Steps towards greening in the EU

Monitoring Member States' achievements in selected environmental policy areas: EU summary report

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Disclaimer: The contents and views contained in this report are those of the authors, and do not necessarily represent those of the European Commission. This summary report is based on the 27 individual country reports produced for this study.

Abbreviations

AQD	Air Quality Directive
C_6H_6	Chemical symbol for benzene
C&D	Construction and demolition (waste)
CHP	Combined heat and power
CO	Carbon monoxide
CO_2	carbon dioxide
EEA	European Environment Agency
EHS	Environmentally harmful subsidies
EIF	European Investment Fund
ERDF	European Regional Development Fund
ESF	European Social Fund
ETAP	Environmental Technologies Action Plan
ETR	Environmental tax reform
ETS	Emissions Trading System
FIT	Feed-in tariff
GDP	Gross domestic product
GHG	greenhouse gas
k	thousand
LPG	liquefied petroleum gases
m	million
mt	million tonnes
MBI	Market-based instrument
MS	Member State
MSW	Municipal solid waste
NECD	National Emission Ceilings Directive
NO_x	nitrogen oxides
NO_2	Nitrogen dioxide
NRP	National reform programme
O_3	Ozone
OECD	Organisation for Economic Cooperation and Development
PAYT	Pay-as-you-throw
Pb	Chemical symbol for lead
PM	Particulate matter
PV	photovoltaic
R&D	Research and development
R&I	Research and innovation

Sec	Second
SME	Small- and medium-sized enterprise
SO_X	Sulphur oxides
SO_2	Sulphur dioxide
t	tonne
VAT	value added tax
VC	Venture capital
VOC	Volatile organic compounds
WFD	Waste Framework Directive

1 Executive summary

A key objective outlined in the EU's current economic strategy - the Europe 2020 Strategy[1] is for Europe to become a low-carbon, resource-efficient economy. Various Roadmaps[2] and other strategies have been adopted that support this over-arching objective – including on resource efficiency, a low carbon economy, transport, energy, and biodiversity – providing specific details in some areas and short-medium term steps in others.

National reform programmes (NRPs), together with stability/convergence programmes translate the objectives of the Europe 2020 Strategy into national targets and "growth-enhancing" policies in Member States. Implementation of the Strategy has been supported since 2011 through the creation an annual cycle of economic policy coordination known as the "European Semester". Resource efficiency is one of the areas addressed through the European Semester, and to date has focused on the provisional headline indicator of resource productivity, through thematic indicators such as municipal waste management and environmental taxation, and other resource areas such as water and air quality.[3]

This latest Environmental Policy Review covering 2011-2012 examines a select number of areas of immediate priority to the transition agenda set out in the Europe 2020 Strategy. In particular, it focuses on economic, fiscal and financial aspects (i.e. budgetary issues, market-based instruments, environmentally harmful subsidies and state aids), waste management, support to SMEs and air quality. These are seen as areas that can more immediately enhance growth and job creation and/or contribute to fiscal consolidation in addition to being environmentally beneficial. While other areas are also relevant to the transition to a resource efficient economy, they are beyond the scope of this study.

Economic, fiscal and financial aspects

At the heart of the EU's resource efficiency agenda is the principle of 'true costing', and this requires that the costs/prices of resources and products better reflect their negative environmental and social impacts as well as their benefits. Economic and fiscal tools such as national budgets, market-based instruments (MBIs), environmentally harmful subsidies (EHS), and state aid are among the instruments available to governments to take this agenda forward.

Budgetary expenditure

The economic and financial crisis in Europe has demanded closer attention from national governments to their handling of public debt, and the more considered allocation of limited public funds together with stringent application of more coordinated EU fiscal management rules through the Stability and Growth Pact.[4] It is against this backdrop that a small number of Member States have cut budgets for public environmental protection expenditures, including Austria[5], Bulgaria[6], Hungary, Ireland[7], and Slovenia[8]. Italy[9], Latvia, Lithuania[10], Portugal[11], and Spain[12] have restructured government departments (increasing responsibilities) while reducing budgets. This has not however been a widespread trend in all Member States. Of the Member States showing *increases* in budgetary expenditure in environment, resource efficiency and green growth areas, the Czech Republic Denmark, Estonia, Finland, France, Germany, Malta[13], Poland[14], Romania[15] and the UK[16], have made increases alongside non-environmental areas, whereas Slovakia has increased its environment budget against a general backdrop of overall national budget reductions.[17] Hence, the weak economic performance in the EU has not automatically led to lowered environment-related national budgets in all Member States.

Market-based instruments

A range of market-based instruments (MBIs) including environmental taxes are applied in Member States across different sectors, especially the energy and transport sectors. Energy-based taxes by far make up the largest percentage of revenues raised through environmental taxes – 92% for Slovenia[18] and 88% for Bulgaria[19] are among the highest. France, Ireland[20] and the UK[21] [22] use MBIs to support climate and energy objectives, in particular giving support to renewable energies. In Italy[23], Spain and France there has been a reversal of support for renewable energy, eliminating or decreasing funds in 2011-2012. In the area of transport, measures undertaken include supporting the purchase of less-polluting vehicles and electric vehicles, charging lower tolls for less-polluting heavy goods vehicles and charging lower registration taxes for cars meeting newer Euro emissions standard limits.

Although not all introduced in 2011-12, materials/natural resources taxes are in place in eight Member States. Four countries have aggregates-related charges: the Czech Republic has a quarrying charge on sand, gravel and stone, France has a tax on the same materials, Sweden has a natural gravel tax[24], and the UK has an aggregates levy on rock, sand and gravel[25]. Cyprus has a quarrying charge on mineral extraction, Denmark has a tax on extracted raw materials[26], Estonia has a mineral resources extraction charge[27], and Latvia has a far-reaching natural resources tax which covers the extraction of natural resources (of a long list of materials including curative mud, dolomite, lime, cement, stone, soil, sand, gravel, and loam), waste disposal, environmentally hazardous goods, packaging, radioactive substances, end-of-life vehicles and coal, coke and lignite.[28]

Despite the existence of various environmental taxes, in general, revenue from these taxes (as a percentage of GDP) has been declining. Only nine countries show an increase in environmental tax revenues as a percentage of GDP between 1995-2011 (Austria, Bulgaria, Estonia, Finland, Latvia, Malta, the Netherlands, Poland and Romania), with only three countries experiencing increases of more than 1% (Estonia at 1.8%, Latvia at 1.3% and Romania at 1.9%). Cyprus is the only country to have stagnated with a 0% change. The remaining 17 countries have had declining revenues from environmental taxes as a percentage of GDP with the highest decline of 0.8% in Italy.[29]

There are also some encouraging recent signs of environmental fiscal reform with changes to various environmental taxes underway or planned in: Estonia (increases to excise duties and charges); Finland (increases in taxes of vehicles and traffic fuels, on peat, a new windfall-tax for hydro and nuclear power, tax on waste); the Netherlands (removal of reduced excise tax rates for certain uses of diesel, tax-free compensation of commuter expenses and the exemption from the coal tax on coal used in power plants; increase in existing energy tax rates, continuation of tap water tax and tax on heavy motor vehicles, reduced rate of energy tax for small-scale renewable electricity production, removal of motor vehicle tax exemption for old cars); France (eco-tax on trucks, discussions on a carbon tax[30]); Denmark (taxes increased or announced on lorry road pricing, motor vehicles, fuel consumption, tap water, some consumer products; and nitrogen oxides); Italy (need for green fiscal reform and possible introduction of carbon tax on energy products[31] discussed).

In relation to water pricing, Member State performance on charging true costs (so that prices truly reflect environmental, social, and economic costs and benefits/advantages) has shown both negative and positive developments –despite pressure from the European Commission to properly implement the Water Framework Directive. Hungary has nearly doubled its water fees from 2001-2011[32], and Estonia, Portugal[33] and Slovakia have also increased their charge levels. Some Member States such as Denmark, the Czech Republic, Slovenia and Latvia use multiple instruments

to encourage the more efficient use of water, including abstraction fees, water metering, charges on water use, fees/charges on discharges into surface water, water-related green taxes, installation of water meters, and penalties for using water resources without permission. Member States which have reduced or maintained low prices include Germany, Greece, the Netherlands[34], Poland[35] [36], Portugal and Spain. Exemptions to water pricing for the agriculture sector are also still present, in Estonia[37], Hungary, Italy[38], Malta[39], Slovakia and Spain[40] at least, as well as the narrow definition of 'water user' applied by Member States more generally in implementing the EU's Water Framework Directive.

Member States that have undertaken recent efforts to reform water pricing include: Cyprus (changes to system of water pricing for irrigation and proposed fines on illegal water drilling[41]), Ireland (move towards domestic water meters and a charging system based on use above a free allowance[42]), Bulgaria (higher water abstraction fee introduced in 2012 and number of changes to water policy proposed including new eco-tax fee on water prices[43]), the UK (Parliament has called for an increase in metering of households by 2020) and Sweden (Government is contemplating an introduction of water pricing in line with the WFD).

Environmentally harmful subsidies

Direct and indirect environmentally harmful subsidies (EHS) remain an issue in all EU Member States and occur across various sectors. This study particularly looked at EHS provided to fossil fuels thus focusing on the energy generation sector, fossil fuel-based energy materials and other CO_2-emitting fuels, and the transport sector. Subsidies include tax exemptions or reductions for fossil fuels and other CO_2-emitting fuels, (including coal, peat and natural gas), and for certain sectors in particular agriculture and fishing as well as direct support. The transport sector is also supported through the absence of kilometre-based road tolls (e.g. in Latvia), commuter subsidies (e.g. Estonia), and subsidies for the use of company cars which exist in several MS, including Denmark which is also one of only three countries (including Estonia[44] and Germany[45]) to not estimate the value of employer-provided fuel when calculating a tax base explicitly, thus the benefit-in-kind provided by employers by paying for fuel used in company cars is not taxed, thereby creating the incentive to use cars more intensely than if this were taxed. In the area of agriculture, the most wide-spread EHS is the reduced rate of excise tax for diesel used in the sector. This is reported through this study in 22 MS Austria, Belgium, Czech Republic, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Portugal, Romania, Slovakia, Slovenia, Sweden, the UK), as well as tax rebates offered in Poland.

It is worth highlighting that some important steps in EHS reform have recently been undertaken. Reports identifying EHS in key sectors have been published in Germany (focusing on federal-level subsidies in the areas of energy supply and use, transport, construction and housing, and agriculture)[46] the Netherlands (which identifies subsidy support in key sectors indicating which EHS could be abolished at national level, and which ones at EU level to avoid border effects and ensure a level playing field[47]). Cyprus identified some EHS in its government budget, Slovenia created a working group to study existing EHS[48], and Sweden[49] produced reports on fossil-fuel related EHS as did Finland's environmental organisations. These are important first steps in the reform of EHS, however the approach taken to identify EHS and hence the definition of an EHS varies between MS. In terms of progress in EHS reform, Germany has begun the process of phasing-out its hard-coal mining subsidies by 2018, Cyprus has reduced refund rates for diesel used in the agriculture sector[50], and Portugal phased out reduced VAT rates on gas and electricity[51]. Reforms are also planned in Finland which intends to identify and reallocate subsidies harmful to the environment and to increase taxation of peat and revise its agri-environmental aid

programme to promote water protection and biodiversity measures by farmers[52], Slovakia is to review subsidies to industries with a negative impact on the environment, especially in the energy sector (coal mines) [53], Romania intends to review inefficient subsidies, with an emphasis on environmental-related subsidies, in line with EU requirements, and Sweden will reform its CO_2 tax from 2013-2015 to further reduction exemptions for the agriculture sector[54]. These are noteworthy efforts and should be welcomed, however they represent a first step and a number of other EHS remain which need to be tackled if the milestone in the Resource Efficiency Roadmap of phasing out EHS by 2020 is to be achieved.

State aids

Given the complexity of state aids and the numbers of cases available for detailing, the study provides only a course comparison of some examples of recent cases, focusing particularly on the area of climate change, for both renewable energy (positive state aid) and for fossil fuels (negative state aid). This climate change focus supports efforts led by the G20 on phasing out EHS to fossil fuels, and state aid can constitute a type of EHS.

A number of approaches are being taken by Member States to the provision of state aid in this area, including the provision of state aid to non-fossil fuel-based energies and technologies, reducing state aid to fossil fuel-based energies, as well as cases where state aid is provided to both fossil fuel-based and non-fossil fuel-based energies and technologies. This latter situation results in lack of coherence in state support, as well as reducing the effectiveness of increasingly limited public funds. Eight Member States grant state aid for renewable energy sources *and* energy efficiency improvements (Austria, Bulgaria, Denmark, Estonia, Finland, Italy, Romania, and the Netherlands). A further nine Member States grant state aid to both renewable energy *and* fossil fuels (Belgium, the Czech Republic, France, Germany, Latvia, Poland, Slovakia, Slovenia and Spain. In relation to state aid for fossil fuels, six Member States do not allocate state aid for coal production (Bulgaria, Czech Republic, Estonia, Greece, Italy and the UK) out of the 13 coal-producing Member States (the remaining countries are Germany, Hungary, Poland, Romania, Slovakia, Slovenia and Spain).[55] No state aid was granted to the coal sector in Bulgaria after 2006, in 2011 by Slovakia, and between 2004 and 2010 by the Czech Republic. However, the Czech Republic and Hungary[56] have since provided support to mine closures, treatment of health damage for miners, and addressing environmental liabilities related to past mining. Slovenia's on-going support may also be continued into the future beyond the planned closure of uneconomic coal mines.[57].

The economic crisis in the hardest hit countries is also affecting state aid decisions: Greece's state aid is now often provided for the support of economic activity affected by the on-going crisis (e.g. the recapitalisation of banks, but also to the state-owned electricity company).[58] [59] Cyprus's state aid has also been partly diverted to support the banking sector. In 2011 the majority of state aid was provided to the service sector (42.9%), followed by manufacturing (21.5%) and the transport sector (16.0%).[60]

Notwithstanding the particular focus in this study on fossil fuels-related state aid, some other cases of state aid were provided. Linked to MBIs and EHS to the agriculture sector, state aid is also a mechanism for favouring agricultural practices that can either enhance or contradict environmental objectives. Examples of enhancing support include amendments to Finland's reduced energy tax mechanism in the agricultural sector, (and revisions to agri-environmental aid to provide more efficient support to water protection measures and biodiversity.[61] Similarly, Belgium uses agri-environmental measures to focus on water management by providing

payments to farmers voluntarily committing to lower uses of fertilisers, with a total budget for 2010-2011 of 0.5 million EUR.[62]

State aid has been provided for other activities potentially supporting environmental objectives: The Czech Republic offers investment aid for the reduction of NO_x emissions and particulate matter from non-combustion installations[63] and for the reduction of air pollution in the Moravia-Silesia Region[64] (with high presence of heavy industry). Malta provides grants (through ERDF funds) for sustainable tourism projects.[65] Slovakia provides loans to support activities such as protection of air and the ozone layer, protection and use of water resources, waste management, nature and landscape protection, and environmental protection and training.[66] The UK supports resource efficiency through continuing funding to its Waste and Resources Action Programme[67], and through support to establish and fund the Green Investment Bank[68].

Waste management

The resource efficiency agenda has helped continue to frame EU waste policy within the context of more efficient use of natural resources particularly by enhancing the need for waste management practices to treat waste as a resource and prioritising activities at the higher end of the waste hierarchy. Resource efficiency thereby adds to the on-going pressure to ensure the full implementation of the whole of the EU waste acquis. At the same time, Member States have been transposing the revised Waste Framework Directive (WFD), a process that has taken place between 2010 and 2012, although transposition was meant to have taken place by 10 December 2010.

Three recent studies have clustered countries into different performance levels:

- High performing countries: Austria, Belgium, Denmark, Germany, Luxembourg, the Netherlands and Sweden.
- Medium-performing/transitional countries: the Czech Republic, Estonia, Finland, France, Ireland, Italy, Slovenia and the UK.
- Lower-performing/limited countries: Bulgaria, Cyprus, Greece, Hungary, Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Spain.

High performing countries generally have met or exceeded EU waste legislation targets. They have introduced and generally make good use of a range of economic instruments, including landfill and incineration taxes/charges, pay-as-you-throw schemes, producer responsibility schemes, deposit-return systems and landfill bans. However, a number of these countries (Denmark, Germany, the Netherlands and Sweden, but also the United Kingdom) already have an over-capacity for incineration and need to import waste to meet that capacity. Hence, Denmark, Germany, the Netherlands, Sweden and the UK need to address incineration capacity levels, to allow for more focus on waste prevention, material recycling and composting, and reuse, according to the legally binding waste hierarchy. This also means linking waste management policy to energy policy, as waste is seen (and legally supported via EU legislation) as an energy source.

For high performing countries, the main issues of concern are the encouragement of resource efficient public behaviour, focusing on waste prevention, and reduction activities including repair and reuse, as well as reinvigorating activity on recycling/composting. The other most important aspect is that of reducing their over-capacities in incineration.

Medium-performing countries are typically characterised by mid-level recycling, around 25-30%, and landfilling between 35-50%. As only three (Czech Republic, Estonia, Slovenia) more recently joined the EU, important changes have been made to pre-EU waste management practices but it still remains to be seen how a recycling

society is to be supported by political, economic and infrastructural frameworks. More than half of the medium-performing countries, however, are EU15 countries, with EU membership spanning from 18 years (Finland) and 40 years (Ireland and the UK), to over 60 years (founding nations, France and Italy). These transitions extend beyond generations and it is evident that more political effort is needed to 'complete' the transition to a resource efficient recycling society, meeting EU legislative targets on the way.

For many of the medium-performing countries, a focus is needed on setting up the appropriate political, economic and infrastructure framework to avoid diverting waste from landfill to incineration instead of to recycling. The UK is one of the countries identified as the only country which is currently not in the 'high performing' country group, that already has over-capacity in incineration. The use of economic instruments plays a key role in helping to fund such infrastructure creation and development, while also effecting behavioural change to less wasteful practices.

Lower-performing countries generally still have extremely high levels of landfilling, which is the lowest level of the waste hierarchy and therefore not in line with either the spirit or the letter of EU legislation. Recycling and composting levels also remain very low. Hence, the transitions are very long (30 years for Greece, and 25 years for Portugal and Spain) or extremely slow (the majority of the countries in this group joined the EU in 2004) and waste management does not appear to be receiving the attention required of an activity with significant green economy and resource efficiency potential and considerable impacts on human health and the environment. These lower-performing countries also often have no or only very weak MBIs in place, whether to implement producer responsibility elements of the recycling directives or household charging for waste collection, or to encourage treatment at the higher levels of the waste hierarchy through landfill and incineration taxes or levies.

For the medium- and lower-performing countries, adequate waste treatment infrastructure remains a challenge, and EU funds play an important role in the development of waste treatment infrastructure for the EU12, but also EU15 countries such as Greece, Italy, Portugal, and Spain. EU structural funds totalling 10.8 billion EUR have been allocated to waste management infrastructure since 2000. The European Court of Auditors audited EU co-financing of municipal waste management infrastructures in 2011 and found that the effectiveness of structural funding measures for these infrastructures was rendered less effective due to poor implementation of supporting information-based, administrative and economic measures. In particular, the report states that the projects were not effective due to their large size and due to limited human capacities to operate them. Furthermore, basic EU legislation on the treatment of waste landfilled was not respected, and data collection measures could not provide reliable data.

Hence, improvement is needed at all levels of MS performance, to ensure appropriate and necessary contribution to a low-carbon, resource-efficient Europe.

Support to SMEs

There is currently no specific EU legislation relating to SME activities that needs to be implemented by Member States. However the need to better integrate consideration of SMEs in the development and implementation of EU environmental (and broader) policy and to put in place support activities for this substantial group of economic actors has been increasingly recognised. Member State support to SME activities have been on-going for a number of years, and there is a continuing focus on environmental themes, which are characterised as (eco-) innovation, promotion of environmental technologies, sustainable production, and an on-going focus in areas such as air pollution and waste management. The resource efficiency agenda has also

started to be applied to this sector, often continuing historical environmental themes (air, water, waste, and energy) or (eco-) innovation.

A wide range of financial support tools are provided to SMEs by both state ministries or other bodies, such as loans and loan guarantees (e.g. Cyprus's loans on renewable energy projects, and Finland's loans for projects producing a marketable product or service or creating a new business concept[69]); grants and funds (e.g. the Czech Republic's SME funding in the areas of recovery of environmental landscape functions, improvement of infrastructure for water management and for air quality, waste management and rehabilitation of historical ecological damage[70]; and the UK's 'Energy Entrepreneurs Fund' supporting SMEs in developing and demonstrating their ideas, including getting support from experts on how to bring their products to market[71]); subsidies, and venture capital. (e.g. Belgium's 'Business Angels Network'[72] [73], and the Danish government's agreement with the pension sector on venture capital).

Fiscal support is also provided through tax reductions, as in the Czech Republic's tax reductions to SMEs in the area of recycling[74]; France's numerous funds for business support and R&D; and Italy's support to 'solidarity purchasing groups' which promotes a direct exchange of goods between local producers and consumers[75].

Countries also make use of funding provided through EU funds such as structural and cohesion funds to support SME activities for general environmental protection (such as improving environmental performance, reducing environmental impacts of products or production processes) or eco-innovation. Many initiatives seek to encourage the take-up of environmental technologies. For example, Cyprus has used structural funds for R&D research and implementation, particularly in the area of sustainable agriculture; Greece has used structural funds to provide funding for eco-innovation, complemented by public commitment to support public spending in related R&D research and implementation, has been particularly in construction and the primary sector[76]; and Hungary has used cohesion funds for environmental and sustainable infrastructure, energy efficiency and pollution control[77]. Eco-innovation is largely promoted in Italy through EU funding (EU 7th Framework Programme, CIP-EcoInnovation, ERDF, LIFE+, the EuroTransBio initiative, and the European Investment Bank). Finland's cohesion funds are allocated to entrepreneurship and to creation of new companies, especially SMEs.[78] In the Netherlands, SME eco-innovation is mostly funded through EU funds such as the CIP Eco-innovation and the 7th Framework Programme.

A number of countries also have dedicated funding for research and development. Germany supports research on resource efficiency and energy efficiency technologies; Luxembourg co-finances launches of new products/services or the development of new manufacturing or commercialisation processes, as well as providing incentive schemes on applied research and pre-competitive development), research and innovation, the development of clusters; Estonia supports cooperation projects between academia, industry (including SMEs) and the public sector[79]; Belgium's Walloon and Brussels-Capital regions supports clusters in the building sector; and Luxembourg's Clusters Programme supports areas such as eco-construction and eco-materials, eco-design and eco-conception, the rational use of energy; and renewable energies), and the export of SME products/services (thereby helping to 'globalise' or 'internationalise' the country's SMEs).

Capacity-building in the form of bringing people together, to share ideas, to create clusters or networks is supported by a number of countries. These activities most often have (eco-) innovation aims, including on energy efficiency (such as reducing energy consumption in the building sector in Belgium), sustainable energy, green buildings, and 'green' products and services, eco-design. Countries also offer a number of services providing environmental expertise to SMEs at low or no cost. In some cases, funding is also provided for access to such services. One such support

activity is providing access to consulting services or consultants themselves. Examples include Germany's *lander* North Rhine-Westphalia's Efficiency Agency (EFA) which runs a resource efficiency consulting programme, offering companies a 50% grant for consultancy services[80]; Malta's 'business advisor scheme' provides customised advisory services to encourage take-up of innovative processes and techniques including waste and energy management[81]; and Poland's 'EURESP' platform aiming to improve SME environmental performance, including through environmental consultancy, a series of workshops and seminars[82].

Projects are supported by countries across a range of activities, sometimes focusing on specific environmental objectives, or more generally supporting eco-innovation. Cluster development support is also provided, as is support to reduce SME ecological footprints. Examples include France's Ile-de-France regional council providing funds to regional SMEs wishing to implement eco-innovation or eco-design projects[83]; Estonia's NeGOSE network for Green Office Standardisation[84]; and Portugal's Energy and Environment Voucher Programme, aiming to support use of services such as consulting, studies and assessments, energy and environmental audits, technical assistance and testing[85]. Finland's SITRA initiative supports the development of environmental SME clusters by identifying target SMEs through a mapping exercise, identifying the most innovative environmental ones, and helping them form the base for networks with other SMEs, universities and other organisations.[27] Italy's Techfood EU-Asia project stimulates technological and business collaboration in food processing and packaging between SMEs from Italy, Hungary, Slovenia and China, Mongolia and Vietnam.[86] Examples of support to reduce SME ecological footprints are Estonia's 'EcoTips 2.0' project using a training curriculum and educational tool for trainers from vocational schools, institutions and other organisations working with SMEs from different sectors[87]; and Hungary's fund for Environmental Technological Development aims to help businesses reduce their environmental footprint.

Many countries provide assistance on environmental management systems (EMS), often specifically relating to the EU's Environmental Management and Audit Scheme (EMAS), but also to EMSs generally or to ISO-14001. Estonia's 'EMAS Easy MOVE-it!' project applies EMAS cluster certification to regional tourist products or services; Spain's Catalonia Region has an EMAS Club promoting registration and offering a direct communications link to local and regional governments on business and environment matters.[88] Austria waives administrative fines for EMAS-registered businesses if non-compliance is detected during an internal audit, and it also requires the existence of an EMS as an important criterion in public procurement decisions.[89] Germany supports the introduction and maintenance of EMSs through various projects and actions, including EMS 'Ökoprofit' promoted by providing consulting for SMEs for its introduction, to reduce environmental impacts and save costs.[90] France's Rhône-Alpes region provides assistance to the implementation of eco-innovation by offering training on strategy and environmental management through its 'Plan PME'.[91] Nationally, the public agency, ADEME, provides funding to SMEs for registration to EMSs.[92] Ireland's 'Green Plus' programme helps companies to develop products and services so that they comply with specific green procurement requirements, such as through implementation of an accredited EMS, improvements in products or processes or applying for eco-labels.[93] The Netherlands' 'Stichting Stimular' supports SMEs wanting to obtain ISO14001 certification.

Through structural support, such as "one-stop shops", much effort has been made by most countries to reduce administrative burden for SMEs, whether in relation to uniting various permitting procedures or legislation compliance reporting into one, often electronic, online procedure. Some countries have created central information sources, to simplify access to information on legislation that SMEs must comply with. A number of countries are also applying the "think small first" principle when

preparing legislation (i.e. alleviating administrative burden by simplifying processes). Ireland created an environmental information portal (Envirocentre.ie), to enhance environmental awareness and improve performance in Irish industry, including information on legislation, waste management and recycling, eco-design and carbon management.[94] Spain's environmental information website (lineambiental.es) provides information on environmental projects, legislation, administrative procedures, events, and publications. In the UK, the three country environmental regulators created a web-based tool 'NetRegs' (becoming 'Business Link' and 'Business Gateway' since 2011), providing free environmental guidance to SMEs.[95] Germany's 'Demea' and 'VDI ZRE' bodies are its main vehicles in providing information, as well as simplified administrative procedures or information on environmental issues. Italy has been simplifying environmental permitting procedures, which has reduced the administrative burden on SMEs.[96] In the Netherlands, most permits have been integrated into a single one ('Omgevingsvergunning'), which can be applied for digitally.

Air quality

Much effort has been made to reduce emissions from stationary sources (such as industrial installations and products) as well as mobile sources (such as vehicles and ships). However, despite the long-standing attention to air quality issues, this area of policy still lacks a long-term framework and is still little integrated into climate and energy related long-term visions. The Resource Efficiency Roadmap highlights the need for better implementation of existing air quality legislation, and the need to integrate air quality considerations particularly into agricultural policy and the transport sector.

In relation to the Air Quality Directive pollutants, whether for 2010 or 2011: SO_2, NH_3 and VOC limit levels were respected by all Member States, where reporting has occurred (Eurostat does not have figures for Slovenia for NH_3, $PM_{2.5}$ and $PM_{10,}$ or for Hungary for $PM_{2.5}$ and PM_{10}). Difficulties in meeting limit values have, however, been identified for NO_x, and particulates of both sizes, PM_{10} and $PM_{2.5}$.

For NO_x, some countries have technically met their limit value levels for 2010, but this masks difficulties in reducing NO_2 concentrations specifically. NO_2 concentrations are not decreasing in the same way as NO_x due to the high influence of traffic emissions. In 2011, 7 Member States exceeded their NO_x ceilings: Austria, Belgium, France, Germany, Ireland, Spain and Luxembourg; compared to 12 in 2010.[97]

Germany also exceeded NMVOC and NH_3 ceilings (as it also did in 2010), Spain also exceeded NH_3 ceilings, and Finland only exceeded NH_3 ceilings.[98]

For PM_{10}, in 2010 only 4 Member States recorded no exceedances - Denmark, Finland, Ireland[99] and Luxembourg[100] – meaning that the great majority (23) exceeded the daily limit value at one or more air quality monitoring stations. Exceedances of limit values in urban areas are usually due to traffic levels.

For $PM_{2.5}$, 9 Member States had exceedances in 2010 (Bulgaria, Czech Republic, France, Germany, Italy, Latvia, Poland, Romania and Slovakia).

Technical issues needing attentions generally relate to the transport sector. Emissions from the transport sector, in other words from vehicular traffic (whether personalised transport or freight) was most often cited as a source of negative impact on air quality and Member State performance in relation to air quality legislation. Italy presented the starkest figures, with road transport accounting for more than 70% of the overall emissions of PM_{10}, NO_x and non-methane volatile organic compounds (NMVOC) in urban settings.[101] Industrial activity was also an important source of air pollutants, whether for general industrial activity, and more specifically, the energy generation

sector, the building sector, incineration installations, and the glass industry. Fuels used for heating and/or energy and energy plants were also identified as important sources of air pollution, as were emissions from agriculture. For example, Italy's energy generation and building sectors[102], Slovakia's incineration installations, and Luxembourg's glass industry were cited as sources of air pollution[103]. Belgium's emissions calculations for biomass and for coal have been deemed as under-estimated, resulting in poorer performance against air quality targets than anticipated; and Poland's heavy dependence on coal and lignite continues to be a source of serious air pollution[104].

Economic issues needing addressing include the impact of the economic crisis on the types of fuels used for heating and transport (particularly the case in Bulgaria, the Czech Republic and Slovenia[105] – these are most often linked to poverty levels. The economic downturn has also served to reduce air pollutants in some countries such as the Netherlands[106] and Romania, while Poland has been able to have strong economic performance without having major increases in air pollutants (due to uptake of environmental technologies) [107]. Despite transport being a major source of air pollution, Member States still have economic support in place to encourage private transport – lower excise duty on diesel fuel and generally low fuel taxes – or have not supported public transport infrastructure (see section on environmentally harmful subsidies).

Political issues needing attention relate to political decisions taken which negatively affect air quality performance, ranging from not upgrading or building appropriate infrastructure, lack of urban mobility plans, and elimination or abandonment of some MBIs that existed or was planned. Bulgaria's lack of a national agency to undertake enforcement of legislation means that transposition of EU legislation is not necessarily backed up by on-the-ground respect for requirements.[108] In Italy, many cities are not implementing urban mobility plans, and where measures supporting sustainable mobility have been or are to be adopted, there is no integrated and coherent set of measures set out from the federal level (as is the case in Austria, where harmonisation at the local and regional level has been organised at the federal level[109]). Nonetheless, there are some local successes, including the Emilia Romagna region which has introduced successful policies aiming to improve air quality including by improving public transportation, introducing a ban on private car use and promoting less polluting heating systems. The Netherlands took some measures that can be seen as counterproductive from an air quality point of view, including increasing the maximum speed on motorways to 130 km/h and abandoning plans for a 'kilometre charge' (road pricing), which were part of the National Cooperation Programme on Air Quality. Portugal is supporting its transport sector through its National Road Programme which promotes new highways and roads, increasing spending in the individual transport area, and decreasing investment in public transportation.

Nonetheless, political decisions have also been taken that strengthen the political framework supporting air quality improvements, via local urban air quality plans, changes to support schemes to encourage better environmental performance, improving air monitoring networks, and control of industrial installations. Hungary has set up an inter-ministerial committee to identify actions needed to improve air quality in 2013, and this will include a review of legislation affecting air pollution.[110]

Structural issues having a negative impact on air quality performance include a historical and sometimes on-going preference for road transport infrastructure over public transport or other forms of mobility. Also of relevance is the energy infrastructure of a country and the government's support for different types of energy carrier. Examples include Austria's major driver for the emissions of air pollutants being traffic and to some extent also energy production. Since the late 1990s,

passenger transport vehicle kilometres of private cars and aviation have shown a strong increase, and freight transport has shown an even more pronounced increase, tripling since 1990.[111] Finland's transport sector is a driving force behind air emissions, and vehicle mileage has been increasing steadily, along with overall energy consumption.[112] Domestic wood combustion is also common in Finland and the $PM_{2.5}$ emissions from these are considerable.[113] Germany's transport sector continues to be one of the main emitters of air pollutants, with increasing passenger kilometres by car growing substantially (increasing from 1991 to 2007 by 24% to approximately 885 billion kilometres).[114]

Instruments used by Member States to encourage reductions in air pollutant emissions, addressing activities, sectors, and pollutants. These include taxes/levies on transport and/or energy consumption, on fuels (whether specifically for heating, or on vehicle use), on specific pollutants, and regulation, as well as investments and funds for public transport. Examples of initiatives, decisions or instruments on transport and energy consumption include Austria's increased tax levels on mineral oil (gasoline, unleaded petrol, diesel and heating oil) and on natural gas. This rise in taxes on fossil fuels could possibly lead to decreased consumption, but the rise was offset by higher tax deductions for commuters, so the reduction effect was buffered. Denmark has indexed its excise duty on vehicle fuel consumption from 2012, as part of a broader tax reform.[115] [116] In 2011, Finland's tax levels on vehicles and on peat were increased, and a new windfall tax for hydro and nuclear power was introduced.[117] Slovenia has piloted its first Low Emission Zone and it is envisaged to roll these out across the country in 2013.[118] Germany's use of instruments to particularly reduce PM_{10} and $PM_{2.5}$ emissions include tax rebates to vehicle owners for retrofitting cars with particulate filters and grants for their installation; and truck road tolls partly based on the truck's pollution category (lower for less polluting categories).[119] Greece's measures include an annual vehicle circulation fee (applied to passenger cars, motorcycles and trucks according to the engine's capacity); excise taxes on gasoline and diesel fuel (with revenues partly channelled to air pollution control measures) and a reduction in the taxation and classification fees for new on-road passenger vehicles and motorcycles aiming at a faster fleet renewal.[120] Some of Italy's regions have introduced circulation tax exemptions for methane and LPG vehicles (Piemonte), incentives to buy more modern motorcycles and on the switch of private cars to methane or LPG (Lazio), and grants for buying newer (more efficient, less polluting) private cars for low income households (Lombardia).[121] Malta has introduced measures for cleaner vehicles: registration taxes for commercial vehicles of lower than Euro III emission standard were increased to encourage the purchase of less polluting vehicles; a car scrappage scheme was introduced to encourage the scrapping of energy inefficient and polluting private passenger vehicles to be replaced with Euro IV standard or higher.[122] The Netherlands applies a reduced registration tax rate on diesel cars meeting Euro VI emission standards before they become binding. Romania provides subsidies for Euro III or IV (or higher) emissions standards for vehicles, and has instituted a pollution tax for new and second-hand cars registered in Romania.[123] Slovenia charges lower excise duties on vehicles with lower CO_2 emissions.

Examples of positive action supporting public transport include Slovenia's efforts to improve public transport systems, to shift road transport to railway, and to establish public transport systems where these do not yet exist. The UK has allocated funds to encourage public transport, including the Green Bus fund to encourage uptake of low-emission buses and the Local Sustainable Transport Fund for local authorities to support sustainable travel; the promotion of cycling and walking; reduced vehicle excise duty for lorries and buses meeting the Euro V standard before it became mandatory; and the Sustainable Distribution Fund to encourage freight transport by rail, inland waterway or sea.[124] An example of contradictory public funding is Hungary's allocating more than 50% of the funds to transport in its national

development plan for public transport and modal shift of 'heavy traffic' from road to rail. Yet, it is also funding the building of highways and by-pass roads, to better manage traffic levels (supposedly improving quality of the environment of settlements and their safety as well, but in reality still responding to personalised and other road transport demands).[125]

Despite efforts at reducing the impacts of climate change, and the strong links between transport and air quality, political decisions are still being taken that have negative effects on air quality. Hungary's capital, Budapest, was considering introducing congestion charging, however this looks to be delayed as the Hungarian National Assembly voted against changing the law for it to be implemented in July 2012, backed up by a 2012 Parliament vote against legislation enabling the congestion charge at a national level. Instead, a public utilities tax has been introduced from 1st January 2013, imposed according to the metric length of pipelines and cables (for natural gas, heating, electricity, amongst other public utilities).[126]

Examples of taxes on specific pollutants include the Czech Republic, Denmark, Luxembourg and Sweden having taxes/levies on sulphur according to its content in fuel. The Czech Republic's new 2012 law on air quality protection imposes charges on four pollutants - VOC, NO_x. SO_2, and PM.[127] Denmark has increased its NOx tax five-fold from 2012 (to 3.36 EUR/kg to help improve its performance on NOx. Estonia is increasing its 'environmental charge' from 2010-2015: air pollution rates for CO, NO_x, VOC, heavy metals and mercaptans are increasing 5-10% annually; and SO_2 and particulate matter charge rates increase 30%. Latvia uses its natural resources tax to address air pollutants, and rate increases have been announced to 2015: the PM_{10}/tonne rate will increase ten-fold between 2009 and 2015, and the CO_2 rates will rise by more than six-fold.[128]

Examples of initiatives relating to specific industry sectors include Austria's cement industry running pilot projects installing selective catalytic converters, and emission reduction technologies have been installed in Austria's main crude oil refinery. Estonia provides state grant funding through its electrical mobility programme (ELMO) for private and public institutions to acquire an electric car.[129] The Netherlands supports the uptake of low-emission vehicles, machines and appliances, and its National Cooperation Programme on Air Quality includes measures on the road transport and agriculture (animal husbandry) sectors, and industry.[130]

Only two Member States have introduced regulation on air quality in 2011/12: Ireland in 2011 turned into legislation a 2002 voluntary agreement limiting the sulphur content in bituminous coal[131], and Malta's air quality plan includes various legislative acts[132].

Recommendations

The transition to a low-carbon, resource-efficient Europe is a central objective of the EU. Various Roadmaps and other strategic documents further developing and supporting this transition have been put forward over the past few years. Such a societal transformation requires the involvement of key actors, in addition to strong and clear leadership from governments at all levels. Although it is still early days in the transition to a resource efficient, low carbon economy, some Member States have taken bolder steps than others in their societal and market transformation efforts. These efforts are welcome and should be further encouraged.

In general, further work is however needed to create a stronger momentum towards a low-carbon, resource-efficient Europe. The European Semester is also in its early days, and those issues taken up under the resource efficiency umbrella (including resource productivity, municipal waste management, environmental taxation, reform of environmentally harmful subsidies, water and air quality) should continue to be

developed. Ideally, resource efficiency should eventually focus on input-related aspects, supported by efforts tackling outputs and impacts. The EU's environmental acquis still focuses more on these latter elements.

A resource efficient, low carbon economy requires supporting political decisions and the implementation of instruments to ensure its objectives are achieved. Positive steps are already being taken on all the themes addressed in this report, but there are also contradictory decisions being taken or delays that hinder or slow down achievement of the objective of making Europe's economy resource efficient and low-carbon.

Based on the advice/recommendations from the 27 country reports, and from the horizontal screening across the countries, a summary of priority actions or areas where further effort is needed is set out below.

Economic, fiscal and financial elements

- More effective **monitoring and reporting** of public expenditure on environmental protection and evaluations of the effectiveness of this spending will be critical in this respect.
- **Budgetary expenditure needs to be considered alongside other instruments** and efforts such as **environmental** taxation (and other MBIs), the phasing out of environmentally harmful subsidies and the appropriate use of state aid which also have a role to play in the transition to a resource efficient economy.
- **The need** for **environmental tax reform to be put at the heart of Europe 2020 activities**, for monitoring and reporting on efforts in this area to be seriously pursued under the European Semester and for **relevant indicators** to be integrated into the European Semester.
- **Learning and exchange of best practices** between Member States including those that have already introduced input and/or natural resources taxes (e.g. on **aggregates** and other extracted materials, and general natural resources taxes applied to resources including water, physical raw materials, and even pollutants) to encourage their wider application among a greater number of Member States, as well as their further refinement so that they are more effective in supporting the transition to a resource efficient economy
- **Regular and transparent reporting** on the identification and reform of **environmentally harmful subsidies (EHS)** should be further encouraged and their results communicated through the European Semester process as well as at the national level. EHS reform efforts could focus on certain issues identified as priorities and already have some political momentum (e.g. subsidies for fossil fuels, transport-related subsidies including company car taxation and commuter subsidies, etc.).
- The need to ensure coherence of **state aid** provided by Member States to avoid, for example, funding efforts to combat climate change and reduce fossil fuel consumption and use, while also funding the production and consumption of fossil fuels. Good examples of the phasing out of funding for coal exist, and these examples should be **replicated** beyond the coal sector to other highly polluting, 'sunset' sectors, through the careful management of the shift of funds (often long-standing for many years/decades) from environmentally damaging to environmentally enhancing sectors and technologies.
- The European Semester provides a regular and consistent process for EU economic oversight and thus needs to become a key **development, implementation and evaluation process** for the on-going transition to a resource efficient, low carbon economy. It needs to ensure that a **strategic approach** continues to be developed across the often-overlapping issues addressed in the package of Roadmaps and strategies on resource efficiency,

low carbon economy, transport, energy, and biodiversity. Strong links also need to continue to be made to the Industrial Policy and Horizon 2020, and future developments in these areas.

- **The development of a strategic approach to the resource efficiency agenda will need to integrate, facilitate and require the better use of economic, financial and fiscal instruments as well as links to the circular economy and restoration / natural capital which are in the process of being constructed.**

Waste management

Given the division of Member States into clusters in the waste management chapter, we provide a similar structure here. For the **higher performing countries** (Austria, Belgium, Denmark, Germany, Luxembourg, the Netherlands and Sweden), most of the key instruments are in place for environmentally sound waste management. Looking ahead, these countries will need to focus activity in the following areas:

- Ensuring effective **waste prevention** helping to reduce waste generation, and change consumption patterns.
- Realigning **treatment capacity** along the lines of a **circular economy** approach, thereby **reducing incineration capacity** and considering **alternative treatments** such as intensifying separate collection aiming to increase high quality reuse and, **recycling levels**.
- Better development and implementation of **individual producer responsibility** in existing and any future schemes, thereby establishing a clear link between product (eco-) design and the cost of end-of-life management, creating **financial incentives for eco-design**, as well as ensuring that **total separate collection and recycling costs are covered by producers**. In this regard, **EU policy (beyond waste legislation) needs to further develop the producer responsibility principle, both in its articulation and its integration in legislation and voluntary tools** (such as the Ecodesign Directive voluntary agreements). Further development of producer responsibility, in this case, means its application to more products and to sectors, and beyond the end-of-life management of products to include information provision and potentially other elements building transparency.
- Development of **sustainable consumption and production policies**, beyond voluntary measures and provision of information. These could include the development of **sustainable business models** (working in collaboration with business partners), **choice editing in shops** (working with the retail sector to eliminate less environmentally performant products from shop shelves), and **promoting less materialistic, voluntary simplicity lifestyles**.

For **transitional countries** (Czech Republic, Estonia, Finland, France, Ireland, Italy, Slovenia and the UK), much focus is on the further development of existing tools. Looking ahead, particular focus is also needed to:

- Further develop a **reuse, recycling and waste prevention culture**, via **awareness-raising and communication activities**, to support expansion of separate collection schemes (financially supported by producer responsibility and PAYT schemes).
- Focus policy efforts, and related support mechanisms, on **waste prevention activities**. This should also include the legal requirement for regional and local authorities to prepare **waste prevention plans** as part of waste management plans.

- Strategic development of **treatment capacity**, to ensure appropriately scaled recovery installations and recycling/composting capacity that is easy to increase. Both political objectives and subsequent decisions on measures should reflect a priority for activity higher up the hierarchy, notably reuse/recycling/composting capacity before incineration or other recovery activities.
- The same observation on **individual producer responsibility** as for higher performing countries above.

For **below average performing** countries (Bulgaria, Cyprus, Greece, Hungary (check if to go up to medium), Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Spain), most are still missing key elements of an environmentally sound waste management system. Looking ahead, particular attention will be needed to:

- Develop waste and related policy to support a resource-efficient, circular economy, encouraging **eco-design** and broader **eco-innovation**, respecting the **waste hierarchy** (including prevention), and building a culture that supports this.
- Deliver studies on **treatment capacity needs**, aligned to the previous point, and providing analysis of appropriate **economic instruments**, particularly landfill and incineration taxes, and landfill/incineration bans.
- Ensure strategic use of **EU structural and cohesion funds**, to build appropriate treatment capacity in line with the waste hierarchy; and ensure coverage of all households by **waste collection schemes,** with **separate collection** of recyclables, compostables and hazardous waste.
- Increase **capacity of competent authorities** to create, implement, and enforce high performing waste management systems, through appropriate strategy development, adequate infrastructure, public engagement, and well-funded environmental regulators.
- Review existing **producer responsibility schemes** along the lines of that suggested for high performing countries, and apply them to at least all of the waste streams/products addressed by the EU recycling directives.
- Address **diversion of biodegradable waste from landfill**, through infrastructure (separate collection, composting/digestion facilities), regulatory and economic instruments.

Support to SMEs

In most cases, Member States are providing SMEs with some elements of support and even have specific policies, programmes and Ministries dedicated to them. A number of Member States (Belgium, Bulgaria, Czech Republic, Denmark, Estonia, France, Germany, Hungary, Latvia, Luxembourg, Romania, and Slovakia) appear to have provided more developed support to SMEs throughout 2011-12, recognising the importance of this type of enterprise to their economies.

The priorities of such support for SMEs build on existing examples making them more systematically available through:

- **Well-targeted and easy-to-use financial support which aim to facilitate the development of new products/technologies, eco-innovation, connections with other key stakeholders** in these processes (universities, academics, venture capital and business angels) such as through clusters and R&D funding.
- **Reducing administrative costs** by continuing efforts to provide 'one-stop shops' offering information and a single or fewer registration procedures related to environmental and other legislation.

- **Promoting compliance with environmental (and other) legislation** through outreach, online information portals, links to key legal registration documents, training, and other capacity-building activities. These activities aim to maintain high levels of awareness of relevant environmental legislation and requirements.
- **Enabling SMEs to become more resource efficient** by both cutting the costs of their resource inputs, and developing new green products. In this context, the provision of environmental expertise, support in applying environmental management services and project support can work well together.
- **Making better use of EU programmes for supporting SMEs and innovation**, learning from existing Member State initiatives specifically targeting SMEs across a range of eco-innovation areas, or in specific fields such as sustainable agriculture, construction, environmental and sustainable infrastructure, energy efficiency and pollution control.

Air quality

The air pollutants with the most serious need of attention across most Member States are **NO_x**, **PM_{10}** and **$PM_{2.5}$**. Despite having met EU limit levels on NO_x, some countries are still having difficulty meeting NO_2 levels, mostly due to difficulties in managing traffic levels.

Transport-related activities are especially needed as Euro standards on vehicles have been generally identified as not having had an impact on specific pollutants although general air quality has been improved. Other sources include industrial activities, and specific cases such as building works of a significant size, the increased use of solid fuels and other high polluting fuels (such as damp biomass) in heating (due to the economic crisis, and the lower prices for such fuels).

For transport-related activities, there is a need for increased efforts to ensure **policy coherence** between climate change, transport and air quality objectives, notably by **supporting infrastructure and modal shift to non-road transport** (for both passengers and freight), **phasing out EHS** in at least company vehicle taxation and commuter subsidies, and encouraging more effective use of energy and transport taxation. A stronger emphasis on **behaviour innovation** (promotion of non-personal vehicle transport) and **positive impacts on health** (particularly of walking and cycling) need to be integrated into what has historically been a technological innovation approach (Euro standards, CO_2 from cars). Also, **support to diesel-powered vehicles** needs to be reconsidered, given the fuel's emissions of particulate matter and related health impacts.

Apart from individual country industrial activity, **the agriculture sector needs to have air quality considerations integrated in policies and instruments relating to its activities**. This is especially the case for ammonia and for fuel-related emissions, and extends also to water use and the reform of environmentally harmful subsidies to this sector.

2 Introduction

One of the key objectives of the EU's current economic strategy, the Europe 2020 Strategy[133] is for Europe to become a low-carbon, resource-efficient economy. Various Roadmaps[134] and other strategies have been adopted that support this over-arching objective – including on resource efficiency, a low carbon economy, transport, energy, and biodiversity – providing specific details in some areas and short-medium term steps in others.

National reform programmes (NRPs), together with stability/convergence programmes translate the objectives of the Europe 2020 Strategy into national targets and "growth-enhancing" policies in Member States. Implementation of the Strategy has been supported since 2011 through the creation an annual cycle of economic policy coordination known as the "European Semester". Resource efficiency is one of the areas addressed through the European Semester, and to date has focused on the provisional headline indicator of resource productivity, through thematic indicators such as municipal waste management and environmental taxation, and other resource areas such as water and air quality.[135]

Resource efficiency was highlighted in the Roadmap to a Resource-efficient Europe[136] as bringing both environmental and economic benefits. The Roadmap calls on Member States to shift taxation away from labour to environmental impacts, as well as to identify the most significant environmentally harmful subsidies (EHS) by 2012 and report on plans and timetables to phase them out as part of their NRPs by 2012-2013. The Roadmap also stresses the importance of full implementation of EU legislation on waste and air quality. It also mentions the need for advice and support at the national level for small- and medium-sized enterprises (SMEs) to help them in the field of resource efficiency and sustainable use of raw materials. Finance and support services for SMEs also feature among the actions foreseen as part of the Eco-Innovation Action Plan adopted in 2011.

The objectives of this study are to:

- Provide an assessment at both Member State and EU levels of achievements and progress made in selected policy areas over 2011 and 2012, highlighting instruments used as well as potential barriers and drivers for improvement; and
- Identify where further progress can be made in the selected environmental policy areas to enhance growth at national level and provide advice on measures that can foster such improvement

The areas of policy addressed in this study are:

- **Economic, fiscal and financial aspects** – addressing budgetary issues including environmental taxation, use of market-based instruments, environmentally harmful subsidies, and state aids.
- **Waste management** – addressing legally binding targets on reducing the landfilling of biodegradable municipal solid waste, batteries, end-of-life vehicles, packaging and packaging waste, and on waste electrical and electronic equipment.
- **Support to SMEs** – addressing various ways to support SMEs in translating potential and real interest in the resource efficiency agenda into practical action.
- **Air quality** – addressing legally binding targets on pollutants relating to the air quality directive and the national emissions ceilings directive.

3 Economic, Fiscal and Financial Instruments

A variety of economic and fiscal tools are available to governments, to more deeply ingrain resource efficiency principles and objectives into their economies, including national budgets, market-based instruments (MBIs), environmentally harmful subsidies (EHS), and state aid.. Despite some progress, EU Member States are still slow to put serious backing to the comprehensive introduction, reform and development of such tools, and the long-standing 'environmental fiscal reform' agenda still languishes in many countries. Nonetheless, the Europe 2020 Strategy through its resource efficiency agenda puts true costing at the heart of activities that are to be undertaken to support the achievement of the overall objective of becoming a low-carbon, resource-efficient Europe. The true costing focus of the resource efficiency agenda aims to ensure that the costs/prices of resources and products better reflect their negative environmental and social impacts as well as their benefits. This should help to overcome an important market failure in the generally low prices currently paid for many resources. An overview of Member State (MS) developments in these areas in 2011 and 2012 follows below.

3.1 Budgetary expenditure

Examples of Member States showing an *increasing trend* of public budgetary expenditure in areas of environment, resource efficiency and green growth include Germany where spending by the Federal Environment Ministry (BMU) almost doubled from 2008-2012 (from 847,000 EUR to 1.6 million EUR) with particular increases in the areas of resource conservation, resource efficiency[137], climate change mitigation and adaptation[138]. In the UK, general government expenditure on environmental protection has shown an upward trend from 1996-2010 (in 2010 environmental protection expenditure was 16.4 billion, an increase of 12.3 billion EUR between 1996 and 2010). 2012 and 2013 show slight decreases to 13.8 billion EUR and 15.2 billion, respectively[139]. In Denmark, environmental protection expenditure increased between 2008 and 2011, from 891.5 million EUR to 1 billion EUR.[140] In France, environmental spending has been particularly increasing as a result of the 2007 *Grenelle de l'Environnement* environment plan, which highlighted the cross-sectoral nature of environmental issues and led to ministerial and administrative structural reform to mainstream environment in all policy making (although this trend is connected to GDP and was affected by the economic crisis.[141] Although total expenditure on environmental protection activities was up by 3.1% in 2010 compared to 2009, this increase after a slowdown in 2009 was still smaller than the annual increase which exceeded 5.3% between 2000 and 2008.[142] In Sweden, resource-related investments increased by 20.6% from 2008 to 2011 while energy related investments increased by 32.2% over the same period.[143] In Finland, public sector environmental protection expenditure grew between 2007 and 2009 on average by 2.4% per year.[144] Similar increases have taken place in Malta (since 2005), Estonia (since 2008), the Czech Republic (since 2006), Romania (since 2009)[145] and Poland (since 2008). In some cases, these increases took place against the backdrop of overall cuts in government spending, for example in Slovakia overall government spending on the environment increased by approximately 30% between 2009-2010 while the total budget decreased by approximately 15% between 2008-2009, Environment Ministry expenditure increased by 77% between 2010 and 2011 with the most significant increase in the area of air protection.[146] In the Netherlands, fiscal consolidation efforts have resulted in increased environmental spending through a continuation of existing income tax relief for people investing in 'green' funds, a temporary subsidy scheme for small-scale solar panels, and additional funding for nature areas.

Nonetheless, the *economic and financial crisis has also led to gradual declines or substantial cuts in spending* across a number of areas including environment, resource efficiency and green growth: Of those countries gaining the most headlines for continuing difficulties with their economic performance, Cyprus's environmental protection budget has fluctuated significantly from 2008 to 2011, dropping by 12% (2008 to 2009) before rising by 2% (2009 to 2010), although recording a 23% decline from 2010-11.[147] Spain's environmental protection budget has shown similar substantial fluctuations as Cyprus, with annual declines since 2009 of 4%, 17% and 9% and a further 11% decline forecasted for 2013.[148] Despite this decline at national level, Autonomous Bodies' budgets have remained rather stable since 2009, undergoing only minor reductions. This shows the importance placed by the Central Administration on the continuous operation of these entities and the weight they can have in political and economic decisions. This might also suggest that in this specific case, the major reductions have been directed towards redundancies at the higher levels of the central government in order to spare the sectoral entities from cuts which would potentially result in further slowdown of the agricultural sector and continued failure to meet European environmental policy objectives. Despite Italy's Environment Ministry's responsibilities being increased in 2006, its budget decreased by 65% between 2006 and 2012 in the context of a general cut in governmental expenditures aimed at reducing the public debt. The budget for 2013 was further reduced by 11%.[149] Portugal's federal, regional and local budget for environmental protection showed an 11.5% increase from 2008-9, but then declines of 22% from 2009-10, and of 6% from 2010-11.[150] Despite the severe public finance problems in Greece, the expenditures on environment remain relatively stable, although expenditure is disproportionately allocated towards payrolls and other mandatory employer contributions (e.g. to social insurance), which tend to be relatively stable over time, rather than expenditure on capital infrastructure.[151] Nonetheless, environmental protection expenditure has decreased notably since 2009, particularly in overall environmental protection, wastewater management, and water supply.

Other countries showing decreases in environmental expenditure include Austria, with a 2.9% decrease from 2009-2011 and a planned decrease from 2012-2013[152] (although, oddly, 2012 saw a 47.5% increase on 2011, but then a 34.2% decrease forecasted for 2013. This reduction has taken place against the backdrop of overall reductions in government spending between 2008-2010 due to the economic crisis and related austerity measures In Ireland, the government's environment-related expenditures gradually declined from 2008 to 2011 by 0.9%, but then showed more significantly marked declines as the economic crisis hit – reducing by 22% and 43% in 2012 and 2013 respectively.[153] In Hungary, central government spending on the environment decreased by 7.8% between 2008 and 2010 reflecting the implications of the financial crisis and efforts to reduce the budget deficit below 3%. In Slovenia, public spending on the environment has been negatively affected by budget cuts and measures to eliminate administrative burdens with environmental investments in real terms falling from 2008-2010 by 15.3%.[154] In Bulgaria, overall central government spending on environmental issues decreased by more than 20% between 2008 and 2011, with a significant decrease in expenditure on water and air management.[155]

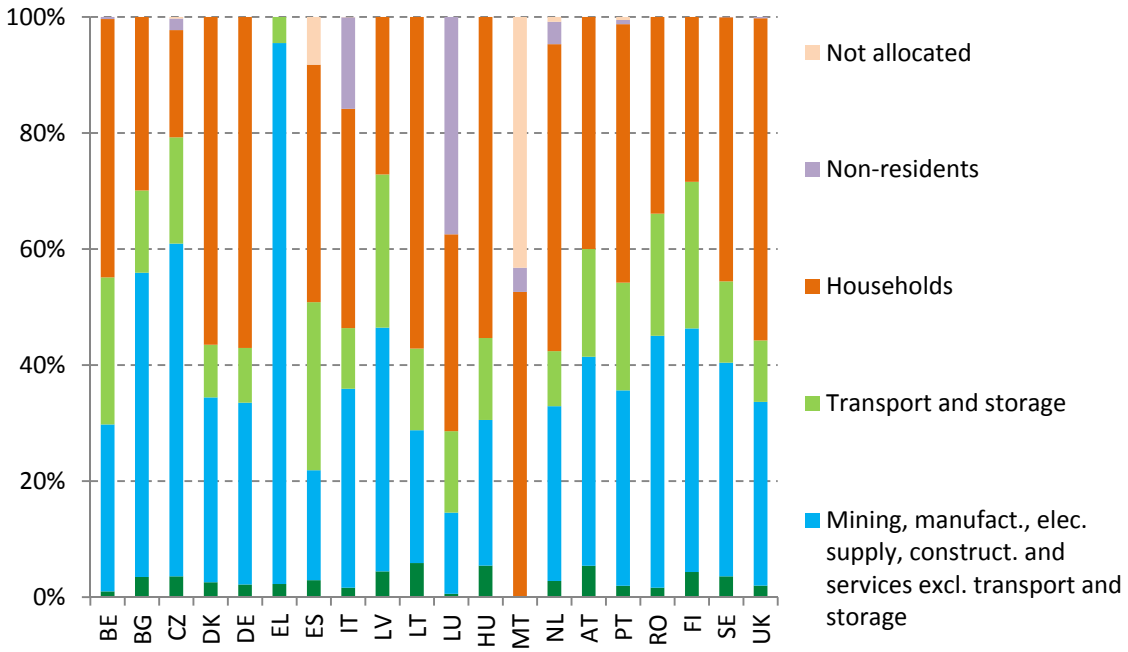
The crisis has also led to a restructuring of government departments in at least five Member States and related reductions in financial resources and staff. For example, in Lithuania, the economic crisis has in general caused budgetary and staff cuts which have reduced capacities in the environmental sector (among other areas) and pushed environmental issues down the list of political priorities. An 8% decline to the environmental protection budget was made from 2009-2010, followed by an 83% increase in 2011 (with a majority of the funds coming from

auctioned emission trading allowances and being spent on climate change), and then a 58% decline to 2012.[156] [157] In Spain, there has been a gradual decrease in funding and reductions in staff numbers in environmental secretariats, directorates and agencies (with the exception of the Spanish Office for Climate Change and the autonomous bodies) between 2010 and 2011, with further cutbacks projected for 2013 given expected reductions in the environmental protection budget mentioned above. After the merger of the Latvian Ministry of the Environment with the Ministry of Regional Development and Local Government in 2011 as part of a reform programme to recover from the financial crisis, the total budget for the combined ministry was 19% lower than the sum of the 2010 budgets for the two ministries.[158] In Portugal, since the merger of the Ministry for the Environment with the Ministry of Agriculture and Fisheries in 2011, funding has been cut significantly to the environment department – percentage details were provided above.

3.2 MBIs

MBIs including environmental taxes are applied in all Member States. This study looked particularly at MBIs in relation to energy, as these constitute the largest percentage of income against environmental taxes – below are a number of examples.

Figure 1: Energy taxes on energy tax revenue by economic activity in 2010



Source: Eurostat, 2013

Energy-based taxes constitute 88% of environmental taxes and MBIs in Bulgaria.[159] In Slovenia, energy taxes accounted for 92% of environment-related tax revenue in 2010, with transport fuel taxes contributing more than 75% of these revenues.[160] In the Czech Republic environmental taxes are levied on electricity, natural gas and solid fuels, while reductions are available for renewable and alternative electricity, biogas, combined heat and power (CHP), specified environmentally sound vehicles and a tax refund is available for public transportation using green electricity. In Germany there has been a stepwise increase in energy taxes (including gasoline, diesel, domestic fuel oil, gas, coal and electricity) from 1999-2003 which triggered the reduced use of taxed fuels and energy carriers and thus in turn caused reduced tax revenue.[161] The percentage of environmental taxes against GDP rose from 5.8% in

2000 to 6.8% in 2003, mainly linked to the increase in energy taxes due to environmental tax reform efforts, and subsequently decreased to 5.8% in 2010.[162] Hungary taxes energy use on electricity, natural gas and coal which forms the largest part of environmental tax revenue in the country (5.4% of total tax revenue, introduced in 2004).[163] In the UK, taxes for energy use comprise of fuel duty rates which apply to oil products and biofuels (with some rebates for non-road use)[164] and the climate change levy which applies to business and public sector consumption of electricity, natural gas, liquefied petroleum gases (LPG) and solid fuels (including coal)[165]. For cars registered on or after 1st March 2001, the vehicle tax rate depends on CO_2 emissions and fuel type.[166] In Sweden, a 2009 tax reform package included reductions in subventions for the CO_2 tax for fossil fuels in certain sectors (see section on EHS below). Denmark's tax on energy consumed for heating purposes (including on industries) is set at approximately 80 EUR/tonne CO_2 and has led to greater improvements in industry energy intensity than in other EU MS with lower tax levels.[167] The structure of energy taxation in Finland was changed in January 2011 to take into account in a more sophisticated manner the energy content, CO_2 emissions and emissions to the local environment that have adverse health effects.[168]Romania levies a tax on electricity, natural gas and solid fuels, both for individual consumers and institutions, whilst providing tax reductions for renewable and alternative electricity production and consumption, natural gas and petrol used for generating heating, as well as a tax refund for public transportation fuels. In the 1990s, Slovenia introduced a CO_2 tax that applies to all liquid fuels based on their carbon content.[169]

Other MBIs to support climate and energy objectives: Ireland's Renewable Energy Feed-in Tariff (REFIT) supporting electricity from renewable sources[170], and the UK's Renewables Obligation (RO) supporting renewable electricity projects and the Feed-In Tariff scheme (FITs) supporting smaller scale generation.[171] Various tax credits and other support schemes have also been introduced in MS, for example in France a tax credit scheme for energy reduction introduced in 2008 has been extended until 2015 because of its success. [172] [173] In at least 3 MSs there has been a ***reversal of support for renewable energy, eliminating or decreasing funds***. For example in Spain the national administration called for a freeze in subsidies for renewables in early 2012[174] while a new tax of 6% on all forms of electricity production and certain fossil fuels was proposed in late summer 2012.[175] In Italy in 2012 an incentive for oil-fired thermoelectric power plants was introduced and subsidies to photovoltaic energy and other renewables cut, at the same time incentives were introduced to encourage energy efficiency, develop technological innovation, support green employment and the development and use of renewable energies. In France, given the rapid growth of solar photovoltaic (PV) energy since at least 2009, in September 2010, the tax credit for PV for individuals was decreased from 50% to 25% and to 11% in 2011 which has led to a decline in sales.[176] In parallel, feed-in tariffs for PV were revised downwards each quarter between July 2011 and September 2012.

A number of MBIs are also in place in the area of transport. For example, in Malta, registration taxes of commercial and non-commercial vehicles of lower than Euro 3 emissions standard were increased in 2011/2012 to encourage the purchase of less polluting vehicles, companies can also benefit from a reduction in company tax up to 125% on the amounts spent on electric cars, while an annual circulation tax is also applicable based on age of the car and its CO_2 emissions.[177] The Netherlands raises significant revenue from transport taxes and has a non-negligible contribution of pollution taxes.[178] Lithuania's pollution tax (see more details below) is applied on emissions from stationary and mobile sources (automobiles equipped with an exhaust emission neutralisation system are exempt). The Austrian government introduced an 'ecological air travel levy' in March 2011 for all departing flights, similar to the tax introduced in Germany, which raised 60 million EUR in 2011 and about 100 million

EUR in 2012.[179] The levy will however be lowered in 2013 following criticism, mostly from airline representatives. Austria also has a distance-based Heavy Goods Vehicle Charge ("LWK-Maut") introduced in 2004 requiring all heavy goods vehicles to pay a toll when using a high-speed route in Austria.[180] In Germany, tax rebates and concessions are used to encourage the retrofitting of both cars and heavy goods vehicles with particulate filters to reduce particulate matter emissions.[181] Since 2012 in Romania a pollution tax applies to both new and second-hand vehicles on their first registration in the country. In Malta from 2011, registration taxes of commercial vehicles up to the Euro 3 standard have been increased to encourage the purchase of newer and cleaner vehicles.[182]

Environmental taxes are also in place in a number of other sectors or areas. In Latvia the Natural Resources Tax is the main mechanism for environmental taxation[183]. In Lithuania, a pollution tax[184] is applied on certain goods (e.g. batteries and mercury lamps), packaging and emissions from stationary and mobile sources (as mentioned above)[185]; while a natural resources use tax applies to minerals, water and soil[186]. In Poland, a number of taxes and subsidies on processes (such as emission of gases and dust into the air, sewage entering water or soil, and waste storage) or resources are in place including an effluent charge system which is considered to have been relatively successful in reducing emissions (see Box 1), while a new tax on extraction of certain minerals, such as copper and silver, will also be introduced in the country.[187] Environmental taxes/charges in Austria include a tax on land contamination, and a waste deposit levy. In the UK, the landfill tax was introduced in 1996 and has increased annually by 1.17 EUR (1 GBP) from 1999-2004, then by 3.51 EUR (3 GBP) per year from 2005-2007, and finally by 9.36 EUR (8 GBP) annually since 2008. Since 1 April 2013, the standard rate is 89 EUR (72 GBP) per tonne, up from 79 EUR (64 GBP); from 1 April 2014 it will rise to 99 EUR (80 GBP)[188]. The highest landfill tax rate in 2010 was in the Netherlands at 107.49 EUR per tonne (although this was abolished in 2011 and compensated for by an increase in the number of waste types to which a landfill ban applies).[189] The UK also introduced an aggregates levy in 2002 for the commercial use of rock, gravel and sand[190]. From 1 April 2013 the rate will be set at 2.60 EUR (2.10 GBP) per tonne[191]. A programme of environmental tax reform (ETR) initiated in the Czech Republic in 2007 is being implemented in stages: the first stage transposed Directive 2003/96/EC on the taxation of energy products and electricity and included the introduction of new taxes on natural gas, solid fuels and electricity with supplements to existing charges on mineral oils; the second stage occurred through the adoption of the Clean Air Act, which came into effect in September 2012 and introduced a new system of charges for air pollution (VOC, NO_x, SO_2 and PM); and the third phase will amend the tax base based on an assessment of the effects of the taxes introduced a part of the ETR package.[192] [193] In Estonia, a mineral resources extraction charge is paid for the extraction, use or rendering unusable of mineral resources belonging to the state; a fishing charge is paid for rights to fish or collect aquatic plants; and a charge is paid for regeneration cutting in state-owned forests.[194] In Hungary, a new Green Tax Act entered into force on January 2012 and applies inter alia to entities producing and selling packaging materials provided that their customers use the purchased materials to package goods for onward sale.[195] Slovenia also has well developed pollution and resource taxes which are the sixth highest in the EU.[196]

Some new environmental taxes have been introduced or existing systems revised against the backdrop of the economic and financial crisis. One prominent example is the case of Ireland where environmental fiscal reform has been an important part of its response to the economic crisis. A carbon tax on transport fuels was introduced in December 2009 and on fuel for heat in May 2010. The level of the tax was 15 EUR/t CO_2 in 2010 and 2011, increasing to 20 EUR in 2012.[197] The tax has become an important source of income for the government, as

well as contributing to environmental protection and GHG emission reduction obligations. The tax has helped to redress falling tax revenues in other areas, raising 246 million EUR in 2010, 330 million EUR in 2011,[198] and 400 million EUR in 2012. This is expected to rise to around 500 million EUR in 2013 if the tax rate is raised to 25 EUR/t. In addition to the extra revenue raised, the tax does appear to have had environmental benefits. Between 2008 and 2011 the consumption of petrol fell by 21%, and the consumption of auto-diesel by 13%; whilst some of this may have been as a result of the carbon tax, a drop in consumption was already underway in 2008-2009 before its introduction.[199] In Portugal, several MBIs are planned including a 10% tax increase on high power engines (over 2.500c m^3), a special tax on motorised vehicles and improved harmonization of taxes and fees in the energy sector. These taxes are expected to decrease fuel consumption and related CO_2 emissions by making fuel consumption less attractive[200].

There are significant differences in approaches to how revenues raised from environmental taxes and charges are spent. In Ireland for example, revenue from waste taxation goes to the Environment Fund, supporting activities including programmes on waste prevention and reduction, recovery activities, research and development, enforcement of waste management laws and awareness-raising campaigns at both the regional and national level.[201] In Slovenia, revenues accrued from water abstraction fees are channelled into the Water Fund together with revenues from payments for water rights. In Bulgaria, all environmental taxes are collected by the Enterprise for Management of the Environmental Protection Activities (EMEPA), and are used exclusively for improving the environment.[202] In Poland, revenue from penalties is collected and distributed to the National and Regional Funds for Environmental Protection and Water Management[203], all charges and fines must be earmarked for investments and expenditures to reduce pollution and protect the environment, for example through reducing wastewater discharges. For example, in the UK, revenues from the landfill tax are not earmarked and are added to the national budget. In Denmark, proceeds from water abstraction charges are collected by municipalities, and these funds go to general central government revenue, so they are not earmarked for further water-related improvements.[204] In Italy, only 1% of the revenue from environmental taxes goes to environmental protection expenditure.[205]

Environmental taxes as a percentage of GDP has been declining or stagnated in the majority of Member States. The greatest increases (above 1%) between 1995 and 2011 were in Romania at 1.9%, Estonia at 1.8%, and Latvia at 1.3%. Cyprus was the only country to have stagnated in this time (0% change), and 17 Member States recorded declines of between 0.1% (Belgium and Germany) and up to 0.7% (France and Slovenia) and 0.8% (Italy).[206] Some specific examples include, in Belgium, the share of environmental taxation in total taxation decreased over the years and the tax rate is very low compared to other MS. In Portugal, there has been a reduction in total environmental tax revenue from 2006-2010 (from 4.6 billion EUR in 2006 to 4.0 billion EUR in 2010) mainly due to reduced transport fuel consumption as a consequence of higher oil prices.[207] In Cyprus, although total environmental taxes increased substantially in value between 2000 and 2010 they have not increased further in recent years due to the financial crisis and a fall in aggregate demand.[208] In Spain, there has been an overall decline of 1.3% in environmental tax as a percentage of total tax revenue between 2000 and 2010.[209] In Italy the share of environmental taxes in total taxes and social contribution decreased between 2000 and 2010 (7.61% to 6.14%) with only 1% of total environmental taxes used for environmental purposes.[210] In Luxembourg taxes on transport excluding fossil fuels are very low, there are no taxes on pollution and resources, and low taxes on road fuel encourage 'fuel tourism' (75% of fuel sales are to non-residents).[211] Its environmental taxes as a share of total taxation was at 7.1% in 2000, peaked at 8.1% in 2004 and steadily declined annually to reach 6.4% in 2010. In France, environmental taxation has been

decreasing since 2000 (from 4.9% in 2000 to 4.1% in 2010).[212] In Denmark, despite a number of progressive developments in this area, revenues from environmentally-related taxes have been steadily declining since their peak in 2002 (from 4.8% against GDP in 2000 to 4% in 2010) reflecting an inability to keep pace with increases in GDP as well as various exemptions and reductions introduced to the benefit of vehicle-owners, farmers and retail packaging.

There are also some encouraging recent signs of continuing environmental fiscal reform, with initiatives underway or planned. In Estonia political will to carry out an environmental tax reform[213] is growing and some excise duties and charges were increased in 2010 and 2011, including on liquid fuel, unleaded petrol, diesel fuel, and on electricity. From 1 January 2011, the Finnish Government increased taxation of vehicles and traffic fuels, as well as effecting a slight rise in the tax on peat, a new windfall-tax for hydro and nuclear power, an increase in the tax on waste and an assessment of the suitability of creating a tax on packaging waste, construction waste and uranium. In the Netherlands some economic instruments were recently removed including taxes on waste and groundwater (as of 1 January 2012), on packaging (as of 1 January 2013[214]), and on landfill[215] and the national emissions trading system for NO_x will be abolished as of 2014. In April 2012, a fiscal agreement was reached between the ruling government and a number of political parties to implement actions or introduce other measures as part of efforts to meet the 3% budget deficit limit, including the removal of reduced excise tax rates for certain uses of diesel, the abolitions of tax-free compensation of commuter expenses and of the exemption from the coal tax on coal used in power plants, an increase in existing energy tax rates, the continuation of the tap water tax and tax on heavy motor vehicles (Eurovignette), , a reduced rate of energy tax for small-scale renewable electricity production (for which no subsidy is received) and the removal of the motor vehicle tax exemption for old cars. Other measures that increase 'green' public spending were also included in the agreement, e.g. continuation of the existing income tax relief for people investing in 'green' funds, a temporary subsidy scheme for small scale solar panels, and additional funding for nature areas. In France, there was a planned increase of 30% of electricity rates for households and professionals (*tarifs bleus*) by 2016 and 45% by 2020, with progressive fees to be introduced by 2014 and aid for energy efficiency to alleviate pressure on low-income households (but this initiative is placed on hold).[216] An eco-tax on trucks will be introduced in 2013.[217]. A proposal for a carbon tax, originally put forward in 2010 is still being studied. The tax was abandoned (under the previous government) because of potential negative effects on purchasing power and competitiveness, lack of consensus within the government on the use of the revenue and insufficient communication and thus awareness among consumers.[218] In Denmark, as part of its on-going tax reform programme[219] [220], taxes were increased or announced for spring 2012 on lorry road pricing, motor vehicles, fuel consumption, tap water, some consumer products; and nitrogen oxides. Road pricing for lorries introduced in 2009 was to be extended over larger sections of the country, although this was abandoned. The existing Danish NO_x tax was increased from 1st January 2012, aiming especially to reduce air pollution. Italy's "general tax reform" presented in April 2012 by the then Government, explicitly mentioned the need for a green fiscal reform and included a carbon tax on energy products.[221] However, the fall of the Monti Government in December 2012 and elections in February 2013 has delayed this reform process, and it is still too early in the new government's existence to know how (or if) this reform will be taken forward.

Box 1: Best practice case - Effluent charging in Poland

In the 1970s, Poland introduced an effluent charge system, thereby becoming one of the leading countries in the region, together with Bulgaria and Hungary. In contrast to other Eastern European countries, Poland is regarded as the only country in which the fees may have reduced emissions (Stavins, 2001) [1]. Additionally, it revised its emission fee system for pollutants in aviation in 1991 and thereby increased total charges significantly. Consequently, Polish effluent fees rose to among the highest in the world, reaching twenty times their level since their introduction. The effluent charge includes a "normal fee" imposed on emissions below the regulatory standard and an additional fee which applies as a fine for excess emissions. This is one of the rare examples of a non-linear effluent charge. By and large, fees depend on ambient air quality guidelines and marginal abatement costs but in Poland, they have also been subject to political influence and revenue requirements (Anderson and Fiedor 1997).

Sources:

[1] Stavins, R. (2001). Experience with Market-Based Environmental Policy Instruments. Cambridge, Massachusetts, United States.

http://www.hks.harvard.edu/fs/rstavins/Papers/Handbook_Chapter_on_MBI.pdf.

Water pricing policies and abstraction fees

Various approaches are taken to water pricing and abstraction fees in MSs thus it is difficult to provide a detailed overview of practices. Of those Member States having increased water prices over the years, Hungary's water prices increased from 0.2 EUR/m³ to 0.5 EUR/m³ after subsidies were removed in 1992, which led to a reduction in water use by approximately one-third by 1996.[222] Since then, water fees nearly doubled between 2001 and 2011. In 2013, the water tariff will be 0.90 EUR/m³ for residential customers, 0.93 EUR/m³ for non-residential customers, and the meter usage fee is 1.16 EUR/calendar day/meter.[223] In Slovakia the price/m^3 of surface water taken from surface streams increased from 0.0963 EUR/m^3 in 2010 to 0.1059 EUR/m^3 in 2011.[224] Prices for drinking water production, distribution and supply via the public water supply system have also shown an increasing trend. These price increases have led to a decline in consumption of drinking water and water consumption by households to 79.8 litres per person per day, but have also led to people using other sources of water supply which are often below acceptable quality standards. In Portugal, there was a sharp increase in water and wastewater tariffs from 2009-2011 with the average price in 2011 costing households on average 186 EUR for 120m^3/year.[225] Estonia's pollution and resource tax is based on the amount of water used and pollution discharged into water bodies. There was a significant increase of on average 20% per year of the tax between 1995 and 2005 with rates continuing to increase in 2010-2015 depending on the pollutant. Examples include a 5-10% annual increase for water pollution for suspended particles and sulphur tetroxide (SO_4); 15-20% annual increases for phenols, naphtha and N-compounds; and for P-compounds the increase is 50% in 2010 and 30% per year after this. Water abstraction charges have also increased gradually by 10% annually from 2010-2012 and will increase by 5% after 2013.[226]

A mix of instruments, including water pricing policies, provide incentives for users to use water resources more efficiently: For example in Denmark, a variety of tools including abstraction fees, water metering, charges on water use and a number of water-related green taxes, including on piped water and sewage, have contributed to lowering consumption levels[227] (see Box 2). In Belgium, the average water price for households in Flanders is 3.83 EUR/m^3 [228], in Wallonia 4.03 EUR/m^3 and in the Brussels-Capital region 3.42 EUR/m^3.[229] This price level has acted as an incentive for rational consumption of drinking water and together with increasing consumer awareness, has led to a decrease in domestic consumption. However, the efficiency of the pricing system is difficult to assess as the decrease in consumption is

affected by a number of other factors including among others more water-efficient devices, an increase in domestic wells and rainwater harvesting. Instruments applied in the Czech Republic include fees for discharges to surface water and for groundwater abstraction, payments for river management and river basin management, charges relating to the supply of drinking water and discharges of wastewater into the sewage system, and sanctions for non-compliance. The average price (excluding VAT) of drinking water in 2011 was 1.22 EUR/m^3 and the average sewerage charge was 1.20 EUR/m^3. Compared to 2010, the price of drinking water increased by 5.8% and the sewerage charge by 6.1%.[230] [231] In Slovenia, the water pricing policy together with the implementation of meters at the farm level is expected to maintain the low use of water in agriculture[232] (water abstraction for agriculture accounted for less than 1% of total abstraction), while water use at household level decreased by 12% between 2002 and 2009. In Latvia, tax rates for water pollution are set in the National Resources law. As of January 2011, the rates for water pollution ranged from 4.31 EUR/tonne for non-hazardous substances to 71,754.50 EUR for especially hazardous substances.[233] Penalties for using water resources without permission are also in place, a tariff system discourages farmers and others against excessive water usage; once farmers exceed permitted quantities, excess consumption is charged at approximately three times the base rates, while the government may also ban irrigation during droughts or when faced with a similar priority.[234] In Austria, the average water use per person is declining, increasing costs may play a role, but the main reason is the use of water-saving valves and devices.[235]

Declining or low water prices which are too low to have a steering effect: For example in the Netherlands, water prices have decreased in real terms over the past decade, the recent abolition of the groundwater tax will contribute to a further decrease in prices (estimated average price decrease of tap water is about 7%). The tax on tap water is levied only on the first 300m^3 of tap water per year per connection which means that (as far as private households are concerned) the price incentive arising from the tax is largely absent for the most "luxury" (and most price elastic) part of water consumption, such as excessive garden watering and private swimming pools. 96% of tap water connections in the Netherlands have a water meter, and all metered users pay a combination of a fixed rate and a price per m^3. For an 'average' household (average water use per person per year of 48.3 m^3) the fixed rate in 2011 was 48.64 EUR and the variable rate was 1 EUR/m^3, implying an average water price (including the fixed rate, excluding tap water tax and VAT) of 1.50 EUR/m^3. The average nominal consumer price increased from 1.43 EUR/m^3 in 2000 to 1.53 EUR/m^3 in 2010 (+6.9%). Excluding taxes the consumer price increased from 1.14 EUR/m^3 to 1.16 EUR/m^3 (+2.4%); adjusted for inflation, the current price is in fact 0.22 EUR/m^3 lower compared to ten years ago. The average water price for business in 2010 was 1.05 EUR/m^3. [236] In Portugal abstraction fees facing households and farmers are low and have little or no real steering effect in terms of reducing water use. Prices since 2009/2010 for agriculture, fish farming, aquaculture and marine cultures is 0.003 EUR/ m^3, and for residential/dwellings is 3.75 to 5 EUR/ m^3.[237] In Germany, the relatively low abstraction fees (in 2011, 11 of the 16 *Länder* levied water abstraction fees, for public water supply ranging from 0.015 EUR/m³ in Saxony to 0.31 EUR/m³ in Berlin) facing households (with the exception of Berlin) are thought to have only a minor steering effect on households in terms of reducing water use. The abstraction fees paid by water suppliers make up only a minor fraction of the amount the households are charged per m^3 and therefore would need substantial changes to exert a clearer steering effect. The highest public water supply abstraction charges are found in five *Länder*: Bremen, Lower Saxony, North Rhine-Westphalia (NRW), Saarland and Saxony. In 2011, water abstraction fees for surface water were 0.005 or 0.003 EUR/m³ in Bremen, 0.051 EUR/m³ in Lower Saxony, 0.036 EUR/m³ in NRW, and 0.0077 EUR/m³ in Saxony; and for groundwater were 0.05 EUR/m³ in

Bremen, 0.051 EUR/m³ in Lower Saxony, 0.036 EUR/m³ in NRW, 0.07 EUR/m³ in Saarland, and 0.11 EUR/m³ in Saxony. In Greece water prices are considerably low and do not ensure cost recovery, which has had environmental consequences and contributed to cumulative debts for water utility companies.[238] In Spain, tariffs for water supply and sanitation services are calculated as a function of the water used by domestic and industrial users and is designed as an increasing block tariff. Existing tariffs, however, are in need of revision in order to improve the level of control, avoid subsidies and achieve greater transparency.[239] In Poland, water equipment is not labelled for its water efficiency; no standards are set for equipment and tap performance, fire protection requirements contribute to the installation of over-sized water pipes, especially in areas with low population density, while water loss in distribution networks remains substantial.[240]

Approaches to water pricing differ significantly across Member States. For example in Austria rights to groundwater use are attached to land ownership. Surface water resources are treated differently, but are also strongly regulated and authorisation for water abstraction is issued at district level.[241] Poland uses a volumetric-based pricing system, without fixed charges. Income from tariffs should cover costs concerning water intake, treatment, distribution and infrastructure development. In Luxembourg, water management is publicly controlled; water pricing is done at communal level, according to a new harmonised national method[242] and can be different from one supplier to another depending on geographical conditions. In France, water supply is financed by the fee paid by users and by state subsidies (for investment). The coverage rate of the water price compared with the real price depends on the region but it is 83% in the Adour-Garonne water agency for example.[243] In Estonia, a water abstraction charge is applied; the pollution and resource tax is based on the amount of water used and pollution discharged into water bodies.[244] In Slovenia, although the pricing structure for household users is set out at national level, the pricing itself is carried out at municipal level and there are differences in methodologies used by the municipal water companies thus price levels can vary significantly between municipalities. In the UK, charges for households vary depending on the water company, but are normally calculated in one of three ways: unmetered, metered, or assessed.[245] In the Czech Republic, water pricing uses cost-based estimates and reflects eligible costs, an adequate profit and the relevant taxes.[246] Regions in Belgium have adopted a water pricing mechanism composed of a fixed price for water supply and sanitation, a variable cost depending on water consumption, a social fund tax and VAT. Only households pay the VAT while agriculture and industries, which represent the majority of the catchment, do not. The water tariff for each consumption blocks depends on the regions.

Exemptions are also applied, in particular for the agriculture sector which can also be considered examples of EHS as they incentivise environmentally damaging activities/practices (for further discussion on EHS see section below). For example in Italy the water tariff is based (with very few exceptions) on irrigated area rather than on volumetric usage[247] [248], moreover water tariffs for farmers are lower than for other users (water tariffs for agriculture vary significantly across the regions and the different river basins, and range from 30 EUR/ha to 100 EUR/ha, and in some cases up to 700 EUR/ha) and do not cover investment or depreciation costs, but only part of operation and maintenance costs.[249] The cost recovery rate varies in different areas and ranges between 20 and 30% in the South and between 50% and 80% in the North. In Malta, agricultural water use is exempted from abstraction taxes and a flat volumetric tariff of 0.093 EUR/m³ is applied for the supply of non-potable water from public boreholes to agriculture.[250] In Portugal, the agriculture sector benefits from direct support for water abstraction for irrigation purposes, which the government implemented as drought compensation amounting to 5 million EUR in 2012.[251] In Spain, while surface water for irrigation is highly subsidised, cost recovery levels for

groundwater management tends to be better and farmers are required to cover the amortisation costs of infrastructure investments as well as those related to pumping and management. Nevertheless, the issue of illegal and unregistered exploitation of underground reservoirs continues to be a hindrance.[252] In Slovakia, water abstraction for agricultural irrigation has not been charged since 2004, thus abstraction costs are limited to private on-farm costs. This is also the case for the agriculture sector in Estonia and Hungary which is exempted from abstraction taxes. In Romania in 2010, the government eliminated the subsidy for pumping irrigation water which resulted in a dramatic decrease in irrigated agriculture by 75%[253]; however, this decision was reversed following a drought in 2012.[254] In Germany, the mining sector is in some *Länder* exempted from or has to pay a much lower fee for water abstraction than households have to pay for public water supply (14.4 million EUR annually[255]). Not only are the fee levels considered insufficient for full cost recovery, but also the lowered fees discourage efficient water use.

There are a number of plans or recent initiatives of relevance in water pricing. For example in Cyprus, recent changes to the system of water pricing for irrigation with a proposed fixed charge of 44.01 EUR per water meter and a variable rate of 0.22 EUR/m^3 are expected to lead to a 71.6% of cost recovery for irrigation water. It has also been proposed that fines be imposed on illegal water drilling as a means of preventing distortions in water management.[256] In Ireland, households using water for domestic purposes are not currently subject to charging.[257] The Government has decided to create a State company Irish Water, which will take over the water investment and maintenance programmes of all the county and city councils after its statutes are fully established in mid-2013 and will involve a move to domestic water meters and a charging system based on use above a free allowance.[258] In Bulgaria, a new higher water abstraction fee was introduced in 2012 which includes taxes on use of water bodies, on abstraction of groundwater, surface and mineral water and on pollution. Furthermore, the National Strategy for Management and Development of the Water Sector passed in 2012 by the Bulgarian Parliament proposes a number of changes to water policy including the inclusion of a new eco-tax fee on water prices calculated per m^3 water and for each type of service, with the tax revenue used for improving water infrastructure.[259] In the UK, the Parliament has called for a target to increase metering to 80% of households by 2020 (in 2012 around 40% of customers in England and Wales had a water meter). In Sweden there are currently no fees for water abstraction and it relies instead on quantitative restrictions through regulation.[260] However, the Government is contemplating an introduction of water pricing in line with the Water Framework Directive.

Box 2: Best practice case - Water pricing in Denmark

Denmark is considered an exception in having attempted to cover full economic and environmental costs in water pricing, having the highest water supply and sanitation prices amongst OECD countries. [1] It has made good use of a variety of policy tools relating to water consumption and quality, including abstraction fees, water metering and separate taxes (such as on pollution and wastewater). Its abstraction charges apply for direct water abstraction, on a capacity basis, and charges are included in retail water supply service tariffs, with no differentiation between user types. Proceeds are collected by municipalities only when a property is not connected to the public water supply, and these funds go to general central government revenue, so they are not earmarked for further water-related improvements.

In relation to Denmark's abstraction fees, no minimum abstraction quantities have been stated, and it is not clear if the fee applies to the agricultural sector or for irrigation purposes.[2] Denmark's wastewater tax is charged to consumers, in addition

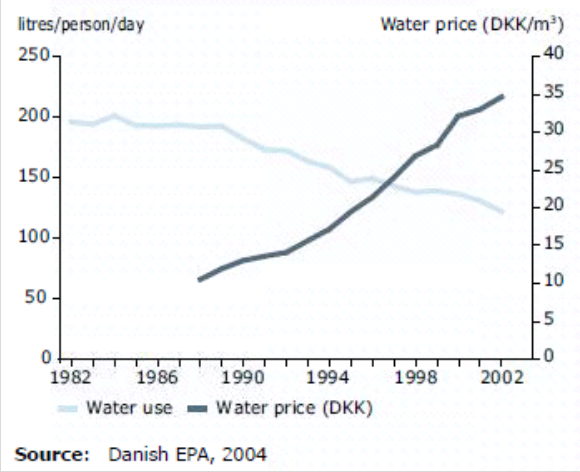
to charges for wastewater treatment services. The tax applies to households and to industry. 100% of households are metered. Although the agriculture sector is exempted from the wastewater tax, it does pay for surface water supply, with 100% of costs (operation, maintenance and capital costs) being covered.[3] Hence, for wastewater treatment, the "polluter pays" principle is implemented by a 100% user funding.

Denmark's household tariff structure is based on a constant volumetric rate with or without a fixed charge, depending on whether the household is in an urban or rural area. A connection fee is also charged. Industrial users pay for sewerage and sewage treatment based on consumption, and large users have these two charges separated, with sewage treatment charged on pollution and consumption. [1]

The Commission's assessment of Denmark's implementation of the Water Framework Directive [4] states that Denmark has applied the narrow definition of water services and uses (public and private suppliers, private water supply, private sewage disposal and private abstraction for crop irrigation in accordance with water plans), and that no further information was available if at least households, industry and agriculture are defined as water users. However, national reviewers clarify that this is correct for "water services" but not for "water users", and that water users includes households, industry and the agriculture sector.[5] Nonetheless, some environmental and resource costs are recovered. As stated earlier, water supply prices recover costs relating to mapping, monitoring and protecting water resources. Also, the Act on payment rules for wastewater treatment plants is based on a principle that wastewater treatment is a public utility to be fully funded by users and thus the "polluters pay" in accordance with uniform guidelines.

The Commission's assessment identified that the current water pricing policy provides adequate incentives for users to use water resources efficiently by metering water and applies volumetric charging. Water use is charged in Danish Kroner (DKK) per m^3 water used, and these include consumers' direct payment for water supply services and wastewater treatment. In addition, a number of green taxes are also paid. Water-related green taxes, i.e. piped water tax and sewage tax, provide greater revenue than the tax-funded activities within the water sector. In Denmark, a green fee per m^3 water is usually charged to all users. This is to create incentives for reducing water consumption. Businesses can recover the tax if they are VAT registered. Other green taxes (e.g. waste tax and CO_2 tax) are also included in the user charges.

Danish water pricing and household water use



Source: Danish EPA, 2004

Sources:

1. OECD (2010); Pricing Water Resources and Water Sanitation Services; http://www.keepeek.com/Digital-Asset-Management/oecd/environment/pricing-water-resources-and-water-and-sanitation-services_9789264083608-en.
2. Arcadis, InterSus, Fresh Thoughts Consulting, Ecologic, Typsa (2012). The role of water pricing and water allocation in agriculture in delivering sustainable water use in Europe – FINAL REPORT. Under contract: DG ENV.SRD.2 (BU-5 00/122). Brussels, 2012. http://ec.europa.eu/environment/water/quantity/pdf/agriculture_report.pdf.
3. OECD (2010); Sustainable Management of Water Resources in Agriculture; http://www.keepeek.com/Digital-Asset-Management/oecd/agriculture-and-food/sustainable-management-of-water-resources-in-agriculture_9789264083578-en.
4. European Commission (2012). Staff Working Document, Member State: Denmark, Accompanying the document Report to the European Parliament and the Council on the Implementation of the Water Framework Directive (2000/60/EC) River Basin Management Plans. (SWD(2012)379final). http://ec.europa.eu/environment/water/water-framework/pdf/CWD-2012-379_EN-Vol3_DK.pdf.
5. From correspondence with national reviewers.

3.3 EHS

Direct and indirect EHS remain an issue in all MS, varying across various sectors. In particular subsidies are prevalent in the ***energy sector*** and include tax exemptions or reductions for different uses of fuel and different sectors such as transport, agriculture, fisheries and industry as well as direct support. For example in Ireland many fuels (including coal, peat and natural gas) and energy services are subject to VAT at a special rate of 13.5%, and the carbon tax has only been applied to coal and peat since May 2013 (it is difficult to identify what amounts in total are subsidised).[261] Moreover a subsidy is provided to peat production in the form of a Public Service Obligation levy to support the higher cost of purchases of electricity generated from peat although support to peat-fired power plants is expected to cease by 2020. It was estimated that this subsidy represented 93.52 million EUR in 2010 and 78 million EUR in 2011.[262] In the UK, a reduced VAT rate of 5% is applied to domestic fuel and power, and fuel and power used by charities for non-business purposes, resulting in estimated subsidy levels in 2011 for coal of 100 million EUR, for petroleum of 469 million EUR, and for natural gas of 4.3 billion EUR[263]. The Petroleum Revenue Tax applied to profits from the exploitation of the UK's oil and gas is subject to a range of reliefs, providing estimated subsidies in 2011 for petroleum of 196 million EUR, and for natural gas of 149 million EUR[264]. In Slovenia, market price support for domestic coal amounted to 7 million EUR in 2010 and 2011[265], while plans to build a new 600MW block at the Šoštanj power plant will be supported by EU funds from the European Investment Bank and European Bank for Reconstruction and Development.[266] In Poland, preferential treatment of the hard coal mining industry includes exemptions from excise tax on coal and social support for heating costs[267], providing an estimated subsidy over the period 1999-2009 of approximately 5 billion EUR[268]. In 2012, grid access fees for electricity generated by wind and solar power were introduced in Bulgaria[269] (no estimates are available on the amount of subsidy this represents) - the fee will have a significant effect on the renewable energy sector and is currently being investigated by the Commission.

In the Czech Republic, Slovakia, and Latvia, a number of ***tax exemptions are in place for certain uses of fuel***. In the Czech Republic, such subsidies apply as energy tax exemptions for uses of solid fuels, for oil used for heating, and for uses of natural gas, representing subsidies of 36.3 million EUR, 22.9 million EUR, and 62.5

million EUR respectively.[270] In Slovakia, exemptions are available on the coal tax (a subsidy of 39 million EUR in 2011), on the natural gas tax (50 million EUR in 2011), and there is a reduced excise duty on LPG (5 million EUR in 2010). Latvia's fuel-related subsidies include a reduced excise duty on gas for heating (at 17 EUR/1000m³, compared to 99 EUR/1000m³ for gas used in transportation).[271] From 1 July 2011 to 31 December 2013, full excise rebates/exemptions were given on natural gas for heating for greenhouses and industrial poultry breeding (0.29 million EUR); for heating and use in industrial manufacturing and the processing of raw agricultural materials (1.44 million EUR); and lower VAT levels were charged to households using natural gas (9.62 million EUR).[272] Between 2005 and 2011, excise rate exemptions were provided on oil products for industry and on petroleum, fuel oil and diesel oil used for heating (11.34 million EUR). Also, peat is exempt from the CO_2 tax, although there are no figures for level of subsidy were available. Similarly in Belgium fuel tax exemptions/reductions are in place for certain professional and industrial uses, regional bus transport, and for agriculture (see State Aids section below for amounts of support these represent).[273] In France, there is a reduced tax rate for fuel oil used as diesel fuel (1 billion EUR in 2011), and a tax refund for diesel used in road transport (300 million in 2011).[274] In Germany the manufacturing, agricultural and forest sectors benefit from electricity and energy tax reductions of up to 60% of standard tax rates for electricity and heating fuels (natural gas and liquefied gas) and up to 73% of the standard rate for heating oil.[275] Financial assistance is provided for the production of hard-coal (1.77 billion EUR in 2010[276]), and coal mine operators are offered debt relief schemes, mining-royalty exemptions and reduced pension contributions for miners (1.47 billion EUR in 2011[277]). In addition, companies in the manufacturing sector can further get refunded 95% of the ecological tax, which exceeds the relief on pension scheme contributions.[278] In 2010 the German federal government agreed to extend this scheme beyond 2012, but exemptions will only be granted under the conditions that receiving companies prove to have introduced by the end of 2015 an energy management system, and have reduced energy intensity by 1.3% for the years 2013-2015, and 1.35% for 2016.[279]

Subsidies are also evident in a number of other areas: In Hungary, unpaid environmental damage from coal mining represents an annual subsidy of 342-514 million EUR, and a "coal penny" levy paid by final electricity consumers for electricity generated from coal represented a subsidy of 20 million EUR in 2011. The "coal penny" is likely to be phased out by end 2014 with the closure of the mine.[280] Petroleum and natural gas production and distribution receive annual subsidies of 279-383 million EUR.[281] There are also several cases of tax reductions and exemptions for waste incineration, for example in Slovakia there is no charge for waste incineration or landfilling as of 2008 (no estimated subsidy amount available), direct subsidies for the construction of waste incineration plants, for example in Portugal (70 million EUR)[282], the Czech Republic (Cohesion Funding of more than 200 million EUR for two waste incinerators[283]) and Poland (direct transfers of funds favouring incineration over waste prevention and recycling) [284]. Other waste-related subsidies include incomplete producer responsibility, for example for financing WEEE management systems in Slovenia[285]; and payments of feed-in tariffs (6.53 million EUR) and premiums for landfill gas and sewage gas used for electricity and heat (27.13 million EUR) which do not encourage a shift in the waste hierarchy towards waste prevention, for example in the Czech Republic[286]. There are also cases of reduced VAT rates for foodstuffs for example in Luxembourg (146 million EUR in 2010, Slovakia (estimated value not available), and France (estimated value not available); and although figures are not available on the subsidy amounts, reduced VAT rates are offered for water, for example in Luxembourg and Spain. Indirect subsidies on material extraction are in place in several MS, e.g. the Czech Republic where the level of taxes and charges on aggregate materials extraction is low (3% in 2008)[287] and in Malta where there is an

indirect subsidy to rock extraction given that there is no tax or charge applied to stones extracted from quarries – no figures are available for levels of subsidy these represent[288]. In France, subsidies contributing to unsustainable land use, soil sealing and urban sprawl include tax breaks or reduced dues on land use granted by public authorities to attract businesses, and specific state support schemes including loans with reduced or no interest rates and tax breaks to help individuals become homeowners (this latter is estimated at 4.7 billion EUR in 2011). Similarly in Austria, the promotion of traffic infrastructure in rural areas could increase access and thus urban sprawl, while promoting the construction of new single family houses (representing subsidies of 180-270 million EUR) sustains splinter development/urban sprawl and increases soil sealing as developments spread into pristine nature.[289]

A number of EHS exist in the ***transport sector***, for example the lack of kilometre-based road tolling (e.g. in Latvia – no subsidy amount available); commuter subsides (e.g. in Estonia– no subsidy amount available) and subsidies for the use of company cars in several MS, including Denmark which is also one of only three countries (including Estonia[290] and Germany[291]) to not estimate the value of employer-provided fuel when calculating a tax base explicitly, thus the benefit-in-kind provided by employers by paying for fuel used in company cars is not taxed, thereby creating the incentive to use cars more intensely than if this were taxed. Calculations for loss of public income due to Denmark's company car taxation approach have been identified at 0.2% of GDP, or 600 million EUR; and Germany's flat-rate taxation of privately used company cars was estimated to total a subsidy of 22.9 billion EUR in 2008[292]. The total annual welfare loss due to distortionary taxation of company cars for the Dutch economy has been estimated to be about 900 million EUR. In Italy, there are many excise tax exemptions and reductions in the transport sector, i.e. for shipping both in national waterways and within EU waters (547 million EUR in 2011), including for the fishery sector; for rail transport (2 million EUR in 2011); for diesel fuel used in public passenger transportation (25 million EUR in 2011) and by ambulances (5 million EUR in 2011); for fuel used by trucking companies (346 million EUR in 2011).[293] In Germany the distance-based income tax deduction for commuters allows employees to set off 30 cents/km one-way distance between home and work place against income tax as a business expense (4.3 billion EUR in 2008[294]). This tax concession supports long commuting distances between home and work and contributes to increasing passenger-kilometres.

In the area of ***agriculture,*** the most wide-spread EHS is the reduced rate of excise tax for diesel used in the sector. This is reported through this study in 22 MS (Austria, Belgium, Czech Republic, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Portugal, Romania, Slovakia, Slovenia, Sweden, the UK), as well as tax rebates offered in Poland (see below). Where figures on the levels of subsidy this represents are available, this equates to 20 million EUR in 2011 in Cyprus[295], 46 million in 2010 in Slovakia, 49 million in Austria[296], 50 million EUR in 2008 in Romania[297], 72.2 million EUR in the Czech Republic[298], 89 million EUR in Portugal[299], 100-170 million EUR in the Netherlands, 150 million EUR in 2011 and 2012 in Germany[300], 170 million in 2011 in Spain[301], 201 million EUR in Denmark, 209 million EUR in Greece[302], 506 million EUR in 2010 in the UK, 908 million EUR per year in Italy[303]. In Poland, farmers get a tax rebate on fossil fuels, representing in 2011 a subsidy of 174.2 million EUR.[304] Other EHS examples in this sector are the UK's interpretation and implementation of eligibility criteria for Common Agricultural Policy Pillar 1 Direct Payments (Single Payment Scheme) which can lead to the exclusion of the most environmentally interesting agricultural land due to farmers not wanting to risk payments being withheld or having to be repaid as a result of land later being found to be ineligible. This can lead to the breaching of EU environmental/biodiversity standards or conflicts between agricultural and biodiversity objectives. As noted in section on water pricing

above, in some countries the agriculture sector also benefits from subsidies in the form of support (e.g. for water abstraction). . In Estonia, agricultural subsidies include market development, substitution of agricultural producer (to provide vacation), breeding of farm animals, insurance, investment aid and covering the expenses of handling dead farm animals.[305] In Lithuania, until 2011, 100% of the separate sugar direct aid and transitional soft fruit payments were still based on volume of production (coupled).[306]

Some MS have also made progress in reporting on subsidies which can be seen as an important step in the road to EHS reform. For example in Germany, the Federal Environment Agency regularly reports on "Environmentally harmful subsidies in Germany"; the latest update is from 2008 and was published in English in 2010.[307] The report analysis federal-level subsidies and their environmental impacts in the fields of energy supply and use, transport, construction and housing, and agriculture, Although it sets out how the subsidies could be reformed, it stops short of making such clear recommendations and rather sets out a path towards subsidy analysis for environmental impacts and their reform. An inventory of EHS has been made by the Netherlands Environmental Assessment Agency (PBL), indicating which EHS could be abolished at national level, and which ones at EU level to avoid border effects and ensure a level playing field. The removal of some of the former (including reduced excise tax rate for diesel for non-road vehicles) is already part of the Dutch government's plans (see section on MBIs above).[308] In Cyprus, a number of environmentally harmful and benign subsidies were identified in the 2010 government budget. In Slovenia a working group was established in 2010 to study existing subsidies including a review of their environmental impacts.[309] Finnish environmental organisations identified a number of subsidies harmful to the environment including low tax rates for diesel fuels, for light engine fuel used in machinery, for peat, and for natural gas; greenhouse farm support and reduced tax rates for energy in agriculture; and tax reductions for work travel. In Sweden, a report on EHS by the Swedish Environmental Protection Agency (SwEPA) identifies subsidies in the transport and energy sectors (most of which are tax reductions as well as the electricity certificate system, free allocation of emission allowances under the EU ETS and limited liability of nuclear energy producers), in the agriculture sector (which consist of tax reductions and market regulations within the purview of EU agricultural policy) as well as subsidies to the fishing sector. These are important first steps in the reform of EHS and should be encouraged. However it should be noted that the approach taken to identify EHS, and hence the definition of an EHS still varies between MS as it has not been possible to agree a common (EU) approach.[310]

Some progress in phasing out EHS has been made: For example in Germany, state subsidies to the hard-coal mining industry are being phased out stepwise by 2018.[311] Acknowledging that hard-coal mining is largely uneconomic because production cost levels are substantially above revenue levels, the main producer of hard-coal, Ruhrkohle AG (RAG), the federal government, the government of North Rhine-Westphalia (where the large majority of hard-coal mining is undertaken), mines and miners unions agreed on a roadmap for a socially acceptable phasing out of subsidies by December 2018. Therefore, production is gradually reduced, while production subsidies and subsidies for mine closures will continue to be paid until 2018 jointly by the federal government and the *Länder* government of North Rhine-Westphalia (the latter will only jointly pay production subsidies until 2014). In the Czech Republic the government has agreed to decrease the refund rate of excise tax for diesel in the agriculture sector to 40% in 2013 and to abolish the measure in 2014. In Portugal EHS phased-out in 2011 include the reduced VAT rate on gas and electricity which contributed to an overall reduction in electricity consumption in 2012 and stimulated efforts to improve energy efficiency among the public administration.[312] Subsidies to energy production will also be cut by 1.8 billion EUR by

2015. In the UK, the 2012 national Budget announced changes to be applied between 2014 and 2016 to strengthen the environmental incentive for businesses to purchase fuel efficient cars by increasing the percentage of the taxable list price for more polluting cars.[313] In Hungary the levy paid by final consumers per kWh of coal-generated electricity will be abolished with the closure of the last active underground mine at the end of 2014.[314]

Plans have also been recently announced by governments in relation to phasing-out EHS. For example, the Finnish Government intends to identify and reallocate subsidies harmful to the environment and according to the Government Programme 2011, the taxation of peat will be raised by a moderate amount, and agri-environmental aid will be revised to promote water protection measures and biodiversity. In Slovakia, the Government plans to review subsidies to industries with a negative impact on the environment, especially in the energy sector (coal mines). [315] According to the Romanian National Development Plan for 2011-2013, efforts are being undertaken to meet EU requirements regarding inefficient subsidy plans, with an emphasis on environmental-related subsidies. Denmark is part of a group of a handful of countries making up the "Friends of Fossil-Fuel Subsidy Reform"[316] group, alongside Sweden (as well as Norway, Switzerland, and New Zealand), which plans to put pressure on the G-20 to achieve a transparent and ambitious outcome on its efforts to reform inefficient fossil-fuel subsidies. In Spain, a non-legislative proposal (*proposición no de ley*) was presented in the lower house of representatives of Catalonia to urge the government to eliminate or reduce the EHS identified.[317] However, no follow-up information has been found on this proposal. In Sweden a number of tax changes including measures entering into force in 2013 and 2015 include a further reduction in the amount of reimbursement of the CO_2 tax on diesel used in agriculture.[318] These are noteworthy efforts and should be welcomed, however, they represent a first step and a number of other EHS remain which need to be tackled if the milestone in the Resource Efficiency Roadmap of phasing out EHS by 2020 is to be achieved.

3.4 State aids

Given the complexity of state aids and the numbers of cases available for detailing, this section provides only a coarse comparison of some examples of recent cases. We particularly focus on the area of climate change, for both renewable energy (positive state aid) and for fossil fuels (negative state aid). The Table below provides an overview of state aid spending on environmental protection for most of the EU27, from 2006 to 2011. Amounts vary across the years, with little sign of positive progression year-on-year. However, the majority have increased averages of spending from 2009-2011, compared to 2006-2008. The exceptions are Germany, Hungary, Lithuania, and Sweden, where average spending reduced more recently.

Table 1: State aid on environmental protection including energy saving, 2006-2011

Country	2006	2007	2008	2009	2010	2011	Average 2006-2008	Average 2009-2011
Austria	458	533	752	916	1,036	940	581	964
Belgium	194	235	142	301	451	328	190	360
Bulgaria	0.0	0.0	0.0	0.0	1.1	2.2	0	1.1
Czech Republic	25	4	8	10	44	63	12	39
Denmark	389	411	271	504	320	334	357	386
Estonia	1	0	2	1	6	3	1	3
Finland	259	262	281	346	329	497	267	391
France	161	173	171	338	451	274	168	354
Germany	8,554	6,131	5,882	5,631	5,563	3,628	6,856	4,941
Hungary	15	4	89	41	14	14	36	23
Ireland	4	10	37	50	81	62	17	64
Italy	140	85	79	156	113	121	101	130
Latvia	3	7	10	11	59	36	6	35
Lithuania	10	19	22	34	3	7	17	15
Luxembourg	3.5	0.9	8.9	8.7	13.2	31	4.4	17.6
Netherlands	996	821	1,001	1,089	1,064	976	939	1,043
Poland	14	2	236	246	359	143	84	250
Portugal	1	1	0	3	2	2	1	3
Romania	12	12	16	0	0	137	13	46
Slovakia	7.7	30	50	75	89	22	29	62
Slovenia	5	20	27	24	48	69	17	47
Sweden	2,752	2,694	2,574	2,338	2,434	2,475	2,673	2,416
UK	1,056	1,091	1,516	2,051	1,509	1,398	1,221	1,653

Given the strong link to international efforts led by the G20 in phasing out environmentally harmful subsidies to fossil fuels, this study focused particularly on state aids to fossil fuels and to efforts to reduce their use (e.g. energy efficiency and renewable energies).

State aid for renewable energy sources and energy efficiency improvements: Examples include Austria's Green Electricity Act 2012 which provides financial support to the production of electricity from renewable energy sources through the use of feed-in tariffs and investment grants from 1st January 2012 to 31st December 2030. 50 million EUR have been allocated to achieve the Act's targets, spread across different renewable energy technologies.[319] Renewable energy makes up a significant part of Dutch state aid approved by the European Commission and it is anticipated that subsidies and fiscal incentives for renewable energy will continue to increase with a view to meet the new government's 16% renewable energy target by 2020. Estonia provides funding for investment projects helping to increase the overall share of renewable energy sources with 9.6 million EUR until end 2013 including the renovation of smaller-scale district heating networks, the establishment or the conversion of smaller boiler plants, and the establishment of cogeneration plants.[320] In Luxembourg, the government provides aid to businesses that invest in environmental technologies[321] [322] or environmentally-friendly processes, grants for less-polluting vehicles[323] and reduced interest rates on loans to finance the construction of passive or low-energy houses[324]. Bulgaria provides 31.5 million EUR (38 million BGN) in the form of grants and loans for private homeowners to improve energy efficiency of buildings, including insulation, replacement of windows, and local installations and/or connection to heating systems. 50% of the costs are covered by the project and the remaining costs have to be paid by the homeowners.[325] It also provides state aid through integrated investment and advisory support to micro-enterprises and SMEs for projects related to the implementation of energy saving technologies and the introduction of renewable energy in order to push forward the transition to a "green economy".[326] Until end 2012, Denmark provided 2 million EUR of public funding for a pilot programme to provide incentives for the purchase of electric cars by fleet owners in both public institutions and private enterprises.[327] Finland's renewable energy state aid scheme was approved by the European Commission in early 2011. The scheme will run from 2011-2020, providing a guaranteed price totalling approximately 1.36 billion EUR for wind power and biogas.[328] Additional funds estimated at 21.35 million EUR is provided for fixed operation aid for power plants using renewable energy from 2013-2016.[329] In 2012, Italy launched its "Revolving Kyoto Fund" with a budget of 600 million EUR to provide low-interest loans (0.5% interest rate) for SMEs and public and private entities to reduce GHG emissions.[330] The fund is designed to promote public and private investments to improve energy efficiency in the building and industrial sectors; promote the use of small-size high-efficiency systems for electricity and heating/cooling co-generation; use renewable energy in small installations; manage forests in a sustainable way; and promote innovative technologies in the energy sector.[331] A fund of 27 million EUR for 100 projects is also targeted at contributing to "green growth" (e.g. on electric cars, photovoltaic windowpanes, and biofuels).[332] Finland will also amend its reduced energy tax mechanism in agriculture so that environmental regulation related to the fight against climate change will be extended to the agricultural sector (CO_2 emissions).[333] Romania provides state aid to promote electricity from various renewable sources. Until 31 December 2016, Green Certificates will be used to encourage hydropower, wind, solar, biomass from bio-waste (electricity only, or high efficiency cogeneration), biomass from energy crops (electricity only), landfill gas and sewage treatment plant gas, with a budget totalling 19.5 billion EUR. Another scheme aims to promote co-generation in order to reduce the environmental impacts of electricity production. The aid spans a period of 12 years, from 2010-2023, with a budget totalling 4.1 billion EUR.

In many cases, ***state aid is provided to both renewable energy and fossil fuels***. For example in Belgium, 2.14 billion EUR was given for various support of fossil fuel consumption in 2011, in the form of a fuel tax reduction for certain professional and

industrial uses, and fuel tax exemptions for regional bus transport and for agriculture. Public support is also provided as part of these initiatives, in the form of a social fund on oil (for heating) and a special heating grant.[334] Federal level aid is also available for energy savings such as tax reductions (allowing up to 40% reduction of the cost for low energy, passive and zero energy buildings) and a green loan (available from 2009 to the end of 2011) and tax deductions on investments. Poland provides support to co-generation, biogas and biomass, while also continuing to support its coal industry. Co-generation is encouraged through support to investment in the construction of cogeneration plants and the development of currently operating plants, giving investors better opportunities in the competitive energy market in the years following their large front-up investments.[335] Regional aid of 4.6 million EUR was provided for the construction of a biomass and biogas plant in 2012, using feedstock from agriculture for the production of biogas.[336] While Poland has made significant improvements in dismantling the coal sector, the country is still heavily dependent on this energy source. It is also important to keep in mind that Poland's coal-fired generation fleet is very old, with more than 70% of power plants over 30 years old, 40% over 40 years old, and 15% over 50 years old, with more than half slated for retirement within 5–20 years. Multi-billion EUR investments will be required to renew the exhausted power sector and guarantee uninterrupted supplies of energy.[337] In Germany, tax rebates for pure and some high-blend biofuels[338] [339] are considered to constitute state aid which seeks to enhance environmental protection by supporting the use of renewable energies, while at the same time, state aid is granted through reduced tax rates for the manufacturing industry, agriculture and forestry, and a tax cap for energy intensive users.[340] The reduced tax rates take the form of tax rebates (businesses having to pay only 60% of the normal tax rate) for heating fuels (heating oil, natural gas and liquefied gas), on electricity for heating purposes and on electricity. For 2011, this state aid led to revenue foregone amounting to 1.25 billion EUR (1.1 billion EUR electricity tax plus 150 million EUR energy tax)[341]. The tax cap is in the form of a tax rebate (a refund of 95% of the ecological tax, which exceeds the relief on pension scheme contributions) meaning that eligible companies pay only 0.06 EUR cents for each kWh of electricity consumed instead of the 2 EUR cents to be paid without the refund. This is considered to have led to a revenue loss in 2011 of 2.245 billion EUR (2.05 billion EUR from electricity tax and 195 million EUR from energy tax).[342] As a very coarse comparison, Germany's 2011 state aid for renewables totalled 4.5 billion EUR, while fossil fuel use-related state aid totalled 1.5 billion EUR. In Latvia, state aid has been granted to both renewable energy and energy efficiency as well as for fossil fuels including for a 400-megawatt power plant that could potentially run on liquefied natural gas or solid fuels.[343] In 2011, Slovenia's state aid to renewable energies was 118 million EUR, while fossil fuel use related activities received 14.1 million EUR.[344] In France state aid provided to fossil fuels was stable between 2008 and 2010[345] while the amount of state aid provided to renewable energy has been on an (erratically) increasing trend from 2006-2011.

The Czech Republic provides funds as part of a transitional free allocation of greenhouse gas emission allowances for the modernisation of electricity generation installations.[346] The funds granted amount to 1.9 million EUR for the period 2013-2020, supporting projects including the development of new gas-fuelled and biomass plants, waste-to-energy installations (hence the energy agenda drives waste generation – see also the section on Waste Management for 'high performing countries') and cogeneration units. Nonetheless, the aid is compatible with the Guidelines on certain State aid measures in the context of the greenhouse gas emissions allowance trading scheme (ETS Guidelines)[347]. Slovakia's total aid to fossil fuels in 2011 totalled 217 million EUR, compared to aid provided in the same year in environmental and energy saving areas which totalled 22.4 million EUR. Spain supports renewable energies through funding to programmes aiming to

introduce such energies in buildings (large thermal installations), and to SMEs and large enterprises for environmental investment for the promotion of energy from renewable energy sources (17 million EUR of soft loans from April 2011 to end 2014)[348] while also supporting coal mining (see separate paragraph below).

In relation to state aid for fossil fuels, six MS do not allocate state aid for coal production (Bulgaria, Czech Republic, Estonia, Greece, Italy and the UK) out of the 13 coal-producing Member States (the remaining countries are Germany, Hungary, Poland, Romania, Slovakia, Slovenia and Spain).[349] In the Czech Republic, no state aid was granted to the coal sector between 2004 and 2010.[350] Since 2011, the Czech Republic has been following Council Decision 2010/787/EC which only allows state aid for the purpose of mine closures, treatment of health damage for miners, and addressing environmental liabilities related to past mining. Slovenia's national energy act allows the government to cover additional costs, should the price for producing electricity from domestic sources exceed the market price of electricity generated from comparable generation units.[351] This subsidy may also be continued into the future beyond the planned closure of uneconomic coal mines, and as the biggest domestic lignite deposit's operator plans to operate the mine until 2054[352], this producer support could go on well into the future. In Bulgaria, no state aid was spent on coal after 2006. No aid to the coal sector was provided in 2011 by Slovakia, compared to 11.65 million EUR provided in 2010. In Hungary, an aid scheme providing direct grants totalling 140 million EUR was accepted by the Commission in early 2013. This aid will be available until 2014, until the foreseen coal mine closure, and will provide accompanying measures to mitigate social impacts (supporting miners in their re-skilling for new jobs outside the coal industry) and environmental impacts of the closure, while production aid will be decreasing over time.[353] Spain's 2011 state aid to the coal mining sector amounted to 803 million EUR.[354]

The economic crisis in the hardest hit countries is also affecting state aid decisions: In Greece, the financial crisis and corresponding fiscal discipline have severely affected the state's capacity to provide state aid and has also skewed the distribution of state aid. This is now often provided for the support of economic activity affected by the on-going crisis (e.g. for the recapitalisation of banks[355]), but also to the state-owned electricity company hit by a severe liquidity crisis due to unpaid electricity bills. In response, the government granted in June 2012 an emergency loan to the company through the Consignment Deposit and Loans Fund.[356] Cyprus's state aid due to the financial crisis has also been partly diverted to support the banking sector. In 2011 the majority of state aid was provided to the service sector (42.9%), followed by manufacturing (21.5%) and the transport sector (16.0%).[357]

This study focused primarily on state aid cases relating to fossil fuels –illustrating examples of support to their production and use, and of support to non-fossil fuel based activities thereby aiming to increase their production and use. Nonetheless, some other cases of state aid have been provided. In the area of agriculture, state aid is also a mechanism for favouring agricultural practices that can either enhance or contradict environmental objectives (such as reduced excise duty rates on diesel, as mentioned in the section on environmentally harmful subsidies previously). Examples of enhancing support include Finland's 2011 announcement that the reduced energy tax mechanism in agriculture will be amended so that environmental regulation related to the fight against climate change will be extended to the agricultural sector (CO_2 emissions). Also, revisions to agri-environmental aid will be made so that more efficient support can be provided to water protection measures and biodiversity. Agri-environmental measures will be directed both regionally and farm specifically on the most sensitive areas in terms of water protection.[358] Belgium provides aid through agri-environmental measures focusing on water management (payments to farmers

voluntarily committing to lower uses of fertilisers) with a total budget for 2010-2011 of 0.5 million EUR.[359]

Examples of potentially 'good' state aid, supporting environmental objectives: The Czech Republic offers investment aid for the reduction of NO_x emissions and particulate matter from non-combustion installations[360] with a total budget of 245 million EUR from 2009-2013, and for the reduction of air pollution in the Moravia-Silesia Region[361] (with high presence of heavy industry) with a total budget from 2011-2014 of 82 million EUR. The beneficiaries include companies in the sectors of coke and refined petroleum products manufacturing, basic metals manufacturers, and electricity, gas, steam and air conditioning. Malta has allocated 10 million EUR in the form of grants (although through ERDF funds for 2007-2013) for sustainable tourism projects. These projects should strengthen Malta's competitive advantage in tourism; increase the use of ICT for tourism; increase good environmental practices by tourism enterprises; and/or increase innovation in tourism.[362] Slovakia provides aid through its Environmental Fund in the form of loans with a 1% interest rate, duration of 5-15 years, and a guarantee set at 130% of the requested loan. These loans support activities such as protection of air and the ozone layer, protection and use of water resources, waste management, nature and landscape protection, and environmental protection and training.[363] The UK supports resource efficiency partly through continuing funding (of 62 million EUR) to its Waste and Resources Action Programme, which will extend its Capital Grants scheme (funding for recycling facilities) to cover WEEE, textiles and flooring, and to introduce new soft loans.[364] It also provides state aid to establish and fund the Green Investment Bank (GIB) – a new institution providing complementary financing to 'green projects' in the UK, with priority given to offshore wind power, waste infrastructure and non-domestic energy efficiency, but potential funding also for biofuels for transport, biomass, carbon capture and storage, marine energy and renewable heat generation. The total capital to be made available is 3.8 billion EUR.[365] Romania's regional development aid aims to promote sustainable economic development in areas with high unemployment rates and abnormally low standards of living. Direct grants are offered covering an extremely wide range of domains and activities from waste management technical solutions and economic and educational activities (but also to fossil fuel extraction). Although the title of the state aid refers directly to sustainable regional development, the activities that it covers are not necessarily revealing on the expected environmentally related outcomes.

3.5 Indicator trend analysis for MBIs

MBIs are widely used in order to influence environmentally harmful behaviour of individuals, groups and corporations. The basic idea is to influence the price of commodities, e.g. by levying a specific tax. Where there is sufficient price-elastic demand, the increased consumer price will tend to lower the production and consumption of the good and hence the overall environmental impact associated with its production and consumption. Therefore, environmental taxes are an important way of implementing the 'polluter pays' principle. Making an influence on the price of goods changes the interplay between supply and demand, hence the term 'market-based instrument'.

Environmental taxes

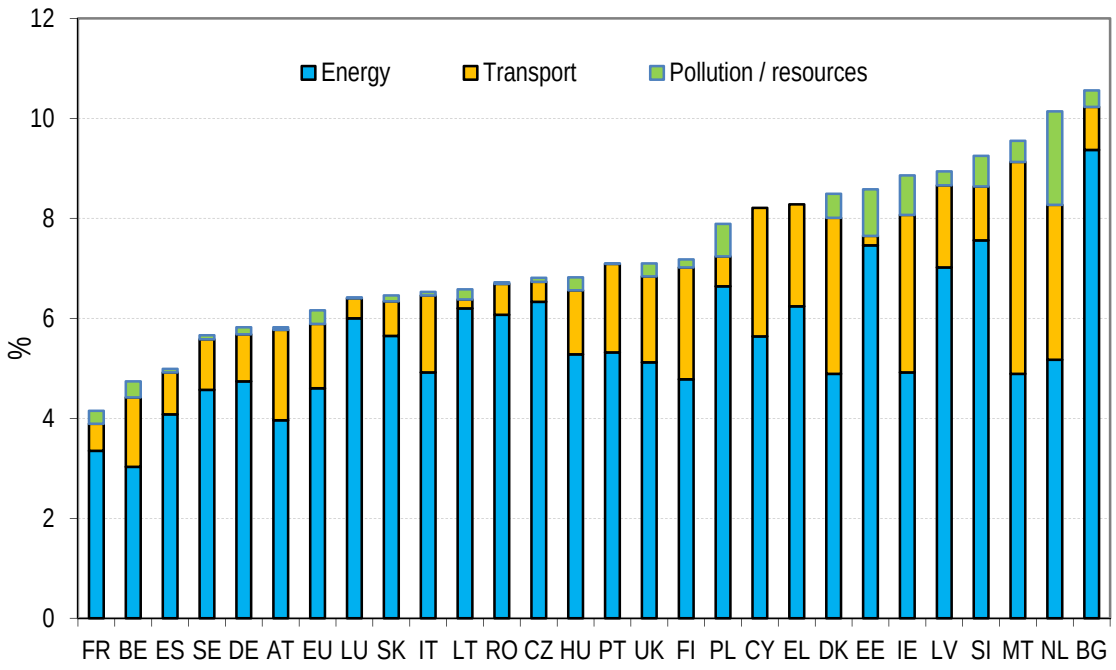
An environmental tax is defined as a tax whose tax base is a physical unit (or a proxy of it) of something that has a proven specific negative impact on the environment, for example emissions of polluting substances (CO_2, NO_x, etc.). Value added-type taxes (VAT), though having a strong impact on consumption levels, are excluded from the definition of environmental taxes.[366] Data tables are available from Eurostat under code [env_ac_tax]. Further information has been taken from a statistical guide on

environmental taxation[367] and from the statistical guide on environmental taxation published by the European Commission[368].

Activities that have a large negative impact on the environment often provide a strong tax base. It is therefore difficult to distinguish between fiscal taxes (taxes levied to generate governmental revenue) and taxes that aim to change environmentally harmful behaviour (Pigovian taxes). Though both types of taxes have a dampening effect on consumption levels, the fiscal tax aims to maximise revenue while the Pigovian tax aims to reduce the negative impact to a desired level. It is not always clear whether the tax rate has been set with either revenue maximisation or the minimisation of negative environmental impacts in mind. The distinction is further blurred since there is commonly no obligation for the intended use of the revenue streams from the taxation.

The classification of environmental taxes distinguishes between taxes levied on energy (including transport fuels), transportation and on pollution and resource usage. Table 2 shows the importance of environmental taxes in overall taxation structured by these three classes. The share of environmental taxes on total taxation ranges from 4% in France to 11% in Bulgaria with an average value of 6% across the considered countries.

Figure 2: Environmental taxes on total tax revenue in EU in 2011



Source: Eurostat and DG Taxation

Looking at the different segments of environmental taxation, energy taxation makes up the largest part, with transport second and taxation of pollutants or resource usage making up only a minor share. The reason for this is probably that energy commodities are widely used and easily taxable. Other than for pollution, no measurement equipment is needed and the tax can be levied at the delivery point of the energy commodity. Nevertheless, the commonly higher energy intensity in the EU-12 economies tends to drive up environmental tax revenue and offset otherwise higher tax rates on consumer goods in revenue terms.

In Table 2 the environmental taxation figures are put into a wider context by specifying each tax type in absolute terms and in relationship to GDP as well as in relationship to overall taxation for the year 2010. In this year, the EU-27 as a whole generated around 292 billion EUR in revenue from environmental taxes, corresponding to a share of 7.4% of total revenues from taxes and to 2.4% of GDP.[369] Looking at the individual countries, the revenue generation of environmental taxation seems of rather homogenous importance: in relation to GDP, figures range from 1.7% in Spain to 4.0% in Denmark and the Netherlands. For the share of environmental taxes in total taxation, there is a slightly larger fluctuation around the mean: The highest shares in overall taxation can be found in Bulgaria (10.7%) and in the Netherlands (10.3%); with 4.2% of total taxation, the lowest rate prevails in France.

In absolute terms, in 2010 Germany (54.7 billion EUR), the UK (44.6 billion EUR), Italy (40.4 billion EUR) and France (35.9 billion EUR) together account for almost 60% of the total EU-27 revenue from environmental taxation. Energy taxation in relation to overall environmental taxation is most important in Lithuania, the Czech Republic and Luxembourg, where it makes up more than 90% of the total. The Netherlands and Estonia show the highest values of taxation on pollution and resources in 2010. Their share as a percentage of total environmental tax revenue was 18% in the Netherlands and 11% in Estonia. For all other countries this share was below 10%.

Though the differences in revenue from environmental taxation as a percentage of total taxation are noteworthy, due to the great differences in taxation schemes the differences do not justify a conclusion as to which country puts most weight on environmental protection.

Table 2: Environmental taxes by country and type of tax, 2010

Environmental taxes by country and type of tax, 2010 Source: Eurostat [env_ac_tax].												
	Energy taxes			Taxes on Pollution/Resources			Transport taxes			Total Env-taxes		
Country	[Mio €]	Env- tax share	Share of GDP	[Mio €]	Env- tax share	Share of GDP	[Mio €]	Env- tax share	Share of GDP	[Mio €]	Share of GDP	Total-tax share
AT	4,580 €	68%	1.6%	61 €	1%	0.0%	2,142 €	32%	0.8%	6,783 €	2.4%	5.6%
BE	4,711 €	64%	1.3%	532 €	7%	0.2%	2,081 €	28%	0.6%	7,324 €	2.1%	4.7%
BG	927 €	88%	2.6%	29 €	3%	0.1%	96 €	9%	0.3%	1,051 €	2.9%	10.7%
CY	322 €	64%	1.9%		0%	0.0%	184 €	36%	1.1%	506 €	2.9%	8.2%
CZ	3,315 €	93%	2.2%	52 €	1%	0.0%	204 €	6%	0.1%	3,571 €	2.4%	7.1%
DE	45,769 €	84%	1.9%	20 €	0%	0.0%	8,880 €	16%	0.4%	54,669 €	2.2%	5.8%
DK	5,341 €	57%	2.3%	504 €	5%	0.2%	3,601 €	38%	1.5%	9,446 €	4.0%	8.4%
EE	374 €	88%	2.6%	45 €	11%	0.3%	7 €	2%	0.1%	426 €	3.0%	8.7%
EL	4,004 €	73%	1.8%		0%	0.0%	1,484 €	27%	0.7%	5,488 €	2.4%	7.8%
ES	14,135 €	82%	1.3%	205 €	1%	0.0%	2,993 €	17%	0.3%	17,333 €	1.7%	5.2%
FI	3,222 €	65%	1.8%	103 €	2%	0.1%	1,650 €	33%	0.9%	4,975 €	2.8%	6.5%
FR	27,453 €	76%	1.4%	2,331 €	6%	0.1%	6,135 €	17%	0.3%	35,919 €	1.9%	4.2%
HU	1,983 €	78%	2.0%	101 €	4%	0.1%	462 €	18%	0.5%	2,545 €	2.6%	6.9%
IE	2,275 €	62%	1.5%	3 €	0%	0.0%	1,412 €	38%	0.9%	3,690 €	2.4%	8.4%
IT	31,179 €	77%	2.0%	490 €	1%	0.0%	8,756 €	22%	0.6%	40,425 €	2.6%	6.1%
LT	492 €	96%	1.8%	7 €	1%	0.0%	13 €	2%	0.1%	512 €	1.9%	6.9%
LU	887 €	93%	2.2%	5 €	1%	0.0%	66 €	7%	0.2%	958 €	2.4%	6.4%
LV	359 €	83%	2.0%	13 €	3%	0.1%	61 €	14%	0.3%	433 €	2.4%	8.8%
MT	93 €	49%	1.5%	12 €	6%	0.2%	84 €	44%	1.4%	189 €	3.1%	9.2%
NL	12,006 €	51%	2.0%	4,219 €	18%	0.7%	7,311 €	31%	1.2%	23,536 €	4.0%	10.3%
PL	7,601 €	83%	2.2%	803 €	9%	0.2%	754 €	8%	0.2%	9,158 €	2.6%	8.1%
PT	3,153 €	73%	1.8%	1 €	0%	0.0%	1,153 €	27%	0.7%	4,306 €	2.5%	7.9%
RO	2,236 €	89%	1.8%	16 €	1%	0.0%	252 €	10%	0.2%	2,503 €	2.1%	7.5%
SE	7,719 €	81%	2.2%	120 €	1%	0.0%	1,720 €	18%	0.5%	9,559 €	2.8%	6.0%
SI	1,086 €	84%	3.1%	59 €	5%	0.2%	146 €	11%	0.4%	1,291 €	3.6%	9.6%
SK	1,077 €	88%	1.6%	26 €	2%	0.0%	128 €	10%	0.2%	1,230 €	1.9%	6.7%
UK	32,816 €	74%	1.9%	1,602 €	4%	0.1%	10,191 €	23%	0.6%	44,609 €	2.6%	7.4%
EU27	**219,114 €**	**75%**	**1.8%**	**11,356 €**	**4%**	**0.1%**	**61,964 €**	**21%**	**0.5%**	**292,434 €**	**2.4%**	**7.4%**

Source: Eurostat [env_ac_tax] and [gov_a_tax_ag]

4 Waste management

The resource efficiency agenda has helped to begin to frame EU waste policy within the context of more efficient use of natural resources, thereby applying further pressure on the full implementation of the whole of the EU waste acquis. At the same time, Member States have been transposing the revised Waste Framework Directive[370] (WFD), a process that has taken place between 2010 and 2012, although transposition was meant to have taken place by 10 December 2010. A 2011 study delivered for DG Environment on the anticipated benefits of full implementation of EU waste legislation[371] identified that such full implementation would achieve cost savings of 72 billion EUR per year, an increase in waste management and recycling turnover of 42 billion EUR per year and the creation of 400,000 jobs.

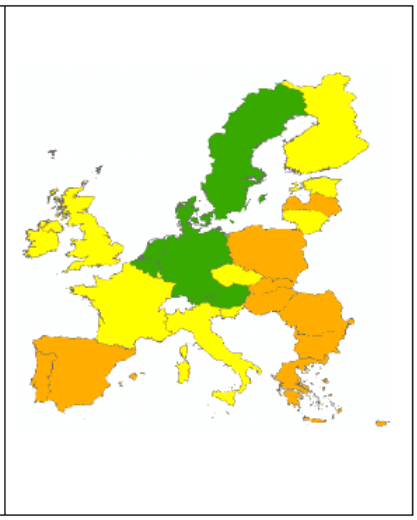
Member State performance against the legally binding targets set in EU waste legislation has been characterised by significant differences in implementation. Figure 3 below provides a visual snapshot of Member State waste legislation performance, classified according to 'high', 'transitional' or 'limited' comparative performance towards a recycling society (the overall stated goal of the Thematic Strategy on the Prevention and Recycling of Waste is "for the EU to become a recycling society, that seeks to avoid waste and uses waste as a resource"). The figure was provided in a study undertaken for DG Environment as part of the review of this Thematic Strategy[372].

Figure 3: EU comparative performance towards an EU recycling society

High - *Member States delivering the highest level of compliance with the goal of delivering a recycling society* – These countries are considered to be delivering: high levels of MSW recycling with a continuing upward trend, high levels of recovery as a proportion of waste treatment activities; low and/or falling levels of landfilling; and falling levels of GHG emissions from the waste sector

Transitional – *Member States showing rapid improvements in terms of moving towards a recycling society* – These countries are currently seeing: significant increases in their level of MSW recycling but are only achieving medium to low levels overall; medium levels of recovery comparable to a medium or low level of MSW recycling; a falling reliance on landfilling; and falling levels of GHG emissions from the waste sector

Limited – Member States showing limited or slow progress towards a recycling society – These countries are currently seeing: Low levels of MSW recycling and static or low associated rates of increase; high and static or increasing levels of landfilling; and increasing levels of GHG emissions associated with the waste sector.



Another recent study for DG Environment[373] analysed the relationship between the performances of the waste management systems of the EU Member States and their use of economic instruments, to better understand the role of market-based instruments in helping to achieve EU targets. According to that study, analysis suggests that there is a positive relationship between higher landfill taxes (and higher total landfill charges) and lower percentages of municipal waste sent to landfill. Three similar 'clusters' of countries emerge (note, Malta was not listed), characterised below:

- **High**: high total charges for landfill and low percentages of municipal waste landfilled - Austria, Belgium, Denmark, Germany, Luxembourg, the Netherlands, Sweden;
- **Medium**: mid- to high-range total landfill charges and mid-range percentages landfilled - Finland, France, Ireland, Italy, Slovenia, the United Kingdom; and

- **Low:** low total landfill charges and high percentages landfilled - Bulgaria, Cyprus, Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Poland, Portugal, Romania, Slovak Republic, Spain. All (except Cyprus, Estonia, and Spain) have total landfill charges of less than 40 EUR/tonne and were landfilling more than 60% of their municipal waste.

A third recent study delivering a screening of waste management performance of Member States[374] across a number of criteria also grouped the countries into clusters. These are:

- **performing above average:** Austria, Belgium, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Sweden and the UK.
- **average performing:** Hungary, Ireland, Portugal, Slovenia and Spain.
- **largest implementation gaps:** Bulgaria, Cyprus, Czech Republic, Estonia, Greece, Italy, Latvia, Lithuania, Malta, Poland, Romania and Slovakia.

The clusters below are based upon a mix of performance against EU waste legislation targets and existence of effective economic instruments to support continuing improvements in this performance. It cannot be identified how countries have improved within the same cluster, however, it is worth noting that 11 countries have changed cluster across those studies. Finland, France, Hungary, Portugal, Spain and the UK (6 countries_ have moved up to the next higher level of cluster, whereas the Czech Republic, Estonia, Italy and Lithuania (5 countries) have gone down. This study did not aim to analyse this movement, rather it is interesting to see that such movement is possible in a short period of time (two years between studies), depending on developments – political, infrastructural, economic – in any given country.

Given the clear stratification in performance into such 'clusters', we propose to look at each of the clusters in more detail, to identify potential trends, drivers, solutions and barriers for improvement. Given the recent changes to national legislation in transposing the revised WFD, which came into force in December 2010, there will likely be an element of unidentifiable change in performance/behaviour amongst key actors so here we focus on the changes made to the legal situation rather than to the observed changes on the ground.

Performance in relation to key EU waste legislation targets is reported on the following targets:

- By 2020, 50% recycling (including composting) of municipal or similar waste (at least paper, metal, plastic, glass)
- Reducing the landfilling of biodegradable municipal waste to 75 % before 2006, to 50 % before 2009 and to 35 % before 2016
- By 2020, 70% of construction and demolition waste to be prepared for reuse, recycled or other material recovery
- Batteries and accumulators: by 2012 and 2016, 25% and 45% collected; by 2011, 65% (lead-acid), 75% (nickel-cadmium), 50% (other) recycling
- By 2015, reuse and recycling of 85% of ELVs by weight
- By 2008, 15 – 60% recycling rate for packaging waste according to material,
- By 2006, 50 – 80% recovery rate for WEEE by average weight according to category

For a number of countries, adequate waste treatment infrastructure remains a challenge, and EU funds play an important role in the development of waste treatment infrastructure for a large number of Member States. **The European Court of Auditors recently audited EU co-financing of municipal waste management infrastructures and found that the effectiveness of structural measures funding for these infrastructures was rendered less effective due to poor**

implementation of supporting information-based, administrative and economic measures. Although the countries involved in this audit were limited to Italy, Portugal, Romania, and Spain, the recommendations are likely to be relevant across most of the Member States using structural funds for their waste treatment infrastructure. Furthermore, basic EU legislation on treatment of waste landfilled was not respected, and data collection measures could not provide reliable data. EU structural funds totalling 10.8 billion EUR have been allocated to waste management infrastructure since 2000.

The report recommends that Member States should implement information, administrative and economic measures to support their co-financed infrastructures. In particular, greater attention needs to be given to public participation and adherence, focusing on separate collection implementation including biodegradable waste when this is cost effective, and implementing a landfill tax and incentives via tariffs to encourage waste prevention and recycling. It also recommended that the European Commission should request the implementation of these recommendations from the Member States before granting EU financial support; and reduced rates of assistance should be applied when the 'polluter pays principle' is not applied.[375]

The legal basis for the Commission's capacities to reduce rates of assistance dates back to 1999. Article 26 of General Regulation 1260/1999/EC[376] sets out explicitly the polluter pays principle. This Regulation governs the rules for approval and implementation of major projects, i.e. those with a total cost above 50 million EUR. It stipulates that information concerning its application should be submitted to the Commission for appraisal prior to actual decision-making about the project. Further to this, General Regulation 1083/2006/EC[377] governs EU funds programmes and projects in 2007-2013 and it refers explicitly to the polluter pays principle (Article 52). It prescribes that the contribution of EU funds can be modulated in light of *inter alia* protection of the environment and in particular through the precautionary principle, principle of prevention action and the polluter pays principle. This would mean that EU funds will contribute lower co-financing rate in the cases when charging systems can be introduced to cover not only investment costs but also environmental externalities.[378]

Hence, we also highlight where ineffective use of such funds has been identified.

4.1 High performing countries

This group consists of Austria, Belgium, Denmark, Germany, Luxembourg, the Netherlands and Sweden. For each of these countries, waste management policy aims to ensure the good handling of waste, incorporating the polluter pays principle (to varying degrees, as explained further below), clearly outlining responsibilities between producers and those collecting and managing waste (whether for disposal, incineration or recycling, reuse or composting), and increasingly introducing more developed policy action on waste prevention.

However, a number of these countries (Denmark, Germany, the Netherlands and Sweden, but also the United Kingdom) already have an **over-capacity for incineration** and need to import waste to meet that capacity. For countries such as Sweden, new incineration plants continue to be constructed as they are seen as addressing energy needs. Yet, this situation prevents increases in material recycling levels.[379] Hence, these countries need to address incineration capacity levels, to allow for more focus on waste prevention, material recycling and composting, and reuse, according to the legally binding waste hierarchy. This also means linking waste management policy to energy policy, as waste is seen (and legally supported via EU legislation) as an energy source.

Waste generation and management trends

In reducing the environmental impacts of waste generation, beyond looking at the more environmentally performing management of waste (focused efforts on those actions at the upper end of the waste hierarchy), it is worth looking also at overall levels of waste generation.

Austria's total waste generation has decreased significantly between 2008 and 2010, from 56.3m tonnes to 34.9m tonnes (a 38% decrease), and this is likely due to an increase in fees and the general economic crisis.[380] Most of this decrease was in other waste categories than municipal waste, as figures for the two years are 4.997 million tonnes (mt) and 4.960mt respectively.[381] In 2010, 40% of municipal waste was composted, 30% each was recycled and incinerated, and about 1% was landfilled.[382] Austria not only meets the EU targets specified above, but it also outperforms them.

Belgium's household waste appears to have reduced since 2004 and hovers between 460-490kgs per person per year[383] (below the 2010 EU average of 520kg/person), although what is a catch-all term of 'non-hazardous waste' appears to fluctuate considerably, rising and dropping between 2004 and 2010 (rising and falling with differences of 15-35% between 2-year intervals[384]). Mineral waste also fluctuates considerably, dropping from 24.5mt in 2006, to 19mt in 2008 and just under 14mt in 2010. [385] In 2010, 58% of municipal waste was recycled, including composting.[386] The 2020 MSW recycling target is thus already achieved at national level. However, this hides significant variations at regional level. Flanders has the highest level with 65% in 2008, with the Brussels-Capital region and Wallonia at with 23% and 36% respectively.[387] In 2010, the recovery rate (energy recovery and other recovery) of C&D waste was 66%, so it is difficult to say whether the 2020 target will be met (as the target is for recycling).[388] Over 50% of portable batteries were collected, meeting the first target. 100% of all collected batteries are directed to a recycling facility.[389] The 2015 ELV target has already been met, with an 89% recycling and reuse rate in 2010.[390] On packaging waste, the average rate is particularly high: 79.8% in 2010. In that year, the recycling rate for plastic packaging was 41.5% and this increased to 100% for glass packaging. The target is clearly being met.[391]

Denmark's overall waste generation has dropped since 2010 back down to 2004 levels, after significant year-on-year increases in between. Non-mineral waste increased from 8.2mt (2004) to 8.9mt (2006) and up to 9.4mt (2008) before dropping considerably to 7.2mt in 2010. Municipal waste increased from 3.7mt (2004) up to 4.5mt in 2008, then dropped right back down to slightly lower than the 2004 3.7mt in 2010.[392] In 2010, 54.3% of municipal waste was incinerated, 23% was recycled, and 19% was composted.[393] This gives a 42% recycling rate, which is not far from the 2020 target of 50%, but Denmark has been struggling since 2007 to increase recycling and composting levels. It has already surpassed targets on C&D recycling (achieving more than 90% in 2010)[394], on ELVs (a 2010 rate of 90.5% reuse and recycling)[395], and on WEEE (2016 targets)[396] for all categories except gas discharge lamps. Data has not yet been published on batteries as this is only due by June 2013.

Luxembourg's waste generation continues to grow, with total waste generated at 8.3mt in 2004, rising to just under 9.6mt in 2006 and 2008 then rising again to 10.4mt in 2010.[397] Household waste fluctuated greatly in this time, from 221,000 tonnes in 2004, dropping to 191,500 tonnes in 2006 then rising again to 276,200 tonnes in 2008 and 385,400 tonnes in 2010.[398] Per capita municipal waste generation was at 679kg in 2009 and 678kg in 2010, higher than the 2010 EU average of 520kg.[399] Luxembourg applies the lower level of economic instruments amongst this group of countries, and anecdotally this may play a role in not helping to reduce levels of waste generated. In 2010, 47% of household waste and similar was recycled (including composting)[400], so the 2020 target should not be difficult to meet. It has already met targets for diversion

of biodegradable MSW from landfill, for C&D waste recycling, batteries recovery, packaging recycling, ELV reuse and recycling, and existing WEEE targets.

In the Netherlands, total waste generated decreased from 63.2mt in 2000 to 59.9mt in 2010.[401] In terms of the 2008 Waste Framework Directive, the figures for 2010 were as follows: recycling 78%; other recovery 19%; landfill 2%; other disposal 1%[402]; hence the Landfill Directive target[403] has been met as has the 2020 MSW recycling target[404].Sweden's municipal waste generation has decreased since 2006 to 2010, from 4.6 million tonnes to 3.7 million tonnes.[405] In 2010, material recycling was at 49.2%, making the 2020 MSW recycling target largely manageable.[406] In 2010, only 1% of household waste was landfilled, a decrease of 33% from 2009.[407] In the same year about 50% of construction and demolition waste was reused, recycled or materially recovered. The information on which this estimate has been done is not reliable and therefore it is not possible to estimate whether or not Sweden will meet the 2020 EU target.[408] The batteries target will be met by 2015[409], as will the ELVs target. Packaging waste targets are surpassed [410] as are WEEE targets.[411]

Transposition of the Waste Framework Directive

National transposition of the revised WFD occurred between 2010 (Austria[412], the Brussels Capital region in Belgium[413]), 2011 (the Netherlands[414], Sweden[415]) and 2012 (Germany[416], Luxembourg[417]). The Flanders region in Belgium does not appear to have altered legislation to implement the Directive, but was ahead of EU legislation anyway. [418] The Belgian Walloon Region is currently preparing a new waste plan for 2020.[419]

Where transposition has occurred, a number of areas of focus have been identified in the evolution of waste policy:

- In Belgium, waste prevention has been part of all three regions' policies since the late 1990s or early 2000s. Flanders has also taken a **sustainable materials management** approach, aiming to develop a **circular economy** and to incentivise cooperation between different actors in the **material lifecycle**.[420] Broader environmental policy also encourages **environmentally friendly production and consumption** and integrates the concept of **ecosystem services**, including objectives on **eco-efficiency**, **the consumption of materials, natural resources and energy**, the **use of substitutes** and **renewable energy**.
- Denmark has focused on **waste prevention** and innovation of waste treatment technology. Waste prevention is to be promoted through increased attention to reuse, sale, exchange sharing, repair and less wasting, directed at both households and businesses; and reduction of food waste will get special attention. Waste prevention initiatives to be delivered include information-based elements, and tools for improving waste prevention in companies. Innovation of waste treatment aims to ensure recovery of resources ending up in the waste stream, through new ways of recycling or energy recovery.[421]
- Germany's 'Closed Substance Cycle and Waste Management Act' (Kreislaufwirtschaftsgesetz, KrWG) puts strong emphasis on resource efficiency and recycling, highlighting the increasing importance of secondary raw materials as raw materials supply to German industry. This is a strong articulation of the **circular economy** concept, and is based on developing a resource efficient material flow management; effective waste separation; preparation for reuse, recycling or recovery; and most notably includes the introduction of an **obligatory bin for municipal bio-waste for separate collection**.[422] [423]
- Denmark, Germany and the Netherlands have altered their legal text to more formally introduce the waste hierarchy and to provide requirements on national waste management plans and waste prevention programmes.

- Luxembourg's 2012 change to its waste law focused on **waste prevention** and **incentives to recycle**, the latter most notably through a tax reflecting the real cost of waste management for households.

Use of policy tools

Each of these countries also makes **extensive use of different economic and regulatory instruments to further support the political targets** set in their waste legislation. These instruments are usually based on key principles such as 'polluter pays' and (extended) producer responsibility. These countries have surpassed most of the targets set in EU waste legislation, with some exceptions detailed below.

Taxes or charges for landfill and incineration are generally high, with resulting impacts on reduced levels of waste landfilling. Landfill taxes are set at 82 EUR/tonne[424] for the landfilling of combustible waste in Flanders, and 62 EUR/tonne on non-hazardous waste in Wallonia[425]. Incineration taxes, which are less present than for landfill, are relatively lower than for landfilling. In Belgium's Walloon Region, the incineration tax increased from 3 to 8.10 EUR/tonne in 2010 for incineration with energy recovery and from 10 to 50 EUR/tonne without energy recovery[426] [427]. Austria has high levies for landfilling and incineration, the latter of which has a lower levy levels. The landfill tax level has been at 87 EUR/tonne since 2006, and in 2009, when the landfilling rate of municipal waste was very low the tax dropped to 26 EUR/tonne (and subsequently to 29.8 EUR/tonne in 2012). The gradually increasing tax had its positive impact on reducing landfilling together with the ban on landfilling gradually implemented between 2004 and 2008.[428] An unusual development in relation to taxation structure occurred in the Netherlands in 2011/2012. The landfill tax[429] and packaging tax[430] were abolished (the landfill tax having been in place for 16 years, playing a positive role in the reduction in amount of waste going to landfill), and replaced with an extended landfill ban (by increasing the number of types of waste to which the ban is applied). As the change is very recent, it is difficult to identify what impacts it has had, but such a change in policy tools is unusual in this group of countries and is therefore worth noting. At household level, charging for waste collection via **pay-as-you-throw (PAYT) schemes** is also widely used. Germany's *Länder* (regional governments) base their schemes on different factors: bin or sack volume, frequency of collection, and weight of waste collected; the majority being volume- and frequency-based.[431] According to analysis on the introduction of such schemes in Germany, this helped to reduce household waste generation from 12,000 tonnes in 1997 to around 8,000 tonnes in 1998 – a level near which the quantities have remained ever since.[432] Austria has PAYT schemes in all municipalities covering all municipal waste. The fees are based on the size of the residual waste bin and the frequency of emptying. Increased PAYT fees probably had a slight dampening effect on waste generation, but the effect is somewhat limited and is not the only factor influencing waste generation.[433] Such systems are also used in the Netherlands, although less widely than in other Member States: these are applied in the least urbanised parts of the country, representing 36% of municipalities and 27% of the population.[434]As stated earlier, Luxembourg's approach to the polluter pays principle is probably too weak. Only one-third of the population (15 municipalities) live under a harmonised and differentiated waste tax regime, yet in these municipalities waste volumes for disposal have halved and specific waste volumes are 30% lower than in other municipalities.[435] This situation may change due to the 2012 change to its waste law in relation to household charging.

Packaging deposit return systems are in effect in at least three of the countries: Belgium, Denmark[436] and Germany. These go beyond the extended producer responsibility schemes set up in countries in order to meet recycling directive targets (for batteries, end-of-life vehicles, packaging and packaging waste, and waste electrical and electronic equipment). The country reports did not provide further details, however

it is interesting to note such systems exist and work well. Austria is one of the countries having introduced **producer responsibility schemes that cover all municipality/waste collection authority costs for collection and recycling**. These apply to the four waste streams covered by the recycling directives.[437]

Landfill bans are also used in these countries. In Germany and the Flanders region in Belgium, landfilling of bio-waste is banned. Germany bans municipal waste that is unsorted, separately collected or residual/untreated and having a total organic content (TOC) of <3%. German analysis has shown that illegal dumping of untreated municipal waste was not as serious a problem as anticipated, helped to fund intelligent municipal waste management and prevention activities, thereby contributing to increasing recycling rates and a moderate decrease in waste generation.[438] In Flanders, composting of bio-waste is very developed, with 34% of inhabitants doing home composting. Training sessions are regularly provided to inhabitants to ensure appropriate composting. Austria has a landfill ban for any waste having a TOC <5% (with some exceptions for mechanically-biologically extensively treated wastes) since 1997 for new landfills, and since 2004 for old landfills.[439] Sweden has a landfill ban on separately collected combustible waste materials. The Netherlands bans waste that is separately collected.

Other activities promoting **behavioural change** are supported, through tools, surveys and studies, information and advice (Walloon region); reuse centres (Flanders region). In Luxembourg, the "SuperDresckKëscht" (SDK) programme organises awareness campaigns, provides public assistance and advice, and awards quality labels, thereby bringing significant progress and acting as a driver for waste recycling.[440] Austria's Waste Prevention Vienna programme "Naturally less waste", running since 1998, is one of Europe's most famous examples of a behavioural change campaign. Various programme initiatives target efficient production, as well as efficient public and private consumption. These initiatives have already put in place several good waste management practices like: the establishment of the repair-network Vienna, the promotion of the use of tap-water instead of bottled water, the distribution of cloth shopping bags and the use of reusable drinking cups for public events.[441]

4.2 Medium-performing or transitional countries

This group is made up of the Czech Republic, Estonia, Finland, France, Ireland, Italy, Slovenia and the UK. These countries are typically characterised by mid-level recycling, around 25-30%, and landfilling between 35-50%. As only three of them more recently joined the EU, important changes have been made to pre-EU waste management practices but it still remains to be seen how a recycling society is to be supported by political, economic and infrastructural frameworks. More than half of them, however, are EU15 countries, with EU membership spanning from 18 years (Finland) and 40 years (Ireland and the UK), to over 60 years (founding nations, France and Italy). These transitions extend beyond generations, therefore, and it is evident that more political effort is needed to 'complete' the transition to a resource efficient recycling society, meeting EU legislative targets on the way.

For many of these countries, a focus is needed on setting up the appropriate political, economic and infrastructure framework to avoid diverting waste from landfill to incineration instead of to recycling. The UK is one of the countries identified, the only not in the 'high performing' country group, that already has over-capacity in incineration. The use of economic instruments plays a key role in helping to fund such infrastructure creation and development, while also effecting behavioural change to less wasteful practices.

Waste generation and management trends

The Czech Republic's MSW generation has generally been increasing from 2005 levels of 2.95 million tonnes to 3.33 million tonnes in 2010. Still in 2010, the majority of this (2.16 million tonnes) was landfilled, and only 528 thousand tonnes was recycled/composted (6.25%). However, this latter amount does not appear to reflect a further figure provided by national sources: municipal waste recycling was estimated at around 31% in 2010. It is not clear why such discrepancies in figures exists, giving an indication that monitoring and reporting efforts likely need as significant attention as changes to waste management practices. It may partly be linked to a methodological change in the calculation of MSW, which has had a major impact on reported MSW landfilling levels: 86.2% in 2007 and 89.9% in 2008, then sudden drops in subsequent years, 64% in 2009 and 59.5% in 2010. It is therefore not clear whether EU targets on landfill diversion and 2020 MSW recycling will be met (notwithstanding derogations of 4 years granted on landfill diversion targets). National analysis has identified that biodegradable MSW landfill diversion targets have not been met, and that further reduction is limited by the capacity of existing infrastructure, especially in relation to MSW. It has also identified that packaging waste recycling targets have been met. No data was provided for performance towards targets on ELV, WEEE or batteries.

Estonia's municipal waste decreased significantly from a high in 2007 at 449kg/person, to 346kg/person in 2009, although figures were provided only to 2009. Its total waste generation levels are very high (a 2007 per capita average of 16.3 tonnes, compared to the EU average of 3.5 tonnes) due to oil shale-based energy production (around 80% of total waste is generated by this industry), and its share of hazardous waste is 40% of total waste generation. Municipal waste recycling is increasing, from 28% in 2009 to a forecasted 50% in 2013.[442] In 2011, 74% of the waste was landfilled, around 15% recycled and around 11% composted.[443] C&D waste *recovery* is already at 72%, and recycling of paper, metals, and wood packaging meets existing EU targets. Collection and recycling targets for WEEE and ELVs recycling and recovery have been met, but those for packaging have not.

Finland's total waste generation continues to increase (from 74mt in 2004 to 94mt in 2010), but its MSW (included in a 'mixed waste' category) levels have been reducing slightly in the same period (from 2.3mt to 2.2mt).[444] [445] [446] Landfilling remains the main waste treatment type for MSW at 45% in 2010, compared to 33% recycling and 22% incineration. However, landfilling has reduced considerably from 61% in 2001, although much more waste has gone to incineration (up from 9% in 2001) than to recycling (down from 35% in 2001).[447] The landfill diversion target is therefore met, but significant effort is required to meet 2020 MSW recycling targets. C&D waste recycling targets will be difficult to meet, given the high proportion of wood used in buildings in Finland and a tendency to incinerate this material for energy recovery (a practise that does not contribute to EU recycling targets). Targets on WEEE, packaging waste and ELVs have been met. It is not clear whether batteries targets will be met.

Despite France having introduced a Waste Prevention Plan in 2004, both its overall waste generation and its municipal waste generation levels have been increasing since 2004 at least. Total waste generation has grown from just under 303mt in 2004 to 355mt in 2010. Municipal waste has grown in that time from 25.7mt to 29.3mt, equivalent to 532kg/person in 2010 (higher than the EU average of 520kg).[448] Data from EU sources for France's performance against EU targets appears unavailable. National sources provide some details: Despite MSW recycling levels increasing since 2005, in 2010 35% of household and similar waste was recycled/ composted[449], and it is estimated that the 2020 50% target will not be met without significant effort[450]. 37% of biodegradable municipal waste was landfilled in 2010, but it is not certain that this will ensure meeting landfill diversion targets.[451] 65% of C&D waste was recycled in 2010[452], although there is

no trend data to provide support for forecasting the meeting of 2020 targets. Collection targets for batteries appear to be met, although no data on recycling levels is yet available. 76% of ELVs were recycled in 2010[453], and recycling has hovered at this level since 2006 so it is not certain that EU targets will be met. Packaging recycling targets have been achieved. WEEE targets have been met.

Ireland's municipal waste levels have been decreasing since 2007, reduced from 3.4mt in 2008 to 2.9mt in 2010[454], largely due to the economic crisis and reduction in personal consumption.[455] Still heavily dependent on landfilling, in 2010 the other treatment types material recycling and composting and digestion make up roughly 35% and 4% respectively, with incineration with energy recovery also hovering at 4%.[456] These figures are for total MSW treatment, whereas in 2010, 53% of household-derived paper, metal, plastic and glass was being prepared for reuse and recycling, therefore already meeting the EU's 2020 target of 50%.[457] Ireland has also met all existing EU recycling/recovery legislation except for end-of-life vehicles, for which there are doubts that the 2015 target will be met.[458] [459]

In Italy, municipal waste has increased between 2000 and 2010 from 28mt to 32mt, equivalent to 509kg to 531kg/person, higher than the 520kg/person EU average for 2010. The country has great variability in waste management quality, with very well performing (high recycling/composting, stabilised or reduced waste generation levels) regions as well as extremely poor (with a strong organised crime presence) performing regions.[460] Italy has notorious difficulties with waste management in some regions, with the most famous recent case being Naples and the Campania regions.[461] Rome has similarly suffered recent difficulties. These are usually due to a combination of technical, political and criminal elements, demanding and requiring significant governance attention. Italy's recycling and recovery rates are still in transition, for example it doubled municipal waste recycling between 2000 and 2010 from 10% to 20%, and it reduced its landfilling of municipal waste in that time from 76% to 48%. It is anticipated that Italy will meet the 2020 target of 50% municipal waste recycling. However, it is questionable whether the 2009 (2013 with derogations) biodegradable municipal waste diversion target will be met.[462]

Slovenia's MSW levels are lower than the EU average and have decreased from 1995 to 2009 (even achieving absolute decoupling from economic performance) to achieve 511kg/person.[463] Landfilling has been reducing, to 64.5% in 2010 and 58% in 2011[464], although it is not clear whether the 2016 landfill diversion target will be met. Waste recovery has increased from 35% in 2009 to 41% in 2010[465], although it is not clear if this is a mix of recycling and energy recovery, especially as a figure of 42% incineration without energy recovery has been provided.[466] ELV targets are already exceeded, as is the 2008 packaging target (although for materials combined). No information was found for C&D waste or for performance against existing targets for batteries or WEEE. Improved structural changes to support the waste hierarchy are needed to meet 2020 WFD targets, for municipal and C&D waste.

The UK's total municipal waste generation has been decreasing since 2005, from just over 35mt to just under 32.5mt in 2010. Historically, a landfilling-dependent country, in 2010 only 49% of MSW was landfilled, with 12% incinerated with energy recovery, 25% recycled and 14% composted or digested.[467] In 2011, household waste recycling was at 42.9%, up from 41.5% in 2010.[468] The UK is also already meeting or scheduled to meet recycling targets covered by the recycling directives, although figures for WEEE are an average of all categories. There is some concern as to whether the UK will meet its 2020 diversion target under the Landfill Directive, in part due to the time available to build the necessary organic waste recycling and recovery facilities.[469]

Transposition of the Waste Framework Directive

Transposition of the WFD occurred throughout 2010 to 2012, with national legislation being revised in 2010 (France[470], Italy[471]), 2011 (Estonia[472], UK) and 2012 (Finland[473]), or still underway (Czech Republic[474], Ireland[475], and Slovenia).

- It remains to be seen how the Czech Republic will transpose the WFD, but a new law on waste is being prepared (draft legislation has already been prepared) with the aim of simplifying current legislation and further promoting the reuse of waste with a simultaneous reduction of waste disposal in landfills.
- Italy's transposition of the WFD included the introduction of an **obligatory register for companies transporting waste** and for foreign companies involved in cross-border transport of waste, as well as provisions for coordination with SISTRI (a control system for tracing waste). SISTRI is one of the most advanced systems of its type in Europe, managed by the environmental police corps and requiring registration by all waste transporters.[476] The system is important in a country with an established "eco-mafia", notably operating in the waste field, and it was also important in the monitoring and tracing of hazardous waste (approximately 10% of total waste generated in Italy). However, a legal decree in 2012 suspended SISTRI until June 2013, hence SISTRI has never entered into force, despite companies being obliged to register and pay the required fee over the past two years.[477]
- France's national waste action plan was updated, reflecting the revised WFD and a national environmental stakeholder engagement process called the *Grenelle*. Its main objectives are to prevent waste, to promote recycling and recovery, to reform planning and efficient treatment of residual waste, and to improve construction and demolition (C&D) waste management. The action plan includes a **per capita waste reduction target** of 362kg by 2013, amongst other targets relating to municipal waste recycling (and specifically for packaging waste), reducing waste to landfills or incineration, and recycling of industrial waste.[478] [479]
- Finland updated its Waste Act in 2012, and enacted a number of decrees for different aspects of the WFD. Its national waste plan[480] is in effect until 2016 and emphasises the **relationships between waste issues and other areas of policy including chemicals, sustainable resource use, climate, environmental health, soil protection, and technology policy**.
- Slovenia's legislative package, which was delayed in 2012, is meant to set **minimum standards** for public service provision, set out responsibilities in the creation **local infrastructure** for public service provision and the responsibilities of the producer of municipal waste with regard to **separate collection at source**, set provisions for **mandatory door-to-door separate waste collection** for packaging waste and biological waste, glass and paper, metal and plastic packaging, detail new recovery and disposal objectives, transfer waste management objectives from national to local levels, and provide more attention to **public awareness-raising**.
- The UK's legislation includes a duty on waste collection authorities to ensure that separate collection where 'necessary' to ensure, facilitate or improve recovery, and where it is 'technically, environmentally and economically practicable', which is somewhat of a step forward from previous reticence towards such separate collection of materials for recycling/composting. A historical approach of lowest cost option appears to be slowly changing, following the revised WFD text and Commission pressure.

Issues needing attention

For many of these transitional countries, key issues still needing attention most often relate to governance and use of policy tools. There is a need to effect general cultural change, based on a clear policy framework, supported by appropriate use of tools to change behaviour and to provide the legal backdrop against which this behaviour change occurs.

In the Czech Republic, municipal waste generation continues to grow, albeit at a slow pace. Total waste generated has increased from 2005 of 3mt to 3.3mt in 2010. Landfilling is still the main form of treatment, representing 68% of total MSW treated in 2010, whereas 15% was incinerated with energy recovery, 14% recycled and 2% composted.[481] However, both incineration with energy recovery and material recycling continue to grow, and in 2011 rates were 18% for incineration and 15% for recycling. Significant attention, measures and support are needed to continue to build a recycling/composting/reuse infrastructure, to ensure that the 2020 targets of the WFD and the landfill Directive are met, as well as any future increases to recycling directive targets. The country is transitioning slowly from its strategy before joining the EU, and much focus is needed in building the political, infrastructure, and economic framework promoting waste treatment at the upper levels of the waste hierarchy.[482] Several **PAYT schemes** have been introduced, representing an opportunity for further policy development, however industrial and agricultural interest groups apply pressure against further policy development. On a clearly positive note, the government introduced a **plastic carrier bag charge** in 2011, as in Bulgaria and Ireland (Italy has a ban in place).

Estonia appears to have erratic performance in relation to EU targets. It seems it has met recovery targets for packaging materials, recycling and recovery targets for ELVs, and has high rates for WEEE (collection) and C&D waste (recovery), but performance on *recycling* is not clear. The first landfill diversion target (for 2010, with derogations) has been met, and the 2020 target is anticipated to be met by 2013 thanks to the building of a waste incinerator. It has introduced some measures, making its policy toolbox more advanced than other countries in this grouping, including **separate collection schemes for biodegradable *packaging* waste**, and **deposit-refund schemes for glass and plastic bottles**, and a **landfill ban on unsorted municipal waste**.[483] [484] Municipalities are also required to organise **source-separated collection** of paper/card, green garden waste, hazardous waste, and packaging waste[485], and part of the population is subject to **PAYT schemes** which are volume- and frequency-based.[486] **Producer responsibility schemes** are in place, with full cost recovery by producers.[487] A l**andfill tax** was introduced in 1990 and is set incredibly low for municipal waste in 2010 at 12 EUR/tonne, but is meant to rise by 20% per year until it reaches 30 EUR/tonne in 2015.[488] Other positive trends are in **increasing public awareness** of the need to separate waste for recycling, and in the **enforcement and increased use of producer responsibility and polluter pays principles**.[489]

In Finland households' willingness to sort their waste is high, with an increase over five years from 35% to 80% of households sorting their waste regularly.[490] However, despite this positive household behaviour, waste management practices are not driving towards the higher end of the waste hierarchy in significantly increasing recycling levels. The share of recycling increased by 2% from the previous year, whereas the amount of incinerated municipal waste with energy recovery has tripled in five years although it also increased in 2010 by only 2%. Finland therefore needs to ensure that a supportive political, economic and structural framework for increasing recycling is put in place. While **PAYT schemes** in Finland are not legally mandated, charges for municipal household waste are primarily determined by the quantity and type of waste being disposed of, as well as the frequency of collection. The charge must also be of enough

significance to serve as a deterrent to waste production and encourage recycling. In addition to a **weight-based waste charge**, an **annual fixed fee** is applied based on house type (e.g. single family home, apartment block). Residents also have the option of disposing of waste at collection points, though access to these collection points also incurs the levying of a fixed fee, which varies among municipalities/regions.[491] Given its low population density, **regional cooperation** in waste management activities has been emphasised as a means of improving the collection and processing of municipal waste, helping to enhance the effectiveness of collection route planning, ease the implementation of separate waste collection services (e.g. biowaste, packaging, recyclables, hazardous waste), and reduce the unit costs of waste management. [492] A **landfill tax** has been in place since 1996, raised to 40 EUR/tonne in 2011 and set to rise to 50 EUR/tonne in 2013.[493] There is a **ban on landfilling of non-pre-treated biodegradable municipal waste**, introduced in 2005.[494]

France's political, technical and structural situation regarding waste management prevents more resource-efficient management of waste, whether in monitoring policy implementation and imposing penalties for infractions particularly of illegal landfilling, in having very specialised structures which increases costs for recycling and recovery of waste, and in not maximising the jobs potential of the sector. France's **landfill tax** is the lowest amongst West European countries[495], but will be increased from its 2008 level of 10.03 EUR/tonne to 40 EUR/tonne by 2015, and its **incineration tax** is to reach 4-14 EUR/tonne by 2013.[496] The latter should be clarified as soon as possible, to give market clarity on costs and to allow behaviour change. [497]

Ireland aims through its 2012 national waste strategy to virtually eliminate landfilling[498], and this requires careful attention to avoid simply shift to more incineration.[499] Ireland still has a considerable number of households not having access to a waste collection service[500], so infrastructure needs to play a key role in more resource-efficient waste management. A **landfill levy** was introduced in 2002, at 15 EUR/tonne and has risen more sharply recently to achieve a mid-2012 level of 65 EUR/tonne. This is seen as having had a role to play in reducing landfilling levels.[501] In theory, **PAYT schemes** have been introduced across the country, although municipal waste collection is almost completely delivered by private companies which establish contracts with households and determine pricing and design (weight- or volume-based charging). [502] An unusual situation is also that households are not required to have a private or municipal waste collection service, giving unusual 'freedom' to choose.[503] Beyond the landfill levy, Ireland needs to reform certain incineration subsidies and examine its extended producer responsibility schemes to ensure that full costs of separate collection and recycling are covered.[504]

In Italy, focus in previous years has been on the much-needed **closure of illegal or sub-optimally performing landfills**.[505] This has led to a shortage in landfill capacity, and hence to waste crises for which parts of Italy are famous. This situation has been exacerbated by **poorly developed waste collection services**. In some regions, since the closure of many landfills, political focus has been on building of large incinerators instead of introducing recycling/composting collection systems. This also explains the wide discrepancies in recycling performances between regions. In general, technical barriers to good waste management include lacking and misused infrastructure, surplus staff and poor management.[506] Italy also does not make full use of polluter pays or extended producer responsibility tools, which are key in waste management. Although a **landfill tax** was introduced in 1996 (through a law defining the upper and lower levels of the tax, with tax levels set at a regional level), the levels vary widely between regions and is generally considered to be low.[507] Italy has also introduced an **incineration tax of** 125 EUR per tonne which is considered relatively high with respect to other Member States. **PAYT systems** have been introduced in 1,000 of 8,100 municipalities, although

amounts paid are often linked to the surface area of the household and to the number of inhabitants, rather than to actual waste generation.

Slovenia's joining the EU helped to strengthen its performance in waste management and to finance and upgrade infrastructure. Despite this, the country is characterised by erratic data availability and performance. Unusually, the country does not have regional level administration, to more easily harmonise across its 21 municipalities.[508] Serious effort is needed in establishing the infrastructure, resources (both staff and financial), behavioural and cultural change to create a resource-efficient waste management performance. Separate collection systems are not in place so PAYT charges cannot be introduced, and the existing **landfill tax** is not collected centrally, rather it goes directly to municipal budgets with little oversight on its spending. Not all landfills meet EU requirements. Recycling of packaging waste is undertaken by private companies that do not reimburse municipalities for collection. In late 2012, a decree was adopted giving municipalities the ability to set prices for mandatory public environmental services, including waste management[509], so it remains to be seen how this will help improve the situation in future. In any case, there appear to be few economic instruments used to support policy objectives.

The UK's more significant reduction in landfilling began after its **landfill tax** (introduced in 1996) was significantly increased in 2008, with announced annual increases of just under 10 EUR/tonne until 2014 when the level will reach almost 100 EUR/tonne. Further policy and supporting infrastructure is needed to accommodate higher levels of recycling/composting, and to avoid simply shifting from landfilling to incineration. The UK could make more use of market-based instruments, such as an incineration tax or other charges making recycling/composting more attractive, introducing PAYT schemes (thereby making more explicit charges for waste collection, which is not the case until now as these charges are integrated into local taxes), and revising **producer responsibility schemes** to ensure that full costs of collection and recycling are covered (this is currently not the case). England and Wales are said to be considering some **landfill bans**, whereas Scotland will ban from 2015 landfilling of mixed, unsorted waste, and source-segregated dry recyclables and food waste, and a landfill ban on biodegradable waste is planned for 2017.

4.3 Lower-performing countries

This group is made up of Bulgaria, Cyprus, Greece, Hungary (check if to go up to medium), Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Spain.

In general, all these countries still have **extremely high levels of landfilling**, which is the lowest level of the waste hierarchy and therefore not in line with either the spirit or the letter of EU legislation. Recycling and composting levels also remain very low. Hence, the transitions are very long (30 years for Greece, and 25 years for Portugal and Spain) or extremely slow (the majority of the countries in this group joined the EU in 2004) and waste management does not appear to be receiving the attention required of an activity with significant green economy and resource efficiency potential and considerable impacts on human health and the environment. They also often **have no or only very weak MBIs in place**, whether to implement **producer responsibility** elements of the recycling directives or **household charging** for waste collection, or to encourage treatment at the higher levels of the waste hierarchy through **landfill and incineration taxes or levies**.

Waste generation and management trends

Bulgaria has consistently reported reduced waste generation levels since 1999 (with 2000 being an exception), likely due to improvements in reporting systems, changes to municipal waste definitions, better controls in landfills, introduction of separate collection systems for recyclables, the introduction of economic instruments, and negative population growth.[510] In 2010, Bulgaria reported a 410kg/person municipal waste generation level (considerably lower than the 520kg/person EU average)[511], with the highest percentage in the EU being landfilled – 98.4%. Only 0.8% was recycled.[512] Despite these almost non-existent recycling levels, it appears Bulgaria has already met the EU's 2020 50% recycling target for paper and the 2008 targets for metal and wood packaging. For other waste streams erratic performance is identified, with no data being available (C&D waste), performance very far from meeting targets (batteries – 1% sent for recovery), or targets being exceeded (ELVs – 88.9%, WEEE – 92.5% recycling and reuse rate for all categories combined).

Although Cyprus' waste statistics reporting is still under development, municipal waste has increased from 69kg/person in 2001 to 118kg/person in 2010, and 16% of this was recycled in 2010.[513] Cyprus still landfills the majority of its waste – around 80% in 2010, slightly less than the 2006 figure of 87%. Cyprus appears to have developed very little statistical reporting on its waste management practices, and the only figures available were for packaging waste for which amalgamated data shows that recycling increased from 22% in 2002 to 42.5% by 2009, although a 2010 figure puts MSW recycling at 16%. It has not met targets on packaging waste recycling, landfill diversion, or ELV recycling/reuse. It has met previous WEEE targets on collection. Overall, current waste management infrastructure is still not capable of handling the high consumption and waste generation observed in Cyprus.

Greece's reporting systems are still under-developed, however data provided for MSW shows an increase from 416kgs/person in 2001 to 457kgs/person in 2010. 17.3% of this was recycled in 2010, and 82% was landfilled. It is clear that landfilling is still the dominating form of waste treatment, and neither the landfill directive nor current packaging directive targets have been met (the overall recovery rate for packaging waste increased from only 32.6% in 2002 to 58.8% by 2010). Recycling and reuse targets for ELVs have been met (as a result of a substantial increase in authorised treatment facilities[514], and it appears that battery recycling targets have also been met.[515]

Hungary's municipal waste generation declined by approximately 10% from 4.5 million in 2007 to 4.1mt in 2010, and by approximately 5% from 2009 to 2010. Experiences and trends until 2010 predict that the decreasing waste trend will continue up to 2015.[516] Data from national statistics indicate that in 2011 the amount of solid municipal waste generated was 3.26 million tonnes, a reduction of 320,000 tonnes compared to 2009.[517] Though in recent years, 'deposit-oriented' solutions have been increasingly replaced by prevention and recycling, landfilling of municipal waste still remains the main treatment method – 68.7% was landfilled in 2010. Though recycling rates (including composting and digestion) have increased from 12.7% in 2007 to 21.4% in 2010, substantially increased efforts appear necessary to reach the 50% MSW recycling target by 2020. Hungary missed the 2009 landfill diversion target[518], and substantial further efforts are necessary in order to achieve the 2016 target.

Latvia reported a decrease in municipal waste generation per capita between 2009 and 2010 from 753,000 tonnes to 650,000 tonnes, equivalent to 334kgs/person to 304kg/person.[519] Landfilling dominates, with 90.2% in 2010, and 8.1% recycling, and 0.7% composting or digestion. However, collected volumes for recycling have increased considerably from 2009 levels of 3,000 tonnes to 60,000 tonnes in 2010. Until now,

Latvia has not met targets for packaging (although recovery rates already exceed 50%) or landfill diversion, whereas it has exceeded the 2015 targets for ELVs.

Lithuania's waste generation is amongst the lowest in the EU. In 2010, 1,253 thousand tonnes of municipal waste was generated.[520] A distinctive reduction of municipal waste generated in the country in 2009 might be explained by the economic crisis of 2008-2009, and a rise in 2010 might show that the country has achieved a certain level of recovery since the economic crisis.[521] In 2010, 94% of waste was landfilled, only 4% was recycled and 2% was composted.[522] No data was provided on Lithuania's performance on waste recycling/recovery targets.

Malta's waste generation increased annually from 2005 when it was at 251,000t, peaking in 2008 at 274,000t before decreasing to 234,000t in 2010. Its total waste generation (including non-mineral waste and mineral and solidified waste) has decreased from 2006 to a 2010 level of 1.5mt. [523] Malta still depends heavily on landfilling, with municipal waste in 2010 having the following treatment: 82.1% landfilling, 13% recycling/composting.[524] [525] Landfilling appears to be reducing relatively quickly, nonetheless, with 95% MW landfilled in 2009.[526] No data is available regarding performance against targets for ELVs or WEEE, although the country appears to be struggling to implement the ELV Directive (exporting the vehicles or inadequately treating them domestically). 10.5% of C&D waste appears to have been recycled in 2010[527], and total packaging waste recycling for the same year was 28.5%[528].

Poland's data collection systems for waste management make performance difficult to verify and assess. In 2010, it appears to have landfilled 76% of its MSW, although it supposedly recycled 26% - a total of 102%.[529] No separate collection of biodegradable waste is undertaken, and around 20% of households do not have contracts for waste collection, so much of this household waste is illegally deposited in nature or burned in home furnaces. The landfill diversion target has not been met, nor it appears have other waste legislation targets.[530]

Portugal's households generated just under 5.5mt in 2010, against an overall waste generation level of 32.9mt. MSW increased by 6% from 2010, rising to 487kgs/person, below the EU average of 520kgs). In 2010, MSW was treated as follows: 58% landfilled, 20% incineration (not clear whether with or without energy recovery), 14% recycling and 9% composting and anaerobic digestion.[531] It has met the 2006 landfill diversion target, but has missed the 2009 target and has asked for derogations for the remaining target years. However, it has met or surpassed packaging targets for all materials and the previous WEEE targets, but it is not clear whether targets for all batteries/accumulators has been met (that for car batteries has), and it is likely to meet the 2015 target for ELVs. It currently recovers 40% of C&D waste, requiring efforts to achieve the 2020 WFD target.

Romania's MSW levels have fluctuated between 7.5-8.4mt between 2001 and 2010, with no real trend shown or explanation for yearly changes. In 2010, 1% of MSW was recycled, 0.5% was composted, yet only 79.7% was landfilled, leaving almost 20% unaccounted for. This is assumed to be biodegradable waste that was illegally dumped in the environment[532], as Romania has not exceeded 2010 allowances for landfilled biodegradable waste and a national target exists requiring the landfilling of this waste to be halved against 1995 levels. Despite low MSW recycling levels, Romania has met EU packaging waste targets. However, it has not met all other EU waste-related targets, largely due to continuing political instability and cases of corruption in companies gaining MSW collection contracts from municipalities.

Slovakia's total waste generation shows similar trends, increasing between 2004 and 2006 and decreasing since then, to a total figure for 2010 of 8.8mt. Municipal waste on the other hand decreased slightly between 2008 and 2009 (from 1.77mt to 1.75mt)

before rising in 2010 to 1.81mt. Landfilling still remains the main form of waste treatment for MSW, with 2010 figures of 78% landfilled, 10% incinerated, and 9% recycled/composted/digested.[533] Targets for landfill diversion, packaging waste, and WEEE have not been met, although that for ELVs has already been met. Despite meeting some key EU legislation targets, it appears that there is 'leakage' in the management of municipal waste and this may mean that this waste was illegally disposed of in the environment.[534]

Spain is considered to have deficits in household provision of waste collection services, below average recycling rates for municipal waste and low relevance of waste prevention on the political agenda.[535] Despite this, in 2010, 33% of MSW was recycled/composted, 58% was landfilled and 9% was incinerated.[536] A significant portion of the recycling/composting figure is made up of organic waste recycling, although this does not necessarily mean low landfilling rates of biodegradable municipal waste as the 50% landfill diversion target before 2009 was not met. WEEE performance has been identified by Spain's environmental prosecutor as being massively breached – 70-75% are considered not managed in line with the Directive, being dumped, exported illegally or dismantled at unauthorised sites for later sale of the parts on the black markets. This is seen as due to the country's economic situation.[537] [538]

Transposition of the Waste Framework Directive

Transposition of the WFD occurred throughout 2011 to 2012, with national legislation being revised in 2011 (Cyprus[539], Latvia[540], Romania[541]) and 2012 (Bulgaria[542], Latvia[543], Lithuania[544] [545], Spain[546]), or still underway (Malta). Poland[547] appears not to have updated its legislation, but rather adopted new waste policies (see bullet points below), and it was not clear when Slovakia updated its main waste act[548]. Portugal appears to have begun updating various national waste plans throughout 2011-2013.[549] [550]

- Bulgaria's new Waste Management Act came into force in mid-2012, one year late due to a long debate in Parliament and protests by the metal industry (due to restrictions on collection of scrap metal).[551]
- Latvia has passed 20 regulations on waste management throughout 2011-12, most of which address various EU Directives. The main law on waste management, appearing to transpose the WFD, was passed in 2010, and amended in 2011 and 2012.[552]
- Lithuania made 4 amendments to its Waste Management Law throughout 2011-2012, mostly to address different aspects of the WFD and other EU waste legislation.
- Poland's 2011 waste policy creates a new model for MSW management, aiming to meet the WFD's 2020 50% recycling of MSW target notably through the introduction of source separation, closure or adjustment of landfills not meeting EU legislation requirements, a significant increase in incineration with energy recovery, and elimination of landfilling of WEEE.[553]
- Hungary[554] and Poland has given municipalities more legal responsibility for waste management (shifting away from private companies), an important change in these countries.
- Slovakia's Waste Programme 2011-2015 introduced new measures on waste prevention and reuse, and set targets for increased waste recovery (incineration with energy recovery), as well as requiring separate collection of bio-waste and setting targets for composting or anaerobic treatment. It also introduced regional waste management plans with targets and responsibilities for local authorities.[555]
- Spain's 2011 Waste Act was substituted by a Waste and Contaminated Soils Act, last revised on 21 December 2012. The new waste act sets out concepts and definitions, and sets out responsibilities at different governance levels. There is a significant focus on contaminated soils. A National Integrated Waste Plan 2008-

2015[556] was also adopted to improve the management and prevention of waste and to ensure that the various entities involved (public and private) comply with the requirements of law and are actively involved in achieving environmental objectives through implementation of the Plan's measures.

Issues needing attention

Bulgaria needs to put serious efforts into supporting its policy framework with adequate infrastructure, funding (cohesion funds need strategic spending to build the appropriate infrastructure), economic instruments and action to make behavioural and cultural changes needed. It introduced a **municipal waste charge** in 2011, based on property size (m²) rather than on a waste-related base.[557] At the same time it also introduced a **landfill tax**, although this is extremely low at 3 EUR/tonne. The tax has been deemed 'unconstitutional' by the Bulgarian Industrial Association, so some effort is needed to win over key actors in the transition to a resource efficient economy.[558] It has also introduced a **plastic bag charge** (to add to similar actions undertaken by the Czech Republic and Ireland; instead Italy has a ban), and a **product-based environmental tax** which appears to be meant to act as a **producer responsibility** mechanism[559].

Cyprus has introduced **producer responsibility schemes**, appearing to fully cover costs of collection and treatment for packaging, WEEE and batteries.[560] No other MBIs appear to have been introduced.[561] Given its small size and relatively low level of political infrastructure, the country needs to consider carefully how to spend funds on creating an infrastructure and cultural situation supporting meeting of EU targets, supported by legislation and MBIs. It also needs to work with Member States beyond its borders, to ensure the effective and efficient use of infrastructure elsewhere, to help achieve a resource efficient recycling society.

Despite Greece having joined the EU in 1981, it is still very early in its transition process to better performing and resource-efficient waste management. It is also another country very strongly hit by the economic crisis, so political attention is elsewhere. Attention is still, rightly, given to **improving practices at landfills** and in closing illegal and uncontrolled dumping sites. **Producer responsibility schemes** are in place for packaging waste, WEEE, and batteries, although it is not clear whether these cover full costs of collection and recycling.[562] No landfill tax has been introduced, and it appears there are no landfill bans.

Hungary's waste management transition since joining the EU has been characterised by increasing MSW levels due to increasing consumption levels, and also due to a change from existing national deposit-return schemes (reuse, which is higher in the waste hierarchy than recycling or recovery) to the EU's approach of recycling collection systems. However, since 2006, MSW levels have been decreasing and this is predicted to continue into the near future[563], particularly given an increased focus on **waste prevention policy**.[564] The government has set more ambitious targets in order to meet the EU's 2020 WFD targets, including a **waste reduction target** of 20% by 2014 based on 2009 levels. However, this will require serious efforts in creating the infrastructure, behaviour change and economic framework to support such action. The country is still heavily dependent on landfilling, and needs to address hazardous waste deposits and contaminated land due to historical poor management practices. It also needs to introduce **selective collection systems** in more municipalities, as only 55% of the population is currently covered by such systems. No landfill tax or levy has been introduced, but a similar approach to other countries in this cluster has been taken using **product-based environmental taxes** to implement the **producer responsibility** principle. In January 2012, new rates to the **Environmental Protection Product Charge** came into force.[565] This Charge is applied to packaging materials, electrical and electronic equipment, tyres and commercial advertising paper. Oddly, levels for the

charge have been reduced for some of the products while it has risen for others. For two product categories, tax rates were raised considerably: lubricating oil is charged at 32.40 EUR/kg (112 HUF) and advertising paper at 18.50 EUR/kg (64 HUF).[566] A **Car Battery Charge** also exists, to raise funds for the reduction and prevention of their environmental impacts (presumed for collection and recycling or safe disposal).[567] However, the amounts determined are not high enough to encourage large scale improvements in environmental performance. A **producer responsibility scheme** is also in place for batteries.

In 2011 and 2012, the Latvian government passed twenty regulations on waste management, to bring it in line with EU legislation. These numerous pieces of legislation may prove too complex, putting too high an administrative burden on authorities, to achieve effective change on the ground in meeting EU legislation targets. The overhaul of its legislation aims to meet the targets, addressing them directly. Cohesion funds have been used to build waste sorting and collection capacity, although no assessment of the effectiveness of the use of these funds has been delivered. It introduced a **natural resources tax** in 1991, the country's main mechanism for environmental taxation and promoter of resource efficiency. It also applies to various waste-related activities, although it is still very low despite recent rises: in 2012, the level of the tax for landfill was raised to 10 EUR/tonne. The tax, albeit charged at different levels, also applies to **packaging** and **single-use tableware**, and to **C&D waste**.[568] The tax on packaging also provides an incentive for packaging from bio-plastics, with the tax level being four times lower than for paper or wood-product material levels.[569] A **product-based environmental tax** has been introduced, which appears to be meant to act as a **producer responsibility** mechanism. Latvia therefore has some policy architecture it can modify, but it remains to be seen whether its complex legislative landscape proves its undoing in improving performance. New instruments to encourage better waste management practices are under development, including a **beverage packaging deposit system**. It will apply to both reusable and single-use packaging and is anticipated to be operational from 1st January 2015.[570]

Lithuania suffers from insufficient waste treatment infrastructure for municipal waste.[571] No landfill taxes are in place, but are planned to be introduced in 2013. Furthermore, low landfilling fees hinder the development of recycling operations as they are economically discouraging. Producer responsibility schemes exist for the key waste streams, but there are no PAYT schemes. EU funding for the waste management sector is not sufficiently used as there are still legislative gaps and capacity shortages to implement the legislative regulations that hinder the developments in the sector.

Malta has under-developed reporting structures, making performance difficult to assess. No landfill tax has been introduced and PAYT schemes are also absent, although it does have **producer responsibility schemes** in place.[572] Malta also needs to consider carefully how to develop its political, infrastructure and behavioural tools to better meet EU targets.

Poland introduced changes to waste management in its 2011 waste policy which have potentially 'order-changing' effects (including municipalities having legal responsibility for municipal waste collection and 100% coverage of households with such services), although it is too early to see on-the-ground results. However, important elements for addressing the country's historical difficulties in achieving EU legislation in spirit and word are to be found in the new waste policy: **financial support** for waste recovery and recycling, **awareness-raising** to encourage waste sorting, and **strengthening of the environmental protection inspectorate**. For example, a **standard waste collection fee** to be paid by households to the municipality has been introduced, with exceptions for households segregating waste for recycling.[573] However, not all issues appear to have been addressed. These include a too-low **landfill tax**, currently set at 25 EUR/tonne

(identified as needing to rise to a minimum of 40 EUR/tonne) [574]; lack of or too narrow **producer responsibility schemes**; and the poor use of **cohesion funds** to build adequate infrastructure to support EU legislation in spirit and letter.

Portugal has also been a part of the EU for 25 years, and despite this and national targets aiming to achieve EU legislation its waste management performance remains erratic and generally below average. There has been recent focus in developing **infrastructure** to increase recycling and anaerobic digestion and mechanical-biological treatment (MBT) plants, yet no changes have been made to MSW collection systems so this waste is still collected unsorted and not door-to-door. This explains still low levels of recycling and composting/digestion.[575] A lack of strategic vision and of planning is seen to be key reasons for other poor infrastructure decisions, such as over-used landfills and too-large incinerators.[576] The existing **landfill tax** is very low at 4.15 EUR/tonne for municipal waste or 6.22 EUR/tonne for non-municipal waste[577], and will need to rise considerably to provide funds for further infrastructure development and other support mechanisms achieving behavioural and cultural change. Producer responsibility mechanisms are in place, although it has not been communicated whether these cover full collection and recycling costs. No PAYT schemes are in place, as door-to-door collection is not introduced, and indeed waste collection is not charged at all in 50 municipalities and in others the service is provided with charges that do not cover actual costs.[578] No other economic instruments encourage separate collection or recycling/composting. On a positive note, the national regulator (ERSAR) is increasingly **monitoring municipalities** and encouraging changes to waste management systems, capacity-building for better quality services.

Romania, as one of the most recent EU accession countries, was granted transition periods to comply with some EU directives on basic waste management practices at landfills. Attention has been given to **remediating landfills** that were not closed down, as well as closing down a larger number of them. Efforts are also being made to introduce **integrated waste management projects** at national and regional levels, and these are to eventually expand to cover all rural areas to eliminate uncontrolled landfills and waste burning or dumping. A number of economic instruments are in place: **deposit-refund schemes** on reusable packaging and on car batteries, as well as an **environmental tax for non-biodegradable packaging**. Money raised from the tax goes into an environmental fund, which has been used to set up a collection system for PET packaging for recycling. **Producer responsibility schemes** are in place for packaging and WEEE, but no information is available about ELVs or batteries. No landfill or incineration taxes have been introduced, nor PAYT schemes. Hence, much effort will need to be made to build the cultural and behavioural change, and to strengthen governance, to create a resource-efficient waste management service.

Slovakia has been taken to court by the Commission in relation to a specific landfill site, and it has been cautioned on its implementation of the ELV Directive. Waste management is highly criticised in Slovakia and is considered a policy addressed at strategic level but not taken sufficiently seriously.[579] Continuing issues needing attention include the still strong dependence on landfilling, critical infrastructure for treatment of bio-waste, and addressing serious allegations of corruption in relation to the recycling funds provided by producers and distributors meant to be used for the development of recycling schemes. **Producer responsibility schemes** exist for packaging, WEEE, ELV, batteries, paper/cardboard and tyres. There is still a fundamental issue of municipal waste 'leakage' due to illegal waste disposal that needs addressing. Infrastructure for handling WEEE is following a positive trend, but that for other key waste streams (biodegradable MSW, C&D) is still showing significant lack. Although a **landfill tax** and a **landfill levy** (paid by municipalities to the local authority where the landfill is located) were introduced, these are seen to be at too low levels to be considered effective: 2008 levels were just under 10 EUR/tonne for mixed municipal waste, rising to just over 33

EUR/tonne for hazardous waste. **PAYT schemes** have been introduced but their use is very limited, implemented at regional level and covering a minority of the population. A **car scrappage scheme** exists, giving owners of cars a 2,000 EUR bonus when they buy a new car and return their old one. The new Waste Programme 2011-2015 highlights the need to implement economic instruments in waste management, to support municipal waste source separation and to further promote waste prevention and reuse. Actions envisaged include revising **landfill fees** and **local taxes and fees** for the treatment of municipal and inert waste; additional **financial support for source separation collection systems**, and a **landfill ban** of waste containing more than 5% organic carbon. The package of new measures should be adopted no later than December 2013.

In Spain, waste management performance varies heavily between its autonomous regions.[580] The new government of December 2011 disbanded the old Environment Ministry to create a Ministry for Agriculture, Food and Environment, intending to allow for successful achieving of European and national objectives. However, it is too early to say whether this is the case, and the economic crisis has hit the country hard so political attention and public funds are channelled elsewhere. In any case, Spain joined the EU in 1986, giving it 25 years to improve its waste management yet it still remains in the lower performing grouping. **Landfill taxes** have been introduced at the regional level (in Andalusia, Catalonia, Madrid and Murcia) for municipal, industrial and C&D waste. Catalonia also introduced an **incineration tax**, although levels are still relatively low: a rise from 10 EUR/tonne to 11 EUR/tonne in 2011 for municipalities with separate collection systems, and a similar rise from 20 EUR/tonne to 21 EUR/tonne for municipalities without such systems. The incineration tax was increased by 0.50 EUR to 5.50 EUR/tonne and by 1 EUR to 16 EUR/tonne respectively.[581] Householders paying Barcelona's **waste treatment and disposal tax** can receive refunds and reductions if they implement good practices such as correct separation of waste for recycling. As MSW recycling rates have varied considerably in the past 3-5 years, it remains to be seen whether a decreasing or increasing trend in recycling/composting will prevail in the future, but in order to meet the 2020 target considerable efforts will be necessary.[582] [583]

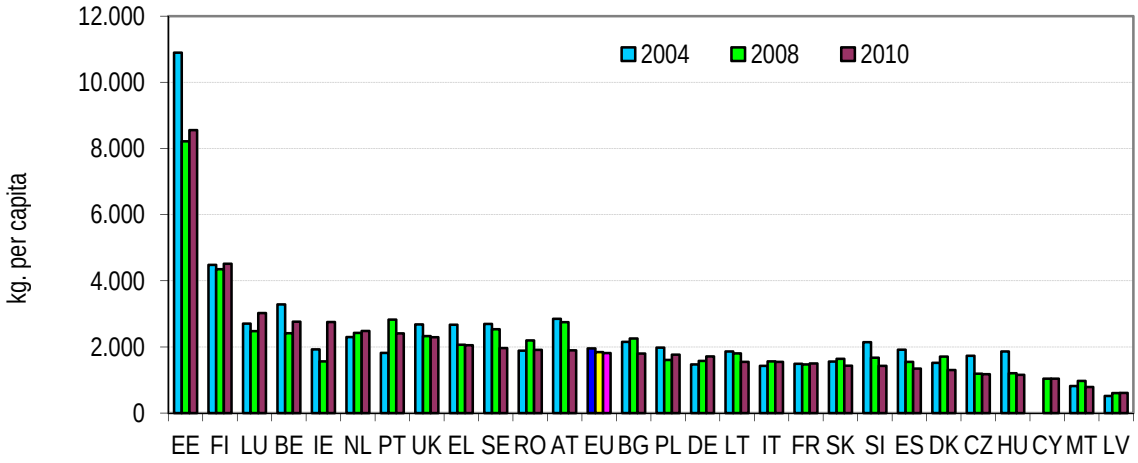
4.4 Indicator trend analysis for Waste Management

This section provides textual analysis of the trend development over the last ten years as far as possible for the three key indicators: total waste generation[584], municipal waste generation treatment,[585] and landfilling and recycling rates for municipal waste[586].

Total per capita waste generation

Total per capita waste generation varies significantly over time and across countries.

Figure 4: Total non-mineral waste generated in 2004, 2008 and 2010



Source: Eurostat, 2013

In the EU-27, total waste generation decreased from 4,913 kg/person in 2004 to 4,548 kg/person in 2010. For all years where data are available (2004, 2006, 2008 and 2010), Bulgaria ranks highest in total waste generation – with 21,874 kg/person generated in 2010. The next highest in 2010 performance ranking are Luxembourg (19,833 kg/person), Finland (19,140 kg/person), Estonia (13,856 kg/person) and Sweden (12,111 kg/person). At the other end of the spectrum, Latvia always ranks lowest – with 359 kg/person generated in 2010. The next lowest in 2010 performance ranking are Hungary (1,287 kg/person), Lithuania (1,315 kg/person) and Slovakia (1,625 kg/person).

The high numbers for many countries ranking highest in total waste generation to a great extent relate to mineral waste[587], which are included in total waste generation. In 2010, mineral waste constitutes a very large fraction for Bulgaria (19,937 kg/person of the total 21,874 kg/person), Luxembourg (16,607 kg/person of the total 19,833 kg/person), Finland (14,623 kg/person of the total 19,140 kg/person), Estonia (5,300 kg/person of the total 13,856 kg/person) and Sweden (10,144 kg/person of the total 12,111 kg/person)[588]. While for Bulgaria, Finland, Sweden and Estonia mineral waste generation results mainly from the mining sector (for Estonia mainly oil shale mining),[589] Luxembourg generates most mineral waste from the construction sector.[590] In addition, the countries ranking low in total 2010 waste generation also tend to have a weak or non-existent mining sector so that non-mineral waste accounts for most of total waste generation, such as Latvia (where virtually all total waste comes from non-mineral waste), Hungary (1,156 kg/person of the total 1,287 kg/person), Lithuania (1,549 kg/person of the total 1,315 kg/person) and Slovakia (1,435 kg/person of the total 1,625 kg/person).

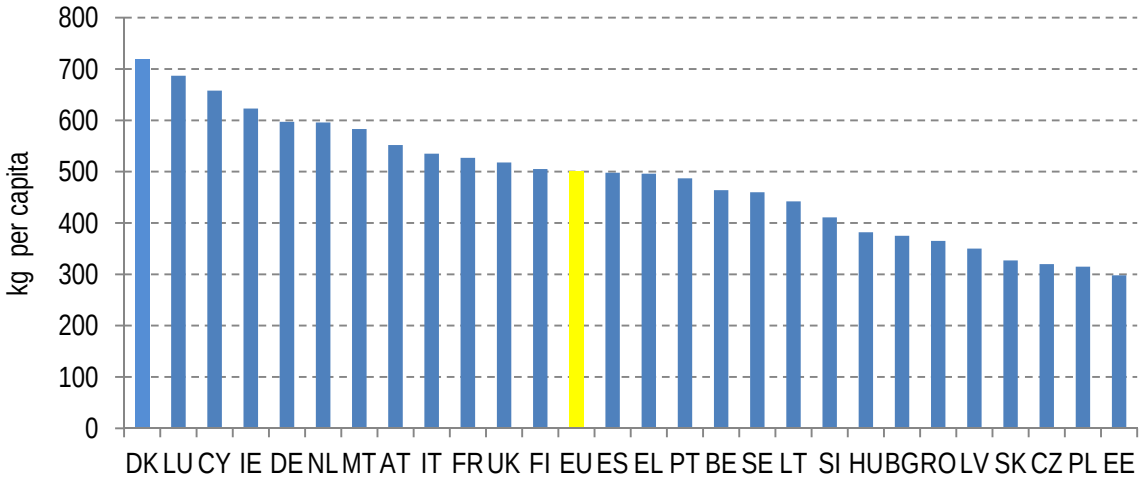
While for most Member States total waste generation decreased from 2004 to 2010, Finland, Sweden and the Netherlands show particularly noteworthy increasing trends: from 13,111 kg/person in 2004 to 19,140 kg/person in 2010 in Finland; from 9.747 kg/person in 2004 to 12,111 kg/person in 2010 in Sweden; and from 4,830 kg/person in 2004 to 6,631 kg/person in 2010 in the Netherlands. For Finland and Sweden, the economic relevance of the mining and construction sector and the associated increasing amounts of resources being mined and moved likely are the main driver behind the almost 50% increase in total waste generation from 2004 to 2010.[591] Though municipal waste generation in the Netherlands increased until 2007, it stabilised and even slightly

declined in 2011, so that therefore increasing total waste generation likely also relates to mineral waste.[592]

Municipal waste generation per capita

While per capita municipal waste generation also differs across the EU-27, the differences are not as great in magnitude as for total waste generation.

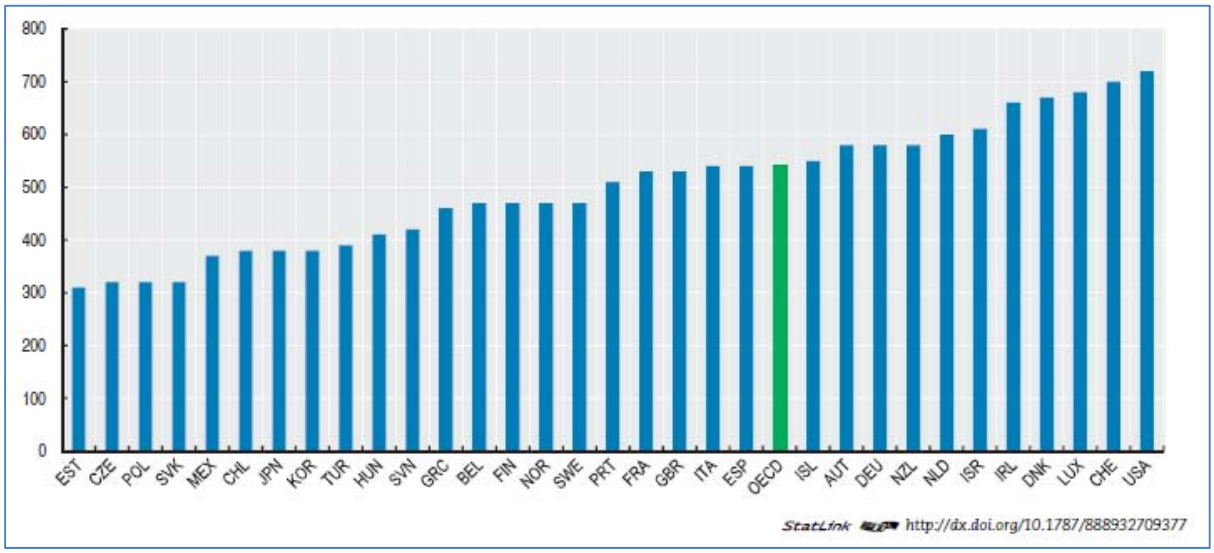
Figure 5: Municipal waste generated in 2011



Source: Eurostat, 2013

The Figure below provides MSW figures for OECD countries[593], showing Estonia and the Czech Republic with the lowest per capita levels, and a number of EU15 countries (therefore long-standing deliverers of EU waste legislation) making up the majority of countries producing more waste per capita than the OECD average (Austria, Germany, the Netherlands, Ireland, Denmark, and Luxembourg).

Figure 6: OECD Municipal waste generation, kg per capita, 2010 or latest available year



Cyprus ranks highest with 760 kg/person of municipal waste generation, and Latvia ranks lowest with 304 kg/person. The 2010 EU-27 average is 520 kg/capita. Except for small island states such as Cyprus and Malta (591 kg/person), higher values of per capita municipal waste generation usually occurs in countries with a high per capita income.[594] For instance Luxembourg (678 kg/person), Denmark (673 kg/person), the Netherlands (595 kg/person), Austria (591 kg/person) and Germany (583 kg/person) clearly rank above EU-27 average.

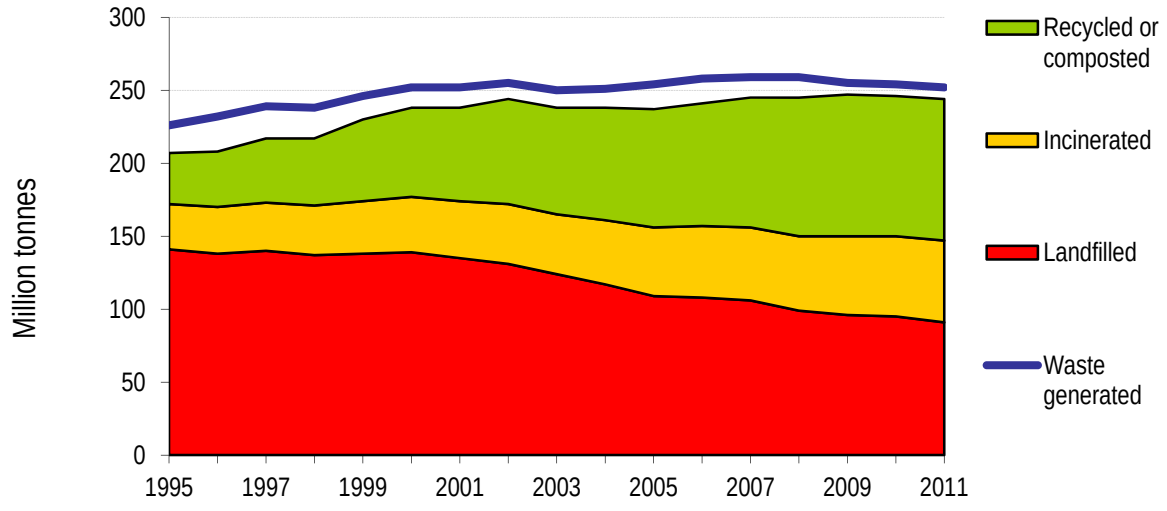
Considering municipal waste generation over time, Cyprus' municipal waste generation increased from 677 kg/person in 2000 to 760 kg/person in 2010, while Luxembourg saw a less considerable increase from 654 kg/person in 2000 to 678 kg/person in 2010. For Denmark, though municipal waste generation increased from 664 kg/person in 2000 to 830 kg/person in 2008, it subsequently decreased to 673 kg/person in 2010 (although this is partly – possibly largely – due to a change in municipal waste definition). The Netherlands witnessed an increase from 613 kg/person in 2000 to 629 kg/person in 2007, and a subsequent overall decline to 595 kg/person in 2010 in relation to 2000 levels. Austria's municipal waste generation increased from 580 kg/person in 2000 to 651 kg/person in 2006, and subsequently decreased to 591 kg/person in 2010. German municipal waste generation decreased from 642 kg/person in 2000 to 564 kg/person in 2006, and subsequently increased to 583 kg/person.

However, looking solely at the per capita figures for municipal waste generation will be misleading with regard to the environmental impact of waste generation, since environmental impacts are mostly related to the treatment strategy. For instance, the very high municipal waste generation rates in Luxembourg meet with very high recovery rates (e.g. almost 50% recycling rate in 2010).[595]

Landfilling and recycling of municipal waste

Waste treatment differs substantially across the member states and also over time.

Figure 7: Municipal waste generated and treated in EU during 1995-2011



Source: Eurostat, 2013

The figure shows how the shares of the different treatment methods developed over time on the EU-27 aggregate level between 1995 and 2011. Between these years, the amount of municipal waste generated grew by 11% from 226 to 253 million tonnes. Total municipal waste generation peaked in 2007, amounting to 259 million tonnes. The

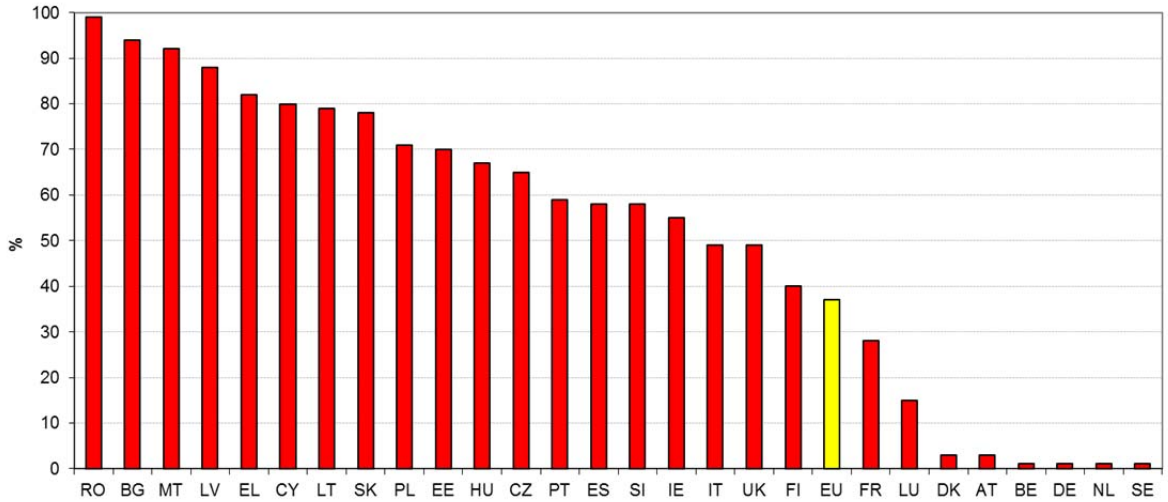
downward trend in the last three years is most likely attributable to the overall economic downturn over this period. Beyond the overall trend, four separate developments can be discerned:[596]

- The share of municipal waste not treated has been continuously declining from 8% in 1995 to 3.3% in 2011.
- While landfilling has been the predominant treatment method for municipal waste in 1995, it has become less and less important over time. In 1995, 68% of all treated municipal waste was landfilled while this fraction decreased to 37% in 2011.
- The share of municipal waste incinerated increased from 15% in 1995 to 23% in 2011. This development has been accompanied with a notable change in technology. While early on incineration was carried out mostly to reduce the volume of waste, incineration plants now are used to generate utilisable heat and electric energy. The quality of stack filters and other cleaning equipment has also vastly improved, reducing the emission of air pollution and greenhouse gases.
- While only a minor fraction (17%) of municipal waste went to recycling/composting in 1995, this share has risen to 40% in 2011
- In 2011 this share has been higher than for landfilling, amounting to 37% for the same year. This trend is clearly related to numerous efforts to improve the waste problem.

Overall the trends indicate a positive development towards the goal of a closed cycle economy.

Looking at the different Member States reveals a very diverse picture.[597]

Figure 8: Landfilling rate of municipal waste in 2011

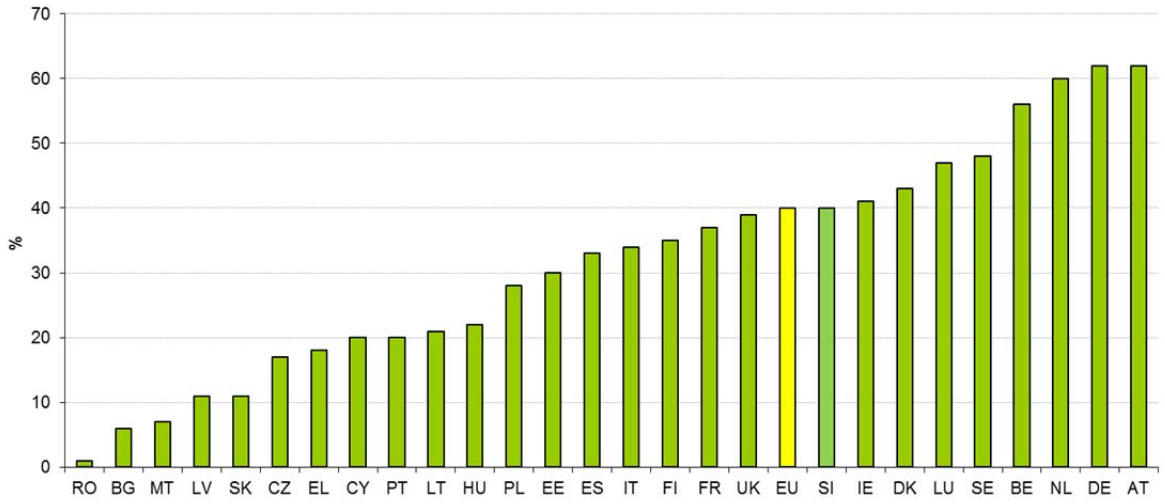


Source: Eurostat, 2013

While for several eastern and southern European countries landfill rates are highest (Romania and Bulgaria leading with almost 100%, for Bulgaria in 2011 slightly reduced to 94%, Malta with 92% and Latvia with 88% of municipal waste being landfilled in 2011), nearly or virtually no municipal waste is deposited into or onto land in Austria, Belgium, Germany, the Netherlands and Sweden. Considering the developments from

1995 to 2011 for the countries named above, the landfill rate in Bulgaria over time always hovered at almost 100%. However, according to national data for Bulgaria, in 2011 the landfill rate dropped to 94% and the recycling rate increased to 6%.[598] For Romania, landfill rates slightly dropped from 100% to 98% in 2001, but increased to 99% from 2004 onwards, including in 2011. The remaining 1%of municipal waste is recycled (including composting). The development in Malta shows an increase in landfilling rates from around 76% in 1995 to 92% in 2011, peaking at 96% in 2008. For Latvia, landfill rates dropped from 100% until 2000 gradually to 88% in 2011, with recycling rates gradually increasing to 10% in 2011.

Figure 9: Recycling rate of municipal waste in 2011



Source: Eurostat, 2013

Austria's landfill rate fell from 43% in 1995 to 28% in 2003 and then sharply to 7% in 2004, further declining to 3% in 2011. One main driver for this decrease was a legal ban on landfilling municipal waste exceeding 5% total organic content (TOC) in old landfills by 1st January 2004.[599] Since 2004, recycling rates increased from 60% in 2003 to 68% in 2004, and slightly decreasing to 62% in 2011, while incineration rates increased from 11% in 2003 to 25% in 2004 and further to 35% in 2011. For Belgium, while landfill rates dropped continuously from 44% in 1995 to 1% in 2011, incineration rates stayed more or less stable around 36% in 1995 and 2011, whereas recycling rates increased substantially from 20% in 1995 to 56% in 2011. The latter development is driven by a new generation of environmental policies in Belgian regions focusing on the optimisation of levels of recycling and the prevention of waste generation.[600] German landfilling rates dropped substantially from 46% in 1995 to 1% from 2006 to 2008 and ever since to 1% or below. The main reason here is the landfill ban on municipal solid waste, which became effective from 1 June 2005 requiring all municipal waste to undergo pre-treatment procedures, either thermal or mechanical-biological treatment, before it can be deposited.[601] Over the same period of time, incineration rates increased from 18% in 1995 to 37% in 2011, while recycling rates rose from 35% in 1995 to 62% in 2011. The Netherlands witnessed a decrease in landfilling rates from 30% in 1995 to 1% in 2011, while incineration rates increased from 27% in 1995 to 38% in 2011 and recycling rates increased from 43% to 60% in 2011. Drivers behind these developments are for instance the country's high population density, which on the one hand makes landfilling a relatively expensive option (high land prices) and on the other hand allows for relatively cost-effective systems of waste collection, transport and processing. In addition, until 2011 a landfill tax over the past 15 years played a positive role in the

reduction of the amount of waste going to landfill – while it was abolished in 2011/2012, as some sort of compensation the number of waste types to which a landfill ban applies was increased.[602] For Sweden, landfilling rates dropped from 35% in 1995 to 1% in 2011, while incineration rates increased from 39% in 1995 to 51% in 2011 and recycling rates rose from 26% in 1995 to 48% in 2011.

5 Support to SMEs

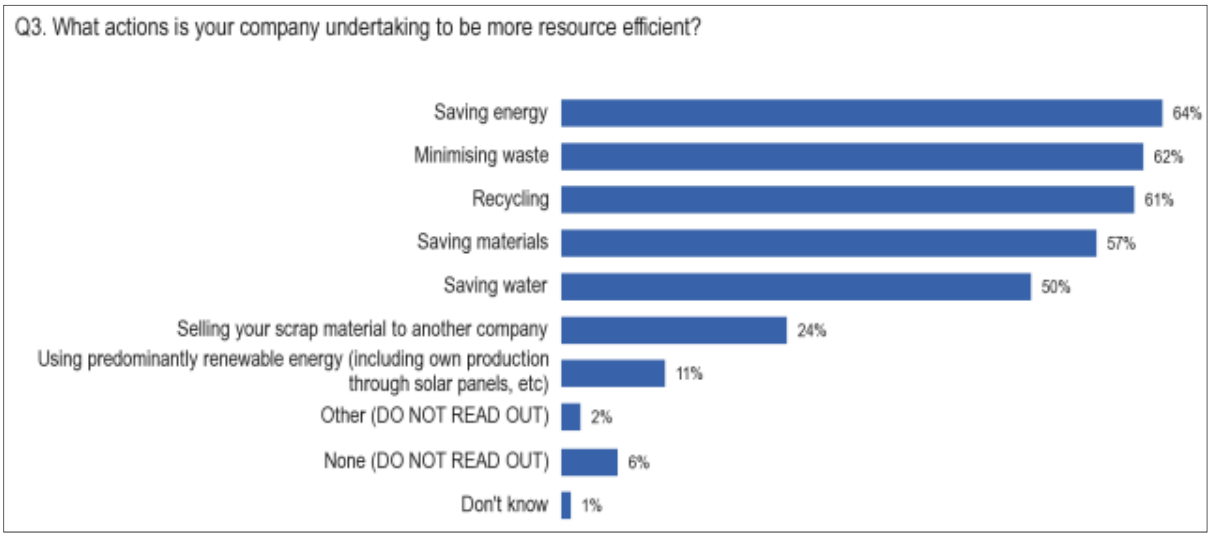
The EU's 23 million small- and medium-sized enterprises make up more than 99% of all businesses in the EU, providing two-thirds of all private sector jobs (around 90 million) and over 50% of the total value-added created by businesses. 90% of these SMEs are more specifically 'micro' enterprises, with fewer than 10 employees. They are therefore very important to engage in the resource efficiency agenda, as significant employers, and as the source of approximately 64% of industrial pollution in Europe. Policy tools (financing, capacity-building, and regulation) need to be specially designed for these enterprises that are usually too small to have dedicated staff scanning information for resource-efficiency news.

Government outreach to this diffuse and varied type of enterprise should aim to provide assistance that meets the needs of these companies, including information provision, promotion of good environmental management, market signals and financial incentives.[603]

A 2012 Eurobarometer survey on SMEs, resource efficiency and the green economy[604] identified that almost one-quarter of SMEs actively engage in actions to reduce their environmental impact (mainly by reducing energy consumption). Lack of expertise, lengthy approval procedures for new products and lack of consumer demand are the main obstacles that prevent SMEs from entering green markets.

The Figure below provides a list of the most popular resource efficiency activities undertaken by SMEs.

Figure 10: Eurobarometer survey responses, resource-efficiency activities by SMEs



The Europe2020 Industrial Policy Flagship Initiative[605], identifies that Member States can improve the business environment for SMEs by applying the "think small first" principle in relation to SMEs in the context of smart regulation (i.e. alleviating administrative burden by simplifying processes), and in simplifying support schemes, providing initiatives to support SMEs' competitiveness through access to eco-markets and eco-innovation, and cooperation between enterprises and internationalisation.

5.1 Main national policies / initiatives

Although no specific EU legislation relating to SME activities exists to be implemented by Member States, it has been recognised for some years that it is important to better integrate consideration of SME needs in EU environmental (and broader) policy formulation and implementation, and to put in place support activities for this substantial type of economic actor. For many EU Member States, SME activities have been on-going for a number of years, so here we focus primarily on activities taking place in 2011-12. For many Member States, there is a continuation of focus on environmental themes, particularly characterised as (eco-) innovation, promotion of environmental technologies, sustainable production, and with on-going focus in areas such as air pollution and waste management. The resource efficiency agenda also begins to be applied to this sector, often continuing historical environmental themes (air, water, waste, and energy) or (eco-) innovation.

Whilst the commitment to SMEs varies 'on the ground', there is frequently recognition of the need to support SMEs in strategic policies and initiatives. Below are some SME-related developments for 2011-2012 from a number of Member States, reflecting this overall recognition.

Belgium's three regions have introduced regional policy statements covering 2009-2014, with SMEs specifically mentioned by the Flanders[606] [607] and Walloon Regions[608]. The Walloon Region's 2009 'Marshall Plan 2 Green' seeks economic stimulus, with measures including the creation of a cluster, grants for SME sustainable initiatives, training and promotion of ecodesign.[609]

Bulgaria's National Strategy for the Development of SMEs in Bulgaria runs from 2007-2013. The overall goal of the strategy is to increase the effectiveness and potential of Bulgarian SMEs, particularly through investments in "green" high-tech industries and services, in new energy sources, and in environmental science and education, and others as highly productive identified sectors of the economy.[610] Since 2010, Bulgaria has been part of a joint programme (EUROSTARS) providing SMEs support on technology and innovation[611].

The Czech Republic adopted its Support for Small and Medium Enterprises Act in 2002, which includes instruments of state support for SMEs. Despite this, the 2011 National Reform Programme which supports economic growth based on research and innovation (R&I) and the low-carbon economy did not specifically target SMEs, leaving them out of an important area of innovation.[612]

Denmark's 2011 National Reform Programme report (of the Europe 2020 process) specifically mentions SME funding through a number of initiatives, supporting access to financing and globalisation, venture capital, and guarantee schemes.

In 2011, Estonia's Competitiveness Plan ('Estonia 2020') was approved, with environmental concerns and sustainable consumption the main driving forces for existing policies and also some policies under preparation. The 'Knowledge-based Strategy' (2007-2013) guides the development of entrepreneurship through creation and growth of new innovative enterprises; co-operation between companies and R&D institutions, technology and know-how transfer; technological renewal of enterprises and growth of their development capacity and productivity. The 'Enterprise Policy Plan' (2007-2013) is aimed at entrepreneurs, and has four main fields of activity: developing knowledge and skills, supporting investments, supporting internationalisation and developing the legal environment.[613]

The 2012 change of government in France has seen a shift in responsibility, e.g. policies on resource efficiency and eco-innovation were assigned to the Ministry of Productive Recovery and to the Ministry for SMEs, Innovation and the Digital Economy. Previously,

these were led by the Ministry of Economy, Industry and Employment; and the Ministry of Sustainable Development.[614] Also in 2012, the Strategic Committee for Eco-Industries (COSEI) produced its 'Ecotech 2012' policy document, guiding policy interventions in support of eco-industrial activities.[615] The national ETAP roadmap includes seven measures, most of which are supply-side oriented, with priorities in solid waste management, renewable energy generation, climate change mitigation technologies, fossil-fuel energy-efficient electricity generation and energy efficiency and conservation measures in the residential, commercial and industrial sectors.[616] French regions have also adopted initiatives in support of eco-innovation, such as the 'SME Plan' ("Plan PME") implemented by the Rhone-Alpes region.[617] The national government faces difficulties in identifying what is done at the regional level and there are no common guidelines regarding eco-innovation amongst regions or between regions and the national government.

In Germany, SMEs play a crucial role in the economy and are also key players for eco-innovation and resource efficiency.[618] In 2012, the Resource Efficiency Programme (ProgRess) was adopted[619], a programme for the sustainable use and conservation of natural resources and a central government response to increase its efforts to improve efficient resource use and to achieve the resource related goal put forward under the National Sustainability Strategy of doubling the raw abiotic material productivity by 2020 in comparison to 1994. ProgRess explicitly addresses SMEs, for their potential to improve their own resource efficiency and as innovators that can help increase German resource efficiency.

Despite Greece having a lower ranking in eco-innovation, the National Strategic Framework for Research and Innovation (NSFRI) anticipates that research will be primarily focused on selected priority areas, with 'environment' already being identified as a prominent sector, in line with the national strategic objective for Green Growth. Food and chemical industries are showed to be more active in promoting eco-innovative products and processes. Present policy priorities and strategic developments indicate the following emerging lead markets with a good potential for eco-innovation: the waste management sector (recycling, treatment, re-use), the green tourism industry, and 'green' banking services.[620]

In January 2011, Hungary produced the 'New Széchenyi Plan' as a strategy for the development of a green economy and providing a long-term financial framework that could help drive regional policy towards environmental objectives. The plan focuses on energy efficiency with operations for 'green' homes, refurbishment of prefabricated residential buildings, green SMEs, as well as the promotion of green education, green employment, awareness-raising, and green R&D activities. Despite fragmented efforts in eco-innovation, Hungary lacks an overarching strategic framework, and public support for eco-innovation remains limited. While eco-innovation is often mentioned in strategic policy documents as a component of a larger mainstream issue, such as, general innovation, science and technology policies, sustainable development and economic growth, it is not addressed in a concerted way.

Italy's SMEs have an increasing interest in sustainable products and services as they understand that eco-innovation can have both economic and environmental benefits. The past decade's significant eco-innovation growth trend has been stimulated rather by public finance, EU funding and EU R&D projects.[621] Many innovative projects start spontaneously in existing and new companies, both as a result of strict environmental legislation and increasing environmental awareness of consumers.

Luxembourg's activities in 2011 focused on simplification of administration as a means of reducing administrative burden. Two laws (on public aid and on promotion of research, development and innovation) provide state aids to green growth actions, in particular for SMEs. [622] [623]

Poland does not have a strategy or regulated support for SMEs. However, it does use data on compliance with environmental legislation that is collected at regional level to improve legislation as frequent non-compliance can prove to be due to incorrectly written legislation.[624]

Romania produced a Strategy for the development of SMEs in 2011[625], as this sector represents a development priority for the Government and measures to encourage and support entrepreneurial initiatives are being designed and implemented until 2013. To meet the objectives of increasing SME competitive capacity on the national and external market and promoting SME sustainable development, a set of priorities have been agreed. 'Encouraging innovative actions of SMEs and increasing their market competitiveness' includes measures promoting sustainable production and energy efficient consumption.

Slovenia's support to SMEs includes the 'Entrepreneurship for Young People' programme launched in 2010 aiming to promote innovation, creativity and the entrepreneurial spirit through education. The programme began to bring trained mentors into primary and secondary schools in 2011 accompanied by awareness-raising events. In 2012, a public tender was issued for the provision of training for in-company mentors to work with secondary school and tertiary education students from vocational programmes to promote innovation and skills that will equip individuals to become entrepreneurs. By 2012-2013, 7000 mentors are expected to be trained.[626]

In Slovakia, the National Agency for the Development of Small and Medium Enterprises (NADSME) aims to support the development and growth of SMEs and to improve their competitiveness. One of its key roles is the implementation of the European Environmental Compliance Assistance Programme for SMEs (ECAP).[627]

5.2 Financial support

A wide range of financial support tools are provided to SMEs by both state ministries or other bodies, and these include **loans and loan guarantees**, **grants and funds, subsidies, and venture capital.** Fiscal support is also provided **through tax reductions** in some cases**.** A number of countries also identify funding provided through **EU funds** such as **structural and cohesion funds**.

Activities funded can be for **general environmental protection** (such as improving environmental performance, reducing environmental impacts of products or production processes) or **eco-innovation**. Many initiatives seek to encourage the take-up of **environmental technologies**. Only Germany has developed a strong '**resource efficiency**' agenda for the activities it supports, whereas others also focus on specific environmental aspects relating to **energy efficiency**, **waste**, **agriculture**, **air**, and also **sustainable tourism**. A number of countries also have dedicated funding for **R&D**, **R&I**, the development of **clusters**, and also the **export** of SME products/services (thereby helping to 'globalise' or 'internationalise' the country's SMEs.

Notwithstanding the broad range of mechanisms made available to SMEs and efforts to simplify processes for them (see 'one-stop shops' efforts under Section 5.7), it appears that **efforts are needed to reduce complexity in applying for support especially as the limited capacity within SMEs is a barrier to accessing these funds**. Bulgarian SMEs do not apply for EU Fund financial support because of the bureaucratic application process.[628] German SMEs do not make use of loans due to the funding conditions linked to the funding programmes, notably the short duration or the high level of loan securities and of detailed business data demanded.[629] Despite France having a dense eco-innovation policy-support system at national and regional levels, covering all stages of the innovation cycle, this support system is fragmented and often deters potential beneficiaries from gaining access. Other barriers to the implementation of eco-

innovation for SMEs are that they do not necessarily have the internal capacity to implement the required changes. Luxembourg SMEs, on the other hand, have easy access to public support and its performance in effective assistance to SMEs is considered one of the best in the EU-27. Nonetheless, difficulties observed concern credit access due to opacity of information, and European funding being less designed for SMEs than in other countries.[630]

Below is a selection of details of the support mechanisms identified.

Countries providing **grants for R&D** include Belgium (the Walloon Region's WINNOMAT, the Brussels-Capital Region's direct subsidies for industrial R&D, and the Flanders Region's 'Sustainable Technology Development' facility and the Flemish agency for innovation provide funding), Finland (TEKES[631]), France ('ANR' ECOTECH programme[632], ADEME funding, and 'PREDIT'[633] and 'PREBAT'[634] programme on sustainable cities), Germany ('KMU-Innovativ'[635] provides funds for research on resource efficiency and energy efficiency technologies), , and Luxembourg (including for innovation processes, co-financing of R&D involving the launch of a new product/service or the development of new manufacturing or commercialisation processes, incentive schemes on applied research and pre-competitive development, and collaborative grants).

Grants are also available for a wide range of eco-innovation, resource efficiency, and environmental activities, too numerous to mention all in short detail. Some highlights follow. Belgium's Walloon Region's 'FIRST Enterprise Spin-out' programme aims to create **spin-outs** by funding an entrepreneurial person in a company with an idea outside the company's core business, thereby creating a new company. The Czech Republic provides SME funding in the areas of **recovery of environmental landscape functions**, improvement of water management infrastructure and air quality infrastructure, and waste management and **rehabilitation of historical ecological damage**.[636] The UK's 'Energy Entrepreneurs Fund' created in 2012 with a budget of up to 42 million EUR to 2015 will provide financial support for SMEs to **develop and demonstrate their ideas**, including getting support from experts on how to **bring their products to market**.[637] France offers **collaborative grants** for transport programmes or **circular economy programmes**.[638] Ireland's '**technical feasibility grants'** assist companies in undertaking a feasibility study to investigate the technical aspects of introducing or developing new or improved products, technologies, services or processes that are environmentally superior.[639] Slovenia's 'Enterprise Fund' encourages start-ups through co-financing of expenses, and in 2011 the Fund provided 7.3 million EUR in subsidies to 351 projects.[640]

Venture capital (VC) schemes also seek to draw in funding for SMEs. These have been introduced in a small number of countries: Belgium's 'Business Angels Network' is targeted at SMEs, with 'angels' (individuals or companies) investing between 25,000 and 250,000 EUR in new companies. [641] [642] Denmark's government signed an agreement with the pension sector on venture capital meaning that pension institutions will make a minimum of 670 million EUR available to entrepreneurs and SMEs as venture capital. It also created a public venture capital fund (Vaekstfonden) in 2009, which committed an additional 70 million EUR for venture capital investments in 2010–2011. France also has a number of VC initiatives.[643] Luxembourg has created a flexible legal framework for private equity and venture capital companies (SICAR).

Public guarantee funds are also offered by a number of countries: Belgium (the Walloon Region's 'FIRD'), Denmark (approximately 250 million EUR in loan guarantees has been provided to SMEs with high growth potential in recent years), France (the 'FOGIME' fund promotes SME investments in energy efficiency[644]), Luxembourg (integrated such funds into its legal framework which promotes research, development and innovation), and Slovenia (the 'Enterprise Fund' provided 62.5 million EUR for guarantees in 2011).[645]

Loans are made available to SMEs for different activities. Belgium's Brussels-Capital Region provides zero-interest loans for SMEs for **pre-competitive research**. Cyprus offers loans with favourable terms on **renewable energy** projects. Finland's loans go towards projects producing a marketable product or service or create a new business concept. These are **risk-bearing loans without a guarantee**.[646] The state's special financing company (Finnvera) gives **reduced-interest loans** for environmental investments, but these are conditional on the planned measures **going beyond regulatory requirements** and **the use of best available techniques**, and applications need to be certified by the competent environmental authority.[647] France offers loans and grants, for strategic industrial innovation projects[648], and the creation of innovating businesses[649]. Germany offers **preferential loans** for investing in activities to increase **energy and material efficiency**, whether with **interest-free initial periods** or with interest-free start up years and **favourable interest rates**. The Ministry for Environment, Land and the Sea (IMELS) has promoted a €600 million revolving loan fund at a rate of 0.5% to reduce CO_2 emissions, which can be accessed through the Deposits and Loans Bank. In the UK, the Energy Saving Trust (a non-profit organisation) provides **zero-interest small business loans** of up to 120,000 EUR for installation of **renewable energy technologies** or measures that **reduce energy consumption**. The 'Green Deal', a new 4 billion EUR government initiative, will provide loans for **energy efficient equipment** with **no down-payment** and with **payback tied to cost savings** obtained over the course of its operation.[650] Its 'Waste Prevention Loan Fund' supports enterprises in England to develop innovative, more resource-efficient ways of doing business, including **innovative business models** to **reduce the products and resources consumed**, and **increasing reuse, repair and recovery capacity**. Textiles, electrical products and furniture are the priority 'materials', but funding related to other materials will also be considered if significant environmental benefits are demonstrated. Loans of between 120,000 and 1.2 million EUR are available.[651]

Another fiscal support measure is **tax reductions for specific environmental activities**. At federal level, Belgium offers **tax credit for research** applying to patents and assets tending to promote the research and development of new products and advanced technologies which have no effects on the environment or aim at **reducing the negative effects on the environment**. Tax deductions are made on **R&D investments** and **patents acquisition**. Cyprus offers tax deductions on expenditure allocated to (environmental and broader) **innovation** and patent acquisition. The Czech Republic offers **tax reductions and reductions of social security contributions** to support SMEs in the area of **recycling**.[652] Italy has a tax exemption (55%) related to energy-efficiency measures/refurbishment of buildings; and on 'solidarity purchasing groups' (GAS), promoting a direct and exchange of goods between local producers and consumers.[653] Malta's 'Investment Aid Tax Credits Scheme' allows eligible enterprises to benefit from tax credits calculated as a percentage of the value of the investment project for qualifying expenditure, including the value of wage costs for jobs directly created by the initial investment project. Portuguese tradition has been to offer general incentive systems, which do not address specific industries, technologies or scientific fields. Therefore the bulk of funding is assigned to projects on the basis of their general eligibility and merits, and not from a thematic or sector perspective.[654]

Details were found for a number of countries in relation to EU funding sources, whether for **structural or cohesion funds**. Bulgaria has a low rate of absorption of EU funds: 25.55% for the period between 2007 and 2011.[655] Funds provided by the EU total 6.65 billion EUR and accounts 83.2% of the overall amount, whereas the remaining part of around 1.5 billion EUR should be covered by the state budget. Bulgarian co-financing of the Cohesion Fund amounts to 20%; however, this will be reduced to 15%. Cyprus has used structural funds for eco-innovation, complemented by public commitment to

support public spending in related **R&D research and implementation**, particularly in the area of **sustainable agriculture**. Nonetheless, eco-innovation policies and support mechanisms are rather fragmented with little attempt to unify different initiatives within a single framework. In Estonia, in 2011 the EU Regional Funds for entrepreneurship and SMEs were 5.7% of total allocation while the EU average was 9.5%, whereas the EU funds for business creation and development were 7.4% of EAFRD total allocation while the EU average was 2.1%. Greece has used structural funds to provide funding for eco-innovation in recent years, which has been complemented by public commitment to support public spending in related R&D research and implementation, particularly in **construction** and the primary sector. An estimated total of 4 billion EUR is due to be spent on actions related to innovation in the programming period 2007-2013.[656] Hungary's cohesion funds for eco-innovation has reached nearly 52 million EUR, and a further 941 million EUR have been planned for **environmental and sustainable infrastructure**, **energy efficiency** and **pollution control**.[657] By 2011, Malta's spending of structural funds for the period 2007-2013 has totalled 3 million EUR for environmental innovation, 15 million EUR in energy grants, 17 million EUR for the promotion of renewable energy sources in domestic buildings, and 10 million EUR in grants to promote sustainable tourism.[658] In Slovakia, SME support is provided under the OPE priority areas of **air protection** and **minimisation of adverse effects of climate change**, which focuses on the promotion of sustainable production patterns through the introduction of cost-effective **environmental management systems** and promotes the adoption and use of **pollution prevention technologies**. Overall, a substantial share of the direct assistance provided under OPE should be targeted at SMEs.[659]

In September 2012, the European Investment Fund (EIF), Estonia, Latvia and Lithuania created the Baltic Innovation Fund (BIF) with a goal to increase equity investments in enterprises within the area. R. Money will be invested into private equity and venture capital funds over the next four years to further developing equity investment into SMEs. The total volume of the fund is 100 million EU; the EIF is investing 40 million EUR alongside investments of 20 million EUR each from the national agencies of Estonia (KredEx), Latvia (LGA) and Lithuania (Invega). Grants are issued for energy audits, building expert evaluations and building designs of reconstruction work based on energy audit drafted from January 1st, 2007.

In Denmark, Finland, Italy, and the Netherlands, EU funds have been used for supporting SMEs. Denmark allocated the highest percentage of funding to SMEs – almost 25%.[660] Eco-innovation is largely promoted in Italy through EU funding (EU 7th Framework Programme, CIP-EcoInnovation, ERDF, LIFE+, the EuroTransBio initiative, and the European Investment Bank).[661] Finland has allocated 345 million EUR for the cohesion policy funding period 2007-2013 for entrepreneurship and to create new companies, especially SMEs.[662] In the Netherlands, current main sources of project based support for eco-innovation in SMEs are EU funds such as the CIP Eco-innovation and the 7th Framework Programme.[663]

5.3 Capacity-building, e.g. information and training

Capacity-building in the form of **bringing people together, to share ideas, to create clusters or networks** is supported by a number of countries. These activities most often have (eco-) innovation aims. Belgium's Walloon Region uses 'green clusters' to promote eco-innovation, with clusters including on reducing energy consumption in the building sector, on solid waste, on green buildings, on sustainable energy, and on 'green' products and services.[664] The Brussels-Capital Region runs an 'EcoBuild' cluster, promoting such buildings.[665] The Czech Republic's main innovation programme 'OPE' facilitates co-operation between **universities** and **businesses**.[666] Denmark promotes networks and partnerships through competence centres, clusters, science-technology

parks; through technology platforms and innovation; and through market intelligence and other forms of information-sharing. Its 'Netmatch' initiative is a partner of Enterprise Europe Network and develops and provides a number of services for the innovation networks to ensure optimum working conditions. It also aims to connect **researchers and vocational training institutions** with SMEs that do not have sufficient means to have their own development departments. France's 'Investments for the future' programme finances Institutes for Technological Research, which are interdisciplinary institutes bringing together **industrial and public research actors** to promote industrial or services development. IRTs cover all innovation stages, from demonstration to industrial prototypes.[667] The Orée association brings together businesses, local governments, corporate sector associations, education institutions and non-governmental organisations to carry out a **collective debate** regarding the best solutions in favour of an **integrated environmental management**.[668] Luxembourg's Clusters Programme includes one on eco-innovation, aiming to create and develop new and sustainable business opportunities through **collaborative R&D** and innovation projects. The cluster covers areas such as eco-construction and eco-materials, eco-design and eco-conception, the rational use of energy; and renewable energies. A new centre of innovating technology for sustainable building, NEOBUILD, was also created, aiming to strengthen the competitiveness of the sustainable building sector by proposing training, an active network and help with standardisation procedures. In the Netherlands, the 'Agentschap NL' supports knowledge networks between SMEs and **knowledge institutions**. In 2012, networks are supported in the areas of 'sustainable gluing', 'sustainable packaging' and 'natural fibre composite design'.[669] The UK has a number of **Knowledge Transfer Networks** (KTNs) contributing to eco-innovation[670], including online networks on environmental sustainability, chemistry innovation, materials and modern built environment[671]. Greece provides more general collaboration support through 'Start up Greece', **information, networking and collaboration space**, aimed at creating **a new generation of entrepreneurs**. In collaboration with communities of young entrepreneurs, it uses social media to bring together people**,** ideas, corporations, universities and other organisations, with a view to foster **creative partnerships and investment opportunities**.[672] Poland's 'EURESP' platform aims to improve the environmental performance of SMEs via activities including **creating working relationships** between European service providers and SMEs, to facilitate sharing of tools, knowledge and innovative work practices. Targeted sectors are food production, waste management and manufacture of building materials.[673]

Beyond activities listed in the section on 'one-stop shops', **information provision** activities range in the countries. Provision of **environment-related information** is most prevalent amongst the countries. Germany's initiatives 'Demea' (German Material Efficiency Agency) and 'VDI ZRE' (Centre for Resource Efficiency of the Association of German Engineers) are the country's main vehicles for providing information and training. Ireland's 'Green Start' is an information and advisory service assisting companies to meet and exceed regulatory requirements and improve efficiency through eco-efficiency assessments, site audits and technical advice.[674] Spain's 'Fundación Entorno' offers guidance for enterprises on a range of environmental issues, from conferences and publications to full-scale projects.[675] [676] The Netherlands has a dedicated **website** providing SMEs with environmental guidance. The UK has a website to build links between providers of funding for low carbon action and those who are seeking such funding; developed by one of its KTNs.[677] Portugal provides information on **going digital** through its 'PME Digital' initiative. It aims to ensure that SMEs become more competitive by encouraging the use of digital tools, allowing access to new markets, improving management and making relationships more efficient between customers and suppliers.[678] Another initiative, 'Energy efficiency in 100 SMEs', supports SMEs in adopting energy efficiency action, and includes a **road show** as part of an awareness-raising campaign and support for sustainable management.[679] Specifically on **waste**, the

UK's 'WRAP' advises and supports businesses in how to benefit from reducing waste, developing sustainable products and using resources in an efficient way. Its 'Carbon Trust' supports business to boost business returns by **cutting carbon emissions**, saving energy and commercialising low carbon technologies.[680] Estonia provides more general **start-up information** via a number of online information resources for entrepreneurs.[681] The UK also established the first **National Contact Point for the CIP Eco-Innovation Programme**, which will provide advice and individual assistance to support SMEs and improve the dissemination and exploitation of their project by bridging the gap between research and innovation, helping them to expand their businesses and raise their competitiveness in the world markets.[682]

Training is also provided by a number of countries, across a range of areas including and beyond the specifically **environmental**. Belgium's Brussels-Capital Region has a 'Brussels Enterprise Agency' offering free training and education services[683]; its Flanders Region provides training with a maximum of 2,500 EUR for SMEs through its 'KMO-portefeuille' initiative[684]; and its Walloon Region offers SMEs 'training cheques' of up to 15 EUR per hour per person[685]. Germany's 'Demea' and 'VDI ZRE' provide training. The Czech Republic's 'OPEI' supports the development of **vocational training schemes** for SMEs, and the provision of environmental expertise to SMEs is carried out through the **funding of training programmes**.[686] Denmark also provides tailored training courses for companies and entrepreneurs.[687] Estonia focuses a programme on **internationalisation** of SMEs products/services through its 'Export Revolution 2'. It aims to train the next generation of export sales managers for Estonia's global SMEs.[688] Slovakia's 'SIOV' organisation is responsible for encouraging development of the skills and activities necessary for **setting up and managing SMEs**, and it runs several **educational programmes in the areas of agriculture, forestry and rural development**.[689] The Environmental Fund provides funding as a subsidy or loan for environmental education and training in various environmental areas such as **air pollution** and **waste management**.[690]

5.4 Provision of environmental expertise to SMEs at low or no cost

Countries offer a number of services aiming to provide environmental expertise to SMEs at low or no cost. In some cases, funding is also provided for access to such services. One such support activity is **providing access to consulting services or consultants themselves**. Belgium's Flanders Region provides a consulting service to SMEs ('FINMIX'), where SMEs can present their project to a financial expert panel that will give specific advice. Germany's *lander* North Rhine-Westphalia's Efficiency Agency (EFA) runs a resource efficiency consulting programme, offering companies a 50% grant for consultancy services.[691] Ireland's 'Green Business Initiative' aims to help enterprises **save money and reduce their environmental impacts**, through a number of free services including guidance, web tools and actual site visit support.[692] Luxembourg provides funds to SME using external consulting in the areas of **environmental protection and the rational use of natural resources**. Malta's 'business advisor scheme' provides customised advisory services to encourage take-up of **innovative processes and techniques** including waste and energy management. This assistance covers the first ten hours of advisory services and co-finances subsequent hours of advice. Poland's 'EURESP' platform aims to improve SME environmental performance through a number of activities, including through environmental consultancy, a series of workshops and seminars to help them to reduce their environmental impact and save money.[693] Portugal supports SME eco-innovation through a project 'Energy efficiency in 100 SMEs', having an energy efficiency theme. Through a **road show** aiming to raise awareness on energy saving, a **"green team" of consultants** provide tools and expertise enabling reductions in business energy consumption business.[694] Slovakia's State Nature Conservancy (SNC) provides consulting services in **nature conservation**,

with particular emphasis on **Natura 2000 protected areas**.[695] SNC professionals provide information on protection restrictions, conservation objectives and site conditions, including digital mapping documents.[696]

A number of countries also provide **(eco-) innovation support** specifically. The Czech Republic's Agricultural Research Institute provides information on **agricultural innovation**, particularly on **water saving practices and energy efficiency in greenhouses**. Since 2010, Denmark's 'Green Labs' scheme supports test facilities where **companies can test and demonstrate environmentally friendly technologies**. The scheme targets private businesses and has a budget of approximately 5 million EUR over the period 2010–2012. Both Belgium's Flanders Region and France offer funds for strategic advice on **environment and innovation** (Flanders[697]) and eco-innovation (France[698]), covering 50-75% of costs, up to a limit of 10,000 EUR per year for innovation advice and 5,000 EUR per year for **internationalisation** and entrepreneurship for Belgium, and up to a limit of EUR 50,000 for France. At the regional level, France's Rhône-Alpes region supports **innovation initiatives** through its "Plan PME", spending 15 million EUR per year. It provides advice, tools and guidance, with a specific focus on environmental topics. 75% of the training is financed either by the region (65% of total funding), the European Regional Development Fund or other organisations. 'Plan PME' appears to be effective: SMEs seem satisfied and it has created an important **network** in the region.[699] Germany offers financial support via 'innovation vouchers' for qualified external consulting to foster innovation and efficiency aiming to improve the SME knowledge about methods and tools for successfully managing product and technology innovation and to exploit efficiency potentials in production processes. The vouchers cover half the costs of the consulting services.[700]

Some countries also offer general **help and advice on environmental issues**. Belgium's Walloon Region implemented a "facilitator" network that can provide free help and advice to SMEs wishing to invest in **renewable energy or energy savings projects**. The intervention can be specific to the sector or the technology.[701] Although not specific to SMEs, Italy's Energy Service Operator (GSE) launched a project 'Rinnova, verso il 2020' in October 2011. It provides an information area open to all (citizens, public administrations, businesses and industry professionals) to promote information on European, national and regional actions; industry studies; and best practices for citizens, associations, businesses and governments for the diffusion of renewable energy sources and energy efficiency.[702]

5.5 Project-based support

Projects are supported by countries across a range of activities, sometimes focusing on **specific environmental objectives**, or more generally **supporting eco-innovation**. Germany's KfW Environment Protection Programme grants up to EUR 10 million in loans for individual projects for investments in **general environmental protection measures**.[703] Cyprus supports SMEs and entrepreneurs through an EU Lifelong Learning Programme, including **project management in eco-innovation**. An example of a Danish project is provided in Box 3, helping SMEs to create jobs in energy efficiency building renovations. France provides grants through various sources, some of which focus on '**eco-industries**', and ADEME has a support programme (Eco-innovation for SMEs) and provides assistance for regional projects.[704] The Ile-de-France regional council provides funds to regional SMEs wishing to implement **eco-innovation or eco-design projects**.[705] Estonia's NeGOSE is a network for **Green Office Standardisation in the EU** that will run until end 2013. The project's aim is to create environmentally sound and healthy offices and raise the awareness and skills of the office staff.[706] Slovakia one of a number of Member States that is part of the GECKOS project, aiming to deliver

environmental services in three main sectors: **soil management**, **waste management** and **production and manufacturing of metals**. In Slovakia, GECKOS builds on the use of knowledge of **environmental legislation and standards** with the aim to gain experience, which will be used in the further development of the counselling activities provided by NADSME.[707] Portugal takes a broader approach through its Energy and Environment Voucher Programme, aiming to support use of services such as **consulting**, **studies and assessments**, **energy and environmental audits**, **technical assistance and testing**.[708] Cohesion Funds are also used to promote individual projects to finance investments in **general environmental protection measures** or **resource efficiency**, although this is now being revised.

Two countries provide **cluster development support**: Finland recognises that SMEs rely to a large extent on external support and relationships, so participation in clusters can be important to their success. Its SITRA initiative supports the **development of environmental SME clusters**, which identifies target SMEs through a **mapping exercise**, identifying the most innovative environmental ones, which form the base for the networks with other SMEs, **universities** and other organisations. Through these clusters and SITRA funding, it is anticipated that Finnish SMEs will be able use internationalise their environmental know-how.[709] Italy's Techfood EU-Asia project stimulates **technological and business collaboration** in food processing and packaging between SMEs from Italy, Hungary, Slovenia and China, Mongolia and Vietnam. The project is designed to **strengthen mutual trade and investment flows** between those countries.[710]

Reduction of SME ecological footprints is supported by two countries: Estonia's 'EcoTips 2.0' project does so through a training curriculum and educational tool for trainers from vocational schools, institutions and other organisations working with SMEs from different sectors. 'EcoTips' is a software programme providing advice and resources for better environmental management.[711] Since 2010, its Fund for Environmental Technological Development (supported by **EU structural funds)** offers to help businesses reduce their **environmental footprint**.

Two countries **support others helping SMEs**: The Czech Republic's Innovation Programme 'OPEI' is one of the main funding sources for projects, and it carried out a study analysing the need and use of environmental consultancy and consultants in the country. The aim of the study was to describe the state of **environmental consulting** in the Czech Republic and identify future needs.[712] Greece's 'Development of Human Resources' programme provides funding to industry chambers, business associations, academic institutions and non-profit organisations to **design and implement training courses for SMEs and entrepreneurs**.[713]

Another two countries support **idea development**, particularly relating to **applied research**: Luxembourg's Cité of sciences, research and innovation of Belval opened a centre of **applied research** called "La maison de l'innovation" in 2012. The centre is closely collaborating with the new **SME incubator** that welcomed start-ups in 2012.[714] The government also created the enterprise and innovation centre 'Ecostart' to diversify the range of **support services** on offer to innovative businesses. Its mission is to support promoters of innovative projects at the idea stage and to provide on-going assistance up to the start-up phase.[715] Malta's Council for Science and Technology (MSCT) and Malta Enterprise both coordinate various research programmes related to the environment. The main objective of these collaborations is to bridge the existing gap between research and industry, focusing on **applied research**.[716]

Box 3: Danish support to small businesses for energy efficiency renovations

Denmark's "Green Business Growth in SMEs" project in the region of Southern Denmark is successfully creating new jobs by helping small businesses undertake energy efficiency renovations in residential and office buildings. The project was launched in July 2009 and targets small businesses and in particular the master craftsmen who are being retrained in the techniques of energy-saving renovation. The project takes its inspiration from the EU's energy efficiency Directive which encourages public authorities and private business to focus on measures to aid energy efficiency and to help achieve the EU's goal of three million new green jobs by 2020.

Green Business Growth is a public-private partnership between three municipalities and fourteen private partners, covering businesses involved with production, consultancy, entrepreneurship, finance and education. The local initiative has targeted the energy efficiency of single family detached homes by deploying energy concepts and new business models which support SMEs wishing to work in the energy renovation sector. SMEs showing an interest are offered a full support package designed to provide them with the required skill sets for undertaking energy renovation and the marketing of their services.

The project has targeted the creation of 300 new, green jobs over the period of 2010-2013 within businesses promoting energy efficiency in existing buildings. Ultimately the SMEs should be capable of developing their own business strategy including energy efficiency programmes and products aimed at customers covering private households, companies and public buildings. By the end of 2011, some 120 master craftsmen were to have been trained in energy renovation and an estimated 90 new green jobs created in the municipalities concerned. The project total cost is 1.5 million EUR, with an EC contribution of 768,000 EUR.

Source: DG Regio.Inforegio. Developing green master craftsmen to save energy and generate jobs. http://ec.europa.eu/regional_policy/projects/stories/details_new.cfm?pay=DK&the=72&sto=2516&lan=7&region=ALL&obj=ALL&per=2&defL=EN.

5.6 Assistance on environmental management systems

Many countries provide such support on environmental management systems (EMS), often specifically relating to the EU's Environmental Management and Audit Scheme (EMAS). In the Czech Republic, development and maintenance of EMSs for SMEs is supported under its Enterprise and Innovation programme (OPEI). Estonia's 'EMAS Easy MOVE-it!' project applies EMAS cluster certification to regional tourist products or services. They form a competitive tourism service package, linking cultural, economic, ecological and social aspects with their respective added value. Spain's Catalonia Region, created an **EMAS Club** promoting registration and offering a direct communications link to local and regional governments on business and environment matters.[717] Spanish enterprises have been using EMAS's 'Easy' methodology to simplify registration and have received assistance in maintaining it. Austria aimed to encourage SMEs to develop EMSs by waiving administrative fines for EMAS-registered businesses if non-compliance was detect during an internal audit. It also requires the existence of an EMS as an important criterion in public procurement decisions.[718] However, only about 11% of SMEs had an EMS in 2011, considerably below the EU-average of 25%.[719] Poland has introduced incentives for enterprises to register with EMAS, and these include free training sessions and counselling organised by the Ministry of Environment.[720] Portugal supports its SMEs in promoting registration to EMAS through a programme introduced in 2010, run by an independent institute (ISQ); 'ECO-SME' which is a Leonardo da Vinci multilateral-transfer and innovation project developed under the EU's Lifelong Learning Programme.[721] It addresses an important challenge SMEs face: the

difficulties in undertaking continuous training, usually due to lack of time and support. It also developed an EMAS training course, using an e-learning tool.

Some countries take a **broader approach to EMSs**, supporting them generally or **supporting ISO-14001 as well as EMAS**. Cyprus's Chamber of Commerce and Industry provides training programmes to SMEs in the areas of environmental management and quality systems. In Finland, activities supporting SMEs in developing their environmental management skills have aimed to strengthen employment, improve employee skills, expand the regional industrial base, and improve the competitiveness of SMEs either nationally or internationally. Most of these projects have been partly funded by **Structural Funds**.[722] Germany supports the introduction and maintenance of EMSs through various projects and actions. A simpler and tailor-made EMS 'Ökoprofit' has been promoted by providing consulting for SMEs for its introduction, to reduce environmental impacts and save costs. It has been successfully introduced in SMEs in Munich, Hamburg and other cities.[723] In Estonia, **t**he number of EMAS-registered organisations is quite low, but there is more solid growth in ISO14001 certification. A 2010 study has shown that the public sector is not interested in implementing environmental management systems. Yet, a project running to 2020, the national action plan for environmental management systems aim to promote the use and implementation of environmental management tools (environmental management systems - EMAS, ISO 14001, ecolabels, green public procurement, green office etc.).[724] France's Rhône-Alpes region provides assistance to the implementation of eco-innovation by offering training on strategy and environmental management through its 'Plan PME'.[725] Nationally, the public agency, ADEME, provides funding to SMEs for registration to EMSs.[726] Ireland's 'Green Plus' programme helps companies to develop products and services so that they comply with specific green procurement requirements, such as through implementation of an accredited EMS, improvements in products or processes or applying for eco-labels.[727] Malta's Tourism Authority set up an **eco-certification scheme** encouraging hotels to deliver a better product to meet the demand of increasingly environmentally conscious tourists, and the newly-formed Malta Competition and Consumer Affairs Authority is another step to strengthen the institutional capability for the promotion of environmental certification through EMAS and ISO14001[728]. The Netherlands' 'Stichting Stimular' supports SMEs wanting to obtain ISO14001 certification.

In Slovakia, public funds are provided to SMEs to cover mainly external costs associated with implementation of ISO14001.[729] The Slovak authorities also issue permits with longer validity periods and with reduced reporting requirements to EMAS-certified companies.[730] In Spain's Basque Country, systems like 'Ekoscan' are promoted to simplify the introduction of EMSs.[731]

5.7 Structural support such as "one stop shops"

Much effort has been made by most countries to **reduce administrative burden for SMEs**, whether in relation to **uniting various permitting procedures or legislation compliance reporting into one, often electronic, online procedure**. Belgium's Brussels-Capital Region introduced a 'without any hassle' (*Sans tracas*) test aiming to introduce administrative simplification and e-government projects.[732] The Czech Republic's new waste act will promote the use of **electronic registration**[733], and similar efforts have been made in the new air quality law. The government also developed an online platform ('Czech POINTS') aiming to simplify and accelerate administrative processes for businesses and individuals (www.czechpoint.cz/web). Italy has also been simplifying environmental permitting procedures, which has reduced the administrative burden on SMEs.[734] In the Netherlands, most permits have been integrated into a single one ('Omgevingsvergunning'), which can be applied for digitally. Furthermore, many

activities that used to need an environmental permit are now covered by general rules ('Activiteitenbesluit'), and for these activities an environmental permit (i.e., the specific environmental part of the Omgevingsvergunning) is no longer required. Poland's Chief Inspectorate for Environmental Protection has prepared a webpage for SMEs containing information on environmental requirements, and a new system of control based on a risk scale that is used to establish inspection frequency. SMEs tend to have very little environmental impact and are only inspected if complaints occur. Environmental management systems within the enterprise also influence the category and consequently the inspection frequency.

Some countries have created **central information sources**, to simplify access to information on legislation that SMEs must comply with. In the UK, the three country environmental regulators created a web-based tool 'NetRegs' (becoming 'Business Link' and 'Business Gateway' since 2011), providing free environmental guidance to SMEs. **Sector guidelines** were tailored to provide specific guidance on environmental legislation and good practices applicable to the processes in each sector, but distinguishing between the two. Management guidelines contained practical explanations of issues such as packaging, waste, clean air and effluent management which are relevant to all businesses regardless of their industry sector.[735] France has tried to overcome one of the weaknesses of its support system, its fragmentation; which often deters potential beneficiaries from accessing it. Structural supports exist in the **creation of clusters**.[736] [737] An initiative ('Investments for the future'), supports the creation of institutes of excellence, bringing together higher education institutions, public and private applied research laboratories, businesses and demonstration infrastructure on renewable energy and innovative platforms.[738] Another initiative (DATAR) also implements clusters and centres of excellence.[739] Germany's 'Demea' and 'VDI ZRE' bodies are its main vehicles in providing information, as well as simplified administrative procedures or information on environmental issues. Through the support programmes and pooling material efficiency consultancy for SMEs, according to first evaluations of the impacts, on average material savings of more than 25% of the material costs could have been realised.[740] Ireland created an environmental information portal (Envirocentre.ie), to enhance environmental awareness and improve performance in Irish industry, including information on legislation, **waste management** and **recycling**, **eco-design** and **carbon management**.[741] Spain's environmental information website (lineambiental.es) provides information on environmental projects, legislation, administrative procedures, events, and publications.

A recent study of economic benefits of the UK's NetRegs service concluded that it enabled British SMEs to save an estimated 71.3million EUR each year, on average 3,200 EUR per business.[742]

A number of countries are also **applying the "think small first" principle** when preparing legislation. This is the case in Belgium where the federal government **consulted stakeholders** when drafting legislation on a "road transport package", aiming to develop national legislation on transport requiring a minimum of paperwork. Belgium's Brussels-Capital Region's 'without any hassle' (*Sans tracas*) test aims at assessing the impact of new regulations from an administrative burden perspective and to introduce administrative simplification. The Czech Republic has set a national target on reducing administrative burden, corresponding to a 25% reduction by 2012 compared to 2005.[743] A review of national environmental legislation in 2011 identified 96 specific proposals on the elimination of unnecessary or inefficient requirements in regulations exceeding EU requirements and having no clear justification. Luxembourg has developed a similar activity through its Department of Administrative Simplification. Since February 2012, nearly 70 documents have been evaluated following guidance on administrative simplification to avoid adding unnecessary bureaucracy in the legislative process.[744]

In some countries, **simplification of business creation procedures** has been introduced. Cyprus established the **Department of One-Stop-Shop** for this purpose, and it provides information and administrative support to new investors. While the focus is broader, some of this guidance targets SMEs active in the environmental domain. Slovakia has various centres and contact points (RPICs, BICs, and CPKs) operating **in almost all regions to promote the development of SMEs**. These centres provide support related to administrative aspects of SMEs.[745] Slovenia took steps to reduce the administrative burden faced by SMEs, setting up a website providing information on SME regulations[746] and **gathering suggestions** on how to simplify and reduce administrative burdens. A number of actions were undertaken as a result of this 'consultation' exercise.

6 Air quality

EU air quality legislation has existed since the 1970s, aiming to improve quality to reduce the negative effects on human health and the environment. Much effort has been made to reduce emissions from stationary sources (such as industrial installations and products) as well as mobile sources (such as vehicles and ships). However, despite this long-standing attention to air quality issues, this area of policy still lacks a long-term framework and is still little integrated into climate and energy related long-term visions. The Resource Efficiency Roadmap[747] includes a section on air, identifying continuing human health impacts concerns from air pollution despite actions taken to improve air quality. The Roadmap highlights the need for better implementation of existing air quality legislation, and the need to integrate air quality considerations particularly into agricultural policy and the transport sector.

On transport, it is recognised that 'Euro standards' for vehicles have not helped to meet nitrogen dioxide ($NO_{2)}$ emissions levels set in EU legislation, despite their having contributed to more general air quality improvements.[748] Increasing transport of goods also results in poor air quality, and freight is one of the main causes of high NO_2 levels. Increased shipping has dampened reductions in sulphur oxides (SO_x) emissions.

The Resource Efficiency Roadmap's 2020 milestone on air is for EU interim air quality standards to have been met, including in urban hot spots, and for those standards to have been updated and additional measures defined to close the gap on the original goal of air quality levels that do not cause significant damage to human health and the environment. A comprehensive review of air pollution policies is to be undertaken in 2013, and a mid- to long-term strategy is to be proposed, to put in a place the long-term framework needed to support further efforts by Member States in tackling a persistent problem despite decreasing pollutant emissions in some areas and countries.

Despite substantial decreases in emissions of some pollutants, concentrations of air pollutants are still too high and air quality problems continue. According to the EEA, air quality standard levels are exceeded especially urban areas, where a significant proportion of the EU population lives. There are regular exceedances of levels of ozone, nitrogen dioxide and particulate matter (PM) pollution, posing serious health risks.[749]

Outdoor air quality has recently been identified as a 'top level risk' for public health, in one of the international assessments undertaken in two decades.[750] 430,000 premature deaths and more than 7 million years of healthy life lost can be attributed in Western, Central and Eastern Europe in 2010 due to exposure to fine particulate matter ($PM_{2.5}$). Substantial shifts in the burden of disease from premature mortality to morbidity (the relative incidence of a particular disease in a specific locality) and disability is likely to result in heavier health care costs and productivity losses.

The main sources of air pollutants from human activities are the burning of fossil fuels in electricity generation, transport, industry and households; industrial processes and solvent use, for example in chemical and mineral industries; agriculture; and waste treatment.[751]

6.1 Overall review of progress at EU level

The main pieces of legislation considered in this environmental policy review are the Air Quality Directive[752] (AQD) and the National Emission Ceilings Directive[753] (NECD). The AQD sets limit values and some exposure-related objectives for pollutants affecting ambient air quality: dioxide (SO_2), nitrogen dioxide (NO_2), nitrogen oxides ($N0_x$), particulate matter (PM_{10}, $PM_{2.5}$), lead (Pb), benzene (C_6H_6), carbon monoxide (CO), and ozone (O_3). Member States were to have transposed the legislation by 2010. The NEC sets upper limits for each Member State for four pollutants responsible for acidification,

eutrophication and ground-level ozone pollution: sulphur dioxide (SO_2), nitrogen oxides (NO_x), volatile organic compounds (VOCs) and ammonia (NH_3). It also is the EU's implementation tool of the Convention on Long-Range Transboundary Air Pollution (the 'Gothenburg protocol'). Revised Gothenburg protocol pollutant reduction levels per country were agreed in 2012, to be met by 2020. Under NEC, Member States are to have prepared national programmes by 2002 and revised them by 2006, to meet 2010 and future limit levels. In relation to the Air Quality Directive pollutants, 12 Member States exceeded their respective NO_x ceilings according to early analysis of official 2010 data, and in 2011 seven of these still show exceedances for NO_x and some of the other pollutants: Austria, Belgium, France, Germany, Ireland, Spain and Luxembourg exceeded NO_x ceilings, while Germany also exceeded NMVOC and NH_3 ceilings (as it also did in 2010), Spain also exceeded NH_3 ceilings, and Finland only exceeded NH_3 ceilings.[754]

In addition to difficulties in respecting NO_x ceilings, similar difficulties have been identified for particulates of both sizes, PM_{10} and $PM_{2.5}$.

For those countries still exceeding NO_x ceilings, vehicular traffic is the most often-cited reason for exceedances. Belgium has reduced emissions by 25% between 2005 and 2010[755], reflecting efforts involving industrial combustion and, to a lesser degree, mobile sources. However, NO_2 concentrations are not decreasing in the same way mainly due to emissions in the road transport sector – real world diesel emissions are higher than emission standards and there is a high and increasing share of diesel-fuelled cars in the Belgian vehicle fleet. In France, road transport accounted for 52% of NO_x emissions in 2010, and although emissions fell by 30% between 2005-11, this did not help France to reduce enough to respect its ceiling. For NO_2 specifically, emissions seem to have decreased by only 9%, so significant efforts are needed to reach its 2020 ceiling.[756] Germany has major problems in achieving its NOx ceiling and is currently 26% above the ceiling, also requiring effective measures and actions.[757] In Ireland, despite benefitting from a clean flow of air from the Atlantic and there being few large cities or heavy industrial installations, NO2 levels in 2011 in the larger cities of Dublin and Cork have exceeded annual limit values, both due to traffic.[758] In 2011, Spain's NO_x exceedances were due to NO_2 exceedances in some of the main metropolitan areas: eight zones exceeded annual limit values (compared to nine zones in 2010) and three zones showed rates over the hourly limit value (compared to one in 2010).[759] In Luxembourg, although efforts to reduce emissions from industrial combustion and, to a lesser degree, mobile sources were made, NO_X emissions have decreased by only 7% between 2005 and 2010. NO_2 concentration appear to have increased from 2005-10 in Luxembourg city centre, mainly due to automobile traffic, while it is stable or slightly decreasing in other cantons.[760]

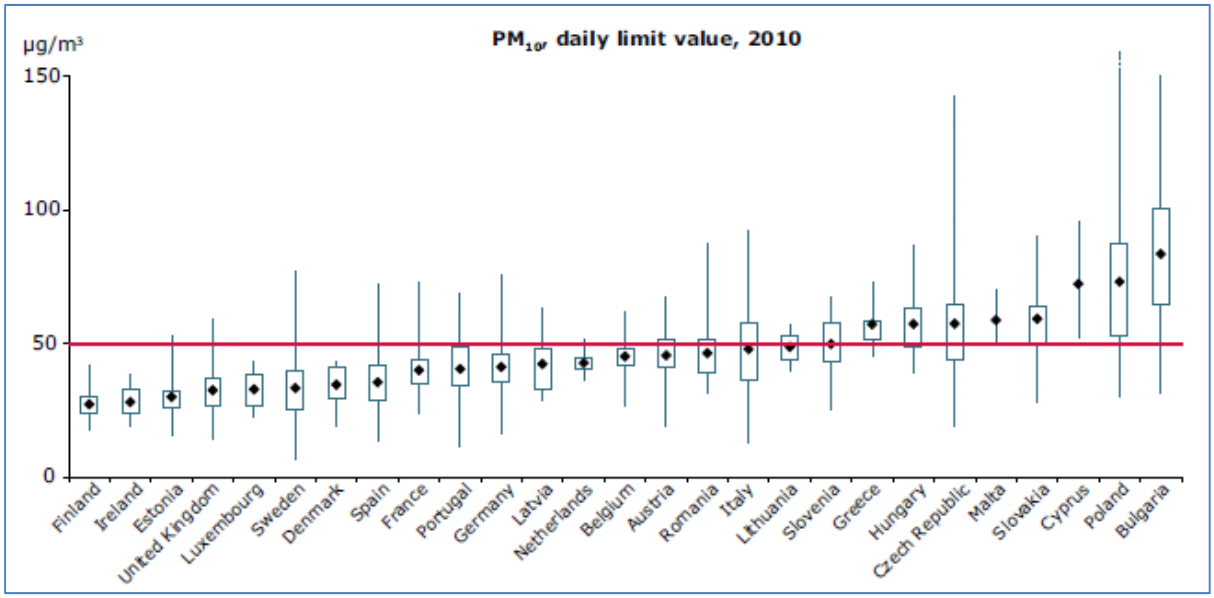
Germany was the only country to have exceeded its NMVOC ceiling in 2011, which it did by 6%.[761] Efforts will certainly need to focus on the transport sector, as it accounts for more than half of total NOx emissions and the majority of NMVOC emissions. [762] Three Member States exceeded NH_3 ceilings in 2011: Finland, Germany and Spain. Of these three, Finland's exceedances are the most significant (at 20.4%, compared to 7.8% for Spain and 2.4% for Germany[763]), and the Finnish Government recognizes that meeting the ceiling will pose a challenge.[764]

In relation to **particulate matter**, the AQD has the following target/limit values:

- PM_{10}: yearly average of 40µg/m³ for a calendar year; daily average of 50µg/m³, not to be exceeded more than 35 times a calendar year.
- $PM_{2.5}$: yearly average of 25 µg/m³ for a calendar year (target value entered into force on 1st January 2010; limit value enters into force on 1st January 2015).

For **PM_{10}**, in 2010 only 4 Member States recorded no exceedances - Denmark, Finland, Ireland and Luxembourg – meaning that the great majority (23) exceeded the daily limit value at one or more air quality monitoring stations (see Figure below showing exceedances of the daily limit value in 2010). The annual limit value was exceeded most often across various monitoring stations in Bulgaria, Greece, Italy, Poland, and Slovakia; and in cities in Latvia, Lithuania and Sweden, and in London in the UK.[765] Although Ireland recorded no exceedances in 2010, levels were highest at traffic-influenced sites in cities and in large towns due to burning of coal and other solid fuel (additional to traffic emissions). Levels of PM_{10} have remained stable during the last five years with a decreasing trend emerging in larger cities and towns, and this is likely due to cleaner vehicles.[766]

Figure 11: Attainment situation for PM_{10}, 2010[767]



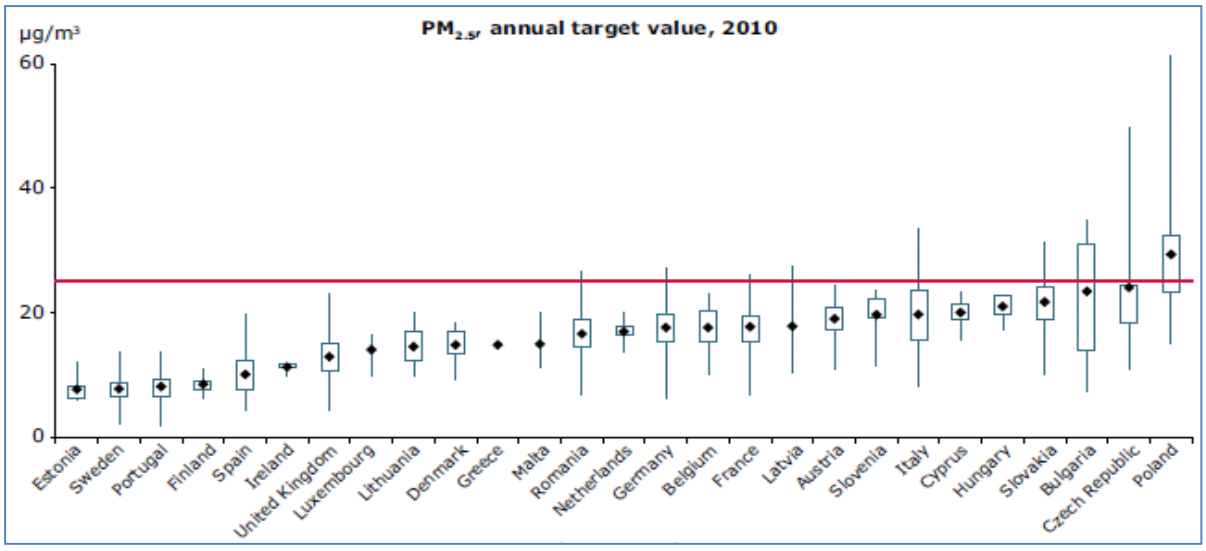
For most countries, exceedances of limit values in urban areas are usually due to traffic levels, as is the case for the Belgian Brussels-Capital region (with 24 to 87 days of concentrations higher than 50µg/$m^{3,}$ depending on the stations). For Estonia, in Tallinn and Kohtla-Järve where limit values are often exceeded, the main sources of the particles are fuel burning in vehicle engines, especially diesel; road abrasion; automobile tyre and brake wear and also some construction works.[768] In Italy, there was a 12% increase in monitoring stations registering exceedances (at 67% of stations in 2011, compared to 42% in 2010). Furthermore, in addition to the increasing number of stations with registered exceedances, the number of days of exceeding emissions is also increasing.[769] In Germany, around 20% of all monitoring stations recorded more than 35 days with exceedances, it is mainly the traffic-oriented monitoring stations that record such exceedance.[770] Luxembourg's exceedances were due to urban traffic in Luxembourg City centre, and to industry in one of the suburbs where exceedances occurred.[771] In the Netherlands, in 2011 the daily average for PM_{10} concentrations was not exceeded more than 35 times, except for a few locations. Thanks to the derogation that applied until 11 June 2011 there was no exceedance of the limit value at all.[772]

In Portugal, Lisbon's Avenida da Liberdade monitoring station is the most emblematic case where exceedances occurred above the 35 times limit since 200[773]. Portugal[774], like Belgium[775], is one of the Member States having been taken to court by the European Commission for failure to comply with limit values.

Slovenia's average annual concentrations have reduced below limit values; however, daily concentrations at a number of locations were exceeded in 2011 and 2012.[776] The pollution sources are primarily road transport, in particular in urban areas, end-use energy consumption (heating) and industrial sources (thermal power plants), as well as road salting in winter. In 2011, the daily average was exceeded on more than 35 days in 13 of 22 measuring stations, with the highest number of days of exceedances in the capital Ljubljana (95 times). The exceedances of daily limit values have been consistent and permanent, being recorded in 4 out of 6 zones and/or agglomerations in 6 out of 7 reporting years (since 2005). In the UK, days of moderate (65-96 µg/m^3) or higher (97-130 µg/m^3 or more) air pollution from PM_{10} declined from a peak of 43 days in 1993 to 3 days in 2010.[777] For Austria, despite substantial progress in reducing emissions, especially during the 1980s, the limit value for the PM_{10} daily mean was exceeded in several provincial capitals and small towns in recent years. Salzburg is the only larger Austrian town with levels below the limit.[778] The sources mainly responsible for high PM_{10} levels include road transport, residential heating using solid fuels, the industrial sector and the building industry, as well as agriculture in rural areas and, to some extent, long distance transport. Cyprus' PM_{10} exceedances are due to a mixture of natural sources (sea spray), transboundary pollution (i.e. Sahara dust storms) and anthropogenic sources, as well as traffic, central heating and industrial emissions.[779]

For **$PM_{2.5}$**, 9 Member States had exceedances in 2010 (Bulgaria, Czech Republic, France, Germany, Italy, Latvia, Poland, Romania and Slovakia). Extreme exceedances were registered at particular sights in the Czech Republic and Poland, with annual mean concentrations near or above two times the target value. The Figure below is based on measurements at fixed sampling points and does not reflect subtraction allowed in the AQD for contributions from natural sources (such as volcanic eruptions, seismic activities, geothermal activities, high-wind events or the atmospheric re-suspension or transport of natural particles from dry regions and sea spray, as is the case for Cyprus and Portugal) and winter road sanding/salting when limits are exceeded.[780]

Figure 12: Attainment situation for $PM_{2.5}$, 2010[781]



Some countries identify different problems with meeting limit values. Beyond Bulgaria's increasing dependence on solid fuels for household heating and transport, its high fine particle concentrations are also due to municipalities' lack of organisational capacity in their relatively low level of management or control from higher administrative levels.

This results in streets that are not regularly cleaned and construction sites that are not managed properly, hence higher levels of particles in the air.[782]

6.2 Issues needing attention

The 2013 review of air quality legislation was planned from 2010, when it was decided to delay any further legislative revisions as some Member States were struggling to meet existing limit values and as 'target fatigue' became evident amongst Member States when questions on such revisions were raised.

As stated in the introductory section of this chapter, the Resource Efficiency Roadmap identifies the need to better integrate air quality considerations into the agriculture and transport sectors. As we see below, the activities of various sectors plays a key role in the difficulties Member States are having in meeting limit values set in legislation.

Before we look at specific issues needed attention, we provide details on some individual Member State situations as a broader backdrop. For Austria, diesel vehicles are the most significant source of $NO_{x,}$ but EU legislation for mobile sources ('Euro standards') has failed to deliver significant reductions in NO_x emissions for diesel-fuelled vehicles.[783] For the Czech Republic significant funds were invested in the reduction of air emissions in the 1990s, mainly from large power plants.[784] Prior to that, air quality in some regions had been ranked among the worst in the world (especially for sulphur dioxide and particulate matter). However, the growth of industry and increase in traffic after the year 2000 has caused air quality to deteriorate once more. Currently, the main air pollution problems are pollution from suspended particulate matter, surface ozone, polycyclic aromatic hydrocarbons (PAH) and NO_2. For Finland, most air pollution originates from energy production and traffic, but the breakdown of sources varies for different kinds of emissions. As a whole, most airborne particles are derived from energy production, but in built-up areas road traffic is the most significant source. Greece's urban air pollution stems mainly from transport and central heating systems. The major challenges of transport in urban areas are the rising number of vehicles and subsequent traffic congestion, and the increased average age of the vehicles. Air quality problems from industrial sources mainly concern areas with thermo-electrical power stations and industrial units located close to residential areas.[785]

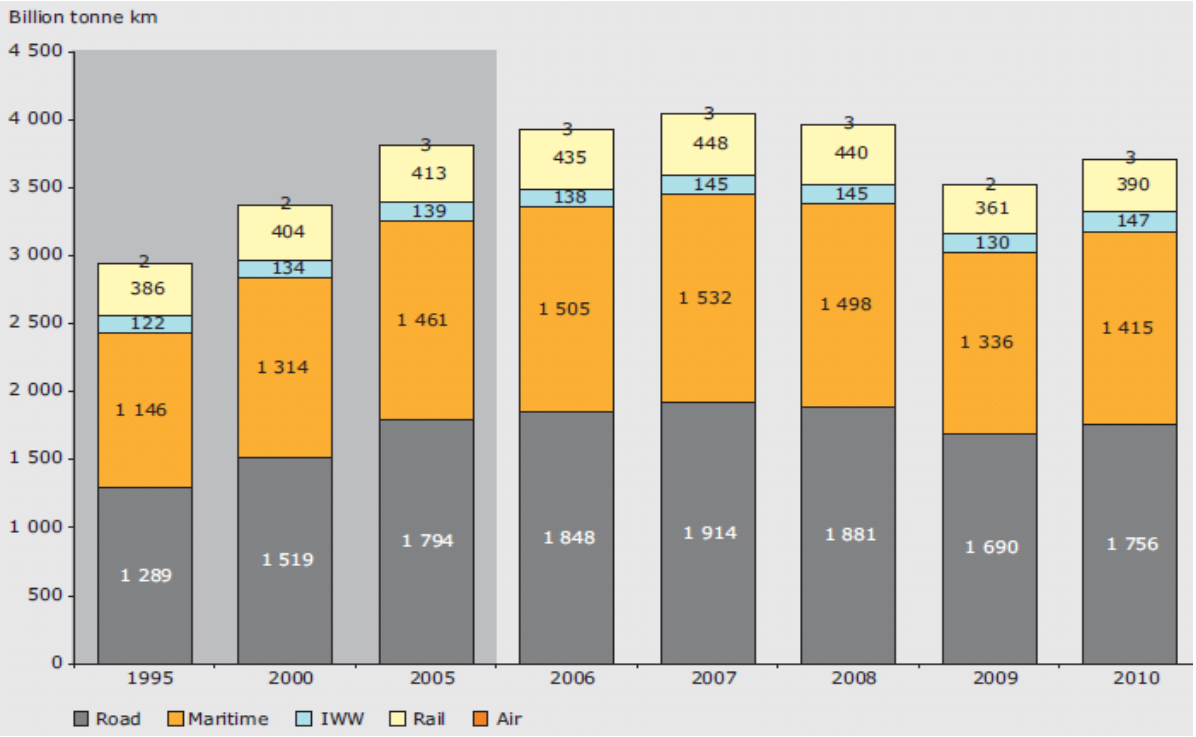
Possibly the most severe case of non-implementation of legislation is that of Poland, which was taken to court by the European Commission in 2011 for failure to notify on the transposition of the Ambient Air Quality Directive; the European Court of Justice imposed penalty payments of over 71,000 EUR per day as a result. Poland needs to make additional efforts in transposing the related Industrial Emissions Directive as well.[786]

As transport is identified as a significant source of air pollutant emissions, often still receiving too little policy attention and where important integration between air quality and climate change policies has still to be made, we briefly look at this issue in more detail. The two Figures below provide an overview of transport volume – for freight (Figure 13) and passenger transport (

Figure 14). Both freight and passenger transport is dominated by road travel, although maritime transport is increasing considerably. Freight levels increased annually between 2005 and 2007, reduced in 2008 and more considerably in 2009 (when the economic crisis hit), then rose again in 2010. In 1995 and 2010, road transport represented just under 50% of total freight transport, hence modal shift away from road has not occurred. For passenger transport, road dominates more considerably, representing 77% in both 1995 and 2010. Road passenger transport has risen consistently between 2005 and 2009, before dipping very slightly in 2010.

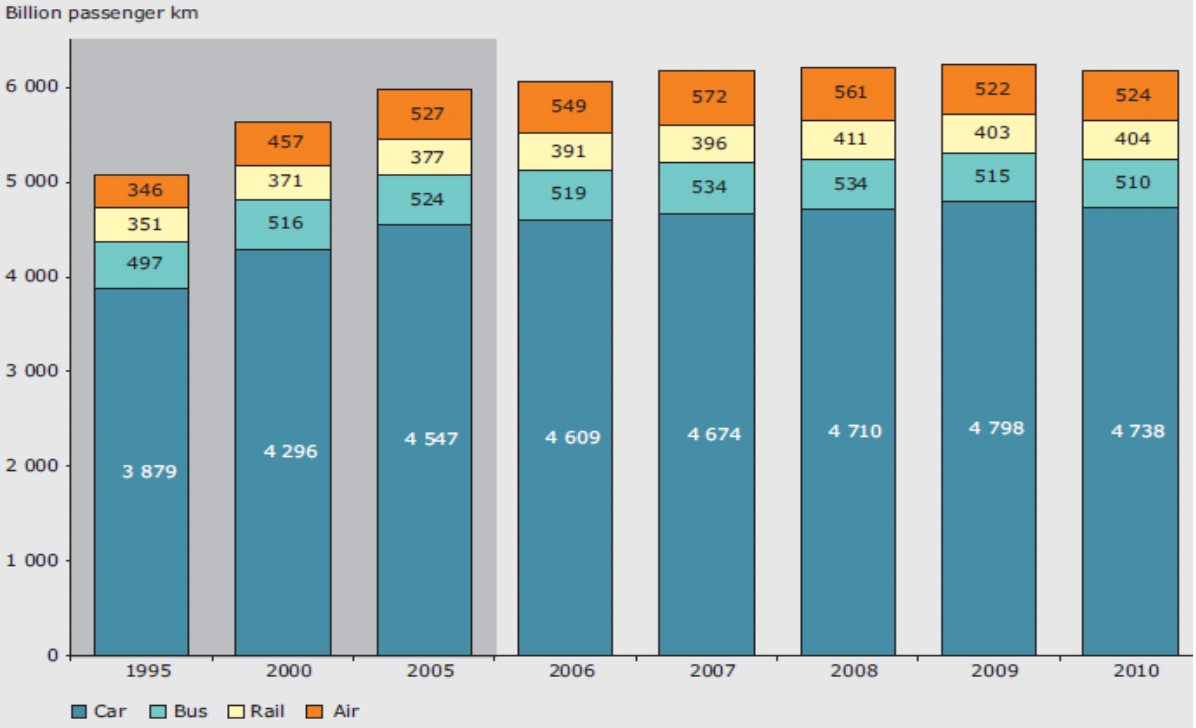
The continuingly increasing or slightly stabilised figures for road transport have occurred despite EU efforts to reduce GHG emissions. As stated earlier, **Euro standards regulating exhaust emissions for various vehicles have not helped to reduce some air pollutant levels. Hence, further efforts are needed, particularly extending policy efforts on technological innovation to instruments effecting social innovation – behaviour change.** As we will see through analysis of different factors influencing Member State air quality performance below, there is still considerable room for improvement in the development of policies and implementing and supporting instruments effecting such change.

Figure 13: Freight transport volume (billion tonne kilometres), EU-27, 1995-2010



Source: EEA report "The contribution of transport to air quality", 2012

Figure 14: Passenger transport volume (billion passenger kilometres), EU-27, 1995-2010



Source: EEA report "The contribution of transport to air quality", 2012

Technical

For the vast majority of Member States, emissions from the transport sector, in other words from vehicular traffic (whether personalised transport or freight) was most often cited as a source of negative impact on air quality and Member State performance in relation to air quality legislation. Italy presented the starkest figures, with road transport accounting for more than 70% of the overall emissions of PM_{10}, NO_x and non-methane volatile organic compounds (NMVOC) in urban settings.[787] Latvia's use of salt and sand to treat roads during snowfalls are the culprit for excessive PM_{10} concentrations recorded in Riga.[788]

Member States have identified different means of attempting to address the problem, whether through funding of public transport projects (Cyprus using 45 million EUR through structural funds) or for electric vehicles (Estonia), strengthening of environmental zones (Denmark), reductions on emissions from vehicles (Denmark, with filters for new taxis and installation of catalytic converters generally; Germany with particulate filters[789]; and Ireland; the Netherlands[790]; and Slovakia), and the promotion of modal shift from personalised transport to public transport (Belgium, Ireland[791]). Euro standards were identified as not having helped a number of countries (Belgium, Ireland[792]), as well as the under-estimation of real-world emissions from diesel vehicles and their increased use of diesel-powered vehicles in the national vehicle fleet (Belgium)[793].

Industrial activity was also an important source of air pollutants, whether for general industrial activity (accounting for approximately 80% of Cyprus' SO_2 emissions),

and more specifically, the energy generation sector (Italy), the building sector (Italy), incineration installations (Slovakia), and the glass industry (Luxembourg, where permits are to be reviewed to require appropriate technical equipment[794]). Austria's difficulties were in transferring technical innovations into use, despite it being a highly developed country, having access and the innovation potential to develop or buy advanced technology and even seeing itself as global leader in technologies such as solar energy and air pollution control technologies.[795]

Fuels used for heating and/or energy and energy plants were also identified as important sources of air pollution, from Poland's heavy dependence on coal and lignite continuing to be a source of serious air pollution, whereas Slovakia's biggest reduction in air pollutants in the 1990s was largely due to the reduction in the use of brown coal and lignite, and heavy heating oil and a simultaneous increase in the use of low-sulphur heating oil, accompanied by the installation of desulphurisation plants at all large power sources.[796]

For those countries having already undertaken efforts to reduce emissions of air pollutants from industrial sources, these have been mainly in installation of de-sulphurisation and/or de-nitrification units (Denmark, Germany, Italy, the Netherlands[797], Poland[798], Slovakia), taxes on sulphur emissions (Denmark), the use of fuels with lower sulphur content (the Netherlands[799]), emissions reduction efforts at power plants (Denmark, Poland, Romania) and refineries (the Netherlands, Romania), reduction of leaks and spills in oil regions (Romania), implementation of the Industrial Emissions Directive (through IPPC licensing) and the then Large Combustion Plant Directive (Ireland)[800], and reduction of organic solvents use (the Netherlands).

Emissions from agriculture have been lowered through limiting loss of nitrogen (Denmark), and through injecting manure into the soil and introducing low-emissions sheds and sties (the Netherlands[801]). Romania has also put effort into rehabilitation of polluted soils and their return to agricultural use.

Economic

Economic factors are influencing Member State performance towards air quality legislation targets, in both positive and negative ways. Below we see some examples of the economic crisis having an impact on behaviour, driving down pollutant levels due to reduced economic activity, or driving them up due to behaviour having a greater environmental impact. We also see how some public support measures are still in place or are absent, preventing improvements in air quality. We look more closely at economic instruments in the section below on instruments including MBIs, but as a more generic presentation of effects of economic factors influencing poorer performance in air quality, it is worth noting the need to drive environmental fiscal reform to achieve truer pricing of environmental and social impacts of activities. Transport continues to rise to the top as an issue needing particular attention.

For some Member States, the **economic crisis or general levels of poverty** independent of this contribute to poor air quality levels, particularly due to heating and cooking fuels used (Bulgaria, where 54% of households burn wood and coal for heating as they are much cheaper than electricity or central heating; and where only 15% of households have access to central heating; Czech Republic and Slovenia[802], where a shift to cheaper fuels such as wood, coal and wood pellets has occurred; Spain where the economic crisis has reduced public spending on air quality improvements). In Slovenia, poor quality boilers coupled with increased use of wood with high moisture content has resulted in significant increases in emissions of smoke gases – insufficient economic incentives to install better performing boilers already on the market means fewer householders are replacing their poorer performing boilers. Other activities also contributed to poor air quality, including illegal incineration of tyres (Bulgaria, where

these are burned in order to recuperate metals to sell for scrap[803]). Opposite to this, some countries experienced **significant increases in vehicular traffic during periods of higher economic growth** – Latvia's rapid economic growth between 2004 and 2008 led to an increase of vehicles on the roads, resulting in increased air pollution in big cities. However, the more recent economic downturn reversed this trend, returning numbers of registered vehicles to 2002/2003 levels.[804]

The economic downturn has served to reduce air pollutant emissions generally in some countries – in the Netherlands, there has been a reduction in emissions of the main air pollutants, except for NH_3[805]; Romania has reduced production and consumption levels generally. For others, **economic growth has not resulted in major increases in air pollutant emissions**. Poland's growing economy is occurring alongside increases in the uptake of environmental technologies, following the restructuring and modernisation of the energy and industrial sectors in the 1990s. This is most noticeable in the transport sector, where despite the addition of approximately 6.5 million vehicles to roads in the past decade, this has not translated into increased emissions in this sector. It is expected that new restrictions imposed on industry and transport could reduce the number of deaths by up to 60,000 per year and save around 42 billion EUR on health care.

In the Czech Republic, the deregulation of the electricity market in 2000 and economic growth and subsequent increases in energy demand have prevented reductions in energy production from coal-powered plants. The **industry and transport sectors** are the largest consumers of final energy. The transport sector has also significantly increased its energy consumption (86% between 2000 and 2007), despite a reduction in emissions intensity achieved through technological advances and new policies.

Despite transport being a major source of air pollution, some Member States still have economic supports in place to encourage personalised transport – an environmentally harmful subsidy which is in serious need of phasing out. Italy's excise duty on diesel fuel is much lower than for petrol (23% below petrol in 2011).[806] **Some Member States have also not supported the shift to public transport through investments in such systems or economic incentives designed to discourage personalised transport.** Belgium's high proportion of diesel vehicles are supported by environmental subsidies to vehicles based on their CO_2 emissions and a lower tax on diesel than on petrol – hence diesel is promoted over petrol, resulting in significant NO_x exceedances.[807] Italy's major cities, such as Rome and Florence, have under-developed public transport systems for their level of populations, and as housing prices are too high in these city centres, residents are forced to commute longer distances as they live further away from places of work.[808] Since the economic crisis begun in 2007-8, Italians have a lower substitution rate for vehicles, meaning that less efficient vehicles stay on the road longer – resulting in higher levels of emissions.[809] Luxembourg's low levels of economic instruments (its fuel tax and the "Kyoto cent" on road fuel prices) and lack of road tolls for private cars do not discourage the use of private cars. Slovenia's public transport infrastructure has been neglected for the past 15-20 years, and instead investments were channelled into the construction of the highway system.

The **agriculture sector** is also identified as a source of air pollution. 95% of Germany's NH_3 emissions come from extensive dairy and meat production.[810]

Estonia's efforts at reducing air pollution are restricted due to costs for air emissions reduction technologies. Dust separation technologies have been introduced more widely.[811]

Although already advanced in some countries, the promotion of a shift to increased use of **renewables** in the total energy mix has been taken up recently by EU12 countries

(Hungary, where a target of 14-16% renewables by 2020 has been set[812] – more details in the 'MBI' section below), supported by government economic support to this shift.

Political

Some political issues have been identified as having an effect on air quality performance, in both positive and negative ways.

Some Member States have taken political decisions which negatively affect air quality performance: Bulgaria's lack of a national agency to undertake enforcement of legislation means that transposition of EU legislation is not necessarily backed up by on-the-ground respect for requirements.[813] In addition to the wide use of poorer quality fuels for heating and cooking, the country suffers from outdated energy and industrial infrastructure and an ageing transport fleet. This requires considerable political effort to develop instruments to modernise important infrastructure, while avoiding excessive increases in prices. Yet, public funding including from the EU continues to give priority to road construction and maintenance, and taxation policy continues to support oil and gas over renewables or public transport. Public authorities refuse civil society organisation requests to run public awareness-raising campaigns or promotion of less environmentally damaging modes of transport. Mayors do not want to take the political risk to introduce serious measures for car traffic reduction. In Italy, many cities are not implementing urban mobility plans, and where measures supporting sustainable mobility have been or are to be adopted, there is no integrated and coherent set of measures set out from the federal level (as is the case in Austria, where harmonisation at the local and regional level has been organised at the federal level[814]). Nonetheless, there are some local successes, including the Emilia Romagna region which has introduced successful policies aiming to improve air quality including by improving public transportation, introducing a ban on private car use and promoting less polluting heating systems. In the Netherlands, the government took some measures that can be seen as counterproductive from an air quality point of view, including increasing the maximum speed on motorways to 130 km/h and abandoning plans for a 'kilometre charge' (road pricing), which were part of the National Cooperation Programme on Air Quality. The new government of 2012 does not intend to change this.

Portugal is supporting its transport sector through its National Road Programme which promotes new highways and roads, increasing spending in the individual transport area, and decreasing investment in public transportation. Romania benefited from heavy GHG emissions levels as a post-Communist country entering the EU's ETS. It aimed at a double goal of economic growth and air pollution reduction. However, due to the lack of infrastructure and reporting transparency, a United Nations panel suspended Romania`s right to trade its surplus GHG emissions in 2011. The measure has not yet been revoked, and Romania gave up on the legal battle against the decision.[815] Its National Emissions Registry was also suspended in 2011, due to unlawfully transferred allowances, but was however approved to re-open in March 2012.[816] Slovenia's capital, Ljubljana, has had its air quality action plan delayed due to political tensions between the national government and the municipal government. The balancing of municipal and national requirements and plans is also more challenging in other municipalities due to the recession and reduced public budgets, and federal guidance and funding are not sufficient for municipalities to implement effective measures.[817] Spain continues to support fossil fuels and polluting industries with little reform, through zero rates, reimbursements and exemptions to the excise duty on fossil fuels (especially oil gas and diesel used for transport) and through subsidies to coal and trade schemes with energy producers. However, in early 2012, the Secretary of State for the Environment stated that there was work going on in the development of a new and integrated air quality plan[818] and

proposed modifications to the Air Quality and Atmospheric Protection Act of 2007.[819] The main objective of the reform would be to apply technical improvements to impose a higher tax burden on vehicles with higher emission levels of NO_2 and suspension particles. This would refer mainly to diesel engines and older vehicles, and shorten the gap historically existent between the fuel duty imposed to petrol and that of diesel, the former being higher.[820] No publicly published evidence of the modifications to the Act is available, but its revision will be included in the "National Plan for Air Quality and Atmospheric Protection 2013-2015".[821] In addition to the reform referenced, the plan integrates other measures like restricting the access of vehicles with high emission levels into urban areas, reducing the speed limits at the entry points of metropolitan areas, establishing low-emission zones and increasing awareness.

Whereas some Member States are creating and strengthening the political framework supporting air quality improvements: Helsinki in Finland is trying to address its urban air quality through an action plan which includes improvements in public transport, incentives to promote cycling and walking, awareness-raising measures and increased research.[822] Germany's transport and agriculture sectors are important economically and received increased funding in 2012 for the development and maintenance of new and existing federal transport infrastructure (including rail, road and waterways) to around 10 billion EUR.[823] Its rural areas and agriculture sector received 18 billion EUR for investments in agri-environmental issues and the reduction of NH_3 emissions. However, there is still need for additional efforts as NH_3 emission reductions have been marginal despite many agri-environmental schemes being in place since the 1990s – legally implemented obligations for authorisations have been waived and planned measures, such as limiting the use of manure or guidelines for the use of mineral fertilizers have only insufficiently been implemented. Hungary has announced that it will make improvements to its air quality monitoring network (thanks partly to funding from Swiss sources)[824], but also particularly with the new EU budget beginning in 2014[825] – an inter-ministerial committee has been established to identify actions needed to improve air quality in 2013, and this will include a review of legislation affecting air pollution. In Ireland, the four Dublin municipalities have prepared an air quality management plan to address Dublin's 2009 exceedance in NO_2, which was submitted to the European Commission as required in December 2011.[826] In Latvia, Riga's local government passed a new air quality action plan in 2011 to address its air quality challenges – it has done this without the central government giving much attention or priority to air quality issues.[827] National legislation for air quality falls under a broader law on pollution rather than having a specific piece of legislation dedicated to it. Luxembourg's climate change action plan included the creation of a centralised information centre giving advice and training on better use of energy, and public awareness campaigns on climate change.[828] In the UK, considerable improvements to air quality have been brought about due to national legislation on emissions to air from industrial installations; 4,500 large industrial installations and 20,000 smaller installations are subject to integrated pollution prevention and control (IPPC).[829] (See Box 4 for details on more actions.)

Box 4: UK policy efforts at air quality improvements – linking air and climate change

The UK Government and Devolved Administrations have published guidance to encourage local authorities to promote low emission vehicles, low emission zones and other measures. Many measures to improve local air quality have been introduced by local authorities, including working with bus and freight companies to improve the air quality performance of buses and HGVs, and the creation of Low Emission Zones in urban areas to discourage the most polluting vehicles. The UK Government is currently considering how co-benefits for air quality and climate change may be maximised

through energy efficiency measures, low carbon vehicles, and increased use of renewable energy. The scale of carbon reductions that the UK has committed to for 2050 is likely to be a key driver for continued action in this area.
Source: European Environment Agency (2010). The European environment – state and outlook 2010, Air pollution (United Kingdom), http://www.eea.europa.eu/soer/countries/uk/soertopic_view?topic=air pollution

Structural

Some structural (which are also political and economic) issues are having a negative impact on Member State air quality performance: In Austria, a major driver for the emissions of air pollutants, especially for NO_x, PM_{10} and NMVOC, is **traffic** and to some extent also **energy production**. Since the late 1990s, passenger transport vehicle kilometres of private cars and aviation have shown a strong increase. Freight transport has shown an even more pronounced increase, tripling since 1990. The increase in passenger and freight transport has partly compensated the effect of emissions reduction measures.[830] In Cyprus, the **agriculture sector** is largely responsible for methane, ammonia and dust particles, but given the sector's dominating role in the local economy, the gradual implementation of the IPPC Directive (encouraging more efficient energy use and animal feed control) can alleviate some pressure. Finland's transport sector is a main source of air emissions, and vehicle mileage has been increasing steadily, along with overall energy consumption.[831] Domestic wood combustion is common in Finland and this has considerable $PM_{2.5}$ emissions, particularly as the appliances are relatively simple and not easily controllable. Another structural feature of PM emissions for Finland is those for non-exhaust emissions through the increased suspension of particulates caused by street sanding and widespread use of studded tires. It has been estimated that re-suspension levels of PM can be up to six times higher for the months of January to April compared to the rest of the year.[832] In Germany, the main sectors for PM_{10} and $PM_{2.5}$ emissions are **industrial production**, **transport** and **households**. While structural change, i.e. the restructuring and closing of many industrial production processes in the eastern *Länder* after German reunification, contributed to declining emissions from 1990 onwards, technological improvements helped reduce emissions of particulate matter (see 'Technical' section above). Also, infrastructure and building structures contribute to PM exceedances as many of the monitoring stations recording exceedances are located in major conurbations with dense traffic infrastructure and buildings structures, preventing effective air circulation.

In Greece, **fossil fuels** continue to dominate total primary energy consumption and the share of renewables remains small (9% in 2011, but up from 5.2% in 2007).[833] In particular, SO_2 emission intensity remains among the highest in Europe due to the dominance of domestic lignite and oil in the fuel mix.[834] As stated earlier, one of Italy's main sources of poor air quality is the **lack of or under-investment in public transportation systems**. Such infrastructure is generally lacking across Italy, regardless of size of cities or other conurbations. Poor cycling infrastructure and a high percentage of personal vehicle ownership are partly a result (an average of 61 per hundred inhabitants, compared to a European average of 46).[835] Latvia's challenges in reducing NO_2 levels are in addressing the **transport sector**. The rise in NO_2 pollution is tied to the increase in vehicles[836], where between 2000 and 2009 numbers of registered motor vehicles rose from 701,804 to 1,206,928. The financial crisis has altered this trend - registered motor vehicles fell to 806,462 in 2011 and continued to fall in 2012 to 786,058.[837] Riga's air quality action programme includes support to public transportation, yet between 2010 and 2012, passenger numbers on trains, buses, and trolleys went down.[838] Future efforts include the creation of bicycle lanes and electric mobility infrastructure between 2011 and 2015, and transportation planning and (however) the improvement of road infrastructure.[839] Luxembourg's low fuel tax creates

fuel transportation, i.e. people living in other countries travelling to the country to purchase petrol. Also, as it is a small country, transboundary pollution from border countries has an effect on its air quality. This requires more harmonised approaches to air quality and agreements between governments to ensure efficiency and effectiveness of national efforts. In addition, the air quality action plan for the city of Luxembourg seems to be a good driver to decrease pollution from road traffic and should be extended to the whole country.

In the Netherlands, an increase in road traffic has dampened reductions in total vehicle emissions, while reductions in the number of animals in livestock farming have contributed to the decrease in NH_3 emissions.[840] Poland's highest air pollutant emissions levels are in areas of large urban centres and major industrial districts. The worst situation is in Silesia, an area that constitutes only 2.1% of the Polish surface area, but emits 20-25% of the national SO_2, NO_x, and PM emissions, and exceeds concentration limits for all major air pollutants, including heavy metals, carbon monoxide and hydrocarbons. [841] Industrial activity in the region is diverse, including mining, and production of clothes and fabrics, crystal, porcelain and china. Portugal's air pollutant emissions come mainly from the **transport and agriculture sectors**. In the traffic sector, high personal vehicle passenger kilometres and estimated low car occupancy (number of people in a vehicle) trends are not being reversed and these are counteracting technological efforts to improve PM pollution from road traffic.[842] Furthermore, in the last two years new roads and highways have been built and planned, contrasting with railway track closures and reductions in other public transportation investment.[843] [844]

6.3 Instruments, in particular MBIs, used and planned and their effects

A range of instruments is used by Member States to encourage reductions in air pollutant emissions, addressing activities, sectors, and pollutants. The details provided below outline both positive and negative elements.

Transport/energy

A number of countries have instruments relating to transport and/or energy. Some have taxes/levies relating to uses of different fuels: Austria has increased tax levels on mineral oil (gasoline, unleaded petrol, diesel and heating oil) and on natural gas. Although the tax on fossil fuels was raised, possibly leading to decreased consumption, this was offset through higher tax deductions for commuters (see further below on vehicle use), so the effect was buffered. The tax on fuel was raised by 0.04 EUR to 0.482 EUR/litre, for diesel it was raised by .042 EUR to 0.397 EUR/litre.[845] Belgium's national and regional efforts are detailed in Box 5 below. Cyprus has progressively increased value added tax (VAT) rates on energy products and services (from 15% in late 2008 to 17% as of 1st March 2012). However, it imposes the minimum excise duty on leaded petrol, having the lowest levels across the EU27. It also charges an excise duty of 330 EUR/1000 litres for gas oil used for industrial/commercial use, although a reduced rate of 124.73 EUR is applied on gas oil used as motor fuel in stationary motors.[846] Denmark has indexed its excise duty on vehicle fuel consumption from 2012, as part of a broader tax reform.[847] [848] In 2011, Finland's tax levels on vehicles and on peat were increased (to 50 EUR per year for vehicles, with a new tax relief for electric cars), and a new windfall-tax for hydro and nuclear power was introduced.[849] Luxembourg has reduced VAT on renewable energy sources, although overall its energy taxation levels are among the lowest in OECD Europe for all product and consumer categories. Poland's coal excise duty is exempted for a wide range of uses, including for electricity generation, rail transport of cargo and passengers, and combined heat and power generation.[850] Slovenia applies excise duties on automotive

fuels which account for the majority of revenues from environmental taxes. [851] The country has piloted its first Low Emission Zone ('environmental zone' - POC) and it is envisaged to roll these out across the country in 2013, supported by additional regulations and system options. In the pilot area where the zone was introduced (Maribor), further efforts will be made to reduce air pollution from traffic including a revision of transport arrangements and limited vehicle entry into the zone without appropriate emission classes (entry prohibited to Euro 0 and 1 standards). The required entry permits are issued from 1 September 2012 onwards, free of charge. Monitoring of compliance by drivers will be made, and offenders are meant to be charged a fine.[852] Slovakia charges a fee to medium- and large-sized facilities using brown coal in their operations if at least 30% of that coal originates from Slovakia.[853]

Some Member States have made investments and provided funds for public transport: Hungary is promoting public transport (as well as the modal shift of 'heavy traffic' from road to rail), allocating more than 50% of the funds allocated to transport in its national development plan for such developments. However, it is also funding the development of highways and by-pass roads, to better manage traffic levels (thereby supposedly improving quality of the environment of settlements and their safety as well, but in reality still responding to personalised and other road transport demands).[854] Slovenia's efforts include improvements to public transport systems (including park & ride stations, improved number of stops and access to stops), shifting of road transport to railway, and the establishment of public transport systems. The UK has allocated funds to encourage public transport, including the Green Bus fund to encourage uptake of low-emission buses (55 million EUR (45 million GBP)) and which has helped put in place around 500 buses by April 2012.[855] Cycling and walking was funded between 2008 and 2011 with over 173 million EUR (140 million GBP) of funding; and from 2011-2014 a Local Sustainable Transport Fund will provide 691 million EUR (560 million GBP) funding to local authorities to support sustainable travel.[856] With regards to heavy vehicles and freight, reductions of up to 617 EUR (500 GBP) in Vehicle Excise Duty were offered for lorries and buses that met the Euro V standard before it became mandatory in 2009; a similar Certificate and reduction will be provided for early compliance with the Euro VI air quality standard, but only for five years. A Sustainable Distribution Fund to encourage freight transport by rail, inland waterway or sea had a budget of 25 million EUR (20 million GBP) for 2010/11 and the same for 2011/12, and was expected to prevent around 1.5 million lorry journeys over that period.[857]

In relation to biofuels, a number of Member States are using instruments to increase the use of these in the overall fuel mix or to improve the environmental performance of what is already being used: Bulgaria is seeking to increase the consumption of biofuels in motor gasoline and diesel fuel from 2.25% in 2012 to 2.7% in 2013, which will reduce the total annual emissions of sulphur dioxide.[858]

Others have charges/levies relating to vehicle use: Bulgaria's 'eco-tax' on motor vehicles is charged as part of its vehicle registration fee, ranging between 50 EUR (100 BGN) and 100 EUR (200 BGN). From 2013, electric vehicles will be exempted from the tax.[859] In Spring 2012, Denmark has indexed various excise duties relating to personalised transport, including motor vehicle excise duty and an additional excise duty for private use, as part of its broader tax reform.[860] [861] It also has a yearly tax on diesel cars without particle filters, set at 135 EUR (1,000 DKK). In 2011, Finland's transport fuels taxation was increased.[862] Germany has a number of transport-specific MBIs, particularly aiming to reduce PM_{10} and $PM_{2.5}$ emissions.[863] These include tax rebates to vehicle owners for retrofitting cars with particulate filters, as well as grants for their installation. Until December 2012, grants of 330 EUR were available for a retrofitting undertaken by then, and this has been reduced to 260 EUR for retrofitting undertaken in 2013 (a total of 30 million EUR are set aside as government expenditure[864]). The grant is conditional on a minimum PM-emission reduction of 30% through the retrofitting.

Also, Germany uses road tolls, and fees are calculated based both on the number of axles and on the pollution category of the respective truck with less polluting trucks incurring lower toll fees.[865] Thus the progressive increase in toll fees act as an economic incentive for the retrofitting of trucks with particulate filters. Greece's fiscal and financial measures include an annual vehicle circulation fee (applied to passenger cars, motorcycles and trucks according to the engine's capacity); excise taxes on gasoline and diesel fuel (with part of the revenues channelled to help finance air pollution control measures) and a reduction in the taxation and classification fees for new on-road passenger vehicles and motorcycles aiming at a faster fleet renewal.[866] Some of Italy's regions have introduced measures, including circulation tax exemptions for methane and LPG vehicles in Piemonte, incentives to buy more modern motorcycles and incentives on the transformation of private cars towards methane or LPG in Lazio, and grants for buying newer (more efficient, less polluting) private cars for low income households in Lombardia.[867]

Luxembourg has a number of instruments addressing vehicles, including reduced VAT on less polluting vehicles, its annual road tax is calculated on the CO_2 emissions of a vehicle (contributing 25.5 million EUR in 2011, 27 million EUR in 2012, and forecasted at 28 million EUR for 2013), and a 'Kyoto cent' for personal vehicle use ('climate cents' have been levied on all petrol and diesel sold since 1st January 2007 (0.02 EUR/litre for petrol and 0.0225 EUR/litre for diesel)). However, as stated earlier in this Air Quality section, Luxembourg's tax levels are considered too low to effect the change needed: its low rate of fuel taxes induces "fuel tourism" (75% of fuel sales are to non-residents) and does not contribute to the reduction of air pollution due to road traffic, and the Kyoto cent is too low to have an impact on personal vehicle use. Malta's 2010 Air Quality Plan outlined a number of measures related to traffic, with a particular view to reducing emissions of PM_{10} and nitrogen oxide. Fiscal incentives were introduced for cleaner vehicles: from 2011, registration taxes for commercial vehicles of lower than Euro III emission standard were increased in order to encourage the purchase of less polluting vehicles; this was also applied to non-commercial vehicles as of January 2012. In 2010, a car scrappage scheme was introduced to encourage the scrapping of some of the most energy inefficient and polluting private passenger vehicles. The new car purchased must be of Euro IV standard or higher, with CO_2 emissions of 150g/km or lower. The scheme is also open to new car purchases without scrappage of an old car, but only a 1,000 EUR rebate is paid to the car owner, with the other 1,000 EUR being paid into a government fund to scrap other old cars.[868] The Netherlands applies a reduced registration tax rate on diesel cars that meet the Euro VI emission standards ahead of the date that they become binding (1 September 2015). Several kinds of low-emission vehicles are eligible for fiscal incentives (such as deduction of part of the investment cost from taxable profit, and free depreciation). However, as has been the case in other environmental areas (notably waste management), recent tax reform has included the elimination of some taxes, such as the road pricing scheme as well as subsidies for retrofitting particle filters in existing cars and trucks. In Portugal, there is an absence of MBIs offering incentives to retrofit older vehicles or to purchase better performing ones or to use less environmentally damaging fuels. However, in 2012 Lisbon municipality has introduced various initiatives to reduce the number of polluting vehicles in congested areas, including restricting such vehicles from entering these areas; and it announced that it will install a license plate reading system to detect vehicles moving in the old city centre (in Low Emission Zones). The objective is to ensure that vehicles are effectively fined and controlled; this has not been the case until now.[869] In addition, restrictions to parking, applying to Natural Gas and LPG vehicles, are to be removed in 2013[870], paving the way to further introduction of these vehicles that have lower emissions than diesel engines[871]. However, further economic incentives to switch from diesel to less polluting fuels are not implemented and even the 2011 National Plan for Transportation[872] does not mention any relevant initiatives. Romania also provides subsidies for Euro III or IV (or higher) emissions

standards for vehicles, and has instituted a pollution tax for new and second-hand cars registered in Romania. The tax was raised in 2011, and the new Government suspended the tax in 2012 although it promised to redesign it in the shape of an environmental tax starting in the first quarter of 2013.

Slovenia also applies excise duties on transport, ownership and use of vehicles, and taxes on new motor vehicles. Motor vehicles with lower CO_2 emissions benefit from lower tax on car ownership. In Slovakia, exemptions from energy taxes have been adopted to encourage public transport by rail, road and water.[873] As a way of supporting public transport, subsidies are offered to rail operators as a compensation for their losses. However, these have not led to an increase in competitiveness of the rail sector since they do not support investment in rail infrastructure and currently rail transport is not considered as an attractive alternative to road transport. In addition, for heavy duty vehicles, road tolls are set based on the distance travelled and the emissions of the vehicles, but this is not the case for passenger cars. The UK has recently introduced a number of key national transport measures, including the implementation of Euro standards to improve vehicle fleets, and providing funds to promote the uptake of ultra-low carbon vehicle technologies including support for consumer incentives for electric and other low emission cars, and continued investment in electric vehicle recharging infrastructure (totalling more than 493 million EUR (400 million GBP)).

Examples of negative decisions affecting air quality: The level of Austria's tax deductions for commuters (the 'Pendlerpauschale') was raised in 2011.[874] These depend on the distance between home and work and on availability of public transport. Hungary's capital, Budapest, was considering introducing **congestion charging** (such as London in the UK and Stockholm in Sweden have done), however this looks to be delayed as the Hungarian National Assembly voted against changing the law for it to be implemented in July 2012, backed up by a 2012 Parliament vote against legislation enabling the congestion charge at a national level. The congestion charge could have a significant impact on the reduction of air pollution as the planned daily charge of 1.70 EUR (500 HUF) was expected to encourage more people to use public transport such as buses and metro trains. Instead, a public utilities tax has been introduced from 1st January 2013, imposed according to the metric length of pipelines and cables (for natural gas, heating, electricity, amongst other public utilities). The tax is expected to raise 34 million EUR (10 billion HUF), or approximately the amount originally expected from the congestion charge.[875]

Box 5: Belgium's federal and regional policy toolbox on air quality

Although Belgium has exceeded limit values on NO_x and PM_{10}, and it is still not clear what its performance is on $PM_{2.5}$, it has a varied range of tools in place to help achieve improvements in air quality.

Policy

At federal level, the National Air Pollution Abatement Plan 2009-2012 and the National Climate Plan 2009-2012 are the main policy instruments addressing air quality.[876] The previous plan aimed particularly at reducing SO_2, NO_X and VOC, whereas the current plan gives more importance to prevention and adds a focus on reducing PM emissions. There is also the National Control Plan on Acidification and Ground-level Ozone[877], and a Plan for the implementation of the Stockholm Convention on Persistent Organic Pollutants is in preparation[878].

At regional level, the Brussels-Capital region has an Air-Climate Plan 2002-2010[879], and its Bruxell'air Plan is specific to transport and identifies priorities and implementation measures[880]. The Flanders region had its Climate Policy Plan 2006-2012[881], and its Climate Policy Plan 2013-2020 was approved in February 2013. Numerous policy plans have been elaborated and implemented to tackle both air quality and emissions of air pollutants, such as the Flemish PM reduction plan (2005), NEC reduction plan 2002 (renewed in 2006), PM action plan for industrial hotspot zones (2007), action plan on PM and NO_2 for the port and the city of Antwerp, a PM plan on PM_{10} (2008), an air quality plan on NO_2 (2012) and an Environmental Policy Plan (2011 – 2015) concerning all air pollutants.[882] The Wallonia region also has an Air-Climate Plan that sets reduction objectives and associated sectoral measures.[883] The Walloon Air Agency, created in 2008, is in charge of implementing the action plan in the region.

Tools

The federal government encourages public transport and low-carbon transport. It gave **subsidies** to public transport companies until 2008 (a new subsidy is in the works) to help promote cleaner transport; and offers **free train passes** to 70,000 civil servants. It also uses **taxes** and initiatives such as the '**eco-score'** (see below) to encourage the use of eco-friendly vehicles, giving for example up to 40% tax reductions for less polluting vehicles.[884] **Tax deductions** are offered for 'green' vehicles (i.e. whose emissions do not exceed 115gCO_2eq/km). **Information** is provided on eco-driving, and **mandatory speed limits**[885] **and free bus transport** are put in place during peak smog conditions. **Tax reductions** are offered for energy efficiency improvements during the construction or renovation of buildings (up to 40% of the bill). For industry emissions, a **Royal Decree** on boilers was adopted in July 2009 in order to limit emissions of NO_X and particulate matter emissions and a Royal Decree on pellet-fired boilers is in preparation.

In Flanders and Brussels, the '**eco-score'** is a tool that reflects a car's overall impact on the environment, taking into account polluting emissions (PM, NO_X, CO, HC), CO_2 and noise. Unlike many European countries, emissions other than CO_2 are taken into account, avoiding possible pollution transfers. The 'eco-score' is used for defining standards and grant schemes for car buying.

The regions have also come to an agreement on implementing a **kilometre tax for truck and a vignette for cars**, to come into effect in 2016. Trucks will pay a tax according the distance travelled, thanks to the information transmitted by a GPS. Cars will have to buy an annual vignette, with the cost dependent on the vehicle category. This will also concern foreign trucks and cars.[886] At the local level, some

large industrial plants reduce their PM emissions during winter smog episodes.

Speed reduction has been instituted in Wallonia, from 120 to 90 km/h on highways crossing sensitive zones during peaks in air pollution.[887] The Wallonia short-term action plan in case of peaks of PM pollution includes three action levels, according to PM_{10} mean concentrations of higher than 70µg/m^3, 100µg/m^3 or 200 µg/m^3, respectively. These also include **local speed limit reductions** (to 70 or 50km/h) in the agglomerations of Liège and Charleroi, and the obligation to **reduce heating temperature** in public buildings.[888]

In Brussels-Capital region, the establishment of a **mandatory company travel plan** is obligatory for companies that employ more than 200 workers on the same site. The plan is set up in two phases: development of a diagnosis of mobility, followed by the development of a concrete action plan to reduce air emissions and to avoid pollution peaks.

The Flanders region offers a **grant** bonus for the installation of a soot filter on diesel-powered vehicles with environmental class Euro III and IV standard. Up to 100% of the total costs (cost of the soot filter, but also the cost of its installation and any additional costs) up to 650 EUR are refunded.[889] A measure consisting of reducing vehicle speed from 120 to 90 km/h on the highways crossing sensitive zones during peaks in PM concentration has also been adopted.

Other areas

Some Member States have instruments addressing energy used specifically for **heating**: Cyprus charges full VAT on gas oil for heating, although its excise duty levels are at a reduced rate (for both commercial and non-commercial use).[890] Poland exempts its excise duty on coal for a range of uses, including energy-intensive industries for heating purposes.[891] Slovenia's efforts at air quality improvement focus on individual heating systems (as well as transport), and these include the development of centralised district heating systems based on geothermal energy, investments into individual heating boilers and improved handling of heating, and improvements to chimney servicing. Slovenia has launched an initiative to increase awareness and set up an internet platform to improve environmentally friendly use of wood biomass in individual heating systems.[892] Although the initiative will be integrated into local action plans, doubts remain as to the efficiency of the measures envisaged in the draft plans as compliance with the daily limit values for PM_{10} is expected to be achieved, under favourable meteorological conditions, only in 2015-16.

A number of Member States have **taxes on specific pollutants:** The Czech Republic introduced a law on air quality protection in 2012 which included a number of MBIs. Among the innovative instruments introduced in the new law are compensatory measures that all air polluters will be required to take compensation measures in areas where pollution exceeds the legal limit, and these are part of permitting processes (a permit is dependent on commitment by the company to undertake measures). The law also introduces Low Emission Zones, which will be designated by local authorities in areas with continuous breaches of quality standards. The new law imposes charges on four pollutants - VOC, NO_x. SO_2, and PM.[893] Denmark has made a move to improve its performance on NOx by increasing its NOx tax five-fold from 2012 (from its original 2008 rate of 0.67 EUR/kg (5 DKK) to 3.36 EUR/kg (25 DKK). Estonia has set out increases in its 'environmental charge' from 2010-2015: air pollution rates for CO, NO_x, VOC, heavy metals and mercaptans are increasing 5-10% annually; SO_2 and particulate matter charge rates increase 30%; CO_2 emission charge rate has not changed. Latvia's main MBI relating to air pollutants is its natural resources tax. Rates for CO_2 emissions are assigned based on manufacturing activity, and it also includes rates on PM_{10}

emissions, CO, NH_3 and other inorganic compounds, SO_2, NO_x, volatile organic compounds, and heavy metals. Some rate increases have been announced to 2015: the rate for a tonne of PM_{10} will increase 10 times between 2009 and 2015 (from 5.74 EUR. (4 LVL) to 57.40 EUR (40 LVL)), and for CO_2 the rates will rise from 0.43 EUR/tonne (0.30 LVL) to 2.87 EUR/tonne (2 LVL). No rises have been announced for taxes on CO, NH_3 and other inorganic compounds, SO_2, NO_x, volatile organic compounds, and heavy metals.[894]

The Netherlands has announced that it will abolish its NO_x emissions trading system in 2014. The main reason is its lack of effectiveness due to the fact that the EU's Industrial Emissions Directive leaves little room for emissions trading (other than GHG emissions): each source has to comply with emission limits that correspond to the best available techniques and therefore the opportunities to 'buy' additional emission allowances are limited. A lack of support for this kind of emissions trading (as pollutants such as NO_x are local pollutants and therefore should not be traded nationally) among other Member States played an important role as well.

A small number of Member States charge **taxes/levies on sulphur:** Denmark has had an SO_2 tax since 1996, based either on SO_2 emitted or on content of sulphur in fuel. Fuels with less than 0.05% sulphur content are exempt from the tax. Current rates for the tax are 1.34 EUR/kg SO_2 emitted or 2.68 EUR/kg sulphur in the fuel. No specific information on the effects on SO_2 levels has been found, but Denmark has the lowest level of SO_2 emissions per capita of all OECD countries. Luxembourg has encouraged a rising market share of low sulphur fuels through tax incentives, having a graduated tax according to the sulphur rate in fuels. Ireland has taken a legislative route in this area (see below where Member States have used regulations). The Czech Republic and Sweden also have similar taxes.

Some Member States address **specific sectors** in relation to air quality: Austria's **cement industry** is running some pilot projects to install selective catalytic converters (SCR), and emission reduction technologies have been installed in Austria's main **crude oil refinery**.[895] Estonia provides state grant funding through its electrical mobility programme (ELMO) for **private and public institutions** to acquire an electric car (to an amount of up to 50% of the price of the car, to a maximum of 18,000 EUR).[896] The Netherlands supports the uptake of low-emission vehicles, machines and appliances (giving deductions on part of the investment cost from taxable profit, or giving free depreciation). Its National Cooperation Programme on Air Quality includes a range of measures to ensure that air quality objectives are met (including those for which derogation has been granted). The national measures focus on the **road transport and agriculture (animal husbandry) sectors**, and **industry**.

Use of regulations for improving air quality: In 2011, Ireland passed a regulation relating to coal which turned a voluntary agreement from 2002 into legislation. The voluntary agreement was originally established between the Minister for the Environment and an industry grouping, the Solid Fuel Trade Group (SFTG), representing the majority of coal importers. The agreement required that bituminous coal imported would have a sulphur content of ≤0.7%, and this has resulted in reduced SO_2 emissions from the household burning of such coal. The 2011 law aims to ensure the continued dominance of low sulphur coal in the residential market, while also extending a ban on smoky coal to a large part of the country where population density is highest. It also introduced a ban on the burning of bituminous or smoky coal in all specified areas to complement the existing ban on its marketing, sale and distribution.[897] Italy's national law transposing the Air Quality Directive requires regions and autonomous provinces to draw up air quality plans, if only for the pollutants addressed by the legislation. These regions and autonomous provinces are also required to put in place a set of additional measures in order to be able to meet the requirements set in the Directive.

These additional measures are mostly targeted to the transport sector (53% of the measures aim to reduce PM_{10}[898]). Malta's 2010 Air Quality Plan includes measures on the regular monitoring of traffic levels, regulation of vehicle exhausts, enforcement of quality fuel, an educational campaign, car-sharing initiatives, limiting refuse collection times, improvements to government vehicle fleets, improvements to public transport, planting of roadside vegetation, encouraging school travel plans and cycling initiatives, and implementation of low emission zones.[899] Slovenia's efforts include the introduction of environmental criteria in public tenders for the purchase of personal vehicles (green public procurement); and local mobility plans (supporting more sustainable modes of transport), also as a component of environmental zones with restricted access of polluting vehicles, e.g. the Maribor pilot environmental zone (POC).

6.4 Indicator trend analysis for Air quality

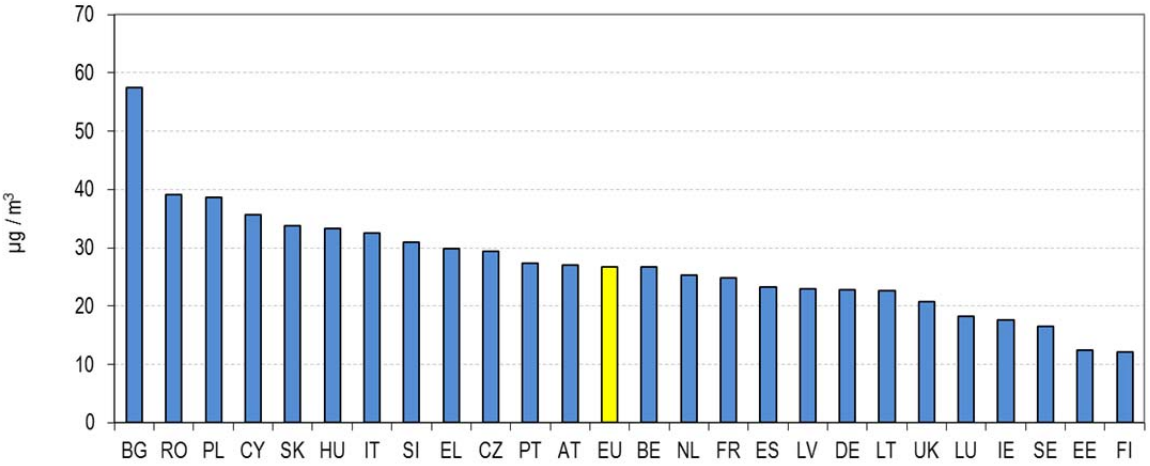
This section provides textual analysis of the trend development over the last ten years as far as possible for the two key indicators (1) concentration of particulate matter, and (2) the share of population that lives in areas with high exposure to particulate matter.

Although there is growing evidence that $PM_{2.5}$ particles pose a greater risk to health, data is usually available only for the coarser PM_{10} fraction of particulate matter.[900] This section takes a closer look at the daily exceedance threshold.

Concentration of particulate matter

In 2011, the concentrations of particulate matter in urban areas for all Member States but Bulgaria (57.5 µg/m^3) were below the annual mean exceedance limit for the EU of 40 µg/m^3.

Figure 15: Concentration of PM10 in urban areas in EU in 2011



Source: European Environment Agency, 2013

For Romania (39.1µg/m$^{3)}$ and Poland (38.7µg/m^3), the data show concentrations very close to but not exceeding the EU limit; Cyprus (35.7µg/m^3) and Slovakia (33.8µg/m^3) rank fourth and fifth highest.

While information for 2011 shows compliance with the annual limit at a national average level in Romania, exceedances of the annual limit value have been recorded at the three stations (1 industrial and two traffic stations) Iasi, Bucharest, Ilfov.[901] For Hungary, in

2011 the annual limit value was not exceeded on a national average level, but in the four cities (1) Kazincbarcika; (2) Miskolc, Búza tér; (3) Pécs, Szabadság; and (4) Szegedf.[902]

12 Member States show below EU average (25.9µg/m^3) emissions, with Sweden (14.3µg/m^3), Finland (13.2µg/m^3), Estonia (12.8µg/m^3) and Denmark (12.1µg/m^3) emitting the lowest level of PM concentrations.

Looking at the developments over time from 1997 to 2010 (please note that the full dataset from 1997-2010 is available only for Belgium, the Czech Republic, Germany, the Netherlands, Poland, Spain and the UK, while for other Member States data coverage spans much shorter periods, for Cyprus covering only the year 2010 and for Malta lacking completely) for the countries named above reveals the following picture:

For Bulgaria, concentration levels increased from 58.9µg/m^3 in 2003 to 61.3µg/m^3 in 2008, with the levels subsequently declining to 48.3µg/m^3 in 2010. Pollution from PM_{10} constitutes the most serious problem concerning air quality in Bulgaria, and household heating is the main source, emitting 58% of the total quantity released in the atmosphere. The weak dilution of locally emitted pollutants due to low wind speeds of less than 1.5 m/sec and long dry periods which contribute additional to air pollution by particulate matter. Reducing PM_{10} and $PM_{2.5}$ in Bulgaria is a very complex issue. Following the economic crisis, people tend to use solid fuel for household heating and for transport resulting in substantial PM emissions. Furthermore, the Bulgarian municipalities responsible for air quality control are lacking the capacities to properly control and enforce air quality standards.

Eurostat data on PM_{10} emissions for Cyprus exist only for 2010. For Cyprus, the high PM_{10} value is mainly due to anthropogenic sources, as well as traffic, central heating and industrial emissions. However, it also relates to natural sources such as sea salt and transboundary pollution from Sahara dust storms.[903]

Data for Romania shows a decline from 49.9µg/m^3 in 2003 to 34.9µg/m^3 in 2010. While exceedances of the annual limit value have been recorded at 1 industrial station and 2 traffic stations in 2010, the number of exceedances has been on a descending trend against the previous years.[904.905]

PM emissions in Hungary increased from 34.0µg/m^3 in 2003 to 39.0µg/m^3 in 2005, subsequently declining to 29.3µg/m^3 in 2008. Afterwards, emission levels rose to 31.3µg/m^3 in 2010. In 2011 Hungary prepared a PM_{10} Reduction Action Plan in order to improve PM_{10} concentration in certain zones and agglomerations.

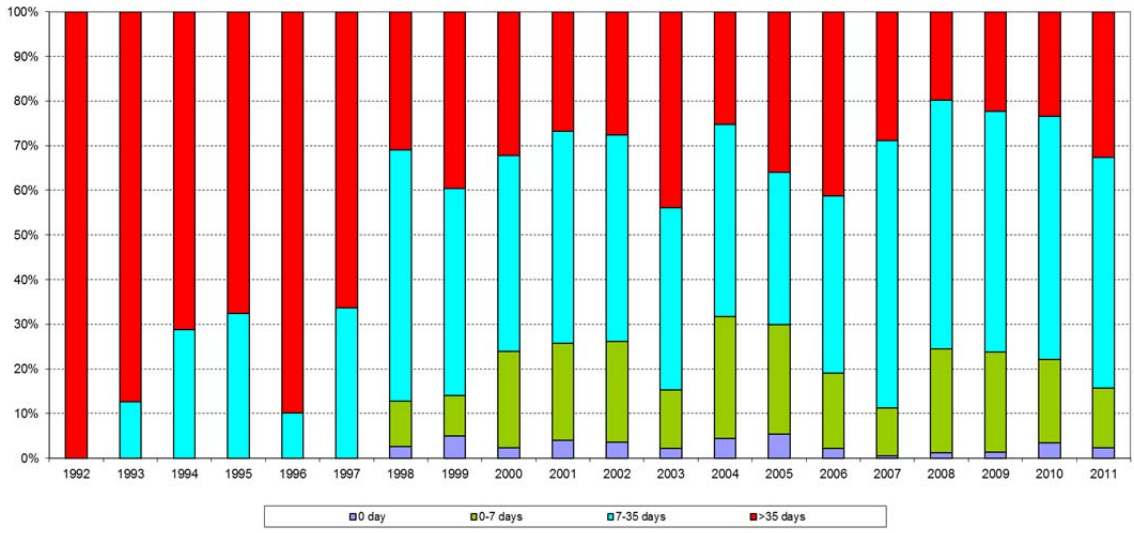
Emission levels in Sweden increased from 13.5µg/m^3 in 1998 to 20.0µg/m^3 in 2006, and subsequently declined to 14.3µg/m^3. For Finland, Eurostat data show emission levels hovering between 15 and 16µg/m^3 between 2001 and 2007 (with a dent in 2004 where emissions fell to 13.6µg/m^3), and dropping from 15.8µg/m^3 in 2007 to 13.2µg/m^3 in 2010. Estonian PM emissions levels peaked in 2006 with 22.6µg/m^3 in 2006, dropping to 18.6µg/m^3 in 2007, then further to slightly above 11µg/m^3 in 2008 and 2009, and in 2010 increasing to 12.8µg/m^3. In Denmark, starting from 24.1µg/m^3 in 2001, PM emission levels peaked in 2007 with 27.1µg/m^3 and subsequently continuously decreased to 12.1µg/m^3 in 2010.

Share of population living in areas with high exposure to particulate matter

PM pollution tends to have a great variability over time with peaks of high concentration not evenly distributed over the year. In fact the short term limit (not more than 35 days with daily average concentration exceeding 50µg/m³) is the level most often violated in Europe.[906]

As regards urban population in areas with high particulate matter contamination, in 2011 32.7% of the European population living in urban areas were exposed to PM concentrations exceeding the limit values on more than 35 days, while 51.6% were exposed to exceeding concentrations on 7 to 35 days, 13.3% on 0 to 7 days and only 2.4% to no days at all exceeding the limit values.

Figure 16: Percentage of urban population resident in areas for days per year with PM10 concentration exceeding daily limit value in EU, 1992-2011



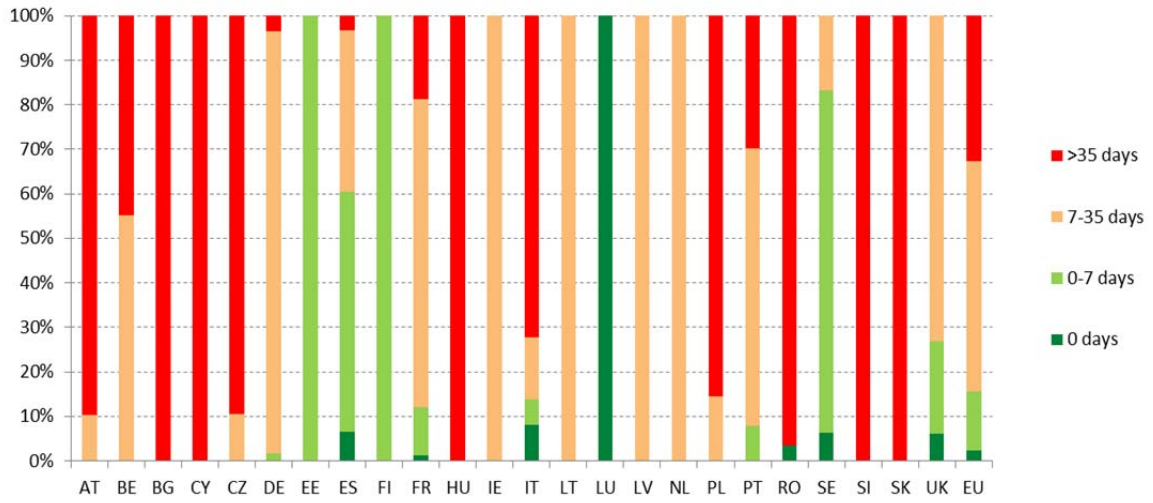
Source: European Environment Agency, 2013

The development of time depicted in the figure shows that the percentage of the European population living in urban areas exposed to PM concentrations exceeding the limit values on more than 35 days a calendar year declined from 48.8% in 1997 to 20.1% in 2009. However, this decline was far from gradual, as from 1997 to 1998 the percentage dropped by more than half (23.9%), until 2002 remaining around 25%, but substantially increasing in 2003 to 40.6%. Falling to 23.1% in 2004, it then increased again to 38.7% in 2006 to subsequently decrease to the lowest value of 18.0% in 2008 and rising to 20.1% in 2009.

This reduction corresponds with a slight increase of the percentage of urban population experiencing 7 to 35 days with excess of limit values from around 50% in 1997 to 58.2% in 2009, and with a more substantial increase of the percentage of urban population experiencing 0 to 7 days with excess of limit values from 0% in 1997 to 20.5% in 2009.

In terms of performance across the Member States, the European Environment Agency reports exceedances of the daily limit values at one or more stations for 22 Member States in 2001 (excluding Bulgaria, Denmark, Estonia, Finland and Ireland), for 24 Member States in 2005 (excluding Estonia, Ireland and Luxembourg) and for 23 Member States in 2010 (excluding Denmark, Finland, Ireland and Luxembourg).[907] These findings are in line with the information provided by the respective country profiles. Some country reports provided areas where exceedances occur, including: such as Maia and Lisbon municipalities in Portugal, Àrea de Barcelona and La Rioja in Spain, in Sofia and the Plovdiv region in Bulgaria, Tallinn and Kohtla-Järve in Estonia, Riga in Latvia, Msida in Malta and Ljubljana in Slovenia.

Figure 17: Percentage of urban population resident in areas for days per year with PM10 concentration exceeding daily limit value in EU Member States in 2011



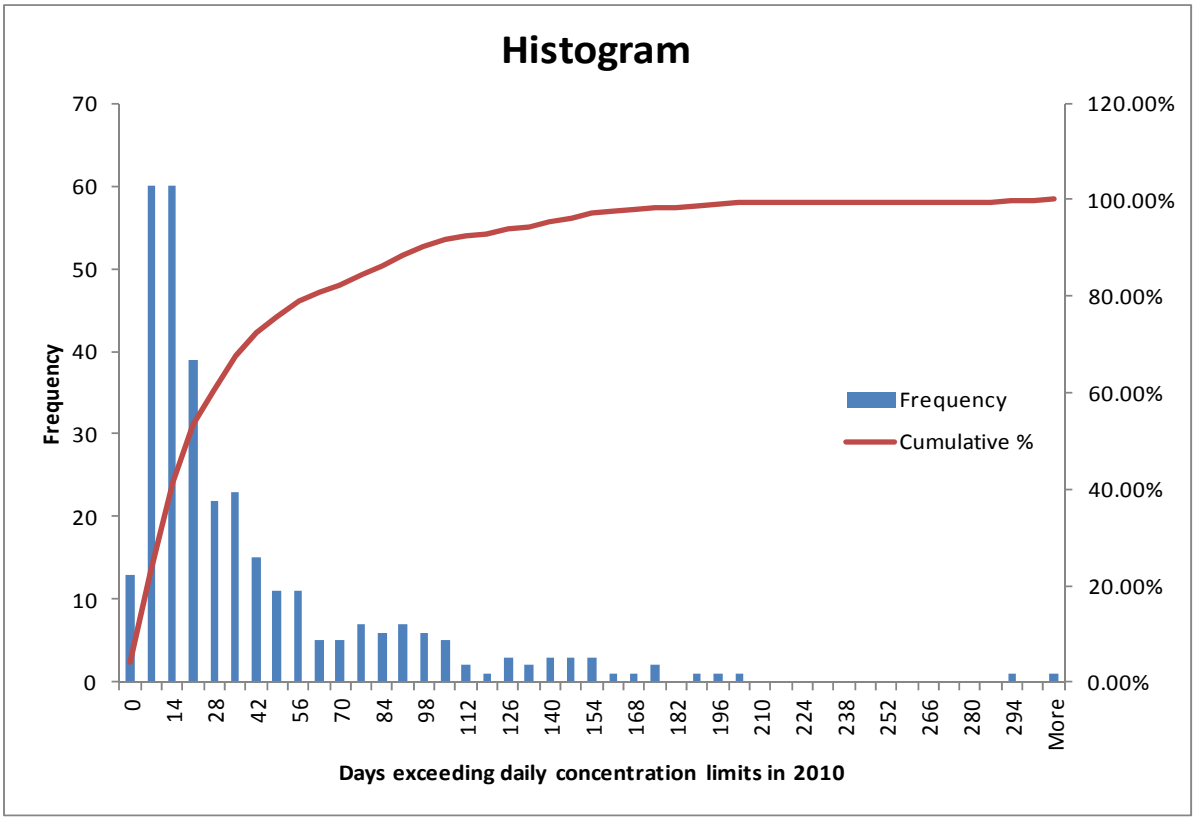
Source: European Environment Agency, 2013

Furthermore, improvements are identified in the number of exceedances of the daily limit values over time for Belgium, Greece, Italy, Portugal, Spain, Sweden, the Netherlands and the UK, while numbers of exceedances increased clearly for Poland and Bulgaria.[908]

However, correctly interpreting the statistic is problematic, because the number of measuring stations in Member States grew considerably over the years considered. While in 1997 only 55 stations were included, in 2009 the number grew to 478. Furthermore in 1997 the majority of stations had been in operation in the UK.

Figure 18 takes a closer look at the distribution of measurement stations in the EU-27 in 2010. The histogram shows the count of stations grouped by number of days of a PM_{10} contamination above the daily limit. The distribution is highly skewed to the left. About 30% of the stations considered were classified >35 days with values up to 308 days (Ostrava in the Czech Republic). Of the total of 478 stations 30 stations (6%) exceeded the daily limit by 100 or more days.

Figure 18: Histogram of PM measurement stations in EU-27 in 2010



Source: European Environment Agency and AirBase

The stations with the highest number of days exceeding the daily limit were located in Bulgaria, the Czech Republic (Ostrava) and Belgium (Liège). It is unclear to what extent the stations are comparable to each other, since for the larger sized particulate matter the diffusion rates are strongly subject to the positioning of the measurement equipment.

Where data was available for 2011, additional instances of exceedances of the daily limit value on more than 35 calendar days were found for

- Belgium, in the Brussels-Capital region, where the number of days above this limit amount to 24 to 87 in 2011, depending on the stations.[909]
- Germany, where around 20% of all monitoring stations recorded more than 35 days at which more than 50µg/m^3 were measured.[910]
- Spain, where the number of zones surpassing the daily limit value for particulate matter went up from 7 in 2010 to 10 in 2011 (Zona Industrial de Bailén, Vallès-Baix Llobregat, Granada y Área Metropolitana, Plana de Vic, Asturias Central, Terres de Ponent, Gijón, Bajo Nervion, Àrea de Barcelona and La Rioja).[911]
- Latvia, in Riga PM_{10} levels exceeded these limits in two measurement stations.[912]
- The Netherlands, where the daily average of 50µg/m^3 for PM_{10} concentrations was not exceeded more than 35 times in only a few locations, but the derogation that applied until 11 June 2011 meant that there was no exceedance of the limit value at all.[913]

- Portugal, where daily limits were exceeded in Lisbon and in Maia, in the latter 115 days of exceedance were recorded, slightly decreasing from 123 days recorded in 2010.[914]
- Slovenia, where the daily average of 50µg/m³ of PM_{10} per day was exceeded on more than 35 days in 13 of 22 measuring stations[915]. The highest number of days with exceeded daily limits was in the capital Ljubljana (95 times). The exceedances of PM_{10} daily limit values have been consistent and permanent, as they have been recorded in 4 out of 6 zones and/or agglomerations in 6 out of 7 reporting years (since 2005). In 2012, PM_{10} daily limit values were exceeded more than 35 days at 6 monitoring stations, including Trbovlje and Zagorje with more than 60 days each.[916]

7 Additional environmental policy areas

Although Member States are delivering a wide range of potentially interesting initiatives, the limits to this study were such that three examples were provided. Two of the examples are on energy strategies developed in Denmark and Germany, offering different approaches taken to addressing climate change and energy challenges.

7.1 Finland: Sustainable use of natural resources

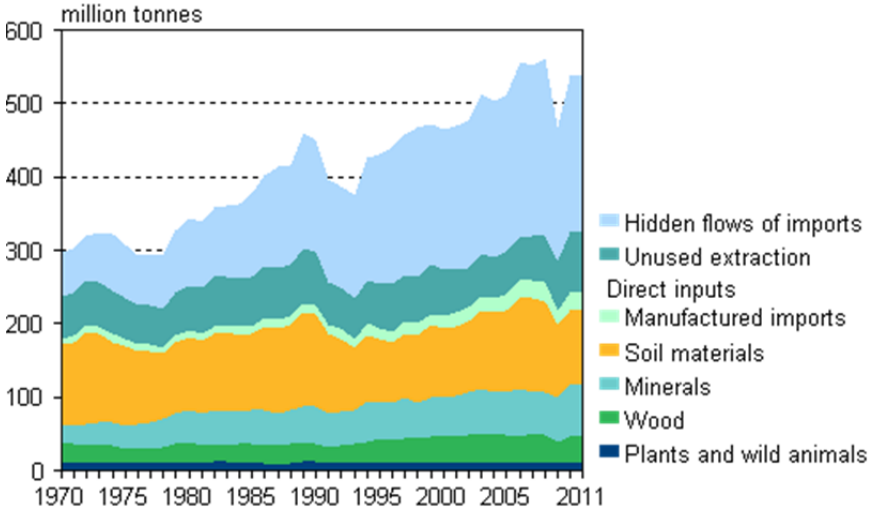
Finland has made a comprehensive effort to reduce the material flow of the economy.

Total material requirement has almost doubled from 1970 to 2011. Finland's direct material requirement is very high compared to international averages: 45 tonnes per capita a year, compared to 16 tonnes as the EU average. Significant growth has been particularly in the direct input and hidden flows from imports: direct input has grown 2.3-fold and hidden flows have grown 3.5-fold in 40 years. However, the material intensity of Finland's economy - the amount of used material relative to GDP – has been on a decreasing trend, and 2009 reached an all-time low (or the highest level of efficiency).

The total material requirement of the Finnish economy amounted to 584 million tonnes in 2005. Half of this total mass of materials was extracted from the natural environment in Finland and the other half was brought in from abroad to meet demand from industry or consumers. The 2009 Natural Resource Strategy for Finland[917] points out that well-being and prosperity must be created in a more sustainable way, and suggests that new operating models are needed in business, policies and daily behaviour. The natural resource strategy examines natural resources and their inter-linkages across sectoral boundaries, and covers the perspectives of both use and protection.

In 2011, Finland imported almost 62 million tonnes of goods, a fifth of which (by weight) was biotic resources. The majority of these were agricultural and forestry products, refined wood products and food. The volume of imported food doubled in the last ten years (to 2.3 million tonnes), and wood products imports grew at a greater rate. Nonetheless, the majority of imported goods were abiotic, and these were mainly made up of energy minerals, oil products, chemicals, ores and metals. The single largest product groups were crude oil (11.2 million tonnes), coal, gas and iron ore. Figure 19 below illustrates total material requirement by material groups from 1970–2011.[918]

Figure 19: Finland, total material requirement by material groups, 1970–2011



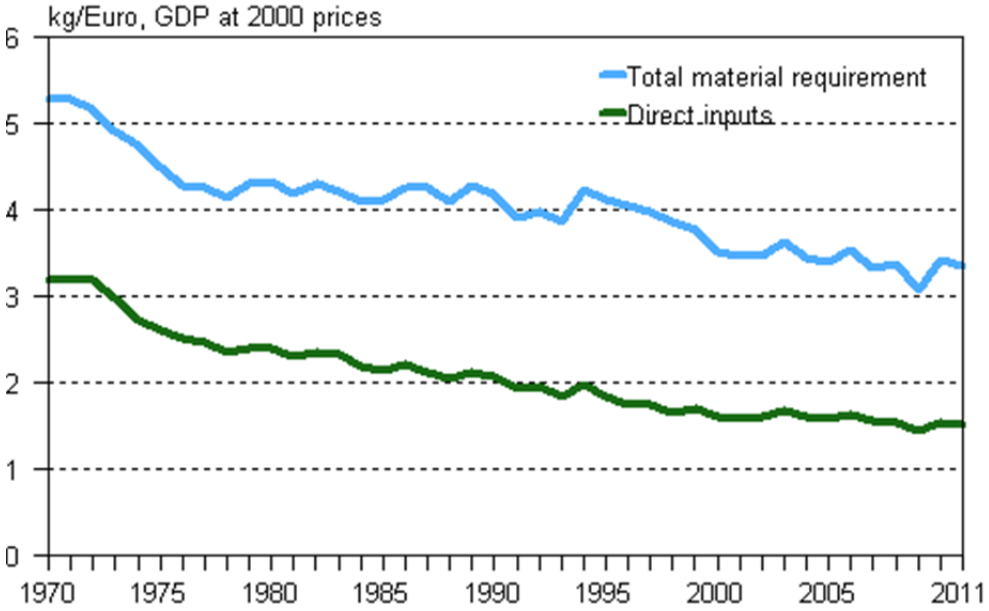
Source: Statistics Finland

In 2010, Finland exported 45 million tonnes of goods, made up of roughly equal volumes of biotic and abiotic products. The majority of export products were wood and paper products, oil products, chemicals, base metals and stone products. Export volumes in the forest industry were much lower than in the early 2000s, and exports of abiotic products was larger than those of biotic products for the first time in 2009. The degree of refining in exported goods is clearly higher than in imported goods.

Statistics Finland started publishing the economy-wide material flow accounts in 2011. The accounts form part of environmental accounts, on which the European Union passed the Regulation 691/2011 of European environmental accounts.

The material intensity of Finland's economy is shown in **Figure 20**.

Figure 20: Material intensity of Finland's economy 1970-2011



Source: Economy-wide material flow accounts 2011, Statistics Finland

EU targets, milestones and objectives

Corresponds to the requirements of the Regulation of European environmental accounts (691/2011).

Distance to EU targets, milestones and objectives

Approach has been adapted to correspond to the data collection requirements of the Regulation 691/2011. Objectives are the annual reporting of stated environmental accounts. No targets or milestones are involved.

Barriers and drivers explaining the distance to identified targets/objectives

One of the objectives of Regulation 691/2011 is the annual reporting of stated environmental accounts; hence the information provided by Statistics Finland achieves this. The Regulation does not include any targets.

Technical

None identified.

Economical

None identified

Political

The Council of State has developed a programme "Getting more and better from less" on ecologically, socially and economically sustainable manners of production and consumption. It includes a vision until the year 2025 as well as goals and action points and suggests that ministries and municipalities should put together their public procurement strategies and define environmental criteria for these. The proposal for the revised programme, "More from Less – Wisely", was published in May 2012.[919]

Structural

None identified

Measures used to achieve progress (including MBI)

None identified

7.2 Germany: Energy Transition

In the aftermath of the dramatic nuclear accident in the Japanese nuclear power plant Fukushima in March 2011, the national debate on an energy transition and on a nuclear phase-out gained important momentum.[920] The so-called energy transition ('Energiewende') was adopted by the federal cabinet – partially in response to Fukushima – in June 2011, focusing on matching Germany's energy demand in the future through renewable energies (mainly wind and solar energy) and on the nuclear phase-out by 2022.[921]

One key national policy is the Renewable Energies Act ('EEG'). First enacted in 2000, the EEG was the main driver behind the expansion of the share of renewable energies in electricity supply to more than 20% in 2012.[922] The main support vehicle of the EEG is the feed-in tariff providing for fixed tariffs to be paid by electricity grid operators to operators of renewable energy installations feeding their electricity into the grid. All quantities of renewable energies are sold on the electricity market by the grid operators. The difference between the revenue from electricity sales and feed-in tariffs payments is then transferred to final energy consumers in the form of cost apportionments per kilowatt hour kWh (EEG-Umlage) so that the EEG-subsidised expansion of renewable energies will be financed.[923] Hand in hand with the success of the EEG in increasing the share of renewable energies, problems of the EEG's design emerged in the last few years requiring amendments to adapt the EEG to the energy transition. Since January 2012, the new version of the Act on granting priority to renewable energy sources (Renewable Energy Sources Act) is in effect, reforming several aspects of the previous Act: The new EEG puts forward time-oriented and quantitative objectives (laying down stepwise objectives for the share of electricity generation from renewable energy sources.

State of implementation/progress on relevant European and national targets

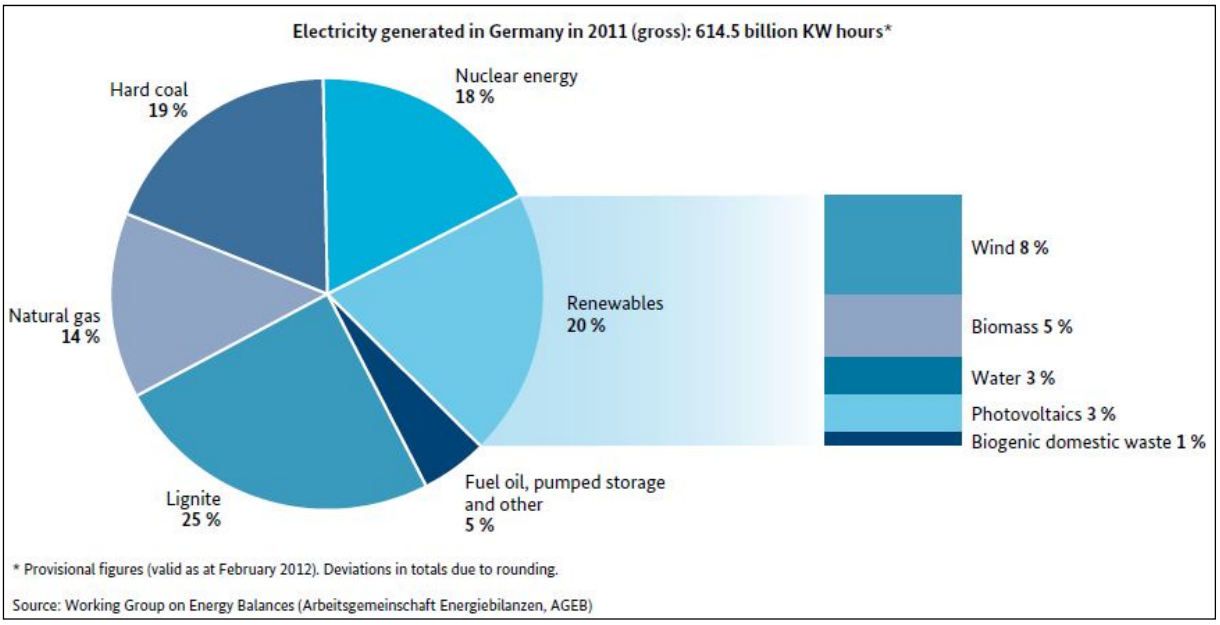
Relevant European targets in relation to renewable energies come from the Europe 2020 strategy and from the Energy Roadmap 2050, according to which, inter alia, the share of renewable energy sources in final energy consumption should be increased to 20% in 2020.

Distance to EU targets, milestones and objectives

The German national targets are less stringent for 2020, calling for renewable energies making up 18% of final energy consumption in 2020, but being increased to 30% by 2030, to 45% by 2040 and to 60% by 2050.

While in 2010 the share of renewable energies in final energy consumption amounted to 10.9%, it is expected that the recent pace of increasing renewable energy shares (increasing from 1.9% in 1990 to 10.9% in 2010) will be sufficient to reach the national 2020 target.[924] According to national data, in 2011 the share of renewable energies in electricity generation amounted to 20% (see Figure 21).

Figure 21: Gross electricity generation in Germany[925]



Source: Federal Ministry of Finance (2012). German Stability Programme 2012 Update

Barriers and drivers explaining the distance to identified targets/objectives

Technical

The EEG triggered technology competition and innovation, which up to date resulted in renewable energy generated from wind and solar power being most economically efficient – as regards wind power production costs per energy generated decreased by almost 50% since 1990, for photovoltaic costs decreased even further by around 80-90%. In contrast, all other renewable energy technologies – water, biomass, geothermal, wave energy, osmosis, etc. – were found (as of 2012) to be significantly more expensive or with much lower potential for their expansion. Therefore, the German energy transition will have to be based on wind and solar power.

Economical

The existing electricity market is a so-called energy-only market, at which providers and buyers trade in kilowatt hours at a certain point in time and therefore only electricity amounts are traded – ensuring security of supply is not part of the market deal and therefore rests with the operators of the electricity grids. It is being intensely discussed whether this market will be supportive to the energy transition or not, because, inter

alia, lacking elasticity in electricity demand and regulatory uncertainties very likely counteract supply security. Therefore, calls for a new energy market are voiced.

Political

Politically, in the wake of the adoption of the energy transition in 2011, widespread concerns were raised about the potential social costs of the energy transition. This links mainly to the EEG-Umlage, which is expected to be increasing from 3.6 EUR cents per kWh in 2012 to 5.3 EUR cents kWh in 2013, raising the annual share of electricity costs in consumption expenditure for private households from 2.3% in 2011 to 2.4% in 2012 and to 2.5% in 2013[926] – accordingly, the EEG-Umlage and with it the entire energy transition are under fire from civil society associations calling for socially acceptable levels of the EEG-Umlage, in particular for low-income household at risk of poverty.[927] Furthermore, the EEG-Umlage is heavily criticised because most large-scale electricity consumers (mainly energy intense industries) are exempted from paying the EEG-Umlage or have to pay a substantially reduced apportionment (0.05 EUR cents per kilowatt hour) – that means that the Umlage increases for all those who have to pay the full Umlage, mainly private households, commerce and SMEs.[928] Therefore, it is increasingly being called for reforming the exemptions for industries (however, not calling for phasing out the exemption in the EEG, but limiting windfall profits, e.g. for energy intense companies that are not placed within international competition) to thus lower the costs for private households and SMEs and achieving fairer shares between all. As it must be assumed that also better designed rules for exemptions (which would lead to effectively limiting windfall profits) will not sufficiently lower additional costs for households linked to the EEG-Umlage, the following further compensation mechanisms are being discussed:[929]

- Adapting existing transfer systems (basic social protection [Grundsicherung], housing support [Wohngeld] and Germany's Federal Education Assistance Act (BAföG)) to include the expected increasing costs for use of electricity due to increases in the EEG-Umlage
- Reducing electricity tax (currently 2.05 EUR cents per kWh) through establishing a tax-free allowance for the first 1,000 kWh used (for which only the minimum taxation of 0.1 EUR cents per kWh would apply) independent of household size, and taxing all electricity consumption beyond this allowance with the existing rate of 2.05 EUR cents per kWh. This is believed a) not to reduce the tax‘ steering effect, as 1,000 kWh are below the electricity consumption of most households and therefore encourages more efficient use of electricity beyond this allowance, and b) to alleviate social injustice by covering a larger share of total electricity consumption of low-income households than of higher-income households.
- Providing advice and financial support for more efficient use of electricity both through use behaviour and through more efficient devices (e.g. providing low-income households with switchable plugs and energy-saving light bulbs free of charge, or financially supporting the purchase of more efficient devices).

Structural

With most of the renewable energy expected to be generated in the North of Germany (mainly through on-shore and off-shore wind farms) and with the phased out capacities of nuclear power plants mainly located in the South of Germany, the expansion of the grid is central to ensuring the security of energy supply throughout all of Germany and thus to the success of the energy transition. The fact that most renewable energy sources do not provide electricity uniformly throughout the day and that increasingly decentralised energy generation is taking place, for instance through photovoltaic installations, further adds to the need for robust and smart electricity grids. In order to

meet this need, operators of electricity grids must modernise grids, construct new grid lines, test technologies such as underground cables, and create smart linkages between grids, electricity generation and consumption.

This expansion poses a main challenge for the energy transition and current expansion planning was found to be insufficiently taking into account innovation and alternative solutions required for the smart grid of tomorrow.

Furthermore, bioenergy will also in the future not be able to contribute much more than 5% of electricity generation, because agricultural and silvicultural (forest) land areas are limited and cultivation of energy crops competes with many other uses, e.g. food production, raw materials production or nature conservation.

Measures used to achieve progress (including MBI)

Measures used to achieve progress on the energy transition include the reform of the EEG in 2012 and the reform of the Energy Industry Act ('Energiewirtschaftsgesetzes' - EnWG) and the Act on Accelerating Grid Expansion ('Netzausbaubeschleunigungsgesetz' - NABEG) in 2011.

The EEG reform introduced targeted incentives to promote market and system integration of renewable energies, in particular a market premium for electricity from renewable energy sources. This premium encourages producers not to make use of the fixed feed-in tariff, but to sell their electricity generated from renewable energies on the market, covering the difference between market prices and feed-in tariff levels.

Reforming the EnWG and the NABEG support a coordinated grid planning and lays the foundation for a federal requirement plan, which are necessary to realise a smart grid and to ensure security of energy supply throughout Germany. However, as stated above, the current expansion planning was found to be insufficiently taking into account innovation and alternative solutions required for the smart grid of tomorrow.

7.3 Denmark: Our Future Energy

In 2012 a broad majority in the Danish Parliament concluded an ambitious Energy Agreement.[930] The Energy Agreement contains key initiatives under headings addressing energy efficiency, wind power and new energy technologies, renewable energy, bio-energy, smart grids, and (crucially) financing initiatives.

The initiatives from the Agreement will among other things achieve by 2020 more than 35% renewable energy in final energy consumption by 2020; and 50% electricity consumption supplied by wind power. Gross energy consumption is anticipated to be reduced by 7.6% by 2020 compared to 2010 and greenhouse gas emissions will be reduced by 34% by 2020 compared to 1990.

The Agreement addresses efforts in energy efficiency and renewable energies. These include, in energy efficiency, that from 2013-14, a 2.6% increase in energy savings is realised by energy companies to final energy consumption (excluding transport) compared to the 2010 level. This percentage rises to 2.9% compared to 2010 from 2015-20. To this end energy companies are obliged to offer subsidies or consultancy to achieve energy savings in enterprises and households, through an initiative targeting industry and buildings. In 2013, a comprehensive strategy for retrofitting Danish buildings to make them energy efficient is to be presented.

In relation to renewable energies, a number of actions are detailed that aim to increase the percentage of energy from wind power. The Agreement ensures substantial expansion of wind power, equal to the annual electricity consumption of 1.5 million households. These efforts seek to achieve the objective of 50% of Danish electricity

consumption to be provided by wind power in 2020. This is compared to 2% in 1990 and 28% in 2011.

Further efforts on renewable energies focus on converting industrial processes to renewables, to reduce individual heating using oil and gas in buildings and to promote renewables, and similarly to convert transport to renewables. Bio-energy related efforts aim to increase the consumption of biomass in district heating and transport, and the expansion of biogas. Smart grids efforts will aim to transform and future-proof the energy system, addressing the volatility of wind power and the currently expensive costs of energy storage.

Denmark's climate and energy strategies also include the 2009 Green Transport Policy[931], the 2009 Business Strategy on Climate Change[932], the 2008 Climate Adaptation Strategy[933], and Spring Package 2.0[934] green tax reform package (see 'Measures used to achieve progress' below).

Given the 2011 and 2012 focus of this report, we will not look at these other strategies in any detail as they have existed for some time. However, where the 2012 Energy Agreement overlap with these other strategies, their details will be provided.

State of implementation / progress in relation to relevant European and national targets

EU targets, milestones and objectives

Relevant European targets in relation to renewable energies come from the Europe 2020 strategy[935], according to which, inter alia, the share of renewable energy sources in final energy consumption should be increased to 20% by 2020.

Distance to EU targets, milestones and objectives

Danish national targets build upon the EU's climate and energy package and are far more stringent than those set at EU level, aiming for zero fossil fuels by 2050.

On **climate and energy**, The Danish government programme Our Future Energy[936] sets out ambitious visions:

- By 2050 energy and transport sectors should rely 100% on renewable energy.
- By 2035 electricity and heat production should rely 100% on renewable energy.
- By 2020, Danish greenhouse gas emissions should be reduced by 40% compared to 1990.
- By 2020, 50% of electricity consumption should be produced by wind power.

In 2012 a broad majority in the Danish Parliament concluded an ambitious Energy Agreement containing various measures and initiatives which will:

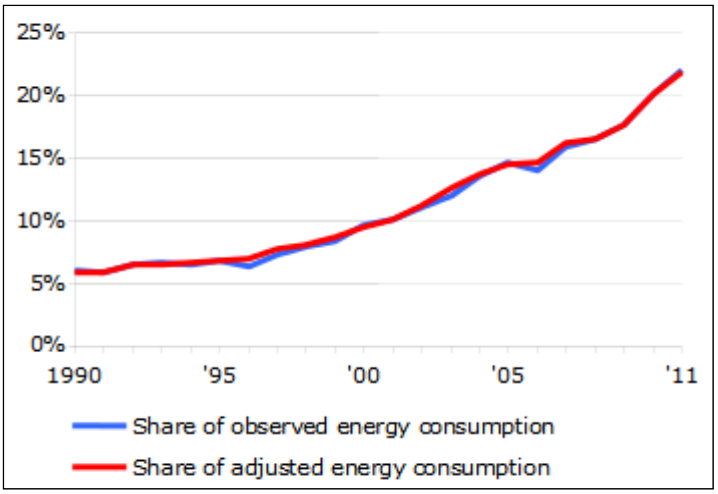
- Increase the share of renewable energy in final energy consumption to more than 35% by 2020.
- Increase the share of domestic electricity consumption produced by wind turbines to 50% by 2020.
- Reduce greenhouse gas emissions by 34 % by 2020 compared to 1990.

Our Future Energy also includes Danish objectives for EU climate and energy policy: The government is working for an EU commitment to reduce overall emissions of greenhouse gases by 30% by 2020 compared to 1990.

According to national data[937], in 2011 the share of renewable energies of observed energy consumption was 22%, up from 20.1% the previous year. See Figure 22 for

trends since 1990. Other key details from energy statistics show a drop in energy consumption by 4.5%, compared to the previous year, made up of drops in consumption of oil by 4.3%, and of natural gas and coal by 6.5% and 23.4% respectively. At the same time, consumption of renewable energy rose by 3.1%.

Figure 22: Renewable energy - share of total energy consumption



Barriers and drivers explaining the distance to identified targets/objectives

Technical

A number of technical challenges arise from the political objective to become fossil fuel independent, not least the technical challenge of an energy system that depends upon fluctuating electricity produced from wind power. This is recognised by the intention to spread electricity production across a number of different technologies, and to support development of these in order to ensure stable energy supply.

Another potential technical challenge is in converting the transport sector to non-fossil fuel alternatives, so it is anticipated that it may be necessary to manage security of supply and climate impacts in another way. In any case, it is recognised that such a conversion is not possible within the next ten years, but that a reduction in fossil fuel use will come from the increased use of biofuels and increases in energy efficiency. See more under the 'Structural' section.

Through the 2012 Energy Agreement, there is recognition of the important role of research, development and demonstration in green energy technologies. There are various programmes that support development and demonstration of energy technologies, including notably the Energy Technology Development and Demonstration Programme (EUDP). Beyond these on-going programmes, the Energy Agreement has allocated various funds to the development and use of various technologies including: 8 million EUR (60 million DKK) to new renewable energy technologies for electricity production (solar, wave power, etc.); 4.7 million EUR (35 million DKK) to new renewable energy technologies in district heating (large heat pumps, geothermal energy, etc.), and 1.3 million EUR (9.5 million DKK) to make the island of Samsø independent of fossil fuels.

In relation to the objective of promoting the use of renewable energies in enterprises, 5.6 million EUR (42 million DKK) has been earmarked to fund the conversion from oil-fired and gas-fired boilers in existing building to renewable alternatives (solar, heat pumps, etc.), and a new green business scheme will promote the efficient use of

renewable energy in enterprises. In 2013, 33.5 million EUR (250 million DKK) has been allocated to this scheme, and this amount is doubled from 2014 to 2020.

Economical

The Energy Agreement explicitly states that it requires financing, and identifies the total financing requirement at 469 million EUR (3.5 billion DKK) in 2020. This financing requirement is to be met through three elements. First, energy saving initiatives by energy companies are to be financed through the companies' tariffs, therefore through consumers' energy bills. Second, Public Service Obligation (PSO) schemes will finance the expansion of renewables in electricity production (including offshore and onshore wind turbines). PSOs will be supplementary to electricity prices paid by all electricity consumers. A new gas PSO scheme, collected through gas bills, finances subsidies for renewable energy for the gas grid. Third, a security of supply tax has been introduced on all fuels – biomass and fossil – for space heating. This is in anticipation of the drop in consumption of fossil fuels, and its subsequent reduction of state revenues from taxes on coal, oil and gas. The new tax will also finance some of the subsidies for renewable energy which cannot be financed via the PSO schemes.

Savings in final energy consumption are estimated at 818 million EUR (6.1 billion DKK) in 2020 as a result of reduced use of fossil fuels.

Specific funding has been earmarked for different elements of the Energy Agreement. In addition to the new green business scheme mentioned earlier, just over 4 million EUR (30 million DKK) per year from 2013 to 2020 has been committed to maintaining and promoting industrial combined heat and power (CHP) in industry and greenhouses. The expansion of biogas is supported by the introduction of subsidy equality as that received for CHP, and the introduction of a new subsidy for biogas used in industrial processes or as a fuel for transport.

Political

The development of the Energy Agreement illustrates the widespread support for and the efforts the government has gone to in order to achieve agreement with various industry sectors and other key players. Denmark has set itself ambitious objectives and targets to achieve fossil fuel independence, recognising that serious technical challenges remain unsolved, but that climate change and energy demands in a world with growing population needs ambitious "game-changing" strategies. The small number of purely political initiatives detailed here does not reflect the political elements of the other initiatives outlined in the other barriers and drivers sections.

In the area of promoting a shift to renewable energies in individual heating, the Energy Agreement contain halts to the installation of oil-fired and gas-fired boilers in new buildings from 2013, and to the installation of oil-fired boilers in existing buildings from 2016 in areas with district heating or natural gas.

Structural

Transport infrastructure is one of the key areas needing significant transformation of a structural nature. The Energy Agreement recognises this and includes 9.4 million EUR (70 million DKK) to introduce more recharging stations for electric cars and to promote the infrastructure for hydrogen cars, etc.; 2 million EUR (15 million DKK) funding to continue an existing pilot scheme for electric cars; and a strategy for the promotion of energy-efficient vehicles. This is in addition to the 13 billion EUR (97 billion DKK) infrastructure fund that was set up to underpin and expand Denmark's position in the climate and energy areas and to help meet the targets identified above. The majority of

this fund is used to improve the rail network, as it is relatively less energy intensive than road transport for example.

Initiatives to expand renewable energy production include 600 MW offshore wind turbines at Kriegers Flak, 400 MW offshore wind turbines at Horns Rev, 500 MW offshore wind turbines in coastal areas, and new planning tools to encourage an increase in net capacity of 500 MW onshore wind power.

Biomass is also supported through allowing producers and consumers to make price agreements, thereby making more attractive conversion from coal to biomass at large-scale CHP plants. Analysis are also to be undertaken in 2013, on the future role of district heating in the energy system, and on the use of bioenergy in Denmark.

Smart grids are supported through agreements to be established with grid companies on the installation of intelligent, remotely readable hourly electricity meters; and the construction of new electricity transmission lines between Denmark and Germany. Analysis will take place, on the continued functionality of the grid with an increased share of wind power in the system, and of the regulation of the Danish electricity supply sector, to ensure incentives for green conversion, cost effectiveness, competition and consumer protection.

Measures used to achieve progress (including MBI)

In 2009, the Danish government launched a fiscal reform strategy, "Spring Package 2.0", which aims to increase environmental taxation through a phased-in process from 2010-19. This includes higher energy, transport and environmental taxes to support the government's energy and climate policy objectives. Spring Package 2.0 builds upon efforts in 2009 to shift taxation levels away from labour while increasing the level of the energy tax. In addition, a fund dedicated to green transition and commercial innovation has been established, which is to support the development of new climate-friendly solutions, amongst other activities. The government has also stated that it will also regularly allocate funds within the globalisation framework through the Energy Technology Development and Demonstration Programme (EUDP) and Green Lab for innovation within the environment, nature and energy.

Denmark's carbon and energy taxes continue to play a central role in achieving political objectives, and these have both been described in more detail in the section on MBIs.

8 Advice / recommendations

The transition to a low-carbon, resource-efficient Europe is a central objective of the EU. Various Roadmaps and other strategic documents further developing and supporting this transition have been put forward over the last few years. Such a societal transformation requires the involvement of key actors, beyond strong and clear leadership from governments at all levels. Civil society, the public sector, businesses (from SMEs to multi-nationals), financial institutions, investors, and partners in third countries, are amongst those stakeholders that need to be engaged in the transition, through progressive and productive involvement in official processes and grassroots activities.

Although it is still early days in the transition to a resource efficient, low carbon economy, some Member States have taken bolder steps than others in their societal and market transformation efforts. These efforts are welcome and should be further encouraged. In general, further work is however needed to create a stronger momentum towards a low-carbon, resource-efficient Europe. The European Semester is also in its early days, and those issues taken up under the resource efficiency umbrella (including resource productivity, municipal waste management, environmental taxation, reform of environmentally harmful subsidies, water and air quality) should continue to be developed in relation to the continuing evolution in policies and instruments detailed in the comprehensive Resource Efficiency Roadmap. Ideally, resource efficiency should eventually focus on input-related elements, supported by outputs and impacts, rather than focusing on these latter elements which currently form much of the EU's environmental acquis.

A resource efficient, low carbon economy requires supporting political decisions and the implementation of instruments to ensure its objectives are achieved. This study has shown that there are positive steps being taken on all the themes addressed in this report, but that there are also contradictory decisions being taken or delays that hinder or slow down achievement of the objective of making Europe's economy resource efficient and low-carbon.

Based on the advice/recommendations from the 27 country reports, and from the horizontal screening across the countries, a summary of priority actions or areas where further effort is needed is set out below.

Economic, fiscal and financial elements

The transition to a resource efficient economy requires a stable, long-term policy framework as well as a substantial increase in investments across a very broad and diverse set of markets, technologies and solutions. The bulk of these investments are expected to come from the private sector. However **public expenditure**, including through the EU budget, is also expected to play an important role.

The recent political decision to cut the EU Multi-annual Financial Framework 2014-2020 (MFF) mirrors efforts taken at national levels to restrain public spending and ensure better financial stability in the current economic climate . At the same time, more than one-third of Member States increased environmental protection budgets in 2011-12 (Czech Republic, Estonia, Finland[938], France[939], Germany, Malta[940], the Netherlands[941], Poland[942], Romania[943], Slovakia[944 945], Sweden[946], and the UK[947]), and Slovakia's increase took place against a backdrop of overall public budget decreases[948].

Achieving a resource efficient, low carbon economy requires not only adequate financing of efforts to achieve environmental objectives (that often also have social and economic objectives/benefits), but also the most effective allocation and spending of what are increasingly constrained public funds. More effective monitoring and reporting of public

expenditure on environmental protection and evaluations of the effectiveness of this spending will be critical in this respect. Member States can learn from each other on how best to allocate and spend public funds towards environmental protection.

Budgetary expenditure needs to be considered alongside other instruments and efforts such as environmental taxation (and other MBIs), the phasing out of environmentally harmful subsidies and the appropriate use of state aid which also have a role to play in the transition to a resource efficient economy.

All Member States have some form of environmental taxes in place. Energy and transport taxes remain the most common types of taxation instruments used, and form on average 75% of income from environmental taxes. Since 2009, there has been a steady increase in environmental tax revenues with the majority of Member States collecting between 2% and 3% of GDP through environmental taxes.[949] Despite these developments, to date these taxes have only led to relatively marginal changes to the tax system and incentives within the economy and there remains scope for the increased application and more effective use of such instruments. There is scope for learning and exchange of best practices between Member States including those that have already introduced input and/or natural resources taxes (including on aggregates and other extracted materials, and general natural resources taxes applied to resources including water, physical raw materials, and even pollutants) to encourage their wider application among a greater number of Member States as well as encourage review and further refinement of existing taxes so that they are more effective in supporting the transition to a resource efficient economy. Thus there is a serious need for environmental tax reform to be put at the heart of Europe 2020 activities, for monitoring and reporting on efforts in this area to be seriously pursued under the European Semester and for relevant indicators to be integrated into the European Semester.

On the identification and reform of **environmentally harmful subsidies (EHS)** countries such as Germany[950] and the Netherlands[951] have produced reports listing EHS that exist in their countries without waiting for a common EU or internationally agreed approach. This can be considered a useful first step in the reform of EHS, helping to raise public awareness of the impacts of such subsidies, the level of public money supporting them and the benefits of their reform. Although the Resource Efficiency Roadmap calls on Member States to identify the most significant EHS, prepare plans and timetables to phase them out, and report on these as part of their National Reform Programmes by 2012/2013, efforts to date have been limited. Such regular and transparent reporting should be further encouraged and their results communicated through the European Semester process as well as at the national level. Such reports can provide the basis for medium- to long-term plans for the progressive and systematic reform or phasing out of EHS. EHS reform efforts could focus on certain issues which have been identified as priorities and already have some political momentum, such as subsidies for fossil fuels, as well as transport-related subsidies including company car taxation and commuter subsidies. The impacts of the former are widely recognised and have received much political attention including at the international level (G20) while the latter are relevant given the wide recognition of the effect of transport on air quality (see air quality section below).

There is also a strong need to ensure coherence of **state aid** provided by Member States to avoid for example funding efforts to combat climate change and reduce fossil fuel consumption and use while also funding the production and consumption of fossil fuels. Nine Member States support both renewable energy *and* fossil fuels (Belgium, the Czech Republic, France, Germany, Latvia, Poland, Slovakia, Slovenia and Spain). Six Member States do not allocate state aid for coal production (Bulgaria, Czech Republic, Estonia, Greece, Italy and the UK) out of the 13 coal-producing Member States (the remaining countries are Germany, Hungary, Poland, Romania, Slovakia, Slovenia and Spain). The

lack of coherence in state aid undermines its effectiveness and can be seen as an irresponsible use of limited public funds, while also hindering progress towards a resource efficient, low carbon economy. Good examples of the phasing out of funding for coal exist, and these examples should be replicated beyond the coal sector to other highly polluting, 'sunset' sectors, through the careful management of the shift of funds (often long-standing for many years/decades) from environmentally damaging to environmentally enhancing sectors and technologies.

Such economic engineering is increasingly needed across all aspects of public expenditure. The European Semester provides a regular and consistent process for EU economic oversight and thus needs to become a key development, implementation and evaluation process for the on-going transition to a resource efficient, low carbon economy. It needs to ensure that a strategic approach continues to be developed across the often-overlapping issues addressed in the package of Roadmaps and strategies on resource efficiency, low carbon economy, transport, energy, and biodiversity. Strong links also need to continue to be made to the Industrial Policy and Horizon 2020, and future developments in these areas. The development of a strategic approach to the resource efficiency agenda will need to integrate, facilitate and require the better use of economic, financial and fiscal instruments as well as links to the circular economy and restoration/natural capital which are in the process of being constructed.

Waste management

Given the division of Member States into clusters in the waste management chapter, we provide a similar structure here.

The **higher performing countries (**Austria, Belgium, Denmark, Germany, Luxembourg, the Netherlands and Sweden), most of the key instruments are in place for environmentally sound waste management, including comprehensive, source-separated municipal waste collection systems, clear lines of responsibility for collection and treatment of waste; separate bio-waste collection; and sufficient treatment capacity. Economic instruments are also in place, including landfill and sometimes incineration taxes; polluter pays principle instruments such as producer responsibility and PAYT schemes; landfill bans; and deposit-return systems in some cases. Looking ahead, these countries will need to focus activity in the following areas:

- Ensuring effective **waste prevention** activities that help to reduce waste generation, and change consumption patterns.
- Realigning **treatment capacity** along the lines of a **circular economy** approach, thereby **reducing incineration capacity** and considering **alternative treatments** such as intensifying separate collection with the aim to increase high quality reuse and, **recycling levels** (which will sometimes mean added efforts in public awareness-raising and behaviour change).
- Better development and implementation of **individual producer responsibility** in existing and any future schemes, thereby establishing a clear link between product (eco-) design and the cost of end-of-life management, creating **financial incentives for eco-design**, as well as ensuring that **total separate collection and recycling costs are covered by producers**. In this regard, **EU policy (beyond waste legislation) needs to further develop the producer responsibility principle, both in its articulation and its integration in legislation and voluntary tools** (such as the Ecodesign Directive voluntary agreements). Further development of producer responsibility, in this case, means its application to more products and to sectors, and beyond the end-of-life management of products to include information provision and potentially other elements building transparency.

- Development of **sustainable consumption and production policies**, beyond voluntary measures and provision of information. These could include the development of **sustainable business models** (working in collaboration with business partners), **choice editing in shops** (working with the retail sector to eliminate less environmentally performant products from shop shelves), and **promoting less materialistic, voluntary simplicity lifestyles**.

For **transitional countries** (Czech Republic, Estonia, Finland, France, Ireland, Italy, Slovenia and the UK), much focus is on the further development of existing tools, including source-separated municipal waste collection schemes to cover the whole population; planned, staged increases to landfill and, where applicable, incineration taxes; and introduction, expansion or strengthening of existing instruments such as landfill bans, producer responsibility and PAYT schemes. Looking ahead, particular focus is also needed to:

- Further develop a **reuse, recycling and waste prevention culture**, via **awareness-raising and communication activities**, to support expansion of separate collection schemes (financially supported by producer responsibility and PAYT schemes).
- Focus policy efforts, and related support mechanisms, on **waste prevention activities**. This should also include the legal requirement for regional and local authorities to prepare **waste prevention plans** as part of waste management plans.
- Strategic development of **treatment capacity**, to ensure appropriately scaled recovery installations and recycling/composting capacity that is easy to increase. Both political objectives and subsequent decisions on measures should reflect a priority for activity higher up the hierarchy, notably reuse/recycling/composting capacity before incineration or other recovery activities.
- The same observation on **individual producer responsibility** as for higher performing countries above.

For **below average performing** countries (Bulgaria, Cyprus, Greece, Hungary (check if to go up to medium), Latvia, Lithuania, Malta, Poland, Portugal, Romania, Slovakia and Spain), most are still missing key elements of an environmentally sound waste management system. Looking ahead, particular attention will be needed to:

- Develop waste and related policy to support a resource-efficient, circular economy, encouraging **eco-design** and broader **eco-innovation**, respecting the **waste hierarchy** (including prevention), and building a culture that supports this.
- Deliver studies on **treatment capacity needs**, aligned to the previous point, and providing analysis of appropriate **economic instruments**, particularly landfill and incineration taxes, and landfill/incineration bans.
- Ensure strategic use of **EU structural and cohesion funds**, to build appropriate treatment capacity in line with the waste hierarchy; and ensure coverage of all households by **waste collection schemes,** with **separate collection** of recyclables, compostables and hazardous waste.
- Increase **capacity of competent authorities** to create, implement, and enforce high performing waste management systems, through appropriate strategy development, adequate infrastructure, public engagement, and well-funded environmental regulators.
- Review existing **producer responsibility schemes** along the lines of that suggested for high performing countries, and apply them to at least all of the waste streams/products addressed by the EU recycling directives.

- Address **diversion of biodegradable waste from landfill**, through infrastructure (separate collection, composting/digestion facilities), regulatory and economic instruments.

Support to SMEs

In most cases, Member States are providing SMEs with some elements of support and even have specific policies, programmes and Ministries dedicated to them. A number of Member States (Belgium, Bulgaria, Czech Republic, Denmark, Estonia, France, Germany, Hungary, Latvia, Luxembourg, Romania, and Slovakia) appear to have provided more developed support to SMEs throughout 2011-12, recognising the importance of this type of enterprise to their economies.

The priorities of such support for SMEs build on existing examples making them more systematically available through:

- **Well-targeted and easy-to-use financial support which aim to facilitate the development of new products/technologies, eco-innovation, connections with other key stakeholders** in these processes (universities, academics, venture capital and business angels) such as through clusters and R&D funding (such as Belgium's 'Business Angels Network'[952] [953], Finland's 'TEKES' programme[954], France's various funds administered by ADEME, Slovenia's 'Enterprise Fund'[955]). Such support aims to overcome some of the barriers facing SMEs in identifying and implementing appropriate solutions given their limited capacities and lack of expertise in many environmental areas.
- **Reducing administrative costs** by continuing efforts to provide 'one-stop shops' offering information and a single or fewer registration procedures (such as the Czech Republic's 'Czech POINTS', and the UK's 'Business Link' and 'Business Gateway')[956].
- **Promoting compliance with environmental (and other) legislation** through outreach, online information portals, links to key legal registration documents, training, and other capacity-building activities (such as Portugal's 'Energy Efficiency in 100 SMEs'[957], and the Netherlands' 'Omgevingsvergunning'). These activities aim to maintain high levels of awareness of relevant environmental legislation and requirements
- **Enabling SMEs to become more resource efficient** by both cutting the costs of their resource inputs, and developing new green products (such as Germany's 'KMU-Innovativ'[958] providing funds for research on resource efficiency and energy efficiency technologies, its preferential loans, and its 'Demea' agency). In this context, the provision of environmental expertise, support in applying environmental management services and project support can work well together. **Making better use of EU programmes for supporting SMEs and Innovation** (such as Latvia's use of ERDF funds to create SME-specific initiatives[959], Cyprus's use of structural funds for eco-innovation particularly in sustainable agriculture, Greece's use of structural funds for eco-innovation particularly in construction and primary sectors, Hungary's use of cohesion funds for eco-innovation for environmental and sustainable infrastructure, energy efficiency and pollution control[960], Denmark, Finland, Italy[961], and the Netherlands[962] which have used EU funds to support SMEs). In September 2012, the European Investment Fund (EIF), Estonia, Latvia and Lithuania created the Baltic Innovation Fund (BIF) with a goal to increase equity investments in enterprises within the area. Money will be invested into private equity and venture capital funds over the next four years to further develop equity investment into SMEs.

Air quality

The air pollutants with the most serious need of attention across most Member States are **NO_x**, **PM_{10}** and **$PM_{2.5}$**. Despite having met EU limit levels on NO_x, some countries are still having difficulty meeting NO_2 levels, mostly due to difficulties in managing traffic levels.

Transport-related activities Euro standards on vehicles have been generally identified as not having had an impact on specific pollutants although general air quality has been improved. Other sources include industrial activities, and specific cases such as building works of a significant size, the increased use of solid fuels and other high polluting fuels (such as damp biomass) in heating (due to the economic crisis, and the lower prices for such fuels).

For transport-related activities, there is a need for increased efforts to ensure **policy coherence** between climate change, transport and air quality objectives, notably by **supporting infrastructure and modal shift to non-road transport** (for both passengers and freight), **phasing out environmentally harmful subsidies** in company vehicle taxation and commuter subsidies, and encouraging more effective use of energy and transport taxation (e.g. reducing exemptions). A stronger emphasis on **behaviour innovation** (promotion of non-personal vehicle transport) and **positive impacts on health** (particularly of walking and cycling) need to be integrated into what has historically been a technological innovation approach (Euro standards, CO_2 from cars). Also, **support to diesel-powered vehicles** needs to be reconsidered, given the fuel's emissions of particulate matter and related health impacts.

Apart from individual country industrial activity, **the agriculture sector needs to have air quality considerations integrated in policies and instruments relating to its activities**. This is especially the case for ammonia and for fuel-related emissions, and extends also to water use and the reform of environmentally harmful subsidies to this sector.

9 Endnotes

[1] European Commission (2010). Europe 2020: A strategy for smart, sustainable and inclusive growth (COM(2010) 2020 final) http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF

[2] Most notably, these are the Roadmap to a Resource-Efficient Europe, the Roadmap for moving to a Low Carbon Economy in 2050, the EU Energy Roadmap 2050, and the EU Biodiversity Strategy to 2020.

[3] http://ec.europa.eu/europe2020/pdf/themes/14_resource_efficiency.pdf

[4] http://ec.europa.eu/economy_finance/economic_governance/sgp/index_en.htm

[5] Bundesministerium für Finanzen (2012): Bericht der Bundesregierung, Budgetbericht 2013. http://www.bmf.gv.at/Budget/Budgetsimberblick/Sonstiges/Budgetsimberblick/Budget2013/Budgetbericht_2013.pdf

[6] Ministry of Environment and Water of Bulgaria. Annex 7 Cost analysis of the water sector and sources of funding. http://www3.moew.government.bg/files/file/Water/IVodi/NSURVS/Analiz_7_Finansirane.doc

[7] Irish Government, The National Recovery Plan 2011-2014, http://www.budget.gov.ie/The%20National%20Recovery%20Plan%202011-2014.pdf

[8] Statistical Office of the Republic of Slovenia, Current expenditure for environmental protection by statistical regions (1000 EUR) http://pxweb.stat.si/pxweb/Dialog/varval.asp?ma=2711804E&ti=&path=../Database/Environment/27_environment/06_protection/27118_environm_protection/&lang=1. See also the Statistical Yearbook 2012, http://www.stat.si/letopis/letopisprvastran.aspx?lang=en

[9] Data from the State General Accounting office for 2008-2012 and Budget Law 2012 for 2013-2015. (http://dwrgsweb-lb.rgs.mef.gov.it/DWRGSXL/pages/lb/index.jsp), for the years between 2008 and 2012 and Budget Law 2012 for the years between 2013 and 2015, Supplemento ordinario n.212 alla Gazzetta Ufficiale, 29-12-2012 (http://www.rgs.mef.gov.it/_Documenti/VERSIONE-I/Bilancio-d/Bilancio-finanziario/2013/Legge_di_bilancio/Allegato_Legge_di_Bilancio2013.pdf)

[10] Ministry of Finance, 2010 Lithuanian State Budget allocation according to the areas, http://www.finmin.lt/web/finmin/2010biudzpatob#vbaps

[11] INE, Estatísticas do Ambiente, 2011, http://www.ine.pt/ngt_server/attachfileu.jsp?look_parentBoui=151038579&att_display=n&att_download=y

[12] Secretarío de Estado de Presupuestos y Gastos, http://www.sepg.pap.minhap.gob.es/sitios/sepg/es-ES/Presupuestos/PresupuestosEjerciciosAnteriores/Paginas/PresupuestosEjerciciosAnteriores.aspx

[13] National Statistics Office Malta (January 2013). News Release 021/2013, http://www.nso.gov.mt/statdoc/document_file.aspx?id=3519

[14] GUS, Central Statistical Office (2012) Poland Quarterly Statistics No. 2/2012, Warsaw, Analysis and Comprehensive Studies Department CSO, http://www.stat.gov.pl/cps/rde/xbcr/gus/as_poland_quarterly_statistics_2_2012.pdf

[15] National Institute of Statistics, 2012. http://www.insse.ro/cms/rw/pages/index.en.do

[16] Data for 2008-2010 from Office for National Statistics. UK Environmental Account 2012, http://www.ons.gov.uk/ons/rel/environmental/uk-environmental-accounts/2012/stb-ukea-2012.html#tab-Environmental-Protection-Expenditure--EPE-; Data for 2011-2015 from UK Public Spending (2013), http://www.ukpublicspending.co.uk/year_spending_2011UKmn_12mc1n_65808a#ukgs302

[17] OECD Statistics, table 11 on government expenditure by function, http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE11

[18] OECD. Environmental Performance Reviews Slovenia 2012 Highlights. http://www.oecd.org/env/environmentalcountryreviews/50510129.pdf

[19] EUROSTAT: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_ac_tax&lang=en

[20] Summary of 2013 Budget Measures: Policy Changes, http://www.budget.gov.ie/Budgets/2013/Documents/Summary%20of%202013%20Budget%20Measures%20Policy%20Changes.pdf,

[21] HM Revenue & Customs. Fuel Duty Rates, http://www.hmrc.gov.uk/tiin/new-clause-fuel-duty.pdf

[22] OECD (2013). Taxing Energy Use: A Graphical Analysis, http://www.oecd-ilibrary.org/docserver/download/2313021e.pdf?expires=1360343295&id=id&accname=ocid75017725&checksum=F87B5E77787168A41AF21ACDC3F45F6C

[23] Legislative Decree of 3 March 2011 n.28

[24] Statistics Sweden, http://www.scb.se/Pages/TableAndChart____39451.aspx

[25] HM Revenue & Customs. Aggregates Levy – introduction, http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?_nfpb=true&_pageLabel=pageExcise_InfoGuides&propertyType=document&id=HMCE_CL_001169

[26] Söderholm, P. (2011); ec.europa.eu/environment/integration/research/newsalert/pdf/262na1.pdf

[27] EEA, 2011 Survey of resource efficiency policies in EEA member and cooperating countries, Country profile Estonia, http://www.eea.europa.eu/themes/economy/resource-efficiency/resource-efficiency-policies-country-profiles

[28] Likums "Dabas resursu nodokļa likums" ("LV", 209 (3367)), 29.12.2005. Article 4. http://www.likumi.lv/doc.php?id=124707

[29] Eurostat (2013). Taxation trends in the European Union, European Union, 2013. http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_structur

es/2013/report.pdf [30] Sénit, C.-A. (2012) The politics of carbon taxation in France: preferences, institutions, and ideologies, Working Paper, IDDRI, http://www.iddri.org/Publications/Collections/Idees-pour-le-debat/WP2012_CAS_politics%20of%20taxation%20france.pdf

[31] Ravazzi A. (2012). The Italian response to reform commitments. Presentation at the workshop Reforming Environmentally Harmful Subsidies for a Resource Efficient Europe, Brussels 26 June 2012.

[32] Information from European Environment Agency, (WQ5) Water prices, http://www.eea.europa.eu/data-and-maps/indicators/water-prices/water-prices

[33] ERSAR, Portuguese Regulation Agency for Water and Waste , http://www.ersar.pt/website/ViewContent.aspx?GenericContentId=972&FolderPath=\Root\Contents\Sitio\Consumidores&Section=Consumidores&FinalPath=Not%C3%ADcias&SubFolderPath=

[34] Ecorys et al. (2011). The role of market-based instruments in achieving a resource efficient economy. http://ec.europa.eu/environment/enveco/taxation/pdf/role_marketbased.pdf

[35] Rauba, E, Rauba, K (2009) Analysis of possibilities for fulfillment of water services costs revoery principle for the example of wastewater treatment plants located in the Nothe-Eastern Poland, Ochrona Srodowiska i Zasobow Naturalnych Nr 40, 2009, http://www.ios.edu.pl/pol/pliki/nr40/nr40_64.pdf

[36] Rauba, E. (2011) Zasada zwrotu kosztow swiadczenia uslugi oczyszczynia sciekow w switle ramowej dyrektywy eodnej unii europejskiej, Inżynieria Ekologiczna Nr 27, 2011, http://www.ineko.net.pl/pdf/27/19.pdf

[37] Arcadis, 2012, The role of water pricing and water allocation in agriculture in delivering sustainable water use in Europe (p.60) http://ec.europa.eu/environment/water/quantity/pdf/agriculture_report.pdf

[38] Berbel, J., Calatrava, J. and Garrido, A. (2007). 'Water Pricing and Irrigation: A Review of the European Experience', in: Molle, F. and Berkoff, J. (eds). Irrigation Water Pricing: The Gap between Theory and Practice. CABI: Oxford.

[39] European Commission (February 2012). The role of water pricing and water allocation in agriculture in delivering sustainable water use in Europe http://ec.europa.eu/environment/water/quantity/pdf/agriculture_report.pdf

[40] Calatrava and Garrido (2010) Measuring Irrigation Subsidies in Spain: An application of the GSI Method for quantifying subsidies. http://www.iisd.org/gsi/sites/default/files/irrig_spain.pdf.

[41] Socratous, G. (2011), Water Pricing Policy in Cyprus: The Implications of the Water Framework Directive. Ch. 9 in: P. Koundouri (ed.), Water Resources Allocation. Policy and Socioeconomic Issues in Cyprus. Springer.

[42] Department of Environment, Community and Local Government (October 2012). Water Sector Reform: Implementation Strategy, http://www.environ.ie/en/Publications/Environment/Water/FileDownLoad,32001,en.pdf

[43] Bulgarian website on Water: http://www.voda.bg/news-84/info-3787

[44] Copenhagen Economics, 2010, Taxation papers, Company cars taxation, http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_papers/taxation_paper_22_en.pdf

[45] Schrode, A., Burger, A., Eckermann, F., Berg, H. und Thiele, K. (2011), p. 23.

[46] Umwelt Bundes Amt (2008).Environmentally Harmful Subsidies in Germany. Originally published in German in 2008, published in English in 2010. http://www.umweltdaten.de/publikationen/fpdf-l/3896.pdf.

[47] Drissen, E., A. Hanemaaijer, and F. Dietz (2011). PBL-notitie Milieuschadelijke subsidies. Planbureau voor de Leefomgeving (PBL), Den Haag. http://www.pbl.nl/sites/default/files/cms/publicaties/20110914%20PBL%20Notitie%20Milieuschadelijke%20subsidies%20-%20500209001.pdf

[48] OECD (2012) Environmental Performance Review of Slovenia Revised Assessment and Recommendations. http://www.oecd.org/environment/environmentalcountryreviews/50068236.pdf

[49] Naturvardsverket(2012), Potentiellt miljöskadliga subventioner Förstudie från 2005 – uppdaterad 2011, http://www.naturvardsverket.se/Documents/publikationer6400/978-91-620-6455-6.pdf

[50] Oosterhuis, F., et al. (2013), Budgetary support and tax expenditures for fossil fuels. An inventory for six non-OECD EU countries. Draft report for the European Commission, DG Environment. Institute for Environmental Studies (IVM).

[51] Jornal Público, Consumo de eletricidade reduz 3.6% e cai para valores de 2006, published 03.01.2013 http://www.publico.pt/economia/noticia/consumo-de-electricidade-cai-36-e-recua-para-valores-de-2006-1579368

[52] Finland's Government (2011), Programme of Prime Minister Jyrki Katainen's Government, http://valtioneuvosto.fi/hallitus/hallitusohjelma/pdf/en334743.pdf

[53] Government of the Slovak Republic (2011) *Slovak National Reform Programme*, http://ec.europa.eu/europe2020/pdf/nrp/nrp_slovakia_en.pdf

[54] Hammar H, and Åkerfeldt S., (2011) CO2 taxation in Sweden, 20 years of experience and looking ahead, 2012 http://www.globalutmaning.se/wp-content/uploads/2011/10/Swedish_Carbon_Tax_Akerfedlt-Hammar.pdf

[55] Ecorys, http://ec.europa.eu/competition/consultations/2009_coal/ecorys_study_final_report.pdf

[56] OECD (2013), "Hungary", in OECD, Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels 2013, OECD Publishing. doi: 10.1787/9789264187610-17-en

[57] Eurocoal, Slovenia, http://www.euracoal.be/pages/layout1sp.php?idpage=80

[58] European Commission, DG COMP, http://ec.europa.eu/competition/state_aid/studies_reports/expenditure.html

[59] European Commission, http://ec.europa.eu/economy_finance/publications/occasional_paper/2012/pdf/ocp123_en.pdf

[60] European Commission, DG COMP, http://ec.europa.eu/competition/state_aid/studies_reports/studies_reports.html,.
[61] Finland's Government (2011), Programme of Prime Minister Jyrki Katainen's Government, 22.6.2011, http://valtioneuvosto.fi/hallitus/hallitusohjelma/pdf/en334743.pdf
[62] Commission Européenne (2009), Aide d'Etat / Belgique (Flandres) – N 561/2009. Prolongation de la mesure agroenvironnementale Engagement de Gestion eau. http://ec.europa.eu/competition/state_aid/cases/233471/233471_1034809_19_2.pdf
[63] http://ec.europa.eu/competition/state_aid/cases/238184/238184_1170088_27_3.pdf
[64] http://ec.europa.eu/competition/state_aid/cases/241894/241894_1284978_69_2.pdf
[65] Tourism and Sustainable Development Unit. Grant Scheme for Tourism Projects by Enterprises 2007-2013, https://secure2.gov.mt/TSDU/grant_scheme
[66] Environmental Fund, http://www.envirofond.sk/sk/podpora_uvery.html
[67] DG Competition, State aid N 517/2010 – United Kingdom, WRAP - Capital Grants and Lease Guarantee Fund Scheme (prolongation and modification), http://ec.europa.eu/competition/state_aid/cases/238289/238289_1181198_54_2.pdf
[68] European Commission (2012). State aid SA.33984 (2012/N) – United Kingdom, Green Investment Bank, C(2012) 7133 final, http://ec.europa.eu/competition/state_aid/cases/245775/245775_1377661_117_1.pdf
[69] Tekes (2012), Tekes funding services for small and medium-sized enterprises, January 2012, www.tekes.fi/en/document/55294/rahoitusesite_engl_pdf
[70] Ministry of the Environment and Ministry of Transport (2007), Operational Programme Infrastructure, https://www.sfzp.cz/ke-stazeni/228/1952/detail/programme-complement---english-12-07/
[71] Department of Energy & Climate Change (April 2012). Announcement: Support for eco innovators, http://www.decc.gov.uk/en/content/cms/news/pn12_052/pn12_052.aspx
[72] Creation PME (2012), Business Angel. http://creation-pme.wallonie.be/1avant/Comprendre/Businessangelcourte.htm
[73] Vossen, R. (unknown), Business Angels Network. www.sme-finance-day.eu/fileadmin/Content/PDF/Brussels/presentation/Vossen_Presentatie_BAN_Vlaanderen.pdf
[74] Ministry of the Environment (2012) 6th evaluation of the Waste Management Plan for 2010, http://www.env.cz/C1257458002F0DC7/cz/plneni_narizeni_vlady/$FILE/OODP-Sesta_hodnotici_zprava_POH_CR_2010-120212.pdf
[75] Determann, W. (2011). Eco-innovation in Italy. Eco-innovation observatory, thematic report. http://www.eco-innovation.eu/images/stories/Reports/eio_country_brief_2011_italy.pdf
[76] European Commission, 2011a. Eco-Innovation in Greece. Eco-Innovation Observatory
[77] Eco-Innovation Observatory, Hungary, http://www.eco-innovation.eu/index.php?option=com_content&view=article&id=473&Itemid=61
[78] European Commission, http://ec.europa.eu/regional_policy/sources/docgener/informat/country2009/fi_en.pdf
[79] EAS, Competence Centre Programme, http://www.eas.ee/en/for-the-entrepreneur/innovation/competence-centre-programme
[80] See http://www.efanrw.de/index.php?id=13&L=1
[81] Eco-Innovation Observatory (2011). Eco-innovation in Malta: EIO Country profiles 2010, http://www.eco-innovation.eu/media/EIO_Country_Brief_2010_Malta.pdf
[82] Polish Information and Foreign Investment Agency (2013) Pomoc publiczna dla malych I srednich przedsiebiorstw w okresie dekoniunktury gospodarczej, http://www.paiz.gov.pl/prawo/prawo_konkurencji/artykuly/pomoc_publiczna_dla_msp
[83] Le Lieu du Design www.lelieududesign.com/aide-a-l-innovation-responsable-air-aides-a-l-innovation
[84] Stockholm Environmental Institute (SEI) projects, http://www.sei-international.org/projects?prid=1884
[85] Agency for Innovation Portugal, http://www.ei.gov.pt/iniciativas/detalhes.php?id=37
[86] UNEP (2012) Eco-innovation practices and business opportunities for European SMEs in the emerging markets of Asia, Latin America and Africa. Eco-innovation observatory, thematic report. http://www.scp-centre.org/news/newsdetails/article/report-on-eco-innovative-smes-in-emerging-and-transition-markets.html
[87] Stockholm Environmental Institute (SEI) projects, http://www.sei-international.org/projects?prid=1884
[88] AEA and Ecologic Institute (2011) First assessment of the Environmental Compliance Assistance Programme for SMEs (ECAP) http://ec.europa.eu/environment/sme/pdf/First%20assessemnt%20of%20the%20ECAP%20for%20SMEs.pdf
[89] Mazur, E. (2012), "Green Transformation of Small Businesses: Achieving and Going Beyond Environmental Requirements", OECD Environment Working Papers, No. 47, OECD Publishing. http://dx.doi.org/10.1787/5k92r8nmfqxp-en
[90] See http://www.iris-berlin.de/deutsch/projekte/oep_00.html
[91] See www.semaphores.fr/observatoire-regions/regions/rhone-alpes/plan-pme-puissante-offre.html
[92] ADEME, http://formations.ademe.fr/index.php?s=produit.
[93] Mazur, E (September 2012). OECD Environment Working Papers No. 47, Green Transformation of Small Businesses: ACHIEVING AND GOING BEYOND ENVIRONMENTAL REQUIREMENTS, http://www.oecd-ilibrary.org/docserver/download/5k92r8nmfqxp.pdf?expires=1360167461&id=id&accname=guest&checksum=D39E41F50C685950D9A49666F1D0B759
[94] Enterprise Ireland http://www.enterprise-ireland.com/en/Productivity/Build-a-green-sustainable-Business/

[95] http://www.oecd-ilibrary.org/docserver/download/5k92r8nmfqxp.pdf?expires=1354879871&id=id&accname=guest&checksum=A274B00185B39E0FF084B407F1DEFD54

[96] OECD (2012). Environmental Performance Review of Italy. Revised Assessment and Recommendations. http://www.oecd.org/env/environmentalcountryreviews/11%20FINAL.%20Room%20Document%202%20EPR%20Italy%20Revised%20Assessment%20and%20Recommendations%20FINAL.pdf

[97] http://www.eea.europa.eu/highlights/air-pollution-breaches-of-legal

[98] http://www.eea.europa.eu/highlights/air-pollution-breaches-of-legal

[99] Environmental Protection Agency http://www.epa.ie/irelandsenvironment/air/

[100] Département de l'environnement (2011) *Rapport d'activité 2011*, http://www.gouvernement.lu/publications/informations_gouvernementales/rapports_activite/rapports-activite-2011/06-mddi/RA_3_DENV_2011.pdf

[101] ISPRA (2009). Database on measures to improve air quality, http://www.misureprqa.sinanet.isprambiente.it

[102] ISPRA (2011). 10° annuario dei dati ambientali 2011. http://annuario.isprambiente.it/tematiche-primo-piano-2011

[103] OECD (2010) *Environmental performance review: Luxembourg*

[104] Ministry of Environment, (2008) Environmental Policy of the country in the years 2009-2012 with a perspective toward 2016, Warsaw, http://www.mos.gov.pl/g2/big/2009_07/2826c539c3015384e50adac8fe920b0b.pdf

[105] Bolte, T. (2012). Onesnazenost zraka v letu 2012. In: Agencije RS za okolje. Nase okolje, december 2012, letnik XIX,stevilka 12, pp. 95 to 102.

[106] Koelemeijer, R., E. Drissen and S. Kruitwagen (2009). Recessie brengt halen van luchtdoelen dichterbij. Tijdschrift Lucht 4 (August 2009): 7-11.

[107] EEA (2011) Air Pollution – Poland, http://www.eea.europa.eu/soer/countries/pl/soertopic_view?topic=air%20pollutio

[108] Internetportal EurActiv, http://www.euractiv.com/specialreport-air-quality/bulgaria-killer-air-exposes-wide-news-508892

[109] OECD (2002): Environmental performance review of Austria. http://www.oecd.org/environment/environmentalcountryreviews/19631516.pdf

[110] Kormanyportal, Fókuszban a levegő minősége, http://www.kormany.hu/hu/videkfejlesztesi-miniszterium/kornyezetugyert-felelos-allamtitkarsag/hirek/fokuszban-a-levego-minosege

[111] European Environment Agency (2011): http://www.eea.europa.eu/soer/countries/at/soertopic_view?topic=air%20pollution

[112] http://www.eea.europa.eu/soer/countries/fi/soertopic_view?topic=air%20pollution

[113] Karvosenoja N., Tainio M., Kupiainen K., Tuomisto J. T., Kukkonen J. and Johansson M. 2008. Evaluation of the emissions and uncertainties of PM2.5 originated from vehicular traffic and domestic wood combustion in Finland. Boreal Environ. Res. 13:465-474. http://www.borenv.net/BER/pdfs/ber13/ber13-465.pdf

[114] See http://www.bmu.de/verkehr/strassenverkehr/doc/41892.php

[115] Finansministeriet (2011) ; Aftaler om Finansloven for 2012 http://www.fm.dk/Publikationer/2011/~/media/Publikationer/Imported/2011/Aftaler%20om%20finansloven%20for%202012/web_aftaler%20om%20finansloven%20for%202012.ashx

[116] Deloitte (2012); Danish Finance Act for 2012. http://www.deloitte.com/assets/Dcom-Denmark/Local%20Assets/Documents/Udgivelser/Nyheder/Skat/Finansloven%202012_UK_udkast%202.pdf

[117] Finland's Government (2010), Programme of Prime Minister Jyrki Katainen's Government, http://valtioneuvosto.fi/hallitus/hallitusohjelma/pdf/en334743.pdf

[118] Energap.si, ENVIRONMENTAL ZONE IN THE CITY OF MARIBOR, http://www.energap.si/uploads/ENVIRONMENTAL%20ZONE%20IN%20THE%20CITY%20OF%20MARIBOR.pdf

[119] UBA (2009a). Feinstaubbelastung in Deutschland. Dessau-Roßlau.

[120] Greek Ministry for the Environment 2006. National Reporting to the Fourteenth & Fifteenth Sessions of the COMMISSION for SUSTAINABLE DEVELOPMENT of the UNITED NATIONS (UNCSD 14 – UNCSD 15) http://www.un.org/esa/agenda21/natlinfo/countr/greece/airPollution.pdf

[121] ISPRA (2009). Database on measures to improve air quality, http://www.misureprqa.sinanet.isprambiente.it.

[122] Eurostat (2012). Taxation Trends in the European Union, http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_structures/2012/country/mt.pdf

[123] European Commission, press Release 2009. http://europa.eu/rapid/press-release_IP-09-1012_en.htm

[124] European Environment Agency (2010). The European environment – state and outlook 2010, Air pollution (United Kingdom), http://www.eea.europa.eu/soer/countries/uk/soertopic_view?topic=air pollution

[125] Information from The New Hungarian Development Plan - Strategic Reference Framework of Hungary 2007–2013

[126] ELTIS, Budapest risks EU subsidies by postponing congestion charge (Hungary), http://www.eltis.org/index.php?ID1=5&id=60&news_id=4040

[127] Ministry of the Environment (2012) Law on the protection of air, http://www.mzp.cz/C1257458002F0DC7/cz/novy_zakon_ochrana_ovzdusi/$FILE/OOO-zakon_ovzdusi-27062012.pdf.pdf

[128] Likums "Dabas resursu nodokļa likums" ("LV", 209 (3367)), 29.12.2005. Attachment 4. http://www.likumi.lv/doc.php?id=124707#piel4

[129] Kredex, News on prolongation of electric cars project, http://www.kredex.ee/kredex/news/the-government-is-planning-to-prolong-the-project-of-electric-cars/

[130] NSL (2009). Nationaal Samenwerkingsprogramma Luchtkwaliteit. Ministry of Housing, Spatial Planning and Environment http://www.rijksoverheid.nl/documenten-en-publicaties/brochures/2011/01/03/nationaal-samenwerkingsprogramma-luchtkwaliteit.html

[131] Environmental Protection Agency (2012). AIR QUALITY IN IRELAND 2011: Key Indicators of Ambient Air Quality, http://www.epa.ie/downloads/pubs/air/quality/Air%20Quality%20Annual%20Report%202011%20final.pdf

[132] Malta Resources Authority (2012). Energy Efficiency Policies and Measures in Malta, ODYSSEE- MURE 2010, Monitoring of EU and national energy efficiency targets, http://www.odyssee-indicators.org/publications/PDF/malta_nr.pdf

[133] European Commission (2010). Europe 2020: A strategy for smart, sustainable and inclusive growth (COM(2010) 2020 final). http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF

[134] Most notably, these are the Roadmap to a Resource-Efficient Europe, the Roadmap for moving to a Low Carbon Economy in 2050, the EU Energy Roadmap 2050, and the EU Biodiversity Strategy to 2020.

[135] http://ec.europa.eu/europe2020/pdf/themes/14_resource_efficiency.pdf

[136] European Commission (2011). Roadmap to a Resource Efficient Europe. Com(2011) 571 final. Brussels, 2011.

[137] See http://www.erneuerbare-energien.de/english/renewable_energy/government_funding/doc/42399.php http://www.erneuerbare-energien.de/en/topics/government-funding/general-information-support/?cHash=816f8cc23fe06c8f81ed0897140ba585

[138] See http://www.bmu-klimaschutzinitiative.de/index_en.html

[139] Data for 2008-2010 from Office for National Statistics. UK Environmental Account 2012, http://www.ons.gov.uk/ons/rel/environmental/uk-environmental-accounts/2012/stb-ukea-2012.html#tab-Environmental-Protection-Expenditure--EPE- Data for 2011-2015 from UK Public Spending (2013), http://www.ukpublicspending.co.uk/year_spending_2011UKmn_12mc1n_65808a#ukgs302

[140] Statistics Denmark. COFOG -classifications of government expenditures by function and time. http://www.statbank.dk/statbank5a/default.asp?w=1280

[141] Commissariat Général au développement durable (2011) *Troisième rapport annuel au Parlement sur la mise en oeuvre des engagements du Grenelle Environnement*.

[142] SOeS (2012) *L'économie de l'environnement en 2010*, Rapport de la Commission des comptes et de l'économie de l'environnement, www.statistiques.developpement-durable.gouv.fr/fileadmin/documents/Produits_editoriaux/Publications/References/2012/rapport-ccee-corrige.pdf

[143] Statistics Sweden, http://www.scb.se/Pages/TableAndChart____71563.aspx

[144] Statistics Finland, http://www.stat.fi/til/jsys/2010/jsys_2010_2012-10-09_tie_001_en.html

[145] National Institute of Statistics, 2012. http://www.insse.ro/cms/rw/pages/index.en.do

[146] Ministry of Environment (2011) *Výročná správa za rok 2011 - Ministerstvo životného prostredia*, http://www.minzp.sk/files/dokumenty/materialy-a-dokumenty/vyrocne-spravy-a-verejne-odpocty/vyrocne-spravy/2011/vyrocna-sprava-mzp-sr-za-rok-2011a.pdf

[147] Eurostat, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=gov_a_exp&lang=en

[148] Secretarío de Estado de Presupuestos y Gastos, http://www.sepg.pap.minhap.gob.es/sitios/sepg/es-ES/Presupuestos/PresupuestosEjerciciosAnteriores/Paginas/PresupuestosEjerciciosAnteriores.aspx

[149] Webpage of the State General Accounting office (http://dwrgsweb-lb.rgs.mef.gov.it/DWRGSXL/pages/lb/index.jsp) for the years between 2008 and 2012 and Budget Law 2012 for the years between 2013 and 2015, Supplemento ordinario n.212 alla Gazzetta Ufficiale, 29-12-2012 (http://www.rgs.mef.gov.it/_Documenti/VERSIONE-I/Bilancio-d/Bilancio-finanziario/2013/Legge_di_bilancio/Allegato_Legge_di_Bilancio2013.pdf)

[150] INE, Estatísticas do Ambiente, 2011, http://www.ine.pt/ngt_server/attachfileu.jsp?look_parentBoui=151038579&att_display=n&att_download=y., see Excel File

[151] OECD, http://www.oecd.org/greece/48214177.pdf

[152] Bundesministerium für Finanzen (2012): Bericht der Bundesregierung, Budgetbericht 2013. http://www.bmf.gv.at/Budget/Budgetsimberblick/Sonstiges/Budgetsimberblick/Budget2013/Budgetbericht_2013.pdf

[153] Figures for 2012 and 2013 from Expenditure Report 2013, http://budget.gov.ie/Budgets/2013/Documents/Expenditure%20Report%202013%20Parts%20I%20-%20IV.pdf ; Figures for 2011 from Comprehensive Expenditure Report 2012-14, http://www.budget.gov.ie/budgets/2012/Documents/CER%20-%20Estimates%20Final.pdf ; Figures for 2010 from 2011 Estimates for Public Services and Summary Public Capital Programme, http://budget.gov.ie/Budgets/2011/Documents/Estimates%20Budget%202011.pdf ; Figures for 2009 from 2010 Estimates for Public Services and Summary Public Capital Programme, http://budget.gov.ie/Budgets/2010/Documents/Estimates%20Book%202010.pdf ; Figures for 2008 are from 2009 Estimates for Public Services and Summary Public Capital Programme, http://budget.gov.ie/Budgets/2009/Documents/CombinedBudgetEstimates2009&SPCP.pdf

[154] OECD (2012) Environmental Performance Review of Slovenia Revised Assessment and Recommendations. http://www.oecd.org/environment/environmentalcountryreviews/50068236.pdf
[155] Ministry of Environment and Water of Bulgaria: Annex 7 Cost analysis of the water sector and sources of funding. Sofia, http://www3.moew.government.bg/files/file/Water/IVodi/NSURVS/Analiz_7_Finansirane.doc
[156] Ministry of Finance, 2010 Lithuanian State Budget allocation according to the areas, http://www.finmin.lt/web/finmin/2010biudzpatob#vbaps
[157] Ministry of Finance, 2012 Lithuanian State Budget allocation according to the areas, http://www.finmin.lt/web/finmin/2012islaidos/
[158] Inese Auniņa (2012). "E.Sprūdžs: ministrijas reorganizācija tiks turpināta un pabeigta." VARAM. http://www.varam.gov.lv/lat/aktual/preses_relizes/?doc=15054
[159] EUROSTAT: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_ac_tax&lang=en
[160] OECD. Environmental Performance Reviews Slovenia 2012 Highlights. http://www.oecd.org/env/environmentalcountryreviews/50510129.pdf
[161] See http://www.umweltbundesamt-daten-zur-umwelt.de/umweltdaten/public/theme.do?nodeIdent=2621
[162] http://ec.europa.eu/taxation_customs/taxation/gen_info/economic_analysis/tax_structures/index_en.htm
[163] Deloitte Global Services Limited (2012). Taxation and Investment in Hungary 2012. Reach, relevance and reliability. Budapest, p. 18. http://www.deloitte.com/assets/Dcom-Global/Local%20Assets/Documents/Tax/Taxation%20and%20Investment%20Guides/2012/dttl_tax_guide_2012_Hungary.pdf. See also https://www.cfe-eutax.org/taxation/environmental-taxes/hungary
[164] HM Revenue & Customs. Fuel Duty Rates, http://www.hmrc.gov.uk/tiin/new-clause-fuel-duty.pdf
[165] OECD (2013). Taxing Energy Use: A Graphical Analysis, http://www.oecd-ilibrary.org/docserver/download/2313021e.pdf?expires=1360343295&id=id&accname=ocid75017725&checksum=F87B5E77787168A41AF21ACDC3F45F6C
[166] Gov.uk https://www.gov.uk/vehicle-tax-rate-tables
[167] Andersen, M.S., 2010; Europe's experience with carbon-energy taxation; SAPIENS Vol.3, number 2; 2010. http://sapiens.revues.org/1072
[168] Ministry of Environment http://www.environment.fi/default.asp?contentid=147208&lan=en
[169] Stefan Speck, Jim McNicholas and Marina Markovic. Environmental Taxes in an Enlarged Europe: An Analysis and Database of Environmental Taxes and Charges in Central and Eastern Europe. The Regional Environmental Center for Central and Eastern Europe SZENTENDRE (October 2001). http://pdc.ceu.hu/archive/00002423/01/SI_taxes.pdf
[170] Department of Communications, Energy and Natural Resources, http://www.dcenr.gov.ie/Energy/Sustainable+and+Renewable+Energy+Division/REFIT.htm
[171] Ofgem. Renewables Obligation, http://www.ofgem.gov.uk/Sustainability/Environment/RenewablObl/Pages/RenewablObl.aspx
[172] QuelleEnergie, www.quelleenergie.fr/fiscalite-verte/credit-impot/montant
[173] QuelleEnergie, www.quelleenergie.fr/fichiers/LivreBlanc-CI2012.pdf
[174] ENDS Europe. *Spain's renewables freeze 'should stay in place'*. 14 March 2012. http://www.endseurope.com/28389?referrer=bulletin&DCMP=EMC-ENDS-EUROPE-DAILY
[175] Asociación Empresarial Eólica. *El impuesto del 6% sobre la generación eléctrica tendrá un impacto para la eólica de 241 millones en 2013.* 14 September 2012. http://www.aeeolica.org/es/new/el-impuesto-del-6-sobre-la-generacion-electrica-tendra-un-impacto-para-la-eolica-de-241-millones-en-2013/
[176] Commissariat Général au développement durable (2012) *L'économie de l'environnement en 2010*, Rapport de la Commission des comptes et de l'économie de l'environnement, édition 2012.
[177] Transport Malta (January 2012). POL 02 - REGISTERING & LICENSING OF NEW & USED MOTOR VEHICLES, https://secure2.gov.mt/vehicleregistration/file.aspx?f=392
[178] Eurostat (2012). Taxation trends in the European Union. 2012 edition. Publications Office of the European Union, Luxembourg. http://ec.europa.eu/taxation_customs/taxation/gen_info/economic_analysis/tax_structures/index_en.htm
[179] European Commission - DG Environment (2011): The role of market-based instruments in achieving a resource efficient economy. URL http://ec.europa.eu/environment/enveco/taxation/pdf/role_marketbased.pdf
[180] European Commission - DG Environment (2011): The role of market-based instruments in achieving a resource efficient economy. URL http://ec.europa.eu/environment/enveco/taxation/pdf/role_marketbased.pdf
[181] UBA (2009a). Feinstaubbelastung in Deutschland. Dessau-Roßlau.
[182] Transport Malta (January 2012). POL 02 - REGISTERING & LICENSING OF NEW & USED MOTOR VEHICLES, https://secure2.gov.mt/vehicleregistration/file.aspx?f=392
[183] Likums "Dabas resursu nodokļa likums" ("LV", 209 (3367)), 29.12.2005. http://www.likumi.lv/doc.php?id=124707
[184] Lithuanian Parliament (Seimas), Legal data base, http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=416628
[185] European Commission, Taxation and Customs Union, Taxation trends in the European Union, Developments in the Member States, Lithuania http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_structures/2012/country/lt.pdf
[186] Lithuanian Parliament (Seimas), Legal data base, http://www3.lrs.lt/pls/inter2/dokpaieska.showdoc_l?p_id=416294

[187] Sek, M., Environmental Taxes in Poland, Foundation Centre of Tax Documentation and Studies, http://www.cfe-eutax.org/taxation/environmental-taxes/poland
[188] HM Revenue & Customs (May 2012). A general guide to Landfill Tax, http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?_nfpb=true&_pageLabel=pageExcise_ShowContent&id=HMCE_CL_000509&propertyType=document#P198_9153
[189] http://www.agentschapnl.nl/actueel/nieuws/afvalstoffenbelasting-afgeschaft
[190] HM Revenue & Customs. Aggregates Levy – introduction, http://customs.hmrc.gov.uk/channelsPortalWebApp/channelsPortalWebApp.portal?_nfpb=true&_pageLabel=pageExcise_InfoGuides&propertyType=document&id=HMCE_CL_001169
[191] HM Treasury (March 2012). Budget 2012, http://cdn.hm-treasury.gov.uk/budget2012_complete.pdf
[192] Ministry of the Environment (2012a) Environmental Tax Reform, http://www.mzp.cz/cz/edr
[193] Zákon č. 261/2007 Sb., o stabilizaci veřejných rozpočtů, http://www.podnikatel.cz/zakony/zakon-c-261-2007-sb-o-stabilizaci-verejnych-rozpoctu/
[194] EEA, 2011 Survey of resource efficiency policies in EEA member and cooperating countries, Country profile Estonia, http://www.eea.europa.eu/themes/economy/resource-efficiency/resource-efficiency-policies-country-profiles
[195] T Magazin, Hungary: Significant changes to the green tax system, http://tmagazine.ey.com/insights/hungary-significant-changes-green-tax-system/
[196] Eurostat. Taxation trends in the European Union: Data for the EU Member States, Iceland and Norway (2012). http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_structures/2012/report.pdf
[197] Summary of 2013 Budget Measures: Policy Changes, http://www.budget.gov.ie/Budgets/2013/Documents/Summary%20of%202013%20Budget%20Measures%20Policy%20Changes.pdf
[198] Tax Strategy Group, Paper TSG 11/17, http://taxpolicy.gov.ie/wp-content/uploads/2012/09/11.17-Energy-and-Environmental-Taxes.pdf
[199] Convery, Frank, 'Budget 2013 – Three Cheers For The Carbon Tax', September 2012, http://www.publicpolicy.ie/budget-2013-three-cheers-for-the-carbon-tax/
[200] Governo de Portugal, Relatório sobre o Orçamento de Estado, http://www.portugal.gov.pt/media/736269/oe2013_rel.pdf, page 62
[201] ETC/SCP (April 2012). Working paper 1/2012, Overview of the use of landfill taxes in Europe, http://scp.eionet.europa.eu/publications/WP2012_1/wp/WP2012_1
[202] Bulgarian law portal, http://lex.bg/laws/ldoc/2135458102
[203] Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodne http://www.nfosigw.gov.pl/en/nfosigw/
[204] OECD (2010) ; Pricing Water Resources and Water Sanitation Services ; http://www.keepeek.com/Digital-Asset-Management/oecd/environment/pricing-water-resources-and-water-and-sanitation-services_9789264083608-en
[205] ISTAT 2012 http://www.istat.it/it/archivio/51482
[206] Eurostat (2013). Taxation trends in the European Union, European Union, 2013. http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_structures/2013/report.pdf
[207] Governo de Portugal, Relatório sobre o Orçamento de Estado, http://www.portugal.gov.pt/media/736269/oe2013_rel.pdf, page 62
[208] Eurostat 2012. Data on Environmental Taxes.
[209] Eurostat (2012): Taxation trends in the European Union. URL: http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_structures/2012/report.pdf
[210] ISTAT 2012 http://www.istat.it/it/archivio/51482
[211] OECD (2010) *Environmental Performance reviews Luxembourg*.
[212] DG Taxation and Customs Union (2012) *Taxation trends in the European Union*, http://ec.europa.eu/taxation_customs/taxation/gen_info/economic_analysis/tax_structures/index_en.htm
[213] Eco-innovation Observatory, 2011, Estonia Country Profile 2010, http://www.eco-innovation.eu/index.php?option=com_content&view=article&id=468&Itemid=56
[214] http://www.rijksoverheid.nl/nieuws/2012/06/29/verpakkingenbelasting-verdwijnt-per-1-januari-2013.html
[215] http://www.agentschapnl.nl/actueel/nieuws/afvalstoffenbelasting-afgeschaft
[216] See www.conseil-constitutionnel.fr/conseil-constitutionnel/francais/les-decisions/acces-par-date/decisions-depuis-1959/2013/2013-666-dc/communique-de-presse.136655.html
[217] Direct écotaxe, www.direct-ecotaxe.fr/18-l-ecotaxe-pl-en-bref
[218] Sénit, C.-A. (2012) The politics of carbon taxation in France: preferences, institutions, and ideologies, Working Paper, IDDRI, http://www.iddri.org/Publications/Collections/Idees-pour-le-debat/WP2012_CAS_politics%20of%20taxation%20france.pdf
[219] Finansministeriet (2011) ; Aftaler om Finansloven for 2012 http://www.fm.dk/Publikationer/2011/~/media/Publikationer/Imported/2011/Aftaler%20om%20finansloven%20for%202012/web_aftaler%20om%20finansloven%20for%202012.ashx
[220] Deloitte (2012); Danish Finance Act for 2012. http://www.deloitte.com/assets/Dcom-Denmark/Local%20Assets/Documents/Udgivelser/Nyheder/Skat/Finansloven%202012_UK_udkast%202.pdf

[221] Ravazzi A. (2012). The Italian response to reform commitments. Presentation at the workshop Reforming Environmentally Harmful Subsidies for a Resource Efficient Europe.
[222] Information from European Environment Agency, (WQ5) Water prices, http://www.eea.europa.eu/data-and-maps/indicators/water-prices/water-prices
[223] Fovarosi Vizmuvek, Service tariffs in 2013, http://vizmuvek.hu/en/water_tariffs
[224] Ministry of the Environment (2011) *Vodné hospodárstvo v Slovenskej republike v roku 2011*, http://www.minzp.sk/files/sekcia-vod/modra_sprava-2011-slovenska.pdf
[225] ERSAR, Portuguese Regulation Agency for Water and Waste , http://www.ersar.pt/website/ViewContent.aspx?GenericContentId=972&FolderPath=\Root\Contents\Sitio\Consumidores&Section=Consumidores&FinalPath=Not%C3%ADcias&SubFolderPath=
[226] Ministry of Environment of Estonia, http://www.envir.ee/1106192
[227] OECD (2010) ; Pricing Water Resources and Water Sanitation Services ; http://www.keepeek.com/Digital-Asset-Management/oecd/environment/pricing-water-resources-and-water-and-sanitation-services_9789264083608-en
[228] For a household consuming 85m^3 per year. Economie (2011) *Approvisionnement en eau potable en Belgique : analyse du secteur*, http://economie.fgov.be/fr/binaries/Sectorstudie_water_FR_tcm326-179535.pdf
[229] Ministère en charge de l'économie (2011) *Approvisionnement en eau potable en Belgique : analyse du secteur*, http://economie.fgov.be/fr/binaries/Sectorstudie_water_FR_tcm326-179535.pdf
[230] Měkotová j. (2009), Management ve vodním hospodářství v kontextu legislativy Evropské Unie, http://ekologie.upol.cz/ku/mvh/management_ve_vodnim_hospodarstvi.pdf
[231] Zákon č. 274/2001 Sb. o vodovodech a kanalizacích pro veřejnou potřebu a o změně některých zákonů (zákon o vodovodech a kanalizacích), http://www.tzb-info.cz/pravni-predpisy/zakon-c-274-2001-sb-o-vodovodech-a-kanalizacich-pro-verejnou-potrebu-a-o-zmene-nekterych-zakonu-zakon-o-vodovodech-a-kanalizacich
[232] OECD. Environmental Performance Reviews Slovenia 2012 Highlights. http://www.oecd.org/env/environmentalcountryreviews/50510129.pdf
[233] Likums "Dabas resursu nodokļa likums" ("LV", 209 (3367)), 29.12.2005. Attachment 2. http://www.likumi.lv/doc.php?id=124707
[234] S. Bogaert, et al. (2012). The Role of Water Pricing and Water Allocation in Agriculture in Delivering Sustainable Water Use in Europe. Arcadis. http://ec.europa.eu/environment/water/quantity/pdf/agriculture_report.pdf
[235] Lebensministerium (2012): Wasserverbrauch und Wasserbedarf – Auswertung empirischer Daten zum Wasserverbrauch. http://www.lebensministerium.at/publikationen/wasser/wasserverbrauch_stud.html
[236] Vewin (2012). Dutch Drinking Water Statistics 2012. The Water Cycle from Source to Tap. Vewin, Rijswijk.
[237] APA, Valor da Taxa de Recursos Hídricos, published 5 April 2013, http://www.apambiente.pt/_zdata/Instrumentos/LicenciamentoUtilizRH/Despacho%20n%201_PRES_2013_TRH.pdf
[238] Enorasis project, http://www.enorasis.eu/uploads/files/D2%201_ENORASIS_GOVERNANCE_AND_BUSINESS_v12.pdf
[239] Roth, E. (2001) Water Pricing in the EU. A Review. The European Environmental Bureau, January 2001. Publication Number 2001/002. ftp://131.174.16.163/pub/ucm/Leonardo/Course%202%20-%20WFD/Chapter%202%20-%20Policy%20concepts/Learning%20unit%202.5%20Water%20pricing/learning%20materials/EEB_2001_WaterPricing.pdf
[240] Zsuzsanna Iwanicka (2007) Racjonalizacja zużycia wody na obszarach zurbanizowanych Polski, POLITECHNIKA KRAKOWSKA, Instytut Zaopatrzenia w Wodę i Ochrony Środowiska, Kraków, maj 2007, http://suw.biblos.pk.edu.pl/resources/i3/i3/i8/i6/r3386/IwanickaZ_RacjonalizacjaZuzycia.pdf
[241] OECD (2010): Member Country Questionnaire Responses on Agricultural Water Resource Management. URL http://www1.oecd.org/dataoecd/7/31/44763686.pdf
[242] www.eauxpotables.com, *12. Prix de l'eau au Luxembourg : le principe de récupération des coûts des services liés à l'utilisation de l'eau*, www.eauxpotables.com/archives/2007/11/14/6414872.html
[243] Agence de l'eau Adour-Garonne, DREAL Midi-Pyrénées and ONEMA, *Dessinons l'avenir de l'eau dans notre bassin*, http://www.eau-adour-garonne.fr/_attachments/documents-du-sdage-et-du-pdm/doc2.pdf?download=true
[244] Keskkonnaministeerium, Estonian national allocation plan for the allocation of GHG emission allowances approved by the EU, http://www.envir.ee/1181791
[245] Ofwat. How household customers are charged, http://www.ofwat.gov.uk/consumerissues/chargesbills/householdcharges/
[246] Ministry of the Environment and Ministry of Agriculture (2011), Zpráva o stavu vodního hospodářství České republiky, http://eagri.cz/public/web/file/171287/Modra_zprava_2011_web_10._9.pdf
[247] Zoumides, C., and T. Zachariadis (2009). Irrigation Water Pricing in Southernope and Cyprus: The effects of the EU Common Agricultural Policy and the Water Framework Directive. Cyprus Economic Policy Review 3 (1), pp. 99-122;
[248] Arcadis et al. (2012). The role of water pricing and water allocation in agriculture in delivering sustainable water use in Europe'. http://ec.europa.eu/environment/water/quantity/pdf/agriculture_report.pdf
[249] Arcadis et al. (2012). The role of water pricing and water allocation in agriculture in delivering sustainable water use in Europe'. http://ec.europa.eu/environment/water/quantity/pdf/agriculture_report.pdf

[250] European Commission (February 2012). The role of water pricing and water allocation in agriculture in delivering sustainable water use in Europe http://ec.europa.eu/environment/water/quantity/pdf/agriculture_report.pdf

[251] Decree Law 2012, 16.08 - http://dre.pt/pdf2sdip/2012/08/158000000/2903529036.pdf

[252] Roth, E. (2001) Water Pricing in the EU. A Review. The European Environmental Bureau. Publication Number 2001/002. ftp://131.174.16.163/pub/ucm/Leonardo/Course%202%20-%20WFD/Chapter%202%20-%20Policy%20concepts/Learning%20unit%202.5%20Water%20pricing/learning%20materials/EEB_2001_WaterPricing.pdf

[253] The role of water pricing and water allocation in agriculture in delivering sustainable water use in Europe, ARCADIS 2012. http://ec.europa.eu/environment/water/quantity/pdf/agriculture_report.pdf

[254] Ministry Decision 146/2012. http://www.madr.ro/pages/comunicate/ordin-146-2012.pdf

[255] See http://www.l-iz.de/Melder/Melder/2012/10/Hermenau-zum-Jahresbericht-des-Saechsischen-Rechnungshofs-44266.html

[256] Socratous, G. (2011), Water Pricing Policy in Cyprus: The Implications of the Water Framework Directive. Ch. 9 in: P. Koundouri (ed.), Water Resources Allocation. Policy and Socioeconomic Issues in Cyprus. Springer.

[257] Department of Environment, Community and Local Government, http://www.environ.ie/en/Environment/Water/WaterServices/

[258] Department of Environment, Community and Local Government (October 2012). Water Sector Reform: Implementation Strategy, http://www.environ.ie/en/Publications/Environment/Water/FileDownLoad,32001,en.pdf

[259] Bulgarian website on Water: http://www.voda.bg/news-84/info-3787

[260] Naturvårdsverket (2012), Styrmedel för att nå miljökvalitetsmålen, en kartläggning. Report 6415 http://www.naturvardsverket.se/Documents/publikationer6400/978-91-620-6415-0.pdf

[261] Convery, Frank (September 2012). 'Budget 2013 – Three Cheers For The Carbon Tax', http://www.publicpolicy.ie/budget-2013-three-cheers-for-the-carbon-tax/

[262] OECD, Ireland: Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels, http://www.oecd.org/site/tadffss/48786291.pdf

[263] OECD. UNITED KINGDOM: INVENTORY OF ESTIMATED BUDGETARY SUPPORT AND TAX EXPENDITURES FOR FOSSIL FUELS, http://www.oecd.org/site/tadffss/48786785.pdf

[264] HM Revenue & Customs. International - taxation of UK oil production, http://www.hmrc.gov.uk/international/ns-fiscal2.htm

[265] OECD (2013), "Slovenia", in OECD, Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels 2013, OECD Publishing. doi: 10.1787/9789264187610-32-en http://www.oecd.org/site/tadffss/

[266] EurActiv, EU subsidies fuel controversial coal plant in Slovenia, http://www.euractiv.com/climate-environment/eu-subsidies-fuel-controversial-news-501771

[267] Withana, S., ten Brink, P., Franckx, L., Hirschnitz-Garbers, M., Mayeres, I., Oosterhuis, F., and Porsch, L. (2012). Study supporting the phasing out of environmentally harmful subsidies. A report by the Institute for European Environmental Policy (IEEP), Institute for Environmental Studies - Vrije Universiteit (IVM), Ecologic Institute and Vision on Technology (VITO) http://ec.europa.eu/environment/enveco/taxation/pdf/report_phasing_out_env_harmful_subsidies.pdf.

[268] OECD (2011) Inventory of estimated budgetary support and tax expenditures for fossil fuels, www.oecd.org/dataoecd/40/35/48805150.pdf

[269] Bulgarian National Televizion (БНТ) from 19 September 2012, http://bnt.bg/bg/news/view/85003/protest_sreshtu_taksa_zelena_energija

[270] OECD & IEA (2013), Fossil fuel subsidies and other support, www.oecd.org/site/tadffss /

[271] Eurostat (2012). Taxation trends in the European Union: Data for the EU Member States, Iceland and Norway. p. 115. http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_structures/2012/report.pdf

[272] Frans Oosterhuis et al. (2013). "Budgetary support and tax expenditures for fossil fuels: An inventory for six non-OECD EU countries." IVM Institute for Environmental Studies. http://ec.europa.eu/environment/enveco/taxation/pdf/fossil_fuels.pdf

[273] From the Belgian country report produced as part of this study. Country reports have not been published publicly.

[274] OECD, www.oecd.org/site/tadffss/

[275] Federal Ministry of Finance (2012c). Dreiundzwanzigster Subventionsbericht. Bericht der Bundesregierung über die Entwicklung der Finanzhilfen des Bundes und der Steuervergünstigungen für die Jahre 2009 – 2012, Berlin, p. 64. http://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Oeffentliche_Finanzen/Subventionspolitik/23-subventionsbericht-der-bundesregierung-anlage1.pdf?__blob=publicationFile&v=2

[276] OECD (2011). Germany: Inventory of estimated budgetary support and tax expenditures for fossil fuels. http://www.oecd.org/site/tadffss/48786187.pdf. See also OECD (2013). Germany: Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil-Fuels – 2013. http://www.oecd.org/site/tadffss/DEU.pdf

[277] See table "State aid to coal mining, by Member State, in million Euro (2006-2011)" http://ec.europa.eu/competition/state_aid/studies_reports/expenditure.html#2

[278] Schrode, A., Burger, A., Eckermann, F., Berg, H. und Thiele, K. (2011). Environmentally Harmful Subsidies in Germany. Update 2010. Dessau-Roßlau, http://www.umweltdaten.de/publikationen/fpdf-l/3896.pdf.

[279] See http://www.bmu.de/bmu/presse-reden/pressemitteilungen/pm/artikel/bundeskabinett-verlaengert-spitzenausgleich-fuer-das-produzierende-gewerbe-im-rahmen-der-oekosteuer/

[280] OECD (2013), "Hungary", in OECD, Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels 2013, OECD Publishing. doi: 10.1787/9789264187610-17-en

[281] Information from Environmentally Harmful Subsidies in the Hungarian Economy, 2004

[282] Azores Government, 2012, http://www.azores.gov.pt/GaCS/Noticias/2012/Setembro/Secret%C3%A1rio+do+Ambiente+reitera+aposta+no+objetivo+aterro+tendencialmente+zero.htm

[283] IEEP (2012), study supporting the phasing out of environmentally harmful subsidies, http://ec.europa.eu/environment/enveco/taxation/pdf/report_phasing_out_env_harmful_subsidies.pdf

[284] OECD (2011) Inventory of estimated budgetary support and tax expenditures for fossil fuels, http://www.oecd.org/site/tadffss/POL.pdf

[285] Withana, S., ten Brink, P., Franckx, L., Hirschnitz-Garbers, M., Mayeres, I., Oosterhuis, F., and Porsch, L. (2012). Study supporting the phasing out of environmentally harmful subsidies. A report by the Institute for European Environmental Policy (IEEP), Institute for Environmental Studies – Vrije Universiteit (IVM), Ecologic Institute and Vision on Technology (VITO) for the European Commission p. 118 et sqq. http://www.ieep.eu/assets/1036/Annexes_to_Final_Report_of_Study_supporting_the_phasing_out_of_EHS.pdf

[286] IEEP (2012), study supporting the phasing out of environmentally harmful subsidies, http://ec.europa.eu/environment/enveco/taxation/pdf/report_phasing_out_env_harmful_subsidies.pdf

[287] www.eea.europa.eu/publications/eea_report_2008_2

[288] Study supporting the phasing out of environmentally harmful subsidies: Annexes to final report, October 2012, http://ec.europa.eu/environment/enveco/taxation/pdf/annexes_phasing_out_env_harmful_subsidies.pdf

[289] Umweltdachverband (2012): Abbau umweltschädlicher Subventionen in Österreich – Update 2012: Ein Beitrag zur Ökologisierung des Steuersystems. Wien 2012. http://www.umweltdachverband.at/fileadmin/user_upload/pdfs/Presse_2012/UWD_Hintergrundpapier_-_Umweltschaedliche_Subventionen.pdf

[290] Copenhagen Economics, 2010, Taxation papers, Company cars taxation, http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_papers/taxation_paper_22_en.pdf

[291] Schrode, A., Burger, A., Eckermann, F., Berg, H. und Thiele, K. (2011), p. 23.

[292] Copenhagen Economics (2010). Taxation Papers: Company Car Taxation. Working Paper No. 22, Luxembourg, p. 28.

[293] OECD (2013b), Taxing Energy Use: A Graphical Analysis, OECD Publishing. http://dx.doi.org/10.1787/9789264183933-en

[294] Bär, H., Jacob, K., Meyer, E. und Schlegelmich, K. (2011). Wege zum Abbau umweltschädlicher Subventionen. Expertise im Auftrag der Abteilung Wirtschafts- und Sozialpolitik der Friedrich-Ebert-Stiftung.

[295] Oosterhuis, F., et al. (2013), Budgetary support and tax expenditures for fossil fuels. An inventory for six non-OECD EU countries. Draft report for the European Commission, DG Environment. Institute for Environmental Studies (IVM).

[296] Bundesministerium für Finanzen (2011): Förderungsbericht 2010. http://www.bmf.gv.at/Budget/Budgetsimberblick/Sonstiges/Frderungsberichteim_11559/Foerderungsbericht_2010.pdf

[297] DG COMP, SA. N 255/2008 http://ec.europa.eu/eu_law/state_aids/agriculture-2008/n255-08.pdf

[298] OECD & IEA (2013), Fossil fuel subsidies and other support, www.oecd.org/site/tadffss /

[299] OECD, http://www.oecd.org/greengrowth/sustainableagriculture/agri-environmentalindicatorsandpolicies/40806416.pdf

[300] Federal Ministry of Finance (2012c). Dreiundzwanzigster Subventionsbericht. Bericht der Bundesregierung über die Entwicklung der Finanzhilfen des Bundes und der Steuervergünstigungen für die Jahre 2009 – 2012, Berlin, p. 64. http://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Oeffentliche_Finanzen/Subventionspolitik/23-subventionsbericht-der-bundesregierung-anlage1.pdf?__blob=publicationFile&v=2

[301] OECD (2013) "Spain", in *Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels 2013,* OECD Publishing. URL http://www.oecd-ilibrary.org/environment/inventory-of-estimated-budgetary-support-and-tax-expenditures-for-fossil-fuels-2013/spain_9789264187610-33-en;jsessionid=27jrvm4vwfrvm.x-oecd-live-02

[302] OECD, http://www.oecd.org/site/tadffss/GRC.pdf

[303] OECD (2013a). Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels 2013, OECD Publishing, http://www.oecd.org/site/tadffss/

[304] OECD (2011) Inventory of estimated budgetary support and tax expenditures for fossil fuels, http://www.oecd.org/site/tadffss/POL.pdf

[305] Ministry of Agriculture, http://www.agri.ee/riigiabi-ja-grupierandi-teatis/

[306] European Commission, Directorate-General for Agriculture and Rural Development, Overview of the implementation of direct payments under the CAP in Member States in 2012 (Reg. 73/2009), Version: January 2012, http://ec.europa.eu/agriculture/direct-support/pdf/implementation-direct-payments_en.pdf

[307] Umwelt Bundes Amt (2008).Environmentally Harmful Subsidies in Germany. Originally published in German in 2008, published in English in 2010. http://www.umweltdaten.de/publikationen/fpdf-l/3896.pdf

[308] Drissen, E., A. Hanemaaijer, and F. Dietz (2011). PBL-notitie Milieuschadelijke subsidies. Planbureau voor de Leefomgeving (PBL), Den Haag. http://www.pbl.nl/sites/default/files/cms/publicaties/20110914%20PBL%20Notitie%20Milieuschadelijke%20subsidies%20-%20500209001.pdf

[309] OECD (2012) Environmental Performance Review of Slovenia Revised Assessment and Recommendations. http://www.oecd.org/environment/environmentalcountryreviews/50068236.pdf

[310] Naturvardsverket(2012), Potentiellt miljöskadliga subventioner Förstudie från 2005 – updated 2011, http://www.naturvardsverket.se/Documents/publikationer6400/978-91-620-6455-6.pdf

[311] European Commission (2011). State aids SA.24642(N 708/2007) – DE – State aid for the closure of hard coal mines and SA.33766 – notification of aid to coal for 2011. C(2011) 8882. http://ec.europa.eu/competition/state_aid/cases/223166/223166_1351998_130_2.pdf

[312] Jornal Público, Consumo de eletricidade reduz 3.6% e cai para valores de 2006, http://www.publico.pt/economia/noticia/consumo-de-electricidade-cai-36-e-recua-para-valores-de-2006-1579368

[313] HM Treasury (March 2012). Budget 2012, http://cdn.hm-treasury.gov.uk/budget2012_complete.pdf

[314] OECD (2013), "Hungary", in OECD, Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels 2013, OECD Publishing. doi: 10.1787/9789264187610-17-en

[315] Government of the Slovak Republic (2011) *Slovak National Reform Programme*, http://ec.europa.eu/europe2020/pdf/nrp/nrp_slovakia_en.pdf

[316] Global Subsidies Initiative/IISD (2010). Policy Brief: Delivering on G-20 commitments: the path to fuel subsidy reform. October 2010. http://www.iisd.org/gsi/sites/default/files/pb9_path.pdf.

[317] Servimedia. *ERC propone eliminar las subvenciones "ambientalmente perjudiciales".* 03 March 2012. http://www.servimedia.es/Noticias/DetalleNoticia.aspx?seccion=1&id=208844

[318] Hammar H, and Åkerfeldt S., (2011) CO2 taxation in Sweden, 20 years of experience and looking ahead, 2012 http://www.globalutmaning.se/wp-content/uploads/2011/10/Swedish_Carbon_Tax_Akerfedlt-Hammar.pdf

[319] European Commission (2012). State aid SA.33384 (2011/N) – Austria. Ökostromgesetz 2012 (Green Electricity Act 2012), C (2012) 565 final. http://ec.europa.eu/competition/state_aid/cases/241457/241457_1348374_122_2.pdf

[320] EC, 2008, C(2008) 7847 final, State Aid N 373/2008 Regional aid – Wider use of renewable energy sources for energy production Estonia http://ec.europa.eu/competition/state_aid/register/ii/doc/N-373-2008-WLWL-en-10.12.2008.pdf

[321] Guichet.public.lu www.guichet.public.lu/en/entreprises/urbanisme-environnement/aides-environnement/aides-primes/aide-protec-envir-PME/index.html

[322] Guichet.public.lu www.guichet.public.lu/en/entreprises/financement-aides/aides-environnement/industrie-services/aide-protec-environnement/index.html

[323] www.car-e.lu/

[324] Ministère du Développement durable et des Infrastructures, presentation 13 September 2012, Nouveau régime d'aides financières pour les economies d'énergie et l'utilisation des energies renouvelables dans le domaine du lodgement, http://www.environnement.public.lu/actualites/2012/09/PrimeHouse/2012_09_13_Prime_House.pdf

[325] Global Solar Thermal Energy Council, http://solarthermalworld.org/content/50-subsidy-scheme-energy-renovation-bulgarian-homes-erbh

[326] European Commission, DG Competition, http://ec.europa.eu/competition/elojade/isef/case_details.cfm?proc_code=3_SA_35127

[327] DG Competition press release. IP/11/266. "State aid: Commission approves Danish subsidy for purchase and operation of electric cars". Brussels, 8 March 2011; http://europa.eu/rapid/press-release_IP-11-266_en.htm

[328] European commission (2011), Operating aid for energy production from wind power and biogas, State aid SA. 31107 2011/N – FI, 15.3.2011. http://ec.europa.eu/competition/state_aid/cases/239404/239404_1200859_36_3.pdf

[329] European Commission (2011), Fixed operating aid for power plants using renewable energy sources, State aid SA. 32470 2011/N – FI. http://ec.europa.eu/competition/state_aid/cases/239407/239407_1201076_31_2.pdf.

[330] Ministry of Environment (2012) Press release 9th February 2012. http://www.minambiente.it/home_it/showitem.html?lang=&item=/documenti/comunicati/comunicato_0286.html

[331] See http://www.cassaddpp.it

[332] Ministry of Environment (2012) Press release 7th May 2012 http://www.minambiente.it/home_it/showitem.html?lang=&item=/documenti/comunicati/comunicato_0381.html

[333] Finland's Government (2011), Programme of Prime Minister Jyrki Katainen's Government, http://valtioneuvosto.fi/hallitus/hallitusohjelma/pdf/en334743.pdf

[334] OECD (2012), OECD Fossil fuel subsidies and other support. www.oecd.org/site/tadffss/

[335] European Commission (2011). "Expenditure and trend in state aid for environmental protection by Member State, in € million, 2005-2010." http://ec.europa.eu/competition/state_aid/studies_reports/expenditure.html

[336] Elektrownia Biogazowa Buczek, http://bioelektrownia-buczek.pl/
[337] REEGLE, Poland 2012, http://www.reegle.info/policy-and-regulatory-overviews/PL
[338] European Commission (2010). State aid No N 81/2010 Germany - Amendment to Aid Scheme for Tax Rebates for Biofuels (DE), C (2010) 2557 http://ec.europa.eu/competition/state_aid/cases/235391/235391_1098089_26_1.pdf
[339] See http://ec.europa.eu/competition/state_aid/cases/228249/228249_986565_36_1.pdf
[340] European Commission (2011). Information communicated by Member States regarding State aid granted under Commission Regulation (EC) No 800/2008 declaring certain categories of aid compatible with the common market in application of Articles 87 and 88 of the Treaty (General Block Exemption Regulation) (2011/C 78/08), p. 38. http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:078:0037:0041:EN:PDF
[341] Federal Ministry of Finance (2012c). Dreiundzwanzigster Subventionsbericht. Bericht der Bundesregierung über die Entwicklung der Finanzhilfen des Bundes und der Steuervergünstigungen für die Jahre 2009 – 2012, p. 64. http://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Oeffentliche_Finanzen/Subventionspolitik/23-subventionsbericht-der-bundesregierung-anlage1.pdf?__blob=publicationFile&v=2
[342] Federal Ministry of Finance (2012c). Dreiundzwanzigster Subventionsbericht. Bericht der Bundesregierung über die Entwicklung der Finanzhilfen des Bundes und der Steuervergünstigungen für die Jahre 2009 – 2012, Berlin, pp. 64 and 65. http://www.bundesfinanzministerium.de/Content/DE/Standardartikel/Themen/Oeffentliche_Finanzen/Subventionspolitik/23-subventionsbericht-der-bundesregierung-anlage1.pdf?__blob=publicationFile&v=2
[343] European Commission (2010). Valsts atbalstu N 675/2009 - Latvijas Republika. Konkurss par atbalstu jaunai elektroenerģijas ģenerācijas jaudai (LV). http://ec.europa.eu/eu_law/state_aids/comp-2009/n675-09.pdf Pete Harrison (2011). EU approves Latvian state aid for new power plant. Reuters. http://uk.reuters.com/article/2010/01/28/eu-energy-latvia-idUKBRQ00969320100128
[344] See table "State aid to coal mining, by Member State, in million Euro (2006-2011)", http://ec.europa.eu/competition/state_aid/studies_reports/expenditure.html#2
[345] OECD, www.oecd.org/site/tadffss/48786105.pdf
[346] http://ec.europa.eu/competition/state_aid/cases/246239/246239_1398526_153_2.pdf
[347] European Commission, Guidelines on certain State aid measures in the context of the greenhouse gas emission allowance trading scheme post-2012, (2012/C 158/04) http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2012:158:0004:0022:EN:PDF
[348] See European Commission (2012). Information communicated by Member States regarding State aid granted under Commission Regulation (EC) No 800/2008 declaring certain categories of aid compatible with the common market in application of Articles 87 and 88 of the Treaty (General Block Exemption Regulation). (2011/C 205/03), p. 33. See http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2011:205:0033:0037:EN:PDF
[349] Ecorys, http://ec.europa.eu/competition/consultations/2009_coal/ecorys_study_final_report.pdf
[350] Key Lisbon figures: State aid volume and orientation towards horizontal objectives, table: Non-crisis state aid by sector and objective, in million Euro (1992-2010) http://ec.europa.eu/competition/state_aid/studies_reports/stat_table_cz.xls
[351] OECD (2013), "Slovenia", in OECD, Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels 2013, OECD Publishing. doi: 10.1787/9789264187610-32-en http://www.oecd.org/site/tadffss/
[352] Eurocoal, Slovenia, http://www.euracoal.be/pages/layout1sp.php?idpage=80
[353] OECD (2013), "Hungary", in OECD, Inventory of Estimated Budgetary Support and Tax Expenditures for Fossil Fuels 2013, OECD Publishing. doi: 10.1787/9789264187610-17-en
[354] European Commission, DG Competition, see table "State aid to coal mining, by Member State, in million Euro (2006-2011)", http://ec.europa.eu/competition/state_aid/studies_reports/expenditure.html#2
[355] European Commission, DG COMP, http://ec.europa.eu/competition/elojade/state_aid/
[356] European Commission, http://ec.europa.eu/economy_finance/publications/occasional_paper/2012/pdf/ocp123_en.pdf
[357] European Commission, DG COMP, http://ec.europa.eu/competition/state_aid/studies_reports/studies_reports.html
[358] Finland's Government (2011), Programme of Prime Minister Jyrki Katainen's Government, 22.6.2011, http://valtioneuvosto.fi/hallitus/hallitusohjelma/pdf/en334743.pdf
[359] Commission Européenne (2009), Aide d'Etat / Belgique (Flandres) – N 561/2009. Prolongation de la mesure agroenvironnementale Engagement de Gestion eau. http://ec.europa.eu/competition/state_aid/cases/233471/233471_1034809_19_2.pdf
[360] http://ec.europa.eu/competition/state_aid/cases/238184/238184_1170088_27_3.pdf
[361] http://ec.europa.eu/competition/state_aid/cases/241894/241894_1284978_69_2.pdf
[362] Tourism and Sustainable Development Unit. Grant Scheme for Tourism Projects by Enterprises 2007-2013, https://secure2.gov.mt/TSDU/grant_scheme
[363] Environmental Fund, http://www.envirofond.sk/sk/podpora_uvery.html
[364] DG Competition, State aid N 517/2010 – United Kingdom, WRAP - Capital Grants and Lease Guarantee Fund Scheme (prolongation and modification), http://ec.europa.eu/competition/state_aid/cases/238289/238289_1181198_54_2.pdf

[365] European Commission (2012). State aid SA.33984 (2012/N) – United Kingdom, Green Investment Bank, C(2012) 7133 final, http://ec.europa.eu/competition/state_aid/cases/245775/245775_1377661_117_1.pdf

[366] Georgescu, Marina Anda, Pendolovska, Velina, and Cabeca, Julio Cesar, *Distribution of Environmental Taxes in Europe by Tax Payers in 2007*, Stat, 2010, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-10-067/EN/KS-SF-10-067-EN.PDF

[367] Eurostat, *Environmental Taxes -- A Statistical Guide*, Methods and Nomenclatures (Office for Official Publications of the European Communities, 2001), http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/documents/2.pdf

[368] European Commission, *Taxation Trends in the European Union - Data for the EU Member States, Iceland and Norway*, Statistical Books (Luxembourg: Eurostat, 2012), http://www.eds-destatis.de/downloads/publ/KS-DU-12-001-EN-N.pdf

[369] Stela Stamatova and Anton Steurer, *In 2009, EU-27 Environmental Tax Revenue Rose to 2,4% of GDP*, Statistics in Focus (Luxembourg: Eurostat, 2011), http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-SF-11-067/EN/KS-SF-11-067-EN.PDF

[370] DIRECTIVE 2008/98/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 November 2008 on waste and repealing certain Directives

[371] BIO Intelligence Service (2011), Implementing EU Waste Legislation for Green Growth, Final Report prepared for European Commission DG Environment.

[372] IEEP, Ecologic Institute, Arcadis, Umweltbundesamt, BIO Intelligence Service, VITO (2010). Supporting the Thematic Strategy on Waste Prevention and Recycling. Brussels. 2010.

[373] IEEP, Eunomia, BIO Intelligence Service, Ecologic Institute, Unweltbundesamt, Arcadis, (2012). Use of Economic Instruments and Waste Management Performances.

[374] BiPRO (2012). Screening of waste management performance of EU Member States. Report submitted under the EC project "Support to Member States in improving waste management based on assessment of Member States' performance".

[375] European Court of Auditors (2012); Is Structural Measures Funding for Municipal Waste Management Infrastructure Projects Effective in helping Member States Achieve EU Waste Policy Objectives?; Special Report No. 20/2012; European Union, 2012. http://eca.europa.eu/portal/pls/portal/docs/1/20156748.PDF

[376] COUNCIL REGULATION (EC) No 1260/1999 of 21 June 1999 laying down general provisions on the Structural Funds; http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:1999:161:0001:0001:EN:PDF

[377] General Regulation 1828/2006 setting out rules for the implementation of Council Regulation (EC) No 1083/2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and of Regulation (EC) No 1080/2006 of the European Parliament and of the Council on the European Regional Development Fund; http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:371:0001:0001:EN:PDF

[378] IEEP (2011). Cohesion Policy and Sustainable Development – Supporting Paper 5: Tools for Sustainable Development. Brussels. 2011. http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/sustainable_development/sd_supporting_paper_5.pdf

[379] Berthoud, M.(2012) Final treatment of MSW and C&I waste in Germany and neighbouring countries. How to cope with emerging over-capacities?, http://www.iswa.org/uploads/tx_iswaknowledgebase/Berthoud.pdf

[380] BIOIS (2012): Use of economic instruments and waste management performances. http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf

[381] Figures taken from: Eurostat (2012): Municipal Waste. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasmun&lang=en

[382] Eurostat (2012): Environment in the EU27 Landfill still accounted for nearly 40% of municipal waste treated in the EU27 in 2010. URL: http://europa.eu/rapid/press-release_STAT-12-48_en.htm

[383] Eurostat (2012) Generation of waste, NACE R2 "Households". http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/waste_generation_management/generation/households

[384] Eurostat (2012) Generation of waste. http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/waste_generation_management/generation

[385] Eurostat (2012) code : W12A (=W121+122+W123+W125), W122 can't be deleted from this aggregated group. http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/waste_generation_management/generation

[386] Of total municipal waste generated. Taken from Belgian country report produced as part of this study. Country reports have not been published publicly.

[387] Direction générale opérationnel de l'agriculture, des ressources naturelles et de l'environnement (2009), Bilan du Plan wallon des déchets – Horizon 2010, volet déchets ménagers et assimilés.

[388] Eurostat (2012) Generation of waste [env_wasgen], NACE R2 "Construction". http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/waste_generation_management/generation/construction

[389] Public Waste Agency of Flanders ,OVAM (Openbare Vlaamse Afvalstoffenmaatschappij), personal communication (10 February, 2013)

[390] Eurostat (2012) End-of-life vehicles: Reuse, recycling and recovery, Totals [env_waselvt] http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/key_waste_streams/end_of_life_vehicles_elvs

[391] Eurostat (2012) Packaging waste [env_waspac] http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/key_waste_streams/packaging_waste
[392] Eurostat. Generation of waste by economic activity (Code: ten00106) ; http://epp.eurostat.ec.europa.eu/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=ten00106&language=en
[393] Eurostat (2012), Treatment of waste, updated 10/10/2012, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wastrt
[394] ETC-SCP (2009), EU as a Recycling Society: Present recycling levels of Municipal Waste and Construction & Demolition Waste in the EU, Working Paper 2/2009, April 2009 http://scp.eionet.europa.eu/publications/wp2009_2/wp/WP2009_2
[395] Eurostat, End-of-life vehicles: Reuse, recycling and recovery, Totals, http://appsso.eurostat.ec.europa.eu/nui/show.do?query=BOOKMARK_DS-176053_QID_33E49201_UID_-3F171EB0&layout=TIME,C,X,0;GEO,L,Y,0;UNIT,L,Z,0;WST_OPER,L,Z,1;INDICATORS,C,Z,2;&zSelection=DS-176053UNIT,PC;DS-176053INDICATORS,OBS_FLAG;DS-176053WST_OPER,RCY_REU;&rankName1=WST-OPER_1_2_1_0&rankName2=INDICATORS_1_2_-1_2&rankName3=UNIT_1_2_-1_2&rankName4=TIME_1_0_0_0&rankName5=GEO_1_2_0_1&sortR=CUSTOM_-1_FIRST&sortC=ASC_-1_FIRST&rStp=&cStp=&rDCh=&cDCh=&rDM=true&cDM=true&footnes=false&empty=false&wai=false&time_mode=ROLLING&lang=EN&cfo=%23%23%23%2C%23%23%23.%23%23%23
[396] Eurostat, Waste Electrical and Electronic Equipment (WEEE), http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do
[397] Eurostat (2012) Generation of waste [env_wasgen]
[398] Eurostat (2012) Generation and treatment of municipal waste
[399] Eurostat (2012) Generation of waste [env_wasgen]
[400] Eurostat (2012) Generation and treatment of municipal waste
[401] http://www.compendiumvoordeleefomgeving.nl/indicatoren/nl0206-Vrijkomen-en-verwerking-van-afval-per-doelgroep.html?i=1-4
[402] From personal communcation, provided in the country report.
[403] http://www.compendiumvoordeleefomgeving.nl/indicatoren/nl0392-Verwerking-afval-van-huishoudens.html?i=1-4
[404] http://www.milieucentraal.nl/themas/afval-heb-je-zelf-in-de-hand/afvalscheiding It should be noted that the 50% target holds for the sum of all waste; there is no need to comply with it for each single waste stream.
[405] Naturvårdsverket, http://www.naturvardsverket.se/Start/Statistik/Avfall-och-avloppsvatten/Avfallsstatistik/
[406] Avfall Sverige (2011), Swedish Waste Management, 2011, http://www.avfallsverige.se/fileadmin/uploads/Rapporter/Utveckling/Rapporter_2011/SAH_eng111219.pdf
[407] Avfall Sverige (2011), Swedish Waste Management, 2011, http://www.avfallsverige.se/fileadmin/uploads/Rapporter/Utveckling/Rapporter_2011/SAH_eng111219.pdf
[408] Naturvårdsverket (2012), Från avfallshantering till resurshushållning, Sveriges avfallsplan 2012–2017, Report 6502, May 2012. http://www.naturvardsverket.se/Documents/publikationer6400/978-91-620-6502-7.pdf
[409] Naturvårdsverket (2012), Avfall i Sverige 2010, Report 6520, October 2012. http://www.naturvardsverket.se/Documents/publikationer6400/978-91-620-6520-1.pdf
[410] Naturvårdsverket (2012), Avfall i Sverige 2010, Report 6520, October 2012. http://www.naturvardsverket.se/Documents/publikationer6400/978-91-620-6520-1.pdf
[411] Naturvårdsverket (2012), Avfall i Sverige 2010, Report 6520, October 2012. http://www.naturvardsverket.se/Documents/publikationer6400/978-91-620-6520-1.pdf
[412] Abfallwirtschaftsdialog 2020 (2012): Meilensteine der österreichischen Abfallwirtschaft seit 1990. URL: http://www.aw2020.at/aw2020/index.asp?Nr=1&SNr=2
[413] Bruxelles Environnement (2010), Plan Déchets - Plan de prévention et de gestion des déchets. http://documentation.bruxellesenvironnement.be/documents/Plandechets_2010_FR.PDF?langtype=20
[414] http://www.lap2.nl/
[415] Naturvårdsverket, http://www.naturvardsverket.se/Stod-i-miljoarbetet/Vagledning-amnesvis/Avfall/Lagar-och-regler-om-avfall/
[416] Federal Ministry of Economics and Technology (2012). National Reform Programme 2012, Berlin. http://www.bmwi.de/English/Redaktion/Pdf/national-reform-programme-2012,property=pdf,bereich=bmwi,sprache=en,rwb=true.pdf *http://www.bmwi.de/English/Redaktion/Pdf/national-reform-programme-2012,property=pdf,bereich=bmwi,sprache=en,rwb=true.pdf*
[417] Journal Officiel du Grand-Duché de Luxembourg, www.legilux.public.lu/leg/a/archives/2012/0060/a060.pdf#page=2
[418] International Law Office (2012), Flanders's new approach to waste management: setting the scene in Europe. www.internationallawoffice.com/newsletters/Detail.aspx?g=9d370ca9-fd0c-4e81-9db8-1a4231e30e59
[419] Service Public Wallon (2009), Déclaration de politique régionale. Extrait. http://environnement.wallonie.be/rapports/owd/pwd/extrait_dec_pol_reg.pdf
[420] OVAM, Sustainable material management in Flanders. www.ovam.be/jahia/Jahia/pid/1684
[421] Regeringen 2009: 1. del af Affaldsstrategi 2009-12. http://www.mst.dk/NR/rdonlyres/747FBCE2-A3D4-444F-BF60-D1747C36516D/0/Endelig1delafAffaldsstrategi200912.pdf
[422] BMU (2011). KreislaufwirtschaftAbfall nutzen – Ressourcen schonen. Berlin.

[423] See http://www.bmu.de/abfallwirtschaft/kurzinfo/doc/3981.php
[424] Public Waste Agency of Flanders ,OVAM (Openbare Vlaamse Afvalstoffenmaatschappij), personal communication (10 February, 2013)
[425] EEA (2013) *Municipal waste management in Belgium*, www.eea.europa.eu/publications/managing-municipal-solid-waste/belgium-municipal-waste-management
[426] Collignon, A.; Gathon, H.-J.(2011), Les déchets en Belgique. www.ciriec.ulg.ac.be/fr/telechargements/WORKING_PAPERS/WP10-09.pdf
[427] Service public de Wallonie (2007), Décret fiscal favorisant la prévention et la valorisation des déchets en Région wallonne et portant modification du décret du 6 mai 1999 relatif à l'établissement, au recouvrement et au contentieux en matière de taxes régionales directes (M.B. 24.04.2007). http://environnement.wallonie.be/legis/dechets/degen024.htm
[428] Watkins, E. et al. (2012). Use of Economic Instruments and Waste Management Performances. http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf
[429] http://www.agentschapnl.nl/actueel/nieuws/afvalstoffenbelasting-afgeschaft
[430] http://www.rijksoverheid.nl/nieuws/2012/06/29/verpakkingenbelasting-verdwijnt-per-1-januari-2013.html
[431] Eunomia research and consulting (2009). International Review of Waste Management Policy: Annexes to Main Report. Bristol, UK, p. 159 et seq. See also Watkins, E. et al. (2012), p. 95.
[432] Landratsamt Aschaffenburg (2008): Landkreis Aschaffenburg Umweltschutzbericht 2003 – 2007. Aschaffenburg. See URL http://shop.landkreis-aschaffenburg.de/artikel_28.ahtml
[433] Watkins, E. et al. (2012). Use of Economic Instruments and Waste Management Performances. http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf
[434] Agentschap NL (2011). Afvalstoffenheffing 2011. Agentschap NL, Utrecht. http://www.rwsleefomgeving.nl/downloads/a/afvalstoffenheffing-1/
[435] OECD (2010) *Environmental Performance reviews Luxembourg*
[436] Ecorys, CambridgeEconometrics, COWI (2011); The role of market-based instruments in achieving resource efficiency; http://ec.europa.eu/environment/enveco/taxation/pdf/role_marketbased.pdf
[437] Watkins, E. et al. (2012). Use of Economic Instruments and Waste Management Performances. http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf
[438] Watkins, E. et al. (2012). Use of Economic Instruments and Waste Management Performances. http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf
[439] Scheffl, C. (2010): Sustainable Management of Solid Wastes: Legal Ban on Landfills for Hazardous and for Organic Wastes in Austria. URL http://www.iswa.org/uploads/tx_iswaknowledgebase/Scheffl.pdf
[440] OECD (2010) *Environmental Performance reviews Luxembourg*
[441] Machacek, E. (2012): City of Vienna: "Naturally less waste" Initiative. Reusable cup project. Waste prevention assignment .BSc. Thesis, Sweden: IIIEE, Lund University. http://wenigermist.natuerlichwien.at/city-of-vienna-naturally-less-waste-initiative
[442] ABB, 2011. Estonia Energy Efficiency Report, http://www05.abb.com/global/scot/scot316.nsf/veritydisplay/0fb7b8f1625a2b8ac12578b100236669/$file/estonia.pdf
[443] Eurostat Statistics on Treatment of Municipal Waste http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=File:Municipal_waste_treated_in_2009_by_country_and_treatment_category,_sorted_by_percentage,_2011.PNG&filetimestamp=20110708153221
[444] Statistics Finland, http://www.stat.fi/til/jate/2009/jate_2009_2011-05-20_tau_002_fi.html
[445] Statistics Finland, http://www.stat.fi/til/jate/2008/jate_2008_2010-05-26_tau_002_fi.html
[446] Statistics Finland, http://www.stat.fi/til/jate/2007/jate_2007_2009-06-04_tau_001_fi.html
[447] Statistics Finland, http://www.stat.fi/til/jate/2011/jate_2011_2012-11-20_tie_001_en.html
[448] Eurostat (2012), Generation of waste
[449] Eurostat (2012) Municipal waste [env_wasmun]
[450] EEA (2012) Waste implementation project, ex-post MSW analysis, France
[451] EEA (2012) Waste implementation project, ex-post MSW analysis, France
[452] Eurostat (2012) Generation of waste [env_wasgen], NACE R2 "Construction"
[453] Eurostat (2012) End-of-life vehicles: Reuse, recycling and recovery, Totals [env_waselvt]
[454] Eurostat (June 2012), Municipal waste, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasmun&lang=en
[455] Environmental Protection Agency (2012). National Waste Report 2010, http://www.epa.ie/downloads/pubs/waste/stats/EPA_NWR_2010_web.pdf
[456] Derived from Eurostat (June 2012), Municipal waste, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasmun&lang=en
[457] Environmental Protection Agency (2012). National Waste Report 2010, http://www.epa.ie/downloads/pubs/waste/stats/EPA_NWR_2010_web.pdf
[458] Eurostat (June 2012), Municipal waste, http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do
[459] Environmental Protection Agency (2012). National Waste Report 2010, http://www.epa.ie/downloads/pubs/waste/stats/EPA_NWR_2010_web.pdf
[460] Ferraris M. and Paleari S. Waste Implementation Project. Ex-post MSW analysis. Italy

[461] Ministry of the Environment (2012). Press release. http://www.minambiente.it/home_it/showitem.html?lang=&item=/documenti/comunicati/comunicato_0312.html
[462] ISPRA (2012). Rapporto rifiuti urbani 2012. http://www.isprambiente.gov.it/it/archivio/notizie-e-novita-normative/notizie-ispra/pubblicazioni/rapporti/rapporto-rifiuti-urbani-2012
[463] OECD. Environmental Performance Reviews Slovenia 2012 Highlights. http://www.oecd.org/env/environmentalcountryreviews/50510129.pdf
[464] IMAD (2012a). Slovenian Economic Mirror, December 2012, No. 12, Volume XVIII, p. 78. http://www.umar.gov.si/fileadmin/user_upload/publikacije/eo/2012/SEM_12_2012_splet.pdf
[465] OECD. Environmental Performance Reviews Slovenia 2012 Highlights. http://www.oecd.org/env/environmentalcountryreviews/50510129.pdf
[466] Bio Intelligence Service. Implementing EU Waste Legislation for Green Growth, p. 131. http://ec.europa.eu/environment/waste/studies/pdf/study%2012%20FINAL%20REPORT.pdf
[467] Eurostat (2012). Municipal waste, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasmun&lang=en
[468] Department for Environment, Food & Rural Affairs. Local Authority collected waste for England – quarterly statistics, http://www.defra.gov.uk/statistics/environment/waste/wrfg22-wrmswqtr/
[469] ETC/SCP (August 2012). Waste Implementation Project: Ex-post MSW analysis, United Kingdom, Final Draft. http://www.eea.europa.eu/publications/managing-municipal-solid-waste
[470] Ministère de l'Ecologie, de l'Energie, du Développement durable et de la Mer (2009) *le Plan d'actions déchets*, www.developpement-durable.gouv.fr/IMG/le-plan-d-actions-dechets-2009-2012.pdf
[471] Ecorys (2010). Italy: Country Report. Monitoring Member State's policy developments on resource-efficiency/environment in Europe 2020.
[472] Information based on feedback from national reviewer.
[473] Ministry of the Environment (2013), Towards a recycling economy, January 2013, http://www.ymparisto.fi/download.asp?contentid=141295&lan=en
[474] Ministry of the environment (2009) Nový zákon o odpadech: vyšší podíl recyklace, větší komfort pro lidi, http://www.mzp.cz/cz/news_tz090227odpady
[475] http://www.ibec.ie/IBEC/DFB.nsf/vPages/Environment~Key_issues~transposition-of-waste-framework-directive-08-11-2010?OpenDocument
[476] EU (2012). Monitoring Member States' policy developments on resource efficiency/environment in Europe 2020. Country Profile 2010. Italy http://ec.europa.eu/environment/pdf/policy/EPR_2010_it.pdf
[477] Ministry of Environment (2012) Press release 12th June 2012 http://www.minambiente.it/home_it/showitem.html?item=/documenti/comunicati/comunicato_0399.html
[478] European Environment Agency (2011) 2011 Survey of resource efficiency policies in EEA member and cooperating countries, Country profile: France.
[479] Ministère de l'écologie, du développement durable, des transports et du logement (2011) *La politique des déchets 2009-2012, Premier Bilan à mi-2011*.
[480] http://www.ymparisto.fi/default.asp?contentid=322125&lan=en&clan=en.
[481] Eurostat (2012) Municipal Waste, http://epp.eurostat.ec.europa.eu/portal/page/portal/environment/data/database
[482] Bipro et al (2012), Screening of waste management performance of EU Member States
[483] REC, 2011, Estonia Country Fiche on the Potential of Regional Policy to Contribute to Sustainable Growth in Europe 2020
[484] Bio Intelligence, IEEP 2012, Use of economic instruments and waste management performances, http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf
[485] Bio Intelligence, IEEP 2012, Use of economic instruments and waste management performances, http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf
[486] European Commission, http://ec.europa.eu/environment/waste/framework/pdf/EE%20factsheet_FINAL.pdf
[487] Bio Intelligence, IEEP 2012, Use of economic instruments and waste management performances, http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf
[488] Information based on feedback from national reviewer.
[489] Ministry of Environment news on the Environmental Inspectorate, http://www.envir.ee/1180085
[490] Statistics Finland, http://www.stat.fi/meta/til/ktutk_en.html
[491] IEEP et al, Use of Economic Instruments and Waste Management Performances, April 2012, http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf
[492] IEEP et al, Use of Economic Instruments and Waste Management Performances, April 2012, http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf
[493] ETC/SCP(2012), Overview of the use of landfill taxes in Europe, working paper 1/2012, April 2012, http://scp.eionet.europa.eu/publications/WP2012_1/wp/WP2012_1
[494] ETC/SCP(2012), Overview of the use of landfill taxes in Europe,working paper 1/2012,April 2012, http://scp.eionet.europa.eu/publications/WP2012_1/wp/WP2012_1
[495] EEA (2012) Waste implementation project, ex-post MSW analysis, France
[496] Ministère de l'Écologie, du Développement durable, des Transports et du Logement (2011) *Premier bilan de la réforme de la TGAP de 2009 et de la politique de soutien sur les déchets ménagers et assimilés*,

www.developpement-durable.gouv.fr/IMG/pdf/RAPPORT_AU_PARLEMENT_-_PREMIER_BILAN_REFORME_TGAP_DE_2009-doc.pdf

[497] ETC/SCP(2012), Overview of the use of landfill taxes in Europe,working paper 1/2012,April 2012, http://scp.eionet.europa.eu/publications/WP2012_1/wp/WP2012_1

[498] Department of the Environment, Community and Local Government (July 2012). A Resource Opportunity: Waste Management Policy in Ireland, http://www.environ.ie/en/Environment/Waste/PublicationsDocuments/FileDownLoad,30729,en.pdf

[499] European Commission, ANNUAL GROWTH SURVEY – POSSIBLE CONTIBUTION WASTE SECTOR, country recommendations on waste, 12/02/12. Not available online

[500] Environmental Protection Agency (2012). National Waste Report 2010, http://www.epa.ie/downloads/pubs/waste/stats/EPA_NWR_2010_web.pdf

[501] Environmental Protection Agency (2012). National Waste Report 2010, http://www.epa.ie/downloads/pubs/waste/stats/EPA_NWR_2010_web.pdf

[502] Irish Environmental Protection Agency (2011). Study of Pay-by-use Systems for Maximising Waste Reduction Behaviour in Ireland, http://www.epa.ie/downloads/pubs/research/waste/STRIVE_84_web.pdf

[503] IEEP et al (2012). USE OF ECONOMIC INSTRUMENTS AND WASTE MANAGEMENT PERFORMANCES, Final Report, http://ec.europa.eu/environment/waste/use.htm

[504] European Commission, ANNUAL GROWTH SURVEY – POSSIBLE CONTIBUTION WASTE SECTOR, country recommendations on waste, 12/02/12. Not available online

[505] ISPRA (2012). Rapporto rifiuti urbani 2012. http://www.isprambiente.gov.it/it/archivio/notizie-e-novita-normative/notizie-ispra/pubblicazioni/rapporti/rapporto-rifiuti-urbani-2012

[506] BIO Intelligence Service (2011). Implementing EU Waste Legislation for Green Growth. http://ec.europa.eu/environment/waste/studies/pdf/study%2012%20FINAL%20REPORT.pdf

[507] IEEP et al. (2012). Use of economic instruments and waste management performances. http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf

[508] OECD. Environmental Performance Reviews Slovenia 2012 Highlights. http://www.oecd.org/env/environmentalcountryreviews/50510129.pdf

[509] Uredba o metodologiji za oblikovanje cen storitev obveznih občinskih gospodarskih javnih služb varstva okolja, Official Gazette RS Nr 87/2012. http://zakonodaja.gov.si/rpsi/r00/predpis_URED6060.html

[510] Watkins, E. et al. (2012). Use of Economic Instruments and Waste Management Performances. Fi-nal Report for DG Environment.

[511] Eurostat, http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tsdpc240

[512] http://www.strategy.bg/FileHandler.ashx?fileId=1716

[513] Eurostat, http://epp.Eurostat.ec.europa.eu/cache/ITY_PUBLIC/8-27032012-AP/EN/8-27032012-AP-EN.PDF

[514] Watkins, E., et al. (2012), Use of Economic Instruments and waste management Performances. Annex I. http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf

[515] Watkins, E., et al. (2012), Use of Economic Instruments and waste management Performances. Annex I. http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf

[516] European Environment Agency, Hungary, Waste Forecast of the amount of municipal waste until 2014, http://www.eea.europa.eu/soer/countries/hu/soertopic_view?topic=waste

[517] Központi Statisztikai Hivatal, 6.5.2. Települési hulladék (2000–2011), http://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_ur003b.html?270

[518] Ernst&Young (2011). Key issues in municipal waste management in EU-11 countries. Warsaw, 22 September 2011, pp. 142 and 143. http://www.ey.com/Publication/vwLUAssets/Key_issues_in_municipal_waste_management_in_EU-11_countries/$FILE/Raport_eng.pdf

[519] Figures taken from Eurostat (env_wasmun), http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasmun&lang=en

[520] Eurostat, Data on municipal waste generation, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasmun&lang=en

[521] Lithuanian Environmental Protection Agency (2012). State of the Environment in 2011: Only facts. P. 70. ISSN 1822-0193, http://gamta.lt/files/AAA_leidinys_Aplinkos_bukle_2011.pdf

[522] Eurostat News Release (48/2012). Environment in the EU27. Landfill still accounted for nearly 40% of municipal waste treated in the EU27 in 2010. 48/2012 - 27 March 2012, http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/8-27032012-AP/EN/8-27032012-AP-EN.PDF

[523] Eurostat (2012). Municipal waste, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasmun&lang=en

[524] Derived from Eurostat (2012). Municipal waste, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasmun&lang=en

[525] Malta Environment & Planning Authority. Biodegradable waste diverted from landfill, http://www.mepa.org.mt/file.aspx?f=8459

[526] Derived from Eurostat (2012). Municipal waste, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasmun&lang=en

[527] Malta Environment & Planning Authority. Waste generation, http://www.mepa.org.mt/file.aspx?f=8457

[528] Eurostat (2012). Packaging waste, http://appsso.eurostat.ec.europa.eu/nui/show.do?query=BOOKMARK_DS-056956_QID_31DC1FEF_UID_-3F171EB0&layout=TIME,C,X,0;GEO,L,Y,0;WASTE,L,Z,0;FLOW,L,Z,1;WST_OPER,L,Z,2;UNIT,L,Z,3;INDICATORS,C,Z,4;&zSelection=DS-056956WASTE,W1501;DS-056956UNIT,T;DS-056956INDICATORS,OBS_FLAG;DS-056956FLOW,DOMESTIC;DS-056956WST_OPER,GEN;&rankName1=WST-OPER_1_2_-1_2&rankName2=FLOW_1_2_-1_2&rankName3=WASTE_1_2_-1_2&rankName4=INDICATORS_1_2_-1_2&rankName5=UNIT_1_2_-1_2&rankName6=TIME_1_0_0_0&rankName7=GEO_1_2_0_1&sortR=CUSTOM_-1_FIRST&pprRK=FIRST&pprSO=CUSTOM&ppcRK=FIRST&ppcSO=ASC&sortC=ASC_-1_FIRST&rStp=&cStp=&rDCh=&cDCh=&rDM=true&cDM=true&footnes=false&empty=false&wai=false&time_mode=ROLLING&lang=EN&cfo=%23%23%23%2C%23%23%23.%23%23%23

[529] GUS, Central Statistical Office (2012), Ochrona Srodowiska 2012, Department of Regional Studies and Environment, http://www.stat.gov.pl/cps/rde/xbcr/gus/se_ochrona_srodowiska_2012_notatka.pdf

[530] Deloitte (2011) Waste management in Poland Challenges in view of EU requirements and legislative changes; public opinion and prospects, http://www.deloitte.com/assets/Dcom-Poland/Local%20Assets/Documents/Raporty,%20badania,%20rankingi/pl_Report_Waste%20management%20in%20Poland.pdf

[531] EUROSTAT News Release 48/2012 - 27 March 2012, http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/8-27032012-AP/EN/8-27032012-AP-EN.PDF

[532] Ernst & Young, 2011. http://www.ey.com/Publication/vwLUAssets/Key_issues_in_municipal_waste_management_in_EU-11_countries/$FILE/Raport_eng.pdf

[533] Eurostat (2012) Treatment of waste, http://epp.eurostat.ec.europa.eu/portal/page/portal/environment/data/database

[534] Ernst and Young (2011) *Key issues in municipal waste management in EU 11 countries*, http://www.ey.com/Publication/vwLUAssets/Key_issues_in_municipal_waste_management_in_EU-11_countries/$FILE/Raport_eng.pdf

[535] BiPRO (2012). Screening of waste management performance of EU Member States. Report submitted under the EC project "Support to Member States in improving waste management based on assessment of Member States' performance" http://ec.europa.eu/environment/waste/studies/pdf/Screening_report.pdf

[536] For municipal waste figures taken from http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasmun&lang=en as well as Eurostat (2012). Eurostat news release 48/2012 - 27 March 2012. http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/8-27032012-AP/EN/8-27032012-AP-EN.PDF. For total and mineral waste figures taken from http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=ten00108&plugin=1

[537] Recyclingportal, Report reveals massive WEEE fraud in Spain, http://www.recyclingportal.eu/artikel/26735.shtml

[538] El País, La fiscalía investiga un fraude masivo en el reciclaje de aparatos electrónicos, http://elpais.com/diario/2011/06/02/sociedad/1306965607_850215.html

[539] MOA 2011, Waste Management Law of 2011. Ministry of Agriculture, Natural Resources and the Environment, Nicosia, Cyprus. http://www.moa.gov.cy/moa/environment/environment.nsf/All/67A3FE2E88259E5EC225798100303816/$file/N185(I)-2011.pdf

[540] Likums "Atkritumu apsaimniekošanas likums" ("LV", 183 (4375), 17.11.2010.) [stājas spēkā 18.11.2010.] http://likumi.lv/doc.php?id=221378

[541] Chamber of Deputies, 2012. http://www.cdep.ro/pls/legis/legis_pck.htp_act?ida=106978

[542] World Bank (2011). 'Solid Waste Management in Bulgaria, Croatia, Poland, and Romania. A cross-country analysis of sector challenges toward EU harmonization'. Washington, April 2011. does not work[I don´t know why, but we can delete the link as we have all the information on this publication)

[543] Likums "Atkritumu apsaimniekošanas likums" ("LV", 183 (4375), 17.11.2010.) [stājas spēkā 18.11.2010.] http://likumi.lv/doc.php?id=221378

[544] EIONET, Factsheet for Lithuania, http://scp.eionet.europa.eu/facts/factsheets_waste/2011_edition/factsheet?country=LT

[545] Lithuanian Parliament (Seimas), Legal data base, http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=440990

[546] Ley 10/1998, de 21 de abril, de Residuos. (Vigente hasta el 30 de julio de 2011) http://noticias.juridicas.com/base_datos/Derogadas/r7-l10-1998.html

[547] Ernst & Young (2011) Key issues in municipal waste management in EU-11 countries, http://www.ey.com/Publication/vwLUAssets/Key_issues_in_municipal_waste_management_in_EU-11_countries/$FILE/Raport_eng.pdf

[548] Act 223/2001 o odpadoch a o zmene a doplnení niektorých zákonov, http://www.etalux.sk/223-2001.pdf

[549] Ambiente Online, News, http://www.ambienteonline.pt/noticias/detalhes.php?id=13450

[550] ESGRA, News, http://www.egsra.pt/trabalho-de-equipa/reuniao-no-ministerio-do-ambiente-revisao-do-persu-ii/

[551] National Assembly of the Republic of Bulgaria, http://www.parliament.bg/bg/bills/ID/13631

[552] Likums "Atkritumu apsaimniekošanas likums" ("LV", 183 (4375), 17.11.2010.) [stājas spēkā 18.11.2010.] http://likumi.lv/doc.php?id=221378
[553] Ustawa o zmianie ustawy o utrzymaniu czystości i porządku w gminach oraz niektórych innych ustaw z dnia 11 lipca 2011 r. (Dz. U. 2011 Nr 152, poz. 897 z późn. zmianami) obowiązująca etapowo od 1 stycznia 2012 r.)
[554] Ministry of Rural Development, Comprehensive reform in waste management – new law adopted by Parliament, http://www.kormany.hu/en/ministry-of-rural-development/news/comprehensive-reform-in-waste-management-new-law-adopted-by-parliament
[555] Ministry of the Environment, *Program odpadového hospodárstva SR na roky 2011 – 2015*, http://www.minzp.sk/files/oblasti/odpady-a-obaly/poh/poh2011-2015/poh-sr-2011-2015.pdf
[556] Plan Nacional Integrado de Residuos (PNIR) 2007-2015 Memoria. http://www.icog.es/files/PNIR3.pdf
[557] Committee on Regional Policy and Local Government, Protocol № 15/12.06.2012, http://www.parliament.bg/bg/parliamentarycommittees/members/227/steno/ID/2494
[558] http://www.btv.bg/radio/za-sofia/story/562395243-Biznesat_iska_promyana_v_sabiraemostta_na_danak_smet.html
[559] Deloitte (2011): Bulgarian Taxes 2011. Sofia, http://www.deloitte.com/assets/Dcom-Bulgaria/Local%20Assets/Tax%20mini%20brochure/Bulgarian%20Taxes%202011.pdf
[560] European Commission, 2012. Use of Economic Instruments and Waste Management Performances. http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf
[561] Watkins, E., et al. (2012), Use of Economic Instruments and waste management Performances. Annex I. http://ec.europa.eu/environment/waste/use.htm
[562] European Commission, 2012. Use of Economic Instruments and Waste Management Performances. http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf
[563] European Environment Agency, Hungary, Waste Forecast of the amount of municipal waste until 2014, http://www.eea.europa.eu/soer/countries/hu/soertopic_view?topic=waste
[564] Ministry of Rural Development, Comprehensive reform in waste management – new law adopted by Parliament, http://www.kormany.hu/en/ministry-of-rural-development/news/comprehensive-reform-in-waste-management-new-law-adopted-by-parliament, http://www.kormany.hu/hu/videkfejlesztesi-miniszterium/kornyezetugyert-felelos-allamtitkarsag/hirek/atfogo-reform-a-hulladekgazdalkodasban-elfogadtak-az-uj-torvenyt
[565] http://ec.europa.eu/environment/pdf/policy/EPR_2010_hu.pdf Legislation: Act LXXXV of 2011 on Environmental Protection Product Charges of the Republic of Hungary
[566] Balázs & Holló Law Firm, New legal regulation regarding environmental product charges, http://www.balazshollo.hu/angol/new-legal-regulation-regarding-environmental-product-charges.html
[567] University College Dublin, Economic Instruments - Charges and taxes. Car Battery Charge (Hungary), http://www.economicinstruments.com/index.php/component/zine/article/215
[568] Likums "Dabas resursu nodokļa likums" ("LV", 209 (3367)), 29.12.2005. Attachment 3. http://www.likumi.lv/doc.php?id=124707
[569] Likums "Dabas resursu nodokļa likums" ("LV", 209 (3367)), 29.12.2005. Attachment 7. http://www.likumi.lv/doc.php?id=124707
[570] VARAM (2012). E. Sprūdžs: Depozīta sistēmas ieviešana dzērienu iepakojumam būs ilgtermiņa ieguvums. http://www.varam.gov.lv/lat/aktual/preses_relizes/?doc=14800
[571] Moora, H. et al. (2012). Incineration of Municipal Solid Waste in the Baltic States: Influencing Factors and Perspectives. In: Karagiannidis, A. (ed.). Waste to Energy. Opportunities and Challenges for Developing and Transition Economies. Springer, London, p. 237 – 249.
[572] European Commission, ANNUAL GROWTH SURVEY – POSSIBLE CONTIBUTION WASTE SECTOR, country recommendations on waste, 12/02/12. Not available online
[573] Ustawa o zmianie ustawy o utrzymaniu czystości i porządku w gminach oraz niektórych innych ustaw z dnia 11 lipca 2011 r. (Dz. U. 2011 Nr 152, poz. 897 z późn. zmianami) obowiązująca etapowo od 1 stycznia 2012 r.)
[574] Watkins, E. et al. (2012). Use of Economic Instruments and Waste Management Performanceshttp://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf,
[575] INE, Estatísticas do Ambiente 2011, http://www.ine.pt/ngt_server/attachfileu.jsp?look_parentBoui=150332663&att_display=n&att_download=y, page 9
[576] ERSAR, http://www.ersar.pt/website_en/
[577] European Commission (DG ENV) USE OF ECONOMIC INSTRUMENTS AND WASTE MANAGEMENT PERFORMANCES, 10 April 2012 , http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf
[578] APA, Report on Portuguese Environmental Economic Instruments 2010, http://www.apambiente.pt/_zdata/Divulgacao/Publicacoes/Guias%20e%20Manuais/report_peei_2010.pdf, page 86
[579] Sustainable Event Alliance, Slovakia, waste management, http://sustainable-event-alliance.org/slovakia/slovakia/waste-management/
[580] CIRIEC, 2010, 'Working paper No. 2010/03: *The Spanish Waste Sector: Waste Collection, Transport and Treatment*' http://www.ciriec.ulg.ac.be/fr/telechargements/WORKING_PAPERS/WP10-03.pdf
[581] Fischer, C., M. Lehner and D.L. McKinnon (2012). Overview of the use of landfill taxes in Europe. European Topic Centre on Sustainable Consumption and Production ETC/SCP working paper 1/2012. http://scp.eionet.europa.eu/publications/WP2012_1/wp/WP2012_1

[582] Area Metropolitana de Barcelona. Tasa Metropolitana de Tratamiento y Deposición de Residuos Municipales (TMTR). URL http://www.amb.cat/web/emma/tramits2/tmtr/bonificacio

[583] Area Metropolitana de Barcelona. Anar a la deixalleria té premi. http://www.amb.cat/web/emma/foment_sostenibilitat/anar

[584] Figures are based on Eurostat's env_wasgen database, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasgen&lang=en.

[585] Figures are based on Eurostat's env_wasmun database, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasmun&lang=en.

[586] Figures are based on Eurostat's env_wasmun database, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_wasmun&lang=en.

[587] According to http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/EN/env_wasnmin_esms.htm **non-mineral waste** covers hazardous (hz) and non-hazardous (nh) waste from all economic sectors and from households, including waste from waste treatment (secondary waste) but excluding mineral waste. Although completely or partly mineral, the indicator explicitly includes combustion wastes (EWC-Stat 12.4) and solidified, stabilised and vitrified wastes (EWC-Stat 13). **Mineral wastes** are EWC-Stat 12.1 - 12.3, 12.5 (see http://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.33/2012/mtg2/Supplement_Manual_on_Waste_Statistics.pdf, p. 67 to 72). Therefore, mineral and non-mineral wastes are complementary and make up the total waste.

[588] These figures are calculated by subtracting non-mineral waste generation (Eurostat's env_wasnmin database, http://appsso.eurostat.ec.europa.eu/nui/show.do) from total waste generation.

[589] Ecologic Institute (2012), Study on "Implementation report for Directive 2006/21/EC2 on the management of waste from extractive industries (Mining Waste Directive)".

[590] See http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Waste_statistics

[591] For Finland, see http://www.environment.fi/default.asp?contentid=198116&lan=en For Sweden, see http://www.naturvardsverket.se/en/In-English/Start/Products-and-waste/Waste/Waste-statistics-2010/

[592] See http://www.compendiumvoordeleefomgeving.nl/indicatoren/nl0140-Afval-van-huishoudens.html?i=1-4, as well as http://www.compendiumvoordeleefomgeving.nl/indicatoren/nl0117-Industrieel-afval-per-sector.html?i=1-4

[593] OECD (2013), *OECD Factbook 2013: Economic, Environmental and Social Statistics*, OECD Publishing. doi:10.1787/factbook-2013-en. http://www.oecd-ilibrary.org/economics/oecd-factbook-2013_factbook-2013-en

[594] The hypothesis of a positive relationship between the level of per capita GDP and per capita waste generation can be verified by fitting a linear model. Such model suggests that per capita waste generation grows by 5kg for each 1,000€ per capita GDP. The relationship appears stable over time.

[595] EEA, ed., *The European Environment -- State and Outlook: Synthesis* (Copenhagen: European Environment Agency, 2010), http://www.eea.europa.eu/soer. See also http://www.eea.europa.eu/soer/countries/lu/soertopic_view?topic=waste

[596] In the following section, data for 2011 has been added from Eurostat News Release (33/2013). In 2011, 40% of treated municipal waste was recycled or composted, up from 27% in 2001. 33/2013 - 4 March 2013. http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/8-04032013-BP/EN/8-04032013-BP-EN.PDF

[597] In the following section, data for 2011 has been added from Eurostat News Release (33/2013). In 2011, 40% of treated municipal waste was recycled or composted, up from 27% in 2001. 33/2013 - 4 March 2013. http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/8-04032013-BP/EN/8-04032013-BP-EN.PDF Where national data have been used this is indicated in endnotes.

[598] National Statistical Institute, Bulgaria, URL: http://www.nsi.bg/otrasalen.php?otr=38

[599] Scheffl, C. (2010): Sustainable Management of Solid Wastes: Legal Ban on Landfills for Hazardous and for Organic Wastes in Austria. URL http://www.iswa.org/uploads/tx_iswaknowledgebase/Scheffl.pdf

[600] See for instance, www.fostplus.be/SiteCollectionDocuments/Publicaties/Jaarverslagen/2011/FR%20bladerbaar/index.html

[601] Watkins, E. et al. (2012). Use of Economic Instruments and Waste Management Performances. See also http://www.bmu.de/abfallwirtschaft/doc/2818.php, and BiPRO (2012).

[602] http://www.agentschapnl.nl/actueel/nieuws/afvalstoffenbelasting-afgeschaft

[603] Mazur, E. (2012), "Green Transformation of Small Businesses: Achieving and Going Beyond Environmental Requirements", *OECD Environment Working Papers*, No. 47, OECD Publishing. http://dx.doi.org/10.1787/5k92r8nmfgxp-en

[604] TNS Political & Social (2012).Flash Eurobarometer 342 – SMEs, Resource Efficiency and Green Markets.

[605] European Commission (2010). An Integrated Industrial Policy for the Globalisation Era: Putting Competitiveness and Sustainability at Centre Stage. COM(2010) 614. Brussels.

[606] Vlaandersen In Actie Pact 2020. See: http://ikdoe.vlaandereninactie.be/?lang=en

[607] Vlaandersen In Actie Pact 2020. See: http://vlaandereninactie.be/pact-2020-en/?lang=en

[608] Service Public de Wallonie (2010), Projet de Déclaration de politique régionale wallonne 2009-2014. http://gouvernement.wallonie.be/sites/default/files/nodes/publication/901-projetdedeclarationdepolitiqueregionalewallonne.pdf

[609] Service Public de Wallonie (2010), Projet de Déclaration de politique régionale wallonne 2009-2014. http://gouvernement.wallonie.be/sites/default/files/nodes/publication/901-projetdedeclarationdepolitiqueregionalewallonne.pdf

[610] Ministry of Economy, Energy and Tourism (2007): National strategy for the promotion of SMEs - 2007 - 2013, Sofia, http://www.sme.government.bg/?p=678
[611] EUROSTARS; http://www.eurostars-eureka.eu/who.do
[612] European Commission (2011), Europe 2020 recommendations, Country-specific Recommendations 2011, Commission Staff Working document, http://ec.europa.eu/europe2020/making-it-happen/country-specific-recommendations/2011/index_en.htm
[613]EEA, 2011. Survey of Resource Efficiency Policies in EEA Members and Cooperating Countries. Country profile: Estonia. European Environment Agency, http://www.eea.europa.eu/themes/economy/resource-efficiency/resource-efficiency-policies-country-profiles
[614] See also www.eco-innovation.eu/index.php?option=com_content&view=article&id=14&Itemid=36
[615] Ministère de l'Ecologie, du Développement durable et de l'Energie, www.developpement-durable.gouv.fr/Le-plan-strategique-Ecotech-2012.html
[616] Kietzan-Slamanig, D., Reinstaller, A. andI. Stadler (2009) *Env-map project task 2, Assessment of ETAP roadmaps with regard to their eco-innovation potential*, Final report part 2, country profiles, prepared for the OECD Environment Directorate.
[617] See www.semaphores.fr/observatoire-regions/regions/rhone-alpes/plan-pme-puissante-offre.html
[618] GE Capital (2012). Analyse Mittelstand – Erfolgsfaktoren für Wachstum in Europa, p. 10. http://www.gecapital.de/de/docs/120610_GE-brochure_1_final.pdf
[619] Deutsche Bundesregierung (2012). Deutsches Ressourceneffizienzprogramm (ProgRess). Programm zur nachhaltigen Nutzung und zum Schutz der natürlichen Ressourcen. Beschluss des Bundeskabinetts vom 29.2.2012. http://www.bmu.de/files/pdfs/allgemein/application/pdf/progress_bf.pdf
[620] European Commision, 2011a. Eco-Innovation in Greece. Eco-Innovation Observatory, DG Environment, Brussels.
[621] Ispra tv (2012) In arrivo finanziamenti Ue per 41 eco-progetti italiani, http://www.ispra.tv/italian/articoli.php?idnews=77
[622] Government of Luxembourg (2008) *3ème Plan d'action en faveur des PME*, www.mcm.public.lu/fr/actualite/2008/05/Communique/3i__me_Plan_d__action_en_faveur_des_PME_.pdf
[623] Ministère des Classes Moyennes, du Tourisme et du Logement, http://www.mcm.public.lu/fr/plan/index.html
[624] Miller, K., Neubauer, A., Varma, A., (2011) First assessment of the Environmental Compliance Assistance Programme for SMEs (ECAP), EC DG Environment and Climate Action, http://ec.europa.eu/environment/sme/pdf/First%20assessemnt%20of%20the%20ECAP%20for%20SMEs.pdf ,
[625] Governmental Strategy for SMEs, 2011. http://www.minind.ro/imm/StrIMM_Doc_23022011.pdf
[626] European Commission: Enterprise and Industry SBA Fact Sheet 2012: Slovenia. http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/countries-sheets/2012/slovenia_en.pdf
[627] National Agency for the Development of Small and Medium Enterprises, http://www.nadsme.sk/en/content/about-us
[628] Bulgarian Industrial Assosation, http://www.bia-bg.com/news/8846
[629] Dreuw, K. et al. (2011). See also http://www.creditolo.de/aktuell/268/mittelstand-laesst-kfw-sonderprogramm-links-liegen/
[630] European Commission (2012) *SBA Fiche Technique 2012: Luxembourg*, http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/countries-sheets/2012/luxembourg_fr.pdf
[631] Tekes (2012), Tekes funding services for small and medium-sized enterprises, January 2012, www.**tekes**.fi/en/document/55294/rahoitusesite_engl_pdf
[632] ADEME, www2.ademe.fr/servlet/KBaseShow?sort=-1&cid=96&m=3&catid=24280
[633] Programme de Recherche et d'Innovation dans les Transports Terrestres.
[634] Plateforme de Recherche et d'Expérimentation sur l'énergie dans le bâtiment.
[635] BMWi (2012). Wirtschaftliche Förderung. Hilfen für Investitionen und Innovationen. September 2012, Berlin.
[636] Ministry of the Environment and Ministry of Transport (2007), Operational Programme Infrastructure, https://www.sfzp.cz/ke-stazeni/228/1952/detail/programme-complement---english-12-07/
[637] Department of Energy & Climate Change (April 2012). Announcement: Support for eco innovators, http://www.decc.gov.uk/en/content/cms/news/pn12_052/pn12_052.aspx
[638] OSEO, www.oseo.fr/votre_projet/se_developper/aides_et_financements/financements_bancaires/pret_vert_bonifie
[639] Enterprise Ireland http://www.enterprise-ireland.com/en/Productivity/Build-a-green-sustainable-Business/
[640] The Eco-Innovation Observatory. Country Report: Slovenia http://www.eco-innovation.eu/index.php?option=com_content&view=article&id=35&Itemid=73
[641] Creation PME (2012), Business Angel. http://creation-pme.wallonie.be/1avant/Comprendre/Businessangelcourte.htm
[642] Vossen, R. (unknown), Business Angels Network www.sme-finance-day.eu/fileadmin/Content/PDF/Brussels/presentation/Vossen_Presentatie_BAN_Vlaanderen.pdf
[643] Observatoire des Aides aux Enterprises, www.aides-entreprises.fr/repertoiredesaides/aides.php?e=NTA3NQ==&id_ter=)
[644] ADEME, www2.ademe.fr/servlet/doc?id=40695&view=standard

[645] The Eco-Innovation Observatory. Country Report: Slovenia http://www.eco-innovation.eu/index.php?option=com_content&view=article&id=35&Itemid=73
[646] Tekes (2012), Tekes funding services for small and medium-sized enterprises, January 2012, www.**tekes**.fi/en/document/55294/rahoitusesite_engl_pdf
[647] Mazur, E. (2012), "Green Transformation of Small Businesses: Achieving and Going Beyond Environmental Requirements", OECD Environment Working Papers, No. 47, OECD Publishing. http://dx.doi.org/10.1787/5k92r8nmfgxp-en
[648] OSEO www.oseo.fr/votre_projet/innover/aides_et_financements/aides/aide_aux_projets_d_innovation_strategique_industrielle_isi
[649] OSEO www.oseo.fr/votre_projet/innover/aides_et_financements/aides/aide_aux_projets_d_innovation_strategique_industrielle_isi
[650] http://www.oecd-ilibrary.org/docserver/download/5k92r8nmfgxp.pdf?expires=1354879871&id=id&accname=guest&checksum=A274B00185B39E0FF084B407F1DEFD54
[651] WRAP. Waste Prevention Loan Fund, http://www.wrap.org.uk/content/wplf
[652] Ministry of the Environment (2012) 6th evaluation of the Waste Management Plan for 2010, http://www.env.cz/C1257458002F0DC7/cz/plneni_narizeni_vlady/$FILE/OODP-Sesta_hodnotici_zprava_POH_CR_2010-120212.pdf
[653] Determann, W. (2011). Eco-innovation in Italy. Eco-innovation observatory, thematic report. http://www.eco-innovation.eu/images/stories/Reports/eio_country_brief_2011_italy.pdf
[654] Erawatch (2011). ERAWATCH COUNTRY REPORTS 2011: Portugal. http://erawatch.jrc.ec.europa.eu/erawatch/export/sites/default/galleries/generic_files/file_0193.pdf
[655] Financial platform: http://www.finance5.bg/analysis/872.html
[656] European Commision, 2011a. Eco-Innovation in Greece. Eco-Innovation Observatory, DG Environment, Brussels.
[657] Eco-Innovation Observatory, Hungary, http://www.eco-innovation.eu/index.php?option=com_content&view=article&id=473&Itemid=61
[658] Eco-Innovation Observatory (2011). Eco-innovation in Malta: EIO Country profiles 2010, http://www.eco-innovation.eu/media/EIO_Country_Brief_2010_Malta.pdf
[659] Ministry of the Economy (2007) Operational Programme Competitiveness and Economic Growth, http://www.nsrr.sk/en/operational-programmes/competitiveness-and-economic-growth/
[660] AEA, Ecologic (2011). First assessment of the Environmental Compliance Assistance Programme for SMEs (ECAP) ec.europa.eu/environment/sme/pdf/First assessmnt of the ECAP for SMEs.pdf
[661] Determann, W. (2011). Eco-innovation in Italy. Eco-innovation observatory, thematic report. http://www.eco-innovation.eu/images/stories/Reports/eio_country_brief_2011_italy.pdf
[662] European Commission, http://ec.europa.eu/regional_policy/sources/docgener/informat/country2009/fi_en.pdf
[663] http://www.agentschapnl.nl/nieuws/analyse-deelname-nederlandse-mkb%E2%80%99s-kp7
[664] Service Public de Wallonie, New Portal for the Walloon Competitiveness clusters and Business clusters. http://clusters.wallonie.be/federateur-en/index.html?IDC=36
[665] Béhance, BrusselsGreenTech. http://www.behance.net/gallery/Brusselsgreentechbe/4157819
[666] Operational Programme Environment 2007-2013, Priority Axis 3, http://en.opzp.cz/sekce/509/priority-axis-3/
[667] http://competitivite.gouv.fr/les-investissements-d-avenir-une-opportunite-pour-les-poles-de-competitivite/les-instituts-de-recherche-technologique-irt-campus-d-innovation-654.html
[668] Orée www.oree.org/presentation/objectifs.html
[669] http://www.agentschapnl.nl/programmas-regelingen/milieu-technologie-kennisnetwerken
[670] Technology Strategy Board. _connect, https://connect.innovateuk.org/web/guest
[671] Eco-Innovation Observatory (2011). Eco-innovation in the United Kingdom, http://www.eco-innovation.eu/media/EIO_Country_Brief_2011_UK.pdf
[672] STARTUPGREECE, http://www.startupgreece.gov.gr
[673] Polish Information and Foreign Investment Agency (2013) Pomoc publiczna dla malych I srednich przedsiebiorstw w okresie dekoniunktury gospodarczej, http://www.paiz.gov.pl/prawo/prawo_konkurencji/artykuly/pomoc_publiczna_dla_msp
[674] Enterprise Ireland, http://www.enterprise-ireland.com/en/Productivity/Build-a-green-sustainable-Business/
[675] Fundación Entorno. Consejo Empresarial para el Desarrollo Sostenible. URL http://www.fundacionentorno.org/
[676] Fundación Entorno. Proyectos. URL http://www.fundacionentorno.org/Proyectos
[677] Knowledge Transfer Network. Low Carbon Funding Landscape Navigator, http://www.lowcarbonfunding.org.uk/Default.aspx
[678] PME Digital, Portuguese Government, http://www.pmedigital.pt/c
[679]ANJE, Supporting SMEs, http://www.anje.pt/portal/empreendedorismo-anje-introduz-eficiencia-energetica-em-100-pme?page=8
[680] Eco-Innovation Observatory (2011). Eco-innovation in the United Kingdom, http://www.eco-innovation.eu/media/EIO_Country_Brief_2011_UK.pdf
[681] EAS, Enterprise Estonia solutions for starting entrepreneurs, http://www.eas.ee/en/for-the-entrepreneur/starting

[682] Eco-Innovation Observatory (2011). Eco-innovation in the United Kingdom, http://www.eco-innovation.eu/media/EIO_Country_Brief_2011_UK.pdf
[683] Béhance, BrusselsGreenTech. http://www.behance.net/gallery/Brusselsgreentechbe/4157819
[684] Geographic information management, KMO Portefeuille www.gim.be/ewcm/ewcm.nsf/_/7B3CC0E73D39609BC12578D200354767?OpenDocument
[685] Sodexe, Chèque-formation http://be.benefits-rewards.sodexo.com/fr/entreprises/cheque-formation
[686] Ministry of Industry and Trade (2011) Operational Programme Enterprise and Innovation 2007-2013, http://download.mpo.cz/get/27518/51101/585388/priloha001.pdf
[687] EIO (2012) ; The Eco-Innovation Gap: An economic opportunity for business. Eco-Innovation Observatory. Funded by the European Commission, DG Environment, Brussels; http://www.eco-innovation.eu/media/ECO_report-2011.pdf
[688] EC, DG Enterprise and Industry, 2012, Small Business Act Factsheet, http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/countries-sheets/2012/estonia_en.pdf
[689] National Vocational Training Institute (SIOV), of the organisation http://www.siov.sk/
[690] Environmental Fund, http://www.envirofond.sk/sk/podpora_uvery.html
[691] See http://www.efanrw.de/index.php?id=13&L=1
[692] Environmental Protection Agency http://www.epa.ie/whatwedo/resource/nwpp/gbi/
[693] Polish Information and Foreign Investment Agency (2013) Pomoc publiczna dla malych I srednich przedsiebiorstw w okresie dekoniunktury gospodarczej, http://www.paiz.gov.pl/prawo/prawo_konkurencji/artykuly/pomoc_publiczna_dla_msp
[694]ANJE, Supporting SMEs, http://www.anje.pt/portal/empreendedorismo-anje-introduz-eficiencia-energetica-em-100-pme?page=8
[695] Štátna ochrana prírody Slovenskej republiky, http://www.sopsr.sk/web/
[696] NADSME, *Podpora malého a stredného podnikania v Slovenskej republike 2012*, http://www.nadsme.sk/files/Sprievodca_iniciativami-2012_0.pdf
[697] Geographic information management, KMO Portefeuille. www.gim.be/ewcm/ewcm.nsf/_/7B3CC0E73D39609BC12578D200354767?OpenDocument
[698] ADEME, www2.ademe.fr/servlet/KBaseShow?sort=-1&cid=96&m=3&catid=24575
[699] See www.semaphores.fr/observatoire-regions/regions/rhone-alpes/plan-pme-puissante-offre.html
[700] BMWi (2012). Wirtschaftliche Förderung. Hilfen für Investitionen und Innovationen. September 2012, Berlin.
[701] UCM, Facilitateurs Energie. www.ucm.be/Environnement/Aides-publiques/Facilitateurs-Energie
[702] Determann, W. (2011). Eco-innovation in Italy. Eco-innovation observatory, thematic report. http://www.eco-innovation.eu/images/stories/Reports/eio_country_brief_2011_italy.pdf
[703] See http://www.kfw.de/kfw/en/Domestic_Promotion/Our_offers/Energy_efficiency_ans_environmental_protection_in_enterprises.jsp#ERPEnvironmentalandEnergyEfficiencyProgramme
[704] Le Lieu du Design, www.lelieududesign.com/aide-a-l-innovation-responsable-air-aides-a-l-innovation
[705] Le Lieu du Design, www.lelieududesign.com/aide-a-l-innovation-responsable-air-aides-a-l-innovation
[706] Stockholm Environmental Institute (SEI) projects, http://www.sei-international.org/projects?prid=1884
[707] AEA and Ecologic (2011) *First assessment of the Environmental Compliance Assistance Programme for SMEs (ECAP)*, http://ec.europa.eu/environment/sme/pdf/First%20assessemnt%20of%20the%20ECAP%20for%20SMEs.pdf
[708] Agency for Innovation Portugal, http://www.ei.gov.pt/iniciativas/detalhes.php?id=37
[709] http://www.sitra.fi/en
[710] UNEP (2012) Eco-innovation practices and business opportunities for European SMEs in the emerging markets of Asia, Latin America and Africa. Eco-innovation observatory, thematic report. http://www.scp-centre.org/news/newsdetails/article/report-on-eco-innovative-smes-in-emerging-and-transition-markets.html
[711] Stockholm Environmental Institute (SEI) projects, http://www.sei-international.org/projects?prid=1884
[712] Ministry of the environment (2012) Ochrana ovzduší, http://www.mzp.cz/cz/ovzdusi
[713] European Commission, http://ec.europa.eu/environment/ecoap/pdfs/roadmaps/greece_en.pdf
[714] Government, *La reconversion des friches industrielles dans le sud du Grand-Duché*, www.gouvernement.lu/dossiers/amenagement_territoire/friches/index.html
[715] European Commission (2011) *Eco-innovation in Luxembourg*.
[716] Eco-Innovation Observatory (2011). Eco-innovation in Malta: EIO Country profiles 2010, http://www.eco-innovation.eu/media/EIO_Country_Brief_2010_Malta.pdf
[717] AEA and Ecologic Institute (2011).
[718] Mazur, E. (2012), "Green Transformation of Small Businesses: Achieving and Going Beyond Environmental Requirements", OECD Environment Working Papers, No. 47, OECD Publishing. URL: http://dx.doi.org/10.1787/5k92r8nmfqxp-en
[719] European Commission (2012): SMEs, Resource Efficiency and Green Markets. URL: http://ec.europa.eu/public_opinion/flash/fl_342_en.pdf
[720] Polish Information and Foreign Investment Agency (2013) Pomoc publiczna dla malych I srednich przedsiebiorstw w okresie dekoniunktury gospodarczej, http://www.paiz.gov.pl/prawo/prawo_konkurencji/artykuly/pomoc_publiczna_dla_msp
[721] ISQ – Instituto da Soldadura e da Qualidade, e Environmental Compliance Assistance Programme for SMEs

(ECAP). August 2010, http://www.isq.pt/project.aspx?menuid=843&eid=87&bl=1
[722] European Commission, http://ec.europa.eu/environment/emas/toolkit/further/further_2_7.htm
[723] See http://www.iris-berlin.de/deutsch/projekte/oep_00.html
[724] Eco-innovation Observatory, 2010, Country profile Estonia, http://www.eco-innovation.eu/index.php?option=com_content&view=article&id=12&Itemid=38
[725] See www.semaphores.fr/observatoire-regions/regions/rhone-alpes/plan-pme-puissante-offre.html
[726] ADEME, www2.ademe.fr/servlet/KBaseShow?sort=-1&cid=96&m=3&catid=24575
[727] Mazur, E (September 2012). OECD Environment Working Papers No. 47, Green Transformation of Small Businesses: ACHIEVING AND GOING BEYOND ENVIRONMENTAL REQUIREMENTS, http://www.oecd-ilibrary.org/docserver/download/5k92r8nmfqxp.pdf?expires=1360167461&id=id&accname=guest&checksum=D39E41F50C685950D9A49666F1D0B759
[728] Eco-Innovation Observatory (2011). Eco-innovation in Malta: EIO Country profiles 2010, http://www.eco-innovation.eu/media/EIO_Country_Brief_2011_Malta.pdf
[729] NADSME, *Podpora malého a stredného podnikania v Slovenskej republike 2012*, http://www.nadsme.sk/files/Sprievodca_iniciativami-2012_0.pdf
[730] Mazur, E. (2012) *Green Transformation of Small Businesses: Achieving and Going Beyond Environmental Requirements*, OECD Environment Working Papers, No. 47, OECD Publishing. http://dx.doi.org/10.1787/5k92r8nmfqxp-en
[731] IHOBE. Acción Pymes: Ekoscan. http://www.ihobe.net/Paginas/Ficha.aspx?IdMenu=bef3bb6c-135a-41fd-bef6-129ffeb6881e
[732] European Commission (2012), SBA Fact sheet 2012 Belgium, http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/countries-sheets/2012/belgium_fr.pdf
[733] Ministry of the Environment (2012b) 6th evaluation of the Waste Management Plan for 2010, http://www.env.cz/C1257458002F0DC7/cz/plneni_narizeni_vlady/$FILE/OODP-Sesta_hodnotici_zprava_POH_CR_2010-120212.pdf
[734] OECD (2012). Environmental Performance Review of Italy. Revised Assessment and Recommendations. http://www.oecd.org/env/environmentalcountryreviews/11%20FINAL.%20Room%20Document%202%20EPR%20Italy%20Revised%20Assessment%20and%20Recommendations%20FINAL.pdf
[735] http://www.oecd-ilibrary.org/docserver/download/5k92r8nmfqxp.pdf?expires=1354879871&id=id&accname=guest&checksum=A274B00185B39E0FF084B407F1DEFD54
[736] Portail du gouvernement, http://investissement-avenir.gouvernement.fr/content/action-projets/les-programmes/%C3%A9nergie
[737] Competitivite.gouv.fr, http://competitivite.gouv.fr/les-investissements-d-avenir-une-opportunite-pour-les-poles-de-competitivite/les-projets-de-plates-formes-mutualisees-d-innovation-659.html
[738] Competitivite.gouv.fr, http://competitivite.gouv.fr/les-investissements-d-avenir-une-opportunite-pour-les-poles-de-competitivite/les-instituts-de-recherche-technologique-irt-campus-d-innovation-654.html,
[739] See www.datar.gouv.fr/
[740] EEA (2011). 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, p. 7.
[741] Enterprise Ireland, http://www.enterprise-ireland.com/en/Productivity/Build-a-green-sustainable-Business/
[742] http://www.oecd-ilibrary.org/docserver/download/5k92r8nmfqxp.pdf?expires=1354879871&id=id&accname=guest&checksum=A274B00185B39E0FF084B407F1DEFD54
[743] Czech Government (2011) National Reform Programme of the Czech Republic 2011, http://ec.europa.eu/europe2020/pdf/nrp/nrp_czech_en.pdf
[744] European Commission (2012) SBA fiche technique Luxembourg, http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/countries-sheets/2012/luxembourg_fr.pdf
[745] NADSME, *Podpora malého a stredného podnikania v Slovenskej republike 2012*, http://www.nadsme.sk/files/Sprievodca_iniciativami-2012_0.pdf
[746] Ministry of Public Administration, http://www.minus25.gov.si
[747] European Commission (2011). Roadmap to a Resource Efficient Europe. Com(2011) 571 final. Brussels, 2011.
[748] EEA (2012). The contribution of transport to air quality - TERM 2012: transport indicators tracking progress towards environmental targets in Europe. EEA Report No 10/12. Copenhagen, 2012.
[749] EEA. Air pollution. http://www.eea.europa.eu/themes/air/intro
[750] HEAL press release, 14 December 2012 ; "Air pollution ranked as top health risk factor in Europe"; http://www.env-health.org/resources/press-releases/article/air-pollution-ranked-as-top-health
[751] EEA. Air pollution.
[752] Directive 2008/50/EC on ambient air quality and cleaner air for Europe
[753] Directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants.
[754] http://www.eea.europa.eu/highlights/air-pollution-breaches-of-legal
[755] Belgium and region government, Belgium's greenhouse gas inventory (1990-2010), National Inventory Report submitted under the United Nations Framework Convention on Climate Change and the Kyoto Protocol

[756] Ministère de l'écologie, du développement durable et de l'énergie, http://www.statistiques.developpement-durable.gouv.fr/lessentiel/ar/227/1101/pollution-lair-oxydes-dazote.html
[757] EEA, 2012a, NEC Directive status report 2011, EEA Technical report No 6/2012, European Environment Agency, p. 18, 20 and 21.
[758] Environmental Protection Agency (2012). AIR QUALITY IN IRELAND 2011: Key Indicators of Ambient Air Quality, http://www.epa.ie/downloads/pubs/air/quality/Air%20Quality%20Annual%20Report%202011%20final.pdf
[759] Subdirección General de Calidad del Aire y Medio Ambiente Industrial (2012) Informe de la Evaluación de la Calidad del Aire en España – 2011. Noviembre 2012. http://www.magrama.gob.es/es/calidad-y-evaluacion-ambiental/temas/atmosfera-y-calidad-del-aire/Situaci%C3%B3n_de_la_calidad_del_aire_en_Espa%C3%B1a_2011_tcm7-221280.pdf
[760] Taken from the Luxembourg country report delivered through this study. Individual country reports have not been published publicly.
[761] EEA, 2012a, NEC Directive status report 2011, EEA Technical report No 6/2012, European Environment Agency, p. 18, 20 and 21.
[762] UBA (2012). Luftqualität 2011 – Feinstaubepisoden prägten das Bild. Dessau-Roßlau. http://www.umweltdaten.de/publikationen/fpdf-l/4211.pdf
[763] http://www.eea.europa.eu/data-and-maps/daviz/progress-by-eu-member-states/download.table
[764] Taken from Finland country report.
[765] EEA (2012); Air quality in Europe; http://www.eea.europa.eu/publications/air-quality-in-europe-2012
[766] Environmental Protection Agency, http://www.epa.ie/irelandsenvironment/air/
[767] EEA (2012); Air quality in Europe; http://www.eea.europa.eu/publications/air-quality-in-europe-2012
[768] EEA, Air pollution (Estonia) http://www.eea.europa.eu/soer/countries/ee/soertopic_view?topic=air%20pollution
[769] Legambiente (2012) E' emergenza smog nelle città italiane. Legambiente presenta Mal'aria 2012, http://www.legambiente.it/contenuti/comunicati/e-emergenza-smog-nelle-citta-italiane-legambiente-presenta-mal-aria-2012-0
[770] UBA (2012). Luftqualität 2011 – Feinstaubepisoden prägten das Bild. Dessau-Roßlau, p. 6. http://www.umweltdaten.de/publikationen/fpdf-l/4211.pdf
[771] Département de l'environnement (2011) *Rapport d'activité 2011*, http://www.gouvernement.lu/publications/informations_gouvernementales/rapports_activite/rapports-activite-2011/06-mddi/RA_3_DENV_2011.pdf
[772] http://www.compendiumvoordeleefomgeving.nl/indicatoren/nl0243-Fijnstofconcentratie%2C-daggemiddelde.html?i=14-66
[773] QUERCUS, Comunicado "Quercus apresenta queixa à Comissão Europeia…", 31.03.2013 http://www.quercus.pt/comunicados/2013/marco/2459-quercus-apresenta-queixa-a-comissao-europeia-devido-a-qualidade-do-ar-nao-monitorizada-e-acima-dos-valores-limite-em-lisboa
[774] APA, Qualidade do Ar, www.qualar.org
[775] MIRA, Annual mean PM_{10} concentration http://www.milieurapport.be/en/feitencijfers/miratree/environmental-themes/dispersion-of-particulate-matter/concentration-of-particulate-matter-in-ambient-air/daily-average-pm10-concentration/
[776] Bolte, T. (2012). Onesnazenost zraka v letu 2012. In: Agencije RS za okolje. Nase okolje, december 2012, letnik XIX,stevilka 12, pp. 95 - 103.
[777] Department for Environment, Food & Rural Affairs (April 2012). STATISTICAL RELEASE: AIR QUALITY STATISTICS IN THE UK, 1987 TO 2011 – FINAL, http://www.defra.gov.uk/statistics/files/Air-Qual-Statistics-final-release-2011.pdf
[778] European Environment Agency (2011): http://www.eea.europa.eu/soer/countries/at/soertopic_view?topic=air%20pollution
[779] European Environment Agency, 2012a. Air Pollution – State and Impacts (Cyprus). http://www.eea.europa.eu/soer/countries/cy/air-pollution-state-and-impacts-cyprus
[780] EEA (2012); Air quality in Europe; http://www.eea.europa.eu/publications/air-quality-in-europe-2012
[781] EEA (2012); Air quality in Europe; http://www.eea.europa.eu/publications/air-quality-in-europe-2012
[782] Interview with Vanja Grigorova for the newspaper Dnevnik. http://eea.government.bg/bg/news/interviews/arhiv-2011.html
[783] European Environment Agency (2011): http://www.eea.europa.eu/soer/countries/at/soertopic_view?topic=air%20pollution
[784] Ministry of the environment (2012) Ochrana ovzduší, http://www.mzp.cz/cz/ovzdusi
[785] European Environmental Agency, 2012a. Air Pollution – State and Impacts (Greece). http://www.eea.europa.eu/soer/countries/cy/air-pollution-state-and-impacts-greece
[786] Hennon, J., Westeren, M., European Commission Press release, Environment: Commission takes Poaldn to court over air quality and marine policy legislation and urges compliance with the nitrates directive, IP/11/1434, HTTP://EUROPA.EU/RAPID/PRESS-RELEASE_IP-11-1434_EN.HTM
[787] ISPRA (2009). Database on measures to improve air quality, http://www.misureprqa.sinanet.isprambiente.it
[788] Latvijas Vides, ģeoloģijas un meteoroloģijas centrs (2012). Pārskats par Gaisa Kvalitāti Latvijā 2011. Gadā. LVĢMC, Riga http://www.meteo.lv/fs/CKFinderJava/userfiles/files/Vide/Gaiss/Gaisa_kvalitate/Parskati/parskats_par_gaisa_kvalitati_Latvija%20_2011_gada.pdf

[789] UBA (2009a). Feinstaubbelastung in Deutschland. Dessau-Roßlau.
[790] PBL (2010). Balans van de Leefomgeving 2010. Planbureau voor de Leefomgeving, Den Haag/Bilthoven. http://www.pbl.nl/publicaties/2010/Balans-van-de-Leefomgeving-2010
[791] Environmental Protection Agency (2012). Ireland's Environment: An Assessment 2012, http://www.epa.ie/downloads/pubs/indicators/00061_EPA_SoE_2012.pdf
[792] Environmental Protection Agency (2012). Ireland's Environment: An Assessment 2012, http://www.epa.ie/downloads/pubs/indicators/00061_EPA_SoE_2012.pdf
[793] Government of Flanders - Environment, Nature and Energy Dept. - International Environmental Policy Division, personal communication (10 February 2013)
[794] OECD (2010) *Environmental performance review: Luxembourg*
[795] Austria – new Environmentally Friendly Energy for our Economy. URL http://www.slideshare.net/InvestInAustria/austria-environmental-technologies2008
[796] Enviroportal, *Emission of acidifying substances*, http://www1.enviroportal.sk/indikatory/detail.php?kategoria=565&id_indikator=6005
[797] PBL (2010). Balans van de Leefomgeving 2010. Planbureau voor de Leefomgeving, Den Haag/Bilthoven. http://www.pbl.nl/publicaties/2010/Balans-van-de-Leefomgeving-2010
[798] Dziennik (2011) Komisja Europejska pozywa polske do trubynalu sprawiedliwosci za zatrute powietrze, http://wiadomosci.dziennik.pl/swiat/artykuly/368070,komisja-europejska-pozywa-polske-do-trubynalu-sprawiedliwosci-za-zatrute-powietrze.html
[799] PBL (2010). Balans van de Leefomgeving 2010. Planbureau voor de Leefomgeving, Den Haag/Bilthoven. http://www.pbl.nl/publicaties/2010/Balans-van-de-Leefomgeving-2010
[800] Environmental Protection Agency (2012). Ireland's Environment: An Assessment 2012, http://www.epa.ie/downloads/pubs/indicators/00061_EPA_SoE_2012.pdf
[801] PBL (2010). Balans van de Leefomgeving 2010. Planbureau voor de Leefomgeving, Den Haag/Bilthoven. http://www.pbl.nl/publicaties/2010/Balans-van-de-Leefomgeving-2010
[802] Bolte, T. (2012). Onesnazenost zraka v letu 2012. In: Agencije RS za okolje. Nase okolje, december 2012, letnik XIX,stevilka 12, pp. 95 to 102.
[803] National Statistical Institute of Bulgaria (2011): Census 2011 - Key Results. Sofia, http://www.nsi.bg/EPDOCS/Census2011final.pdf
[804] Ceļu Satiksmes Drošības Direkcija (2012). "Latvijā Reģistrēto, Pirmoreiz Reģistrēto un Norakstīto Transportlīdzekļu Skaits." http://www.csdd.lv/tools/download.php?file=files/text/1325771209408_gl2012_02_majas_lapa_1.pdf
[805] Koelemeijer, R., E. Drissen and S. Kruitwagen (2009). Recessie brengt halen van luchtdoelen dichterbij. Tijdschrift Lucht 4 (August 2009): 7-11.
[806] OECD (2012). Environmental Performance Review of Italy. Revised Assessment and Recommendations. http://www.oecd.org/env/environmentalcountryreviews/11%20FINAL.%20Room%20Document%202%20EPR%20Italy%20Revised%20Assessment%20and%20Recommendations%20FINAL.pdf
[807] European Environment Agency (2010), Air pollution (Belgium). www.eea.europa.eu/soer/countries/be/soertopic_view?topic=air%20pollution
[808] Cafarelli, E., Di Berardino, A., Rossetti, M. (2011) Mobilità sostenibile in Italia: indagine sulle principali 50 città, http://www.euromobility.org/documenti/strumenti/strumenti_new.htm
[809] ISPRA (2011). 10° annuario dei dati ambientali 2011. http://annuario.isprambiente.it/tematiche-primo-piano-2011
[810] Statistisches Bundesamt (2012). Nachhaltige Entwicklung in Deutschland. Indikatorenbericht 2012. Wiesbaden, p. 45.
[811] Ministry of Environment news on Ambient Air, http://www.envir.ee/1104350
[812] National Development Agency (2012). THE NEW HUNGARY DEVELOPMENT PLAN. National Strategic Reference Framework of Hungary 2007–2013. Employment and Growth
[813] Internetportal EurActiv, http://www.euractiv.com/specialreport-air-quality/bulgaria-killer-air-exposes-wide-news-508892
[814] OECD (2002): Environmental performance review of Austria. http://www.oecd.org/environment/environmentalcountryreviews/19631516.pdf
[815] Euractiv, 2011; http://www.euractiv.com/climate-environment/romania-suspended-kyoto-carbon-t-news-507163
[816] Global CSS Institute. http://www.globalccsinstitute.com/publications/global-status-ccs-2012/online/48626
[817] Mazi, Blaž (2010). Air quality in Slovenia –dSOMETHING IS IN THE AIR (Translation of article published in Drevnik on 19 June). http://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=4&ved=0CE8QFjAD&url=http%3A%2F%2Fwww.citeair.eu%2Ffileadmin%2FCITEAIR_II_in_the_Media%2FArticle_Drevnik-_Something_is_in_the_air_-_20100619.doc&ei=SLYaUc7HNs7WsgbNyICYDw&usg=AFQjCNGRXXduMnJa4XViBl9OM2Cbv-0EZw&bvm=bv.42261806,d.Yms
[818] "Federico Ramos anuncia que el Ministerio de Agricultura, Alimentación y Medio Ambiente ultima un nuevo plan integral de calidad del aire y protección de la atmósfera" http://www.magrama.gob.es/es/prensa/noticias/federico-ramos-anuncia-que-el-ministerio-de-agricultura,-alimentaci%C3%B3n--y-medio-ambiente-ultima-un-nuevo-plan-integral-de-calidad-del-aire-y-protecci%C3%B3n-de-la-atm%C3%B3sfera-/tcm7-223755-16

[819] "El Ministerio propone una modificación de la actual Ley de Calidad del Aire para dotar a CCAA y Ayuntamientos de un instrumento más potente de control de las emisiones contaminantes de los vehículos" http://www.magrama.gob.es/en/prensa/ultimas-noticias/notas-de-prensa-din.aspx?tcm=tcm:11-198821-16

[820] "Spanish minister wants to tax transport pollution". ENDS Europe, Thursday 15 March 2012. http://www.endseurope.com/index.cfm?go=28398

[821] "Reforma del Impuesto de circulación: los más contaminantes pagarán más" http://www.autopista.es/tecnologia/ecologia/articulo/reforma-impuesto-circulacion-mas-contaminantes-mas-pagan

[822] http://www.hel.fi/hki/ymk/en/The+State+of+the+Environment/Air/Air+Quality+Plans

[823] Federal Ministry of Economics and Technology (2012). National Reform Programme 2012, Berlin. http://www.bmwi.de/English/Redaktion/Pdf/national-reform-programme-2012,property=pdf,bereich=bmwi,sprache=en,rwb=true.pdf

[824] Schweizerische Eidgenossenschaft, Development of the Hungarian Air Quality Network, http://www.swiss-contribution.admin.ch/hungary/hu/Home/Projects/Approved_projects?projectinfoID=195916

[825] Kormanyportal, Fókuszban a levegő minősége, http://www.kormany.hu/hu/videkfejlesztesi-miniszterium/kornyezetugyert-felelos-allamtitkarsag/hirek/fokuszban-a-levego-minosege

[826] Environmental Protection Agency (2012). Ireland's Environment: An Assessment 2012, http://www.epa.ie/downloads/pubs/indicators/00061_EPA_SoE_2012.pdf

[827] Rīgas Dome (2011). "Rīgas pilsētas gaisa kvalitātes uzlabošanas rīcības programma 2011.-2015.: Par iespējām samazināt piesārņojumu (daļiņas un slāpekļa oksīdus) un uzlabot gaisa kvalitāti Rīgā." http://www.sus.lv/files/Gaisa_programma_Nr_3285.pdf

[828] Portail de l'environnement, www.environnement.public.lu/air_bruit/dossiers/CC-plan_action_CO2/index.html

[829] European Environment Agency (2010). The European environment – state and outlook 2010, Air pollution (United Kingdom), http://www.eea.europa.eu/soer/countries/uk/soertopic_view?topic=air pollution

[830] European Environment Agency (2011): http://www.eea.europa.eu/soer/countries/at/soertopic_view?topic=air%20pollution

[831] EEA, http://www.eea.europa.eu/soer/countries/fi/soertopic_view?topic=air%20pollution

[832] Karvosenoja N., Tainio M., Kupiainen K., Tuomisto J. T., Kukkonen J. and Johansson M. 2008. Evaluation of the emissions and uncertainties of PM2.5 originated from vehicular traffic and domestic wood combustion in Finland. Boreal Environ. Res. 13:465-474. http://www.borenv.net/BER/pdfs/ber13/ber13-465.pdf

[833] European Environmental Agency, 2012a. Air Pollution – State and Impacts (Greece). http://www.eea.europa.eu/soer/countries/cy/air-pollution-state-and-impacts-greece

[834] OECD (2009), OECD Environmental Performance Reviews: Greece. OECD, Paris.

[835] ISPRA (2009). Database on measures to improve air quality, http://www.misureprqa.sinanet.isprambiente.it

[836] European Environment Agency (2010). EEA State and Outlook 2010. Air Pollution (Latvia). http://www.eea.europa.eu/soer/countries/lv/soertopic_view?topic=air%20pollution

[837] Ceļu Satiksmes Drošības Direkcija (2012). "Latvijā Reģistrēto, Pirmoreiz Reģistrēto un Norakstīto Transportlīdzekļu Skaits." http://www.csdd.lv/tools/download.php?file=files/text/1325771209408_gl2012_02_majas_lapa_1.pdf

[838] Latvijas Statistika (2012). Transports: Galvenie Rādītāji. Pasažieru Pārvadājumi. http://www.csb.gov.lv/statistikas-temas/transports-galvenie-raditaji-30098.html

[839] Rīgas Dome (2011). Rīgas pilsētas gaisa kvalitātes uzlabošanas rīcības programma 2011.-2015.: Par iespējām samazināt piesārņojumu (daļiņas un slāpekļa oksīdus) un uzlabot gaisa kvalitāti Rīgā.

[840] PBL (2010). Balans van de Leefomgeving 2010. Planbureau voor de Leefomgeving, Den Haag/Bilthoven. http://www.pbl.nl/publicaties/2010/Balans-van-de-Leefomgeving-2010

[841] Easton, A. (2012) Poland's dependence on coal, BBC, http://www.bbc.co.uk/news/world-radio-and-tv-17813431

[842] EUROSTAT, Modal split of inland passenger transport, 2000 and 2010, http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=File:Modal_split_of_inland_passenger_transport,_2000_and_2010_%281%29_%28%25_of_total_inland_passenger-km%29.png&filetimestamp=20121016055851

[843] Plano Rodoviário Nacional, http://www.inir.pt/portal/RedeRodovi%C3%A1ria/EstudosdeAvalia%C3%A7%C3%A3odaRRN/Estudos/tabid/228/language/pt-PT/Default.aspx

[844] Ibid., Report on " Componente rodoviária da RTE-T em Portugal prevista nas decisões nº 884/2004/CE e nº 661/2010/CE", page 5

[845] Bundeskanzleramt (2011): Mineralölsteuergesetz. http://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10004908

[846] European Commission, 2012. Excise Duty Tables. Part II: Energy Products and Electricity. July 2012. http://ec.europa.eu/taxation_customs/resources/documents/taxation/excise_duties/energy_products/rates/excise_duties-part_ii_energy_products_en.pdf

[847] Finansministeriet (2011) ; Aftaler om Finansloven for 2012; November 2011. http://www.fm.dk/Publikationer/2011/~/media/Publikationer/Imported/2011/Aftaler%20om%20finansloven%20for%202012/web_aftaler%20om%20finansloven%20for%202012.ashx

[848] Deloitte (2012); Danish Finance Act for 2012. http://www.deloitte.com/assets/Dcom-Denmark/Local%20Assets/Documents/Udgivelser/Nyheder/Skat/Finansloven%202012_UK_udkast%202.pdf

[849] Finland's Government (2010), Programme of Prime Minister Jyrki Katainen's Government, 22.6.2012, http://valtioneuvosto.fi/hallitus/hallitusohjelma/pdf/en334743.pdf
[850] OECD (2011) Poland: Inventory of estimated budgetary support and tax expenditures for fossil-fuels, http://www.oecd.org/site/tadffss/POL.pdf
[851] OECD. Environmental Performance Reviews Slovenia 2012 Highlights. http://www.oecd.org/env/environmentalcountryreviews/50510129.pdf
[852] Energap.si, ENVIRONMENTAL ZONE IN THE CITY OF MARIBOR, http://www.energap.si/uploads/ENVIRONMENTAL%20ZONE%20IN%20THE%20CITY%20OF%20MARIBOR.pdf
[853] Slovak Government (2012) *Ochrana ovzdušia*, http://portal.gov.sk/Portal/sk/Default.aspx?CatID=39&aid=409
[854] Information from The New Hungarian Development Plan - Strategic Reference Framework of Hungary 2007–2013
[855] DG Competition. State aid No N 385/2010 – United Kingdom, Green Bus Fund, http://ec.europa.eu/competition/state_aid/register/ii/doc/Not_N385_2010_WL_EN.pdf
[856] European Environment Agency (2010). The European environment – state and outlook 2010, Air pollution (United Kingdom), http://www.eea.europa.eu/soer/countries/uk/soertopic_view?topic=air pollution
[857] European Environment Agency (2010). The European environment – state and outlook 2010, Air pollution (United Kingdom), http://www.eea.europa.eu/soer/countries/uk/soertopic_view?topic=air pollution
[858] National Budget 2013: http://www.minfin.bg/document/11413:3
[859] Bulgarian law portal, http://lex.bg/laws/ldoc/2135458102
[860] Finansministeriet (2011) ; Aftaler om Finansloven for 2012; November 2011. http://www.fm.dk/Publikationer/2011/~/media/Publikationer/Imported/2011/Aftaler%20om%20finansloven%20for%202012/web_aftaler%20om%20finansloven%20for%202012.ashx
[861] Deloitte (2012); Danish Finance Act for 2012. http://www.deloitte.com/assets/Dcom-Denmark/Local%20Assets/Documents/Udgivelser/Nyheder/Skat/Finansloven%202012_UK_udkast%202.pdf
[862] Ministry of Environment http://www.environment.fi/default.asp?contentid=147208&lan=en
[863] UBA (2009a). Feinstaubbelastung in Deutschland. Dessau-Roßlau.
[864] See http://www.bmu.de/verkehr/dieselruss/doc/20342.php
[865] See http://www.buzer.de/gesetz/7863/index.htm
[866] Greek Ministry for the Environment 2006. National Reporting to the Fourteenth & Fifteenth Sessions of the COMMISSION for SUSTAINABLE DEVELOPMENT of the UNITED NATIONS (UNCSD 14 – UNCSD 15) http://www.un.org/esa/agenda21/natlinfo/countr/greece/airPollution.pdf
[867] ISPRA (2009). Database on measures to improve air quality, http://www.misureprqa.sinanet.isprambiente.it
[868] Eurostat (2012). Taxation Trends in the European Union, http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_structures/2012/country/mt.pdf
[869] SAPO Notícias Online, Greensavers, Câmara de Lisboa pode alargar proibição da circulação de carros no centro da cidade, http://greensavers.sapo.pt/2012/12/05/camara-de-lisboa-pode-alargar-proibicao-da-circulacao-de-carros-no-centro-da-cidade/
[870] Parlamento, Iniciativa Parlamentar – veículos a Gá Natural e GPL, http://www.parlamento.pt/ActividadeParlamentar/Paginas/DetalheIniciativa.aspx?BID=36768,
[871] Associação Gás Natural, Ambiente, Emissões dos Veículos a Gás, http://www.apvgn.pt/ ,
[872] Governo, Plano Estratégico dos Transportes, Nov. 2011, http://dre.pt/pdf1sdip/2011/11/21600/0479604821.pdf
[873] OECD (2011) *Environmental Performance Review 2011- Slovakia*, http://www.oecd.org/env/environmentalcountryreviews/48962644.pdf
[874]Bundeskanzleramt (2012): Pendlerbauschale. https://www.help.gv.at/Portal.Node/hlpd/public/content/193/Seite.800600.html
[875] ELTIS, Budapest risks EU subsidies by postponing congestion charge (Hungary), http://www.eltis.org/index.php?ID1=5&id=60&news_id=4040.
[876] Commission National Climat (2008), Plan National Climat de la Belgique 2009-2012. www.climat.be/IMG/pdf/PNC_2009-2012-2.pdf
[877] Bruxelles Environnement (2004), Plan national de lutte contre l'acidification et l'ozone troposphérique (2004-2007). http://documentation.bruxellesenvironnement.be/documents/PlanNationalOzone_2004-2007.PDF?langtype=2060
[878] Bruxelles Environnement (unknown), Projet de Plan national de mise en œuvre de la Belgique. Convention de Stockholm sur les polluants organiques persistants (POPs). http://documentation.bruxellesenvironnement.be/documents/Projet_PlanNationalPOP_2008.PDF
[879] Institut Bruxellois pour la gestion de l'environnement (2002), Plan d'amélioration structurelle de la qualité de l'air et lutte contre le réchauffement climatique (2002-2010). http://documentation.bruxellesenvironnement.be/documents/Plan_Air_climat_2002-2010_FR.PDF?langtype=2060
[880] Vlaamse overhead (2006), The Flemish Climate Plan 2006-2012. http://documentation.bruxellesenvironnement.be/documents/Plan_Bruxell_air.PDF?langtype=2060
[881] Huytebroeck, Evelyne; Smet, Pascal (2006), Bruxell'air, Mesures de lutte contre la pollution de l'air générée par la circulation automobile. www.lne.be/themas/klimaatverandering/vlaams-klimaatbeleidsplan-2006-2012/flemish-climate-policy-plan-2006-2012/070124_english_version_versie_website.pdf

[882] Government of Flanders - Environment, Nature and Energy Dept. - International Environmental Policy Division, personal communication (10 February 2013)
[883] Plan air climat (2013), Résultats des mesures de la qualité de l'air. http://airclimat.wallonie.be/spip/Plan-Air-Climat.html
[884] www.climat.be/spip.php?article239
[885] www.eea.europa.eu/soer/countries/be/soertopic_view?topic=air%20pollution
[886] http://vlaandereninactie.be/nieuws/akkoord-over-systeem-kilometerheffing-en-wegenvignet/
[887] www.eea.europa.eu/soer/countries/be/soertopic_view?topic=air%20pollution
[888] Direction générale opérationnelle de l'agriculture, des ressources naturelles et de l'environnement, personal communication (10 February 2013)
[889] Government of Flanders - Environment, Nature and Energy Dept. - International Environmental Policy Division, personal communication (02/2013)
[890] European Commission, 2012. Excise Duty Tables. Part II: Energy Products and Electricity. July 2012. http://ec.europa.eu/taxation_customs/resources/documents/taxation/excise_duties/energy_products/rates/excise_duties-part_ii_energy_products_en.pdf
[891] OECD (2011) Poland: Inventory of estimated budgetary support and tax expenditures for fossil-fuels, http://www.oecd.org/site/tadffss/POL.pdf
[892] Izobraževanje in vzpostavitev posebnega spletnega mesta za umno uporabo lesne biomase kot goriva v malih kurilnih napravah. http://www.mko.gov.si/si/delovna_podrocja/gozdarstvo/navodila_za_pravilno_kurjenje/
[893] Ministry of the Environment (2012) Law on the protection of air, http://www.mzp.cz/C1257458002F0DC7/cz/novy_zakon_ochrana_ovzdusi/$FILE/OOO-zakon_ovzdusi-27062012.pdf.pdf
[894] Ministry of Environment news, http://www.envir.ee/1106192
[895] European Environment Agency (2011): http://www.eea.europa.eu/soer/countries/at/soertopic_view?topic=air%20pollution
[896] Kredex, News on prolongation of electric cars project, http://www.kredex.ee/kredex/news/the-government-is-planning-to-prolong-the-project-of-electric-cars/
[897] Environmental Protection Agency (2012). AIR QUALITY IN IRELAND 2011: Key Indicators of Ambient Air Quality, http://www.epa.ie/downloads/pubs/air/quality/Air%20Quality%20Annual%20Report%202011%20final.pdf
[898] ISPRA (2011). 10° annuario dei dati ambientali 2011. http://annuario.isprambiente.it/tematiche-primo-piano-2011
[899] Eurostat (2012). Taxation Trends in the European Union, http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_structures/2012/country/mt.pdf
[900] See http://ec.europa.eu/environment/air/index_en.htm See also EEA (2012). Air quality in Europe – 2012 report. EEA Report No 4/2012, Copenhagen.
[901] EIONET Central Data Repository, Annual report and questionnaire for 2011, http://cdr.eionet.europa.eu/pl/eu/annualair/envugwhyw
[902] Központi Statisztikai Hivatal, A levegő 10 µm alatti szálló porral (PM10) való szennyezettsége az automata mérőhálózat adatai alapján, http://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_ua008b.html
[903] European Environment Agency, 2012a. Air Pollution – State and Impacts (Cyprus). http://www.eea.europa.eu/soer/countries/cy/air-pollution-state-and-impacts-cyprus
[904] EEA (2012), Evaluation of progress under the EU National Emission Ceilings Directive, Progress towards EU air quality objectives
[905] National Agency for Environmental Protection, National Report on the state of environment in 2011. See http://www.anpm.ro/Mediu/raport_privind_starea_mediului_in_romania-15
[906] See http://ec.europa.eu/environment/air/index_en.htm See also EEA (2012). Air quality in Europe – 2012 report. EEA Report No 4/2012, Copenhagen.
[907] EEA (2012). Air quality in Europe – 2012 report. EEA Report No 4/2012, Copenhagen, p. 30.
[908] EEA (2012). Air quality in Europe – 2012 report. EEA Report No 4/2012, Copenhagen, p. 29.
[909] http://documentation.bruxellesenvironnement.be/documents/QAir_Rpt0911_corr_ssAnnexesB_C_D_E_fr.PDF?langtype=2060
[910] UBA (2012). Luftqualität 2011 – Feinstaubepisoden prägten das Bild. Dessau-Roßlau. http://www.umweltdaten.de/publikationen/fpdf-l/4211.pdf
[911] Subdirección General de Calidad del Aire y Medio Ambiente Industrial (2012) Informe de la Evaluación de la Calidad del Aire en España – 2011. Noviembre 2012. http://www.magrama.gob.es/es/calidad-y-evaluacion-ambiental/temas/atmosfera-y-calidad-del-aire/Situaci%C3%B3n_de_la_calidad_del_aire_en_Espa%C3%B1a_2011_tcm7-221280.pdf
[912] Latvijas Vides, geologijas un meteorologijas centrs (2012). Pārskats par Gaisa Kvalitāti Latvijā 2011. Gadā. LVĢMC, Riga.
[913] http://www.compendiumvoordeleefomgeving.nl/indicatoren/nl0243-Fijnstofconcentratie%2C-daggemiddelde.html?i=14-66
[914] See www.qualar.org.pt.
[915] Bolte et al (2012)

[916] Agencijy Republike Slovenje Za Okolje, Število preseganj dnevne mejne koncentracije PM10 v letu 2012, http://www.arso.gov.si/zrak/kakovost%20zraka/podatki/preseganja_pm10.html
[917] SITRA (2009), A Natural resource Strategy for Finland: Using Natural Resources Intelligently, April 2009, http://www.sitra.fi/julkaisut/muut/Aper cent20Naturalper cent20Resourceper cent20Strategyper cent20forper cent20Finland.pdf
[918] Statistics Finland, http://www.stat.fi/til/kanma/index_en.html
[919] http://www.ymparisto.fi/default.asp?node=6051&lan=en
[920] Hennicke, P. und Welfens, P.J.J. (2012). Energiewende nach Fukushima. Deutscher Sonderweg oder weltweites Vorbild? Oekom-Verlag, München.
[921] BMU und BMWi (2012). Energiewende auf gutem Weg. Ein Jahr nach den Energiewendebeschlüssen vom 6. Juni 2011. Juni 2012. http://www.bmu.de/files/pdfs/allgemein/application/pdf/broschuere_energiewende_weg_bf.pdf
[922] BMU und BMWi (2012). Energiewende auf gutem Weg. Ein Jahr nach den Energiewendebeschlüssen vom 6. Juni 2011. Juni 2012. http://www.bmu.de/files/pdfs/allgemein/application/pdf/broschuere_energiewende_weg_bf.pdf
[923] Nestle, U. und Reuter, L. (2012). Ausweisung der EEG-Umlage: eine kritische Analyse Argumente zur Bewertung der Umlage des Erneuerbare-Energien-Gesetzes. http://www.greenpeace.de/fileadmin/gpd/user_upload/themen/energie/2012-11-13_EEG_Umlage_kritisch_analysiert_final.pdf
[924] Statistisches Bundesamt (2012), p. 13.
[925] Federal Ministry of Finance (2012). German Stability Programme 2012 Update, p. 10.
[926] Neuhoff, K., S. Bach, J. Diekmann, M. Beznoska, T. El-Laboudy (2012). Steigende EEG-Umlage: Unerwünschte Verteilungseffekte können vermindert werden. DIW Wochenbericht Nr. 41.2012, S. 3 - 12. http://www.diw.de/documents/publikationen/73/diw_01.c.409391.de/12-41-1.pdf
[927] Ibid. See also for instance http://www.sueddeutsche.de/wirtschaft/kosten-der-energiewende-oekostrom-mit-sozialer-schieflage-1.1492025
[928] Nestle, U. und Reuter, L. (2012).
[929] Meyer, B., L. Reuster, K. Schlegelmilch und U. Nestle (2012). Klimaschutzorientierte Reform statt Senkung der Stromsteuer – Argumente und Positionen zu aktuellen Reformvorschlägen bei der Stromsteuer. FÖS-DISKUSSIONSPAPIER 12/2012. http://www.foes.de/pdf/2012-12_FOES_Diskussionspapier_Stromsteuersenkung.pdf See also Neuhoff, K., S. Bach, J. Diekmann, M. Beznoska, T. El-Laboudy (2012). Steigende EEG-Umlage: Unerwünschte Verteilungseffekte können vermindert werden. DIW Wochenbericht Nr. 41.2012, S. 3 - 12. http://www.diw.de/documents/publikationen/73/diw_01.c.409391.de/12-41-1.pdf
[930] http://www.kemin.dk/Documents/Presse/2012/Energiaftale/Aftale%2022-03-2012%20FINAL.doc.pdf
[931] Ministry of Transport (2009). En grøn transportpolitik. January 2009. http://www.trm.dk/graphics/Synkron-Library/trafikministeriet/Publikationer/2009/En_groen_%20transportpolitik.pdf
[932] Danish Government (2009). The Danish Business Strategy on Climate Change. November 2009. http://www.evm.dk/publikationer/2009/~/media/oem/pdf/2009/2009/SingleTheDanishBusinessStrtegyonClimateChange-low-pdf.ashx
[933] Danish Government (2008). Danish strategy for adaptation to a changing climate. March 2008. http://www.kemin.dk/Documents/Klima-%20og%20Energipolitik/klimatilpasningsstrategi_UK_web.pdf
[934] Danish Competition Authority (*Konkurrence-og Forbrugerstyrelsen*). 2009 Publications. "18. maj 2009: Konkurrence - vækst og velstand"
[935] European Commission (2010): Europe 2020. A European strategy for smart, sustainable and inclusive growth, COM(2010)2020.
[936] http://www.kemin.dk/Documents/Klima-%20og%20Energipolitik/vores%20energi%20-%20web.pdf
[937] Danish Energy Agency (2012). Energy Statistics 2011. http://www.ens.dk/en-US/Info/FactsAndFigures/Energy_statistics_and_indicators/Annual%20Statistics/Documents/Energy%20Statistics%202011.pdf
[938] Finnish Government, http://valtioneuvosto.fi/ajankohtaista/tiedotteet/tiedote/fi.jsp?oid=338771
[939] Sénat (2012) *Avis sur le projet de loi de finances pour 2012, Tome II Ecologie, Développement et Aménagement Durable*, http://www.senat.fr/rap/a11-111-2/a11-111-21.pdf
[940] National Statistics Office Malta (January 2013). News Release 021/2013, http://www.nso.gov.mt/statdoc/document_file.aspx?id=3519
[941] www.rijksbegroting.nl; www.rijksbegroting.nl/2013/voorbereiding/begroting?hoofdstuk=40.39 It should be noted that other governments (provinces, water boards and municipalities) also spend significant amounts of public money on environmental issues.
[942] GUS, Central Statistical Office (2012) Poland Quarterly Statistics No. 2/2012, Warsaw, Analysis and Comprehensive Studies Departament CSO, http://www.stat.gov.pl/cps/rde/xbcr/gus/as_poland_quarterly_statistics_2_2012.pdf
[943] National Institute of Statistics, 2012. See http://www.insse.ro/cms/rw/pages/index.en.do
[944] Ministry of Environment (2011) *Výročná správa za rok 2011 - Ministerstvo životného prostredia*, http://www.minzp.sk/files/dokumenty/materialy-a-dokumenty/vyrocne-spravy-a-verejne-odpocty/vyrocne-spravy/2011/vyrocna-sprava-mzp-sr-za-rok-2011a.pdf

[945] Ministry of Environment (2010) *Výročná správa za rok 2010 - Ministerstvo životného prostredia*, http://www.minzp.sk/files/dokumenty/materialy-a-dokumenty/vyrocne-spravy-a-verejne-odpocty/vyrocne-spravy/2010/new_all.pdf

[946] Statistics Sweden, http://www.scb.se/Pages/TableAndChart____71563.aspx

[947] Data for 2008-2010 from Office for National Statistics. UK Environmental Account 2012, http://www.ons.gov.uk/ons/rel/environmental/uk-environmental-accounts/2012/stb-ukea-2012.html#tab-Environmental-Protection-Expenditure--EPE-; Data for 2011-2015 from UK Public Spending (2013), http://www.ukpublicspending.co.uk/year_spending_2011UKmn_12mc1n_65808a#ukgs302

[948] OECD Statistics, table 11 on government expenditure by function, http://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE11

[949] Eurostat (2013). Taxation trends in the European Union : Data for the EU Member States, Iceland and Norway. European Union, 2013. http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-DU-13-001/EN/KS-DU-13-001-EN.PDF

[950] Umwelt Bundes Amt (2008).Environmentally Harmful Subsidies in Germany. Originally published in German in 2008, published in English in 2010. http://www.umweltdaten.de/publikationen/fpdf-l/3896.pdf

[951] Drissen, E., A. Hanemaaijer, and F. Dietz (2011). PBL-notitie Milieuschadelijke subsidies. Planbureau voor de Leefomgeving (PBL), Den Haag. http://www.pbl.nl/sites/default/files/cms/publicaties/20110914%20PBL%20Notitie%20Milieuschadelijke%20subsidies%20-%20500209001.pdf

[952] Creation PME (2012), Business Angel http://creation-pme.wallonie.be/1avant/Comprendre/Businessangelcourte.htm

[953] Vossen, R. (unknown), Business Angels Network. www.sme-finance-day.eu/fileadmin/Content/PDF/Brussels/presentation/Vossen_Presentatie_BAN_Vlaanderen.pdf

[954] Tekes (2012), Tekes funding services for small and medium-sized enterprises, January 2012, www.**tekes**.fi/en/document/55294/rahoitusesite_engl_pdf

[955] The Eco-Innovation Observatory. Country Report: Slovenia http://www.eco-innovation.eu/index.php?option=com_content&view=article&id=35&Itemid=73

[956] http://www.oecd-ilibrary.org/docserver/download/5k92r8nmfqxp.pdf?expires=1354879871&id=id&accname=guest&checksum=A274B00185B39E0FF084B407F1DEFD54

[957]ANJE, Supporting SMEs, http://www.anje.pt/portal/empreendedorismo-anje-introduz-eficiencia-energetica-em-100-pme?page=8

[958] BMWi (2012). Wirtschaftliche Förderung. Hilfen für Investitionen und Innovationen. September 2012, Berlin.

[959] European Commission (2012). Enterprise and Industry: SBA Fact Sheet 2012 Latvia. http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/files/countries-sheets/2012/latvia_en.pdf

[960] Eco-Innovation Observatory, Hungary, http://www.eco-innovation.eu/index.php?option=com_content&view=article&id=473&Itemid=61

[961] Ispra tv (2012) In arrivo finanziamenti Ue per 41 eco-progetti italiani, http://www.ispra.tv/italian/articoli.php?idnews=77

[962] http://www.agentschapnl.nl/nieuws/analyse-deelname-nederlandse-mkb%E2%80%99s-kp7