ETC/SCP

European Environment Agency

2011 Survey of resource efficiency policies in EEA member and cooperating countries

COUNTRY PROFILE:

Germany

Country information on resource efficiency policies, instruments, objectives, targets and indicators, institutional setup and information needs

May 2011

This country profile is based on the information provided by Mr. Christian Loewe and Mr. Jens Guenther from the German Eionet National Reference Centre for SCP including resource use. The information is current as of April 2011.

This country profile was prepared as part of the EEA-ETC/SCP 2011 survey of resource efficiency policies, which aims to collect, analyze and disseminate information about national experience in the development and implementation of resource efficiency policies in EEA member and collaborating countries. The work resulted in the following outcomes:

- **Short 'country profiles' (this document)** - self assessments prepared by countries, describing the current status of resource efficiency policies, including key strategies and action plans, policy objectives, instruments, targets and indicators used, institutional setup and information needs.
- **Summary report** - prepared by the EEA and ETC/SCP, the report reflects on trends, similarities and differences in policy responses, showcases selected policy initiatives from member countries and identifies information needs and knowledge gaps.
- A session on resource efficiency policies during the 2011 EIONET workshop to discuss further needs and to facilitate information sharing and experience exchange among EIONET members.

More information about resource efficiency policies, including an analytical report "Resource efficiency in Europe" and thirty one country profiles, can be found at:

http://www.eea.europa.eu/resource-efficiency

1. Resource use in Germany – facts and figures

1.1 General facts and figures about the country

Source: https://www.cia.gov/library/publications/the-world-factbook/index.html

Population (projected inhabitants for 2010) [1]	81,802,257
➢ Percent of total EEA-32	13.9%
Surface area (km^2) [2]	357,022
➢ Percent of total EEA-32	6.3%
GDP at market prices – Purchasing Power Standard – Current Prices (Million Euro, 2009) [3]	2,242,040.5
➢ Percent of total EEA-32 (minus Liechtenstein)	17.2%
GDP per capita in Purchasing Power Standards (PPS) [4] EU27=100 (2009)	116
Urban population (rate of pop., 2009) [5]	73.7%
Main economic sectors and their share in total GDP (2009 est.) [2]	
Agriculture	0.8%
Industry	27.9%
Services (2010 est.)	71.3%
EU accession date [6]	Founding member 1.1.1958

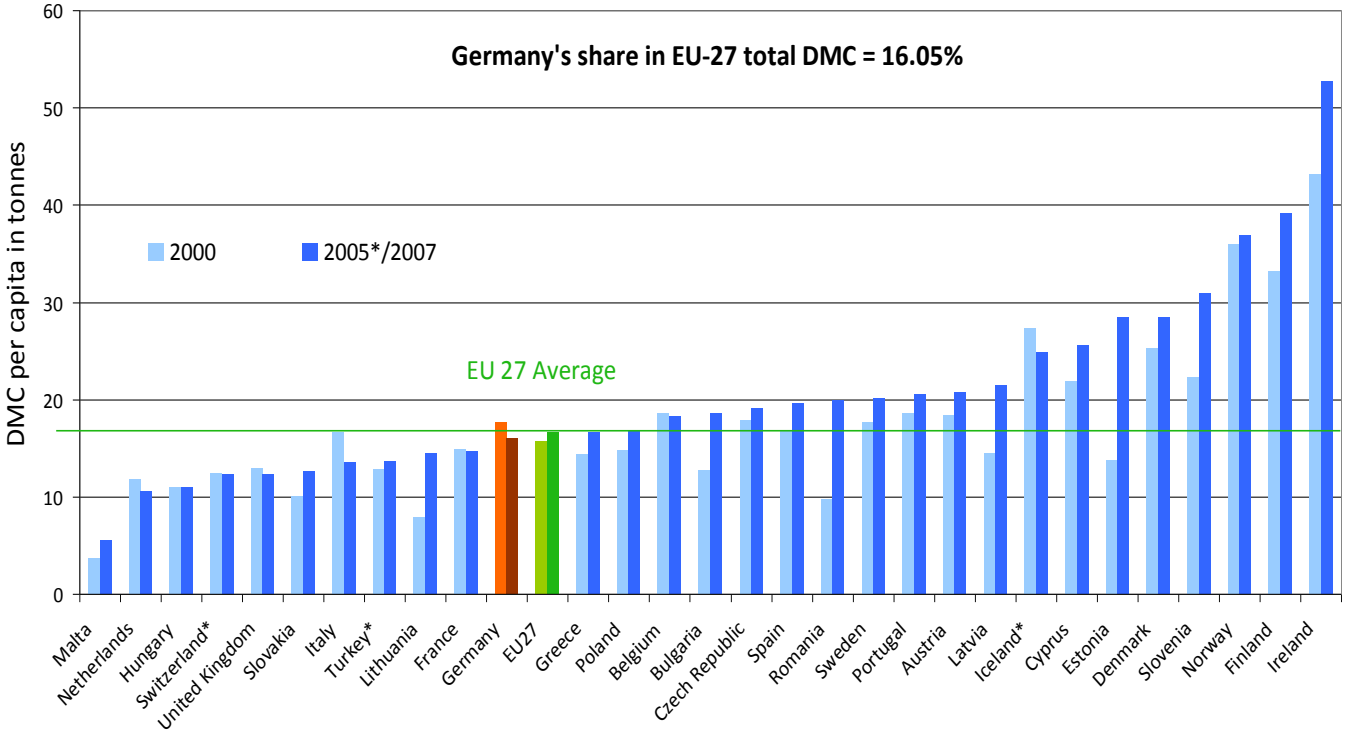
Additional relevant background information on Germany (and on 37 other EEA member and cooperating countries) can be found at the SOER2010 website:
http://www.eea.europa.eu/soer/countries/de

Factsheet on national waste policies for Germany is available at:
http://scp.eionet.europa.eu/facts/factsheets_waste/2009_edition/factsheet?country=DE

Factsheet on national sustainable consumption and production policies for Germany is available at:
http://scp.eionet.europa.eu/facts/factsheets_scp/germany

1.2 Facts and figures on resource efficiency for Germany

Use of resources per capita 2000 and 2007 [tonnes DMC/capita]



Source: Eurostat, OECD and Total Economy Database [7] * = For these countries data is for 2000 and 2005

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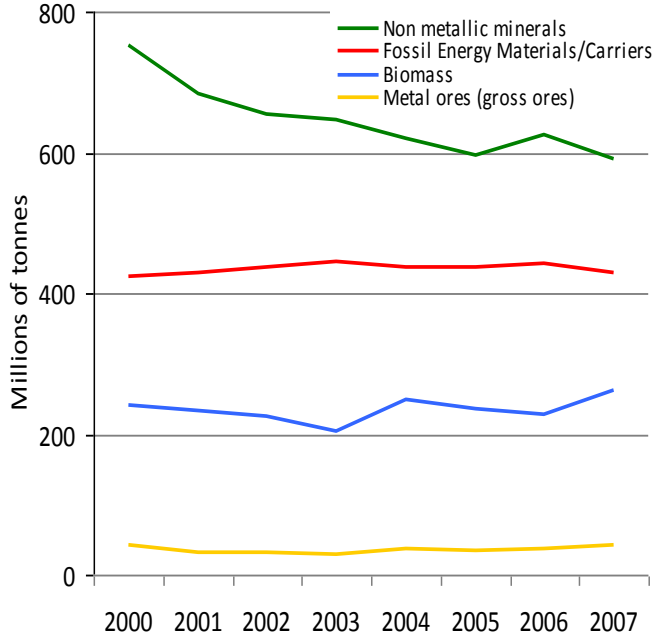
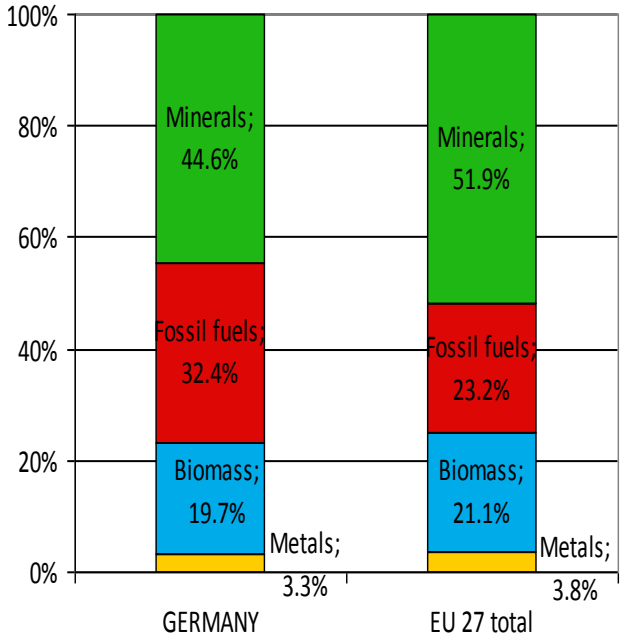
Domestic Material Consumption by category over time, Germany



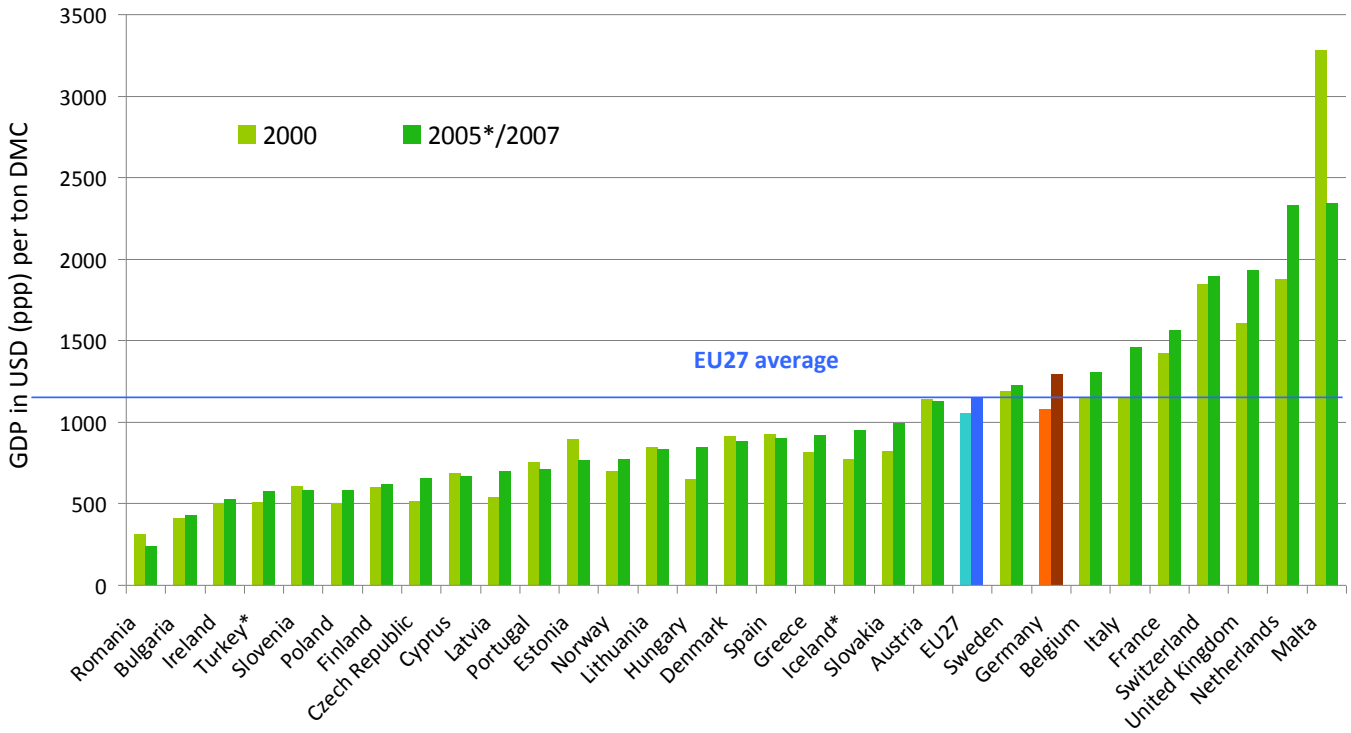
Source: Eurostat [8]

Breakdown of DMC by type of materials (2007)



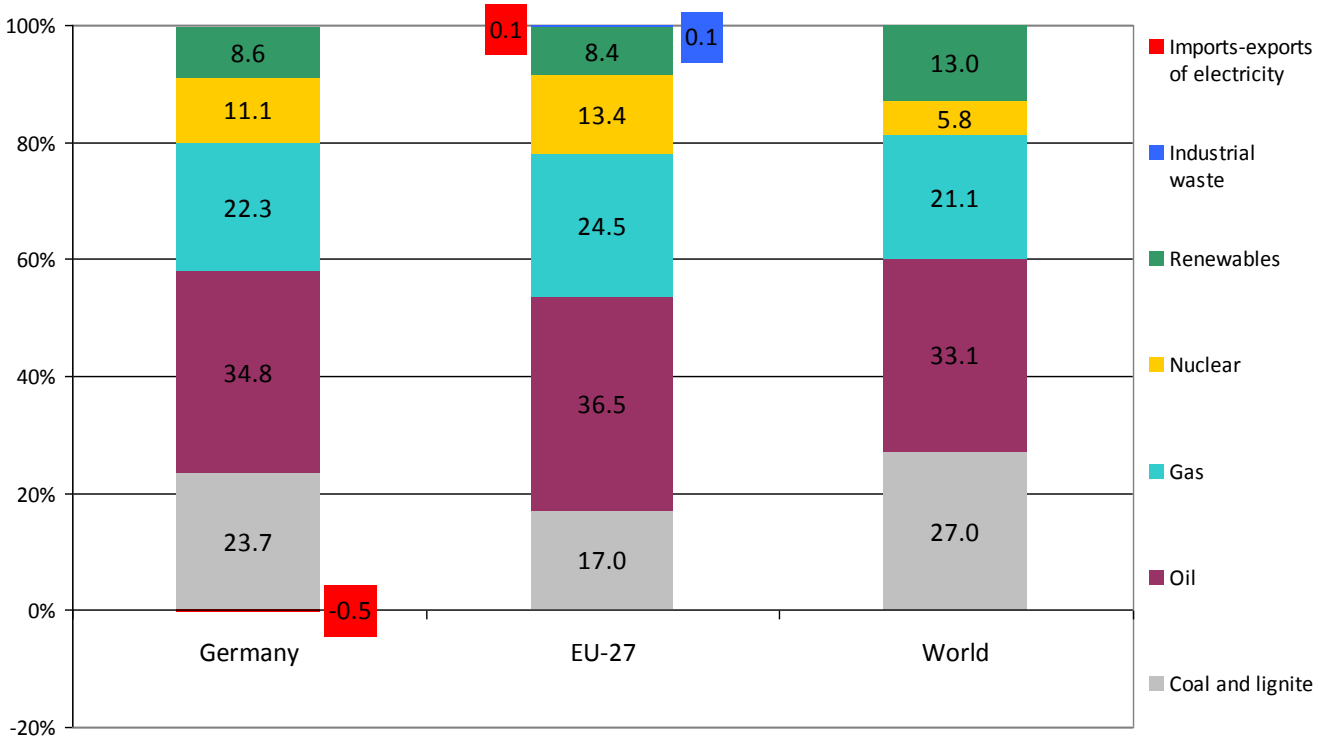
Source: Eurostat [8]

Material productivity 2000 and 2007 [USD ppp/ton DMC]



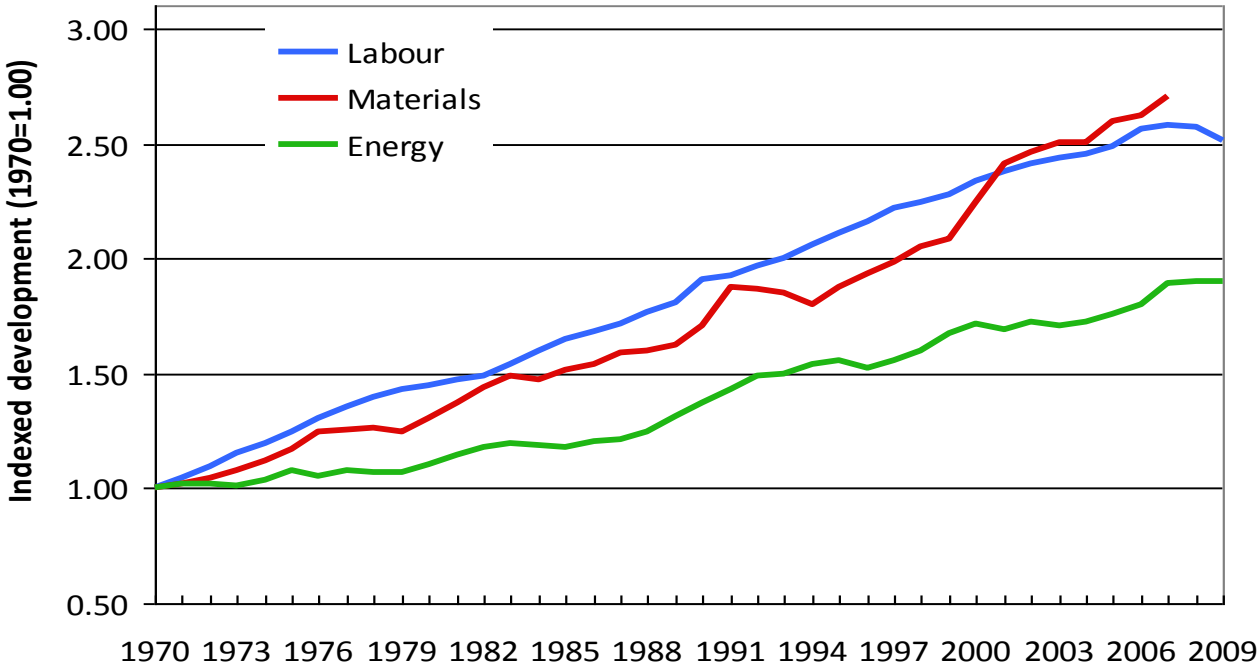
Source: The Conference Board, Total Economy Database, Eurostat [9]
* = For these countries data is for 2000 and 2005.

Primary energy consumption



Source: Eurostat [10]

Trends in labour, materials and energy productivity, 1970-2009



Source: Total Economy Database, IFF Database. WI Database, Eurostat, OECD, IEA Database [11]

2. Evolution and main drivers for the development of resource efficiency policies

In 1970 the German Federal Government started a crash programme on environmental protection, because of serious environmental pollution mainly caused by industrial growth, which was framed by an environmental action programme. Besides various policies addressing waste disposal, emission control, waste water, chemicals and producers responsibilities, the national eco label scheme **"Blue Angel"** (www.blauer-engel.de) and the **"Environmental Technology Programme"** (nowadays: Eco-Innovation Programme) were introduced by 1978 as specific instruments in order to support industry to develop environmental friendly products and technologies and to guide consumer-decisions towards eco-efficient products and services.

After the establishment of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety in 1986, the environmental minister Klaus Töpfer from 1987-1994 tried to position Germany as an international frontrunner in environmental policy. The regulation for large scale combustion plants from 1983, the amended TA Luft order from 1986, the emission regulation for motorcars as well as the circular economy and waste law, planned in 1994 and passed in 1996, contributed to a comparatively ambitious national environmental policy and established producer responsibility. These new regulations were the basis for a more precautionary environmental policy in Germany which also contained more systematic policy approaches on product related environmental policy and sustainable consumption, like green public procurement and consumer information.

After 1998, the principle of sustainable development became a guiding principle of federal environmental policy in Germany. This has been manifested in the national sustainable development strategy from 2002 "**Perspectives for Germany**" [1]. The strategy sets the main route on resource efficiency policy in terms of sustainable development and intergeneration equity by setting defined targets on raw material productivity (doubling to 2020 with base year 1994, long term target is factor 4) and energy productivity (doubling to 2020 with base year 1990, long term target factor 4).

Another main driver for increasing resource efficiency is the German waste policy. Waste policy focused on the prevention of hazards at the beginning, but it now mainly deals with closing the material flows and recycling raw materials. For example, the regulation on packing has lead, since the beginning of the 90's, to a steady increase in recycling and prevention of waste. The ban on dumping of untreated waste since 1st of June 2005 also induced an increase in using waste for secondary raw materials production. The steady increase in using secondary raw materials substituted raw material imports to Germany with a value of around 3.7 billion Euros in 2005.

A third pillar of Germany's resource efficiency policy is resource efficiency as strategic topic for innovation, growth and improving competitiveness of the German economy. To promote resource efficiency as a main driver for future growth, the Federal Ministry of Economy and Technology funded the German Material Efficiency Agency in 2006. Its main goals are to provide information and increase public awareness of the importance of material efficiency, to encourage companies to realise material efficiency potentials and to actively support them within a framework of support programmes and a pool of material efficiency consultants providing their expertise to

companies on recognizing and realizing efficiency potentials. In 2009 the Federal Environment Ministry and the Association of German Engineers founded in a project co-operation the Centre for Resource Efficiency (VDI ZRE). The aim of the Centre for Resource Efficiency is the promotion of an integrated use of technologies protecting the environment, natural resources and the climate. Mostly through awareness raising, case studies and best-practice databases, the Centre for Resource Efficiency aims to reduce the resource consumption in German industries.

Currently the German Government is preparing a **National Resource Efficiency Programme** for Germany with the Federal Ministry for the Environment as leading ministry for development. Main focus will be the minimisation of impacts on the environment through raw material production and processing with measures on all administrative levels from national to business level. It is intended to merge different main drivers and policy approaches e.g. waste policy, securing raw material supply, sustainable consumption and production, improving competitiveness and reducing impacts of resource use into an overall strategy on resource efficiency. The programme is intended to be published at the end of 2011.

3. Overall Policy Approach for Resource Efficiency

In 2010 the Federal Ministry for the Environment started to prepare a **National Resource Efficiency Programme** for Germany as leading ministry. The main focus will be the minimisation of impacts on the environment through raw material production and processing with measures on all administrative levels from national to business level. The programme is intended to be published at the end of 2011.

Up to now, the topic of resource efficiency is addressed in different overall strategies:

- The recently published **National Raw Material Strategy (2010)** is mainly focussing on securing the availability of mineral raw materials. Increasing the material efficiency, mainly addressed through guidance and information instruments, is defined as one pathway to secure the raw material availability [2].
- The **Framework Research Programme for Sustainable Development** (FONA), as one of the main German Research programmes, has several thematic focal points addressing resource efficiency e.g. (i) development of sustainable and high efficient production systems, (ii) r^2-innovative technologies for resource efficiency in raw material intense production systems or (iii) materials for a resource-efficient industry and society [5].
- In November 2010, the Federal Government launched the "**National Research Strategy for BioEconomy 2030 – Our Path towards a Bio-based Economy**" which a total volume of funds of over 2 billion Euro for the next six years. The overarching aim of the strategy is to promote the sustainable use of biological resources by bio-innovations and their application in various industrial sectors to improve material efficiency, climate protection and the use of materials from renewable sources. The first fields of research are innovations in white (industrial) biotechnology [6].

4. Strategies or action plans to improve resource efficiency for individual economic sectors, products or product groups

Sector-specific strategies and action plans at the Federal Level:

- **Ecological Industrial Policy:** In 2006, the Federal Environment Minister called for a new industrial policy based on a "new deal" between economy, environment and employment. The "new deal" is meant as a strategic answer to the challenge of a growing world population and economic activity with a rising demand for resources and energy. Germany is both resource-poor and export-oriented and is facing therefore extreme economic risks. This "new deal" is supposed to be based on cooperation between policymaker, producers and consumers along the full life cycle and in all relevant sectors. Based on six basic principles, the ecological industrial policy framework defines policy actions within 10 major fields, like strengthening economic instruments, encouraging investments, simplifying finance, making use of regulatory law, making benchmarks transparent, establishing labels and top-runners, using and developing market launch programmes, focusing strength with a procurement pact, improving education and training, focusing research funding, intensifying export initiatives and foreign trade [7].
- **National Strategy for the Sustainable Use and Protection of the Sea (2008):** One of the aims of this strategy is that Germany will ensure the procurement and supply of raw materials, energy and food from the sea is carried out in a way that conserves resources. The top priority must be to use the sea's limited resources sparingly and efficiently. The strategy addresses different kinds of uses and resources like fishery, shipping and ports, marine mining and space for offshore wind-parks [8].
- **National Biomass Action Plan (2009) and Action Plan for the Industrial use of Biomass (2009):** These two action plans aims to increase the energetic and industrial use of biomass as a significant contribution to reduce the use of fossil raw materials and to combat climate change. The efficient use of biomass is, in both action plans, one of the main goals and the increase in resource efficiency is addressed in several spheres of activity [9], [10].
- **National Raw Material Strategy (2010):** This mainly focuses on securing the availability of mineral raw materials. Increasing the material efficiency, mainly addressed through guidance and information instruments, is defined as one pathway to secure raw material availability [2].
- **National Energy Efficiency Plan (2008):** A national strategy to reduce energy consumption and improve energy efficiency in Germany, is addressing the efficient use of energy resources [3].
- **Integrated Energy- and Climate package (2007):** Within the package, 29 fields of specific policy measurements are addressed, like market incentive programmes on renewable energy and energy efficiency in buildings, eco-design, public procurement, sustainable mobility. The integrated energy and climate package is complemented by a climate protection initiative of the Federal Ministry for the Environment to widespread renewable energy and energy efficiency within the society and economy, directed to the private and public sector, including policies and instruments towards private households.

- **The High-Tech Strategy 2020 for Germany (2010):** Addresses inter alia resource efficiency in different aspects of innovation processes and future technologies [4]

Sector-specific strategies at the federal state level:

- **Circular flow economy strategy Rhineland-Palatinate:** the strategy aims to address the existing material- and energy flows (e.g. raw materials, biomass, water, waste, energy) in an integrated view in the sense of the sustainable material management. The goal is to reduce resource use where possible and to manage the remaining material flows as efficiently as possible. http://www.mufv.rlp.de/abfall/

5. Individual types of resources identified as priority for national or sector-specific resource efficiency policies

Non-energetic mineral raw materials

- **National Raw Material Strategy (2010)**: Main focus on securing the availability of mineral raw materials. Increasing the material efficiency, mainly addressed through guidance and information instruments, is defined as one pathway to secure the raw material availability [2].
- **German Federal Sustainable Development Strategy (2002):** This declares the prudent and efficient use of scarce resources as a key to sustainable development. To scale down the absolute consumption of scarce raw materials by increasingly efficient use is mentioned as a crucial basis for intergeneration equity. [1]

Energetic raw materials

- **National Energy Efficiency Plan (2008):** A national strategy to reduce energy consumption and improve energy efficiency in Germany, is addressing the efficient use of energy resources [3].
- **National Biomass Action Plan (2010):** Address the sustainable, efficient and secured supply with energetically used biomass [9]
- The **German Federal Sustainable Development Strategy (2002):** Declares the prudent and efficient use of energy as a key to sustainable development [1].

Biomass

- **National Biomass Action Plan (2009)** and **Action Plan for the Industrial use of Biomass (2009):** These two action plans aims to increase the energetic and industrial use of biomass as a significant contribution to reduce the use of fossil raw materials and to combat climate change. The efficient use of biomass is in both action plans one of the main goals and the increase in resource efficiency is addressed in several spheres of activity [9], [10].
- **Charta on wood (2004):** Focus on optimise the quality and quantity of wood supply and increase demand from local wood production [11]

- In 2009, the Federal Ministry of Food, Agriculture and Consumer Protection launched an **integrated strategy on sustainability within food, agriculture and consumer policies** to specify political action in 10 different areas, like climate protection and adaptation, bio-energy and renewable resources, resource efficiency management, rural development and demographical change, safe and healthier food, sustainable consumption, global dimension of food production.

Land

- **Federal Sustainable Development Strategy (2002):** Addresses land use and land sealing. The goal is to reduce land consumption to 30 ha per day in 2020 [1]

6. Strategic objectives, targets and indicators on resource efficiency

Strategic objectives

- Improvement of raw material efficiency (German Federal Sustainable Development Strategy, 2002 [1]);
- Decrease of land consumption (German Federal Sustainable Development Strategy, 2002 [1]);
- Decrease of the use of fossil fuels (National Energy Efficiency Plan, 2008 [3]);
- Increase the proportion of renewable energies (National Energy Efficiency Plan, 2008 [3]);
- Improvement of the energy efficiency in private households (National Energy Efficiency Plan, 2008 [3]);
- Secure the availability of resources and efficient material use (National Raw Material Strategy, 2010 [2]);
- Increase recycling fraction (National Raw Material Strategy, 2010 [2]);
- Considerable increase in energetic use of biomass (National Biomass Action Plan, 2009 [9]);
- Considerable and lasting increase of biomass proportion and efficiency of biomass use in Germans raw material supply (Action Plan for the Industrial use of Biomass, 2009 [10]);

Targets

- Doubling of the abiotic material productivity by 2020 (German Federal Sustainable Development Strategy, 2002 [1]);
- Doubling the energy productivity by 2020 (German Federal Sustainable Development Strategy, 2002 [1]);
- Reduction of land use for housing, transport and soil sealing to the daily growth of 30 ha in 2020 (German Federal Sustainable Development Strategy, 2002 [1]);
- Increase the per capita consumption of wood and wood products from sustainable forestry from 1.1 m^3 to 1.3 m^3 (Charta on wood, 2004 [11] and Action Plan for the Industrial use of Biomass, 2009 [10]);

Indicators

- Raw material productivity: GDP/abiotic DMI [1]
- Energy productivity: energy consumption GDP/ TPES [1]
- Increase in settlement and infrastructure area in ha [1]
- Proportion of renewable energy on total energy consumption [1]
- Per capita consumption of wood and wood products from sustainable forestry in m^3/cap [11]

7. The institutional setup for the development and implementation of resource efficiency policies

Promoting resource efficiency is an overall policy objective of the Federal Government of Germany, but also of the Federal States (Bundesländer), with many cross-cutting linkages to various policy fields. Therefore, resource efficiency policies are formulated and introduced by various Federal Ministries, covering different issues and aspects of the resource efficiency agenda, like:

- Federal Ministry of Economy and Technology (BMWi)
- Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)
- Federal Ministry of Education and Research (BMBF)
- Federal Ministry of Food, Agriculture and Consumer Protection (BMELV)
- Federal Ministry of Economic Development and Cooperation (BMZ).

To better implement policy programmes and measurements in the field of resource efficiency the various Federal Ministries founded several governmental bodies, institutions and networks in the field of resource efficiency:

Initiated in 2006 by the Federal Ministry of Economy and Technology (BMWi), the German **Material Efficiency Agency** ("Deutsche Materialeffizienzagentur", demea) was founded to promote resource efficiency. Its main goals are to provide information and increase public awareness of the importance of material efficiency, to encourage companies to realise material efficiency potentials and to actively support them within a framework of support programmes and a pool of material efficiency consultants providing their expertise to companies on recognizing and realizing efficiency potentials. Demea is currently running several initiatives. Foe example, VerMAT (Verbesserung der Materialeffizienz) is a program for advising small and medium-sized enterprises to improve material efficiency, while the objective of the NeMAT (Netzwerken zur Materialeffizienz) programme is to formulate knowledge networks for material efficiency (regional networks, networks within the same industry and actors within a same supply chain). In 2004 the BMWi established the German Material Efficiency Prize which is awarded to innovative solutions on a yearly base.
http://www.materialeffizienz.de/

In October 2010, the Federal Ministry of Economy and Technology officially launched the foundation of the **German Mineral Resources Agency** which is located at the Federal Institute of Geosciences and Natural Resources (BGR). The foundation of the German Mineral Resources Agency is a reaction to the ongoing political discussion on the availability of critical mineral resources on national and European level. The major objective of the Agency is to increase the transparency of markets for critical mineral resources via scientific support and monitoring in the field of critical mineral resources, but also to built up a knowledge base on critical mineral resources which could support the German industry, especially SMEs. At present, a strategy for the German Mineral Resources Agency is currently under development and will be subsequently implemented incrementally.
http://www.deutsche-rohstoffagentur.de

The German Environment Ministry and the Federal Environment Agency commissioned a large-scale research project **"Material Efficiency and Resource Conservation" (MaRess)**. The project's main aims are the identification of resource efficiency potentials, an analysis of resource efficiency policies and the development of an agenda for increased resource efficiency in consumption and production. To pool the knowledge of efficient use of resources and to intensify the communication between economy, science, and politics the German Environment Ministry created the "Network Resource Efficiency".
http://ressourcen.wupperinst.org/en/home/index.html
http://www.netzwerk-ressourceneffizienz.de/

In 2009 the Federal Environment Ministry and the Association of German Engineers founded in a project co-operation the **Centre for Resource Efficiency (VDI ZRE)**. The aim of the Centre for Resource Efficiency is the promotion of an integrated use of technologies protecting the environment, the natural resources and the climate. Mostly through awareness raising, case studies and best-practice databases the Centre of Resource Efficiency aims to reduce the resource consumption in German industries.
http://www.vdi-zre.de/

The **Agency for Renewable Resources** (FNR – Fachagentur für Nachwachsende Rohstoffe) was founded in 1993 by the German Federal Ministry of Food, Agriculture and Consumer Protection. The main responsibility of FNR is to support research and development in the area of renewable resources, but also inform the public about current research results, give advice on a range of applications of renewable resources and organise and take part in scientific events.
http://www.fnr-server.de/cms35/index.php?id=139

The **Effizienz-Agentur NRW** – abbreviated as EFA – is the centre for small and medium-sized manufacturing enterprises in the German state of North Rhine-Westphalia. The objectives of their work are comprehensive strategic and technical improvements concerning the sustainable economy -through new strategies, innovative technology and ecologically-oriented measures. Today, the Effizienz-Agentur NRW is not only a competent and reliable partner for medium-sized enterprises; it is also a capable intermediary between industry, science, politics, the media and the public.
http://www.efanrw.de/index.php?L=1

Rhineland-Palatinate has created the **Effizienznetz Rheinland-Pfalz** (EffNet) in 2005 as a central consulting and information platform for small and medium enterprises for resource efficiency and environmental technologies.
http://www.effnet.rlp.de/Startseite/

8. Selected policy instruments or initiatives on resource efficiency presented in more detail

The following examples showcase Germany's activities in the field of resource efficiency policies.

STRATEGY:

National ICT Strategy "Germany Digital 2015" and Action Plan "Germany: Green IT Pioneer"

Information and communication technologies (ICT) now contribute more to value creation in Germany than the classic technologies of automotive and mechanical engineering. They are a decisive force in Germany's economy - both as a sector unto themselves and as a form of technology that cuts across most other economic sectors. As the key to an increasingly knowledge-based economy, information and communication technologies help to accelerate growth throughout numerous sectors. At present, these technologies account for roughly 40% of overall economic growth. With an annual business volume of approximately €140 billion, the ICT sector is one of the largest economic sectors in Germany. More than 800,000 people are employed in the ICT sector itself, and an additional 650,000 ICT specialists are employed in user sectors. Because it is growing at a substantially faster rate than the overall economy, the ICT sector is clearly one of the main engines of economic growth in Germany. By focusing on key issues such as convergence, mobility and networking, the Federal Government is advancing the information society in Germany through targeted policies to modernize legal and technical frameworks and to promote research and market-oriented development. As part of this overall effort and as a complement to its High-Tech Strategy, the German government adopted an action programme entitled "Information Society Germany 2010" (iD2010), which is now followed by a "National ICT Strategy – Germany Digital 2015", launched in November 2011. The overall aim of this strategy is to further strengthen the ICT sector in Germany as driver for sustainable economic growth and to support the ICT sector to deal with various challenges associated with the emerging "Information society", but also to increase the contribution of ICT solutions towards more climate protection and resource conservation.

Part of this national ICT strategy is, therefore, the Action Plan "Germany: Green IT Pioneer" which was launched in 2008 by the Federal Government to stimulate innovation in the fields of "Green IT" and "Green through IT" by a set of supportive programmes and measurements, like:

- Information on Green IT for consumers, business and the public sector
- Research and development of innovative IT solutions (smart technologies in various fields, like smart grid, smart housing, smart logistics/mobility, tools for energy management systems)
- Promoting the export of Green IT products and services

- Improving the dialogue and cooperation with the ICT sector in the framework of the national IT Summit process.

Germany's IT Summit process, which was initiated by Federal Chancellor Dr. Angela Merkel in 2006, serves as a forum for bringing together high-level representatives from government, business and science and for pushing forward with the implementation of the Federal Government's strategic innovation programmes (like, for example, High-Tech Strategy) that aim to enhance Germany's international position in the field of ICT. Over the course of the IT Summit process, government, industry and science have agreed on specific steps and projects that aim to strengthen Germany's international position in the ICT sector. The last IT Summit took place on 7 December 2010 in Dresden.

RESEARCH:

Integration of the closed-cycle and waste management into a sustainable resource-conserving substance management (2004)

The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) is pursuing the aim of integrating the closed cycle and waste management into a sustainable resource-conserving substance management in which substances are followed throughout the life cycle ranging from extraction from the environment to production, to use and consumption, and to collection and renewed use or release into the environment. The aim is to influence substance volumes and structures with a view to enhancing resource efficiency and de-linking waste production and economic growth.

Within the framework of the Federal Environment Ministry's environmental research plan, a "*Literature and data survey for generating the basis for the development of closed cycle and waste management policy towards a sustainable substance flow and resources policy*" was carried out to provide a basis for development of a relevant concept.

The final report from that project provides a comprehensive overview of relevant work carried out to date, and identifies the main needs for further research and formulates suitable recommendations.

- Main results of the project: Only a small proportion of the national economy's substance flows can be traced directly to waste. Waste management thus cannot serve as the sole controlling organ for substance flow-oriented management spanning the entire economy; instead, waste management must be understood as part of a comprehensive substance flow-oriented system.
- To date, there is still no comprehensive overall concept for implementing substance-flow-oriented management in the area of waste management.
- Inter-sectoral substance flow-oriented management should be oriented primarily to substance inputs.
- In light of the complexity of substance flows and of relevant aims, a combination of different political instruments needs to be applied, including instruments such as regulatory law, economic incentives and duties, voluntary commitments, producer responsibility, etc.

- Important areas of action in the area of waste management in which substance flow-oriented analysis can play a significant role include: identification of future substance flows in the area of waste management; assessment of products and waste management operations with regard to ecological impacts, throughout entire life cycles; and development of waste prevention strategies.
- Areas of action in waste management in which substance flow-oriented management can play an important role include reduction of recycling costs in comparison to costs for landfilling / incineration; expansion of producer responsibility; and shifting the focus of waste management away from used products and to materials.

Recommendations:

The research project has identified requirements for further research, and it recommends an approach consisting of the following steps:

Step 1: Orientational screening to identify relevant substance flows

Step 2: Calibration with the identified relevance of the substance flows and with the previous addressing by closed cycle and waste management – with the aim of identifying the most important substance flows, with relevance for resources conservation, for which no measures, or inadequate measures, have been taken to date;

Step 3: Detailed studies of particularly interesting examples of substance flows;

Step 4: Issuing of a package of specific recommendations for sustainable substance-flow-oriented policy aimed at resources conservation and waste prevention relative to the selected substance flows.

The research has shown that the closed cycle and waste management policy, if oriented to substance flows, can contribute to ensuring that pollutants are removed and recyclable materials are used within closed cycles. Furthermore, the research has demonstrated that, with such an orientation, the closed cycle and waste management can be enhanced in terms of sustainability criteria.
http://www.bmu.de/english/waste_management/reports/doc/37330.php

Identification of Relevant Substances and Materials for a Substance Flow-Oriented, Resource-Conserving Waste Management (2006)

This is a sub-project within the project "Development of the closed cycle and waste management policy towards a sustainable substance flow and resources policy" and aims to identify relevant materials, and relevant areas in the life cycle, that offer the greatest potentials and the greatest options for reducing environmental impacts and conserving resources. Another aim was to identify further investigation requirements. The project was also tasked to consider the relevance of material storage in the technosphere and the previous addressing by the closed cycle and waste management policy. In keeping with the life-cycle approach, the study was charged with considering flows of substances and materials, from extraction from the environment to production, to use and consumption, and to collection and renewed use or release into the environment.

Based on a prequalification process, 10 particularly relevant produced goods, and 12 particularly relevant consumer goods, were identified and placed in the context of 6 principal material flow systems. After prequalification, and following a more detailed investigation of these six material flow systems, considerable potentials for reducing environmental impacts (conserving resources and saving energy, reducing waste flows, giving impetus to secondary material cycles, reducing polluting gases and greenhouse gas emissions, etc.) were identified and the principal options for action with regard to utilizing these potentials were demonstrated. As a result, a total of 17 major areas of potential for reducing environmental impacts, along with relevant options for action, were identified. Of these, about half are relevant to the waste sector.

In addition, investigation requirements were identified with regard to accessing important identified potential reductions, including development of potential reductions in the areas of scrap and of demolition of buildings. Furthermore, important data gaps were identified in the areas of non-residential buildings and electrical and electronic products. These gaps should be closed within the foreseeable future. In the coming decades, increasing amounts of materials will continued to be stored in Germany in goods and buildings.

The project has shown that considerable potentials remains - notwithstanding the successes achieved to date with closed cycle and waste management policy in Germany - for increasing resources conservation and reducing environmental impacts in the years and decades to come.

The research results provide an outstanding basis for advising of policy-makers and for further research projects in the coming years. At the same time, it is important to note that other materials and life-cycle areas, in addition to those considered by this work, also hold potentials. Such additional materials and areas should be identified. Other useful criteria that should be considered include the availability of materials (scarcity) (for example, rare metals, non-ferrous metals) and materials' potential environmental hazards and pollutant content.
http://www.bmu.de/english/waste_management/reports/doc/37341.php

Research programme on Material Efficiency and Resource Conservation (MaRess)

Environmental damage caused by the extraction and exploitation of resources, the associated emissions and the disposal of waste, all lead directly to environmental problems, and as a result, also to social and economic problems. Other factors, such as the insecurity of supplies, the scarcity of resources, the resulting international conflicts, and high and/or volatile raw materials prices, can also lead to strong economic and social dislocation in every country on Earth. Competitive disadvantages arising from the inefficient use of resources endanger the development of businesses and jobs. Increasing resource efficiency is also more and more frequently becoming a key issue in national and international politics.

Against this background, the German Environment Ministry and the Federal Environment Agency tasked 31 project partners, under the direction of the Wuppertal Institute, with the research project "Material Efficiency and Resource Conservation" (MaRess).

The aim of the project is to make substantial progress in our knowledge regarding four core questions on increasing material efficiency and conserving resources:

- First, the project aims to discover ways in which resource efficiency may be augmented.
- Second, it aims to develop approaches for resource-efficiency policies specific to target groups.
- Third, the project is to collate and analyze results from impact analysis at general and economic levels.
- The fourth component is the expert monitoring of concrete implementation steps and of how the agenda is set, as well as the publication of results.

To conduct project MaRess, 14 work packages were established and assigned to the four areas: "Potentials of Increasing Resource Efficiency", "Target Group Specific Policy of Resource Efficiency", "Analysis of Effects", "Application, Agenda-Setting, Dissemination of Results". The project will be finalized by end of 2010. The results of the 14 working packages are available under: http://ressourcen.wupperinst.org/en/home/index.html

In late 2010 the Federal Ministry of Education and Research (BMBF) decided to establish the **Institute on resource technology** (Ressourcentechnologie-Institut Freiberg). The institute is a joint research centre of the technical university Freiberg and the Helmholtz-Zentrum Dresden-Rossendorf state-aided by the Federal Ministry of Education and Research and the federal state of Saxony. Main research areas are:

- Better availability of primary raw materials (e.g. new mining methods);
- Increase of availability of secondary raw materials (e.g. urban mining, management of secondary raw materials);
- Increase of material- and energy efficiency (e.g. resource-efficient material design);
- Product-specific selection of raw materials (e.g. smart design, substitution of raw materials);
- Sustainability assessment of resource technologies.

The institute is currently in constitution and will start in early summer 2011.

LEGISLATION:

Act for Promoting Closed Substance Cycle Waste Management and Ensuring Environmentally Compatible Waste Disposal (1994, latest update 2006; now under revision)

Since the beginning of the 1990s, waste management has undergone significant changes. Backed by the Closed Substance Cycle and Waste Management Act coming into force in 1994, along with the secondary legislation that accompanied it, the enhancements from disposal-oriented waste management to life-cycle management represent an important change of paradigm. Waste management has become management of material streams with the new underlying goal of conservation of resources.

To achieve this aim, waste must:

- First and foremost be prevented as far as possible, and in particular the volume and level of harm waste can cause; and
- Secondly, be recycled or used to recover energy or materials.

Any residual waste must be disposed of in a way that is compatible with the common good.

Waste management's aim is to be able to guarantee high quality and complete recovery of at least the household fraction of waste by 2020 at the latest ("Ziel 2020"), ensuring compliance with high standards of environmental protection.
http://www.bmu.de/english/waste_management/downloads/doc/3230.php

Commercial Wastes Ordinance (CWO): Ordinance on the Management of Municipal Wastes of Commercial Origin and Certain Construction and Demolition Wastes (2003)

The Ordinance on the Management of Municipal Wastes of Commercial Origin and certain Construction and Demolition Wastes (Commercial Wastes Ordinance) entered into force on 1 January 2003. The ordinance aims to achieve safe and highest possible quality recovery of municipal wastes of commercial origin (municipal wastes from areas other than private households) and of certain construction and demolition wastes. In particular, so-called sham recovery will be prevented by the requirements for an environmentally sound recovery.
http://www.bmu.de/english/waste_management/doc/6885.php

ECONOMIC INSTRUMENTS:

German Ecological Tax Reform

The German ecological tax reform was introduced in 1999, furthered in 2000, and its provisions were partly modified in 2003. The reform consists in an incremental increase in taxes on fuel and in the creation of an energy tax. The additional public income is used to contribute to the lowering of non-wage labour costs, so that the reform is for the most part revenue-neutral. The reduction of non-wage labour costs creates stimuli for more employment, while the price increase of energy generates incentives for an economical energy use. Since April 1999 and over the course of the ecological tax reform, the tax rate on mineral oil for fuel, gas and heating oil has been increased and an electricity tax introduced:

- The tax rates on mineral oil for fuel (gasoline and diesel) was increased in five steps between 1999 and 2003 by 3,07 Cent per liter each year, i.e. by a total of 15,37 Cent per litre compared with 1998.
- The tax on mineral oil for light heating oil increased by 2,05 Cent per liter in 1999. The tax on mineral oil was increased in 1999 for natural gas by 0,164 Cent per kWh for liquid gas by 12,78 Euro for every 1 000 kg; in 2003 the tax rate for natural gas was increased by a further 0,2 Cent per kWh and by 22,26 Euro for every 1 000 kg for liquid gas.
- Starting in 1999, an energy tax of 1,02 Cent per kWh was introduced. The tax rate increased until 2003 by 0,26 Cent per kWh yearly to reach a current 2,05 Cent per kWh.
- From 2000 on, the tax rate on mineral oil for heavy fuel oil for heat and electricity production was fused to a uniform mineral oil tax rate of 17,89 Euro per 1000 kg. This rate has been increased since 2003 and now reaches 25 Euro per 1000 kg.

- Brown coal and hard coal, as well as fuels produced therewith, are not comprised in the ecological tax reform and have been exempt of energy tax to date. http://www.umweltbundesamt.de/umweltoekonomie-e/index.htm

Eco-Innovation Programme

Since 1978, the Federal Environment Ministry has supported large scale technical projects that are aimed at preventing or mitigating environmental pollution, increasing energy and/or resource efficiency. The environmental innovation programme contributes substantially to implementing and continually improving state of the art technologies and environmental law provisions. By supporting measures with a wide-spread demonstration effect the programme also serves as a multiplier: companies receive a stimulus to carry out innovative and low polluting measures. In particular integrated environmental projects receive support under the programme and priority is given to small and medium-sized enterprises. Since the beginning more than 540 projects were supported by the programme.
http://www.bmu.de/foerderprogramme/pilotprojekte_inland/doc/2330.php

Additional to the eco-innovation programme of the Federal Environment Ministry, the Federal Ministry of Economy and Technology launched several programmes to the implementation of environmental technologies. http://www.bmwi.de/BMWi/Navigation/Technologie-und-Innovation/foerderbereiche.html

INFORMATION INSTRUMENTS:

DEMEA Material Efficiency Award Scheme

The German Material Efficiency Prize, first awarded in 2004, decorates on a yearly basis Small and Medium Enterprises (SME) and research institutions for innovative solutions in increasing material efficiency. The prize is granted by the German Material Efficiency Agency and the Federal Ministry of Economy and Technology on a yearly basis. SME's will be awarded for traceable and sustainable increase in material efficiency through innovative solutions that are transferable to other enterprises. These could be achieved through product design, optimisation of production processes, reduction of waste or through supply of services with reduced material input. Research institutions can apply for the Material Efficiency Prize with application-oriented research results improving the material efficiency in operating practice in SME's. Award criteria are the application-orientation and marketability.

In March 2011 the Federal Ministry of Economy and Technology announced the German Resource Efficiency Award, which widen the Material Efficiency Award scheme by including aspects of efficient raw material production and recovery of secondary raw materials. The Resource Efficiency Award scheme will replace the Material Efficiency Award scheme.

DEMEA consultative programmes on material efficiency

The German Material Efficiency Agency offers currently two consultative programmes on material efficiency mainly addressing SME's.

The programme VerMat offers financial support for in-house consultancy on material efficiency for industry companies with factories in Germany. The programme is divided into two modules. The first is an initial consultation mainly dealing with an analysis of material reduction potentials. It includes an quantitative analysis of material flows, detection of material losses as well as practical planning for increasing material efficiency. The second module builds on the first and elaborates more detailed process structures and also includes implementation monitoring. The DEMEA also provides information for specialised consultants for the VerMat programme.

The second programme NeMat offers financial support to formulate knowledge networks for material efficiency (regional networks, networks within the same industry and actors within a same supply chain). The support is given for three years from the phase of establishment over implementation to stabilisation phase of the network and covers measures like SWOT-Analysis, professional training, identification of synergies as well as support in public relations. First evaluations of the programme shows an average material saving of nearly 27% of the material costs in supported material efficiency networks.

National Resource Efficiency Network

To pool the knowledge of efficient use of resources and to intensify the communication between economy, science, and politics, the German Environment Ministry created the "Network Resource Efficiency". The *Network Resource Efficiency* intends to bundle know-how and experience regarding resource protecting production, products and management. It provides possibilities for mutual exchange of information. To operate resource efficiently creates special problems for small and medium sized enterprises (SMEs). Thus, the network organizes regional and sector specific conventions and meetings that provide practical information. In doing so, the network unites actors from politics, business associations, trade unions and society and co-ordinate their activities and intend to inform about efficient use of resources and present successful examples of regional or branch-specific companies. The network also offers support in implementing efficiency measures and inform about funding options for innovative technologies. The Network co-ordination is realized by the Wuppertal Institute (project management) in co-operation with the German Material Efficiency Agency (demea) and the Efficiency Agency NRW. The network is framed by the project “Material Efficiency and Resource Protection” which is funded by the Federal Ministry for Environment, Nature Protection and Nuclear Safety as well as by the Federal Environmental Agency.

PRODUCT POLICY:

Resource efficiency and the national eco-labelling scheme “Blue Angel”

Established 1978, the national eco-label scheme "Blue Angel“was among the first labels permitting recognition of eco-friendly products. The “Blue Angel” is the core instrument of Germany’s environmental product policy, addressing important product related environmental issues, like climate protection and energy efficiency, resource conservation, health aspects, based on a LCA approach. Since 1978 it has set the standard for eco-friendly products and services selected by an independent jury (Eco-labelling Board) in line with defined criteria. The Blue Angel is awarded to companies as kind of a reward for their commitment to environmental protection. They use it to professionally promote their eco-friendly products in the market. The Blue Angel is an ecological beacon showing the consumer the way to the ecologically superior product and promotes

environmentally conscious consumption. Consumers have accepted the Blue Angel as a brand synonymous with a high degree of orientation: Today, 79% of the respondents know the label, while 38% of the respondents say they would look for “Blue Angel”-labelled products when doing their shopping. Currently, 952 suppliers have conducted a contract on the use of the eco-label, 20% of which are foreign suppliers. A total of about 11,500 products are Blue angel eco-labelled. Important product groups in the field of material efficiency and resource conservation are recycling paper and products made from recycling paper, printing and publication paper, building products made of waste paper and waste glass, products made from recycled plastics, reprocessed toner modules, returnable transportation packaging.
http://www.blauer-engel.de/en/index.php

9. Topics of interest and information needs for follow up work

NRC SCP Germany would welcome the organization of a follow-up workshop to this survey to exchange information and experiences on resource efficiency policies in Europe. The following topics could be seen as usable, like:

- Framing national resource efficiency programmes
- Strategic objectives, targets and indicators on resource efficiency within national/sectoral programmes
- Integration of resource efficiency into existing environmental policy frameworks, programmes and policy instruments
- Institutional setup and capacity building for resource efficiency policies
- Resource efficiency policies in other policy frameworks
- Outline a common structure for monitoring, reporting and knowledge base on resource efficiency policies in Europe.

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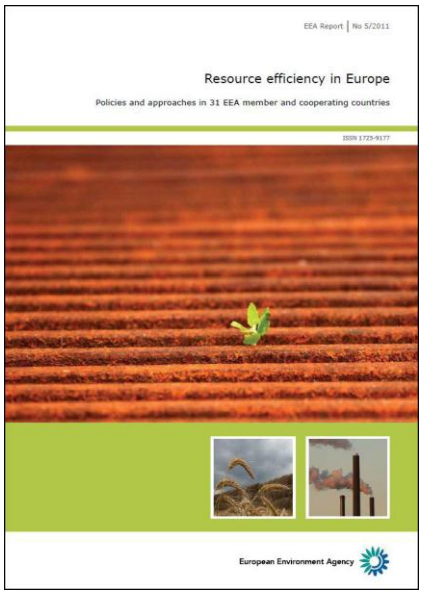

Resource efficiency in Europe

Policies and approaches in 31 EEA member and cooperating countries

Further information about resource efficiency policies, including the analytical report and thirty-one detailed country profiles, are available on the EEA website:

http://www.eea.europa.eu/resource-efficiency

Selected examples of resource efficiency policies, instruments or targets presented in the thirty one detailed country profiles