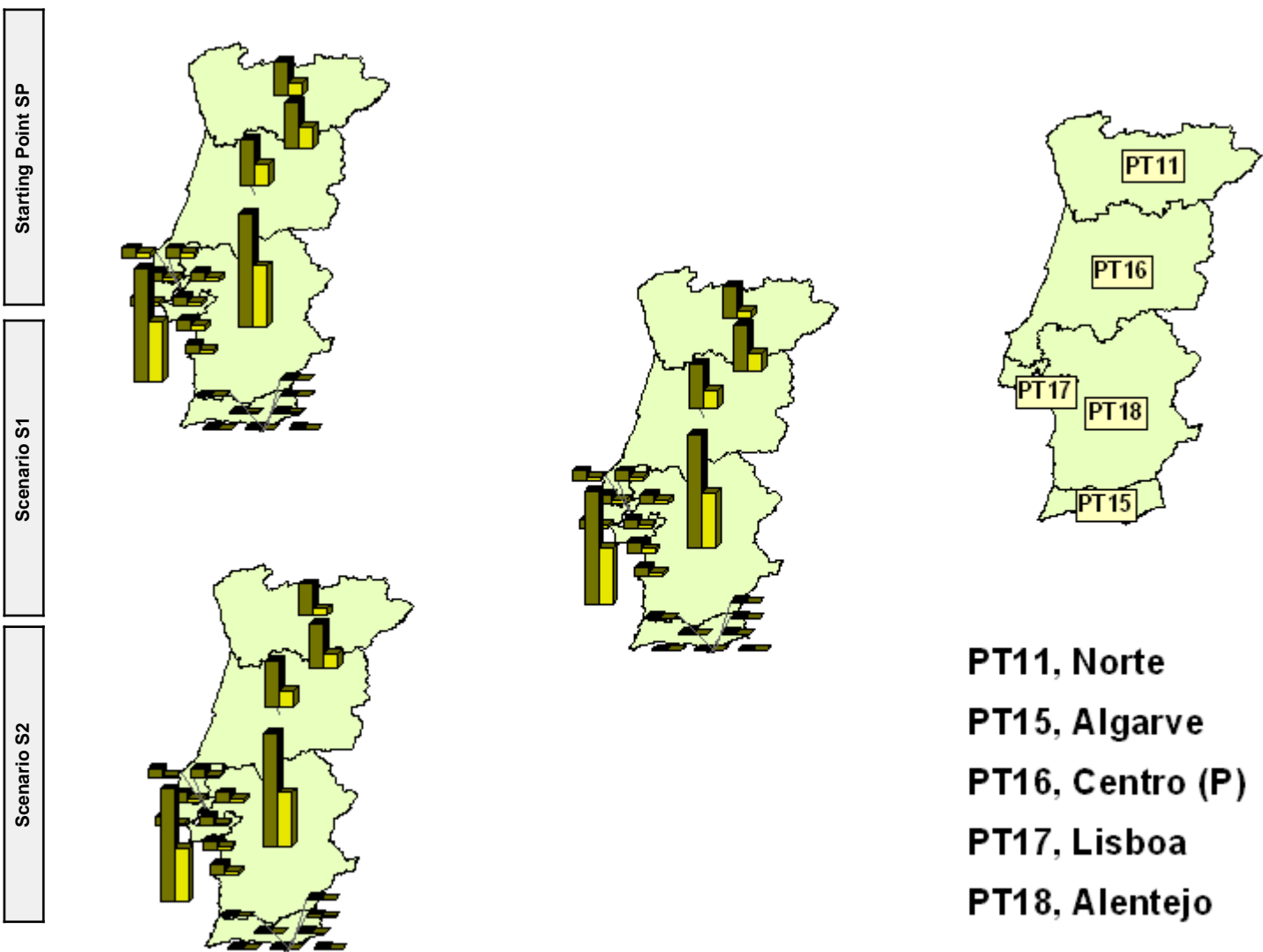
**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	11	11	11	
Meat consumption (**)	[kg / person * year]	602	616	642	
		91	93	97	(*) EUROSTAT; (**) FAO

**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	1,00	0,80	0,80	Straw for bedding (*)	0,50	0,50	0,50
Rape straw / grain ratio	2,00	1,50	1,50	Straw for fodder (*)	0,10	0,10	0,10
Maize straw / grain ratio	1,40	1,00	1,00	Share of cattle on straw (**)	0,50	0,50	0,50
				Share of pigs on straw (**)	0,30	0,30	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,10	0,10	0,10

(\*) [ t / LU \* year ]; (\*\*) [ % of total herd ]; (\*\*\*) [ % of total straw ]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**


**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2	
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
	(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>	<b>33,97</b>	<b>16,39</b>	<b>28,37</b>	<b>12,10</b>	<b>28,37</b>	<b>11,17</b>
PT11 Norte	5,40	1,87	4,48	1,08	4,48	1,00
PT15 Algarve	0,31	0,08	0,26	0,04	0,26	0,01
PT16 Centro (PT)	7,65	3,56	6,34	2,54	6,34	2,13
PT17 Lisboa	1,63	0,77	1,35	0,55	1,35	0,45
PT18 Alentejo	18,98	10,11	15,94	7,89	15,94	7,58
<b>FORESTRY</b>	<b>60,78</b>	<b>11,30</b>	<b>60,90</b>	<b>13,66</b>	<b>73,54</b>	<b>14,84</b>
Logging residues	9,68	2,44	10,64	3,91	9,68	1,62
Thinning wood	32,26	3,23	35,48	5,32	32,26	3,71
Roots	5,17	0,26	4,37	0,07	3,99	0,00
Wood balance	13,68	5,37	10,40	4,36	27,61	9,51
<b>WOOD INDUSTRY</b>	<b>23,45</b>	<b>1,17</b>	<b>36,35</b>	<b>1,82</b>	<b>31,16</b>	<b>1,56</b>
<b>TOTAL BIOMASS</b>	<b>118,20</b>	<b>28,86</b>	<b>125,62</b>	<b>27,58</b>	<b>133,07</b>	<b>27,57</b>

## Romania



### GENERAL INFORMATION

Population 22 mln  
Population density 94 person / km<sup>2</sup>

Total area 23839 1000 ha  
■ Utilised agricultural area 14816 1000 ha  
■ Wooded area 0 1000 ha  
■ Other 9023 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	9399	1000 ha	Cereal production (*)	14 167,33	1000 t
Fallow land	551	1000 ha	Oilseed production (*)	1 207,23	1000 t
Permanent crops	501	1000 ha	Maize production (*)	7 998,40	1000 t
Permanent grassland	4916	1000 ha	Cattle production	2 461,90	1000 LU
			Pig (*)		1000 LU
Number of agricultural holdings	4 464,95	1000 ton	Sheep (*)	742,66	1000 LU
Average farm size	3,51	1000 ton			

(\*) average 2000-2004      LU Livestock Unit      EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	1000 ha
Area of forest available for wood supply	1000 ha
Area of coniferous forest available for wood supply	1000 ha
Area of broadleaves forest available for wood supply	1000 ha
Average volume of growing stock on forest available for wood supply	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	1000 t
Annual fellings overbark on forest available for wood supply	1000 t
Annual fellings overbark on coniferous forest available for wood supply	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	1000 t

*data for 2000, TBFRA*

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues									
Thinning wood	<i>Lack of available data</i>								
Root biomass									
Wood balance									

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9		SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)			
Factor of final fellings			Change of net annual increment (*)			
Factor of coniferous fellings			Factor of clear final felling			
Logging residues factor for coniferous species						
Logging residues factor for broadleaves species						
Root biomass ratio						
Share of spruce in all species						
Share of pine in all species						

(\*) in relation to SP

## Deliverable D5.01.03 Residue biomass potential inventory results

**FOREST BIOMASS - RESULTS**

	[PJ/a]	Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]						
Thinning wood	[PJ/a]	<i>Lack of available data</i>					
Roots	[PJ/a]						
Wood balance	[PJ/a]						
<b>TOTAL</b>	<b>[PJ/a]</b>						
<b>SP Theoretical</b>	<b>SP Technical</b>	<b>S1 Theoretical</b>	<b>S1 Technical</b>	<b>S2 Theoretical</b>	<b>S2 Technical</b>		
<i>Lack of available data</i>							

**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

	SP	S1	S2		
Share of wood by-products in sawmills	0,40	0,40	0,40	Sawlogs and veneer logs      6 992,86   1000 m3 Pulpwood group                      2 250,20   1000 m3 Other industrial wood group      2 219,54   1000 m3 Wood fuel group                      2 926,04   1000 m3 <span style="float: right;">FAOSTAT</span>	
Share of wood by-products in board industry	0,20	0,20	0,20		
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30		
Share of wood by-products in other wood indust	0,30	0,30	0,30		
Wood density	0,6	t / m3			
Heat value	15	GJ / t			
	SP	S1	S2		
Production changes related to year 2004		1,40	1,20		
Utilisation of industrial by-products	0,95	0,95	0,95		

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

	[PJ/a]	Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	35,76	51,98	44,55	1,79	2,60	2,23

**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

		2005	2010	2020	
Population (*)	[mln]	22	21	20	Straw LHV: 13,1 MJ/kg (*) EUROSTAT; (**) FAO
Cereal consumption (**)	[kg / person * year]	539	567	626	
Meat consumption (**)	[kg / person * year]	49	51	56	

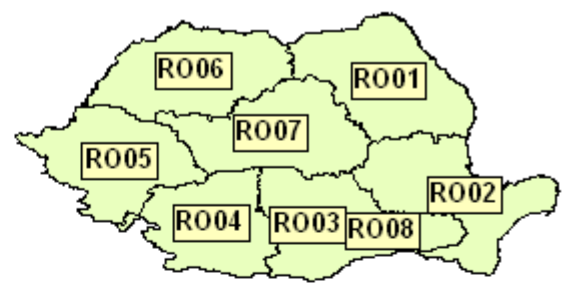
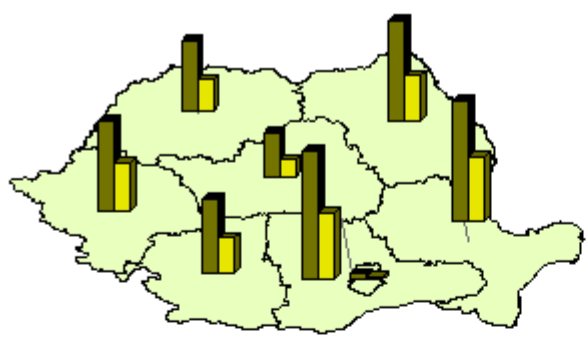
**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	1,00	0,80	0,80	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	2,00	1,50	1,50	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,40	1,00	1,00	Share of cattle on straw (**)	0,90	0,70	0,80
				Share of pigs on straw (**)	0,60	0,50	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,20	0,20	0,20

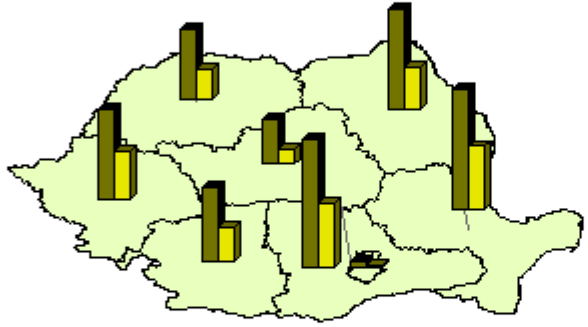
(\*) [ t / LU \* year ]; (\*\*) [ % of total herd ]; (\*\*\*) [ % of total straw ]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**

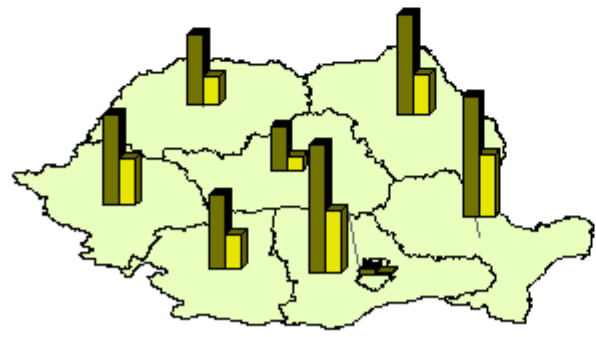
Starting Point SP



Scenario S1



Scenario S2



R001, Nord-Est

R002, Sud-Est

R003, Sud

R004, Sud-Vest

R005, Vest

R006, Nord-Vest

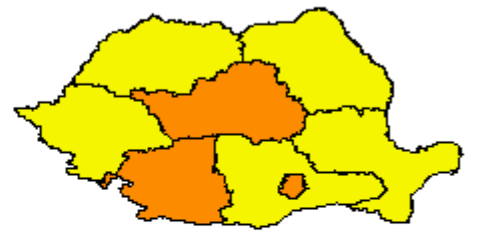
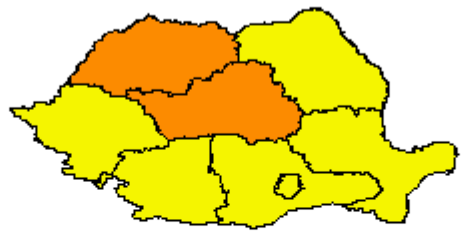
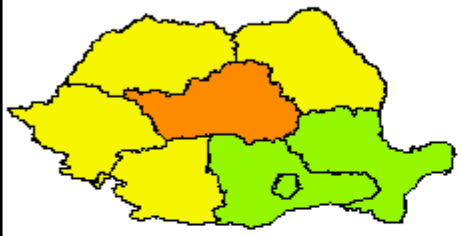
R007, Centru

R008, Bucuresti

Total straw from cereals, oilseeds and maize [PJ / a]

Total straw available excluding agricultural needs [PJ / a] (relevant figures in the next section)

STRAW POTENTIAL DENSITY FOR STARTING POINT



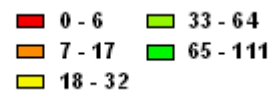
Straw GJ/ha\*year / Total area



Straw GJ/ha\*year / Utilised agricultural area



Straw GJ/ha\*year / Arable land



**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2	
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
	(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>	<b>363,90</b>	<b>178,88</b>	<b>300,95</b>	<b>142,02</b>	<b>300,95</b>	<b>139,23</b>
RO01	57,84	26,07	47,53	20,09	47,53	19,45
RO02	68,85	37,27	56,80	29,87	56,80	29,57
RO03	73,36	37,87	60,94	30,52	60,94	30,12
RO04	42,55	20,59	35,32	16,42	35,32	16,10
RO05	51,83	27,80	42,92	22,47	42,92	22,26
RO06	40,42	17,86	33,36	13,89	33,36	13,41
RO07	25,47	9,55	21,11	7,26	21,11	6,84
RO08	3,58	1,87	2,97	1,50	2,97	1,48
<b>FORESTRY</b>	<i>Lack of available data</i>					
<b>WOOD INDUSTRY</b>	<b>35,76</b>	<b>1,79</b>	<b>51,98</b>	<b>2,60</b>	<b>44,55</b>	<b>2,23</b>
<b>TOTAL BIOMASS</b>	<b>399,66</b>	<b>180,67</b>	<b>352,93</b>	<b>144,62</b>	<b>345,50</b>	<b>141,46</b>

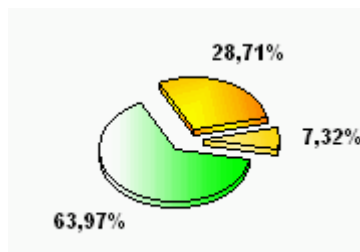
## Sweden



### GENERAL INFORMATION

Population 9 mln  
Population density 22 person / km<sup>2</sup>

Total area 42619 1000 ha  
 Utilised agricultural area 3119 1000 ha  
 Wooded area 27264 1000 ha  
 Other 12235 1000 ha



### MAIN AGRICULTURAL INDICATORS

Indicator	Value	Unit	Indicator	Value	Unit
Arable land	2679	1000 ha	Cereal production (*)	5 459,43	1000 t
Fallow land	264	1000 ha	Oilseed production (*)	155,72	1000 t
Permanent crops	3	1000 ha	Maize production (*)	0,00	1000 t
Permanent grassland	443	1000 ha	Cattle production	1 146,02	1000 LU
Number of agricultural holdings	67,63	1000 ton	Pig (*)	352,92	1000 LU
Average farm size	99,93	1000 ton	Sheep (*)	44,45	1000 LU

(\*) average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	27 264,00	1000 ha
Area of forest available for wood supply	21 236,00	1000 ha
Area of coniferous forest available for wood supply	17 378,00	1000 ha
Area of broadleaves forest available for wood supply	3 858,00	1000 ha
Average volume of growing stock on forest available for wood supply	120,90	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	85 431,00	1000 t
Annual fellings overbark on forest available for wood supply	66 115,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	57 277,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	8 838,00	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,50	0,63	0,50	0,30	0,30	0,40	0,30	0,20	0,35
Thinning wood	0,75	0,75	0,75				0,20	0,20	0,18
Root biomass	0,50	0,50	0,50	0,50	0,29	0,63	0,30	0,81	0,32
Wood balance	0,85	0,85	0,85	0,20	0,15	0,30	0,07	0,06	0,07

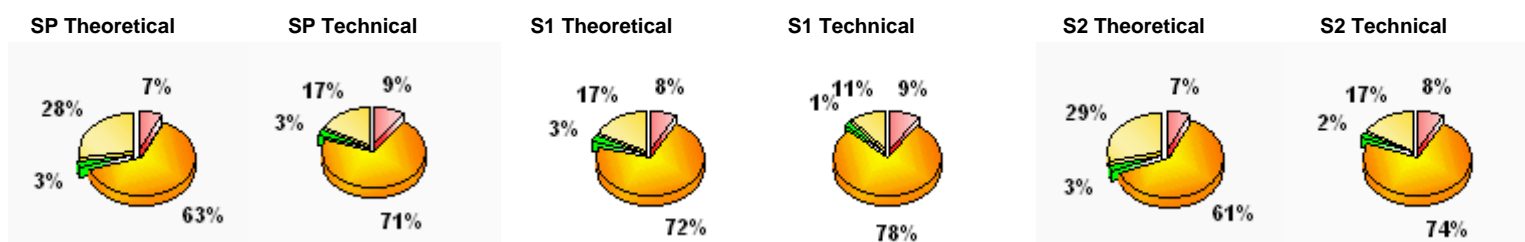
#### CALCULATION PARAMETERS

	t / m <sup>3</sup>	0,9	SP	S1	S2
Wood density	t / m <sup>3</sup>	0,9			
Heat value	GJ / t	8			
Factor of final fellings		0,25		1,19	1,13
Factor of coniferous fellings		0,87		1,05	1,15
Logging residues factor for coniferous species		0,35	0,16	0,17	0,16
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,43			
Share of pine in all species		0,40			

(\*) in relation to SP

### FOREST BIOMASS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	39,27	46,73	44,37	9,62	9,81	8,72
Thinning wood	[PJ/a]	357,02	424,85	403,43	71,40	84,97	82,70
Roots	[PJ/a]	15,49	20,28	18,03	2,71	1,40	2,32
Wood balance	[PJ/a]	157,71	101,56	190,51	17,54	12,19	18,68
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>569,49</b>	<b>593,42</b>	<b>656,35</b>	<b>101,27</b>	<b>108,37</b>	<b>112,42</b>



### WOOD INDUSTRY BY - PRODUCTS POTENTIAL

#### DATA, ASSUMPTIONS, PARAMETERS

	SP	S1	S2			
Share of wood by-products in sawmills	0,40	0,40	0,40	Sawlogs and veneer logs	34 208,00 1000 m3	
Share of wood by-products in board industry	0,20	0,20	0,20		Pulpwood group	24 892,00 1000 m3
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30		Other industrial wood group	500,00 1000 m3
Share of wood by-products in other wood indust	0,30	0,30	0,30		Wood fuel group	5 900,00 1000 m3
Wood density	0,6 t / m3				FAOSTAT	
Heat value	15 GJ / t					
		SP	S1	S2		
Production changes related to year 2004			1,20	1,00		
Utilisation of industrial by-products		0,95	0,95	0,95		

### WOOD INDUSTRY BY-PRODUCTS - RESULTS

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	176,43	224,46	187,05	8,82	11,22	9,35

### AGRICULTURAL BIOMASS POTENTIAL - STRAW

#### MAIN ASSUMPTIONS

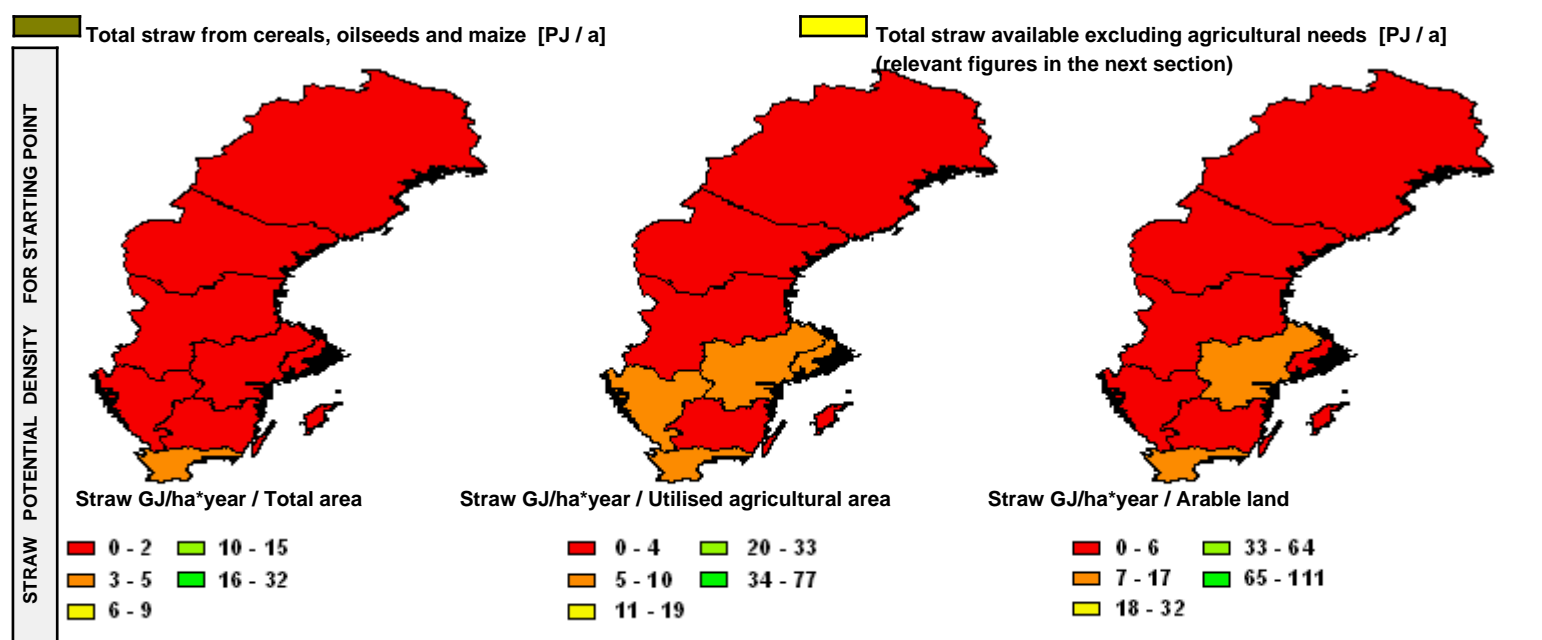
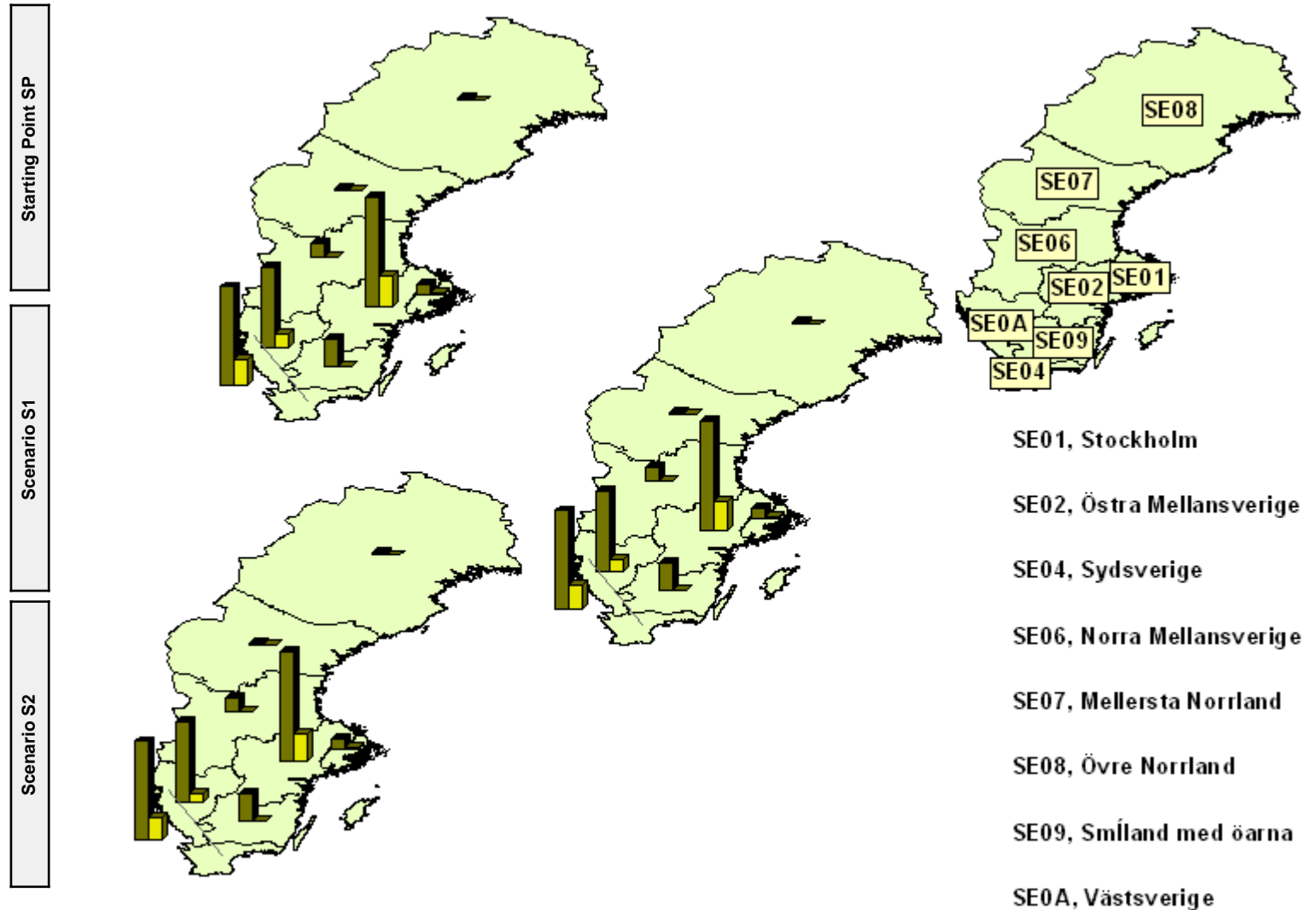
		2005	2010	2020	
Population (*)	[mln]	9	9	10	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	602	616	642	
Meat consumption (**)	[kg / person * year]	91	93	97	
					(*) EUROSTAT; (**) FAO

#### CALCULATION PARAMETERS

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	1,70	1,40	1,40	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,70	0,60	0,70
				Share of pigs on straw (**)	0,60	0,50	0,60
				Straw for soil (***)	0,40	0,40	0,40
				Straw for other purposes (***)	0,20	0,20	0,20

(\*) [ t / LU \* year ]; (\*\*) [ % of total herd ]; (\*\*\*) [ % of total straw ]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**



**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2		
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	
	(1)	(2)	(1)	(2)	(1)	(2)	
<b>STRAW</b>	<b>60,69</b>	<b>12,88</b>	<b>56,17</b>	<b>11,19</b>	<b>56,17</b>	<b>10,00</b>	
SE01	Stockholm	1,82	0,53	1,69	0,47	1,69	0,44
SE02	Östra Mellansverige	19,22	5,40	17,79	4,78	17,79	4,45
SE04	Sydsverige	17,32	4,52	16,03	3,98	16,03	3,61
SE06	Norra Mellansverige	2,58	0,00	2,39	0,00	2,39	0,00
SE07	Mellersta Norrland	0,21	0,00	0,19	0,00	0,19	0,00
SE08	Övre Norrland	0,47	0,00	0,43	0,00	0,43	0,00
SE09	Smaland med öarna	4,81	0,00	4,45	0,00	4,45	0,00
SE0A	Västsverige	14,26	2,43	13,20	1,96	13,20	1,50
<b>FORESTRY</b>		<b>569,49</b>	<b>101,27</b>	<b>593,42</b>	<b>108,37</b>	<b>656,35</b>	<b>112,42</b>
	Logging residues	39,27	9,62	46,73	9,81	44,37	8,72
	Thinning wood	357,02	71,40	424,85	84,97	403,43	82,70
	Roots	15,49	2,71	20,28	1,40	18,03	2,32
	Wood balance	157,71	17,54	101,56	12,19	190,51	18,68
<b>WOOD INDUSTRY</b>		<b>176,43</b>	<b>8,82</b>	<b>224,46</b>	<b>11,22</b>	<b>187,05</b>	<b>9,35</b>
<b>TOTAL BIOMASS</b>		<b>806,61</b>	<b>122,97</b>	<b>874,05</b>	<b>130,78</b>	<b>899,57</b>	<b>131,77</b>

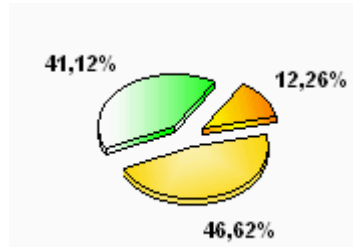
## Slovakia



### GENERAL INFORMATION

Population 5 mln  
Population density 110 person / km<sup>2</sup>

Total area 4903 1000 ha  
 Utilised agricultural area 2286 1000 ha  
 Wooded area 2016 1000 ha  
 Other 601 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land	1406	1000 ha	Cereal production (*)	2 345,50	1000 t
Fallow land	5	1000 ha	Oilseed production (*)	338,25	1000 t
Permanent crops	32	1000 ha	Maize production (*)	602,75	1000 t
Permanent grassland	808	1000 ha	Cattle production	446,22	1000 LU
Number of agricultural holdings	71,73	1000 ton	Pig (*)	274,70	1000 LU
Average farm size	47,90	1000 ton	Sheep (*)	32,54	1000 LU

(\*) average 2000-2004

LU Livestock Unit

EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	2 016,00	1000 ha
Area of forest available for wood supply	1 706,00	1000 ha
Area of coniferous forest available for wood supply	488,00	1000 ha
Area of broadleaves forest available for wood supply	1 218,00	1000 ha
Average volume of growing stock on forest available for wood supply	261,20	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	12 337,00	1000 t
Annual fellings overbark on forest available for wood supply	7 100,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	4 200,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	2 900,00	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

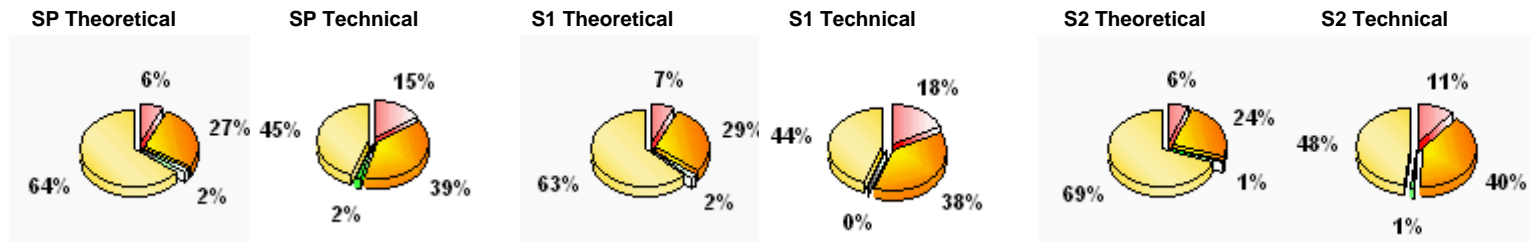
	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,15	0,19	0,15	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	0,60	0,39	0,75	0,40	0,88	0,42
Wood balance	0,85	0,85	0,85	0,20	0,15	0,30	0,24	0,19	0,22

#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,10	1,00
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,59	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,35	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,40			
Share of pine in all species		0,08			

**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	6,64	7,31	6,64	1,98	2,77	1,44
Thinning wood	[PJ/a]	28,12	30,93	28,12	5,27	5,93	5,45
Roots	[PJ/a]	1,75	1,80	1,60	0,21	0,07	0,12
Wood balance	[PJ/a]	65,79	67,92	79,11	6,00	7,00	6,52
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>102,29</b>	<b>107,95</b>	<b>115,47</b>	<b>13,46</b>	<b>15,77</b>	<b>13,52</b>


**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

Share of wood by-products in sawmills	0,40	0,40	0,40	Sawlogs and veneer logs      2 575,70    1000 m3 Pulpwood group                    3 094,00    1000 m3 Other industrial wood group      313,48    1000 m3 Wood fuel group                    282,40    1000 m3 FAOSTAT
Share of wood by-products in board industry	0,20	0,20	0,20	
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30	
Share of wood by-products in other wood indust	0,30	0,30	0,30	
Wood density	0,6	t / m3		
Heat value	15	GJ / t		
Production changes related to year 2004		SP	S1	S2
Utilisation of industrial by-products		0,95	0,95	0,95

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	16,40	24,63	21,11	0,82	1,23	1,06

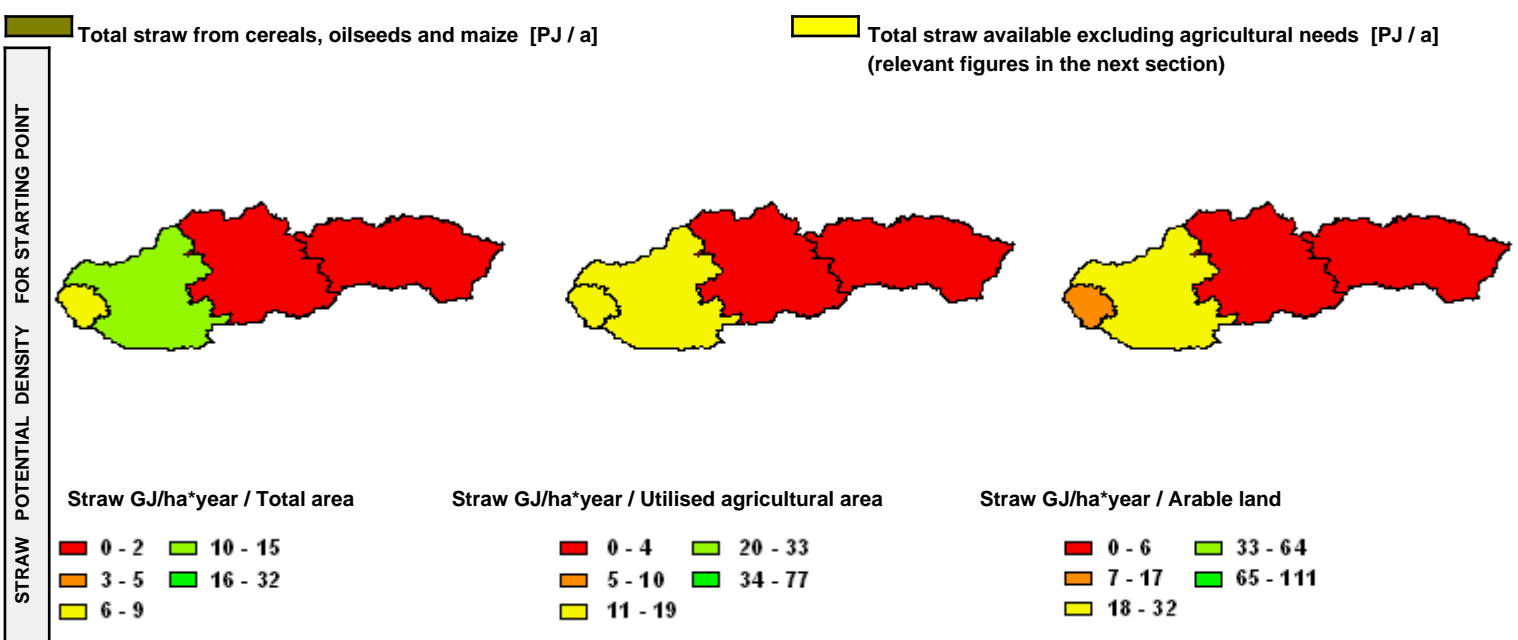
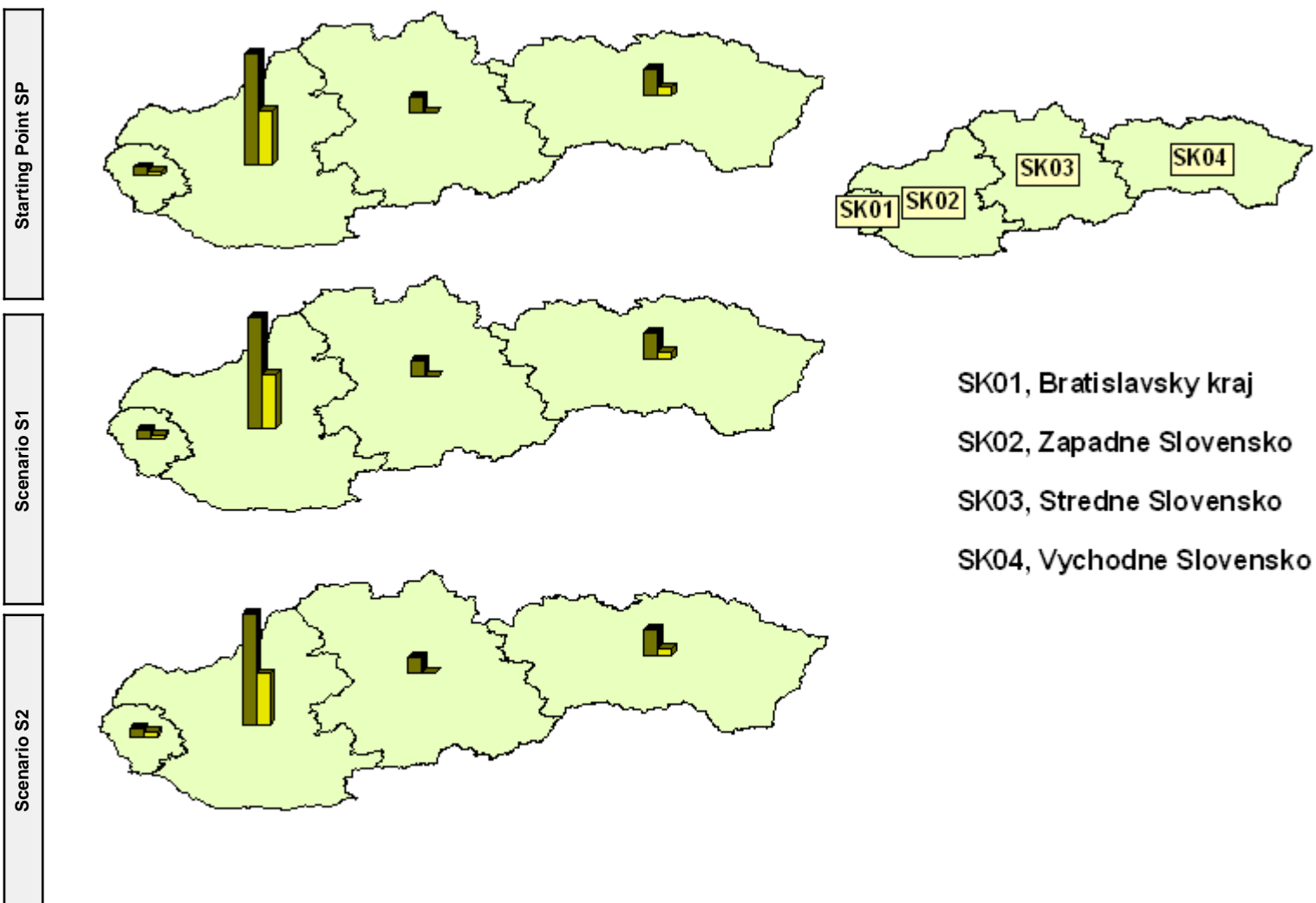
**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

Population (*)	[mln]	2005	2010	2020	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	5	5	5	
Meat consumption (**)	[kg / person * year]	539	567	626	
		49	51	56	(*) EUROSTAT; (**) FAO

**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	1,00	1,00	1,00
Rape straw / grain ratio	1,70	1,50	1,50	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,90	0,70	0,80
				Share of pigs on straw (**)	0,60	0,60	0,70
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,15	0,15	0,15

(\*) [t / LU \* year]; (\*\*) [% of total herd]; (\*\*\*) [% of total straw]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**


**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2	
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
	(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>	<b>43,95</b>	<b>18,20</b>	<b>42,05</b>	<b>17,33</b>	<b>42,05</b>	<b>16,52</b>
SK01 Bratislavský kraj	2,38	1,19	2,28	1,14	2,28	1,11
SK02 Západné Slovensko	30,19	14,70	28,89	13,99	28,89	13,48
SK03 Stredné Slovensko	4,05	0,00	3,86	0,00	3,86	0,00
SK04 Východné Slovensko	7,33	2,31	7,02	2,20	7,02	1,93
<b>FORESTRY</b>	<b>102,29</b>	<b>13,46</b>	<b>107,95</b>	<b>15,77</b>	<b>115,47</b>	<b>13,52</b>
Logging residues	6,64	1,98	7,31	2,77	6,64	1,44
Thinning wood	28,12	5,27	30,93	5,93	28,12	5,45
Roots	1,75	0,21	1,80	0,07	1,60	0,12
Wood balance	65,79	6,00	67,92	7,00	79,11	6,52
<b>WOOD INDUSTRY</b>	<b>16,40</b>	<b>0,82</b>	<b>24,63</b>	<b>1,23</b>	<b>21,11</b>	<b>1,06</b>
<b>TOTAL BIOMASS</b>	<b>162,64</b>	<b>32,48</b>	<b>174,63</b>	<b>34,33</b>	<b>178,63</b>	<b>31,10</b>

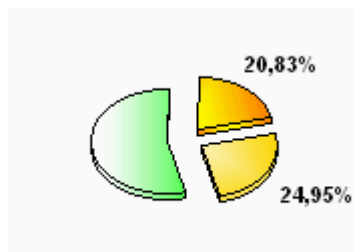
## Slovenia



### GENERAL INFORMATION

Population 2 mln  
Population density 99 person / km<sup>2</sup>

Total area 2027 1000 ha  
 Utilised agricultural area 506 1000 ha  
 Wooded area 1099 1000 ha  
 Other 422 1000 ha



### MAIN AGRICULTURAL INDICATORS

Arable land 173 1000 ha  
 Fallow land 1 1000 ha  
 Permanent crops 29 1000 ha  
 Permanent grassland 304 1000 ha  
 Number of agricultural holdings 77,14 1000 ton  
 Average farm size 12,01 1000 ton

Cereal production (\*) 1000 t  
 Oilseed production (\*) 1000 t  
 Maize production (\*) 1000 t  
 Cattle production 1000 LU  
 Pig (\*) 1000 LU  
 Sheep (\*) 1000 LU

(\*) average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area 1 099,00 1000 ha  
 Area of forest available for wood supply 1 035,00 1000 ha  
 Area of coniferous forest available for wood supply 310,00 1000 ha  
 Area of broadleaves forest available for wood supply 725,00 1000 ha  
 Average volume of growing stock on forest available for wood supply 282,60 m<sup>3</sup> / ha  
 Net annual increment on forest available for wood supply 6 132,00 1000 t  
 Annual fellings overbark on forest available for wood supply 2 300,00 1000 t  
 Annual fellings overbark on coniferous forest available for wood supply 1 500,00 1000 t  
 Annual fellings overbark on broadleaves forest available for wood supply 800,00 1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,15	0,19	0,15	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	0,60	0,39	0,75	0,40	0,88	0,42
Wood balance	0,85	0,85	0,85	0,20	0,15	0,30	0,00	0,00	0,00

#### CALCULATION PARAMETERS

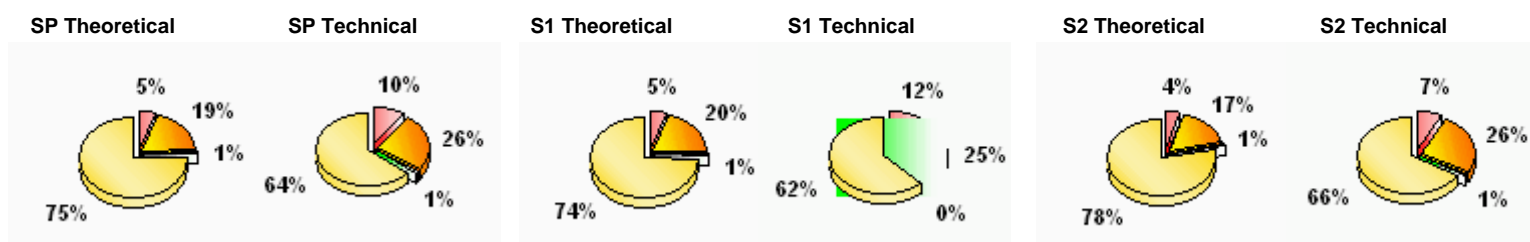
	t / m <sup>3</sup>	0,9	SP	S1	S2
Wood density	t / m <sup>3</sup>	0,9			
Heat value	GJ / t	8			
Factor of final fellings		0,45		1,10	1,00
Factor of coniferous fellings		0,65		1,05	1,15
Logging residues factor for coniferous species		0,35	0,28	0,26	0,26
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,42			
Share of pine in all species		0,08			

(\*) in relation to SP

Deliverable D5.01.03 Residue biomass potential inventory results

**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	2,22	2,44	2,22	0,66	0,93	0,48
Thinning wood	[PJ/a]	9,11	10,02	9,11	1,71	1,92	1,76
Roots	[PJ/a]	0,58	0,60	0,53	0,07	0,02	0,04
Wood balance	[PJ/a]	35,51	36,85	42,13	4,26	4,70	4,42
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>47,42</b>	<b>49,91</b>	<b>53,99</b>	<b>6,70</b>	<b>7,57</b>	<b>6,71</b>



**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**

**DATA, ASSUMPTIONS, PARAMETERS**

	SP	S1	S2			
Share of wood by-products in sawmills	0,40	0,40	0,40	Sawlogs and veneer logs	1 218,20 1000 m3	
Share of wood by-products in board industry	0,20	0,20	0,20		Pulpwood group	415,00 1000 m3
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30		Other industrial wood group	315,60 1000 m3
Share of wood by-products in other wood indust	0,30	0,30	0,30		Wood fuel group	438,20 1000 m3
Wood density	0,6 t / m3				FAOSTAT	
Heat value	15 GJ / t					
		SP	S1	S2		
Production changes related to year 2004		1,40	1,20			
Utilisation of industrial by-products		0,95	0,95	0,95		

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

Industrial by-products potential	[PJ/a]	Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
		6,09	8,85	7,59	0,30	0,44	0,38

**AGRICULTURAL BIOMASS POTENTIAL - STRAW**

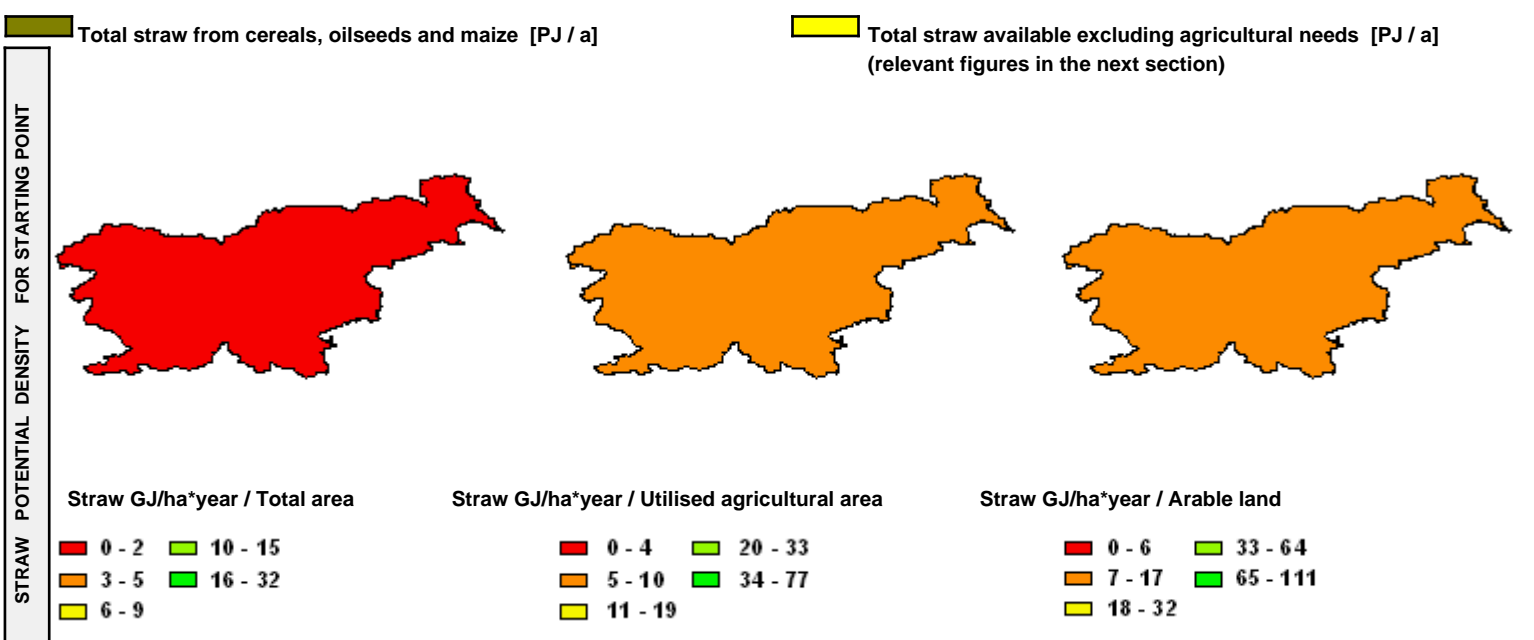
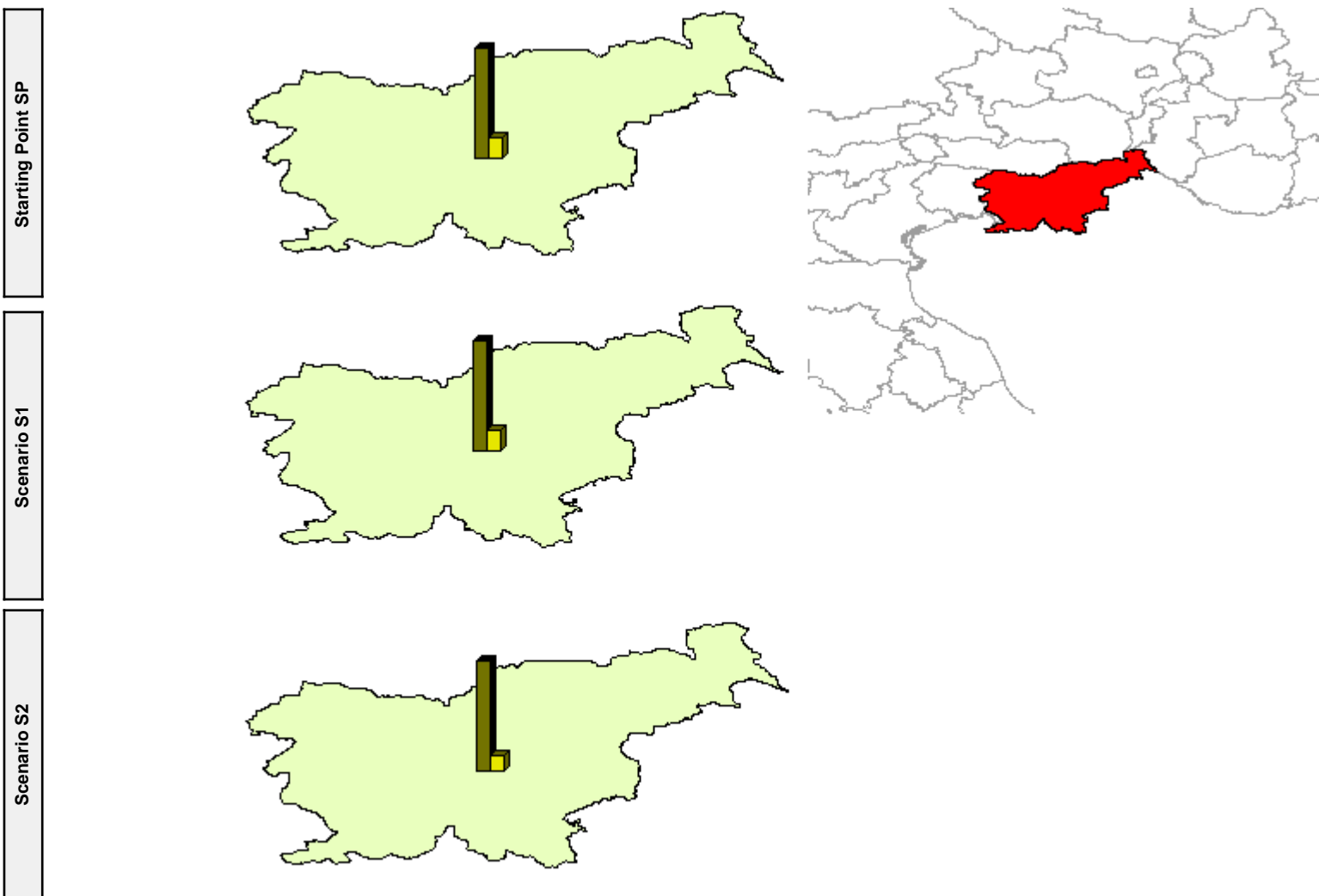
**MAIN ASSUMPTIONS**

		2005	2010	2020	
Population (*)	[mln]	2	2	2	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	539	567	626	
Meat consumption (**)	[kg / person * year]	49	51	56	
					(*) EUROSTAT; (**) FAO

**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,65	0,65	Straw for bedding (*)	0,80	0,80	0,80
Rape straw / grain ratio	1,70	1,50	1,50	Straw for fodder (*)	0,20	0,20	0,20
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,90	0,70	0,80
				Share of pigs on straw (**)	0,60	0,60	0,70
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,10	0,10	0,10

(\*) [ t / LU \* year ]; (\*\*) [ % of total herd ]; (\*\*\*) [ % of total straw ]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**


**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

	Starting Point		Scenario S1		Scenario S2	
	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
	(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>	<b>10,94</b>	<b>2,18</b>	<b>10,68</b>	<b>2,07</b>	<b>10,68</b>	<b>1,52</b>
SL	10,94	2,18	10,68	2,07	10,68	1,52
<b>FORESTRY</b>	<b>47,42</b>	<b>6,70</b>	<b>49,91</b>	<b>7,57</b>	<b>53,99</b>	<b>6,71</b>
Logging residues	2,22	0,66	2,44	0,93	2,22	0,48
Thinning wood	9,11	1,71	10,02	1,92	9,11	1,76
Roots	0,58	0,07	0,60	0,02	0,53	0,04
Wood balance	35,51	4,26	36,85	4,70	42,13	4,42
<b>WOOD INDUSTRY</b>	<b>6,09</b>	<b>0,30</b>	<b>8,85</b>	<b>0,44</b>	<b>7,59</b>	<b>0,38</b>
<b>TOTAL BIOMASS</b>	<b>64,45</b>	<b>9,18</b>	<b>69,44</b>	<b>10,08</b>	<b>72,26</b>	<b>8,61</b>

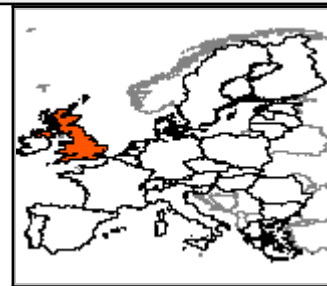
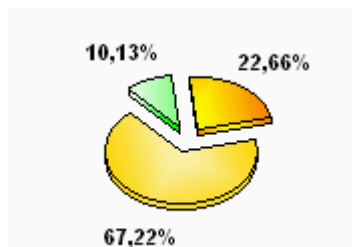
## United Kingdom



### GENERAL INFORMATION

Population 60 mln  
Population density person / km<sup>2</sup>

Total area 24382 1000 ha  
 Utilised agricultural area 16388 1000 ha  
 Wooded area 2469 1000 ha  
 Other 5525 1000 ha



### MAIN AGRICULTURAL INDICATORS

Indicator	Value	Unit	Indicator	Value	Unit
Arable land	6396	1000 ha	Cereal production (*)	21 606,86	1000 t
Fallow land	33	1000 ha	Oilseed production (*)	1 189,75	1000 t
Permanent crops	50	1000 ha	Maize production (*)	0,00	1000 t
Permanent grassland	9935	1000 ha	Cattle production	7 237,70	1000 LU
Number of agricultural holdings	250,40	1000 ton	Pig (*)	1 040,38	1000 LU
Average farm size	67,56	1000 ton	Sheep (*)	2 520,98	1000 LU

(\*) average 2000-2004 LU Livestock Unit EUROSTAT

### FORESTRY BIOMASS POTENTIAL

#### FOREST CHARACTERISTIC

Total forest area	2 469,00	1000 ha
Area of forest available for wood supply	2 108,00	1000 ha
Area of coniferous forest available for wood supply	1 454,00	1000 ha
Area of broadleaves forest available for wood supply	654,00	1000 ha
Average volume of growing stock on forest available for wood supply	139,00	m <sup>3</sup> / ha
Net annual increment on forest available for wood supply	14 590,00	1000 t
Annual fellings overbark on forest available for wood supply	9 500,00	1000 t
Annual fellings overbark on coniferous forest available for wood supply	8 300,00	1000 t
Annual fellings overbark on broadleaves forest available for wood supply	1 200,00	1000 t

data for 2000, TBFRA

#### MAIN ASSUMPTIONS

	Share of forest wood for industry			Share of forest wood for ecology			Share of forest wood for other purposes		
	SP	S1	S2	SP	S1	S2	SP	S1	S2
Logging residues	0,20	0,25	0,20	0,30	0,30	0,40	0,50	0,33	0,58
Thinning wood	0,75	0,75	0,75				0,25	0,23	0,23
Root biomass	0,50	0,50	0,50	1,00	1,00	1,00	0,40	0,88	0,42
Wood balance	0,80	0,80	0,80	0,20	0,15	0,30	0,14	0,11	0,12

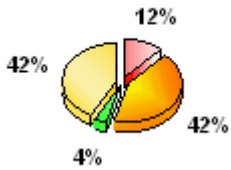
#### CALCULATION PARAMETERS

Wood density	t / m <sup>3</sup>	0,9	SP	S1	S2
Heat value	GJ / t	8	Change of felling factor (*)	1,19	1,13
Factor of final fellings		0,45	Change of net annual increment (*)	1,05	1,15
Factor of coniferous fellings		0,87	Factor of clear final felling	0,28	0,26
Logging residues factor for coniferous species		0,35	(*) in relation to SP		
Logging residues factor for broadleaves species		0,20			
Root biomass ratio		0,25			
Share of spruce in all species		0,42			
Share of pine in all species		0,27			

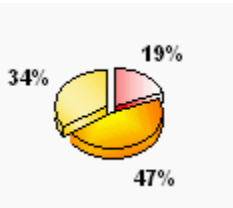
**FOREST BIOMASS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Logging residues	[PJ/a]	10,19	12,13	11,51	2,85	4,24	2,35
Thinning wood	[PJ/a]	37,62	44,77	42,51	7,05	8,58	8,24
Roots	[PJ/a]	3,35	3,73	3,47	0,00	0,00	0,00
Wood balance	[PJ/a]	37,37	29,76	44,33	5,16	4,51	5,44
<b>TOTAL</b>	<b>[PJ/a]</b>	<b>88,53</b>	<b>90,38</b>	<b>101,82</b>	<b>15,07</b>	<b>17,33</b>	<b>16,03</b>

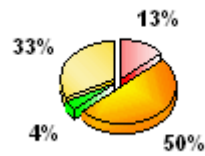
SP Theoretical



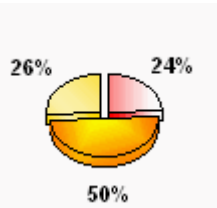
SP Technical



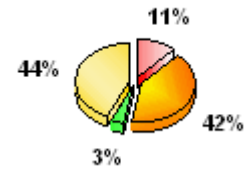
S1 Theoretical



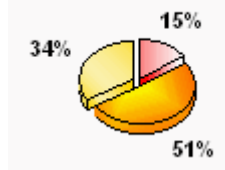
S1 Technical



S2 Theoretical



S2 Technical


**WOOD INDUSTRY BY - PRODUCTS POTENTIAL**
**DATA, ASSUMPTIONS, PARAMETERS**

	SP	S1	S2			
Share of wood by-products in sawmills	0,40	0,40	0,40	Sawlogs and veneer logs	4 781,00 1000 m3	
Share of wood by-products in board industry	0,20	0,20	0,20		Pulpwood group	2 557,80 1000 m3
Share of wood by-products in pulp and paper industry	0,30	0,30	0,30		Other industrial wood group	407,60 1000 m3
Share of wood by-products in other wood indust	0,30	0,30	0,30		Wood fuel group	231,00 1000 m3
Wood density	0,6 t / m3				FAOSTAT	
Heat value	15 GJ / t					
	SP	S1	S2			
Production changes related to year 2004		1,20	1,00			
Utilisation of industrial by-products	0,95	0,95	0,95			

**WOOD INDUSTRY BY-PRODUCTS - RESULTS**

		Theoretical potential			Technical potential		
		SP	S1	S2	SP	S1	S2
Industrial by-products potential	[PJ/a]	23,33	29,23	24,36	1,17	1,46	1,22

**AGRICULTURAL BIOMASS POTENTIAL - STRAW**
**MAIN ASSUMPTIONS**

		2005	2010	2020	
Population (*)	[mln]	60	61	63	Straw LHV: 13,1 MJ/kg
Cereal consumption (**)	[kg / person * year]	602	616	642	
Meat consumption (**)	[kg / person * year]	91	93	97	
					(*) EUROSTAT; (**) FAO

**CALCULATION PARAMETERS**

	SP	S1	S2		SP	S1	S2
Cereal straw / grain ratio	0,80	0,60	0,60	Straw for bedding (*)	0,50	0,50	0,50
Rape straw / grain ratio	1,70	1,40	1,40	Straw for fodder (*)	0,10	0,10	0,10
Maize straw / grain ratio	1,50	1,30	1,30	Share of cattle on straw (**)	0,70	0,60	0,70
				Share of pigs on straw (**)	0,60	0,50	0,60
				Straw for soil (***)	0,30	0,30	0,30
				Straw for other purposes (***)	0,20	0,20	0,20

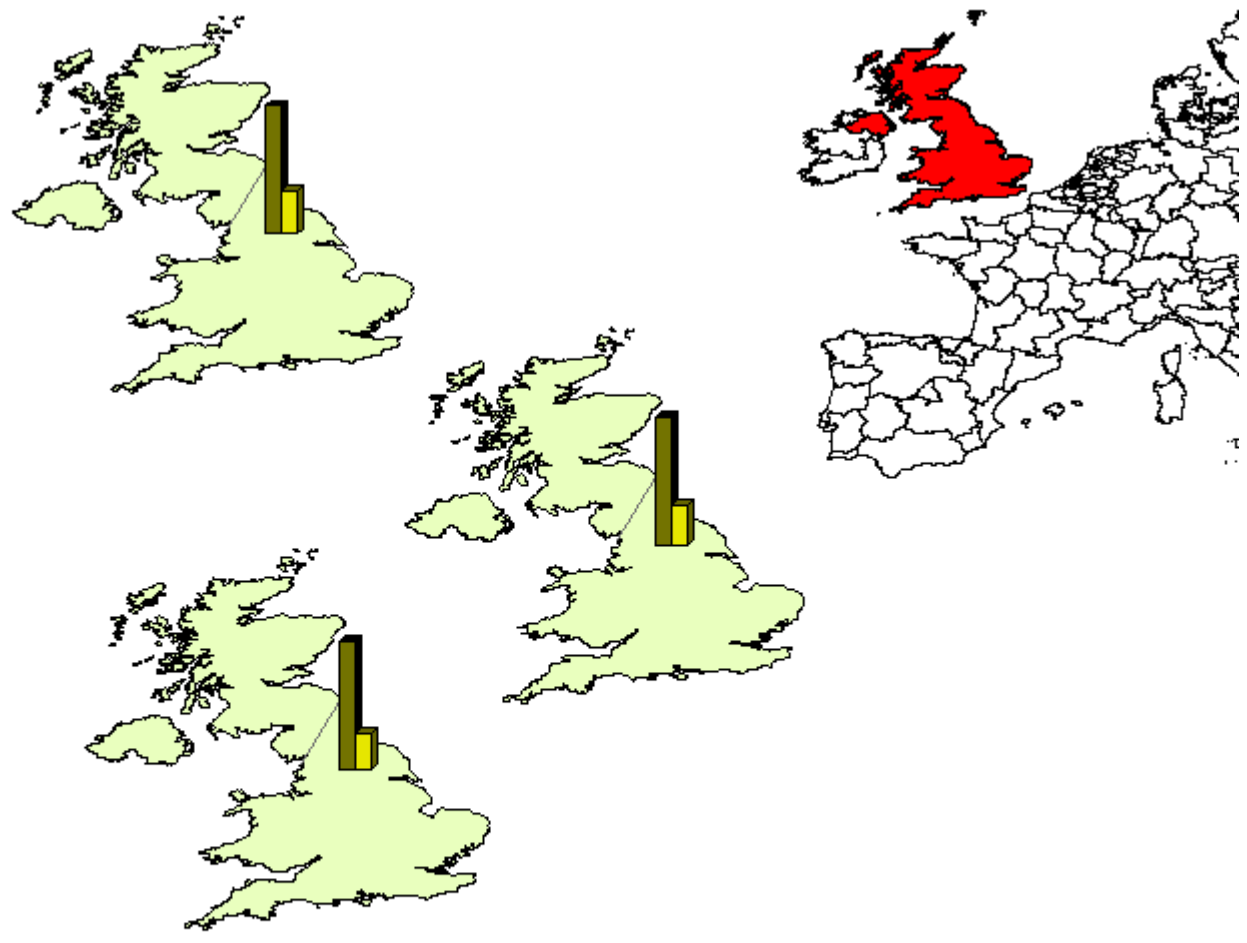
(\*) [t / LU \* year]; (\*\*) [% of total herd]; (\*\*\*) [% of total straw]

**AVAILABLE STRAW POTENTIAL - CARTOGRAMS**

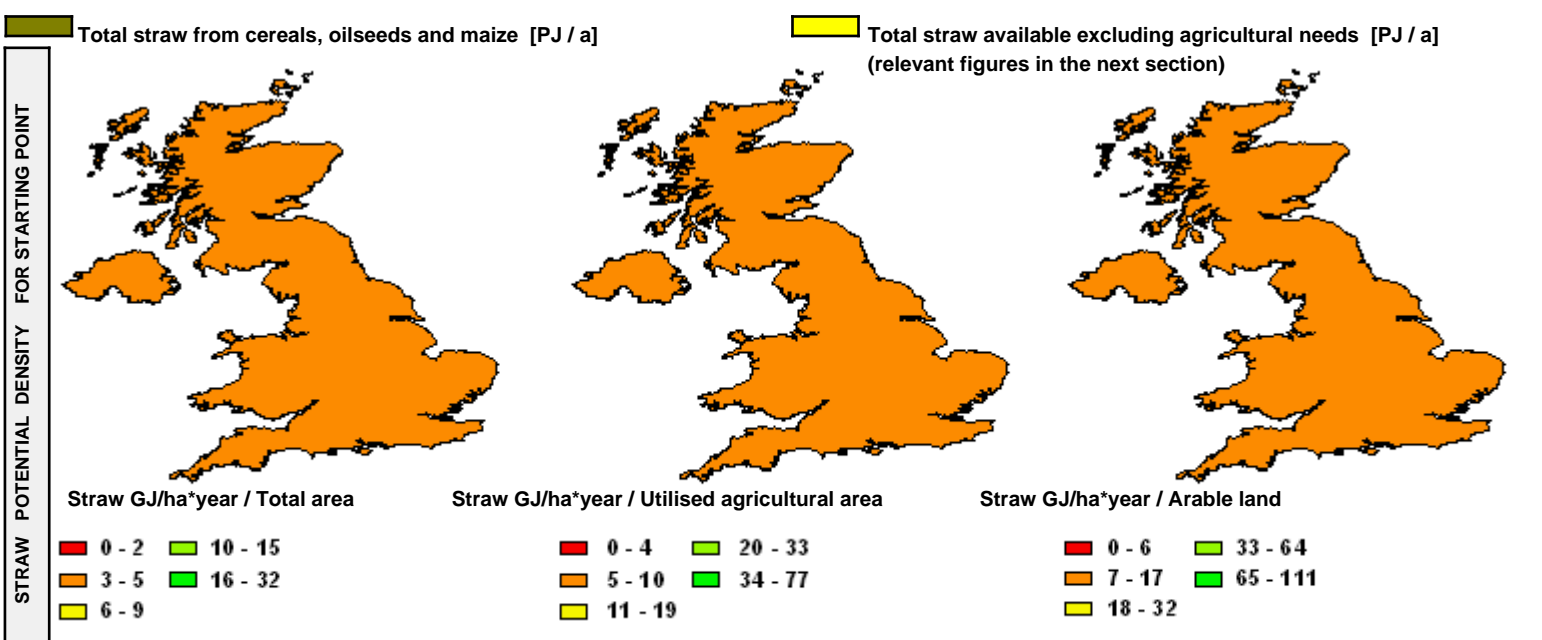
Starting Point SP

Scenario S1

Scenario S2



STRAW POTENTIAL DENSITY FOR STARTING POINT



**RESIDUE BIOMASS POTENTIAL - FIGURES**

(1) Theoretical potential - total straw production; total forestry residues and wood industry by-products production

(2) Technical potential - available straw; available forestry and wood industry residues excluding food and fibre related needs

		Starting Point		Scenario S1		Scenario S2	
		PJ/year	PJ/year	PJ/year	PJ/year	PJ/year	PJ/year
		(1)	(2)	(1)	(2)	(1)	(2)
<b>STRAW</b>		<b>252,94</b>	<b>85,01</b>	<b>214,73</b>	<b>65,66</b>	<b>214,73</b>	<b>59,55</b>
UK	United Kingdom	252,94	85,01	214,73	65,66	214,73	59,55
<b>FORESTRY</b>		<b>88,53</b>	<b>15,07</b>	<b>90,38</b>	<b>17,33</b>	<b>101,82</b>	<b>16,03</b>
	Logging residues	10,19	2,85	12,13	4,24	11,51	2,35
	Thinning wood	37,62	7,05	44,77	8,58	42,51	8,24
	Roots	3,35	0,00	3,73	0,00	3,47	0,00
	Wood balance	37,37	5,16	29,76	4,51	44,33	5,44
<b>WOOD INDUSTRY</b>		<b>23,33</b>	<b>1,17</b>	<b>29,23</b>	<b>1,46</b>	<b>24,36</b>	<b>1,22</b>
<b>TOTAL BIOMASS</b>		<b>364,80</b>	<b>101,25</b>	<b>334,34</b>	<b>84,45</b>	<b>340,91</b>	<b>76,80</b>