MFA **Material Flow Analysis**

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››› Economy-wide indicators

The physical performance of an economy and its development stage is shown by various complementary indicators. Each indicator answers its own target question.

There are indicators on input, output, balance, consumption and efficiency (productivity). All indicators are based on flows given in tonnes per year.

Type of indicators	Acronym	Full name	Policy questions
Input	DEU	Domestic extraction used	How many environmental resources are extracted from the domestic territory (raw materials for further processing)?
	DMI	Direct material input *DMI= DEU + imports*	How many environmental resources are used in domestic production and consumption (incl. imports)?
	TMR	Total Material Requirement *TMR = DMI + Unused Domestic Extraction (UDE) + indirect resource extraction of imports)*	How much primary material is required globally by domestic production and consumption (used and unused extraction)?
Output	DPO	Domestic processed output *DPO = emissions + waste*	How much material is released to nature domestically after use in the economy?
	TDO	Total Domestic Output *TDO = DPO + disposal of unused extraction*	What is the total quantity of material received by the domestic environment (incl. unused extraction and emissions to the atmosphere which do not remain on the domestic territory)?
	TMO	Total Material Output *TMO = TDO + exports*	What is the total amount of material leaving the economy (incl. unused extraction and exports)?
Consumption	DMC	Domestic Material Consumption *DMC = DMI-exports*	How much of environmental resources is used for domestic consumption (excl. exports and unused extraction)?
	TMC	Total Material Consumption *TMC =TMR-exports-indirect flows associated with exports*	How much of the global primary material requirement is associated with domestic consumption?
Balance	NAS	Net addition to stock *NAS = DMI-DPO-Exports*	How much of the used material is incorporated as additional stocks in the domestic economy (which is the physical growth rate of the economy)?
	PTB	Physical Trade Balance (incl. indirect flows associated with imports/exports) *PTB = imports - exports*	Is the system a net importer or exporter of potential environmental burden linked to resource extraction?
Productivity	GDP/TMR	Total resource productivity	Is there a decoupling of total resource requirements from economic growth over time?
	GDP/DMI	Direct Material productivity	Is there a decoupling of material use from economic growth over time?

The **Total Material Requirement (TMR)** comprises the use of all domestic and foreign primary materials for production and consumption. Dividing GDP by TMR accounts for the total resource productivity of an economy.

The **Direct Material Input (DMI)** is a part of TMR which contains domestic used extraction and imports. BIP/DMI shows the material productivity. Sometimes, this is also given as BIP/DMC (DMC = Domestic Material Consumption), although in this case it is often over-looked that DMC does not contain exports; a measure of productivity, however, should also contain the use of materials – or resources – for the production of exports.

The **net addition to stock (NAS)** measures the physical growth of the economy. It comprises all (net) additional buildings, infrastructures and long-lived goods. As long as NAS is higher than zero, the economy is physically growing. Usually this is also linked to an expansion of built-up area.

Extended information and more indicators see: Chapt. 2 of the book Sustainable Resource Management
http://wupperinst.org/en/publications/publications/wi/a/s/ad/951/

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