

Methodology

Most of environmental problems are directly or indirectly related to the passage of materials through the economy. The aim of the compilation of accounts of material flows on the macroeconomic level is the quantification of total demands of the economic system on materials. These demands can be expressed as input of materials into the economic system, their consumption or total waste flowing from the economic system back to the environment. On the basis of these input and output of material flows, it is possible to set up a total material balance.

The CZSO focused on the compilation of indicators *Direct Material Input (DMI)*, *Domestic material Consumption (DMC)* and *Physical Trade Balance (PTB)*. These indicators are from the methodological point of view well developed. For the calculation of these indicators, two basic material flow accounts had to be developed:

- **Domestic used extraction account** – contains the physical quantity of raw materials extracted and biomass harvested in the territory of a given country;
- **Foreign trade account** – covers imports and exports including packing.

Direct (used) material inputs includes all solid, liquid and gaseous substances that enter the economy for further use in the manufacturing process or consumption. Water and atmosphere are excluded except those parts contained in materials. The term “direct material input” means that the material physically enters the national economy as an input. **Indicators of material inputs** are derived from the material balance, it is possible, though, to derive them from individual material flow accounts (MFA) without having to set up a total material balance.

Domestic used extraction is divided into three groups:

- Biomass (contains biomass from agriculture, forestry, fishing and hunting);
- Fossil fuels (included are both energetic and non-energetic uses);
- Mineral resources (ores, industrial minerals, construction minerals).

Imports and exports are classified according to the level of processing into raw materials, raw products, final products and other products (rough classifications are raw materials and products). Other products are products without further description, usually products from the food industry. Further, exports and imports are classified according to main components of individual commodities, which are (similarly as in domestic used extraction) biomass, fossil fuels and mineral resources.

The above indicators of material flows of the Czech Republic were divided into following categories:

- Biomass (raw materials and semi-manufactured products from biomass);
- Fossil fuels (raw materials and semi-manufactured products from fossil fuels);
- Ores (raw materials and semi-manufactured products from ores);
- Non-metallic minerals (raw materials and semi-manufactured products from industrial and construction minerals);
- Others (final products, other products, packing materials)¹.

Direct Material Input (DMI) – measures the input of used materials in the economy, i.e. all materials that have an economic value and are used for production and consumption. DMI is domestic used extraction (extracted raw materials, harvested biomass) plus import.

Domestic material consumption (DMC) – measures the total amount of materials directly consumed in the economy. DMC is calculated as DMI minus export.

¹ This category is negative in the case of the DMC, as the Czech Republic exports larger volumes of final and other products compared to their imports. Consumption of domestically produced final and other products is not covered by this category, as they are included in other categories as raw materials and semi-manufactured products needed for their production.

Further, indicators of economic performance can be related to the input and output indicators of material flows. For example GDP per unit DMI or DMC indicates direct **material productivity** of the economy. On the other hand, if we relate the input indicator to GDP, we get **material intensity** of the economy.

Physical Trade Balance (PTB) – measures the surplus or deficit of the physical foreign trade of the economy. It is calculated as imports minus exports.

The following methodical handbooks were used for the compilation of the above - mentioned accounts:

- ❑ *Economy-wide material flow accounts and derived indicators - A methodological guide; Eurostat 2001*
- ❑ *Material use in the European Union 1980-2000: Indicators and analysis; Eurostat 2002*
- ❑ *Material flow accounts – Standard tables (draft); Eurostat 2004*
- ❑ *Economy-wide Material Flow Accounting - "A compilation guide"; Eurostat 2007*

Note:

- *The symbol of dash (-) in place of figure indicates that the phenomenon did not occur*
- *The symbol of 0 or 0.0 in the table is used to designate numeral data smaller than half of the unit of measure chosen*
- *The symbol of dot (.) shows that figure is not available or cannot be relied on*
- *The symbol of small cross (x) shows that entry is impossible for logical reasons*
- *i.d. – Individual dates*

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