# „Renewable enegy resources with agricultural origin, Hungarian situation


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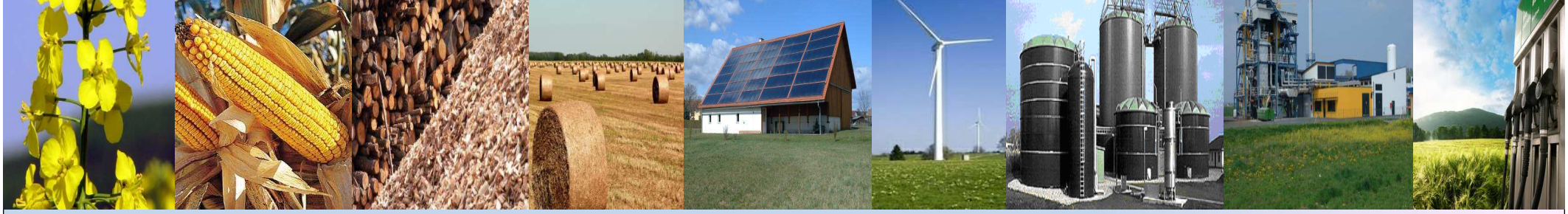
**Department for Agriculture**



## EU's green energy policies and targets

## 20-20-20-10*

**Increasing food security**: reduction of import, increase of own energy resources

**Enviromental protection**: reduction of $CO_2$ and other contaminants (GHG) emission

**Local and regional expansion**: furtherance of economical and social development

**Rural development**: creation of local job opportunities

**Agriculture**: decreasing the overproduction of food with ensuring alternative land-use options

**Safe, sustainable Europe**

**2009/28/EC**

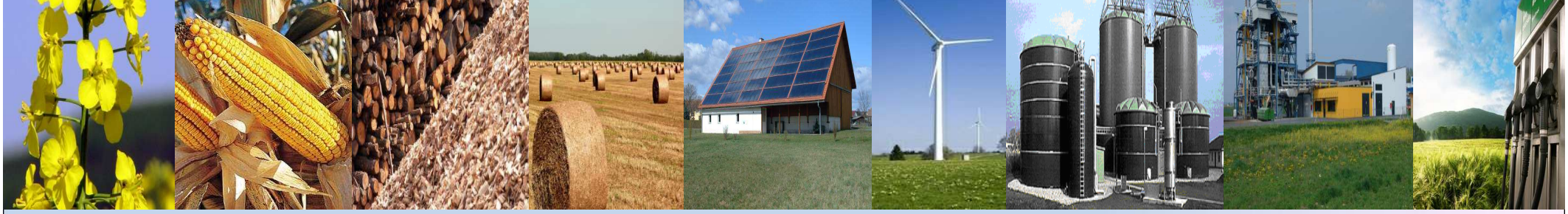
- **White Paper:** enhancement of the rate of renewable energy resources from 6% to 12% till 2010 , till **2020 to 20%** ***( 10.000 MW biomass-based heat and electricity production,1.000.000 houses heated by biomass, 5 million t liquid biofuel,100 small villages, regions, islands supplied by 100% renewable energy)***

- **2001/77/EC guideline**: enhancement of the rate of renewable energy resources in energy consumption related to electric energy from 14% to 22,1% till 2010

- **2003/30/EC guideline**: rate of bio-fuels should reach the rate of 5,75% till 2010, and the rate of 10% till 2020

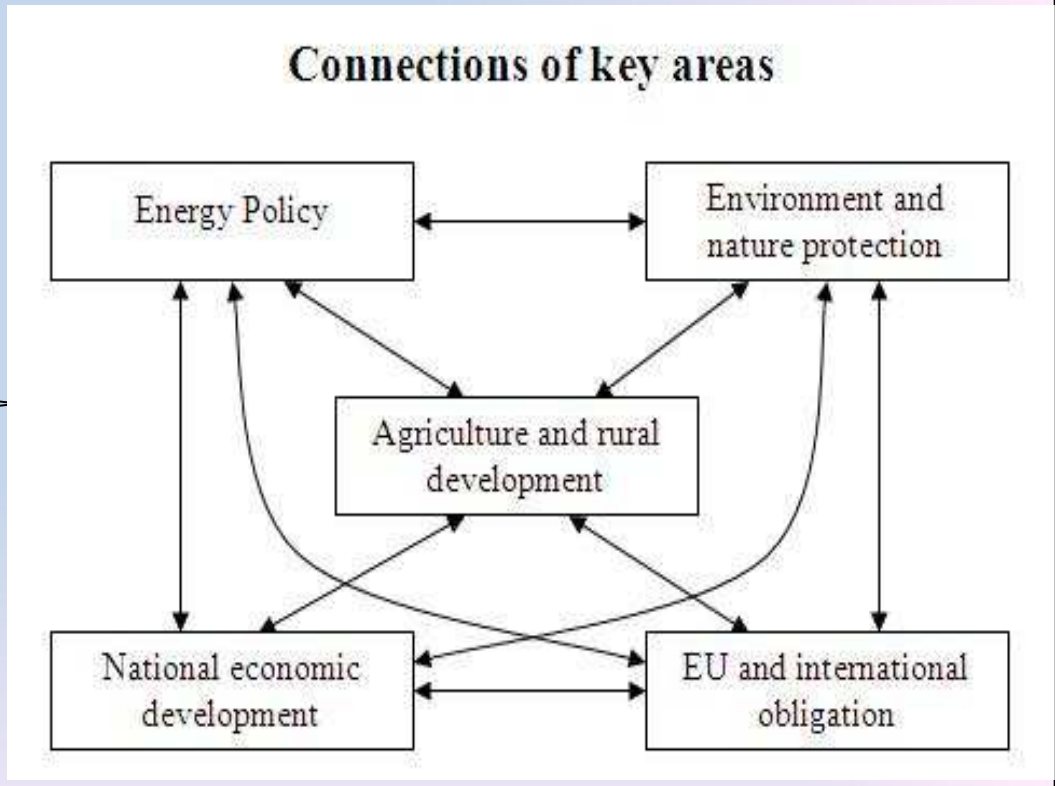
- **Kyoto convention+GHG commitments+ETS**

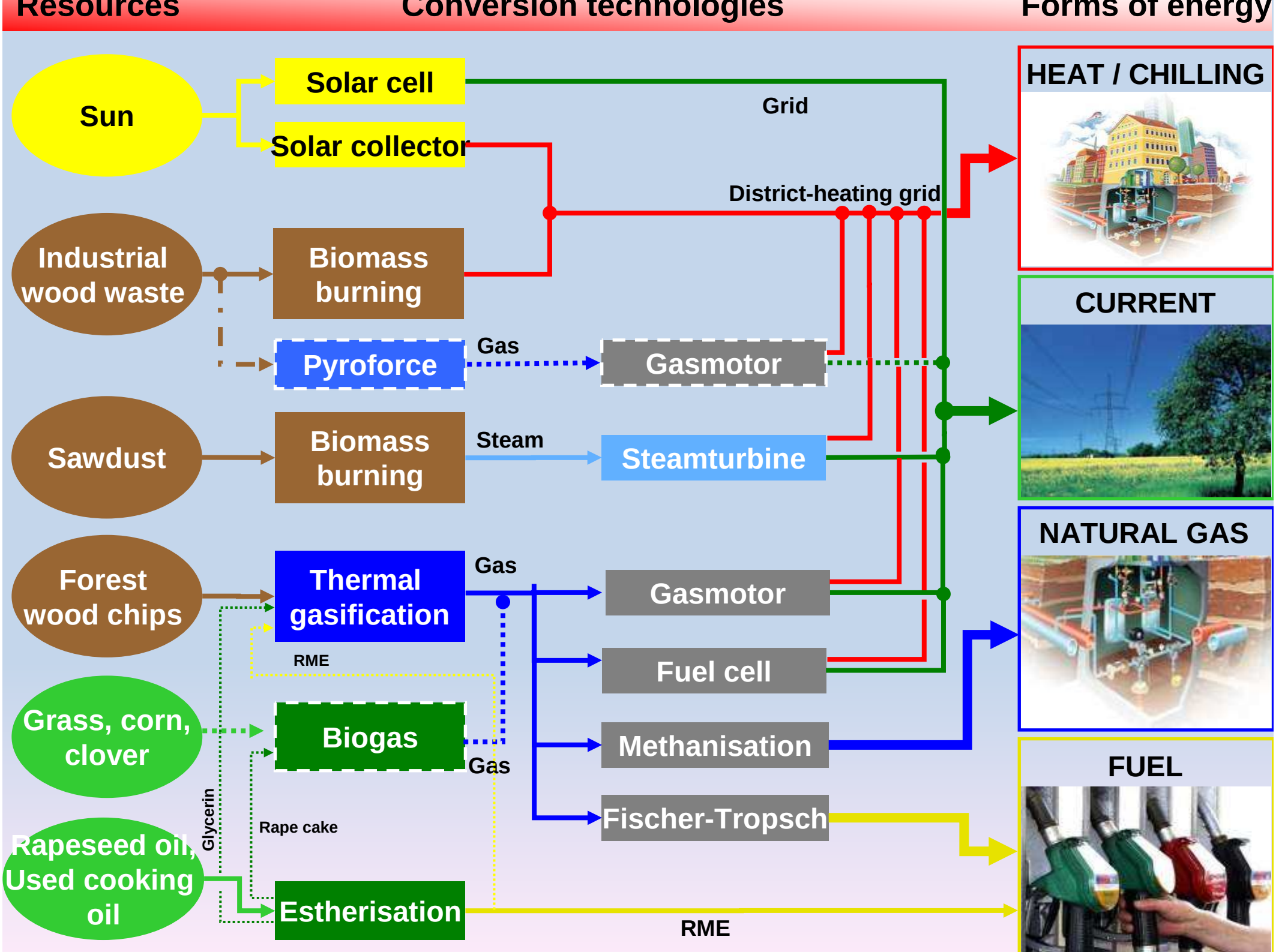
The emission of $CO_2$ (comapred to the 1990 level) till 2020 with 20%, till 2050 with 50% is necessary to moderate

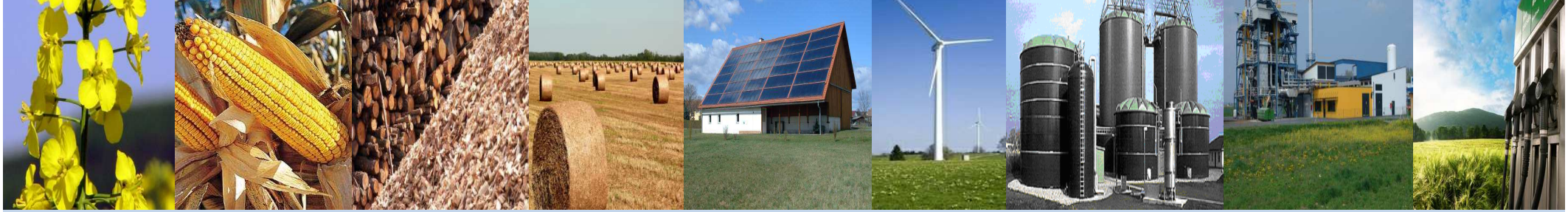


## Implementations, functions effects → Interaction

1. **Accomplishment of EU expectations** (prevention of sanctions, achieving 2001/77/EC and 2003/30/EC guidelines, compliance with the Biomass Action Plan, acceptance of Biofuel Strategy, application of White – Green Paper)
2. **Energy Policy** (safety energy supply, reduction of energy import – oil, gas – dependency, energy-diversification, increase energy-efficiency, renewables)
3. **Agriculture-, rural-, and urban development** (productional and market structural changes , job creation, cheaper energy consumption, and environmentally friendly public transport development )
4. **Environment and nature protection** (reduction of GHG and CO2 emission, municipal solid and liquid waste management and energy production, healthier environment)
5. **National economy considerations** (GDP, balance of payment, tax, reduction of budget




Resources
Conversion technologies
Forms of energy
Sun
Solar cell
Solar collector
Grid
District-heating grid
HEAT / CHILLING
Industrial wood waste
Biomass burning
Pyroforce
Gas
Gasmotor
CURRENT
Sawdust
Biomass burning
Steam
Steamturbine
Forest wood chips
Thermal gasification
Gas
Gasmotor
RME
Fuel cell
NATURAL GAS
Grass, corn, clover
Biogas
Gas
Methanisation
Glycerin
Rape cake
Fischer-Tropsch
FUEL
Rapeseed oil, Used cooking oil
Estherisation
RME



# Hungary in the renewable energy development

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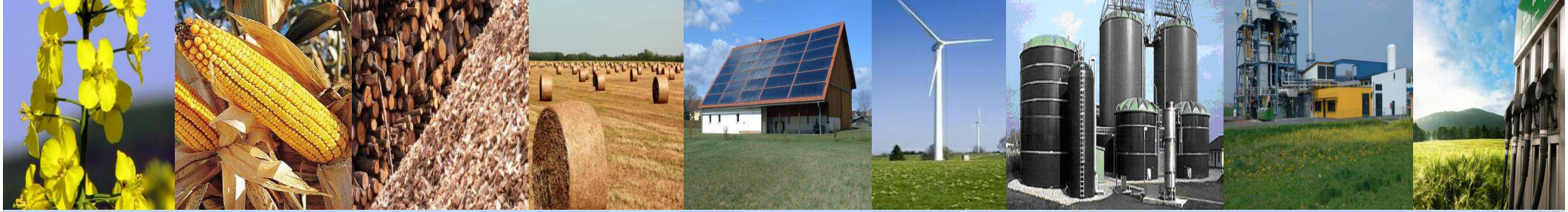


# Energy resources with agricultural origin

The support of building smaller (max. 10 kt/year) bioethanol capacity

The support of building smaller (max. 10 kt/year) crude oil capacity

Modernization of agricultural holdings

Support of livestock-based biogas plants, order to producing heat and electric power

**Liquid biofuels**

**Solid biomass**

**Biogas**

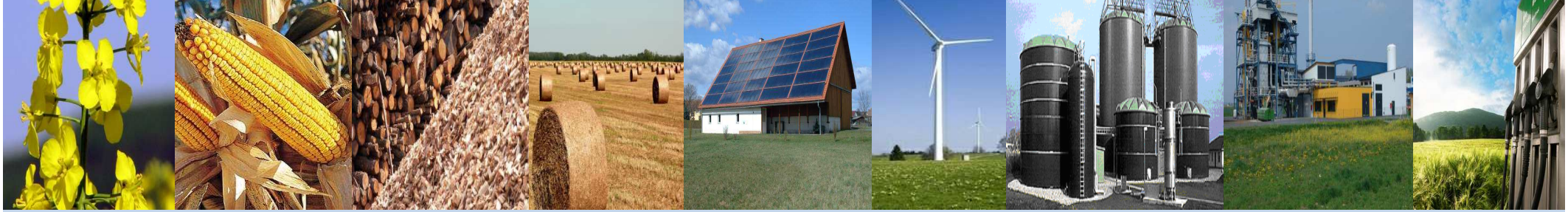
Arboreal and non-arboreal energetics plantation

Renewable energy producer and processing machines

Site energy supply: BIOMASS furnaces

The processing machines of agricultural and forestry byproducts: pellet, briquette

Agricultural energy supply from renewable energy



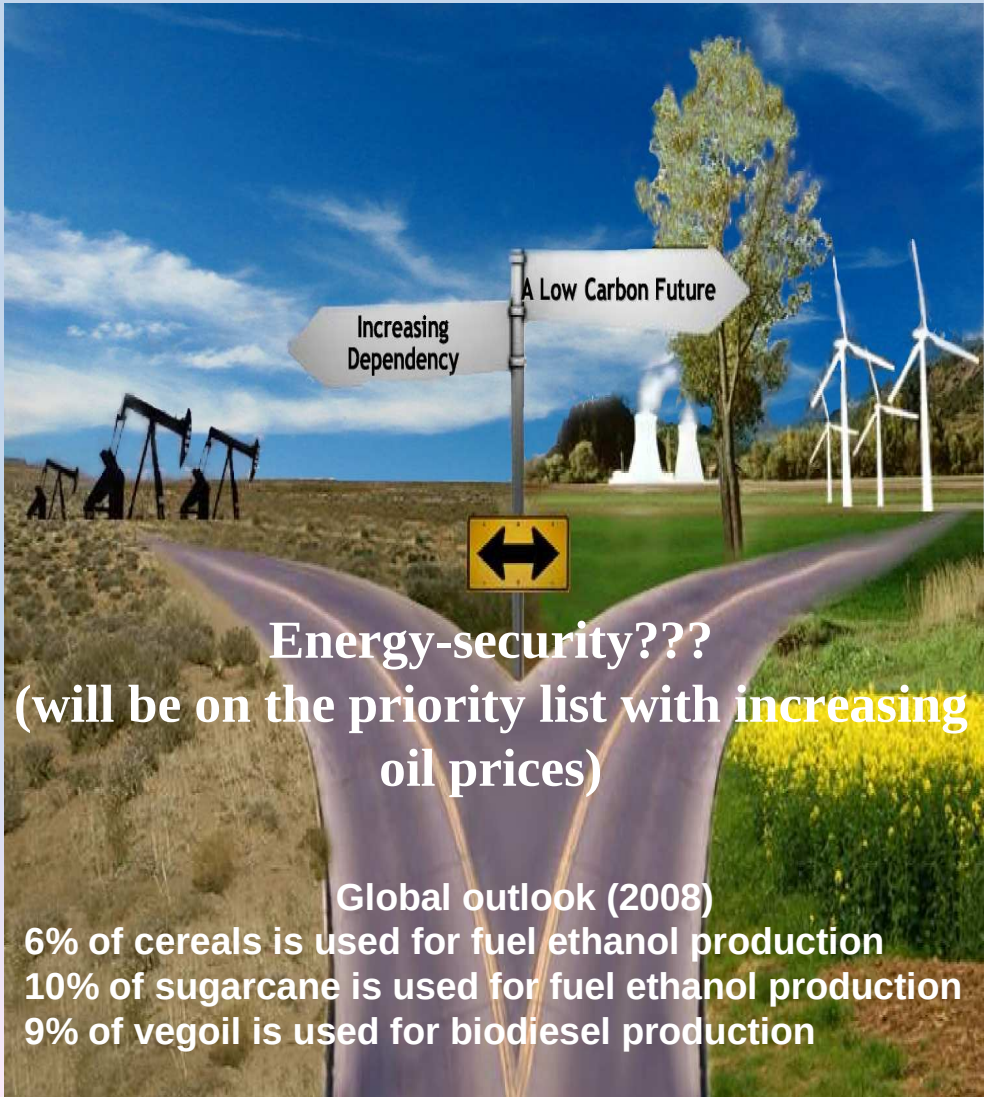
# Food - Biofuels - Feed

**By 2025**

Global population growth from 6,7 to 8 bln people → Increased demand for agricultural products

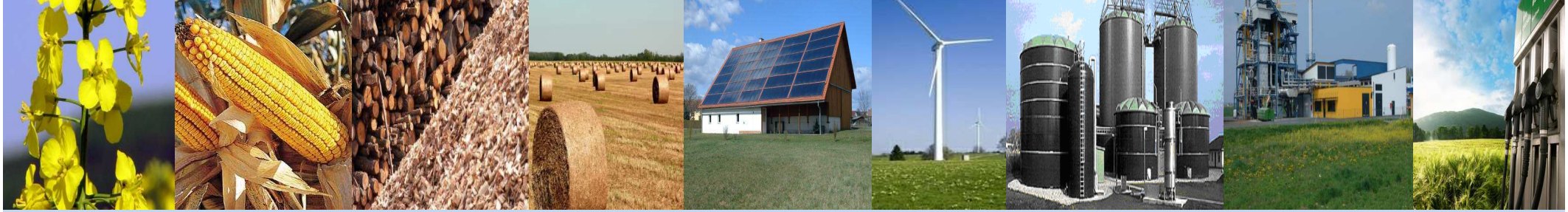
**The global food output must increase by about 50%**

- Food
- Feed
- Biomaterials (inc. Fuel)

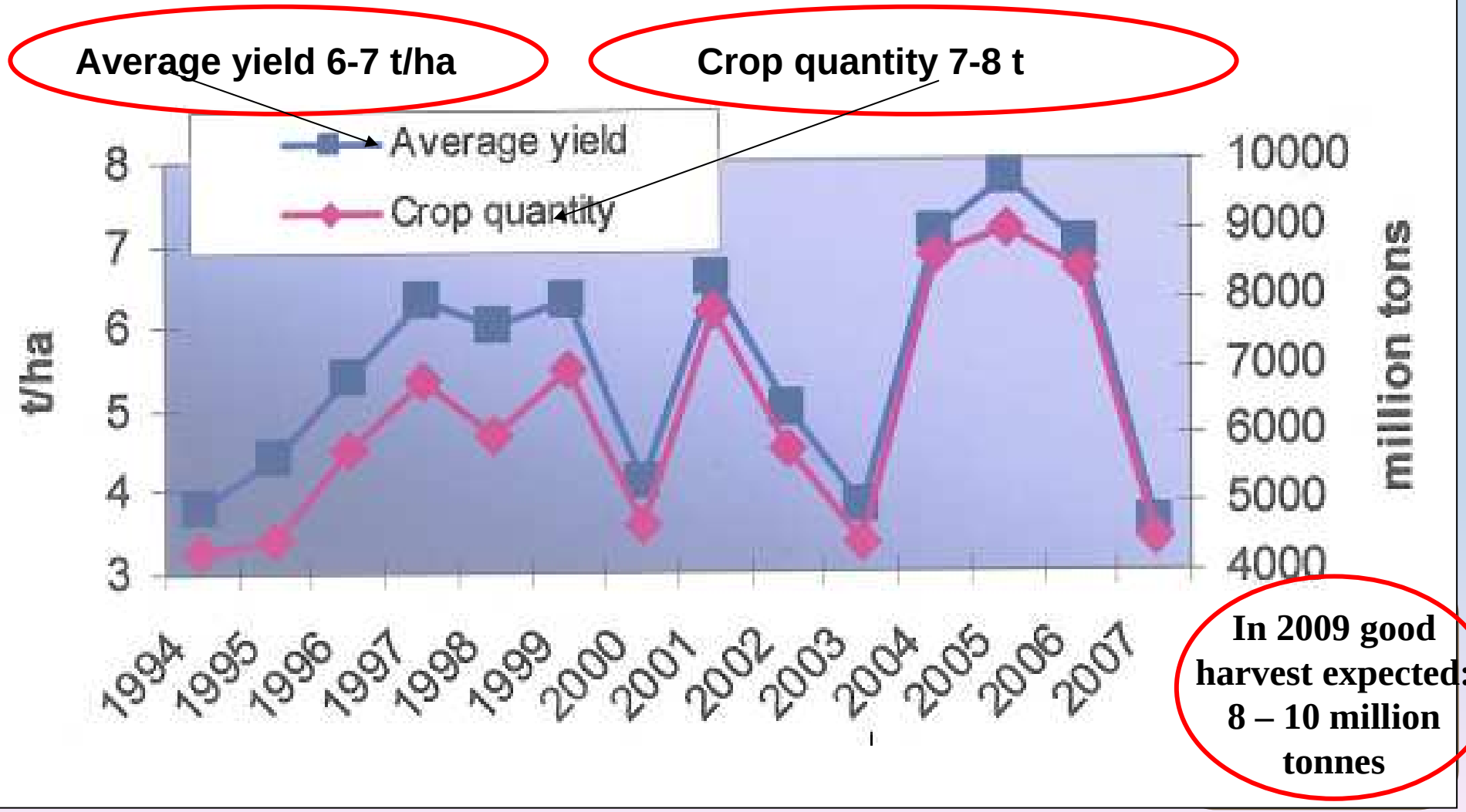



**Energy-security???**
**(will be on the priority list with increasing oil prices)**

**Global outlook (2008)**
6% of cereals is used for fuel ethanol production
10% of sugarcane is used for fuel ethanol production
9% of vegoil is used for biodiesel production



# Maize production in Hungary 1994-2007




**In 2009 good harvest expected: 8 – 10 million tonnes**

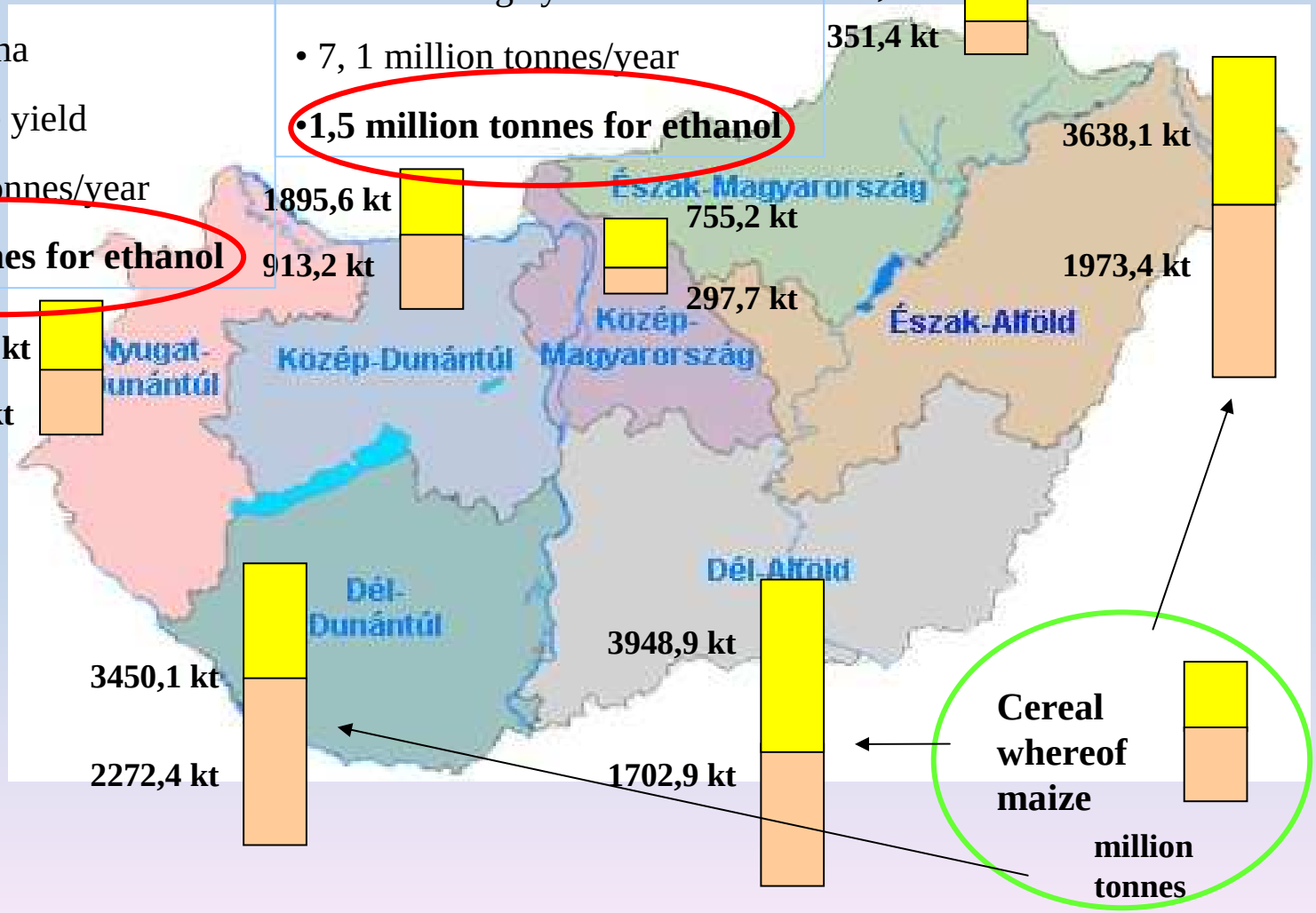
## Hungarian potential of raw material

### Wheat raw material

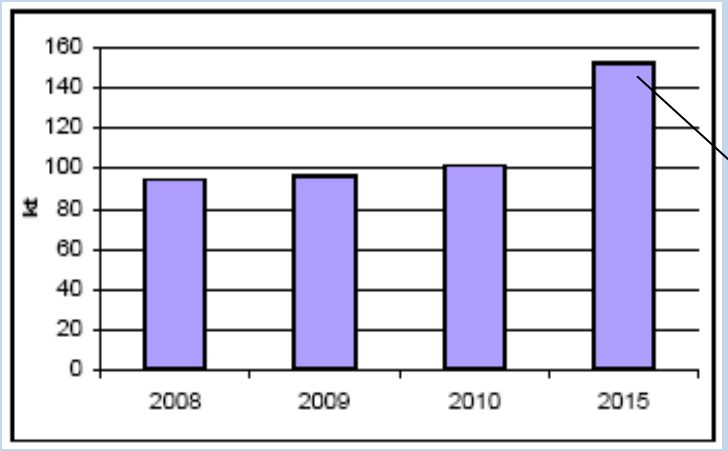
- 1, 15 million ha
- 4 t/ha average yield
- 4, 6 million tonnes/year
- **1 million tonnes for ethanol**

### Maize row material

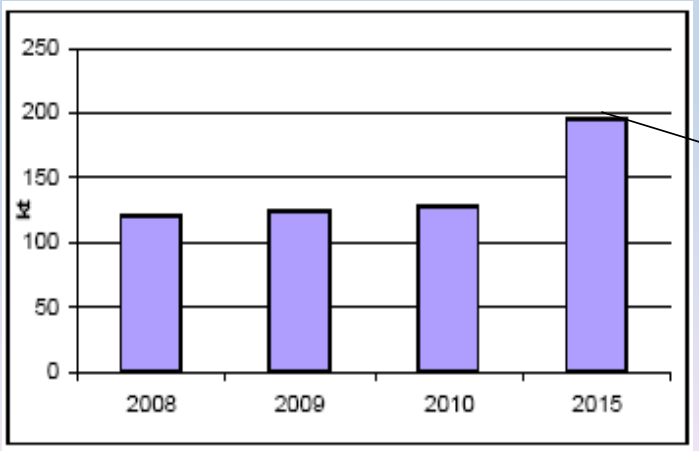
- 1, 2 million ha
- 6 t/ha average yield
- 7, 1 million tonnes/year
- **1,5 million tonnes for ethanol**



## Hungarian bioethanol demand potential




## Domestic biodiesel demand




## Domestic regional bioethanol potential

| | |
|---|---|
| Dél-Dunántúl | 300 Et |
| Észak-Alföld | 300 Et |
| Dél-Alföld | 400 Et. |
| Közép Dunántúl | 200 Et |
| Nyugat-Duntántúl | 100 Et |

| | | min (ezer t) | max (ezer t) |
|---|---|---|---|
| Bioetanol | | | |
| | búza | 240 | 640 |
| | kukorica | 420 | 900 |
| Biodízel | | | |
| | repce | 90 | 160 |
| | napraforgó | 23 | 77 |

## Accomplishment of EU expectations

| Denomination | Biodiesel | Bioethanol | Sum |
|---|---|---|---|
| Proposed capacity (kt) | 220 kt/year | 800 kt/year | |
| Goals | According to EU expectations | According to EU expectations + export | |
| Investigation claim (million €) | 140 | 464 | 604 |
| Claim of support (million € ) | 48 | 120 | 168 |
| Production area (thousand ha) | 300 | 600 | 900 |

### Bioethanol

**150 kt – 5,75 % EU expectation**
**600-650 kt export**

**(by the 10% expectation 350 kt export possibility)**

### Biodiesel

**220 kt – 5,75 % EU Expectation**

**Slim export possibilities**

**Instead of increasing the production area necessary to improve the average yield**

## Solid biomass potential

| Key area | Aspect | Target volumen | |
|---|---|---|---|
| | | *min.* | *max.* |
| Energy diversification | Maximum aim | - | 810 PJ/year<br>31 GWh/year |
| Accomplishment of EU expectations | Minimum the accomplishment of the expectations | 90 PJ/year<br>4 TWh/year | - |
| Agriculture and rural development | potential maximum | 50 PJ/year<br>1,6 TWh/year | 212 PJ/year<br>70 TWh/year |
| Environment and nature protection | Max. climate protection in max. consonance with nature | - | Energy key area |
| National economic impact | Max. aim to the consonance of resource allocation | EU expectation, agricultural key area | - |

| Designation | Realistically collectable/producable million t/year | Energy content PJ/year |
|---|---|---|
| Forestry resource (firewood) | 3,25 | 45,5 |
| Purposefully produced* (350-400 thousand ha) | 5,6 | 74,16 |
| Agricultural byproduct, waste | 5,4 | 62 |
| Other waste | 0,55 | 6,6 |
| Together | 14,8 | 188,26 |

**Development support**

Three section

**Dedicated biomass production**

**71/2007. (VII.27.) FVM regulation**

Deployment of non-arboreal energy plantation

**72/2007. (VII.27.) FVM regulation**

Deployment of arboreal energy plantation

**88/2007. (VIII. 17.) FVM regulation**
Revised: 118/2007. (X.17.)

Afforestation of agricultural land

**Agricultural and forestry byproducts**

**78/2007. (VII.27.) FVM regulation**

Agricultural energy supply from renewable energy (biomass furnaces for site energy supply)

**26/2007. (VII.27.) FVM regulation**

Procurement of machines and technological equipments (deployer and planter, disintegrator, bailer, pellet and briquette-maker machines)

**KEOP 4. – 5.** Renewable energy-based electricity and heat production, own energy consumption for electricity and heat production, building-energetics improvement, modernization of heating energy sector etc.

# Solid biomass efficiency: Thinking in product-line

# 27/2007. (IV.17.) FVM regulation

# 92/2007. (VII.24.) FVM regulation

The support of modernization of agricultural holdings from NHRDP, combined biogas production

## AIM

Adequacy to Nitrates Directíve

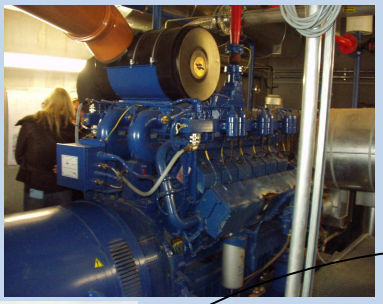
The support if income-producting investment

Combined heat and electricity production for own purposes, consumption and sales

Heating of greenhouses, foil houses, plants and supply with electric energy

Creation of economic investments

Creating conditions of the combined smaller bioethanol plants for positive energy (min. 50% renewable)



**<u>HUNGARIAN MODEL</u>:**

**Small-scale bioethanol plant+**

**biogas (animal and vegetable byproducts) +**

**Pellet and feed production (DGS + straw or hay)**

# Summary

## Results of the above mentioned volumes and developments

a) $CO_2$ emission moderates (2260 t/GWP/year);

b) The county's energy (gas and oil) dependence is decreasing (736 000 KOE/year);

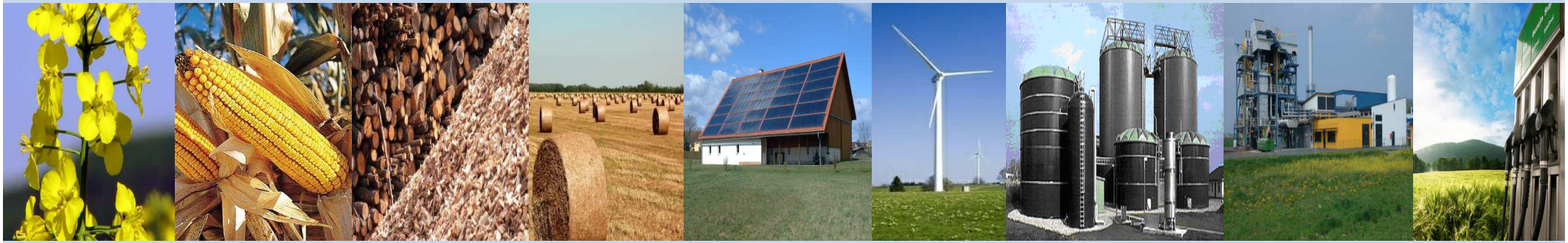
c) Contribution to comply with the EU's observances (5,75%; 5,75%+export);

d) Diversification of the structure of the agricultural production comes true (900000 ha), the grain surplus can be converted into marketable product (2,8 million t/year);

e) The local government and agricultural sector equally become effective and operable;

f) The rural employment-rate improves

g) Contribution to the accomplishment of national economic aims, increases the GDP, the general technological level, new industry may develop, repairs the balance of payment (with 281,32 million €/year).



# Thank you for your attention!

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