Extractive waste

Content

This document presents additional figures that were elaborated during the data analysis for the monitoring of extractive waste (indicator 23) in the 2018 Raw Materials Scoreboard. The figure presented here was not included in the final version of the Scoreboard due to data limitations.

This document also provides more details about the methodological changes in the indicator as compared to the 2016 version of the Scoreboard.

Novelties from the 2016 version of the Scoreboard

- Quantitative data that puts extractive waste generation volumes into context by comparing it with primary mineral production volumes. Although the data have certain limitations, they provide a preliminary overview of extractive waste generation over the last years.
- Data on extractive waste come from Member States reporting to Eurostat. Data on mineral production are based on Eurostat and on World Mining Data.

Key points

- The generation of extractive waste in the EU-28 decreased between 2004 and 2008 and increased between 2008 and 2012.
- The extraction of minerals grew until 2008 and fell afterwards, whilst the net mineral concentrate production remained relatively constant. The change in the trend in 2008 is an indication of the economic crisis, which led to a significant decrease of demand for, amongst others, aggregates and industrial minerals needed for infrastructure developments.
- The increase of extractive waste after 2008, in both absolute terms and relative to minerals extraction, could be explained by the fact that a number of Member States changed their methodology of reporting of extractive waste after the entry into force of the Extractive Waste Directive. Therefore, conclusions based on this quantitative approach should be drawn with caution.

Facts and figures

- Figure 1 shows the trends over time of extractive waste volumes (red line) compared to material extraction (brown line) and mineral concentrate volumes (blue line)[1] in the EU-28. The three data series are displayed as indices related to 2004 (see Table 1 for absolute figures). Further, Figure 1 also presents the ratios of extractive waste relative to minerals extracted and to mineral concentrates.

[1] See methodological notes for description of the content of each data series.

- The data shows that extractive waste generation in the EU decreased between 2004 and 2008 (around 25 %), increased from 2008 until 2012, and slightly decreased between 2012 and 2014. Different trends were observed for material extraction and for the production of concentrates. The change in trend in 2008 for mineral extraction and concentrates production, can be attributed to the economic crisis, which led to a significant decrease in demand for aggregates and industrial minerals, needed for infrastructure developments. Remarkably, the trend for mineral concentrate production remained more constant.
- The increase of extractive waste after 2008 could also be driven by an increased extraction of ores, given that industrial minerals and especially aggregates extraction generally generate hardly any waste. There is a general global trend of decreasing metal concentrations of ore deposits. Another possible explanation of this increase is the effect of the implementation of the Extractive Waste Directive[2] in 2009, which led Member States to report greater waste volumes, in line with the definitions used in the Directive.

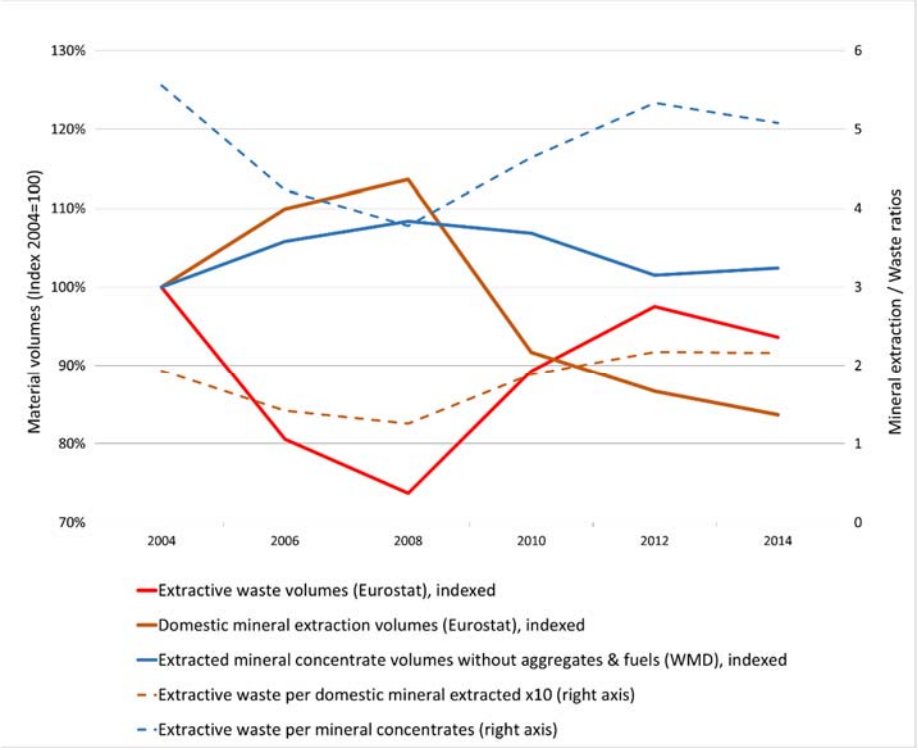

Figure 1: Material indices of generated extractive waste, extracted minerals and mineral concentrates. Extractive waste-to-mineral and extractive waste-to-mineral concentrate ratios are also displayed (right axis) (EU-28, 2004-2014)[3].

[2] Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries and amending Directive 2004/35/EC, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32006L0021.

[3] Source: JRC elaboration based on Eurostat data on extractive waste volumes and domestic material extraction volumes, and World Mining Data for non-aggregates, non-fuel material extraction concentrates.

Volumes (thousand tonnes)	2004	2006	2008	2010	2012	2014
Extractive waste (Eurostat)	752 770	606 420	554 720	672 180	733 990	704 630
Domestic mineral extraction (Eurostat)	3 896 340	4 281 882	4 427 340	3 573 223	3 375 901	3 259 536
Mineral concentrate without aggregates & fuels (World Mining Data)	135 490	143 335	146 837	144 789	137 528	138 772

Table 1: Absolute volumes of extractive waste, extracted material and extracted mineral concentrate[4].

The search for suitable data

- There are no datasets available on extractive waste volumes and qualities that would allow assessing extractive waste management on the global scale. Moreover, the EU legal definition of extractive waste may not match completely with the rest of the world.
- In the EU, in spite of the fact that a specific EU Directive has been put in place, robust and fully comprehensive data are not available yet[5]. Before 2009, the extractive waste categories reported by the Member States' competent statistical authorities were based on a Regulation on the statistical classification of economic activities[6] in which the waste categories were in accordance with the different mining and quarrying subsectors, not completely complying with the extractive waste definition and classes provided in the Extractive Waste Directive. This means that certain waste categories included in the Eurostat volumes before 2009 were not considered as extractive waste under the scope of the Extractive Waste Directive (e.g. general maintenance waste). Vice versa, some waste streams (e.g. massive volumes of removed overburden rocks) were not reported and included in the Eurostat database before 2009.Therefore, an accurate analysis and interpretation of the data on extractive waste is not yet feasible.

[4] Source: See data source for Figure 1.
[5] BiPRO-Oakdene Hollins 2016: Provision and elaboration of information for the preparation of the "Implementation report of Directive 2006/21/EC on the management of waste from extractive industries" - ENV.C.2/FRA/2013/0023, http://ec.europa.eu/environment/waste/studies/mining/waste_extractive_industries.pdf.
[6] Council Regulation (EEC) No 3037/90 of 9 October 1990 on the statistical classification of economic activities in the European Community, http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1497426386960&uri=CELEX:01990R3037-20080101.

- Other efforts in collecting suitable extractive waste time series data covering the EU have been done by DG Environment[7], geological surveys[8] and research projects[9], with limited results.
- The updated Best Available Techniques Reference Document (BREF)[10] on extractive waste management pointed out in 2016 some major data gaps and discrepancies among different datasets, including the Global Material Flow database[11], which confirms that none of the global raw materials intelligence services has long term systematic data collections on the extractive waste volumes and qualities.
- Definitions of extractive waste considerably differ across these databases, and with time. The whole extractive waste stream was considered neither as waste nor as a secondary raw material until the turn of the century. This can explain the gaps in data availability.

Summary of other options that were considered

- **Option 1 – Extractive waste volumes**
  - Similar to the selected option, but displaying only data on extractive waste volumes (without referring to the minerals and mineral concentrates production).
  - Such data would be a limited indicator since changes in extractive waste volumes would not explain whether trends derive from changes in industrial output or from improvement in waste management practices.
- **Option 2 –Newly permitted extraction sites and new extractive management facilities**
  - This option would display annual data on newly permitted extraction sites and new extractive management facilities, in order to give insight into the scale of the operators' activity in the waste management field and the efficiency of the permitting environment. The licensing of both extraction sites and waste management facilities faces similar barriers, such as land competition (e.g. with NATURA2000 sites), environmental concerns, or public opposition. This indicator would mirror the overall activity in this field.
  - There is a lack of harmonized data covering all Member States for such an analysis. In accordance with the Extractive Waste Directive, Member States have to report on the

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[7] EC Directorate General Environment, http://ec.europa.eu/environment/waste/mining/index.htm.

[8] BRGM (http://www.brgm.eu/project/world-economic-databank-on-minerals-metals and http://www.mineralinfo.fr/be3m/grid), BGS (https://www.bgs.ac.uk/mineralsuk/statistics/worldStatistics.html), USGS (https://minerals.usgs.gov/minerals/, and https://minerals.usgs.gov/minerals/pubs/commodity/recycle/), BGR (https://www.bgr.bund.de/EN/Themen/Min_rohstoffe/min_rohstoffe_node_en.html), and DERA (https://www.deutsche-rohstoffagentur.de/DERA/DE/Rohstoffinformationen/rosy/rosy_node.html).

[9] Minerals4EU (http://www.minerals4eu.eu/); Prospecting Secondary raw materials in the Urban mine and Mining wastes (ProSUM) (http://www.prosumproject.eu/); SmartGround (http://www.smart-ground.eu/public/20161118141030.pdf).

[10] JRC 2016: Best Available Techniques Reference Document for the Management of Waste from the Extractive Industries – Draft document, Seville, 674 p.
http://susproc.jrc.ec.europa.eu/activities/waste/documents/MWEI_BREF_Draft.pdf

[11] http://www.materialflows.net/materialflowsnet/home/.

implementation to DG ENV tri-annually, where numbers on permitted new waste management facilities are presented. The recent European Commission Communication (COM(2016)553) on the implementation of the Directive 2006/21/EU[12] confirms that permitting data are not available evenly across Member States. The access to the number of permitted extractive sites is even more complicated. There are snapshot studies with uneven reliability along MS: one is from 2014 on mineral policy indicators[13], the other is the MINLEX report published in 2017[14] .

- **Option 3 – Tri-annual reports on the implementation of the Mining Waste Directive**
  - This option would be a structured summary based on the tri-annual implementation report of the Directive, which provides information on the EU extractive waste management performance. By law, the implementation report shall be repeated every three years, in this way the long-term sustainability of the indicator can be considered to be ensured.
  - These data still do not meet the Scoreboard data requirements. For instance, the European Commission Communication (COM(2016)553) on the implementation of the Directive 2006/21/EU, published in September 2016[15] based on the BiPro report, states that the reported data are not fully reliable for several Member States. It is also worth noting that no data with similar thematic are available for global comparisons.

[12] Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions on the implementation of Directive 2006/21/EC on the management of waste from extractive industries and amending Directive 2004/35/EC - Brussels, 6.9.2016, COM(2016) 553 final http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1489760330450&uri=CELEX:52016DC0553.

[13] EC 2014: Report on National Minerals Policy Indicators – DG Enterprise and Industry, Brussels, 24 p. http://ec.europa.eu/DocsRoom/documents/5562/attachments/1/translations.

[14] MINPOL 2017: Study on the legal framework for mineral extraction and permitting procedures for exploration and exploitation in the EU – Brussels. At https://ec.europa.eu/growth/sectors/raw-materials_en.

[15] http://ec.europa.eu/environment/waste/mining/pdf/report_mining_waste.pdf .

Methodological notes

Extractive waste

- **Name of data:** Extractive waste generation.
- **Organization (data provider):** Eurostat Waste Database.
- **Website (URL):** http://ec.europa.eu/eurostat/web/environment/waste/database, Generation of waste by economic activity, code *ten00106*.
- **Definition, description of data:** The Eurostat Waste Database covers the waste volumes generated by the extractive industry. The entry B, "Mining and quarrying", based on the NACE Rev.2 classification was selected for compiling the database for the selected indicator. Mining and quarrying covers well (90-98%) the extractive waste definition of the Directive 2006/21/EU. Data on extractive waste are based on Member States reporting to Eurostat. Data collection was reinforced after the implementation of the Extractive Waste Directive in 2009. Eurostat data on extractive waste may contain quantities that are not regarded in the strict legal sense of the Directive, as extractive waste. In addition, data previous to the entry into force of the Directive may not include some waste typologies that may qualify as waste after a defined period of time. Eurostat is the only European database with well-established legal mandate, enforcement practices and permanent services that may ensure the longer-term comparison of this indicator.

  A further disaggregation of the data was investigated considering hazardous and non-hazardous waste, yet data soundness was limited.
- **Update frequency:** Bi-annual.
- **Data format:** Online, downloadable in xls, cvs and several other formats.
- **Geographic coverage:** EU-28. The database includes also other non-EU countries.
- **JRC processing methodology for the indicator:** Selection of "Section B, Mining and quarrying" database, and selection of waste categories under items "42 (non-hazardous) and 43 (hazardous) other mineral waste (waste codes 12.2, 12.3, 12.5)".

Domestic mineral extraction

- **Name of data:** Domestic mineral extraction volumes.
- **Organization (data provider):** Eurostat database Economy-Wide Material Flow Accounts (EW-MFA).
- **Website (URL):** https://ec.europa.eu/eurostat/data/database**.** Selection: Environment and energy / Environment / Material flows and resource productivity / Material flow accounts, code *env_ac_mfa*.
- **Definition, description of data:** Domestic extraction[16] is the total amount of material extracted from the natural environment for further processing in the economy, by resident

[16] Collected on basis of the Regulation No. 691/2011**Regulation (EU) of the European Parliament and of the Council of 6 July 2011 on European environmental economic accounts (**http://eur-

units. Based on the compiled material flow inputs into national economies, the EW-MFA framework covers all solid, gaseous, and liquid material inputs, except for water and air, measured in mass units per year. For the purpose of the indicator, the following sectors were selected:

2. Metal ores and concentrates, raw and processed, which includes:
2.1 Iron ores and concentrates, iron and steel, raw and processed
2.2 Non-ferrous metal ores and concentrates, raw and processed
2.2.1 Copper
2.2.2 Nickel
2.2.3 Lead
2.2.4 Zinc
2.2.5 Tin
2.2.6 Gold, silver, platinum and other precious metals
2.2.7 Bauxite and other aluminium
2.2.8 Uranium and thorium
2.2.9 Other n.e.c.
2.3 Products mainly from metals.

3 Non-metallic minerals, raw and processed, which that includes:
3.1 Marble, granite, sandstone, porphyry, basalt and other ornamental or building stone (excluding slate)
3.2 Chalk and dolomite
3.3 Slate
3.4 Chemical and fertiliser minerals
3.5 Salt
3.6 Limestone and gypsum
3.7 Clays and kaolin
3.8 Sand and gravel
3.9 Other n.e.c.
3.10 Excavated earthen materials (including soil), only if used (optional reporting).
3.11 Products mainly from non-metallic minerals.

- **Update frequency:** Annual.
- **Data format:** Online, downloadable in xls, cvs and several other formats.
- **Geographic coverage:** EU-28. The database includes also other non-EU countries.
- **JRC processing methodology for the indicator:** Domestic mineral extraction bi-annual volumes are used to compare with extractive waste volume generation for the available time-span 2004-2016 of the latter

lex.europa.eu/search.html?DTN=0691&DTA=2011&qid=1497448295508&DB_TYPE_OF_ACT=regulation&CASE_LAW_SUMMARY=false&DTS_DOM=ALL&excConsLeg=true&typeOfActStatus=REGULATION&type=advanced&SUBDOM_INIT=ALL_ALL&DTS_SUBDOM=ALL_ALL

Mineral concentrate

- **Name of data:** Mineral concentrate (without aggregates and fuels).
- **Organization (data provider):** World Mining Data, Federal Ministry of Sustainability and Tourism (BMNT) Division VI Minerals Policy, Austria.
- **Website (URL):** http://www.wmc.org.pl/sites/default/files/WMD2017.pdf.
- **Definition, description of data:** EU-28 production of mineral raw materials cummulated and selected for the years (2004-2016) where generated extractive waste volumes data are available. Production figures throughout this database do not refer to crude ore or concentrate produced from it, but indicate the content of recoverable valuable elements and compounds. It does not cover aggregates (sand, gravel, crushed rocks), as compared to the Eurostat dataset. This is why extraction volumes differ one order of magnitude between the Eurostat and World Mining Data datasets. This dataset was used in order to screen out the effect of aggregates and focus on ores, which generate significantly more waste.
- **Update frequency:** Annual.
- **Data format:** xls available online.
- **Geographic coverage:** EU-28. The database has a global coverage.
- **JRC processing methodology for the indicator:** Mineral production volumes are used to compare with extractive waste volume generation for the available time-span 2004-2014 of the latter. Indices are presented each year relative to 2004 values.