Using physical supply-use tables for measuring plastic flows and circular material use rates

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Accounts and indicators for Danish Plastic Flows

Physical supply-use tables for plastics 2016
Circular material use rates for plastics 2011-2019

by

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Statistics Denmark

Eurostat Grant Agreement
Final report, April 2021
Starting point

Existing **full physical supply-use tables** for Denmark (PSUT) 2016
(Detailed material flow accounts – www.statbank.dk)

117 industries, households, governments, capital, imports and exports, environment

1800 products
- 26 types of natural resources
- 130 types of residuals (solid waste, air emissions, etc.)

**Physical supply table:**
Output of products from industries, residuals from industries, households, etc.
Natural resource extraction
Imports

**Physical use table:**
Intermediate consumption by industries
Private consumption, etc., accumulation
Flows to the environment
Exports

Measuring unit: tonnes
From full PSUT to PSUT for plastics

Full supply and use tables - all products and types of waste

List of plastic content in all products and waste

<table>
<thead>
<tr>
<th>Examples</th>
<th>Plastic content per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>390100 Polyethylene in blocks, lumps, powders, granules, flakes, etc.</td>
<td>100</td>
</tr>
<tr>
<td>391704 Rigid tubes, pipes and hoses, of polymers of vinyl chloride</td>
<td>100</td>
</tr>
<tr>
<td>540201 Textured filament yarn of nylon or other polyamides</td>
<td>100</td>
</tr>
<tr>
<td>630500 Sacks and bags of polyethylene or polypropylene strip</td>
<td>100</td>
</tr>
<tr>
<td>320800 Paints and varnishes based on polyesters</td>
<td>90</td>
</tr>
<tr>
<td>630300 Curtains and interior blinds</td>
<td>80</td>
</tr>
<tr>
<td>960300 Brooms and brushes</td>
<td>75</td>
</tr>
<tr>
<td>841802 Household refrigerators</td>
<td>37</td>
</tr>
<tr>
<td>840300 Parts of central heating boilers of cast iron</td>
<td>0</td>
</tr>
<tr>
<td>760100 Aluminium, not alloyed, unwrought</td>
<td>0</td>
</tr>
</tbody>
</table>

Supply and use tables for plastics

Balancing
Reconciliation

From full PSUT to PSUT for plastics
Granularity of the plastic PSUT

- Pure plastic (100 per cent plastics)
  - 13 Raw plastic products (e.g. polyethylene)
  - 26 Processed plastic products (e.g. plastic toys)
  - 3 Waste fractions (PVC, plastic packaging waste, other plastic waste)

- Composite products and mixed waste (0 < plastic percentage < 100)
  - 480 Products (e.g. refrigerators)
  - 14 Waste fractions (e.g. mixed municipal waste)

- 117 industries (Danish national accounts classification)
  Household, government consumption, Capital, Imports and exports, The environment
Danish plastic flows 2016, 1000 tonnes

- **Imports**: 2099 tonnes (96% Products, 4% Waste)
- **Exports**: 1146 tonnes (93% Products, 7% Waste)
- **Total inputs**: 2261 tonnes (98% Products, 2% Waste)
- **Incineration, etc. of waste**: 506 tonnes (100% Waste)
- **Chemicals used for production of plastics**: 63 tonnes (100% Products)
- **Accumulation, net**: 511 tonnes (100% Products)
- **Recycling**: 99 tonnes (100% Products)

- **Accumulated plastics**: 100%
Domestic use of plastic products

[Bar chart showing the distribution of plastic use across different sectors.]

- Raw plastics
- Processed plastic products
- Plastics in composite products

- Households
- Manufacture of basic chemicals
- Manufacture of toys and other manufacturing
- Manufacture of textiles
- Manufacture of paints and soap etc.
- Manufacture of food products, beverages and tobacco
- Wholesale and retail trade
- Other industries
- Manufacture of rubber and plastic products
- Other manufacturing

[Values in 1000 tonnes]
Circular material use rates

For the EU monitoring framework on the circular economy Eurostat has defined the circular material use rate as the share of material resources used which comes from recycled waste materials

\[
CMU = \frac{U}{DMC + U} = \frac{(RCV_R - IMP_w + EXP_w)}{DMC + (RCV_R - IMP_w + EXP_w)}
\]

Circular material use, \( U = RCV_R \) materials recovery for recycling
- \( IMP_w \), imported waste for recovery
  + \( EXP_w \), exported waste for recovery

Domestic material use, \( DMC = \) domestic extraction + imports – exports
**Alternative CMUR for plastics**

U: Recycled sorted plastic waste       DMC: pure plastic products

\[ \text{CMUR1} = 5.5 \text{ per cent} \]

U: Recycled sorted plastic waste       DMC: plastics in pure and composite products

\[ \text{CMUR2} = 4.8 \text{ per cent} \]

U: Plastics in all recovered waste      DMC: plastics in pure and composite products

\[ \text{CMUR3} = 10.5 \text{ per cent} \]

(includes some backfilling!)