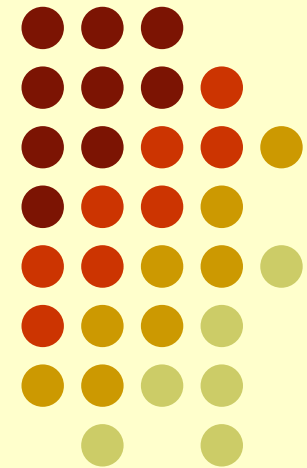
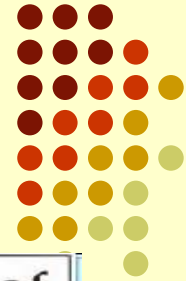


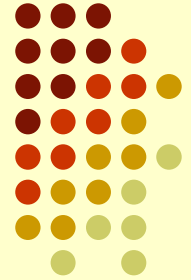
Biofuels in Ukraine: how to make them work

Toronto
Sep 27 2007



I. General information



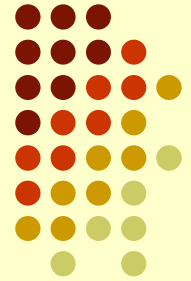


Annually Ukraine needs

- 35-40 mln tones of oil;
- 92 bln cubic meters of natural gas;
- 30 mln tones of imported coaking coal.
- Domestic resources can satisfy not more than 45% of energy need

- BUT Sufficient resources of coal and certain components of nuclear fuel, and surplus capacities for oil transport and electro energy export.

II. Dependence on external sources of energy



Energy dependence is similar to other European countries, but Ukraine relies solely on Russia for its additional energy needs.

Ratio of energy dependence on imported energy in 2000-2004:

EU - 51%

Austria – 64.7%

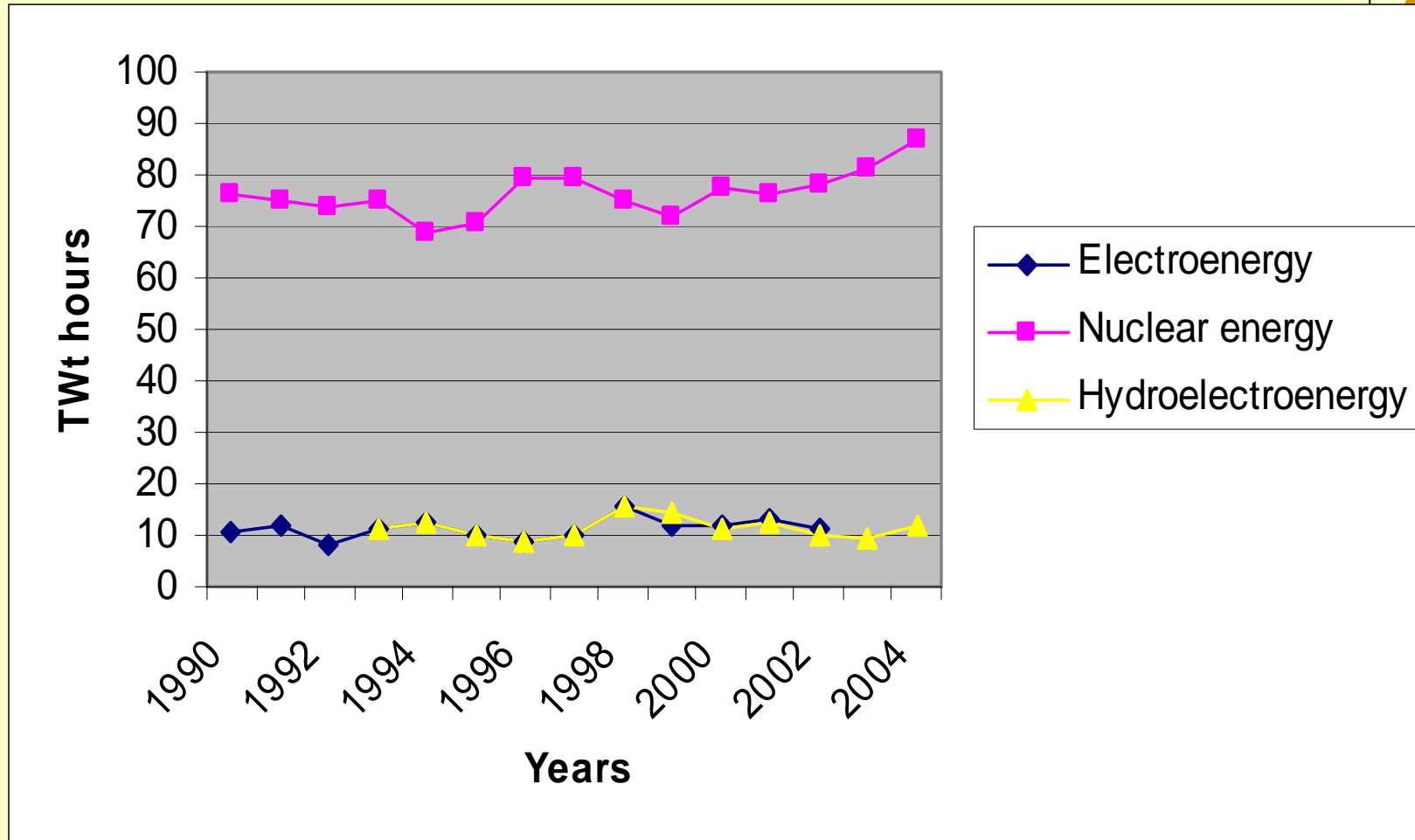
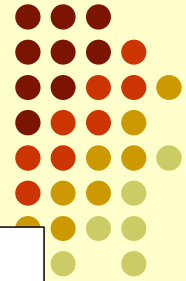
France - 50%

Germany – 61.4%

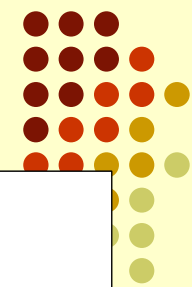
Italy - 18%

Ukraine – 60.7%

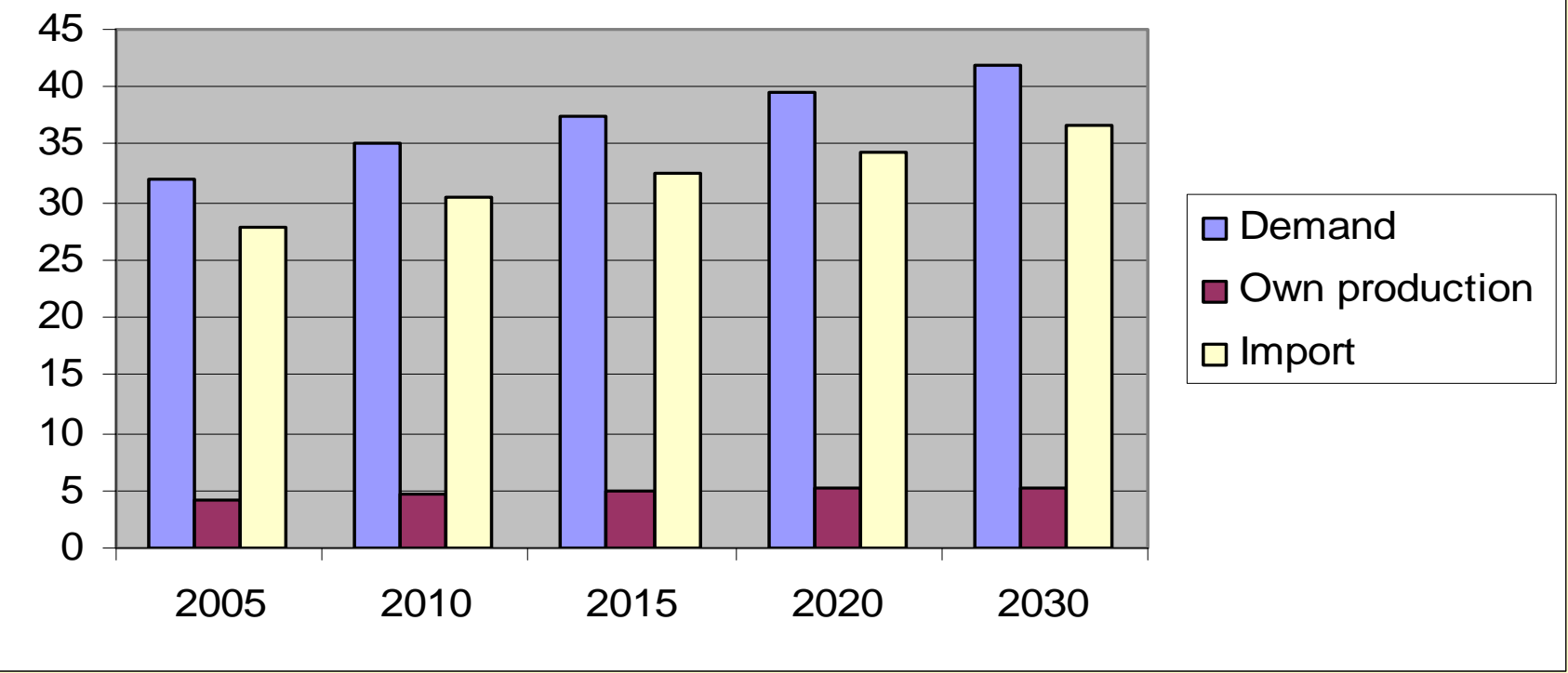
Energy Consumption in Ukraine, 1990-2004



Source: Energy resources and flows. Shydlovsky A. 2003 (ukr.), State Committee of Statistics

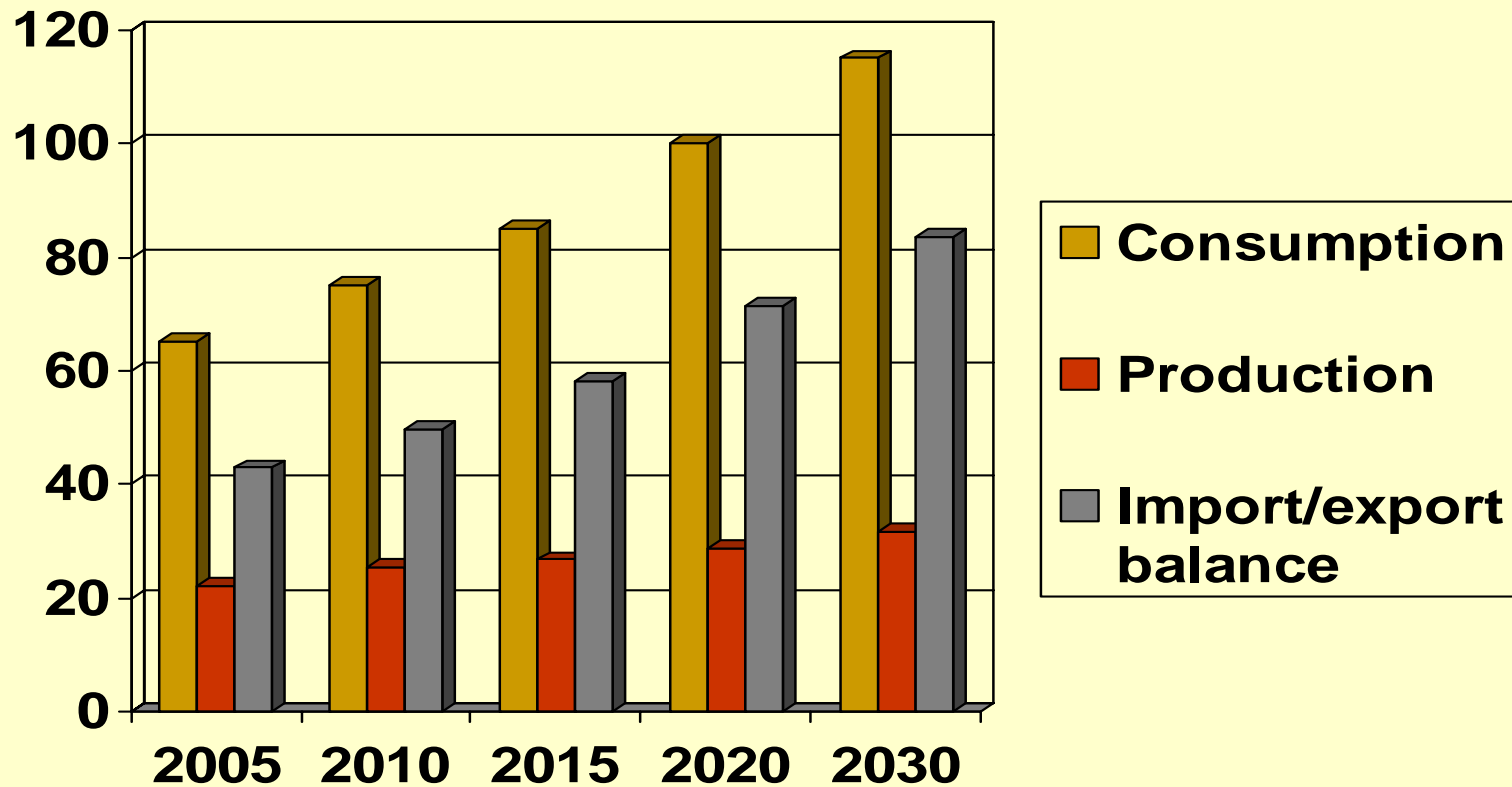
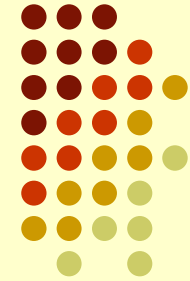


Ukraine: demand for oil till 2030, M tones



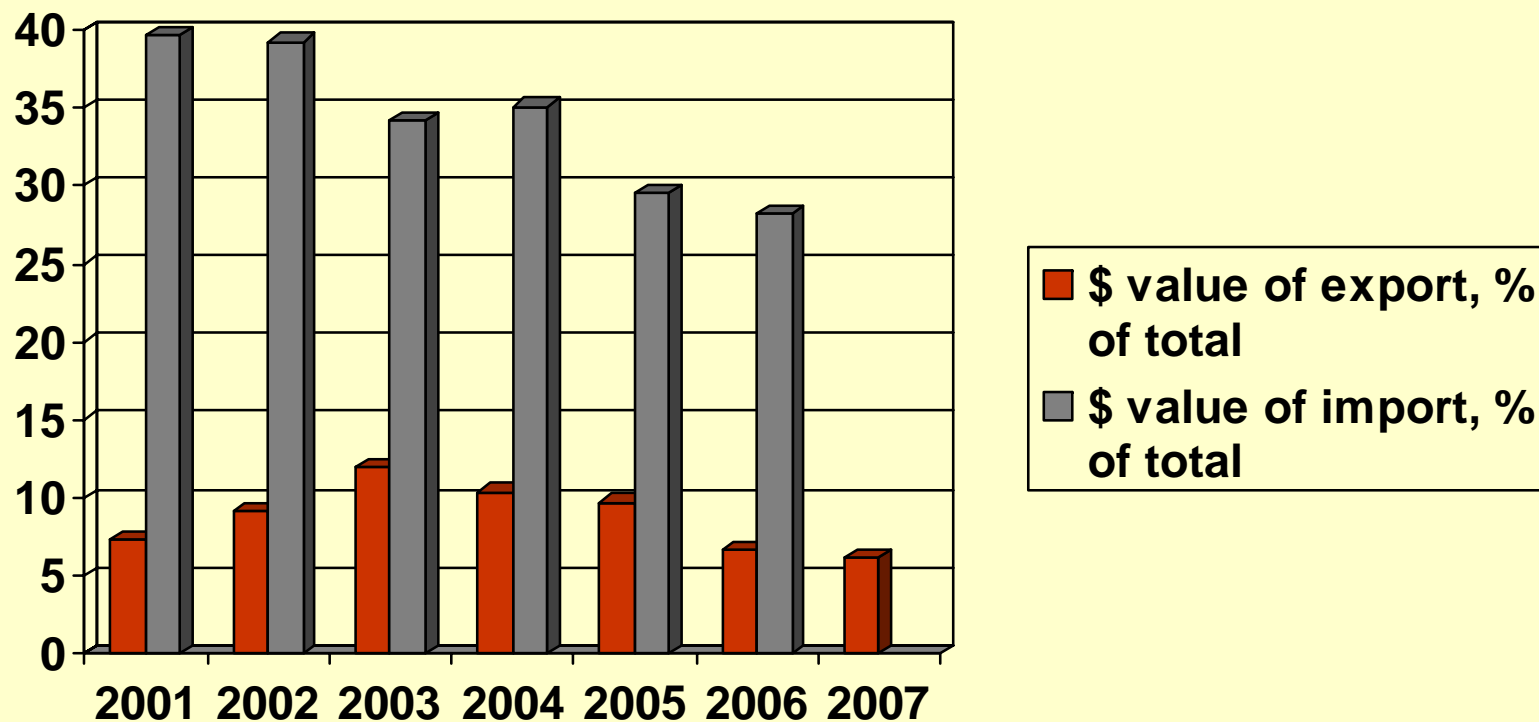
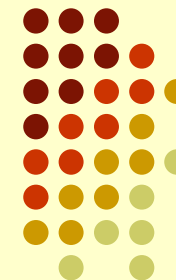
Source: Energy resources and flows. Shidlowky A. 2003 (ukr.)

Ukraine: natural gas demand till 2030, B cubic meters



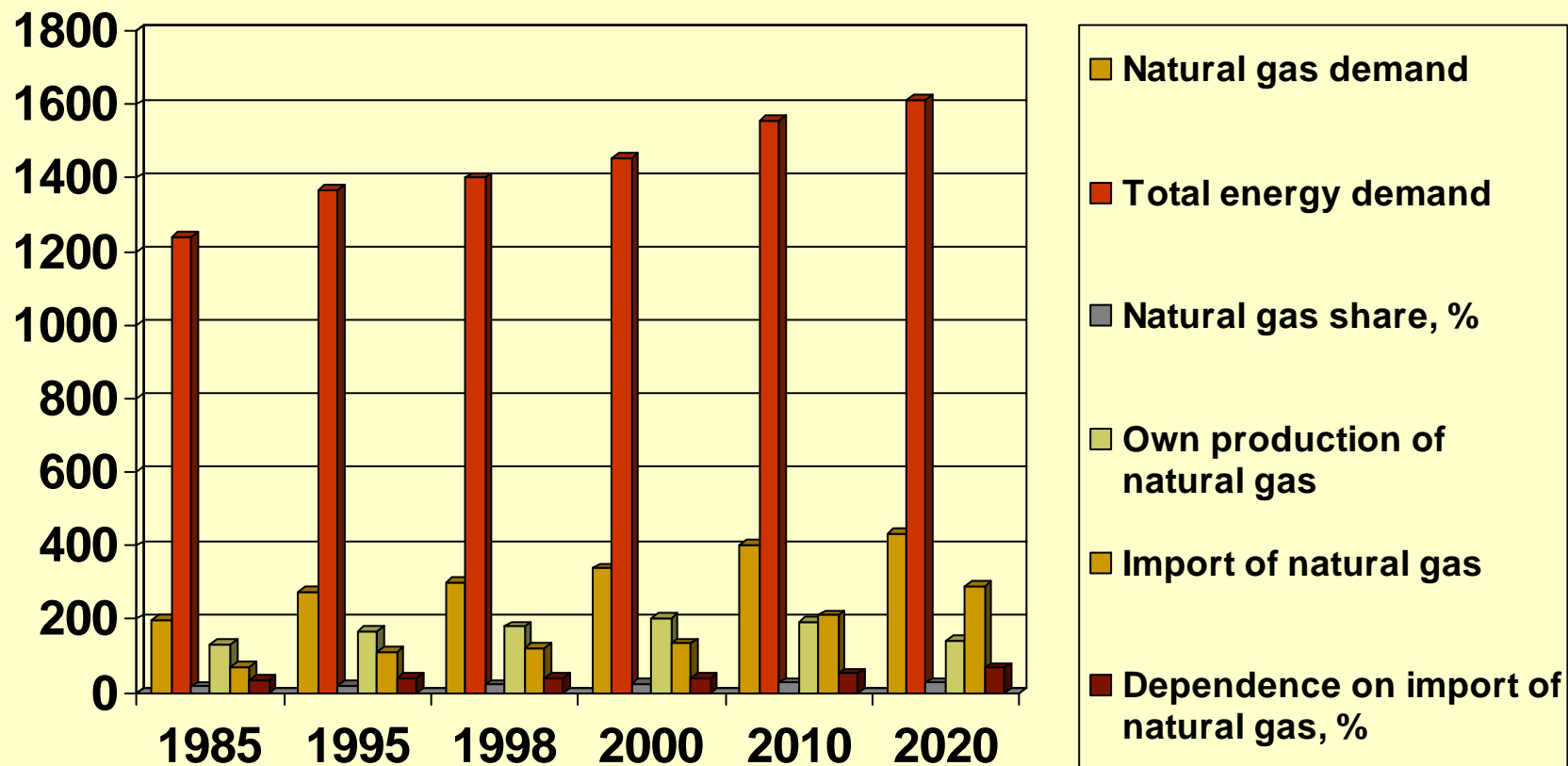
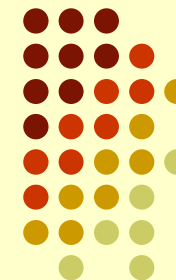
Source: Energy resources and flows. Shidlowsky A. 2003 (ukr.)

Dynamics of energy export/import in Ukraine

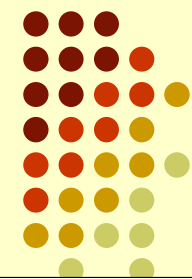


Source: State Statistics Committee of Ukraine

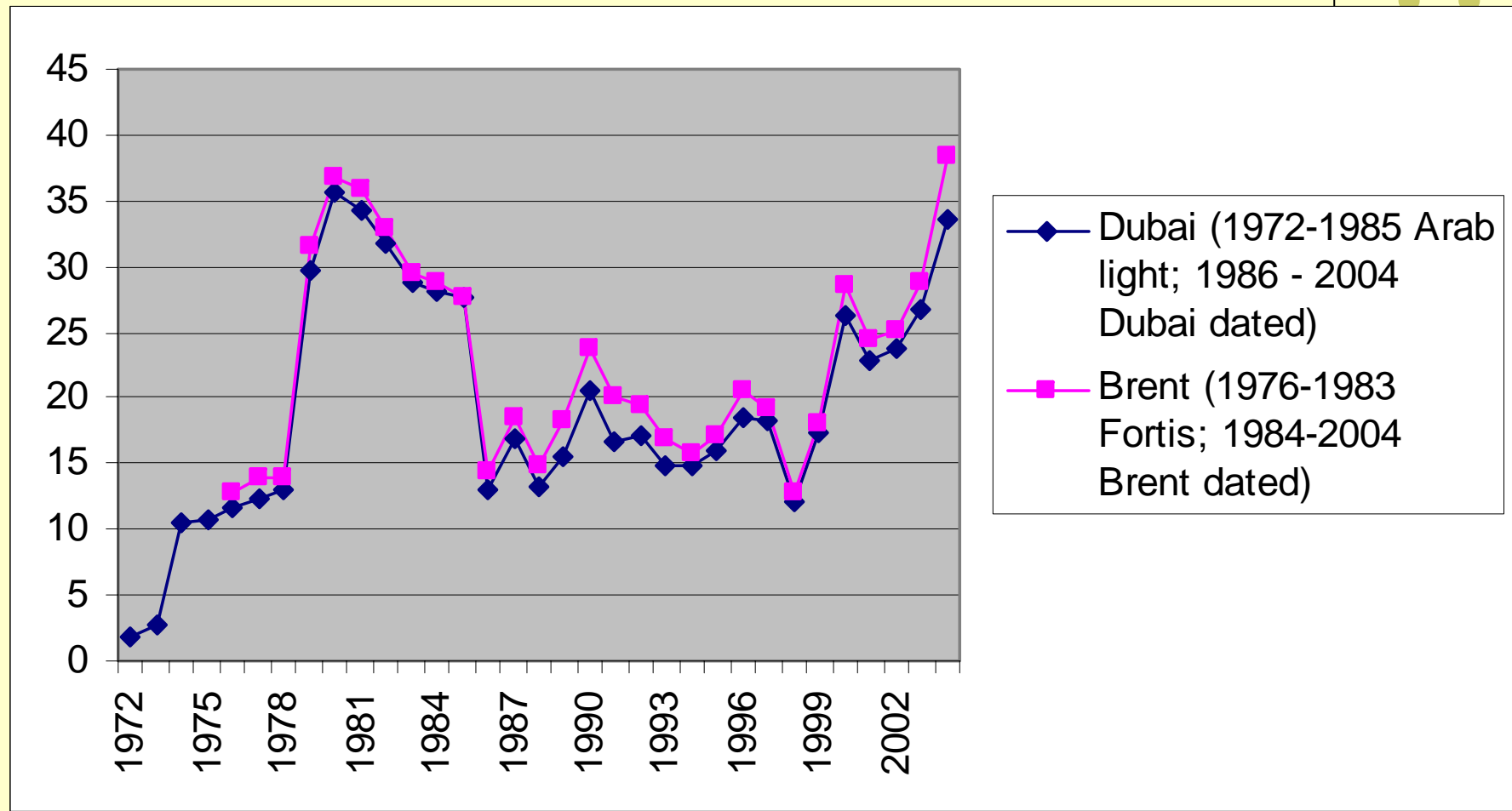
Forecast of Eurocomission about change in energy balances of EU countries in 2000-2020 (mln t.o.e.)



Source: Energy resources and flows. Shidlowsky A. 2003 (ukr.)

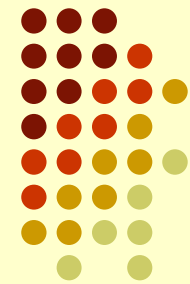


Prices for oil, \$/barrel (1972-2004)



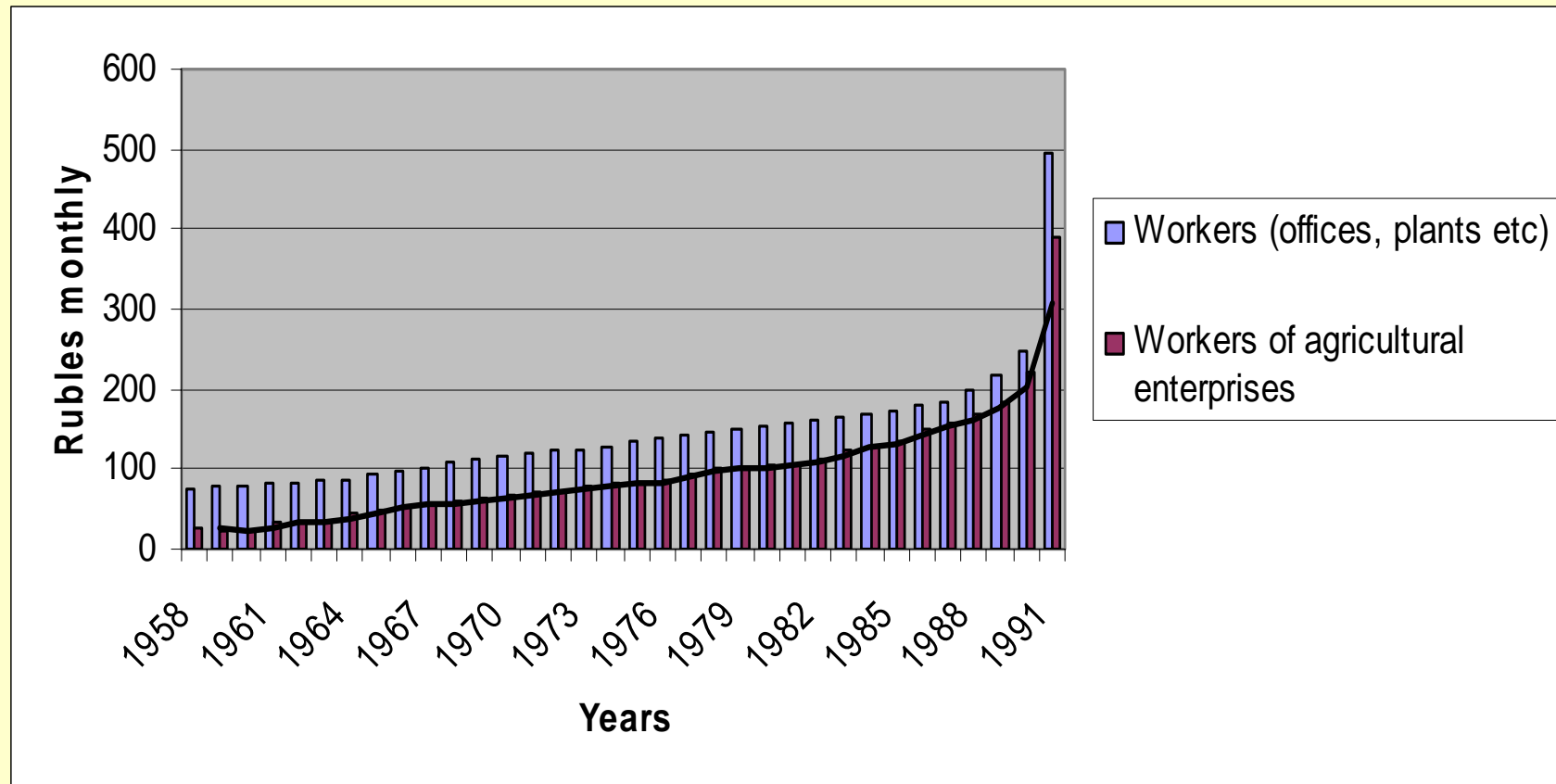
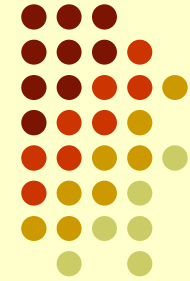
Source: Energy resources and flows. Shidlowky A. 2003 (ukr.)
State Statistics Committee of Ukraine

III. Brief overlook of situation in rural areas



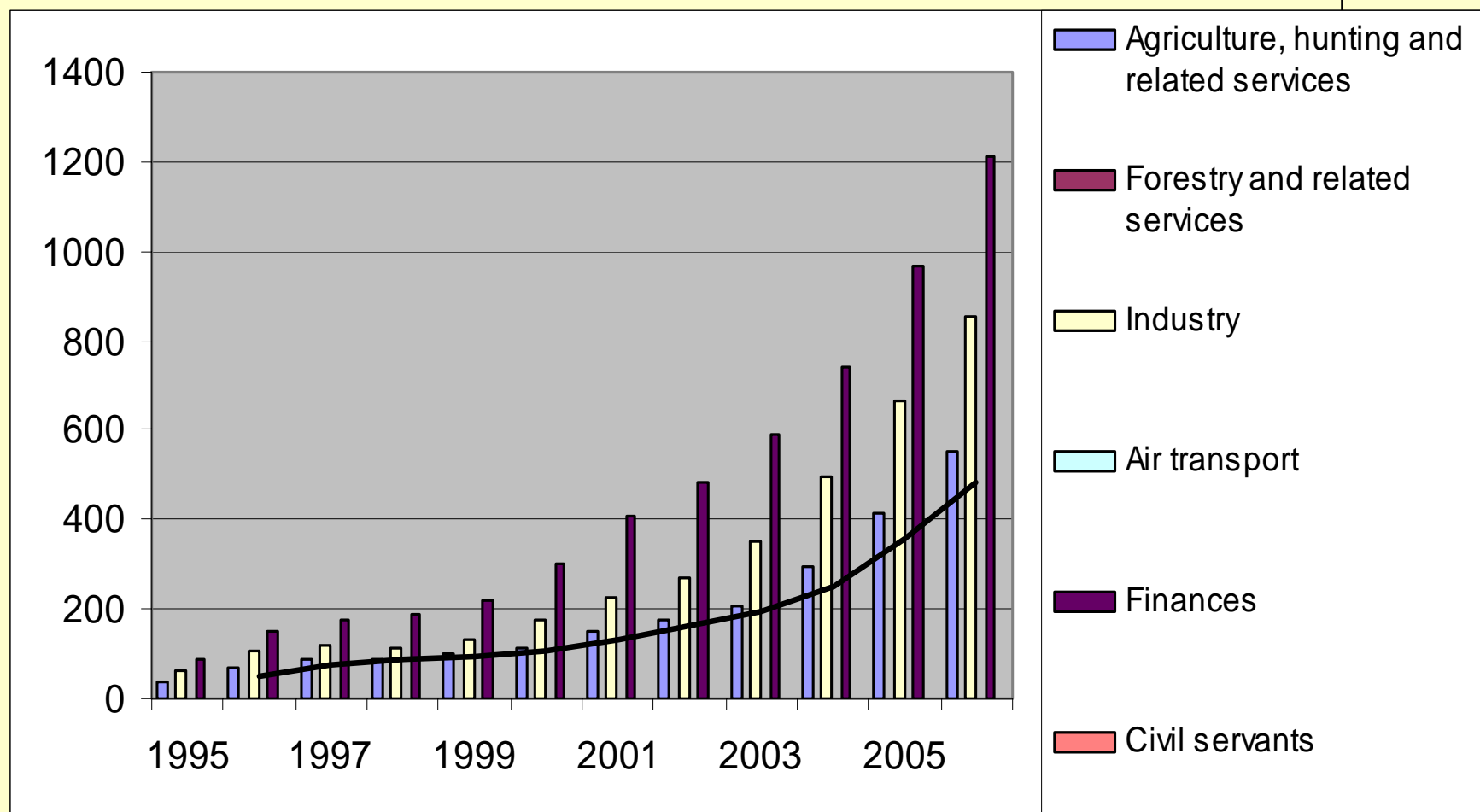
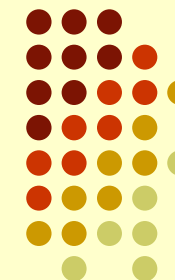
- Rural population in Ukraine (32.8%) has lower educational level (32.5% less than for urban population), low social activity level, mainly due to poor economic conditions.
- Vicious circle of poverty, unemployment, migration to urban areas, short life expectancy (65-67.8 years). 54% of rural population is below poverty line.

Average monthly salary per person in USSR in 1958-1991



Source: www.ukrstat.gov.ua

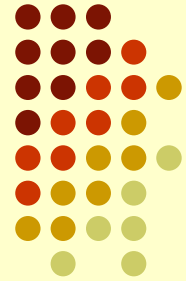
Average monthly salary per person in 1995-2006 for different types of activities, UAH



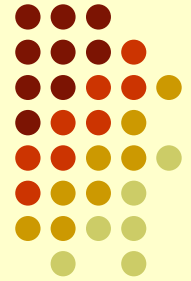
Source: www.ukrstat.gov.ua

For agribusiness to flourish, the following changes are required:

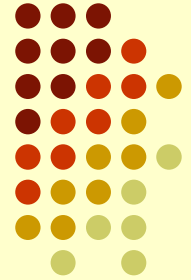
- Change of property rights
- Renewal of agricultural production methods
- Safe use of existing agricultural technologies
- Forming the principles of business relations in agriculture with respective investments
- restructuring of agricultural enterprises
- Increase of educational level



IV. Renewables in Ukraine will grow if:

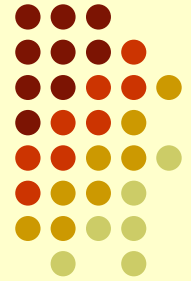


- **State/government** creates legislation, provides system of incentives and technology
- **Energy producers** have relatively stable environment and legislation
- **Investors** see stable markets and favorable conditions for investments



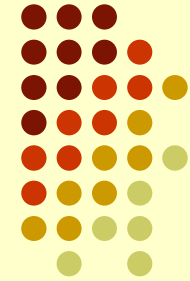
- **Renewable energy traders** need respective legislation in place, secure demand for their product
- **Producers of raw materials** – need high crop yields/high amounts of waste resources with possible prospect to increase price of these raw materials
- **R&D work** is supported
- **NGOs** (spread info and initiatives, provide consultancy)
- **Consumers (households, business etc)** – have secure, reliable and safe energy supply at competitive price

Biomass



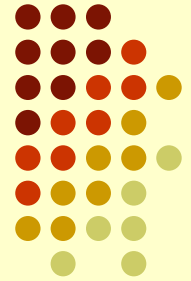
- Ukraine has sufficient energy potential of all kinds of biomass to replace up to 15% of its energy needs
- Energy potential of biomass strongly depends on level of economic activity.

Main Barriers to increasing bioenergy use in Ukraine



- LEGISLATIVE: no efficient state program of bioenergy development
- FINANCIAL: expensive equipment + lack of own firms' fund for its purchase + expensive bank loans + high transaction costs
- undeveloped domestic market of bioenergy equipment (no producers of biogas plants, and the only monopoly producer of straw-combustion boilers)
- TECHNOLOGICAL: for ex, lack of Ukrainian producers of biomass boilers with capacity more than 1 MWt, and no steam boilers, operating on biomass
- INFORMATIONAL barrier

Biofuels

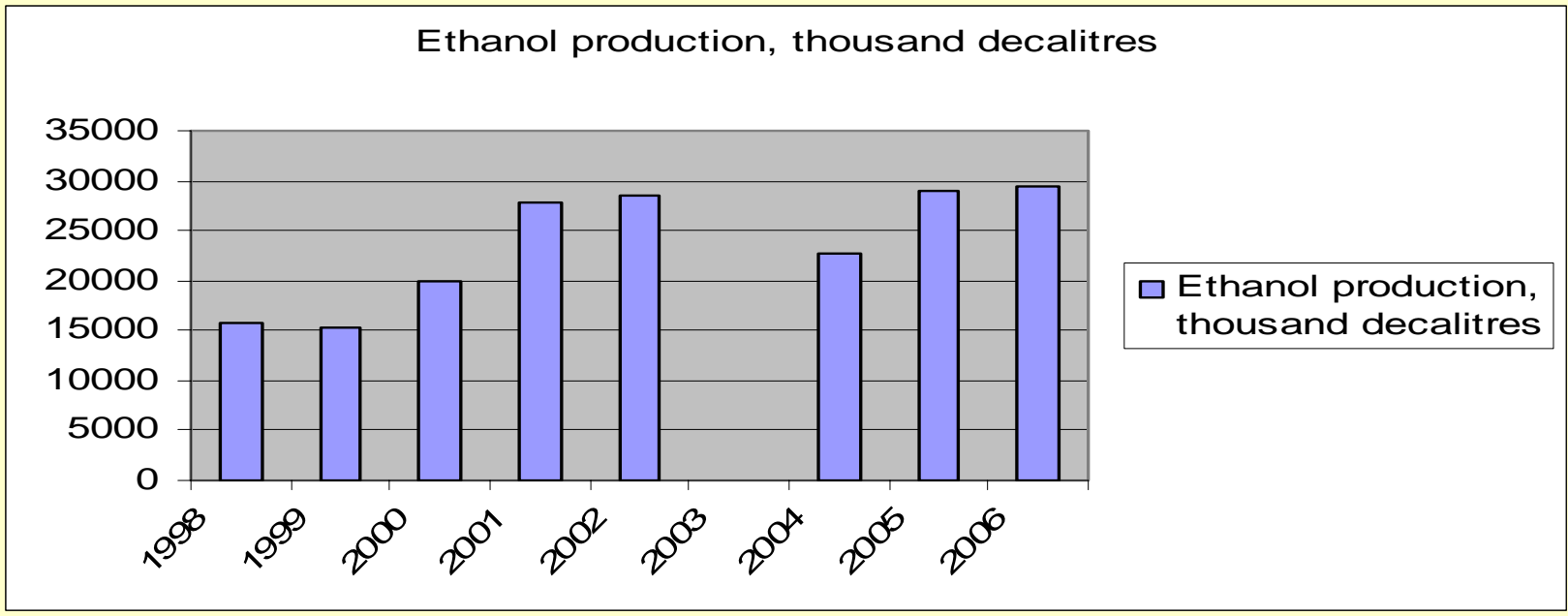


- State monopoly for spirit production - Ukrainian State Concern of Alcohol and Liquor Industry “Ukrspirt”.
- "Ukrspirt" = 84 distilling plants, annually producing 62 mln decalitres of alcohol, 28 072 tons of ethanol.
- Ethanol is licensed to be produced by 66 firms, among which 61 belong to «Ukrspirt».

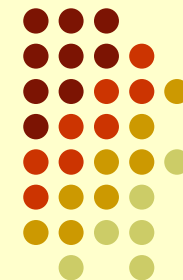


Even with growth in ethanol production, in 2005 production facilities were running only at 49% capacity. Production is seasonal.

Bioethanol can be produced at existing sugar refineries during their idle periods (7 months per year) if additional manufacturing lines are supplied

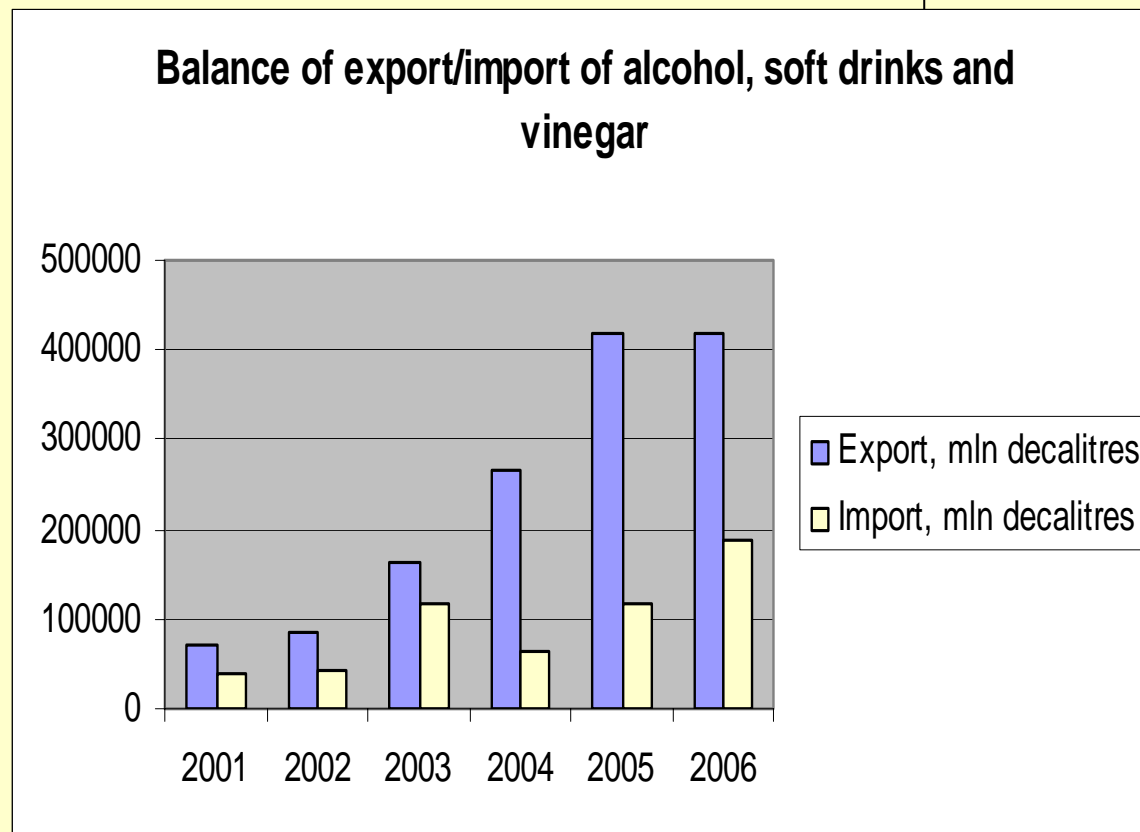


Source: www.ukrspirt.com

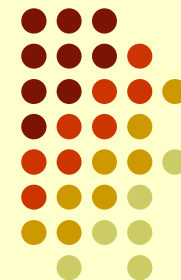


Half of ethanol is exported.

Surplus of production capacities leads to significant shady production of alcohol.

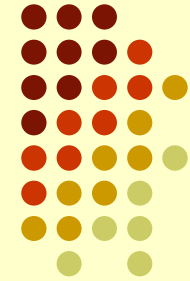


Source: www.ukrspirt.com



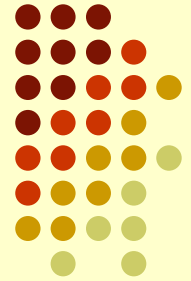
- If one substitutes 10% of petroleum oil by bioethanol, than domestic market of bioethanol can be 200-250 thousand tons a year.
- Estimated market value of fuel additives in Ukraine is \$150-\$200 mln annually.

Main barriers to increasing biofuels use in Ukraine



- **LEGISLATIVE:** no standards and certification system + internal market not protected against import + monopoly of “Ukrspirt”
- **FINANCIAL:** Biofuels are still more expensive (even though 80% of their cost is the cost of raw material) + Undeveloped economy with high risk and uncertainties for investors + No budget financing + undeveloped system of biofuels supply + high transaction costs
- **TECHNOLOGICAL:** risks of raw material supply (quality, quantity) + expensive imported equipment
- **INFORMATIONAL** barrier

Existing sugar refineries require modernization

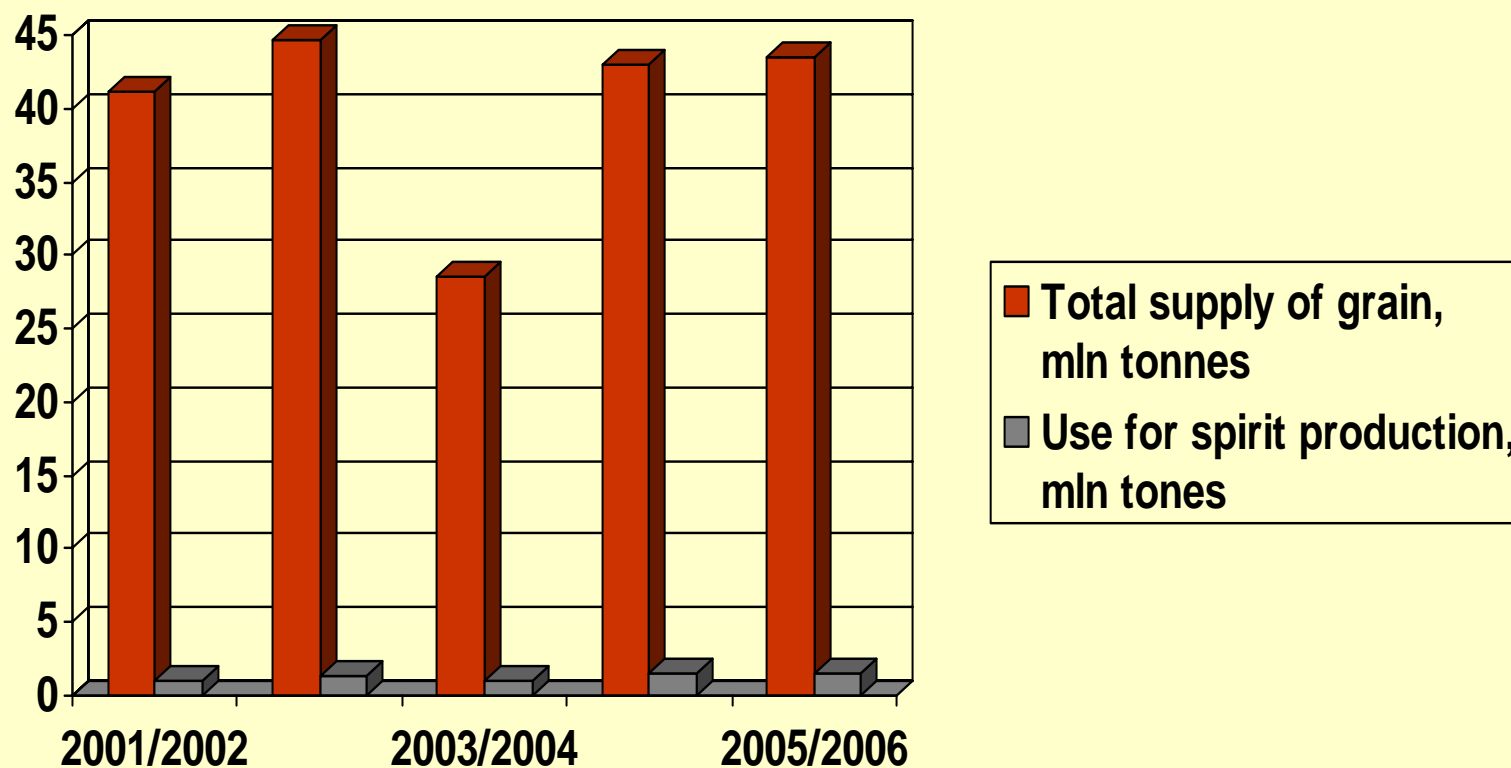


For bioethanol production it is needed spirit oxygenate, production of which is suspended now.



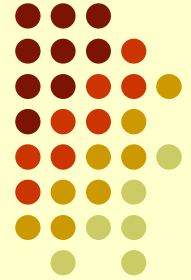
Main stock materials for production of spirit are grain and treacle (by-product of sugar production).

About 3-3,5% of market grain supply (1-1,5 mln tones) are used for spirit production.



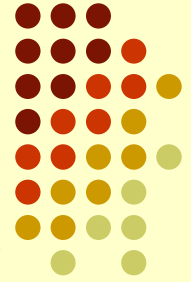
Source: www.ukrspirt.com

High-octane additive to gasoline

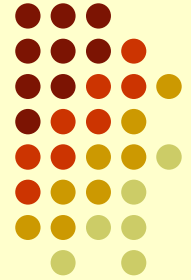


- 1998: started to manufacture high-octane additive to gasoline (60 thousand tons/year, and for vehicles number of 2002 it was needed 250-300 thousand tons a year).
- In 1998 it was sold 23.7 thousand tons, in 2003 – 22.6 tons, in 2004 – 3.3 thousand tons
- 2003: increased production of gasoline additive, but were still not meeting demand
- 2004: excise tax increased, production of additive stopped

BIO 100



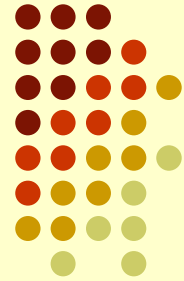
- **Dec 2006 - April 2007** «Bioenergy company» was selling BIO 100 at 20 filling stations in Kyiv, Odessa, Chernivtsi and Dniepropetrovsk regions.
- **No legislation, allowing use of biofuels and their retail sale**



Since April “Ukrspirt” stopped production of component of this biofuel – spirit oxygenate.

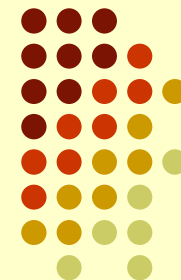
“Ukrspirt” claimed its own production of similar biofuel (but it didn’t happen). As the result, “Bioenergy Company” moved its production back to Moldova, where they launched experiment and production of BIO 100 in 2005.

Governmental promotion of bioenergy crops production



1) **Subsidies** to agricultural firms producing bioenergy crops, \$ per hectare

Crop	2006	2007
Soybean		10-16
Winter rape	20	10
Rape	13	10
Winter wheat, winter triticale (hybrid of wheat and rye), rye		20
Pea, buckwheat, switch-grass		16
Fiber-flex		30
Hemp		130
Wheat, triticale		20
Winter barley		11



2) Favorable financing (low bank rates) for agricultural firms and for sugar refineries

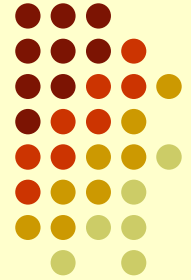
3) Partial crop insurance (50%). Risk factors - water flooding, landfalls, fire, earthquake, **frostkilling, dry weather** etc.

Several types of insurance programs based on

a) crop yield index and weather index

b) insuring against one certain risk factor

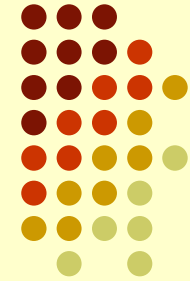
c) multirisk insurance – two and more risks.



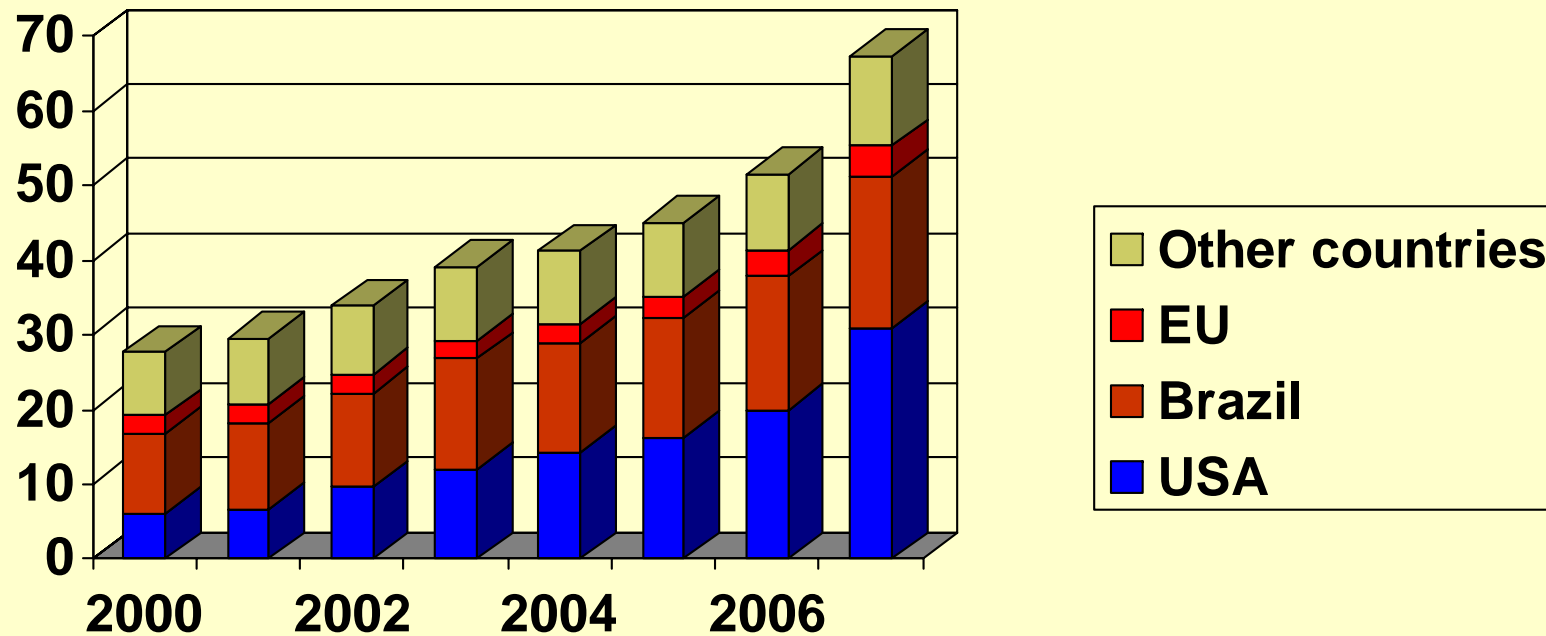
Subjects to mandatory insurance - sugar beet and wheat.

- Crop yield insurance has high risk rate;
- Government subsidized insurance is not well advertised;
- high cost of insurance;
- complicated beurocratic procedure of obtaining coverage money from state budget;
- moratorium on buying/selling land, thus agricultural producers can not provide their land to the bank as collateral for gained loans;
- Small number of insurance companies in regions.

V. International trade

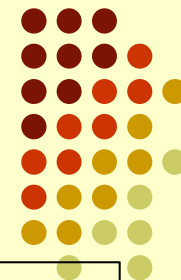


World production of ethanol, mln cub meters

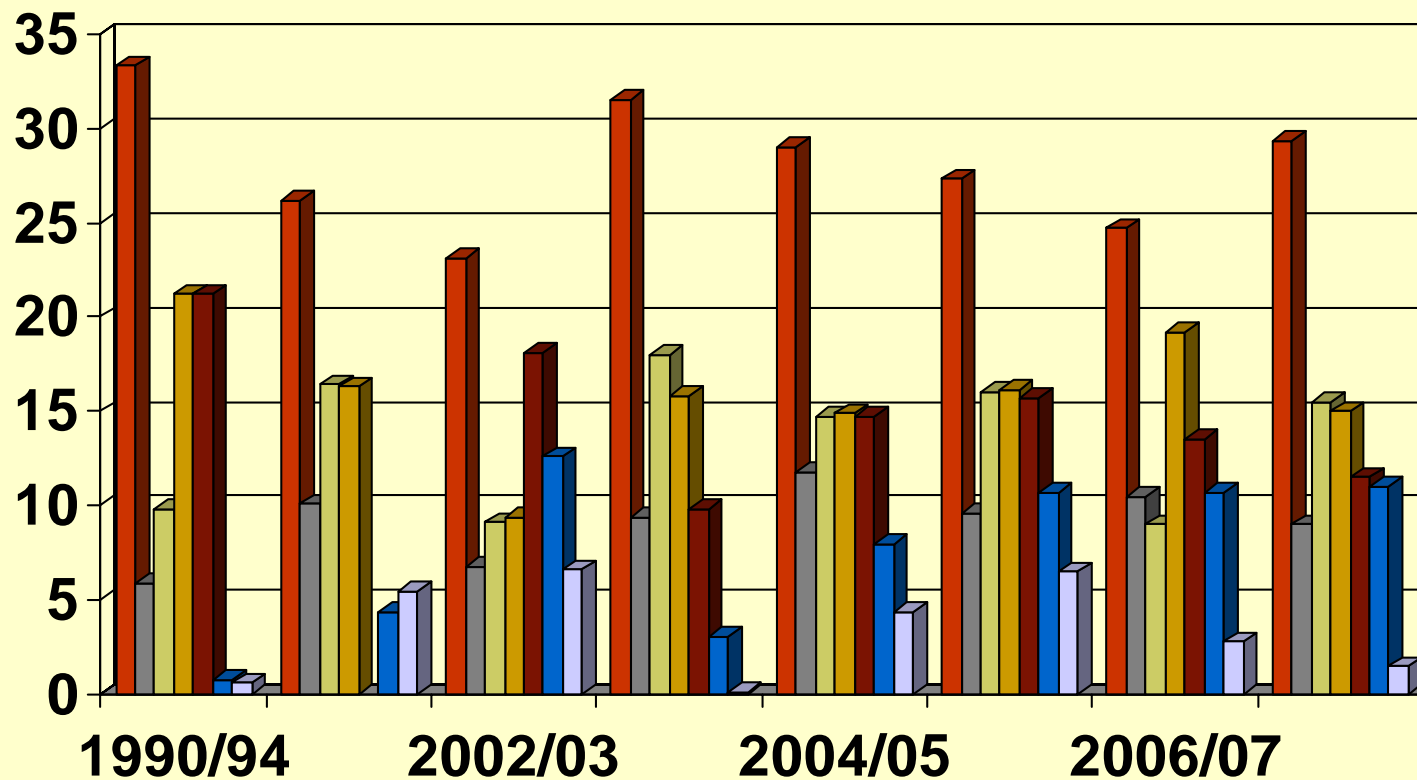


Source: www.acti.de
(Toepfer)

World Wheat Exports (mln tons)

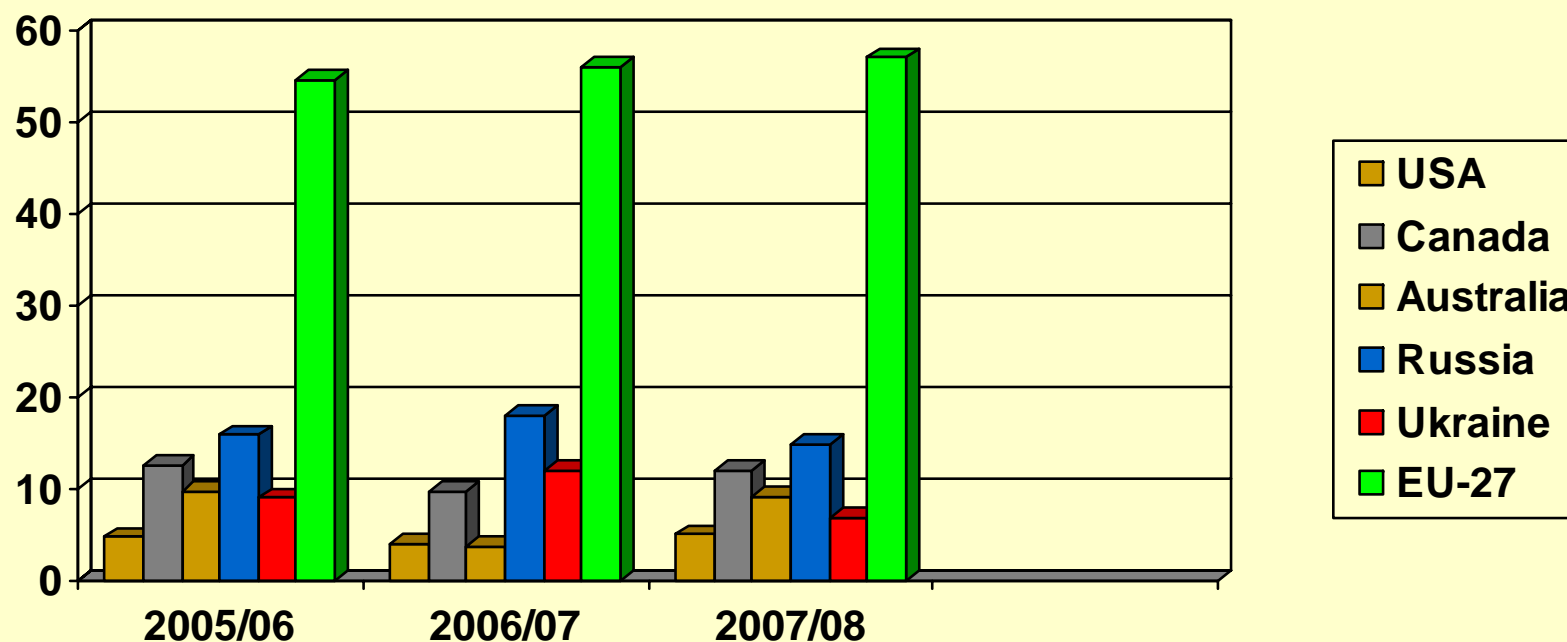
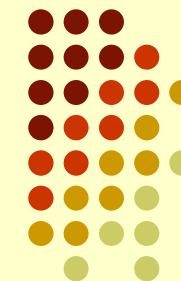


USA Argentina Australia Canada EU (w/out intra trade) Russia Ukraine



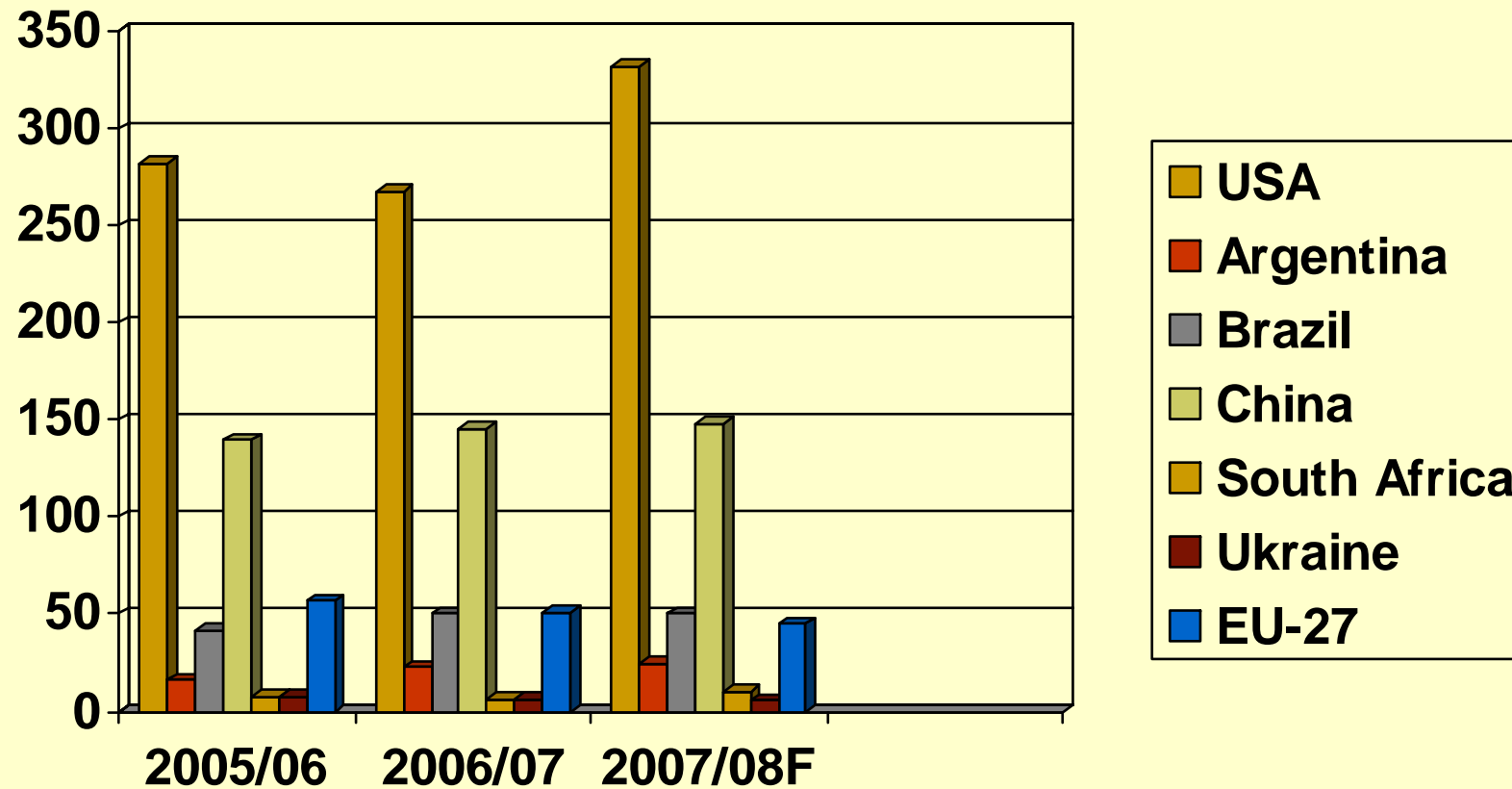
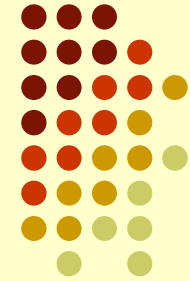
Source: www.acti.de
(Toepfer)

World barley production, mln tons

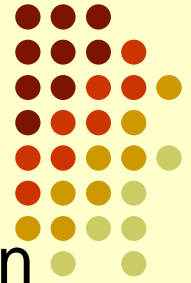


Source: www.acti.de
(Toepfer)

World corn production, mln tons

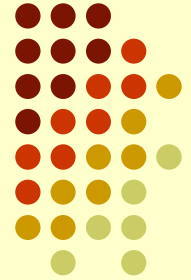


Source: www.acti.de (Toepfer)



- Ukraine may become one 5 largest rape producers in the world in 2007 after EU, China, Canada, India, and overcoming Australia and Russia.
- The long-term consequences of converting large amounts of land for the production of soy and rape are unknown
- It is planned to use land in Chornobyl for production of rapeseed starting 2008
- By 2010 it is planned to assign about 2 mln ha (out of 26) for production of bioenergy plants (mostly rape)

EU mandated biofuel use

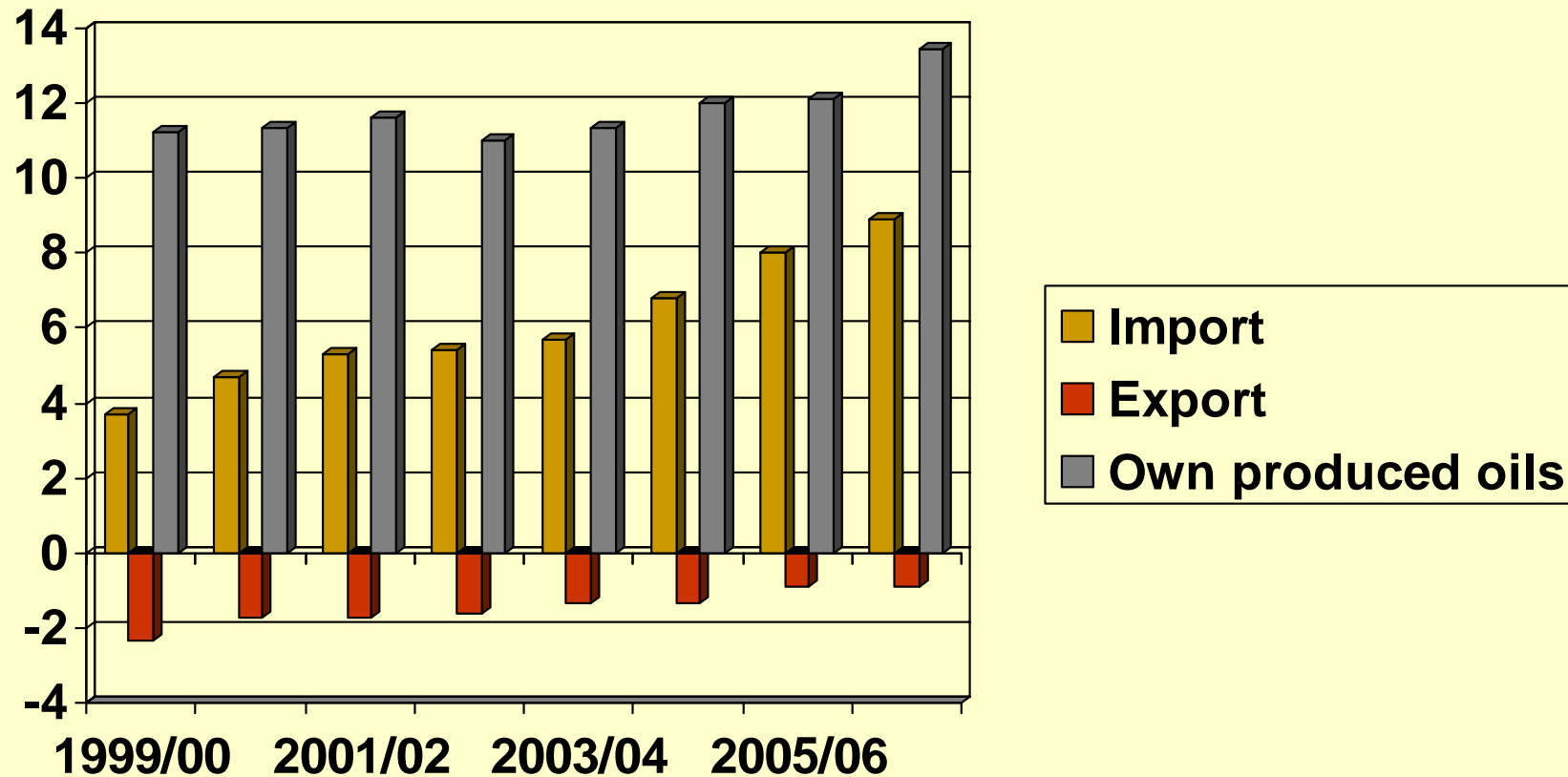
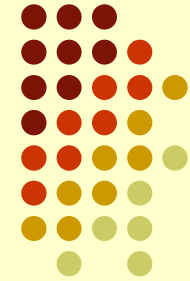


- **2 % by 2005**
- **5,75 % by 2010**
- **20 % by 2020**
- **10% by 2020**

Tax exemptions for import of “pure” biofuels

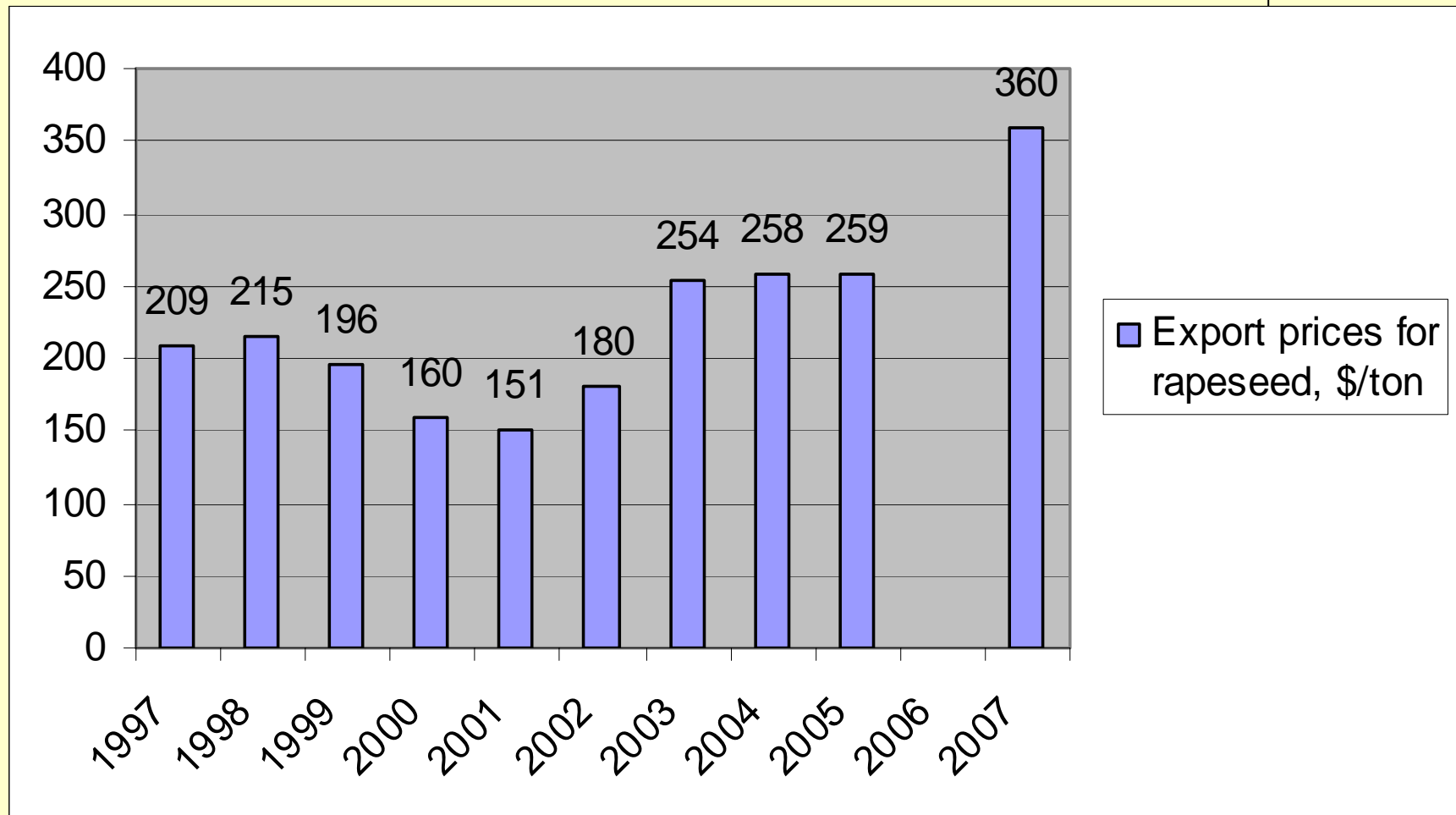
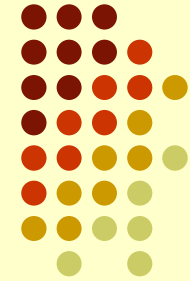
**Low excise taxes for Ukraine for import raw materials for biofuels
(0 to 6,5%)**

EU import/export of oils (rape, sunflower, soybean) and their use, mln tones



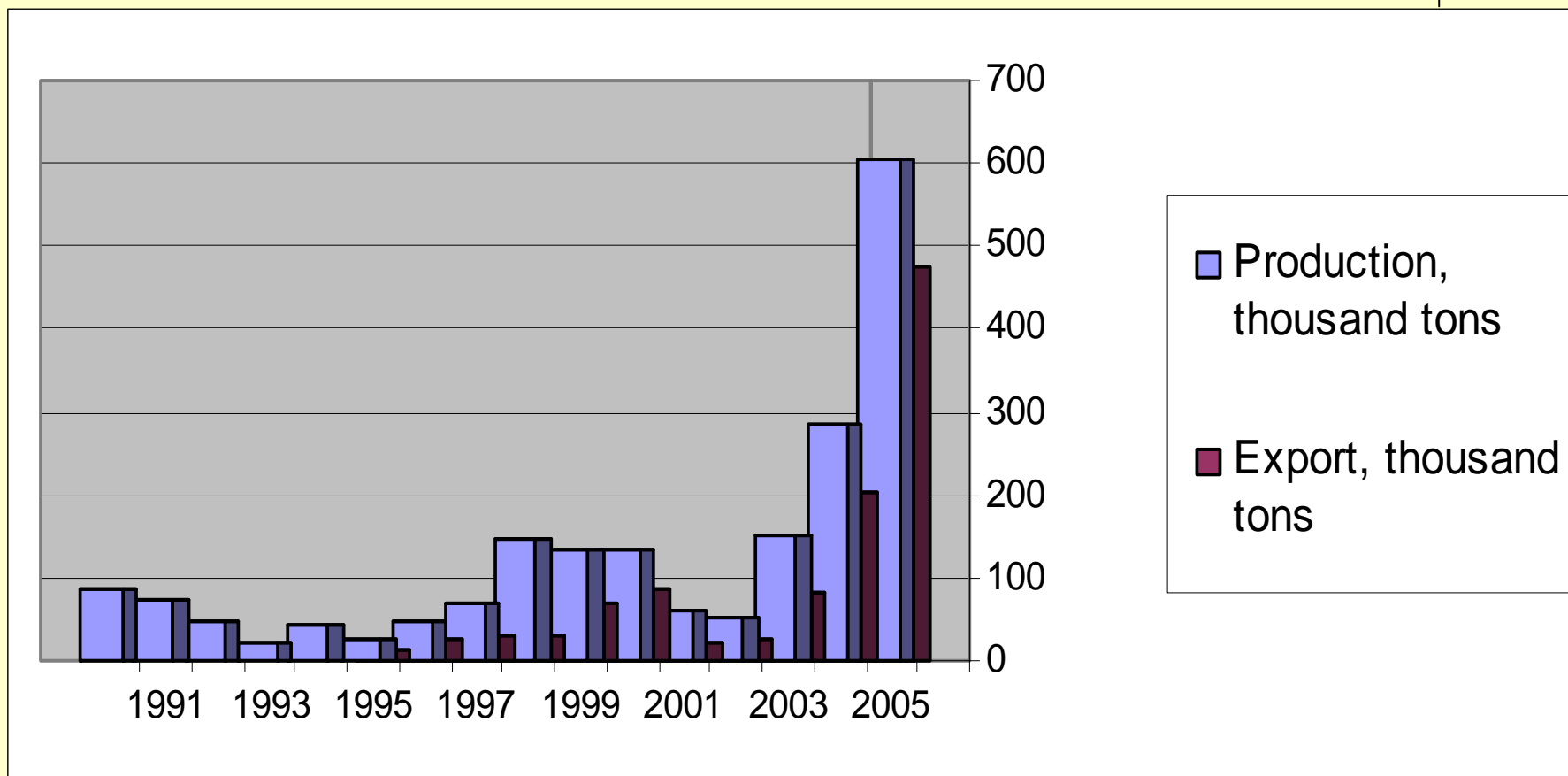
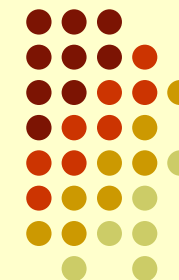
Source: www.acti.de
(Toepfer)

Ukraine: export prices for rapeseed, \$/ton



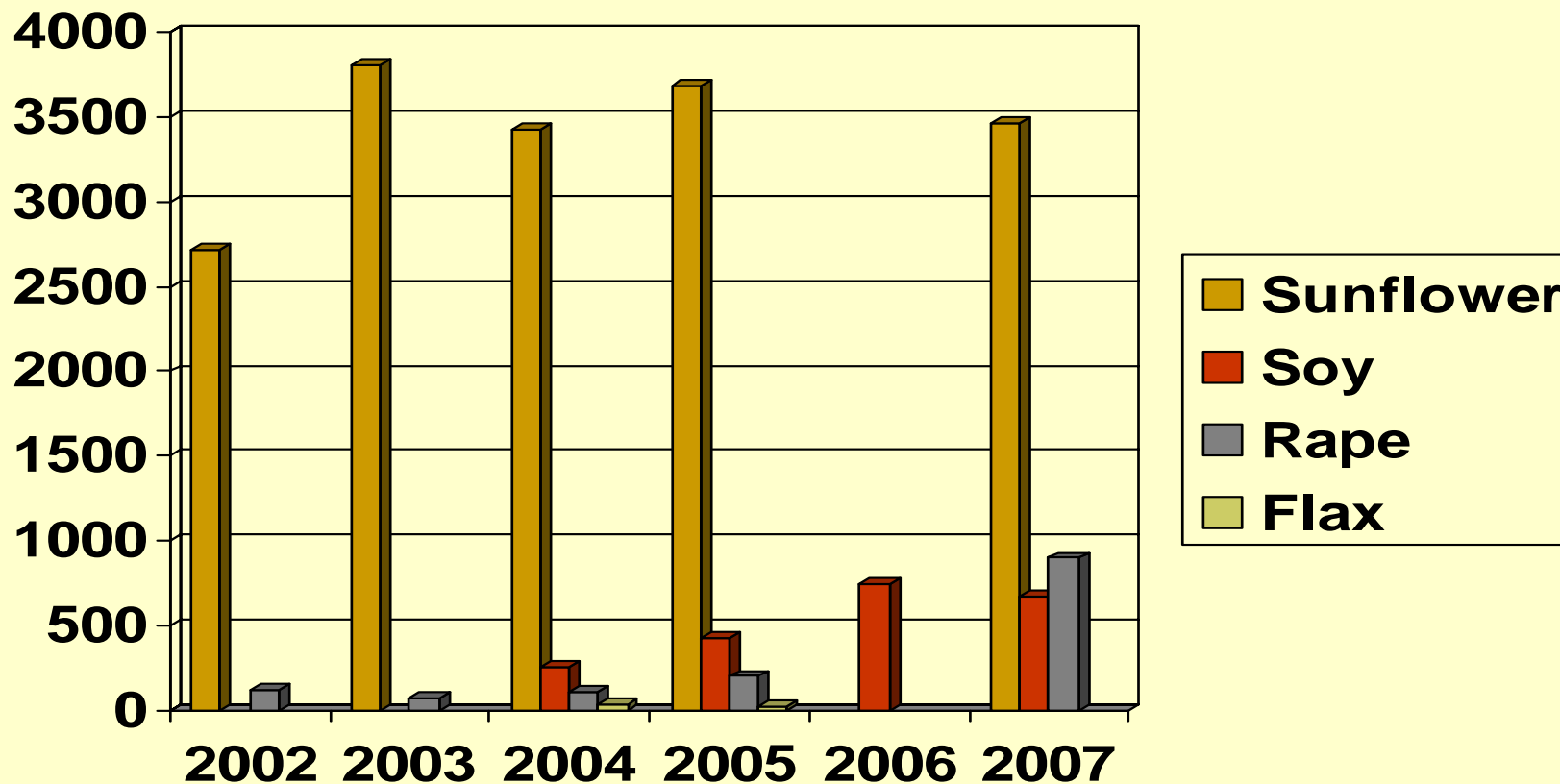
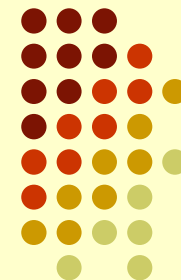
Source: www.acti.de (Toepfer)

Production, export of rapeseed in Ukraine



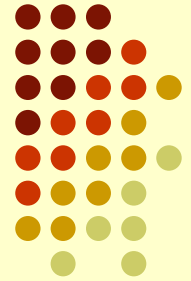
Source: www.acti.de (Toepfer)

Area for planting main energy-crops in Ukraine, thousand hectares



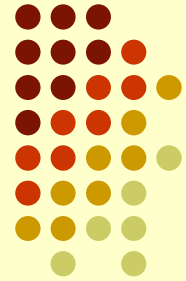
Source: State Committee of Statistics

VI. State regulation of renewables is done through:



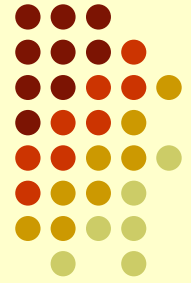
- Provision of permits to produce renewables;
- Development of standards for production, transfer, transportation, storage of renewable energy;
- Setting of prices for electro- and heat energy from renewables;
- (legislative) support of R&D;
- Support to entrepreneurship by subsidies, tax incentives;
- Support to producers of equipment, that uses/producers renewable energy;
- Create attractive environment for investments

Legislation on renewable energy



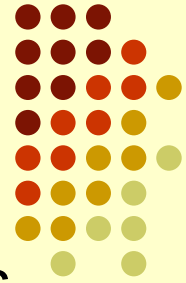
- Law “About state regulation of production and use of ethanol, cognac spirit, alcohol and tobacco” (1995);
- Program of state support of renewable, small hydroenergy and heat energy (1997);
- President’s Decree “About launching of production of mixed benzenes” (1999) about use of oxygenated additive;
- Law “About alternative liquid and gas fuels” (2000);
- State Program “Ethanol” (2000);
- Law “About custom on high-octane oxygenated additives to benzens” (2001);
- President’s Decree “About provision of state monopoly for production of spirit, alcohol and tobacco” (2002)
- Law “About renewable sources of energy” (2003);
- Law “About biofuels”(2003);
- Law “About combined production of heat and electroenergy (cogeneration)” (2004);
- Energy Strategy for Ukraine till 2030 (2006) (nuclear)
- State Program “Production of diesel biofuel” (2006)
- **Draft Law «About production and consumption of biofuels»**

Current practices



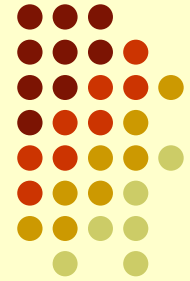
- According to Law Bioethanol is produced by **state-owned** refineries
- For the very few private companies who want to get licenses, they must own premise and equipment for full-cycle of production of ethanol
- Ethanol is taxed (last 7 years tax was increased from 30 to 60 euros per 1000 kg, and in 2006 it is decreased back to 30 euros)

Draft Law «About production and consumption of biofuels»

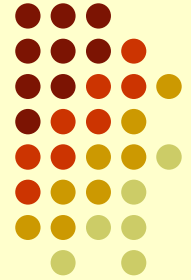


- Production of bioethanol by firms of ANY property rights
- VAT exemption for 10 years for producers of biofuels starting from 1Jan 2008
- Exemption of import duty and VAT for imported equipment, seeds, fertilizers till 1 Jan 2010
- Mandatory blending of biofuels for ALL VEHICLES (2008 – 5% and up to 100% in 2011) in cities with population more than 500 000
- Taxes for imported biofuels

State Program “Production of diesel biofuel” (2006)

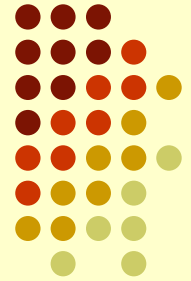


- Subsidies to producers of agricultural crops
- Development of zones for rape production
- Incentives for use of biodiesel by agricultural firms
- Setting up mandatory targets for increase of biodiesel production
- Development of standards for use of biodiesel
- 8% financial help for R&D and for modification of engines



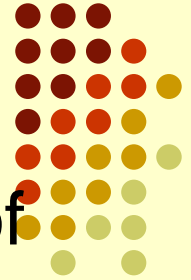
- Construction of 23 biodiesel plants at investors expense (total capacity 623 000 tons of methyl ethers of crop-based oils)
- Assuming these 23 plants meet production quotas, this will reduce agricultural oil imports by 50%

State Program “Ethanol” (2000-2010)



- Had to start at the expense of sugar refineries (owned by “Ukrspirt”)
- “Ukrspirt” plans to begin production of bioethanol by 2008
- “Ukrspirt” made similar claims in 2006 and 2007
- 3 large sugar refineries were designated for modernization, but it is a tiny portion of bioethanol need

Standards



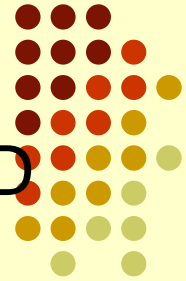
Standards specify data on consumer properties of product, ecological safety, safety for consumers health, production, trade, transfer, transportation, storage, fuel consumption.

These standards are the perview of Ministry of Fuel and Energy, but up to now there are no standards for biofuels developed an no international standards have been adopted

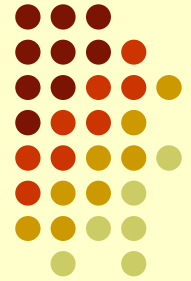
International trade?

Stimulation of demand

- increase of consumer awareness, education, R&D
- fossil fuel taxes, financial estimations of environmental risks
- international trade
- blending requirements to increase consumption
- programs to decrease price of renewables for consumers
- government purchases
- cooperation between producers of biofuels and car-manufacturers
- loans to potential users of biomass energy for buying equipment

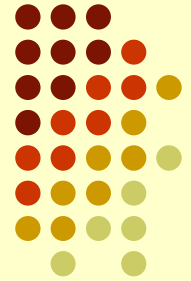


Stimulation of supply

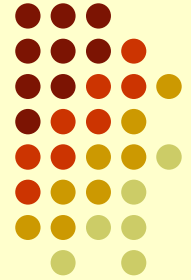


- General energy policy
- Excise tax exemptions
- Obligations and mandatory targets
- Calculation of hidden support to conventional energy
- Creation of general environment

Creation of general environment

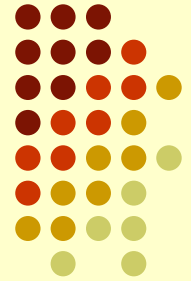


- **Market strengthening.** For development of entrepreneurship in this field, inflow of private capital and growth of technical potential **favorable economic environment** is needed.
- Growth of biofuels market has to be specified, which leads to capital and entrepreneurship growth, growth of competitiveness, technology transfer, creation of production infrastructure, reaching of economy of scale.



- **Acceleration of next-generation technologies**
- **Protection of resource base.** This may include protection of land capacity, water quality and biodiversity.

Possible ways for biofuels

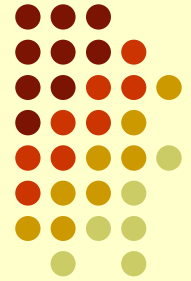


1) Domestic production, domestic consumption of biofuels

Features:

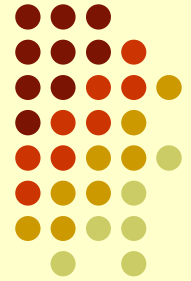
- rational and intensive ways of agriculture (obeying of all technologies of farming rotations, GMC (?) etc)
- new jobs in agriculture
- export – possibility in long run
- possible with foreign investments **ONLY**
- Use of by-products

2) Production of raw materials, export of biofuels, partial domestic consumption



Features:

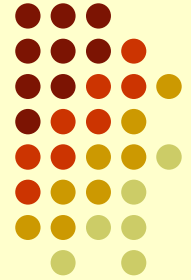
- *construction of biofuel plants by foreign investors (mostly EU)*
- *internal consumption of biofuels mostly for needs of agriculture*
- *trigger of technological problems of biofuels use*
- *new jobs in agriculture*
- *Use of by-products*



3) Production of raw materials and their export

Features:

- new jobs in agriculture
- risks of assigning too much land for biofuel crops
- Current European market favor production of raw materials, and processing remains expensive
- Export mainly to Poland, Germany, Baltic states



Thank you for your
attention

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