Materiálové toky

CENIA, česká informační agentura životního prostředí
2008

Dostupný z http://www.nusl.cz/ntk/nusl-295553

KEY MESSAGES

The environmental burden in the Czech Republic associated with the need for materials decreased between 1990 and 2002. This trend reversed between 2003 and 2006 and the environmental burden began to rise again.

Between 1990 and 2006 the share of imports in domestic material consumption grew from 17% to 32%, thereby reinforcing the material dependence of the Czech Republic on foreign countries.

There was an increase in the efficiency of the conversion of input material flows into economic output and a more significant separation of the trends of environmental burden and economic efficiency in the Czech Republic between 1995 and 2006.

Material intensity in the Czech Republic is almost twice the EU15 average.

The aims of the Czech Republic are to cut material consumption and to reduce the use of uneconomical material.

REFERENCES AND OTHER INFORMATION

- **Ministry of the Environment** – http://www.mzp.cz
- **CENIA, the Czech Environmental Information Agency** – http://www.cenia.cz
- **Czech Statistical Office** – http://www.czso.cz
- **Ministry of Finance** – http://www.mfcr.cz
- **The Internet Encyclopaedia of Environmental Education** – http://www.enviwiki.cz
- **The European Topic Centre on Resource and Waste Management** – http://waste.eionet.europa.eu
- **Eurostat** – http://epp.eurostat.ec.europa.eu

Literature

- Material Flow Accounts in the Czech Republic between 2001 and 2006 (selected indicators): Czech Statistical Office, 2007 – http://www.czso.cz/csu/edicniplan.nsf/aktual/ep-2.
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THE ENVIRONMENT OF THE CZECH REPUBLIC

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This publication was made with the financial assistance of the State Environmental Fund of the Czech Republic.

Printed on chlorine-free paper.

Material Flows

THE ENVIRONMENT OF THE CZECH REPUBLIC

cenia

Ministry of the Environment of the Czech Republic

STATE ENVIRONMENTAL FUND OF THE CZECH REPUBLIC

A unique feature of the Czech Republic is the high contribution of industry in GDP, which currently is near 30%, whereas in most of the EU15 countries, this proportion is considerably lower. This implies higher material and power intensity of GDP production in the Czech Republic.

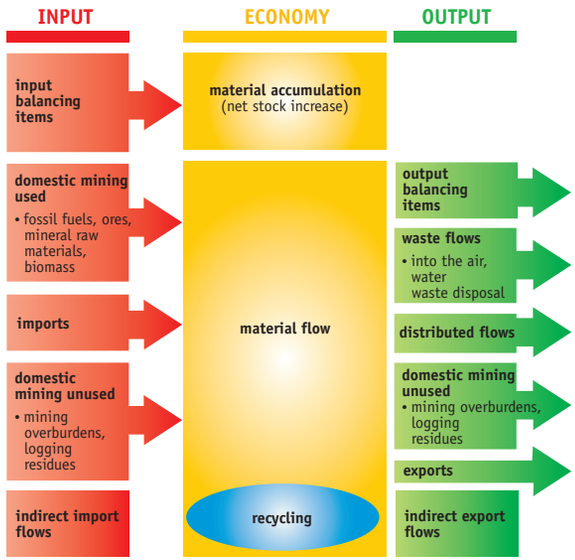
Another important feature influencing material consumption in the economy is the proportion of electric energy generated by coal. When compared to the country's overall power production, the Czech Republic ranks among the highest in Europe. Greater raw material consumption and the lack of our own resources increases the dependence of the Czech economy on imports – e.g. crude oil, gas and iron ore are imported – which represents another burden on the environment.

MATERIAL FLOW RECORDS

The monitoring of material flows in the economy is a relatively new way of identifying the environmental burden generated throughout the entire process of obtaining, processing and consuming materials.

Material flow analysis (MFA) can be used for an international comparison of economic performance and associated environmental burdens. Material and power flows are mapped by analysing material inputs in a given economic system. This includes their consumption and outputs (e.g. emissions, waste) on the corporate, regional and state levels. A general material balance can be determined from these data. Monitoring material flows enables the quantification of overall material intensity within a specific economic system.

Material flow balance on the macroeconomic level
Source: Eurostat 2001, modified



Over a longer period of time, MFA can indicate the dematerialisation and detoxication of the economic system. In other words, whether the economy can achieve the same or better results using the same material and whether it produces fewer substances harmful to human health and the environment for the same national wealth.

SELECTED INDICATORS MONITORING MATERIAL FLOW

The following are monitored for material inputs into the economy and foreign trade quantified as units of weight:

- biomass (encompassing biomass from agricultural production, forestry and hunting),
- fossil fuels (energy and non-energy utilization included),
- mineral raw materials (metal ores, industrial raw materials, building raw materials),
- imports and exports of the above-mentioned commodities and end consumption products.

Material flow indicators:

- direct material input (DMI) – summary of all materials entering an economy that have an economic value and are used for production and consumption. DMI is used for domestic mining products (raw materials mined out, biomass produced) plus all imports (raw materials and products),
- domestic material consumption (DMC) – the total amount of materials directly consumed in an economy without hidden flows, i.e. unused domestic mining products and indirect export and import material flows (raw materials necessary for the production of imports/exports in their country of origin). DMC is calculated as DMI minus all exports,
- physical foreign trade balance (PTB) – measures the excess or deficit of physical foreign trade in an economy. It is calculated as imports minus exports. Upon inclusion of indirect import and export flows, it is used for quantifying the transfer of environmental burdens associated with foreign trade.

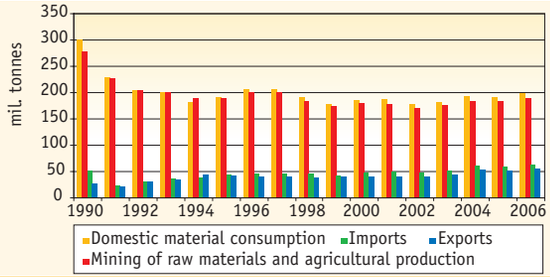
Analysis summary outputs:

- material intensity of the economy – formulated as the amount of materials consumed per unit of economic output, i.e. as DMI/HDP, or DMC/HDP,
- material productivity of the economy – formulated as the amount of economic output per unit of material consumed, i.e. HDP/DMI or HDP/DMC. Its time behaviour is the same as with material intensity, just with an inverted trend,
- decoupling – the separation of economic growth from resource consumption growth, including environmental burdens associated with its utilization.

THE CZECH REPUBLIC'S MATERIAL FLOWS IN THE EUROPEAN CONTEXT

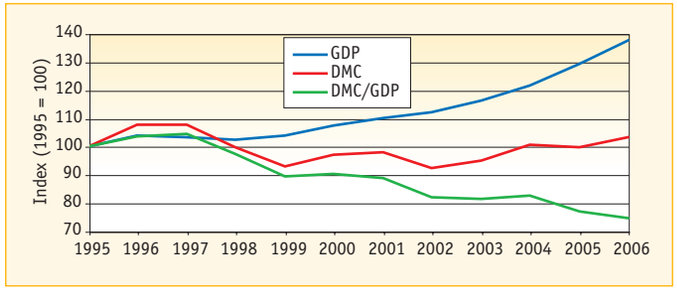
Domestic material consumption (DMC) declined by 41% between 1990 and 2002, which indicates a decrease in the environmental burden associated with material consumption in the Czech Republic. This decline was mainly attributed to the decrease of material-intensive industries (e.g. metallurgy), an increase in the share of services and the reduction of material intensity because of modernization. However, this trend has reversed because of the considerable economic growth in the recent past and domestic material production grew by 12% between 2002 and 2006. Between 1990 and 2006, there was additional growth in the share of imports in domestic material consumption, from 17% to 32%. Thus, the Czech Republic's material dependence on foreign countries has increased. This represents a risk in the event of accidental swings in foreign trade caused by a lack of certain commodities in the market, sudden price increases, etc.

Domestic material consumption in the Czech Republic, 1990–2006
Source: Charles University Environment Center, Czech Statistical Office



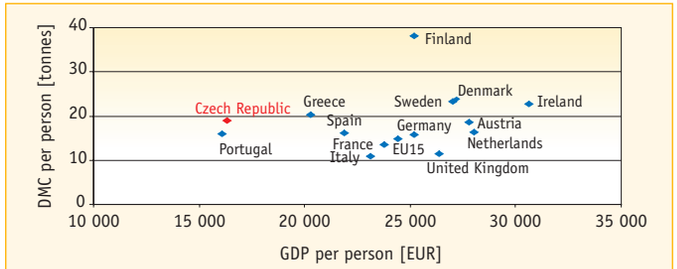
Between 1995 and 2006, there was decline in the material intensiveness of the economy expressed as the ratio of domestic material consumption (DMC) and gross domestic product (GDP). At the same time, there was decoupling, i.e. a separation of the curves or the "opening of the scissors" between the DMC curve representing environmental burdens and the economic performance curve represented by GDP. This tendency indicates a rising efficiency in the conversion of input material flows into economic outputs (DMC/GDP) and a decline in the environmental burdens per GDP unit.

Material intensity of the economy and the decoupling of environmental burdens and economic performance of the Czech Republic, 1995–2006 (2000 constant prices)
Source: Charles University Environment Center, Czech Statistical Office



The Czech Republic has slightly higher domestic material consumption per person compared to the EU15 average, whereas gross domestic product per person is considerably lower. This is reflected in the high material intensity of the Czech economy compared to the material intensity of the EU15 (1.16 against 0.61 tonnes per EUR 1 000 of GDP).

An international comparison of domestic material consumption and GDP per person, 2004
Source: Eurostat



GDP recalculated with the use of purchasing power parity.

The Czech Republic hopes to reduce the material consumption and material intensity of the economy. The key element in this respect is the additional implementation of modern technologies less demanding in terms of the material inputs, increasing the recycling rate and economic restructuring with a focus on a lower share of material intensive industries, a higher proportion of services and industries with high added value. These objectives are in compliance with the supra-national conceptual documents, including the Sustainable Development Strategy of the Czech Republic.