Material use and resource efficiency in Europe

Overview of national experience, approaches and policies to support resource efficiency in the EEA member countries

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• Facts and figures on Europe’s use of resources
• Policies related to resource efficiency in the European Union
• Overview of what member states are doing at the national level
• A few reflections on waste prevention and recycling in the EU
Specialised agency of the European Union, operating since 1994

EEA provides information on the state of environment, trends and outlook, to support policy making

32 member countries: EU-27, Iceland, Liechtenstein, Norway, Switzerland and Turkey.

6 cooperating countries in the West Balkans

Covering over 500 mln people, and about 1/3 of world GDP
Material Flow Accounting – a standardized system used by the EU and OECD

- Invented in the 1990ies
- Methodology development led by Eurostat (EU statistical office) in coordination with OECD
- MFA accounts (in tonnes) for all extraction of biomass, fossil fuels, metal ores and metals, and non-metallic minerals as well as the physical weight of imports and exports
- MFA indicators only count the weight of used materials which have an economic value
- DMC and DMI are the most used MFA indicators, often combined with GDP
Per capita use of material resources in 2008
(tons of materials (DMC)/ per person per year)

EU-27 average

EU-27

Others in Europe

OECD

EU27*

Norway

Iceland

Switzerland

Turkey

Australia

New Zealand

United States

Canada

Japan
Average of 16-17 tones annually per person (as ‘Domestic Material Consumption’)

... which become 40 - 50 tonnes when accounting for unused extraction and for ‘ecological rucksacks’ of imports (i.e. Total Material Requirement)
Material productivity in 2008 (*2007) (GDP per ton of materials used (DMC))

EU-27

EU-27 average

Others in Europe

OECD

GDP in USD (ppp) per ton DMC

Malta

United Kingdom

Italy

Luxembourg

Netherlands

Belgium

France

Germany

Sweden

Spain

Slovakia

Denmark

Latvia

Estonia

Greece

Czech Republic

Finland

Portugal

Cyprus

Ireland

Bulgaria

Romania

EU15

EU17*

EU12*

Switzerland

Iceland

Turkey

Norway

Japan

United States

Canada

New Zealand

Australia
Material productivity over time in EU-15 and EU-12 (compared to selected non-EU countries)
Material productivity and use of material resources EU-15 in the period 1970-2008

EU15-1970-2008

- GDP
- DMC
- Material Productivity

European Environment Agency
Share of imports in total DMC of EU-27, by category

- **TOTAL DMC**: 20%
- **Minerals**: 3%
- **Biomass**: 11%
- **Fossil fuels**: 53%
- **Metals**: 74%

Legend:
- Domestic production
- IMPORTED

European Environment Agency
Access to resources and security of supply of raw materials have become a major strategic concern

• 2008 November: Communication on the Raw Materials Initiative (includes recycling)
• 2010 June: report on critical raw materials
• 2011 February: Communication on tackling the challenges in commodity markets and on raw materials
“Resource efficiency” a dynamically growing environmental policy area

Several major EU policy initiatives in recent years:

- 2011 EC Communication on roadmap to a resource efficient Europe (published in September 2011)
- 2010 ‘Europe 2020’ strategy and its seven Flagship Initiatives one of which is on resource efficiency (May 2010)
- 2008 Action Plan on Sustainable Consumption & Production
- 2005 Thematic Strategy on Sustainable Use of Resources
- 2005 Thematic Strategy on Waste Prevention and Recycling
- EU Sustainable Development Strategy
- 6th Environment Action Programme
- Waste framework directive
A large number of related terms in use

- Resource efficiency
- Resource productivity / material productivity
- Decoupling resource use from economic growth
- Green economy
- Green growth
- Eco-efficiency
- Sustainable use of natural resources
- Sustainable consumption and production
- Sustainable materials management
- Sound material-cycle society / 3R
- Waste prevention and recycling
- Circular economy
Resource efficiency....

“allows the economy to create more with less, delivering greater value with less input, using resources in a sustainable way and minimising their impacts on the environment”

Source: 2011 Resource efficiency roadmap:

European Environment Agency
In the 2011 European Commission Communication 'Roadmap to a resource efficient Europe', resources include raw materials, energy, water, air, land and soil, biodiversity, stable climate and ecosystem services.

2005 EU Thematic strategy on the sustainable use of natural resources: 'raw materials such as minerals, biomass and biological resources; environmental media such as air, water and soil; flow resources such as wind, geothermal, tidal and solar energy; and space (land area).'
Member States should:

- Develop or strengthen existing national resource efficiency strategies, and mainstream these into national policies for growth and jobs (by 2013);

Various interesting policy initiatives already in place in the member states.
The 10 things about resource efficiency policies which we asked countries about:

1. **Main drivers** for resource efficiency policy
2. **Dedicated strategies or action plans** on resource efficiency
3. How resource efficiency is addressed in **economy-wide policies**
4. **Major sectoral strategies and action plans** which include an objective to improve resource efficiency
5. **Priority resources** identified in policies
6. **Product groups** identified for efficiency improvements
7. **Strategic objectives and targets** for resource efficiency, and **indicators** used to monitor developments
8. **Institutional setup** in place
9. Specific policy instruments or initiatives on resource efficiency to be shared as **examples of good practice**
10. **Knowledge gaps and information needs** regarding development and implementation of resource efficiency policies.
In the spring 2011, we collected information on resource efficiency policies in 31 countries.
Some reflections on the definitions of ‘resources’ and ‘resource efficiency’

• There is no generally accepted common understanding of the terms “resources” and “resource efficiency” in place

• A few countries formally define the term ‘resources’ in their policies

• Others use the more narrow term ‘raw materials’ when looking at resource efficiency.

• Countries would welcome clarity on how this new policy priority relates to ‘sustainable consumption and production’, ‘sustainable use and management of resources’, ‘green economy’, etc.
How is resource efficiency addressed in policies today?

- Few countries have a strategic document (strategy, action plan, etc) specifically dedicated to resource efficiency (although all EU countries will have to).

- Generally, six broad ‘economy-wide’ plans include aspects of resource efficiency:
  - National sustainable development strategies
  - National environmental strategies /action plans
  - SCP action plans;
  - Raw materials plans and strategies;
  - Strategies and plans related to climate change;
  - Economic reform programmes (ROADMAP: ‘member states to report their progress on resource efficiency as part of their national reform programmes’).
What are ‘priority resources’?

- For most countries, energy sources (fossil fuels and renewables) already are a high priority

- Waste considered a ‘priority resource’ (#2 !)

- Various types of `biomass’ and `raw materials’ also high on the agenda

- Some countries emphasised local priorities, eg. water or land and soil

- Little note of ‘ecosystems services’ => Roadmap
Strategic objectives and targets

- Strategic objectives are fairly general in nature, and tend to just express guiding principles.

- A few countries address absolute amounts of resources used (e.g., Austria, Denmark, Italy).

- Some address global impacts of national consumption (e.g., Sweden, Netherlands).

- Targets mostly aimed at technology-driven production efficiency improvements - few initiatives aiming to manage consumption/demand.

- Limited experience in addressing consumption impacts or ecosystems resilience.
A sample of objectives and targets in place

Examples of targets on resource efficiency reported by countries

- Doubling of the **abiotic material productivity** by 2020 (Germany)
- Doubling the **energy productivity** by 2020 (Germany)
- Reduction of Italian **TMR** by -25% by 2010, -75% by 2030 and by -90% by 2050
- 2.3 million ha **forest area** by 2013 (Estonia)
- All government **buildings** that are new, under renovation or leased must be passive by 2015 (Finland)
- Decrease in **final energy consumption** by 2050 of at least one third of the 2020 level (Finland)
- The share of **ecologically farmed areas** on all agriculture used areas shall increase to 20 % by the year 2010 (Austria)
- By 2010 extraction of **natural gravel** in the country will not exceed 12 mill tonnes/year (Sweden)
- Reduction of **land use** for housing, transport and soil sealing to the daily growth of 30 ha in 2020 (Germany)
- **Renewable energy share** had to be 49.3% of total consumed energy in 2010 (Latvia)
- Installation of 165 MW **wind turbines**, 25 MW CPS, 10 MW PV systems, 4 MW biomass, and 3 MW biogas systems until 2015 (Cyprus)
- Increase the per capita consumption of wood and wood **products from sustainable forestry** from 1.1 m3 to 1.3 m3 (Germany)
- Reducing the quantity of yearly **waste** produced by 20% (Hungary)
- At least 70% of the **construction-demolition waste** should be recycled until 2020 (Hungary)
• As provisional lead indicator, the EU to adopt resource productivity, measured by the ratio of GDP to Domestic Material Consumption (expressed in Euro/tonne).

• It should be complemented by a 'dashboard' of indicators on water, land, materials and carbon and indicators that measure environmental impacts and our natural capital or ecosystems as well as seeking to take into account the global aspects of EU consumption.

• On a third level, thematic indicators will be used to monitor progress towards existing targets in other sectors.
Institutional arrangements

- Great variety of institutional settings and organizational arrangements for resource efficiency
- Generally, four types of Ministries involved: Environment, Energy, Economy, and Agriculture
- Sometimes overlapping competencies
- Some “specialised agencies” recently established to support policy development (e.g. Finland, Germany)
- Limited involvement at the local and regional levels
More details at:
www.eea.europa.eu/resource-efficiency

- Thirty one detailed ‘country profiles’ available on the EEA website
- An analytical report “Resource efficiency in Europe” (Oct 2011)
Recent EU legal instruments and strategies, such as the revised Waste Framework Directive (2008/98/EC), the Thematic Strategy on the prevention and recycling of waste and the 6th Environmental Action Programme (6EAP) prioritise waste prevention, and decoupling of waste generation from economic growth and environmental impacts.
• The Waste Framework Directive (2008, revised) introduces and defines basic concepts and lays down waste management principles such as the waste hierarchy.

• Waste prevention is the most favourable option in the waste hierarchy.
Are we reducing the generation of waste in Europe?

- The overall trend in waste generation, including hazardous waste, is upwards.
- Total waste generation in the EU-27, Turkey, Norway, Iceland, Croatia: 2.7 billion tonnes (2008)
- Total hazardous waste generation: 98 million tonnes (2008)
- Total municipal waste generation in the EU 27: 260 million tonnes (2008)
- 524 kg/cap municipal waste generation (2008), large differences between countries
Generation of Municipal Waste in Europe kg/capita

Kg per capita

- Denmark, Switzerland, Luxembourg, Cyprus, Ireland, Malta, Netherlands, Austria, Germany, Spain, Italy, France, Sweden, Finland, Portugal, Bulgaria, Slovakia, Hungary, Greece, Turkey, Lithuania, Croatia, Romania, Former Yugoslavia, Serbia, Slovakia, Latvia, Poland, Czech Republic, Albania

2003 - 2008
Trend and Outlook of Municipal Waste Management in Europe

![Graph showing trend and outlook of municipal waste management in Europe](image-url)
Landfilling of Municipal Waste by countries

- 2003
- 2008

Countries listed include:
- Switzerland
- Germany
- Netherlands
- Sweden
- Austria
- Denmark
- Belgium
- Norway
- Luxembourg
- France
- Estonia
- Italy
- Finland
- United Kingdom
- Spain
- Ireland
- Portugal
- Iceland
- Czech Republic
- Poland
- Hungary
- Slovenia
- Romania
- Slovakia
- Greece
- Turkey
- Cyprus
- Lithuania
- Malta
- Latvia
- Bulgaria

[European Environment Agency logo]
Some examples of recycling targets in EU Directives

<table>
<thead>
<tr>
<th>Directive</th>
<th>Year</th>
<th>Recovery targets</th>
<th>Recycling targets</th>
<th>Collection targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packaging waste</td>
<td>1994/62/EC, 2008</td>
<td>60 %</td>
<td>55 %</td>
<td></td>
</tr>
<tr>
<td>Tyres</td>
<td>1999/31/EC, 2006</td>
<td></td>
<td>Zero landfill of tyres</td>
<td></td>
</tr>
<tr>
<td>Landfill of biodegradable municipal waste</td>
<td>1999/31/EC, 2006</td>
<td>Reduction to 75 % of the amount generated in 1995</td>
<td></td>
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<tr>
<td></td>
<td>2009</td>
<td>Reduction to 50 % of the amount generated in 1995</td>
<td></td>
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<tr>
<td></td>
<td>2016</td>
<td>Reduction to 35 % of the amount generated in 1995</td>
<td></td>
<td></td>
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<tr>
<td>End-of-Life Vehicles (ELV)</td>
<td>2000/53/EC, 2006</td>
<td>85 % incl. reuse</td>
<td>80 % incl. reuse</td>
<td>100 %</td>
</tr>
<tr>
<td></td>
<td>2015</td>
<td>95 % incl. reuse</td>
<td>85 % incl. reuse</td>
<td>100 %</td>
</tr>
<tr>
<td>Waste Electrical and Electronic Equipment</td>
<td>2002/96/EC, 2006</td>
<td>70–80 % (differs according to WEEE categories)</td>
<td>50–80 % (differs according to WEEE categories)</td>
<td>Min. 4 kg per inhabitant per year</td>
</tr>
<tr>
<td>(WEEE)</td>
<td></td>
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<tr>
<td>Batteries and accumulators</td>
<td>2006/66/EC, 2012</td>
<td></td>
<td>25 %</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2016</td>
<td>50–75 % efficiency (differs according to battery type)</td>
<td>45 %</td>
<td></td>
</tr>
<tr>
<td>Paper, metal, plastic, glass waste</td>
<td>2008/98/EC, 2015</td>
<td></td>
<td>Separate collection of at least paper, metal, plastic, glass</td>
<td></td>
</tr>
<tr>
<td>Waste from households and possibly from other origins</td>
<td>2008/98/EC, 2020</td>
<td>50 % of materials such as at least paper, metal, plastic and glass (incl. reuse)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction and demolition waste (excl. soil and stones)</td>
<td>2008/98/EC, 2020</td>
<td>70 % (incl. reuse)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: All targets apply per country. Some EU Member States have derogation periods for a number of the targets. The targets have been simplified for the purpose of giving an overview. Exact dates, waste types addressed, etc. are given in the respective directives.

http://www.eea.europa.eu/soer/europe/material-resources-and-waste
The turnover of seven recyclables has almost doubled from EUR 32,5 billion in 2004 to EUR 60,3 billion in 2008. Iron and steel account for over a half of the value, followed by Cu, Al and Ni, and paper and cardboard.
In closing, a quote:

Learn from others but find your own way …