A case study of biomass utilisation in Hungary Heves County

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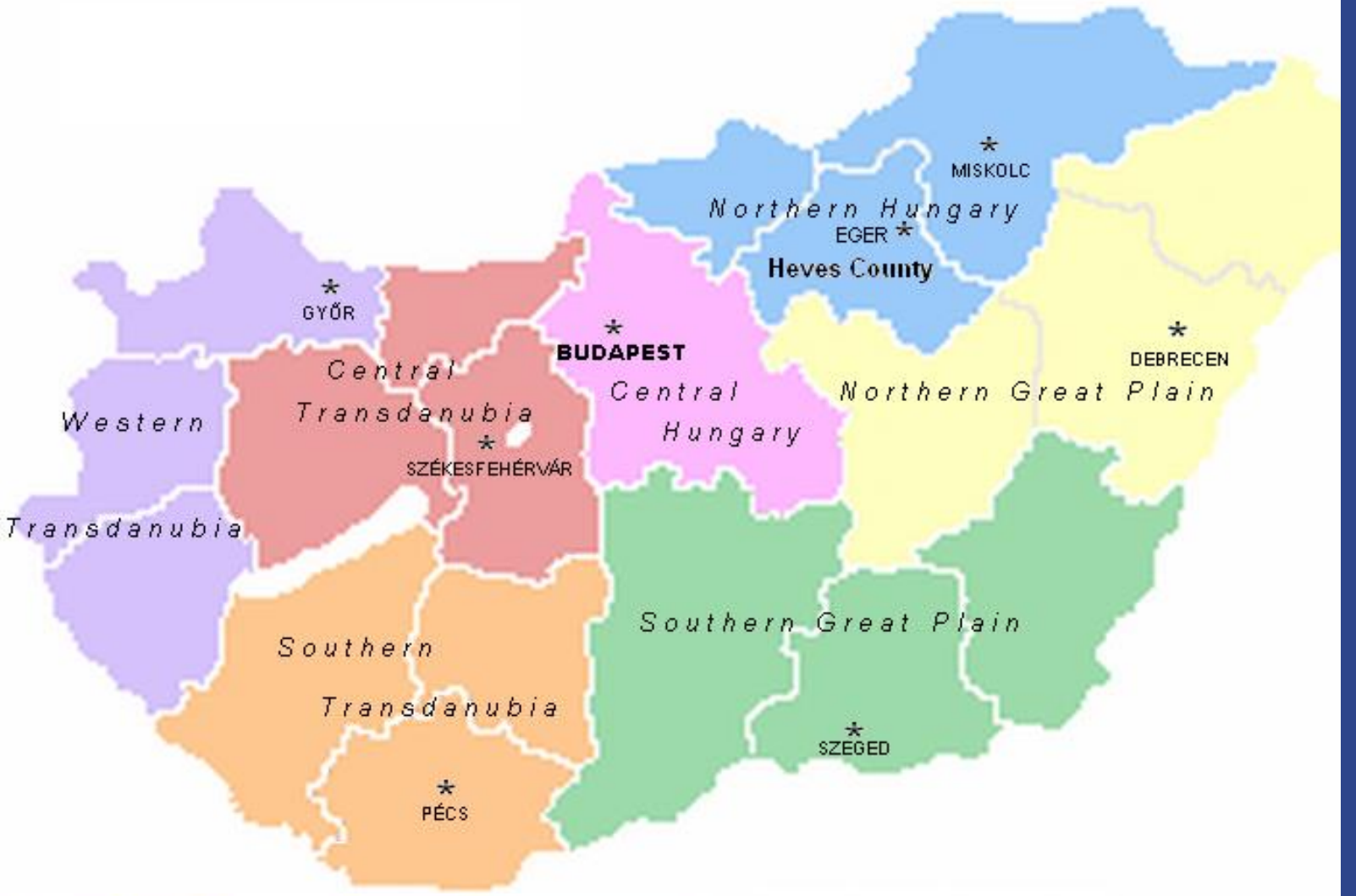
What I am going to talk about?

- Location
- Natural landscape
- Population
- Economy
- The energy sector
- Existing facilities using renewable energy resources – plans to evaluate our potential
- Some concluding question of a survey

Location



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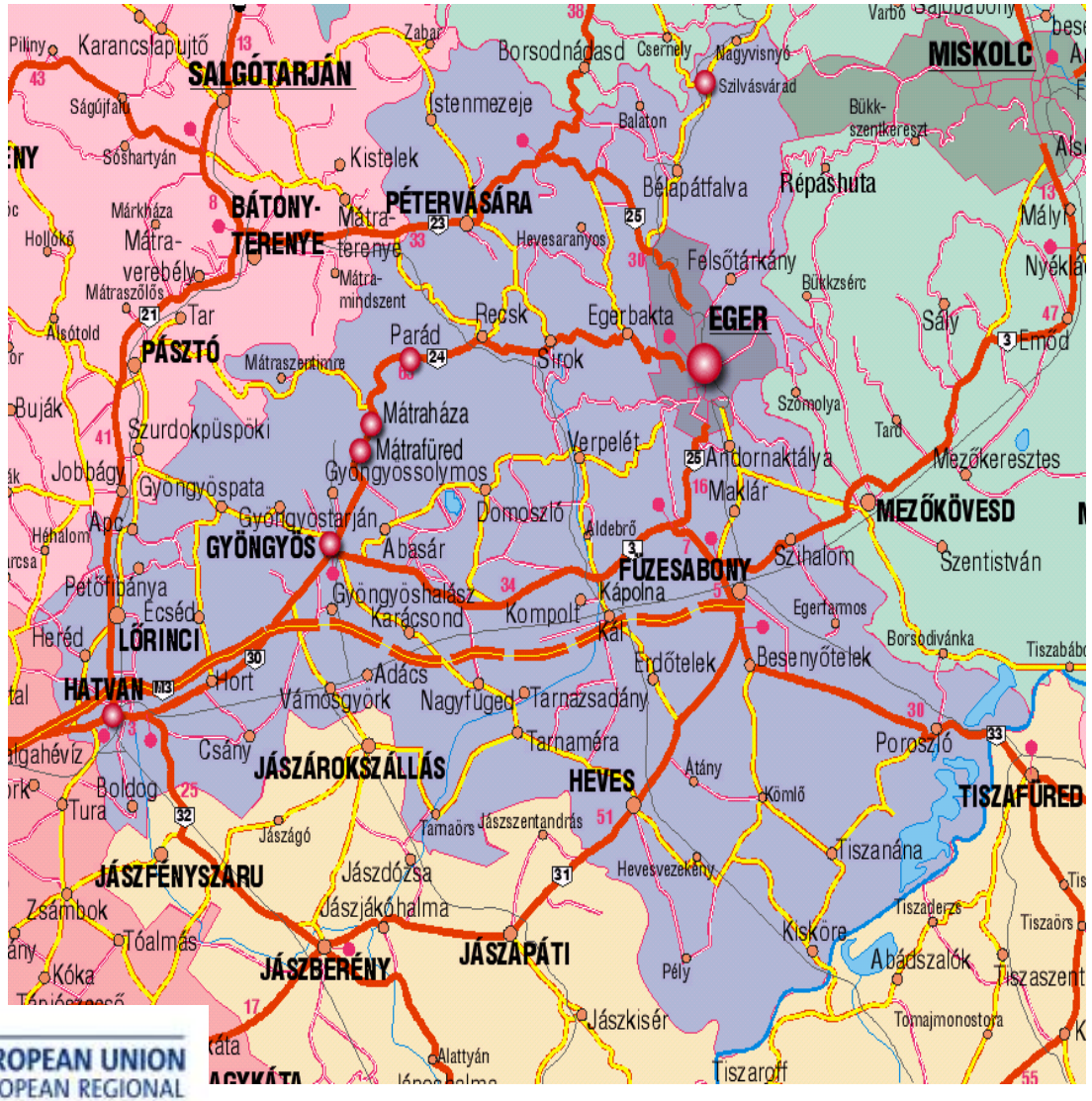
- An administrative unit
- 3637 km²
- 344.000 peop.
- 7 micro regions
- 121 municipalities
- Highway connection
- Railway line
- Tisza river (navigable)



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Natural landscape (North)

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Landscape (South)

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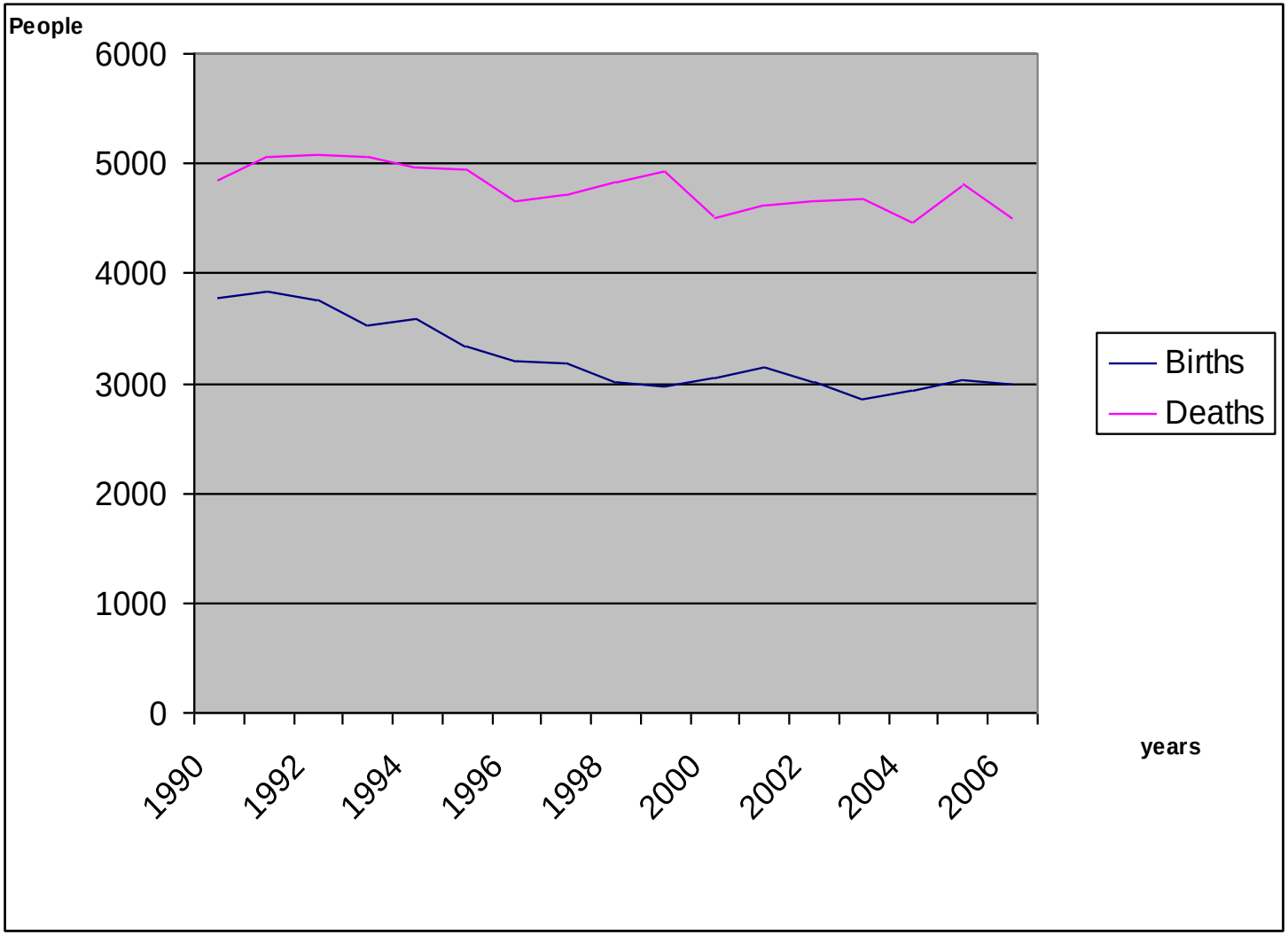
Population, society



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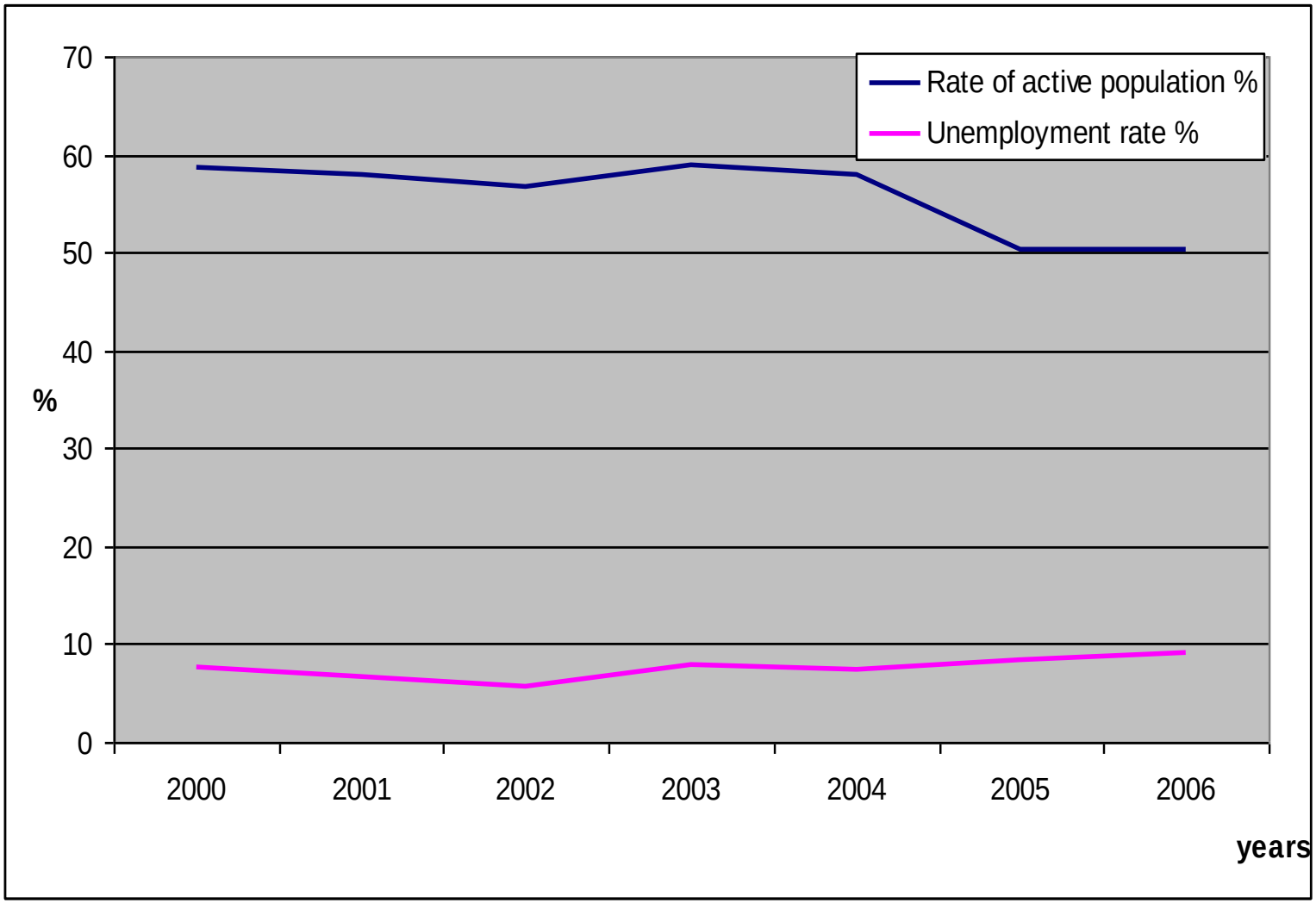

Economic situation

- Abandoned mining
- Hatvan, Gyöngyös, Eger
- Foreing capital
- Individual forced entrepreneurs
- Pauperization of self-governments

Wine regions

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Tourism

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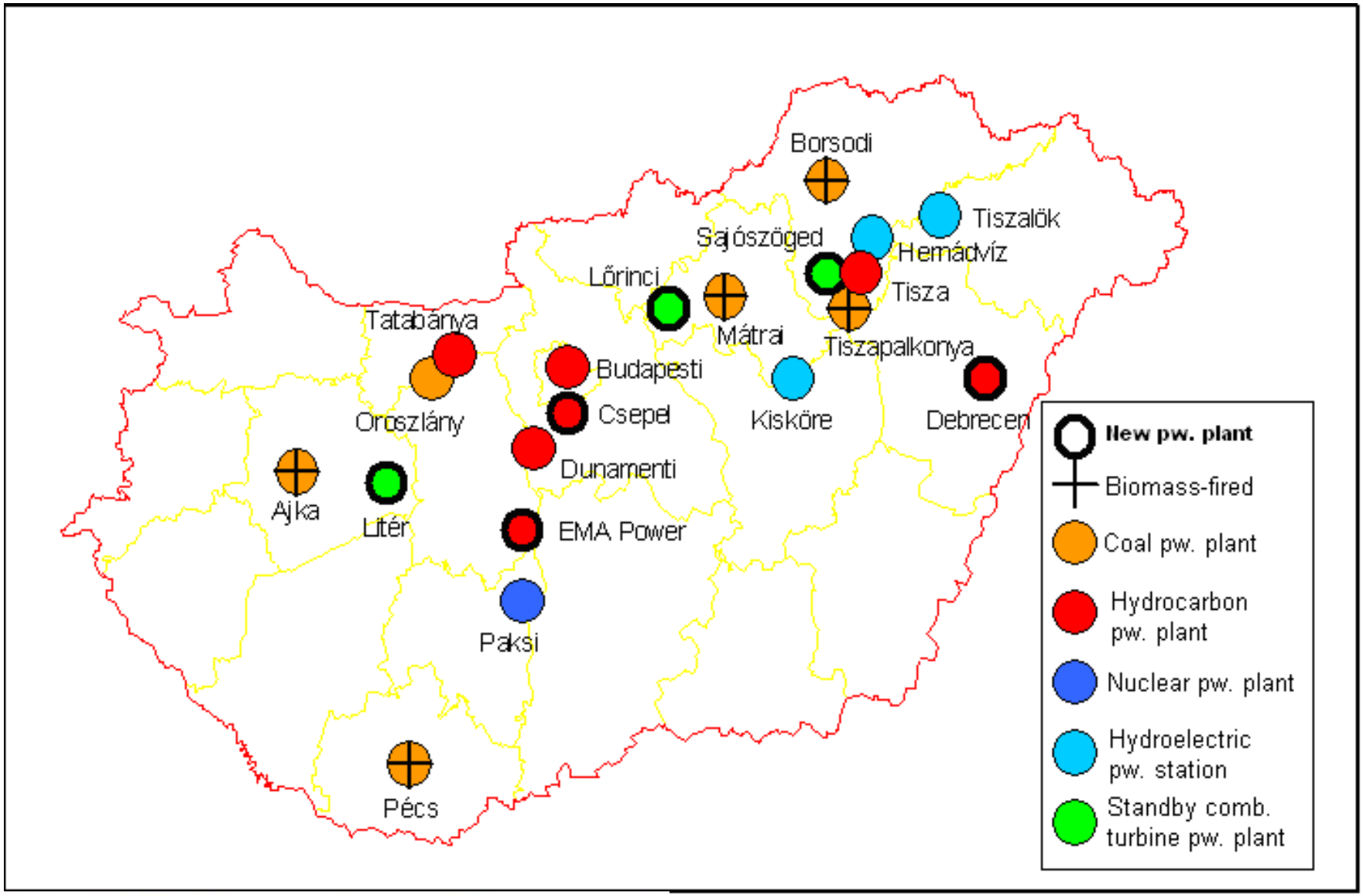
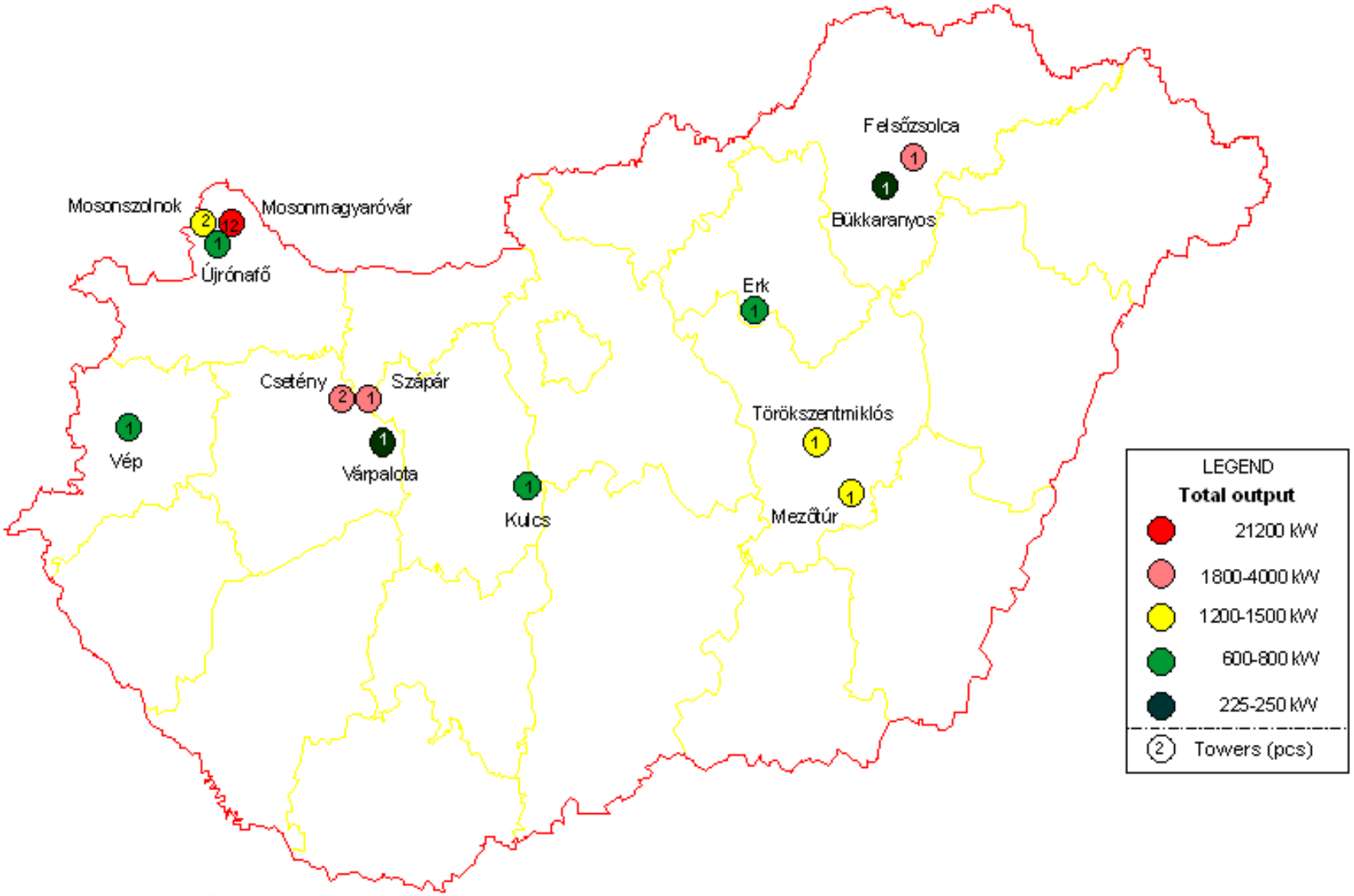
Energy sector



Wind turbines in Hungary



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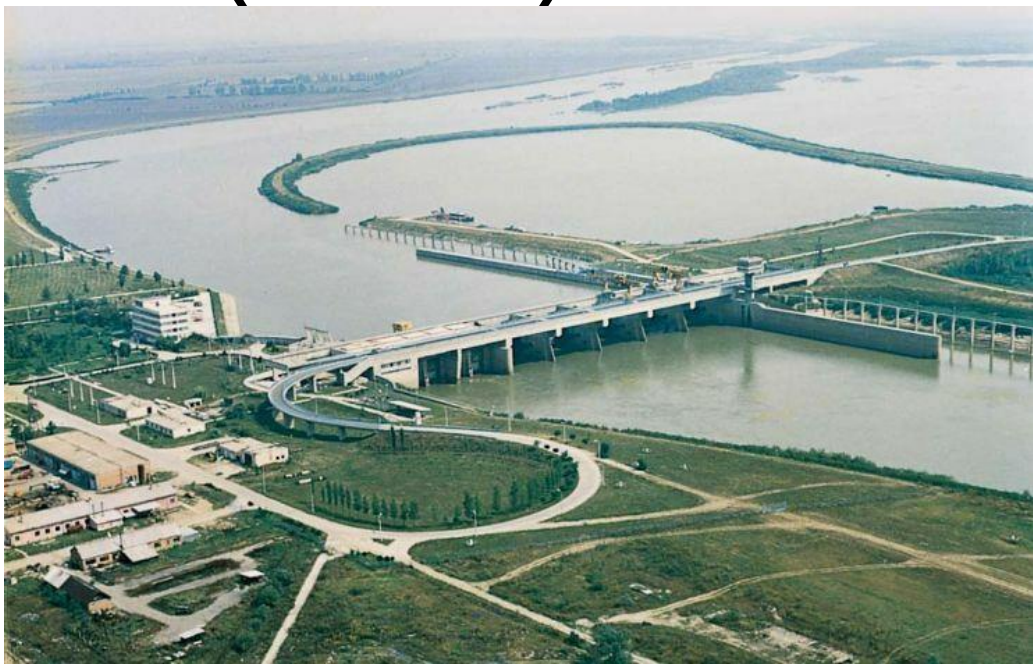
Hydropower
Kisköre Dam (7 MW)

- Energy potential and its utilization (analizing of accepted conceptions)
- Energy production at the Dam (Sources of data: Hungarian Central Statistical Office, institutional data – own survey)



Biomass potential

- Parameters of plant growth in Heves County
  - Landuse (Sources of data: Hungarian Central Statistical Office, analyzing of satellite images)
  - Utilization of agricultural by-products in Heves County (available studies)
  - Potential energy plants in the county (available studies)
  - Utilization of vine in Heves County (available studies)
- Forestry
  - Logging in the county (available studies)
  - Possibilities for utilization of wood in the county

  (Hungarian Central Statistical Office, analyzing of satellite images)

ey actors in biomass utilization

- Egererdő Inc. (Forestation, producer contracts) (own survey)
- Biomass Powerstation of Gyöngyös (Károly Róbert College) (Energy production, transportation, producer contracts, other functions) (own survey)
- Mátra Power Station of Visonta (Energy production, transportation, co-burning program (lignite-biomass), producer contracts) (own survey)

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Biomass power station, Gyöngyös (1 MW)

Mátra Power Station of Visonta (836 MW)

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Wind energy utilization

- Potential of wind energy in the County (analyzing of accepted conceptions)
- Actualities of wind energy production in Heves County - Pacziga Ltd. of Erk (Energy production, transportation, producer contracts, other functions) (own survey)

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Wind energy power station, Erk (0,8 MW)

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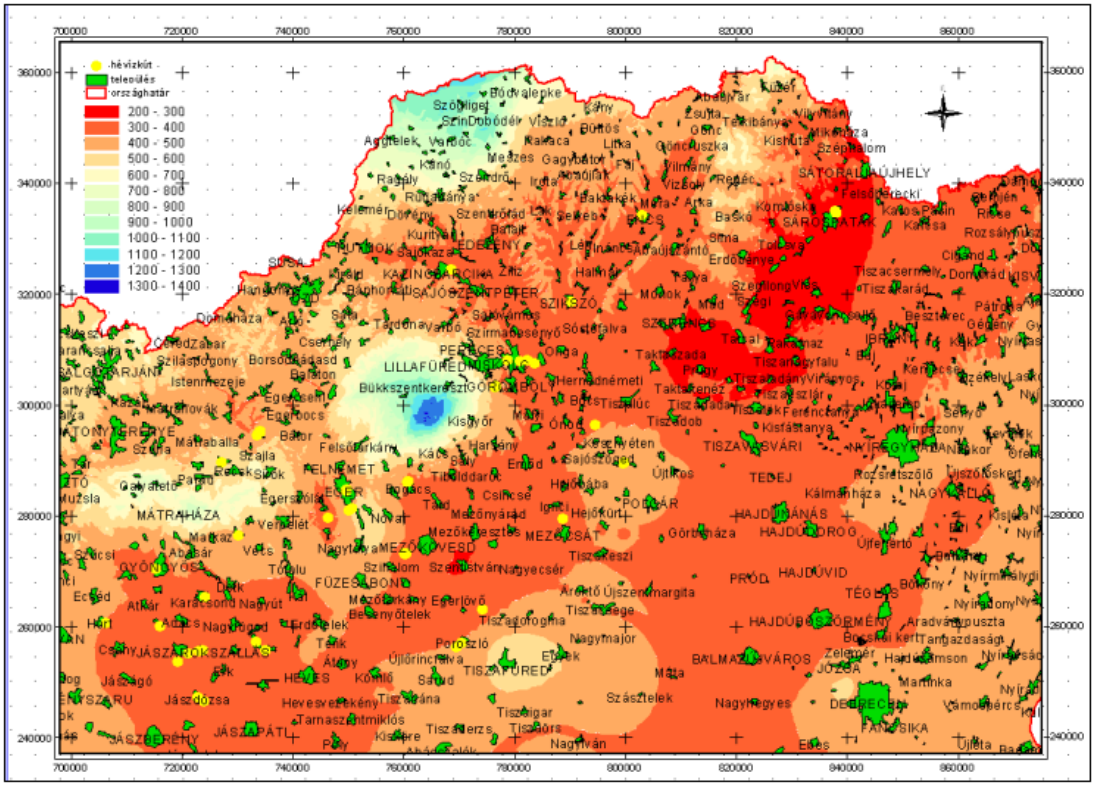
Solar energy

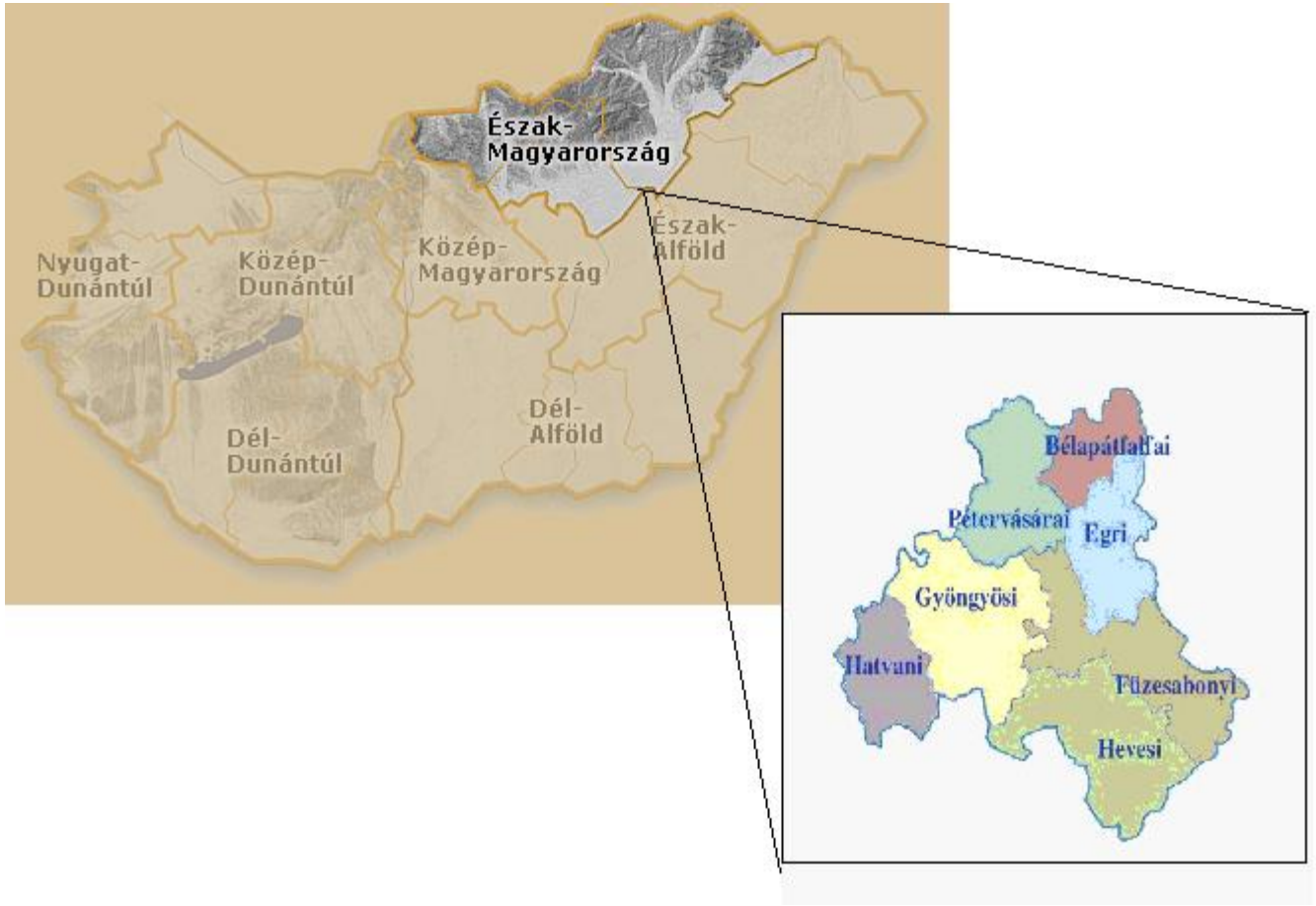
- Potential of solar energy utilization in Heves County (Source of data: Department of Physics of Eszterházy Károly College)
- Present situation of solar energy utilization in Heves County (Own survey)

Thermal water

- Actualities of thermal water management in Heves County (analizing of accepted conceptions)
- Utilization possibilities of thermal water in energy production (analizing of accepted conceptions)



The broader environs of the Eger Micro-Region



- The spatial unit is the Eger micro-region consists of **14 settlements**, i.e. in addition to the Town of Eger, 13
- It can be considered as the **catchment area of the Town of Eger**, with a total number of inhabitants of 79,500.

Biomass potential in the Eger Micro-Region

A model of estimation based on average yield of the last years (Gergely S.)

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Dimensions

- Can be used for **arables**, forestry and viniculture as well.
- Autumn wheat an sunflower are the most general plants of arable lands in the Eger Micro-Region. Spring and autumn barley , rape, corn and oats are of secondary importance.

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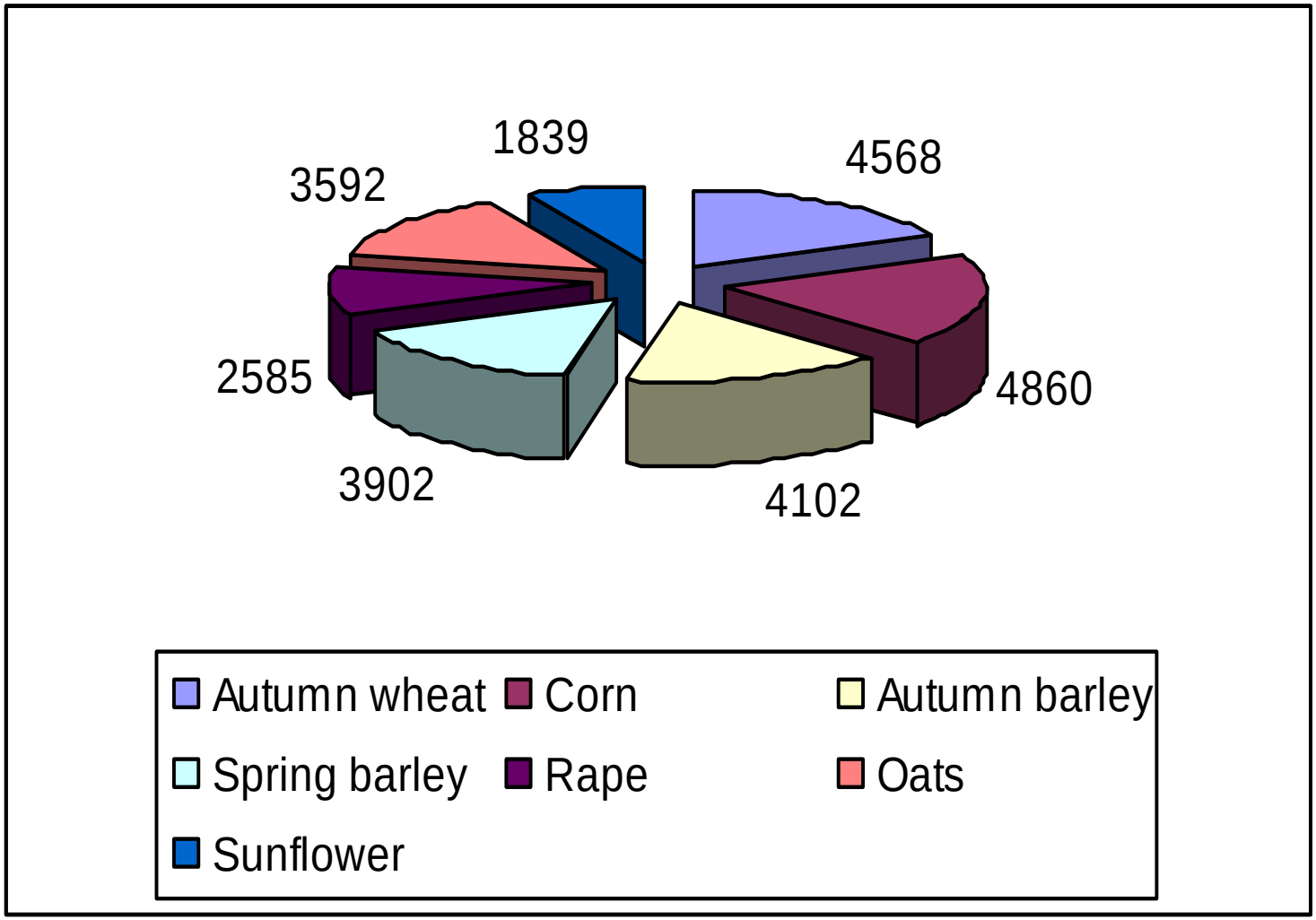

Average amount of arable main-products in the Eger Micro-Region

(kg/ha)

Besides main-products in an energetic point-of-view the **amount of by-products** is the most important question.

According to the experiences of the Agriculture Authority of Heves County (AAHC) the ratio of main- and by-products are as follows:

	Main/By-product
Corn	1:1,8 grain/stem
Sunflower	1:0,8 grain/plate
Rape	1:3,5 grain/straw
Wheat/barley/oats	1:0,6 grain/straw

Source: AAHC

According to these the average mass of by-products produced in the micro-region can be defined:

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4.

The amount of the most important arable by-products in the Eger Micro-Region

By-product	Amount (t)
Autumn wheat straw	8223
Corn-stalk	753
Autumn barley-straw	160
Spring barley-straw	632
Rape-straw	1448
Oats-straw	291
Sunflower-plate	3630
Sum	**15137**

5.

- Assuming 50% of litter and 10% of manuring from wheat/barley/oats straw, 20% from rape, and 20% manuring and animal feeding from corn we may get the net amount of arable by-products can be used for energetic purposes

The amount of arable by-products can be used for energetic purposes in the Eger Micro-Region

By-product	Amount (t)
Autumn wheat straw	3289
Corn-stalk	603
Autumn barley-straw	64
Spring barley-straw	253
Rape-straw	1158
Oats-straw	116
Sunflower-plate	3630
Sum	**9113**

6. The calorific value of biomass fuel

Biomass	Calorific value (MJ/kg)	Ash (%)	Volatile flammable (%)
Wheat straw	17,3	5,28	74
Corn-stalk	17,5	8,78	76
Wood	18,5	0,52	85
Bark	16,2	7,14	76
Wood-bark	18,1	2,65	82
Miscantus	17,4	3,2	80
Rape-oil	26,9	0	100
Ethanol	26,9	0	100
Methanol	19,5	0	100

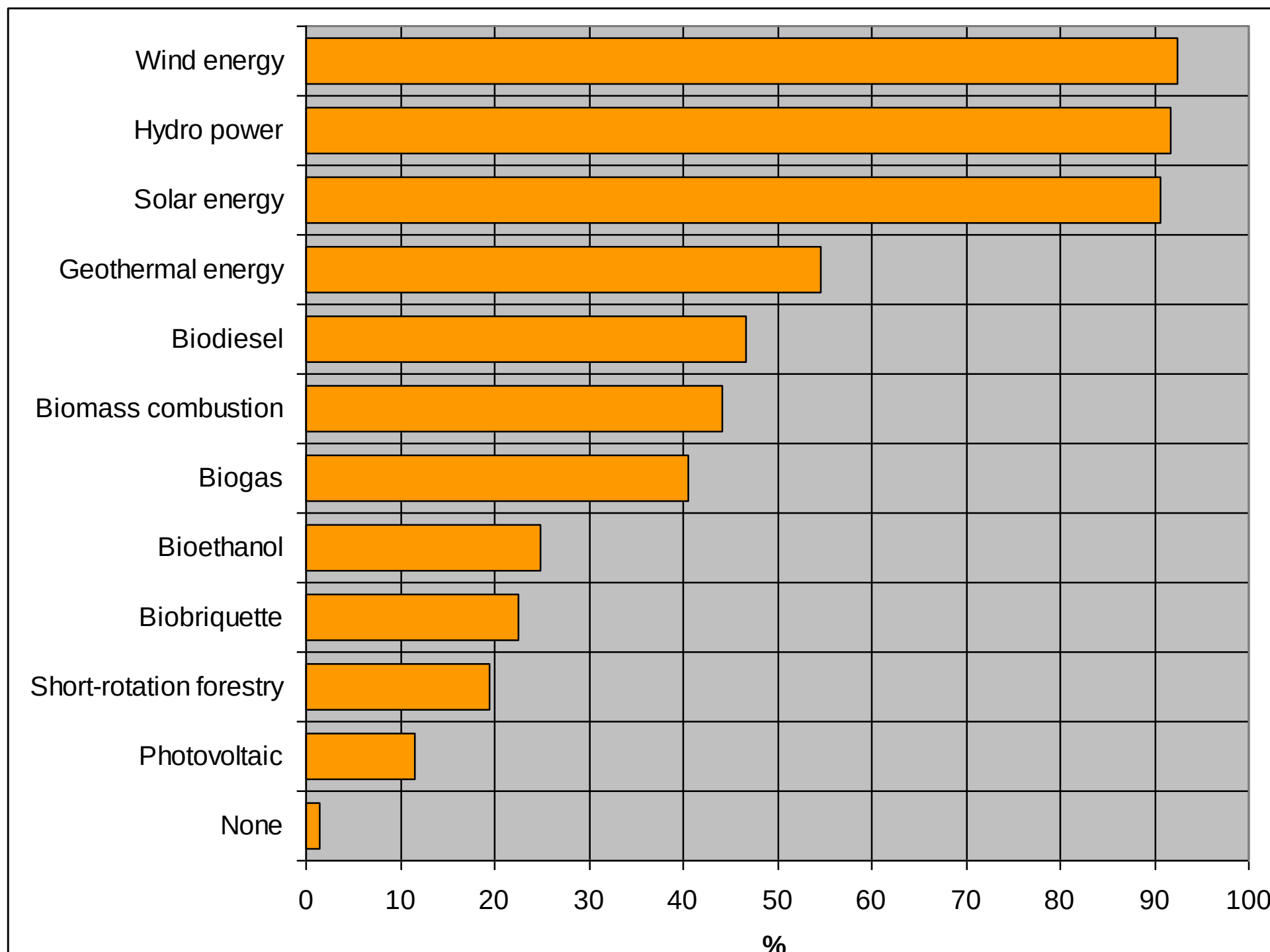
Source: Gergely S., 2005

Counting with the formerly cited calorific values we may determine *the energy content of annual biomass production*

	Calorific value (MJ/kg)	Energy Value (GJ)
Autumn wheat straw	13,5	44403
Corn-stalk	13	7834
Autumn barley-straw	13,5	864
Spring barley-straw	13,5	3414
Rape-straw	13,5	15634
Oats-straw	13,5	1571
Sunflower-plate	11,5	41749
Total energy (GJ)		**115468**

. *Public acceptance of renewable energy sources in the study area*

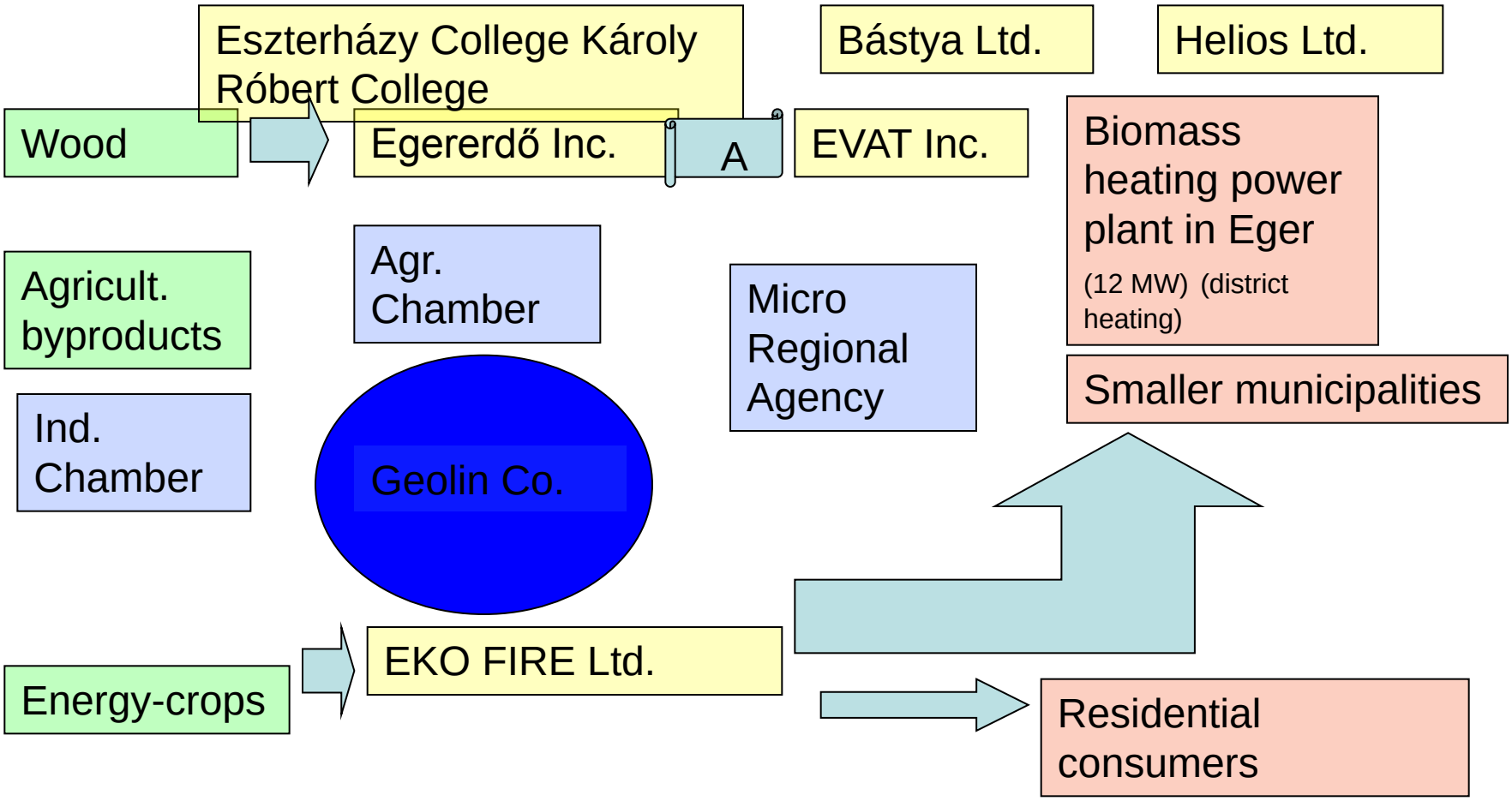
- In order to research the social background of the utilisation of renewable energy sources (RES), questionnaire surveys were conducted for the following designated target groups in the study area:
  - inhabitants: 17 settlements of the County of Heves – 505 units,
  - farmers: the Micro-region of Eger – 100 units,
  - municipalities: 13 municipalities of the County of Heves – 13 units


Wind energy
Hydro power
Solar energy
Geothermal energy
Biodiesel
Biomass combustion
Biogas
Bioethanol
Biobriquette
Short-rotation forestry
Photovoltaic
None
0
10
20
30
40
50
60
70
80
90
100
%

- As the source of information, 85.74% of the pollees indicated television or radio, this figure followed by 61.78% of the press with far ahead all other categories
- Education: strongly emphasized that it should be strengthened at secondary school level.

- benefits in relation to the use of RES
  - non-polluting nature of RES
  - cheaper energy compared to fossil energy sources
  - the possibility of local energy production
  - making use of agricultural areas of poor quality
  - the improvement of employment

BIC Participating companies /actors o BIC



Other outputs

- Regional concept
- Market survey
- VAC analyzis
- Communication guide and strategy for the actors
- www.rubires.eu

Thank you for your attention!

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