

DOMESTIC MATERIAL CONSUMPTION		
Consumption and Production Patterns	Material Consumption	

1. INDICATOR

- (a) **Name:** Domestic Material Consumption (DMC)
- (b) **Brief Definition:** DMC is defined as the total amount of materials directly used in the economy (used domestic extraction plus imports), minus the materials that are exported.
- (c) **Unit of Measurement:** metric tons.
- (d) **Placement in the CSD Indicators Set:** Consumption and Production Patterns/Material Consumption.

2. POLICY RELEVANCE

- (a) **Purpose:** The indicator provides a basis for policies to decouple the growth of the economy from the use of natural resources so as to achieve a reduction of environment degradation resulting from primary production, material processing, manufacturing and waste disposal.
- (b) **Relevance to Sustainable/Unsustainable Development (theme/sub-theme):** Improving the efficiency with which materials are used and consequently reducing stresses on the environment are the subjects of chapter 4 of Agenda21, Changing Consumption Patterns. Primary production of raw materials, processing of the materials into products, and ultimate disposal of the waste material has major environmental impacts. DMC is a useful indicator, as it provides an assessment of the absolute level of use of resources, and combined with GDP, it also provides insight into whether decoupling between the use of natural resources and growth of the economy is taking place.
- (c) **International Conventions and Agreements:** The 2002 WSSD Johannesburg Plan of Implementation has set an objective for 'delinking economic growth and environmental degradation through improving efficiency and sustainability in the use of resources and production processes, and reducing resource degradation, pollution and waste.'
- (d) **International Targets/Recommended Standards:** None.
- (e) **Linkages to Other Indicators:** DMC is linked to indicators, such as 'Waste generation', 'Greenhouse gas emissions' and 'Energy Consumption'.

3. METHODOLOGICAL DESCRIPTION

(a) Underlying Definitions and Concepts: The indicator is defined as domestic material consumption, broken down by component (exports, imports, domestic extraction), and by material (minerals, biomass, fossil fuels).

Direct (used) material inputs are defined as all solid, liquid and gaseous materials that enter the economy for further use in production and consumption processes. Water and air consumption are, apart from the water content of materials, not included. Quantitatively important “memorandum items” for balancing air and water should be included in the input. For example, air is used during the fuel combustion process.

Material inputs of domestic origin are classified into three main material groups:

- minerals (metal ores, other industrial minerals, construction materials),
- biomass (from agriculture reported by harvest statistics, from agriculture as a by-product of harvest, from grazing of agricultural animals, from forestry, from fishing, from hunting, from other activities),
- fossil fuels: hard coal, lignite, crude oil, natural gas, other.
- Imports are classified according to their level of manufacturing into:
 - raw materials,
 - semi-manufactured products,
 - finished products
 - other products (mostly products of the nutrition industry),
 - packaging material imported with products,
 - waste imported for final treatment and disposal.
- Each category of imports is further classified according to the basic material components of the commodities:
 - fossil fuels (further subdivided by type of fuel),
 - minerals (further subdivided by metals and non-metallic minerals),
 - biomass (from agriculture, forestry, fishing or hunting).

The more complex the material mix of a manufactured product, the more critical its attribution to a “dominant” material category and conversion tables may need to be set up for the detailed attribution of imports to material categories.

Exports are classified in the same way as imports. This allows to account for DMC per category of materials.

Agricultural harvest is reported like in agricultural statistics as domestic extraction (from the natural system) while flows of nutrients between the soil and roots of agricultural plants are considered natural flows and not part of material flow accounts. Animal livestock is considered part of the economic system. Consequently, uptake of grass on meadows has to be accounted for as domestic extraction but production of meat and milk are flows within the economic system. Finally, the extraction of metal ores is accounted for as run-of-mine (ROM) or gross ore (i.e. including the sterile parts) and not as metal content.

(b) Measurement Methods: The sum of raw materials domestically extracted and imports constitutes the Direct Material Input (DMI). Deducting exports from DMI

results in the Domestic Material Consumption (DMC). It is important to note that the term “consumption” as used in DMC denotes “apparent consumption” and not “final consumption”. DMC, thus, is defined in analogy to “total primary energy supply” - TPES (see Haberl 2001). Conceptually, DMC most closely represents a “physical GDP equivalent”.

(c) Limitations of the Indicator: A limitation of this indicator is that it does not include unused domestic extraction and indirect flows of imports and exports, thus it is only a proxy for the actual total material consumption.

(d) Status of the Methodology: The Eurostat methodological guide is a worldwide standard reference, used by EU and OECD countries and the London Group (UN). National data collection methods may vary significantly from country to country.

(e) Alternative Definitions/Indicators: Total Material Consumption (TMC) would be a more complete measure of material use compared to DMC, as it measures the total material use associated with domestic production and consumption activities, including indirect import flows, less export and associated indirect export flows. The main advantage is the possibility of showing the "real" environment impacts (through indirect flows) of production and consumption in the case of outsourcing "dirty" production/extraction to other countries. Some countries are already using this measure; however, there remain difficulties in calculating these indirect flows from a practical point of view.

4. ASSESSMENT OF DATA

(a) Data Needed to Compile the Indicator: Data on material flows in and out of the economy, i.e. consumption and trade of all materials. GDP data is needed for visualising it together with DMC in one graph, in order to assess whether a decoupling effect is taking place. Moreover, for country comparisons GDP per capita could be calculated, for which population data would be needed

(b) National and International Data Availability and Sources: Data are available at national level for some countries which have already established Material Flow Accounts (MFA). Economy-wide material flow accounts are generally compiled by national statistical offices. Eurostat has collected data from 15 EU countries, and has recently revised its questionnaire which will be used for all 27 EU Member States and associated countries.

(c) Data References: <http://europa.eu.int/comm/eurostat>

5. AGENCIES INVOLVED IN THE DEVELOPMENT OF THE INDICATOR

(a) Lead Agency: The lead agency is Eurostat.

(b) Other Contributing Organizations: OECD (a joint Eurostat-OECD guidance manual is planned for publication in 2007. United Nations Conference on Trade and

Development (UNCTAD), World Resources Institute, and the Wuppertal Institute on Climate, Environment and Energy have contributed to the development of this indicator.

6. REFERENCES

(a) Readings:

Eurostat. *Economy-wide material flow accounts and derived indicators – A methodological guide*, 2001.

Eurostat. *Development of material use in the EU-15: 1970-2001 - Material composition, cross-country comparison, and material flow indicators*, 2005.

Ndiaye, D. *Statistical Study on the Consumption of Metals*. Centre d'Economie des Ressources Naturelles, Ecole Nationale Supérieure des Mines de Paris. Paris, 1991.

World Resources Institute. *World Resources 1994-95*, part IV, Chapter 21, 1995.

Hammond, Allen, et al. *Environmental Indicators: A Systematic Approach to Measuring and Reporting on Environmental Policy Performance in the Context of Sustainable Development*, (Chapter VI and Appendix I). World Resources Institute, Washington, D.C., 1995.

Hoffmann, U and D. Zivkovic. *Demand Growth for Industrial Raw Materials and its Determinants: An Analysis for the Period 1965-1988*. UNCTAD Discussion Papers, No. 50, Geneva, November 1992.

(b) Internet site:

<http://europa.eu.int/comm/eurostat>