Methodology of Material Flow Analysis in Japan

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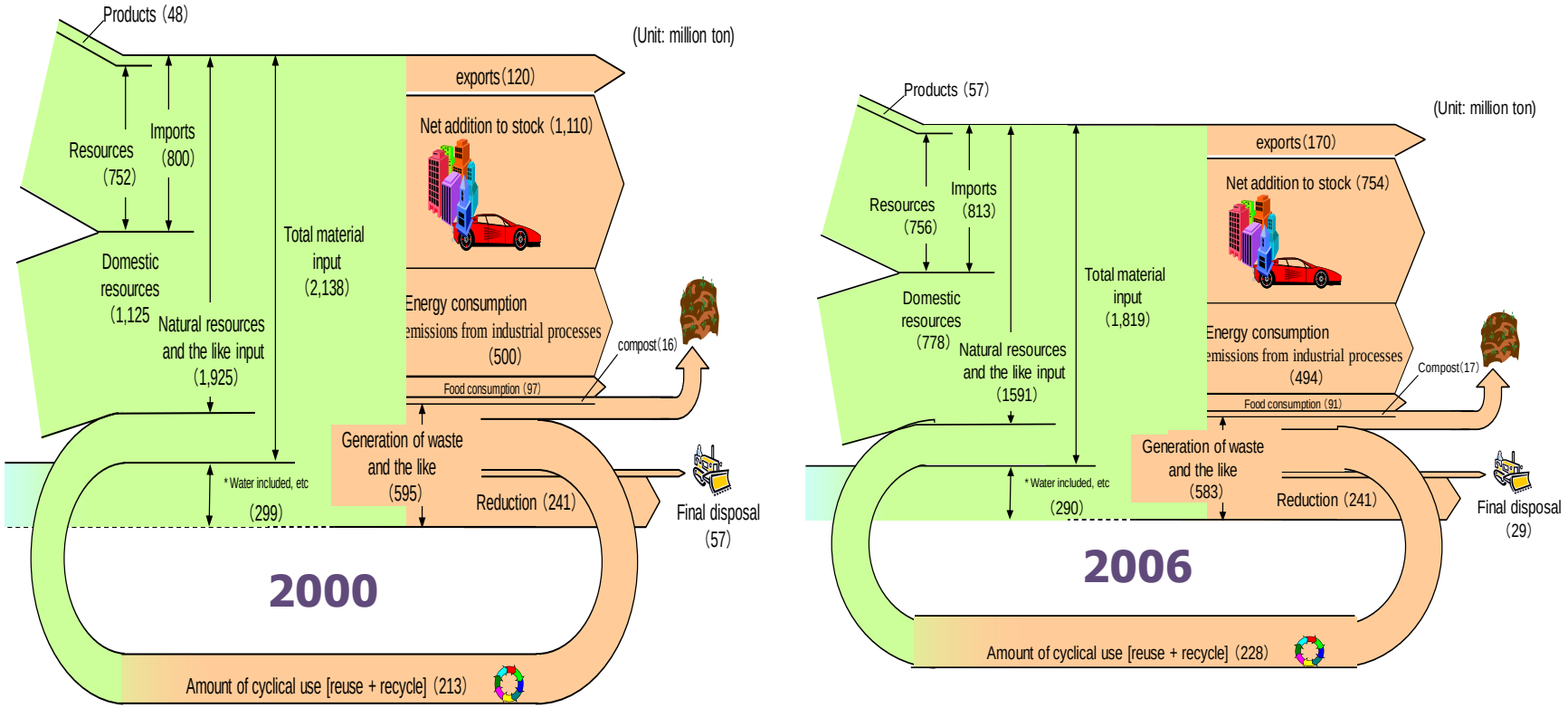
Change in Material Flow of Japan



- TMI: 2 138 Mt → 1 819 Mt (–15%)
- Cyclical use: 213 Mt → 228 Mt (+7%)

Fundamental Plan (Government of Japan)

- Establishing a Sound Material Cycle Society
  - Fundamental law in effect in 2000
  - 1st fundamental plan in 2003 (target year FY2010)
  - 2nd fundamental plan in 2008 (target year FY2015)
- Overview of the 2nd Fundamental Plan
  - The current situation and issues
  - A mid-to-long term image of Sound Material Society
  - Activities of stakeholders
  - Material flow indicators and targets

Overview of the 2nd Fundamental Plan

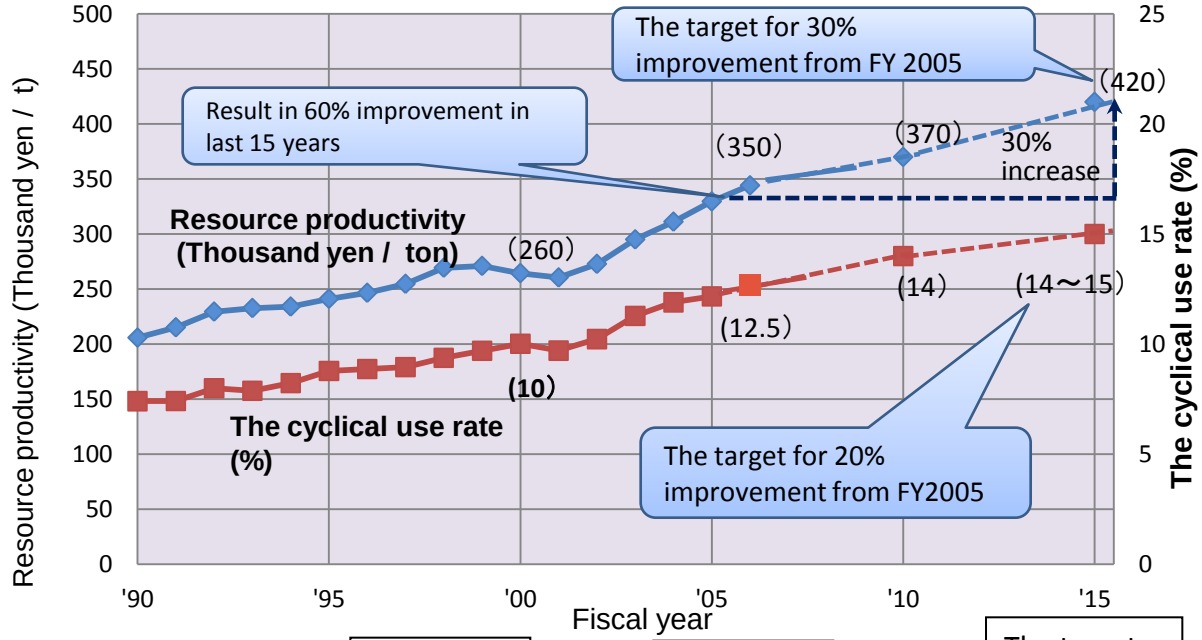
- The current situation and issues
  - All the three material flow-based indicators, *resource productivity*, *cyclical use rate* and *final disposal amount*, improved
  - However, it is necessary to further develop sound material cycle societies both domestically and internationally by implementing the 3Rs thoroughly
- A mid-to-long term image of Sound Material Society
  - “Sustainable Society” in cooperation with “Low Carbon Society” and “Nature Harmonious Society”
  - “Stock-based Society”
  - Sound material societies in regional levels
  - Lifestyle along the concept of *Mottainai*

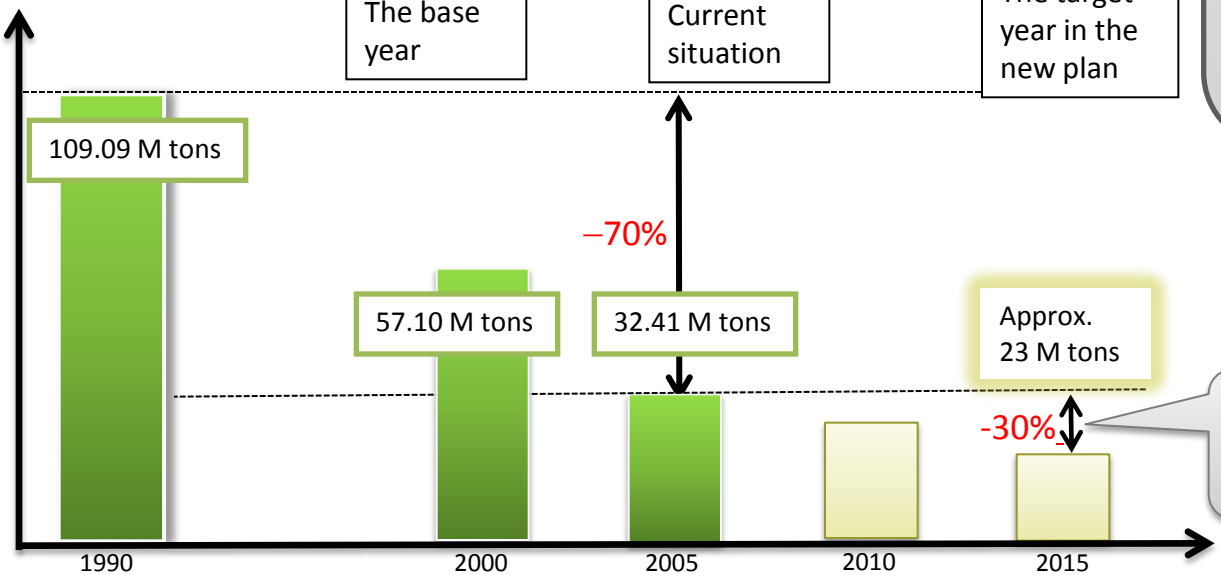
Overview of the 2nd Fundamental Plan

- Indicators and targets (base = FY2000, target = FY2015)
  - Material flow-based indicators
    - "Inlet": Resource Productivity → 420 k JPY/ton (+60%)
    - "Cycle": Cyclical Use Rate → about 14--15% (+40--50%)
    - "Outlet": Final Disposal Amount → about 23 Mt (–60%)
  - Indicators related to effort
    - Reduction of municipal solid waste
    - Reduction of final disposal of industrial waste → about –60%
    - Changes in awareness and actions of citizens
      → awareness: about 90%, actions: about 50%
    - Promotion of Sound Material Cycle Businesses
      → Double the market for Sound Material Cycle businesses
  - Supplementary indicators
    - "Hidden flow and TMR", "refuse rate of plastic bag", etc.

Material flow-based indicators

Resource productivity & The cyclical use rate





The final disposal amount

● Aiming to reduce by another 30%, compared to the current level

The 2nd Plan

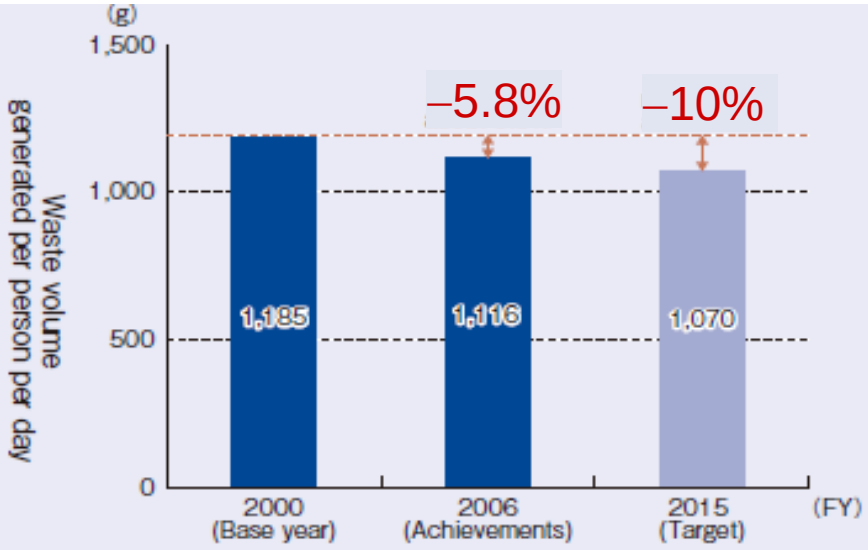
In FY 2000 → In FY 2015

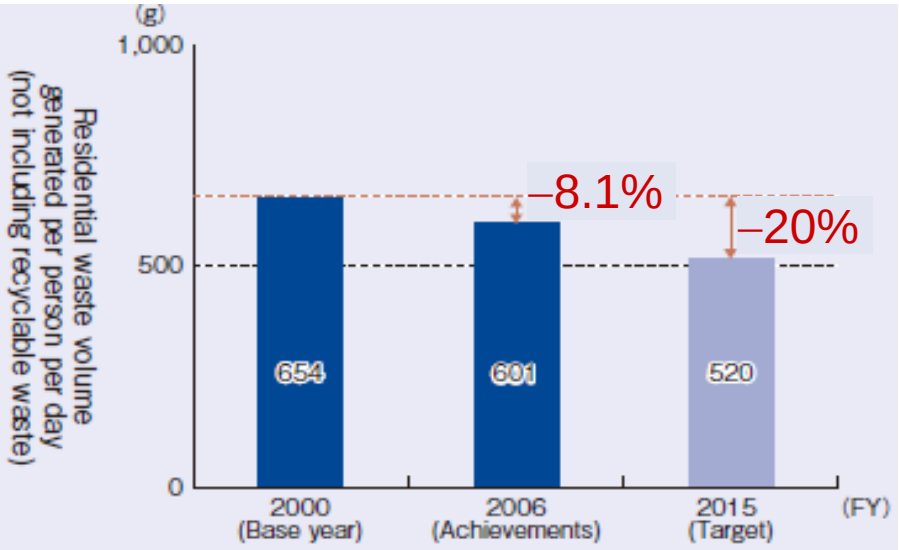
Resource productivity
260 k JPY/ ton
→ 420 k JPY/ton
(about 60% improvement)

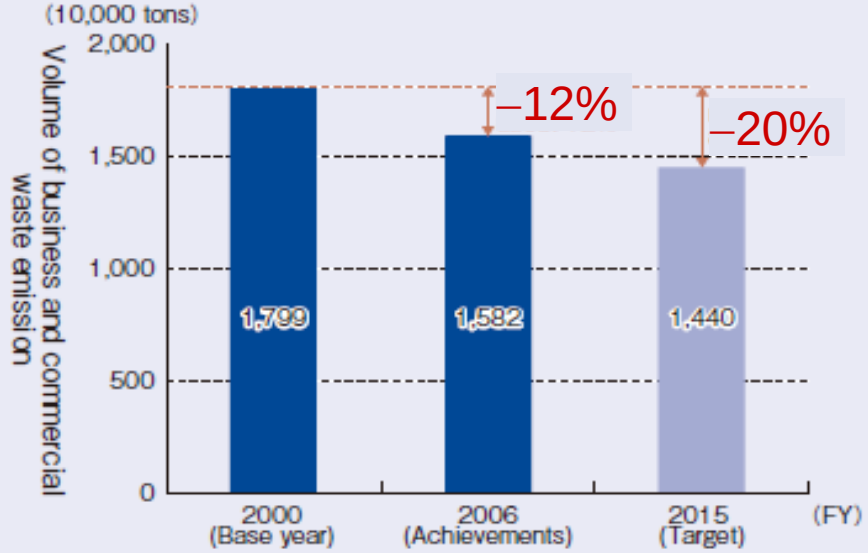
The cyclical use rate
10% → 14--15%
(about 40--50% improvement)

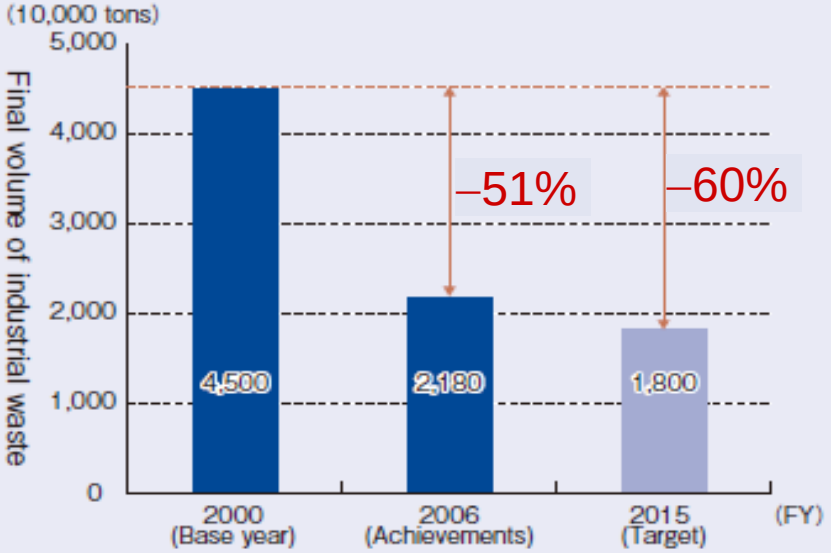
The Final disposal amount
57 M ton → 23 M ton
(60% reduction)

Indicators related to effort







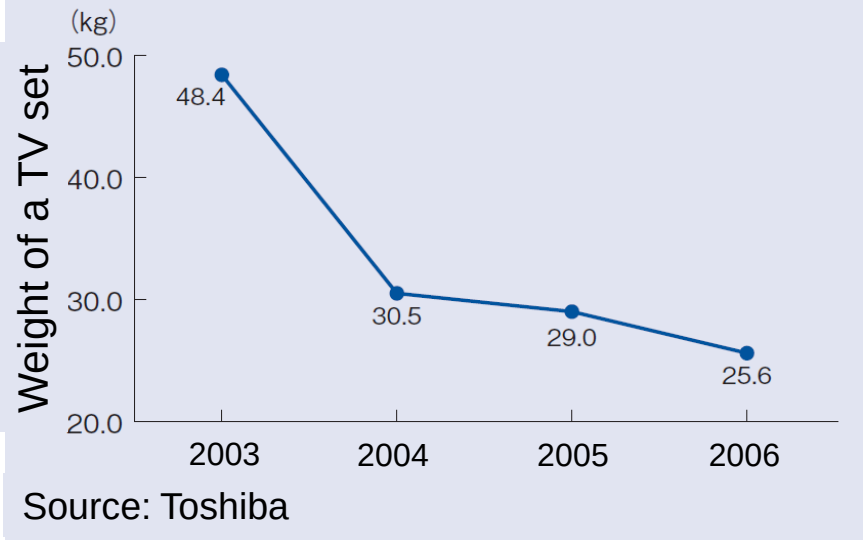


Source: Ministry of the Environment

Amount of municipal wastes and final disposal of industrial wastes decreased steadily

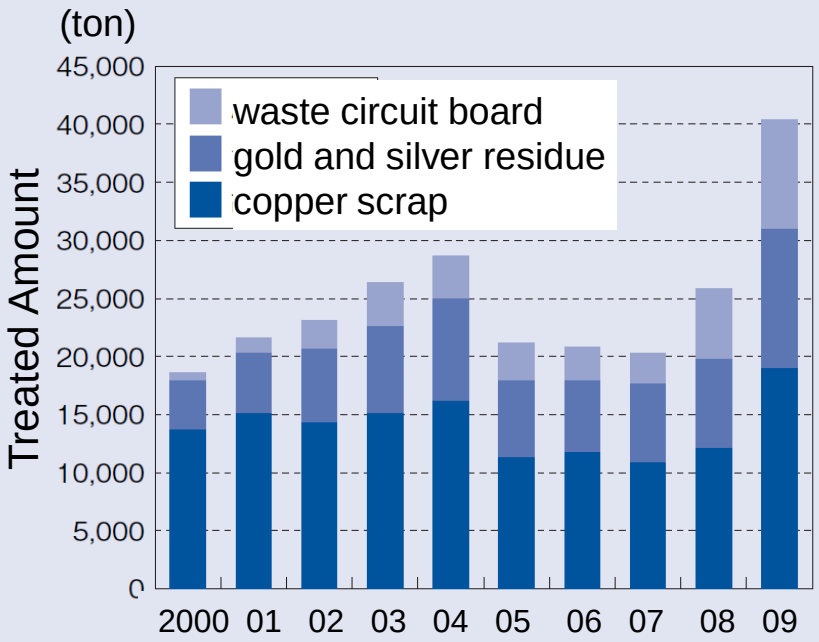
Technologies contributing to the resource productivity improvement

Less use of resource



Source: Toshiba

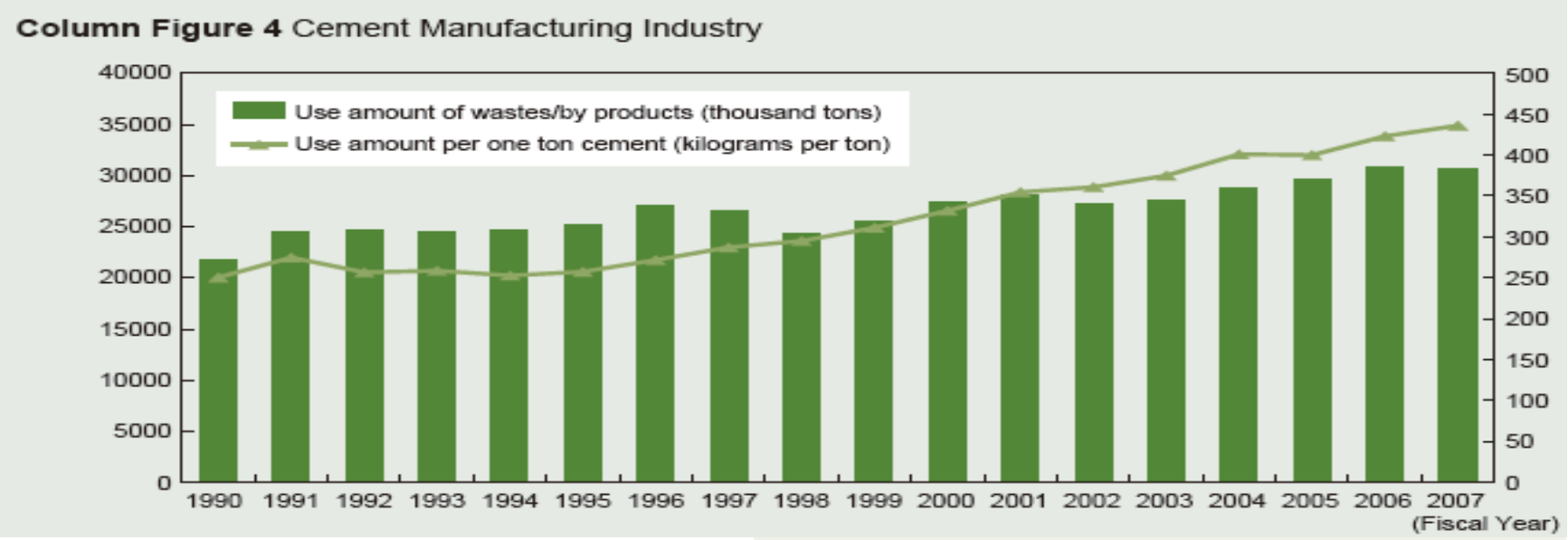
3R of metal resource



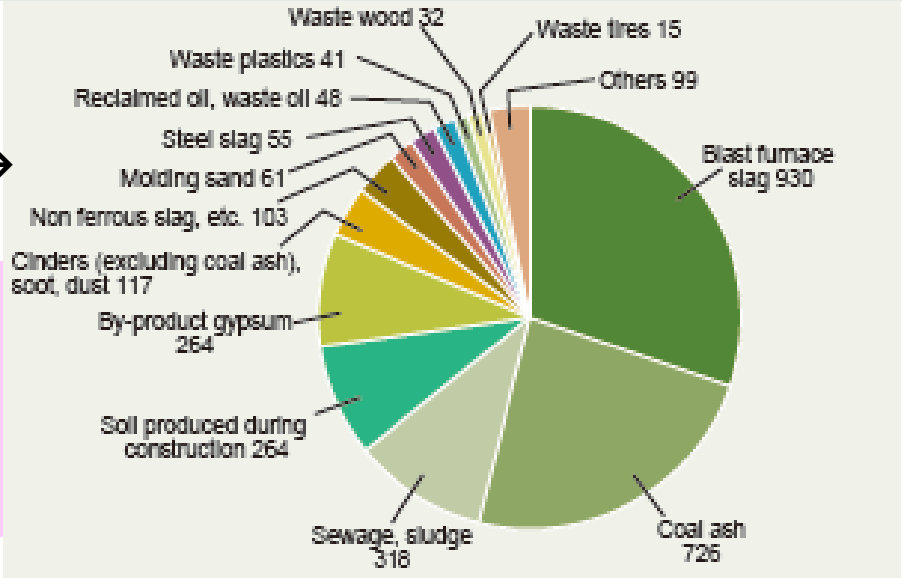
2008 and 2009 estimated
Source: DOWA Eco-System Co., Ltd.

The Resource Productivity of Japan has been steadily increasing as a result of the saving energy and resources.

Cooperation between industries



Itemized amount of wastes/by-products in FY2007 →

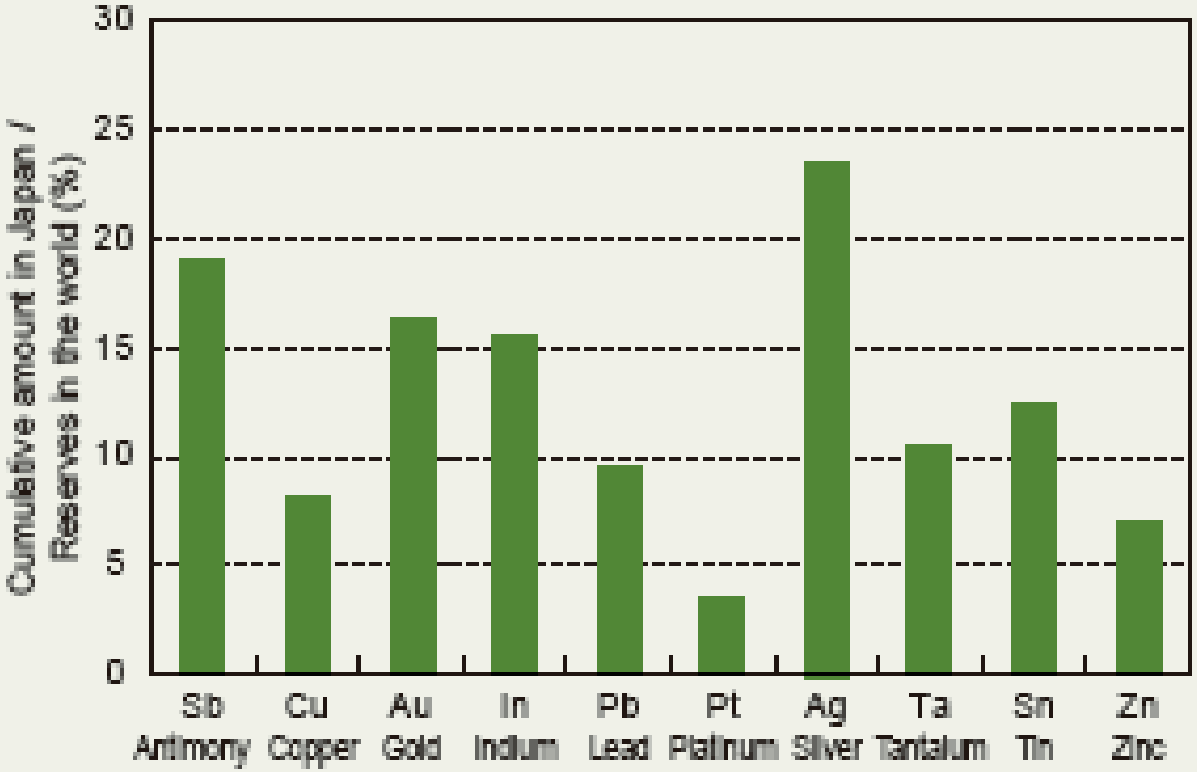


Source: Japan Cement Association

The cement industry has accepted various wastes and by-products from other industries, such as scrap tires and casting sand.

Urban mine: Conservation of natural resources

Figure 1-3 The Amount of Japanese Reserves of the Various Metals found in Electronic Parts, Compared to World Reserves



Note: The data for the reserves was taken from the 2007 edition of the Mineral Commodity summaries published by the U.S. Bureau of Mines.

Source: National Institute for Materials Science

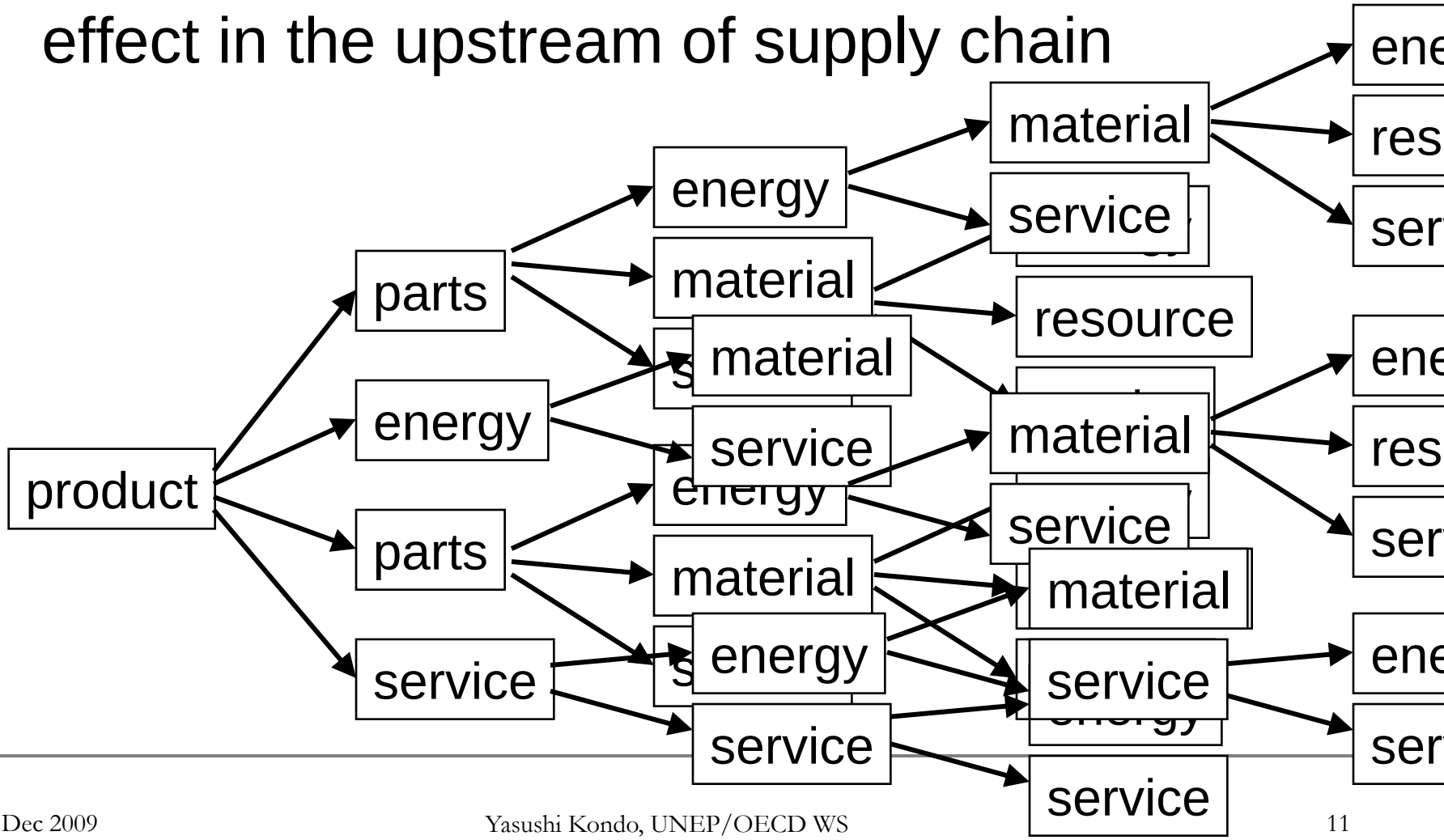
The rate of the amount of metals accumulated in the so-called urban mine, such as domestic electronics parts, to the total world reserves ranges from a few percent to 20% or so.

→→

Detailed information on material composition of products and their destination is necessary for sustainable resource management.

Input-Output Analysis: Repercussion

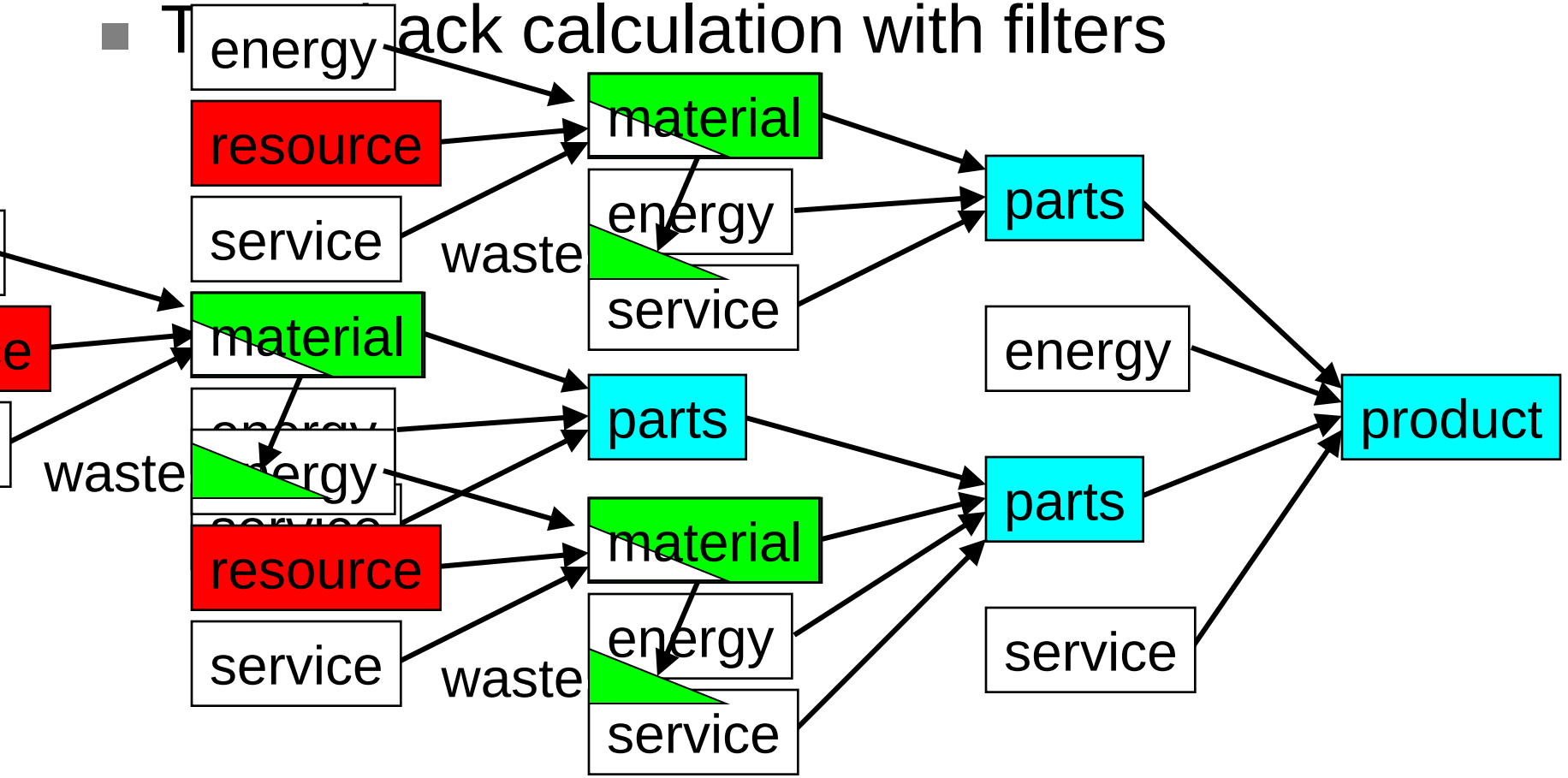
- Demand for a product causes a repercussion effect in the upstream of supply chain



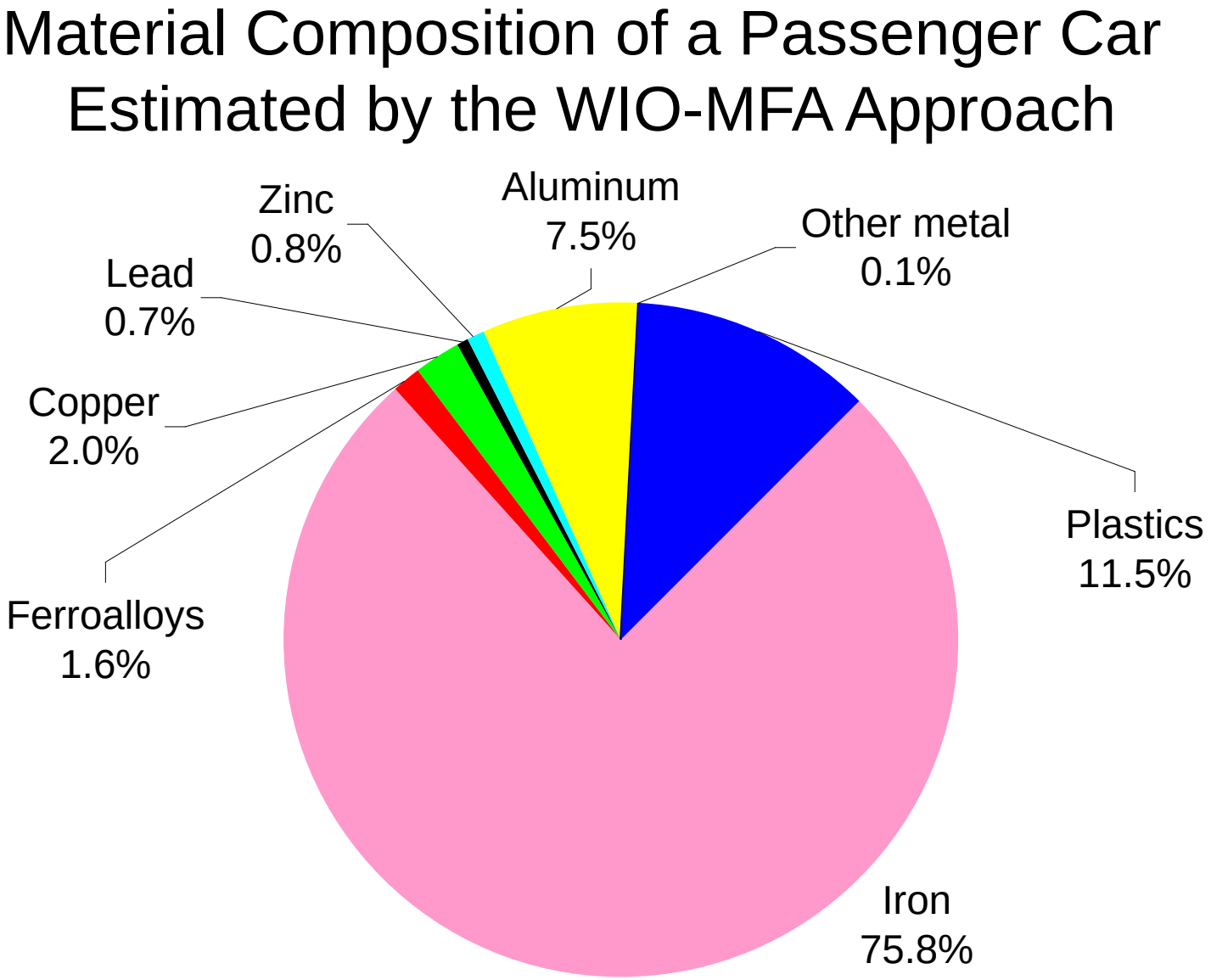
WIO-MFA: Application of IOA

Waste Input Output-Material Flow Analysis
Nakamura & Nakajima (2005, Mat. Trans.), Nakamura et al. (2007, J. Ind. Ecol.)

- T[illegible]ack calculation with filters



WIO-MFA: Estimation of material composition



Nakamura et al. (2007, J. Ind. Ecol), updated

WIO-MFA: Input origin of material composition

Nakamura et al. (2007, J. Ind. Ecol), updated