Foreign Trade and Energy Consumption

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Project financed by Polish Committe for Scientific Research:

"Analyses of economic and social impacts of changes in energy prices in the Polish Economy"

The project is run with the cooperation of Technical University of Łódź. Partners from TU are responsible for preparation of scenarios on possible changes in energy prices and energy consumption.

General concept of the model developed for the purpose of the project is described in: Boratyński J., Plich M., Przybyliński M., 2007, Modeling Economic and Social Impacts of Energy Prices in the Polish Economy, [in:] Plich M., Przybyliński M. (eds.), Recent Developments in INFORUM-type Modeling, University of Łódź.

The project is planned for 20 months.

The data

J. Boratyński prepared complete set of product by product i-o tables for the period 1995-2002 both in current as well as constant prices. This is the starting point for the model and foreign trade equations.

The data set will be extended untill 2005. Import and export time series will be additionally calculated back to 1985 for the purposes of estimation.

We expect, that the new set of i-o tables for 2005 will be published, but it probably will not be available soon.

Product classification of i-o tables

Prod. Of agriculture and forrestry

Prod. Of fishing

Coal and lignite

Other mining products

Food products and beverages

Tobacco products

Textiles

Wearing apparel and furs

Leather and leather products

Wood and wood products

Pulp, paper and paper products

Printed matter and recorded media

Coke, refined petrolium products

Chemicals and chemical products

Rubber and plastic products

Other non-metallic mineral products

Basic metals

Metal products

Machinery and equipment

Office machinery and computers

Electrical machinery and apparatus

RTV and communication equipment

Medical, precision, optical instruments etc.

Motor vehicles, trailers and semi-trailers

Other transportation equipment

Furniture and other manufactured goods

Recovered secondary raw materials

Electrical energy, gas, steam and hot water

Water and its distibution

Construction works

Trade and repair services…

Hotel and restaurant services

Transport and communication

Financial intermediation (incl. Insurance)

Real estate and business services

Public administration services

Education services

Health and social services

Other services

Households services
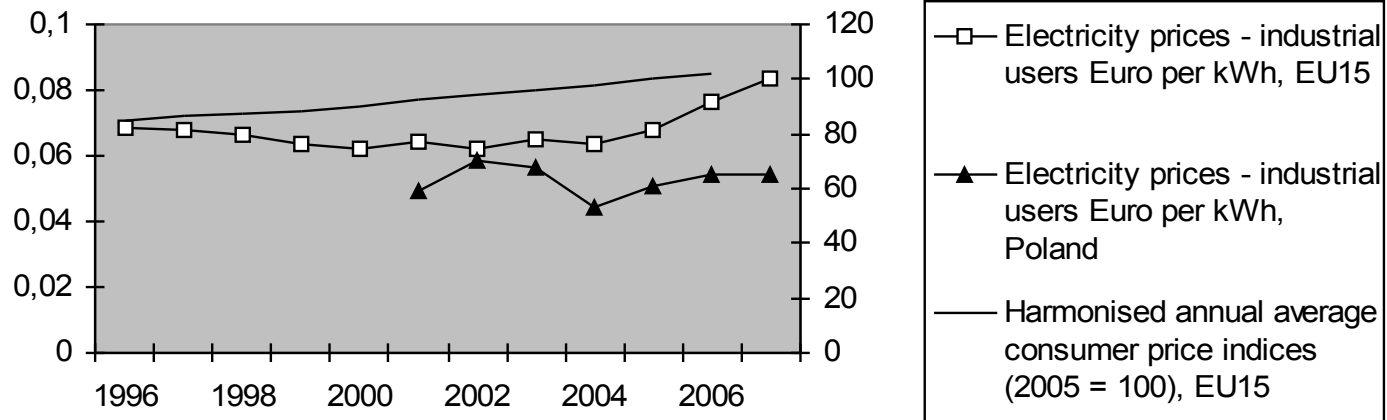
Consistency of scenarios

The most important problem for solving this part of the model is to elaborate consistent scenarios of changes in prices. Domestic prices will be calculated in the framework of the model according to assumptions made about the rise in prices of different types of energy. Most of energy resources are offered on the global market. If domestic producers experience the rise in prices of energy, so do their foreign competitors.

Both domestic, as foreign producers experience the same price impulses, and the reaction of imports and exports for rise in energy prices depends on difference in technology of production between domestic and foreign goods, especially quantity and type of energy used per unit of output. Thus, the crucial point when calculating import and export is to assume the changes in prices of imports adequate to the changes in prices of energy put into the domestic price equations.
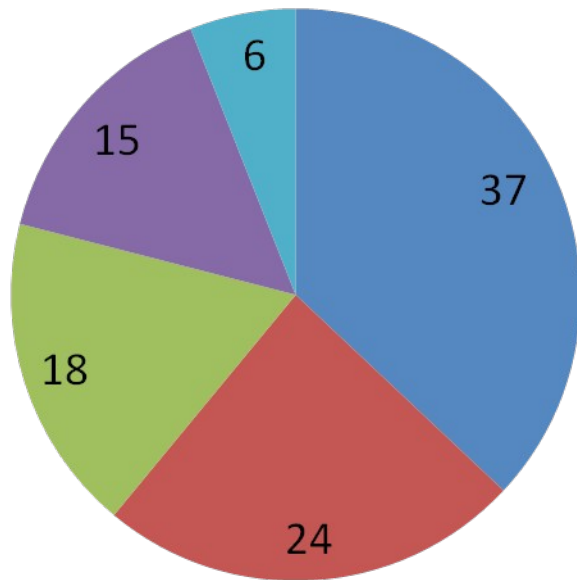
Primary and secondary sources of energy

Scenarios will consider changes in prices both of primary and secondary sources of energy.

Secondary sources of energy will be treated in foreign trade block as „normal" goods, and investigated deeply for domestic market.
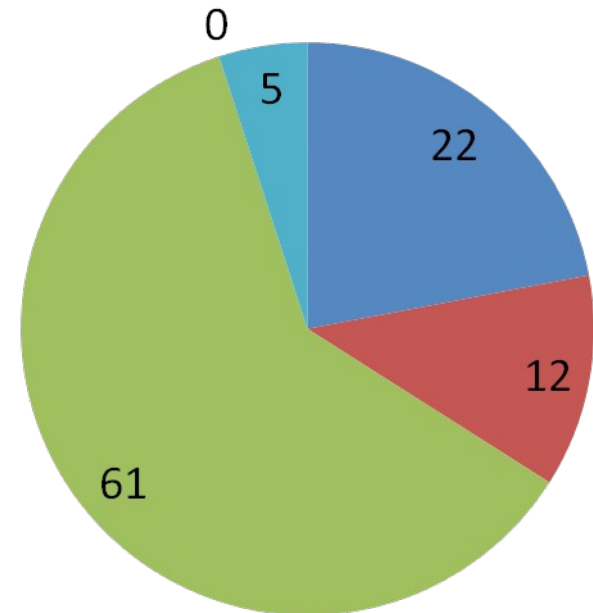

	Electricity prices - industrial users Euro per kWh, EU15
	Electricity prices - industrial users Euro per kWh, Poland
	Harmonised annual average consumer price indices (2005 = 100), EU15

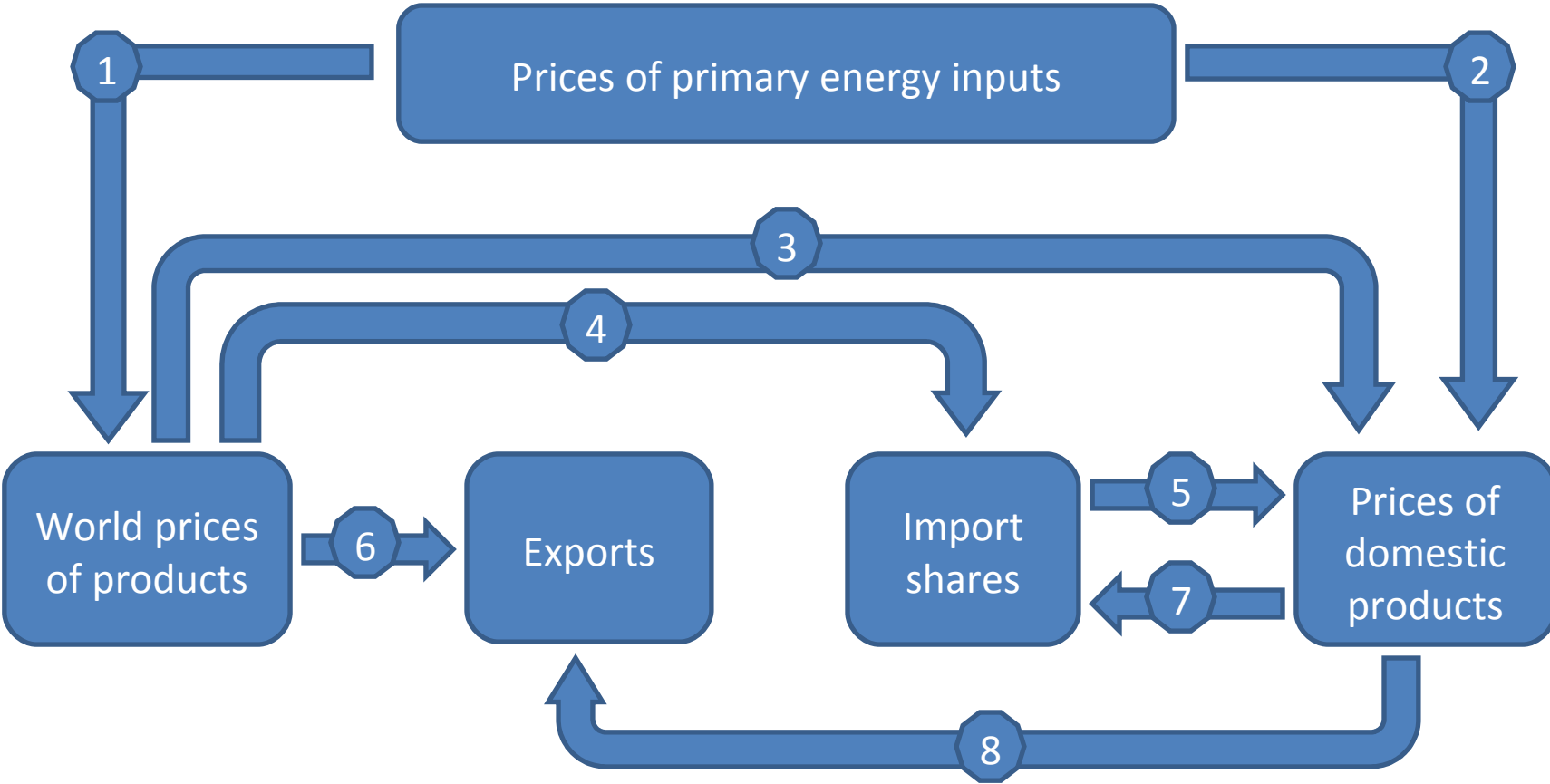# Primary sources of energy in 2003

EU-25

Poland

- Oil
- Natural gas
- Coal and lignite
- Nuclear
- Other

General layout of foreign trade block

World prices of products

World price of product *i* is a function of primary energy cost of an unit of production

$$Pw_i = f(\sum_{k=1}^{K} Pp_k E_k W_k, T_i)$$

Where:

Pp – price of *k-th* primary source of energy

E – technological index showing changes in energy production per unit of *k-th* primary source

W – weight, share of *k-th* primary source in energy production

T – technological index showing changes in energy consumption per unit of production

Domestic prices of products

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Prices of primary energy sources will be transferred into prices of domestic products with i-o price equation. Prices of imported intermediate goods affect the prices of domestic products according to the share of imports in total output.

Import shares equations

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$$\ln(S_i / (1 - S_i)) = \alpha_0 + \alpha_1 \frac{Pw_i T_i R}{Pd_i} + \ldots$$

where:

S - is the share of import in total output,
Pw – world price
T – import taxes etc.
R – exchange rate
Pd – domestic price

Export equations

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$$Ex_i = f(\frac{Pw_i R}{Pd_i}, D_i, T)$$

where:

Ex - export,
Pw – world price
R – exchange rate
Pd – domestic price
D – world demand (volume of world trade)
T – time trend