STUDY SUPPORTING THE PHASING OUT OF ENVIRONMENTALLY HARMFUL SUBSIDIES

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ANNEX I: EHS CASES IN EU MEMBER STATES 4

1 AGRICULTURE 4

1.1 Eligibility criteria for CAP Pillar 1 direct payments in the UK 4

1.2 Reduced fuel excise duty for diesel used in agricultural machinery 8

1.3 Subsidies contributing to unsustainable land use and soil sealing in France 11

2 CLIMATE AND ENERGY 19

2.1 Limited liability for nuclear energy producers in Germany 19

2.2 Preferential treatment for the hard coal mining industry in Poland 24

2.3 Support for biofuels in Sweden 28

2.4 Feed-in tariff for electricity generated by cogeneration in Estonia 40

3 FISHERIES 44

3.1 Subsidies for the modernisation of fishing vessels in Denmark 44

3.2 Subsidies for vessel scrapping in Spain 49

4 FOOD 54

4.1 Reduced VAT rate for food in Luxembourg 54

5 FORESTRY 58

5.1 Subsidies to improve forestry on peat lands in Finland 58

5.2 Exemption from land tax for reforestation and afforestation on wetlands in France 62

6 MATERIALS 68

6.1 Indirect subsidy to rock extraction in Malta 68

7 TRANSPORT 74

7.1 Tax deductions for commuters in Austria 74

7.2 Absence of road pricing for freight and passenger transport in the Netherlands 77

7.3 Company car taxation in Belgium, the Netherlands and the United Kingdom 84

7.4 Car fleet renewal schemes in Germany 112

8 WASTE 115

8.1 Reduced environmental charge rate for waste incineration in Flanders, Belgium 115

8.2 Incomplete producer responsibility for WEEE in Slovenia 118

8.3 Feed-in tariffs for the generation of energy from waste incineration and landfill gas in Czech Republic, Hungary and Portugal 123

8.4 Subsidies for the construction of waste incineration plants in Poland 130

9 WATER 137

9.1 Reduced VAT rate for drinking water in Greece 137

9.2 Irrigation subsidies in Cyprus, Spain and Italy 139
9.3 Implicit subsidy to the use of nitrogen-rich fertilisers in agriculture in France 148

ANNEX II: EHS REFORM CASES IN EU MEMBER STATES 155

1 Elimination of reduced excise tax rate for diesel used in agricultural machinery in the Netherlands 155
2 Reduction of energy tax exemptions for companies in Germany 158
3 Reduction of exemptions from energy and CO_2 taxes for certain fossil fuels in Sweden 162
4 Aggregates levy and landfill tax on construction and demolition waste in the UK 170
5 Income tax deductions for commuters in the Netherlands 179
6 Reform of car registration tax system in Flanders (Belgium) 183
7 Road charging in Austria 189
8 Pay-as-you-throw schemes in Italy 196
9 Reform of water pricing in the Czech Republic 202
10 Water abstraction charges in North Rhine-Westphalia (Germany) 208

ANNEX I: EHS CASES IN EU MEMBER STATES

Key:

	There are no particular problems relating to the criteria.
	There are some concerns with this particular criteria and further attention is useful. It is not, however, an over-riding problem suggesting a pressing need for reform.
	There are significant concerns with respect to the criteria and further attention is needed. The negative impacts suggest a need for attention or reform.

Note on the use of colour coding:

- The colour tabs highlight areas where concerns relating to a particular aspect of a subsidy have been identified in our analysis. The decision as to whether a subsidy merits reform should build on the complete picture across the different aspects of the subsidy and a careful analysis of the pros and cons of potential reform options. For additional detail on the analysis of each case study see Annex I.
- For cases where the subsidy is related to cases of non-action (e.g. lack of resource pricing), the categories of 'objectives' and 'design' are noted as 'red' if there is a major conflict with other objectives and 'orange' if it is sub-optimal from a signalling perspective.

1 AGRICULTURE

1.1 Eligibility criteria for CAP Pillar 1 direct payments in the UK

EHS Description		
Brief description of subsidy	The interpretation and implementation of eligibility criteria for CAP Pillar 1 Direct Payments (Single Payment Scheme) leads to the exclusion of the most environmentally interesting agricultural land (which tends to be farmed least intensively) on eligibility grounds (the administration's approach), or the removal of 'unproductive' scrub (the farmer's approach). This is partly a result of the ambiguity about what the subsidy is for (the Single Payment Scheme seeks to meet several objectives) and the ultra-cautious approach of both national CAP administrators (Defra in the UK) and farmers who know that any 'errors' which are uncovered by an audit will result in payment disqualification (for the MS) and repayments/fines for farmers.	
Economic type	Direct transfer of funds – interpretation of eligibility criteria	
Sector	Agriculture	
Member State	UK	
Other Member State(s) where the subsidy exists	A similar issue is found in many parts of the EU due to administrative and regulatory loopholes that complicate the eligibility of semi-natural farmland in Pillar 1 direct payments (e.g. BG, EE, SE, RO, and SL) which leads to active environmental damage to make land eligible for payments or to land abandonment.	
Nature and unit size of subsidy	In the UK there are issues around the criteria setting out what land is eligible for the Single Payment Scheme (SPS). There continue to be grey areas, where the potential ineligibility of certain semi-natural habitats or features has led to farmers erring on the side of	

	caution and removing them in some instances to avoid the risk of payments being withheld or clawed back at a later date. This can be seen as an environmentally harmful interpretation in the implementation of the SPS in the UK. CAP Pillar 1 payments provide per hectare payments to farmers. Values vary between England, Scotland, Northern Ireland and Wales, due to the different parameters under which the value of Single Farm Payments is established annually. In Scotland, Wales and Northern Ireland, per hectare payments are still based on historic receipts; in England, where payments are no longer related to historic production, payments are as follows for 2011 claim year: Non Specially Disadvantaged Areas (SDA): EUR289.94/ha; SDA: EUR 233.95/ha; Moorland SDA: EUR40.82/ha. The Specially Disadvantaged Areas are a sub-category of the EU Less favoured Areas.	
Legal basis and timeline	The SPS is paid on an annual basis for all eligible hectares (defined in Article 34(2)(a) and 2(c) of Regulation 73/2009 and Article 2(a) of Regulation 795/2004), subject to receipt of a claim from the farmer. The system of income support payments to farmers is on-going, subject to reviews/reforms, usually every 7 years (recently more frequently). The current system is currently undergoing review, with new support schemes to be introduced from 2014	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	The eligibility criteria aim to ensure that only areas of land that are used for agricultural activity or kept in Good Agricultural and Environmental Condition receive payments under the CAP. Eligibility is set out under Article 34 of Council Regulation 73/2009	
Does the subsidy fulfil its objectives?	Broadly, yes, although the objectives especially with regard to the environment are vague.	
Is the rationale for subsidy still valid?	Broadly, yes – in relation to eligibility criteria. The rationale for direct payments is under active discussion in the 2014 reform, with proposals for more attention to environmental management outcomes.	
Are there any key problems with **subsidy design?**	It is the UK interpretation and implementation of the eligibility criteria at the national level (and also by EU auditors) that causes the problems. The SPS, with these eligibility criteria has been in place since 2005 and was last reviewed as part of the CAP Health Check in 2008. It is currently under review, with a revised CAP scheduled to come into operation in January 2014.	
Does the subsidy represent an **infringement of existing EU legislation**?	In some cases, the interpretation and implementation of the eligibility criteria at the national level may lead to the breaching of EU environmental/biodiversity standards. For example, the burning of scrub in Scotland resulted in damage to birds' nests, protected under Birds Directive. It may also lead to conflicts with the pursuit of biodiversity objectives, e.g. objectives of the Biodiversity Action Plan such as conserving biodiversity in the	

	wider EU countryside, as well as with the priorities of agri-environment schemes (also funded under the CAP).	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	Active farmers as defined under Council Regulation 73/2009	
Does the subsidy reach them?	Yes	
What are the **unintended social effects**, if any?	In extreme cases, this has the potential to make the difference between a farm that is profitable or unprofitable and therefore could lead to farms going out of business – with knock on social impacts. This is theoretical, however – there are no examples that could be identified where this has in fact been the case	
Key environmental impacts		
Nature and degree of impacts on the environment	It may be that the problem arises not so much from the rules themselves, but from fear of penalties as a result of enforcement where there are grey areas as to exactly what land is eligible and ineligible for SPS claims. This induces farmers to remove features/habitat. The subsidy could also have wider impacts on the environment, where semi-natural habitats are damaged, scrub or other vegetation removed, then this could release carbon to the atmosphere, it could also increase the risk of water erosion and hence water quality.	
Policy filters	The damage can be driven not necessarily by 'ineligibility' of certain features/habitats per se, but as a result of a fear of penalties if areas are claimed on and subsequently deemed ineligible as a result of enforcement or audit, given the fact that there is often some margin of error in calculating 'ineligible' and 'eligible' areas, maps do not always tally, EU Auditors may be working to different/stricter interpretations of the rules to national enforcement agencies etc. Detailed guidance documents that spell out precisely what is eligible and not eligible can help here. These are provided in all UK regions and updated regularly. The 2012 updated handbook in England, for example, makes the rules regarding the eligibility of scrub much simpler to interpret and implement by removing the '50% rule' and making any areas of scrub that are able to be grazed to be eligible for the SPS.	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	It is hard to find quantitative evidence of the scale of this problem. The total Single Payment national ceiling for the UK in 2009 was EUR3.33b. The extent of the area under-claimed, or claimed but environmentally mismanaged to permit the claim, is a small fraction of this budget. We don't know the magnitude of this problem, but the importance of pointing it up now is that the opportunity of the current CAP reform should be taken to establish the principle that the CAP is	

	increasingly about sustainable land management and this should extend to the very marginal, extensively grazed land where the non-provisioning ecosystem services are likely to be large.	
What are the **unintended economic impacts** if any?	The fear of land managers is that they would forfeit their SPS payment for a proportion of their land if they claimed for areas that were subsequently deemed to be ineligible. The economic impact will vary on a farm to farm basis.	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Yes**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	There would be value in providing greater clarity in the CAP regulation, implementing rules and non-legislative technical guidance on eligibility criteria at the EU level. Institutional capacity at all levels should be improved to avoid misinterpretations that lead to environmentally damaging implementation in the future. As it is proposed that the objectives of the CAP direct payments are explicitly widened in the 2014 reform to embrace 'agricultural practices beneficial to climate and environment' it is important that eligible agricultural land and agricultural activity are defined in such a way to unambiguously include the grazed areas which are the subject of this case study.	
Opportunities for EHS reform		
What are the **main arguments for reform**?	These issues are discussed regularly and many issues have been resolved over time. Much rests on interpretation of EU regulation and guidelines and so there are always going to be grey areas unless rules can be interpreted less stringently. There are calls for reform from both environmental NGOs and the farming stakeholders.	
What are the **main barriers to reform?**	This is a fairly sensitive issue. Particularly as the issue of eligibility relates to payments to farmers and potential penalties not just on farmers as a result of national enforcement, but on national governments as a result of EU audit. But there is resistance from lowland farmers to agree to a widening of the environmental land management function of the CAP over wider areas – thus from their perspective diluting their payments.	
Is there a **window of opportunity** for subsidy removal or reform?	Yes – current negotiations for CAP Reform for 2014-2020	
References	Poláková, J, Tucker, G, Hart, K, Dwyer, J, Rayment, M (2011) Addressing biodiversity and habitat preservation through Measures applied under the Common Agricultural Policy. Report Prepared for DG Agriculture and Rural Development, Contract No. 30-CE-0388497/00-44. Institute for European Environmental Policy: London	

	IEEP, GHK (2012) Incentive Measures and Biodiversity – A Rapid Review and Guidance Development, Volume 3 – Guidance to identify and address incentives which are harmful to biodiversity

1.2 Reduced fuel excise duty for diesel used in agricultural machinery

EHS Description		
Brief description of subsidy	Fuel duty reliefs or exemptions for agriculture, horticulture, pesciculture and forestry	
Economic type	Foregone government revenues (tax reduction)	
Sector	Agriculture	
Member States where the subsidy exists	BE, CZ, DE, EE, ES, FR, IE, CY, LV, LT, LU, HU, NL, PT, FI, SE, UK	
Nature and unit size of subsidy	Reductions, exemptions or refunds of excise duty for energy products and electricity for the sectors specified. The reliefs vary in size by Member State, and by fuel (diesel, LPG, natural gas, heavy oil and electricity). For example, for diesel (gas oil) 17 MS apply reliefs at rates from 100% (7 MS) to 40% (NL), Commission, (2012).	
Legal basis and timeline	These reliefs to the minimum duty rates for energy products are permitted under Articles 8 and 15 of Council Directive 2003/96/EC Restructuring the Community Framework for the taxation of energy products and electricity. These are well established reliefs. The Commission was asked to examine by 1/1/2008 if the zero duties should be repealed. They were not, which is unsurprising given the commodity price spike and food price inflation at that time.	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	The rationale for the subsidy varies across different MS. In some cases the subsidy may have been introduced as a means of encouraging the agriculture sector to improve productivity by mechanizing or as a cost-reducing measure to provide social or income support for farmers. In some cases (see for example reform case in Annex II from the Netherlands), the subsidy is used to differentiate between different users of roads, i.e. a higher excise tax contributes to road construction and maintenance from those who use the roads frequently, while those who do not (or only incidentally) use roads pay a lower rate.	
Does the subsidy fulfil its objectives?	Not entirely clear. There is a strong rationale and private economic incentive for mechanization even without the subsidy. It would be interesting to see if mechanization proceeded faster and further in countries with higher reliefs.	
Is the rationale for the subsidy still valid?	Partially at best, there are pockets of peasant agriculture in the EU still reliant on animal power transport and traction. Low productivity agriculture is seen as a deserving social case, but there is no rationale for modern agriculture, which is also subject to generous CAP subsidies, to also to receive this relief.	
Who is **responsible** for the subsidy?	The economic or finance Ministry in each Member State who set taxation rates.	
Are there any key	The main issue is the policing of agricultural gas oil to prevent it	

problems with **subsidy design?**	being used in non-agricultural uses. It is colour dyed (e.g. red or white) to make detection simple. Extent of fraudulent use is not known but cases appear sporadically.	
Does the subsidy represent an **infringement of existing EU legislation**?	No	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	The beneficiaries are farmers in the first instance. Their net incomes are higher as a result of this significant cut in one of their productions costs. But this subsidy is so well established, and there are such pervasive other agricultural subsidies (much bigger than fuel relief) that its benefits are not clear. Removal of the subsidy would have an immediate deleterious cost raising effect for farmers – which, given the nature of agricultural markets would not easily or quickly be passed on to consumers. The rate of such effect might be lower for the less productive (and less fuel using) parts of the rural economy.	
Does the subsidy reach them?	Yes, but as agriculture is squeezed between much more concentrated up and downstream sectors much of the benefit is competed away.	
What are the **unintended social effects**, if any?	None.	
Key environmental impacts		
Nature and degree of impacts on the environment	Greater fuel use, lower incentive for fuel efficiency, and thus more GHG emissions. There may also be more particulates pollution than would otherwise be the case from the additional gas oil used in agriculture. The environmental effect is the GHG associated with the relatively small amount of fuel saved by the higher price. On the below illustrative numbers for the UK, 316m litres (=13.4% of 1263m litres) of fuel saving with a CO2 emission factor of 2.66 Kg/lit suggests a GHG reduction of 840,000 tonnes. This would be a small (<2%) saving of the UK annual agricultural GHG emissions of ~48mt CO2e.	
Policy filters	None	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	The scale of the subsidy is indicated by the fuel usage in agriculture, horticulture, pesciculture and forestry. This multiplied by the subsidy rate indicates a first approximation of the government revenues forgone by the duty reductions or exemptions. To calculate the additional GHG emissions corresponding to the additional gas oil used as a result of the subsidy requires estimation of the reduction in fuel use with higher prices (and stronger incentive for fuel efficient machinery). This in turn requires data on the price elasticity of demand by farmers of gas oil.	

	To exemplify the orders of magnitude using UK data. UK agricultural (including horticulture) fuel expenditure in 2010 was £884m. p.a. (Defra 2012) At approx. £0.70 per litre this indicates usage of around 1263m litres. The UK fuel duty relief is £0.47 per litre. To calculate the tax revenue forgone we must calculate the consumption at a higher price without the duty relief. This requires an estimate of the price elasticity of demand for agricultural gas oil. Suppose the elasticity is low, e.g. 0.2 (Graham and Glaister 1999). The price with 11 ppl (pence per litre) agricultural relief is 70 ppl, with full duty this would be 117 ppl, i.e. 67% higher. With an elasticity of 0.2 the consumption would be 13.4% lower i.e. 947 m litres, and the tax revenue forgone with these figures is £410m. The demand elasticity is a key parameter. The above figure of .2 is a short run effect; the long run effect may be much higher. However these values estimated by Graham and Glaister are for retail consumer fuel demand. Business demand is likely to be lower. UK figures may not be wildly different than other EU countries. Although the fuel duty relief varies, and the degree of mechanization and likely responsiveness to higher prices will all vary, it would be surprising if the overall relative scale of impact on GHG emissions was very different.	
What are the **unintended economic impacts** if any?	The productivity benefits from mechanisation are so evident even without the fuel duty relief that agricultural mechanisation would no doubt have gone to the extent it has anyway. It is often alleged that EU agriculture is over-mechanised (e.g. machine power per hectare in EU compared to USA), and fuel duty relief would have been a further encouragement to this, but the prime explanation are deeper structural causes.	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Poss.**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	Such is the political power of the farming sector that that abolition of this relief could only be part of a broader wholesale review of agricultural subsidies.	
Opportunities for EHS reform		
What are the **main arguments for reform**?	It is perverse to be encouraging agriculture to increase resource use efficiency – which must include fuel efficiency - and at the same time to have in place a subsidy which significantly reduces the cost of its fuel.	
What are the **main barriers to reform?**	Farmer political power and they would play the food price inflation card (disproportionately – because agricultural fuel costs are a minor part of total production costs of the major commodities). Competitiveness is also likely to play a role, given that the exemption exists in several other EU MS.	
Is there a **window of opportunity** for	The opportunity to repeal the zero duties was offered in the 2003 Directive as the Commission was asked to review the situation by 2008. The	

subsidy removal or reform?	circumstances of extraordinarily high energy and food prices at that time led to the decision to leave the reliefs in place. With continued fears of commodity and food price inflation this may not be a propitious time to re-open this tax relief. However some efforts are being made in certain MS which could support similar reforms in other MS (see Annex II for reform case on the elimination of reduced excise tax rate for diesel used in agricultural machinery in the Netherlands).
Insights on past or existing reform	
Insights from EHS that have been (or are in the process of being) **reformed or phased out**	In early 2012, the Czech government proposed to abolish the 60% tax refund of excise duty on diesel fuel used in agriculture from 1.1.2013. Following strong opposition from the agricultural sector, the Czech government revised its proposal, introduced a two-stage approach where the refund rate would be decreased to 40% in 2013 and abolished in 2014. (Government of the Czech Republic, 2012) The farmers' association has estimated that the abolishment of the excise tax rebate will cost them an estimated CZK 1.8 billion (approx. EUR 70 million) (The Agrarian Chamber of the Czech Republic, 2012). A similar reform will come into effect in the Netherlands from 1 January 2013 where a single excise tax rate for gas oil will be applied (see Annex II for further details on this reform case).
References	Commission (2012) Excise Duty Tables Part II energy products and electricity, Ref 1034 rev 1 January 2012, DG Tax and Customs Union, Brussels. Council Directive 2003/96/EC, Restructuring the Community Framework for the taxation of energy products and electricity, 27 October 2003, Brussels. Defra (2012) Agriculture in the UK, page 84. London. http://www.defra.gov.uk/statistics/files/defra-stats-foodfarm-crosscutting-auk-auk2010-110525.pdf Environmental Protection Agency, Unit conversions, emission factors and other reference data. US Government, Washington, USA (for diesel oil emission factor). Graham DJ and Glaister S (1999) Demand for automobile fuel, a survey of elasticities. Imperial College, London. http://www.cts.cv.imperial.ac.uk/documents/publications/iccts00007.pdf Government of the Czech Republic (2012). 'Green diesel to stay until 2014' URL: http://www.vlada.cz/cz/media-centrum/aktualne/zelena-nafta-bude-az-do-roku-2014-96257/ The Agrarian Chamber of the Czech Republic (2012). 'Blind and non-conceptual cuts'. http://www.agrocr.cz/novinky/slepe-a-nekoncepcni-skrty.php

1.3 Subsidies contributing to unsustainable land use and soil sealing in France

EHS Description		
Brief description of subsidy	Two main types of subsidies/incentives contributing to land sealing and urban sprawl have been identified in France (Centre d'analyse stratégique, 2011). (a) Specific state support schemes including loans with reduced	

	or no interest rates and tax breaks to help individuals become home-owners. The absence of specific conditionalities mean that these schemes indirectly encourage the construction of new homes/buildings, they do not distinguish between developments in urban areas and outside urban areas nor do they take into consideration the ecological characteristics on which a housing development is to take place (b) Tax breaks or reduced dues on land use granted by public authorities to attract businesses, encouraging the development of economic activities outside urban centres. Examples include the "contribution economique territoriale", which tends to be lower outside urban centres, pushing the development of economic activities to the outskirts of cities. It also includes exemptions from taxes on logistical or commercial centres as well as storage houses (as opposed to taxes which are uniformly applied or vary depending on the location of the proposed development and its impacts on surrounding ecosystems and biodiversity).	
Economic type	Off budget, lack of full-cost pricing	
Sector	Construction, commercial, logistic companies	
Member State	France	
Other Member State(s) where the subsidy exists	Similar subsidies exist in a number of EU Member States. Some Member States have found that their housing support schemes, at least in their current form, are likely to have indirect effects in terms of contributing to urban sprawl and soil sealing. Germany is for example revising its "Eigenheimzulage" policy, in Austria support to housing has been criticised for causing harmful environmental impacts (Umweltdachverband, 2010). Subsidies that stimulate urban sprawl have been identified as a focus area in the inventory of EHS currently being compiled by authorities in Flanders (Belgium).	
Nature and unit size of subsidy	Support to the buying of real estate was estimated to be approximately EUR 4.7 billion in 2011. The cost of the PTZ+ (see below) has been estimated to be around EUR 920 million in 2010 and EUR 1,060 million in 2011.	
Legal basis and timeline	Various preferential loan schemes and (partial) tax exemptions exist in France and in their current form contribute to land sealing and urban sprawl. **Public support to increase home ownership** that indirectly encourages new housing developments and does not take into account where the real estate is located (i.e. inside or outside an urban areas) includes: a) The social loan for home-buying (PAS – prêt à l'accession sociale), targeted at low-income households who build, buy or improve a home in view of making it their primary residence. b) The social loan for renting and home-buying (PSLA – prêt social de location-accession) allowing households to become owners of a new real estate development (house/flat) after	

	having paid moderate rent for it during nine years. c) The loan with zero interest rate (PTZ+ – prêt à taux zéro) where the state pays interest on the purchase of the first main residence. The level and conditions of the loan are determined following a range of criteria (e.g. income levels, size of household, where the home is located, whether it is old or new, its energy performance, etc.). While it takes into account market prices, it does not reflect any considerations relating to land use planning or keeping urban sprawl at a minimum. The criteria relating to whether the real estate purchased is old or new results in the conditions of the loan being more interesting for the purchase of new housing, which has the effect of indirectly financing the construction of new individual houses outside urban centres. The criteria relating to the energy performance of the building (the more energy efficient the building, the more interesting the conditions for the loan) also encourages the purchase of new buildings at the expense of the renovation or rehabilitation of old buildings. **Public support for the construction of new homes/developments** include for example: (a) A rebate on income tax to support investment in housing that can be rented out (called "dispositif Scellier". This measure does not focus on areas within cities. Furthermore, specific additional rebates are also granted e.g. for investments in rural areas in need of "regeneration". This kind of support could result in less natural habitat loss and urban sprawl if it was specifically targeted at housing development in urban areas. **Public support/incentives** for economic activities outside urban areas include: (a) The territorial economic contribution/tax ("contribution economique territoriale) is generally lower outside urban centres as municipalities close to urban centres try to make themselves comparatively more attractive for companies when choosing the location of their activities. Local authorities may even decide to exempt companies from the tax altogether if they are prepared to locate their activities in priority areas (e.g. rural revitalisation zones, competitiveness hubs, sensitive urban areas, etc.). This often leads to the creation of areas of economic activity in the periphery or quite far outside urban centres, most often on agricultural land or natural habitats which can be purchased at much lower prices than within urban centres. (b) A tax on commercial surfaces (Tascom - Taxe sur les surfaces commerciales) has to be paid by commercial enterprises and is determined by the m^2 and turnover of the enterprise. Tax reductions are granted to enterprises	

	that require extraordinarily large selling surfaces (e.g. furniture shops, car dealerships etc.). The tax applies irrespectively of where the shop is located and thus does not take into account the impacts of the specific location of a shop on the surrounding environment. (c) Exemptions from the taxes and charges on the creation of new office space, including the charge for the creation of offices, research, commercial or storage spaces in the region Ile de France and the annual tax on offices in the Region Ile-de-France. The use of land for the creation of office space is both profitable and intensive while their impacts on habitats and biodiversity are not adequately taken into account. By reducing the price of land sealing these exemptions are harmful to biodiversity. (Centre d'analyse stratégique, 2011).	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	The first type of subsidy is meant to facilitate home ownership by low income households and to encourage the development of affordable housing in general. The second type of subsidy is meant to encourage the development of commercial activities, attracting investors and creating local jobs, to amongst others counter rural flight.	
Does the subsidy fulfil its objectives?	Yes - subsidies/tax rebates to facilitate home ownership by low income households and to encourage the development of affordable housing are likely to contribute to making home-ownership more affordable for low-income households. Similarly, tax rebates granted in view of attracting businesses, shops and offices to settle in the periphery of urban areas or even in rural areas have also proved effective.	
Is the rationale for the subsidy still valid?	Partially. The objectives pursued by those subsidies/tax rebates and exemptions may be considered worthwhile. Reforming the subsidy would therefore not necessarily imply discontinuing these schemes all together but would rather involve the introduction of criteria that better channel the developments to areas where they result in the smallest ecological impact and provide stronger incentives to encourage more efficient land use, for example via the purchase and/or renovation of existing buildings rather than the construction or purchase of new buildings (achieving the same objectives while keeping land-take and resource use to a minimum).	
Who is **responsible** for the subsidy?	National government, local authorities.	
Are there any key problems with **subsidy design?**	The identified incentives do not take into account environmental externalities and do not provide enough of an incentive/reward for developments that are particularly efficient as regards land use.	
Does the subsidy represent an **infringement of existing EU legislation**?	No.	
Key social impacts		

Who are the **intended recipients / beneficiaries**?	The subsidies to facilitate home ownership are particularly attractive for and targeted at low-income families which would like to acquire or build a home (however the conditions may also be attractive for higher income households). The beneficiaries of the tax rebates meant to trigger economic activities (shops, warehouses, offices) are commercial investors themselves, who benefit from lower costs.	
Does the subsidy reach them?	Yes, the measures have an impact on the costs and result in changing locational choices of the targeted agents, whether they are households or commercial actors.	
What are the **unintended social effects**, if any?	One cost of urban sprawl is that commute times are increased since homes and places of work and shopping are more dispersed. This also means CO_2 emissions from transport will be more important, especially in the absence of well-developed public transport systems (Bart, 2009). The daily commuting sub-urban dwellers into urban centers contribute to poor air quality in urban centers. A benefit of sprawl is that it allows consumers to purchase/build larger lots and homes and may allow them easier access to a range of recreational activities through more direct proximity to nature.	
Key environmental impacts		
Nature and degree of impacts on the environment	According to Corine Land Cover (CLC), between 1990 and 2006, the share of sealed surfaces in mainland France increased from 4.6% to 5.1%, which corresponds to a loss of 281 354 ha in sixteen years, of which 122 949 ha occurred over the period 2000-2006. The increase in sealing has been accelerating: over the period 1990-2000, about 16 000 ha a year were sealed, this rose to 20 000 ha/year over the period 2000-2006. According to CLC, consolidated urban areas represent only 1.6% of sealed surfaces. Discontinuous urban areas, on the other hand, represent three quarters of sealed space. A study by the CGDD (CGDD, 2010) estimated that urban sprawl (i.e. discontinuous urban areas) in France progresses by 5600 ha/year. According to the same study, industrial and commercial areas continue to expand in all French regions (+3 800 ha/year), as does transport infrastructure (+1 300 ha/year), which represents (relative to its surface) the highest relative progression (19%). Sealing soils with artificial, impenetrable surfaces interferes with the essential environmental, economic and social functions performed by soils. Services provided by soils include the provision of food and materials; the regulation of water, energy and matter; providing habitats to support biodiversity; the provision of spaces for recreational purposes; and the support of landscapes that have aesthetic and cultural values. Another problem associated with urban sprawl is the increased reliance on private motor vehicles for transport with corresponding negative impacts of GHG emissions, impacts of road infrastructure on habitat fragmentation etc. (EC, 2012). These unsustainable trends therefore threaten the availability of fertile soils and groundwater reservoirs. Soil sealing often affects fertile agricultural land, puts biodiversity at risk, increases the risk of	

	flooding and water scarcity and contributes to global warming (EC, 2011). The fragmentation of habitats linked with urban sprawl also has adverse effect on biodiversity - fragmentation results in habitat loss and degradation, and constrains movements by species (e.g. for foraging, breeding, migration and dispersal) – these impacts are also likely to be exacerbated by climate change (Kettunen et al., 2007).	
Policy filters	For particularly large developments as well as developments within Natura 2000 areas, Environmental Impact Assessments (EIAs) might be required, which would encourage developers to identify options which have the lowest environmental impacts. This is however likely to apply only in a very limited number of the above described situations given the rather high thresholds (e.g. large size of a development, limited number of activities for which EIAs are systematically required) for triggering the obligation for developers to carry out an EIA.	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	Nature and unit size of the subsidies have been indicated above. No estimates of the size of the subsidies taking into account environmental externalities as well as wider social costs could be found.	
What are the **unintended economic impacts** if any?	There are broader costs to society of the resulting urban sprawl as they increase the cost of providing public services (e.g. waste collection, water collection, roadways, sewerage). Research has shown that urban sprawl undermines the cost-effectiveness of public service delivery. Traffic congestion is also an often cited consequence of urban sprawl. No estimates of the costs were found for Europe but some attempts were made in the US to quantify the additional costs of less compact development. Perhaps one of the most quoted recent research attempts to estimate the relationship between sprawl and infrastructure costs was conducted in the US by a team led by Professor Robert Burchell under the Transit Cooperative Research Program (TCRP). The project included two reports: Costs of Sprawl—2000 and The Costs of Sprawl—Revisited. The Costs of Sprawl—2000 projected that from 2000 to 2025, America would incur USD 227.4 billion in gross additional costs for what the study terms “uncontrolled growth” (less dense, more sprawling growth) versus “controlled growth” (more dense, less sprawling growth). This equates to approximately USD 9.1 billion in gross additional costs per year. The opportunity cost (e.g. loss of agricultural land and therefore agricultural output) and the fall in ecosystem services due to habitat fragmentation and less resilient ecosystems should also be taken into account when considering the costs of urban sprawl and land sealing.	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Yes**
Reform scenarios/options		
What are the main	A 2012 EC report recommends a three-tiered approach focused on limiting	

options for the reform of this subsidy?	the progression of soil sealing by reassessing "negative" subsidies that indirectly encourage soil sealing. It also recommends improved spatial planning, mitigating its effects (e.g. encouraging the use of permeable surfaces instead of conventional asphalt or cement and building green roofs) and compensating valuable soil losses by action in other areas. Soil sealing can be limited through smart spatial planning and limiting urban sprawl. Development potential inside urban areas can be better used, e.g. through the regeneration of abandoned industrial areas (brownfields) (EC, 2012). A report commissioned by the French Government (Centre d'analyse stratégique, 2011) includes the following recommendations for the reform of French subsidies/incentives causing unsustainable land use and soil sealing: • With regard to subsidies in the area of social housing, a partial redirection of aid for home-ownership towards aid directly to households could be less harmful to biodiversity; • In the granting of authorisations for building, authorities should give priority to developments to the construction of houses in those areas within urban areas that are still un-built over areas that are not yet urban. At a minimum, developers receiving an authorisation to build outside urban areas should have to commit to simultaneously build new housing within urban centres or to also invest in urban renewal/regeneration. • Public housing and infrastructure developments should set an example and be used as instruments to promote urban densification. In addition, it seems that, in the future, subsidies that aim to promote energy efficiency in buildings should focus on energy-saving building refurbishment of existing houses rather than encourage the building of new houses.
Opportunities for EHS reform	
What are the **main arguments for reform**?	The incentives do not channel land sealing and urban densification through the development of housing, commercial areas and warehouses to the areas which would ensure the most efficient use of existing infrastructure and limit urban sprawl. Nor do they provide enough of an incentive to minimize land-use when building, thus contributing to urban sprawl, the loss of fertile agricultural land and the fragmentation of ecosystems.
What are the **main barriers to reform?**	A major barrier to reform are the interests of more isolated or remote municipalities in attracting economic activities and increase job opportunities to counter the trend of rural migration and attract new permanent residents that can help to stimulate the local economy.
Is there a **window of opportunity** for subsidy removal or reform?	The Grenelle I law identified urban sprawl and the loss of fertile agricultural land as a problem to be addressed. Article 7 of the law announced a study on the possibilities for reform of the current system of taxation and the incentives to limit the expansion of land sealing (Grenelle I law, 2009). Some of the information presented in this case study was taken from the scoping study produced in response to this call (Centre d'analyse Stratégique, 2011).

	France's new biodiversity strategy, adopted in 2012, calls for policy coherence (target 14). It also highlights that the adverse impacts of some public policies can be reduced without changing the objectives of certain policies, although in some cases new priorities will have to be set in light of new insights. Target 15 of the new strategy on *ensuring the ecological efficiency of policies and public and private projects* notes that urban densification and avoiding areas crucial for biological diversity are both important to achieve the Strategy's objectives (MEDDTL, 2011). The recently elected French government announced that in September 2012 a conference on the environment focusing on the issues of energy transition and biodiversity will be held. An issue on the agenda will be environmental fiscal reform, suggesting an attempt will be made to further distinguish between environmentally beneficial and harmful tax measures/incentives. On biodiversity, a framework law is to be prepared to replace the current law which dates from 1976. This process can be seen as an important window of opportunity to turn recent findings and recommendations regarding environmentally harmful subsidies/incentives into concrete reform commitments and action.
Insights on past or existing reform	
Insights from EHS that have been (or are in the process of being) **reformed or phased out**	In a report published in 2010, the Germany UBA (UBA, 2010) identified home ownership grants as one of the main EHS in the construction and housing sector. Reiterating the target set in the Germany sustainability strategy (namely to reduce the additional land take for settlement and transport to 30 ha per day by 2020), the report highlighted the possible contradiction between the target and the home ownership grants. The Germany government has subsequently decided to discontinue the home ownership grant, partly as a contribution to meeting the target to reduce the additional land take for settlement and transport to 30 ha per day by 2020. Setting overall targets on land use and land sealing can be an important factor to achieve policy coherence and support efforts to reform those measures that might undermine the achievement of the target.
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2 CLIMATE AND ENERGY

2.1 Limited liability for nuclear energy producers in Germany

EHS Description		
Brief description of subsidy	German nuclear power generation is subsidised through three different mechanisms: • German nuclear power generation has received – and to a lesser extent still receives – substantial financial aid for research, particularly in the early stages in the 1950s and 1960s. For 2008, approximately EUR332 million was provided to cover nuclear energy research (Schrode et al., 2010). • German nuclear power plant (NPP) operators face limited liability for accidents in nuclear plants. The government is liable for economic damage exceeding the financial security of the	

	operator of the nuclear plant. NPP operators are only obliged to cover EUR2.5 billion of the potential costs of a nuclear accident (Schrode et al., 2010). • Moreover, with regard to the building of decommissioning and disposal facilities of nuclear power plants, NPP operators are allowed to accumulate accruals for a period of 25 years thereby reducing their taxable income. In addition, from the 26th year to the actual decommissioning, operators receive interest profits. The NPP operators can use these accruals to finance other activities and investments (Schrode et al., 2010).	
Economic type	Direct transfer of funds; Potential direct transfers of funds	
Sector	Energy	
Member State(s)	Germany	
Other Member State(s) where the subsidy exists	Germany is by no means the only MS providing limited liability to NPP operators. Similar limitations (in million EUR) exist in: Belgium (± 330), the Netherlands (± 313), the Czech Republic (± 250), Finland (± 194), France (± 85), Bulgaria (± 16, 5), Italy (5.5) and Lithuania (3.3).	
Nature and unit size of subsidy	Liability is limited by the German Atomic Energy Act (Atomgesetz – AtomG) to EUR 2.5 billion out of which EUR 256 million have to be covered by the Atom-pool insurance of the NPP operators, while the remaining EUR 2.244 billion have to come from the NPP operators assets capital. Quantifying the effect of limited liability is very difficult, estimates range from 5 to 184 Cent/kWh (Schrode et al., 2010); according to Thomas et al. (2007) and Irrek (2002) these estimations relate a) to a French case study (see Leurs and Wit, 2003) which calculates an insurance for all liabilities at the upper damages estimates for Operator Electricité de France (EDF) to be 5 Cent/kWh and b) to calculations (Moths, 1992) concerning a risk fund for German nuclear plant operators to cover a potential damage of more than EUR 5,000 billion through a nuclear accident, which would amount to 184 Cent/kWh or to 270.5 Cent/kWh in 2008 prices (Meyer and Küchler 2010). Concerning accruals the relating interest profits are estimated to amount to at least EUR 175 million annually. Since the accruals can also be used to finance other activities, benefits for internal financing arise for the year 2008 were estimated to be in the range of EUR 770 million (Schrode et al., 2010). Altogether, since the 1950s, some EUR 40 to 60 billion has been made available for nuclear energy research by the federal and state governments (Schrode et al., 2010).	
Legal basis and timeline	"The Paris Convention (PC) is made directly applicable ("self-executing") under German law. Its provisions provide the basis of nuclear liability in Germany. They are complemented by Sections 25 – 40 of the Atomic Energy Act" (OECD, 2011).	
Objectives and design		
Subsidy	The rationale of the subsidy is to ensure the economic viability of	

rationale/objectives (original and evolving)	nuclear power through support for research and limited liability for nuclear accidents.	
Does the subsidy fulfil its objectives?	Yes, according to estimates, a nuclear accident could cause damages of more than EUR 5,000 billion (Ewers und Rennings, 1992). The subsidy therefore ensures economic viability of nuclear power operations in Germany.	
Is the rationale for the subsidy still valid?	Yes if one considers that nuclear energy would not be economically viable if the limited liability subsidy was not in place.	
Who is **responsible** for the subsidy?	State and federal state governments have supported nuclear power for electricity generation since the 1950s.	
Are there any key problems with **subsidy design?**	None identified, although could argue that the subsidy has been in place for a long time	
Does the subsidy represent an **infringement of existing EU legislation**?	No, the subsidy is based on the German Atomic Energy Act (AtomG), which is in-line with existing EU legislation.	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	German NPP operators	
Does the subsidy reach them?	Yes, NPP operators benefit directly from the subsidy.	
What are the **unintended social effects**, if any?	The indirect financial support for uranium mining might imply negative health impacts for the local population. Also, in case of a nuclear accident, major negative health impacts for large sections of the population can be expected (Schrode et al., 2010).	
Key environmental impacts		
Nature and degree of impacts on the environment	The subsidy must be regarded as generally environmentally harmful due to the adverse environmental impacts caused by uranium mining (including the effects of chemical treatments), unsettled storage of nuclear waste and the risk of major nuclear accidents (Schrode et al., 2010). • Globally, in 2011 56,050 tonnes uranium were mined and it is predicted that this amount will increase to about 63,600 tonnes in 2012 (http://www.world-nuclear.org/info/inf23.html) • Uranium mining leads to landscape destruction and the depletion of natural resources; because of a very low ore grade (approximately 0.3%) most of the material mined is left as solid waste (known as tailings) which retains about 85% of the original radioactivity of the ore – every tonne of uranium extracted results in 848 tonnes of tailings and 1,152 tonnes of combined low-grade ore and waste rock (Mudd, 2006) • Furthermore, the extracted materials are aggressively chemically treated to liberate the uranium, so that the tailings must not only be managed so as to minimise releases of radioactive decay products, but also to minimise release of heavy metals (e.g. arsenic, copper, lead) – that contributes to the problem of so-	

	called acid mine drainage, which is extremely toxic to aquatic ecosystems and causes major, long-term environmental impacts (Mudd, 2006) • In the former German Democratic Republic the world's third largest uranium mining company (SAG/SDAG Wismut) was established; after its closure and the German reunification it was found that the entire area was contaminated by 311 million m³ mine heap material and 160 million m³ radioactive sludge/slurry (Umweltinstitut München, 2011) • In Germany, the NGO Robin Wood estimates that by the end of 2007 more than 12,000 tonnes of highly radioactive irradiated nuclear fuel have accumulated (http://www.robinwood.de/Atommuell.151.0.html); furthermore, they expect that by 2021 (the fixed date of nuclear phase-out) further 5,100 tonnes will have been produced, amounting to a total of above 17,200 tonnes • Nuclear accidents such as Chernobyl (April 1986) or Fukushima (March 2011) make clear that along with the use of nuclear energy comes an inherent risk of possible accidents with potentially dramatic consequences for human health, ecosystems, food security and sanitation, and economies	
Policy filters	According to §19a (1) Atomic Energy Act (AtomG) nuclear plant operators are obliged to conduct a safety review of the installation (at a specific date named in Appendix 4 of the Act and from then on every ten years. After the Fukushima nuclear accident, all German nuclear plants were reviewed for their safety), to submit the results to the supervisory authority and on this basis to improve the nuclear safety of the installation continuously. These reviews act as filter to mitigate the environmental impacts of nuclear energy use.	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	• Concerning accruals the relating interest profits are estimated to amount to at least EUR 175 million annually (Schrode et al., 2010). • Since the accruals can also be used to finance other activities, benefits for internal financing for the year 2008 were estimated to be in the range of EUR 770 million (Schrode et al., 2010). • In case of a nuclear accident, the liability assets of the NPP operators cannot cover risks to the public which is why the lion's share of any impacts linked to an accident will be borne by the public budget. This also relates to the question of nuclear disposal and the management of radioactive waste with half-lives of ± 40 000 years, the so-called "eternity costs"	
What are the **unintended economic impacts** if any?	The subsidy results in a privileged position of nuclear power plant operators compared to other energy producers. The support for nuclear energy research favours nuclear power generation over renewable energy and energy efficiency measures which received funding for research of only EUR 6 billion since 1974 (Schrode et al., 2010).	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Yes**
Reform scenarios/options		

What are the main options for the reform of this subsidy?	The current form of accrued liability would have to be reformed in a way that nuclear power plant operators are not advantaged by the accrual. This would require nuclear power plant operators to insure the full risk of a nuclear accident and that accruals are not used to finance other activities.
Opportunities for EHS reform	
What are the **main arguments for reform**?	The main argument for reform is the safety risk originating from the operation of nuclear power plants (including risks of accidents and radioactive waste management) and the privileged position of nuclear power plant operators compared to other energy producers.
What are the **main barriers to reform?**	The abolishment of the subsidy (limited liability) could force nuclear plant operators to abandon nuclear activities in Germany. In this context, it is a politically sensitive issue.
Is there a **window of opportunity** for subsidy removal or reform?	In the aftermath of the Fukushima accident in Japan in March 2011, political support for nuclear phase out was successfully fostered through NGO work, public resistance and media coverage, which helped to trigger reform efforts. Germany opted for a gradual nuclear phase-out by 2022, thus the subsidy will eventually become obsolete. A possible change in government in 2013 including the Green Party will add further momentum to the reform process.
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2.2 Preferential treatment for the hard coal mining industry in Poland

EHS Description		
Brief description of subsidy	This case study focuses on two subsidies provided to the coal mining industry in Poland: Exemptions from excise duties: Before 2012, all coal was exempt from excise taxes. Since 01.01.2012, Poland introduced an excise tax on coal in line with European obligations. Coal used for heating purposes by households and public entities (schools and hospitals) is exempted from this excise tax (Paszec 2011). The exemption also applies to businesses that use coal for electricity production and to produce coke in order to prevent sharp rises in power prices. Social support for heating costs: Households below certain thresholds of income can apply for support of up to PLN 400 per month which covers about 20-25% of an average fuel bill in heating months. Note: Direct financing to the coal mining industry in Poland is being phased out in line with EU obligations and is thus not a focus of this case study.	
Economic type	Exemptions: Foregone government income Social support: Direct transfer of funds	
Sector	Coal mining	
Member State	Poland	
Other Member State(s) where the subsidy exists	Other European Member States, e.g. UK, FR, LU do not apply the excise tax to non-business use of coal for heating (DG TAXUD).	
Nature and unit size of subsidy	Exemptions: The excise duty is generally PLN 1.28 (EUR0.30) per Gigajoule of energy (about PLN 30 or EUR 7 per ton of coal). The exemption is therefore worth as much. Social support: The social support is worth up to PLN 400 per month which adds up to around 20-25% of an average household bill.	
Legal basis and timeline	Exemptions: Act of 6 December 2008 on excise duty (Journal of Laws of 2011. No. 108, item. 626, as amended. D.). Act of 16 September 2011 on the reduction of certain obligations of citizens and businesses (Dz.U. z 2011 nr 232 poz. 1378) New regulations amend the Act of 16 September 2011 on the reduction of certain obligations of citizens and businesses. To be able to trade lignite coal and coke intended for heating purposes from 2 January 2012 without the excise tax, one needs to obtain the status of the so-called intermediary coal entity. To do this, the appropriate customs office needs to be notified in writing before the start of operations. Specific conditions have to be met and documents have to be provided. Also, buyers benefiting	

	from the exemption of the excise tax have to keep records of coal consumed for exempt purposes. Social support: Law of April. 12 March 2004, on Social Welfare (consolidated version Dz. U. z 2009 r., Nr 175, poz. 1362 z późn. zm.) The Social Welfare Act specifies the types of benefits, income criteria, benefits, and how they are valorised. The allowance is based on three basic types of benefits: constant financial support, periodic support and support for specific purposes. A person who wishes to receive assistance in the form of benefits must go to a social assistance centre (OPS) in his place of residence.	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	Exemptions: The exemption for households should shield households (primarily poor households where coal is the dominant fuel used for heating) from increases in the costs of coal following the introduction of the excise duty. The exemption for public buildings should shield local government budgets from the additional tax. Social support: The support should shield poor households from the high costs of heating.	
Does the subsidy fulfil its objectives?	Exemptions: The exemption was introduced at the start of 2012 thus an assessment is difficult. Social support: Yes, although some commentators claim that the subsidy is not taken up to the extent that it should.	
Is the rationale for the subsidy still valid?	Yes, the rationale for both schemes is still valid.	
Who is responsible for the subsidy?	Exemption: Ministry of Finance Social support: Ministry of health and social security and the social assistance centers at local level.	
Are there any key problems with subsidy design?	Exemptions: Some commentators claim that the current process to retrieve the exemption is administratively too complicated but due to the recent introduction this might be teething problems. Also, the exemption of the excise tax applies to many households and public entities and thus the state revenue from the excise tax is low. Social support: Some commentators claim a lack of uptake for the subsidy.	
Does the subsidy represent an infringement of existing EU legislation?	No	
Key social impacts		
Who are the intended recipients / beneficiaries?	Exemption: All households and public entities, as well as electricity producers using coal. Public entities include: - Public authorities,	

	- Units of the Polish Armed Forces, - Operators of the educational system, - Nurseries and children's clubs, - Medicinal agents, - Organizational units of social assistance, and - NGOs and other organisations involved in public benefit activities and volunteerism Social support: Poor households (TVP Kraków 2012)	
Does the subsidy reach them?	Exemptions: The list of beneficiaries is long. As the exemption has been introduced recently, little evidence is available on whether the subsidy reaches the intended beneficiaries. However to date implementation has proven complicated and confusing both for those buying as well as those selling the coal. As the amount of excise tax is only indicated per tonne of coal, it is not clear how the excise tax applies to buyers of smaller amounts (or how the sellers calculate the tax for smaller amounts), thus a significant part of the subsidy will not benefit poor people who often buy by the bucket. Social support: As has been found in the case of Krakow, a sizable number of eligible households do not apply for the subsidy (see below).	
What are the unintended social effects, if any?	No unintended social effects could be identified	
Key environmental impacts		
Nature and degree of impacts on the environment	Both subsidies reduce the incentive for households and public entities to save energy and to switch to less polluting fuels. While the social support scheme is only provided to households with little choice in respect to their housing and their heating system, the excise duty exemption also reduces incentives for well off households where such a switch is more feasible. The excise duty exemption is also very wide so that the majority of coal use in Poland does not fall under the excise duty. In the long run this will lead to higher consumption and production of coal with associated environmental impacts of coal production.	
Policy filters	None	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	Both subsidies are borne by the national budget. Exemption: The calculation of excise duty is made on the basis of the following rate: EUR 0,29 / 1 gigajoule (GJ). It has been established that 1 ton of coal is 23.8 GJ, 1 ton of lignite 8.6 GJ and 1 ton of coal 27.5 GJ. The Amendment to the Act on excise duty on coal and coke has now	

	been implemented. It provides a broad list of exemptions. The proceeds of the excise duty on these raw materials are estimated only at EUR 30 - 35 million due the exemptions applying to a number of entities says, "DGP" Jacek Kapica, Deputy Minister of Finance. Estimates on the total revenue forgone are not available yet. Social support: Full take up of the social support scheme has not been achieved, for example in the city of Krakow with a population of 756,267 inhabitants, only 1,500 families request the EUR 92 subsidy for coal. Thus for Krakow, EUR 140,000 were spent on the coal subsidy. Approx. 15% of all the population in Krakow could benefit from the subsidy (i.e. approx. 115000 inhabitants). (TVP Kraków 2012)	
What are the unintended economic impacts if any?	Exemptions favour coal compared to other fossil fuels which is economically and environmentally inefficient. On the other side the use of renewable energy is also exempted from the excise duty meaning that the exemption does not provide an advantage compared to renewable energy. (Jankowska 2012)	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**No**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	Any reform of the subsidies would have significant social impacts so a reform of the subsidy schemes is politically difficult. One option for reform would be to improve the targeting of the exemption or removing the exemption and using the extra income to improve the support to poor households. Less controversial would be additional support schemes for the modernisation of housing to incentivise the move to less CO_2 intensive fuels.	
Opportunities for EHS reform		
What are the main arguments for reform?	The main reason for reform would be to tackle the incentives to the use of coal. A co-benefit of any reform could be that poor households which are currently very coal dependent could be weaned away from this power source which is likely to be very expensive in the future.	
What are the main barriers to reform?	The main obstacles are the social fallout which any reform might induce.	
Is there a window of opportunity for subsidy removal or reform?	No	
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2.3 Support for biofuels in Sweden

EHS Description		
Brief description of subsidy	In line with the EU Renewable Energy Directive (RED)[1], Sweden promotes the use of renewable energy in transport,	

[1] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

	in particular of biofuels, to meet a renewable energy in transport target of 13.8% as noted in Sweden's National Renewable Energy Action Plan (NREAP) (Regeringskansliet, 2010). The support for biofuels includes the exemption from energy and carbon tax, for biofuels. Changes to the support system are currently being made. It was announced that from January 2011, low blends above 6.5% for ethanol and above 5% for biodiesel are no longer exempted from the carbon and energy taxes. Exemptions for biogas and high-blends however continue. It was further announced that as of 2014, a quota mandating the use of low blends will be introduced; the design of this system is currently under development (Regeringskansliet, 2011; ENDS Europe, 2012; Swedish Energy Agency, pers. comm.). This case has been selected to stress some positive aspects of the Swedish example, although some aspects of Swedish biofuel policy remain questionable from an environmental point of view as elaborated below: - Biogas plays a significant role in the renewable transport fuel sector in Sweden. According to the European Biofuels Technology Platform, Sweden is the 'world leader in upgrading and use of biomethane for transport'[2]. Furthermore, biogas development has not triggered vast areas of silage maize cultivation with potential negative impacts, but is based on using sewage and landfill gas, i.e. waste products, which is beneficial from an environmental point of view. - Sweden has put in place an obligation for filling stations above a certain size to sell at least one alternative fuel. This has mostly been E85, helping to establish the market for high biofuel blends in Sweden (EG-FTF, 2011). Given the environmental (and social) concerns about biofuels (see below), the advent of high blend biofuels is not a reason for applause. On the other hand, the tool of obliging alternative fuels is seen as a powerful measure for bringing about alternative fuels per se and has also facilitated the growing market for biomethane as a transport fuel (EG-FTF, 2011). - While having implemented measures to promote energy efficiency and other low-carbon transport options (see e.g. Swedish Energy Agency 2011) and while average fuel consumption of new cars dropped	

[2] http://www.biofuelstp.eu/biogas.html. Other countries with important (bio)gas infrastructure for transport are Italy, Germany, the Netherlands and Austria.

	by 28 per cent since 2005 (Swedish Energy Agency, 2012b), Sweden still lags behind when it comes to reaching the EU target of average emissions for new cars per kilometre of 130g/km CO_2 by 2015. A report by Transport & Environment (2011) ranks Sweden 23rd in an EU-wide survey average CO_2 emissions from new cars in 2010 were 151 g/km) despite support for biofuels and other measures to decarbonise transport.
Economic type	Foregone government revenues (tax exemption); Preferential treatment (quota)
Sector	Energy – biofuels
Member State	Sweden
Other Member State(s) where the subsidy exists	The RED stipulates that all EU Member States must meet a target of 10% renewable energy in transport and put policy measures in place to meet this target. Support for RE in transport and most notably biofuels (around 90% of RE in transport in 2020 is anticipated from conventional biofuels, see e.g. Beurskens *et al*, 2011) is therefore found throughout EU MS. In terms of instruments used, 'most MS use a combination of an obligation with tax exemptions' (Ragwitz *et al*, 2011, p21). A GSI review of subsidies for biofuels in the EU and other OECD countries estimates that in the EU in according to figures for 2008, total transfers for biofuels amounted to €3.01 billion, of which €0.84 billion was for ethanol and €2.17 billion for biodiesel.
Nature and unit size of subsidy	The table below taken from Ragwitz *et al* (2011) who have reviewed RE support policies in all EU Member States shows the level of transport fuel taxation, from which biodiesel, ethanol and biogas are fully exempt. As stated above, these tax exemptions have been terminated for low-blend biofuels above 6.5% for ethanol and above 5% for biodiesel since January 2011.

Table 2. Energy, carbon dioxide and sulphur taxes for motor fuels in Swe January 2010 [8]

Energy source	Energy tax	Carbon dioxide tax	Sulfur tax
Natural gas/methane,			
- SEK/m^3	0.00	1.35	0.00
- €/m^3	0.00	0.14	0.00
Diesel fuel,			
- SEK/liter	1.33	3.01	0.00
- €/liter	0.14	0.32	0.00
LPG,			
- SEK/kg	0.00	1.67	0.00
- €/kg	0.00	0.18	0.00
Petrol, unleaded, environment class 1,			
- SEK/liter	3.06	2.44	0.00
- €/liter	0.32	0.26	0.00
Ethanol/RME, SEK/liter (€/liter)	0.00	0.00	0.00

No energy and carbon dioxide taxes are levied on ethanol, rapeseed oil (RME) or biogas.

	Source: Ragwitz et al (2011, p321)	
Legal basis and timeline	Tax exemptions for biofuels have been possible since **1995**. The legal basis is provided in the Energy Tax Act (SFS 1994:1776). Changes were announced in **2011** i.e. limiting the tax exemption to certain low-blends under Government bill 2010/2011(i.e. the 2011 budget review). In **2011**, the Swedish National Audit Office published its review of this policy instrument (SNAO, 2011) (see below for further details of the results of this review). The European Commission granted state aid approval for the tax exemptions of biofuels until the end of **2013**.	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	Support biofuel market penetration in order to reduce GHG emissions from the transport sector	
Does the subsidy fulfil its objectives?	Partially. As discussed in the section on environmental impacts, there are important discussions underway about the true GHG emission benefits from using biofuels. These are mainly related to the indirect land use change (ILUC) impacts. Looking at the type and origin of biofuels, Sweden unlike the EU average, relies more heavily on ethanol. In volume terms, the split is roughly 65/35. Furthermore, an important share (at least 33%) of the ethanol used in Sweden is produced from Brazilian sugar cane (Swedish Energy Agency, 2011). As major modelling studies, foremost the 'IFPRI study' commissioned by the European Commission (Laborde, 2011a), have calculated, ethanol including sugar cane based ethanol is associated with lower ILUC impacts than biodiesel. Biogas also plays a significant role in the Swedish transport sector (12% out of all renewable fuels in road transport in 2011; Swedish Energy Agency, 2012b) and is commonly associated with higher emission savings than liquid biofuels. Furthermore, the Swedish Government states in a report to the Commission that all biogas is derived from waste, hence without any or with reduced land use impacts (Regeringskansliet, 2011). This increases the chance that the use of biofuels generates some emission savings, even if ILUC impacts were taken into account. A report by the Swedish Energy Agency (2012a) states that the use of biofuels including biogas led to emission reductions in 2011 of 940,487 tonnes CO_2eq (p14). Using total emissions for the Swedish transport sector from Eurostat, where the latest available data is for 2010 (20,744,000 tonnes CO_2eq), this gives an approximate percentage reduction of 4.5% from biofuel use in Sweden. It should however be noted that these calculations do not take into account ILUC emissions.	

	The Swedish National Audit Office (SNAO) calculated emission reductions from biofuel use to be 0.4–1.1 million tonnes CO_2eq per year over 2007 to 2009, this being around 1 per cent of total GHG in Sweden. The SNAO states, however, that the reduction could in fact be even smaller due to counteracting effects. Furthermore, putting any emission reductions achieved into perspective, the SNAO calculated that these 'involve a cost for the Government of about 3 kronor per kg/carbon dioxide reduction. Compared to, for example, the carbon dioxide tax of 1.05 kronor per kg/carbon dioxide, a complete tax exemption for biofuels is a relatively expensive measure to decrease greenhouse gas emissions'[3]. Therefore, according to the SNAO, the 'tax exemption for biofuels contributes to reaching the Riksdag's climate objective – but not at a reasonable cost' (SNAO, 2011, p3).	
Is the rationale for the subsidy still valid?	No. The need to reduce emissions from the transport sector persists. However, given the assessment by the SNAO above, it can be stated that the rationale of using a tax exemption to meet climate objectives is questionable, given the high abatement costs that have materialised. Furthermore, the tax exemption was not successful in bringing forward new, advanced biofuels sufficiently and instead favoured low blends, for which the market is now well established (SNAO, 2011).	
Who is **responsible** for the subsidy?	Swedish Government but at least since the 'biofuel directive' in 2003[4]. However as noted above, EU policy drives biofuel support in EU Member States.	
Are there any key problems with **subsidy design?**	Some of the problems in the design of the subsidy as noted in the report by the SNAO include: - inadequate and insufficient follow up by the Swedish Government regarding the total fiscal implications of the subsidy; - the subsidy design favours high-cost ethanol produced in Sweden or the EU over cheaper (and potentially associated with higher GHG reductions) ethanol imported from overseas; - the subsidy leads to unequal treatment of companies and does not guarantee technology neutrality (SNAO, 2011). The fact that the SNAO reviewed the exemption points at the existence of at least some review process of the policy at the national level.	
Does the subsidy	No. It should be noted again that the support of renewable	

[3] Using August 2012 exchange rates from http://www.oanda.com/currency/converter/, these monetary values correspond to 0.13€ and 0.36€, respectively.

[4] Directive 2003/30/EC of the European Parliament and of the Council of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport

represent an **infringement of existing EU legislation**?	energy in transport derives from Member State commitments under the EU RED.	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	The objective is to increase biofuel use in order to reduce emissions from the transport sector. The tax exemption applies to both domestically produced as well as imported biofuels, therefore it is not straight forward to point out the intended recipients / beneficiaries. The effect of the exemption is to reduce the price of biofuels vis-à-vis fossil fuels and hence to increase demand for biofuels. This will benefit the biofuel producing sector (and the wider production chain). As was mentioned above, the SNAO (2011) stated that the design of the tax exemption is such that it favours domestic (or EU) biofuels over biofuels from overseas. According to the SNAO, the EU does not allow the tax exemption to lead to the overcompensation of biofuels relative to gasoline or diesel. As it is difficult to differentiate the tax exemption between various biofuels, the Swedish Government has conditioned the tax exemption with a special tariff. The tariff means that the highest rate is to be charged for a tax exemption to be granted for imported ethanol for low-level blending, which favours ethanol produced in Sweden or within the rest of the EU. Since the production cost for this ethanol is higher than that for imported ethanol, the tariff leads to a higher cost. This higher cost does not have a corresponding climate benefit. Therefore, the tariff favours ethanol that entails smaller emission reductions at the expense of ethanol that could entail larger emission reductions. Across the EU, reasons for promoting biofuels beyond climate change mitigation are energy security considerations and fostering rural development. In that sense additional recipients could be consumers benefitting from increased energy security, farmers and the wider rural community.	
Does the subsidy reach them?	Partially. It is expected that the exemption has benefitted the Swedish biofuel sector given the significant growth in the biofuel market in Sweden (Swedish Energy Agency, 2011)[5]. This is evident in the fact that Sweden has the most important fleet of flex-fuel vehicles in the EU, i.e. vehicles that can be fuelled with any blending mixture of petrol versus ethanol[6]. However, as noted by the Swedish Energy Agency (2011), there are two ethanol and around ten biodiesel producers and with two producers, one for biodiesel and ethanol, accounting for the	

[5] Eurostat data show that final energy consumption of biofuels in transport in Sweden has grown almost six fold from 2003 to 2010, reaching 380 thousand tonnes of oil equivalent (toe) in 2010.

[6] In 2008, 70 per cent of the EU's then 170,000 flex-fuel vehicles were registered in Sweden (see Eggert *et al*).

	majority of domestic production. Thus the tax exemption appears to have developed an industry with few key players. Furthermore, above half of all ethanol and just below half of all biodiesel consumed in 2010 was imported.		
What are the **unintended social effects**, if any?	In line with the discussion below on environmental impacts, it is difficult to pin down any such effects to one country. Much has been written on the agricultural market and ultimately food price impacts of biofuel use, see Kretschmer *et al* (2012) for a recent review. With regard to the choice of quota versus mandates, Charles and Wooders note that governments have been moving from fiscal support e.g. in the form of tax exemptions to mandates, with a subsequent bearing on consumers and the wider economy (2012, p9). This is also the direction of travel in Sweden given the limiting of the tax exemptions and the introduction of a quota in 2014. Laborde (2011b) notes that policies that retain market price signals, which a tax exemption does, are preferable to strict year-on-year production quotas from a food security point of view. This is so that biofuel crop demand would contract in times of tight crop supplies and subsequently lead to high crop prices, so that agricultural price spikes are not aggravated further through inflexible biofuel demand. In that respect, the development in Sweden could be seen to be unfavourable, however it is not clear what the Swedish quota to be introduced will look like. The existence of flex-fuel vehicles allows some degree of market response at the petrol station: as high-blend biofuel prices increase in times of tight agricultural markets, consumers would be expected to switch to conventional petrol, hence reducing biofuel demand. This is evident in Brazil which has a huge market for ethanol and flex-fuel vehicles. It is of less relevance in the small Swedish market. In summary, the assessment of social impacts is 'red'/'yellow'. The 'red' reflects the fact that there are potential harmful social impacts in terms of rising agricultural prices from biofuels in general and that the planned biofuel quota may change Swedish biofuel policy to the worse in terms of agricultural market impacts. At the same time, it is hardly feasible to attribute a share of risks derived from global agricultural market dynamics to a single country, hence the partial 'yellow' ranking.		
Key environmental impacts			
Nature and degree of impacts on the environment	Given that the discussions about biofuels are predominantly held on a larger, i.e. EU or global scale, it is difficult and not very sensible to pin down the effects of Swedish biofuel use. After all, the negative environmental consequences of biofuels are to a large extent due to cumulative effects from the EU-wide and indeed global consumption mandates and the resultant pressures on environmental resources and		

	ecosystem services. Thus the following will provide an overall assessment of the key impacts related mainly to 1st generation biofuels which include the following: *GHG mitigation potential*: While the RED sustainability criteria for biofuels and bioliquids require minimum GHG savings compared to a fossil fuel comparator of 35% (to increase up to 50%/60% for new installations in later years) and include a methodology that takes into account emissions from cultivation, transport and processing of feedstock as well as direct land use change for biofuel feedstock cultivation, ILUC impacts remain unaddressed. This has raised serious doubts about the GHG mitigation potential for at least some biofuel pathways, depending on feedstock and geographical origin of feedstock. As mentioned earlier, some of these negative effects are potentially weaker in Sweden than elsewhere given the higher reliance on better performing ethanol and biogas. *Other impacts from potential land use change*: The conversion of grasslands can lead to biodiversity loss. This should be ruled out by the RED that contains a provision to protect highly biodiverse grasslands, however a definition of these grasslands and their geographic areas by the Commission is still outstanding and therefore their current protection remains questionable. Once protected from direct conversion, the potential for biodiversity loss to the indirect conversion of important habitats remains. *Other environmental sustainability concerns*: Soil and water impacts of biofuel feedstock production are not regulated at EU level. Expanding and/or intensifying biofuel feedstock production can increase water stress. Water quality degradation can occur and is a concern raised especially in relation to maize cultivation (i.e. nitrogen run-off polluting water courses). Expansion and intensification can further risk degrading soils for example in the form of reduced soil organic matter (important in the context of residue/straw extraction for second-generation biofuels, e.g. cellulosic ethanol) or increased soil erosion. With regard to soil erosion, maize again is of particular concern. While the cultivation of silage maize for biogas is widespread in Germany, this does not seem to be an issue in Sweden, given the reliance on waste resources as mentioned above (Regeringskansliet, 2011; also factsheet 'Biogas in Sweden' produced by the Swedish Energy Agency[7]). In summary, the assessment here is 'red'/'yellow'. The 'red'		

7 http://energimyndigheten.se/Global/Internationellt/Exportfr%C3%A4mjande%20o%20Bilateralt/Biogas_Sweden_Faktablad_HR.pdf

	score is warranted given the body of evidence questioning the environmental credentials of biofuels. But as mentioned it is less feasible to have a causal chain attributing certain impacts to a particular country given that a range of issues are the result of global agricultural market effects. We are not aware of anecdotal evidence demonstrating the breach of sustainability criteria e.g. in the form of tropical deforestation or conversion of high biodiversity areas to clear land for biofuel feedstock production that then gets shipped to Sweden. This is not to say that no such things happen, however. At least stronger reliance on arguably better biofuels in Sweden compared to the EU average lead to the partial 'yellow' ranking.	
Policy filters	In line with the RED, biofuels must meet a range of **sustainability criteria** in order to count towards renewable energy targets and be eligible for public support such as tax exemptions. In Sweden, economic operators can apply for a sustainability decision from the Swedish Energy Agency by demonstrating that they have a verification system in place that ensures sustainability criteria are complied with throughout the biofuel supply chain and that is audited by an independent auditor[8]. The sustainability criteria are as required in line with the RED and include minimum GHG savings requirements, criteria to prevent the conversion of high carbon stock land and highly biodiverse land and the need for a mass balance system to ensure the traceability of sustainability information throughout the biofuel supply chain (see RED Article 17[9]). However as mentioned above, current sustainability criteria are not complete and important issues remain unaddressed, such as ILUC as well as wider environmental risks for e.g. soil and water.	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	With regard to the cumulative costs of the tax exemption, the Swedish Audit office states that 'the loss of tax revenues resulting from the tax exemption has increased steadily since the year 2000 and amounts today to about SEK 2 billion per year'[10] (SNAO, 2011, p3). In line with what has been stated above, this together with the expected GHG reductions means that the tax exemption represents a costly means to reduce GHG emissions in the transport sector, hence the 'red' ranking.	
What are the **unintended economic impacts** if any?	Some impacts present: - The SNAO laments that due to the tax exemption having favoured low-blend biofuels, the risk is that it	

[8] See http://www.energimyndigheten.se/en/About-us/Mission/Instruments/Sustainability-criteria-for-biofuels-and-bioliquids/ for further information on the Swedish sustainability system.

[9] Information and legislation relevant to the RED sustainability scheme: http://ec.europa.eu/energy/renewables/biofuels/sustainability_criteria_en.htm

[10] Using either exchange rates from http://www.oanda.com/currency/converter/, 2 billion Swedish Krona equal around €226 million in February 2011 (when the report was published) and around €243 million in August 2012.

	'contributes to settling for technologies that are neither long-term nor can serve as a bridge to long-term solutions' (SNAO, 2011, p3), thus leading to a certain degree of technological lock-in. - Global agricultural market impacts from biofuel use as mentioned above.	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Potentially** [Given there are still problems with the subsidy and quota design still outstanding]
Reform scenarios/options		
What are the main options for the reform of this subsidy?	Given the EU dimension of the policy, this is a generic list of reform options that are not necessarily targeted at Sweden: - re-design support policies to effectively incentivise the use of advanced biofuels produced from unused residues and wastes so as to minimize negative environmental and social impacts; - reduce/abolish support for biofuels and instead increase reliance on other forms of renewable energy in transport and make cars more energy efficient; make biofuel targets more flexible, i.e. instead of rigid mandates allow consumption to fluctuate in times of high and low agricultural prices.	
Opportunities for EHS reform		
What are the **main arguments for reform**?	The increased use of biofuels from unused wastes and residues would potentially be linked with a better environmental performance and would also reduce pressures from biofuel use on agricultural markets. Increasing support for advanced biofuels and other low-carbon forms of transport would foster the availability of novel technologies including not only advanced biofuels but also electricity or hydrogen fuelled transport (with positive knock on effects e.g. for local air quality). More efficient engines would reduce consumption of biomass and fossil resources.	
What are the **main barriers to reform?**	It is not clear to what extent this is relevant in Sweden given the limited involvement of local actors in biofuel production, but EU wide there is an important industry lobby, including biofuel producers and farmers, opposing changes to existing legislation. The relatively few alternative (and commercially available) low carbon options for the transport sector is commonly put forward as an argument for continued support for biofuels. Infrastructure requirements associated with a range of other low-carbon transport options are another challenge in bringing these alternatives	

	forward.
Is there a **window of opportunity** for subsidy removal or reform?	In Sweden, the fact that the tax exemption was granted state aid approval until the end of 2013 can be seen as a window of opportunity, e.g. to further shift the focus from the promotion of biofuels generally to advanced fuels produced from wastes and residues and the further promotion of biomethane as a transport fuel. EU wide, the Commission has to report by 2014 whether the target for renewable energy in transport can indeed be met sustainably. This can be seen as a window of opportunity to reduce the level of ambition of the design (e.g. introducing enhanced support for advanced biofuels) of the EU target.
Insights on past or existing reform	
Insights from EHS that have been (or are in the process of being) **reformed or phased out**	The biofuel case is different from other cases investigated in this report, primarily due to the fact that all EU countries are obliged to meet a 10 per cent renewable energy in transport target by 2020 and all Member States anticipate relying primarily on (conventional) biofuels. Therefore, the real target for reform would be EU biofuel policy, or in other words the renewable energy for transport target of the RED. The RED has put in place incentives for advanced biofuels, i.e. the 'double counting' provision for biofuels from 'wastes, residues, non-food cellulosic material, and ligno-cellulosic material' (RED Article 21(2)), but given the projections in the Member States National Renewable Energy Action Plans anticipating a minor role for these fuels in 2020, this provision does not promise to be effective. There are discussions in the environmental community about a reduction of the target, but it is questionable whether this option is politically feasible. Sub-quotas for advanced biofuels are another option discussed but this would need to be accompanied by strict rules allowing only unused wastes and residues to count for such a target. Increasing straw extraction for advanced biofuel production beyond sustainable limits, for example, could have preserve effects such as reducing soil carbon stocks and hence negating or reducing GHG benefits. Given the importance of the European dimension, other examples of reform attempts in the EU include Germany, as investigated in an earlier EHS report for DG Environment (Valsecchi *et al*, 2009), where the quota obligation will be changed to a GHG savings quota as of 2015, replacing the current energy content quota. Provided that ILUC is addressed in European legislation until then, this is an effective way to incentivise the use of those biofuels associated with the highest GHG savings. In the UK, the issue of ILUC is high on the biofuel policy agenda and the Government has not yet provided biofuel blending targets for beyond 2013; it is waiting for a European level solution for ILUC impacts from biofuel use.
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2.4 Feed-in tariff for electricity generated by cogeneration in Estonia

EHS Description		
Brief description of subsidy	The Estonian Electricity Market Act lays down financial support for electricity generated by cogeneration processes (including peat or oil-shale processing retort gas or biomass (e.g. wood chips) as energy source) through CHP plants in Estonia. This support takes the form of a feed-in tariff, to be paid in Euro-cents per kilowatt hour.[11]	
Economic type	Preferential treatment; regulatory support mechanisms (Feed-in tariffs)	
Sector	Energy	
Member State	Estonia	
Other Member State(s) where the subsidy exists	BE-Wallonia	
Nature and unit size	The rate for the obligatory feed-in tariff, which is valid for 12 years,	

[11] Aside from this subsidy there is also a regulation in Estonia which covers grant payments for small biomass CHP plants (< 2MW) for up to 50% of expenses eligible for assistance. Although this regulation is important for the expansion of small-scale CHP plants, its application is limited by the availability of funds. Thus it is not possible to expect a guaranteed utilization of the grant payments, this makes it unreasonable to take them into account during plant planning. (Latosov et al. 2011) Therefore, this regulation is not further dealt with in this case study.

of subsidy	is 53.7 EUR/MWh (up to May 2007 it was 51.77 EUR/MWh) for electricity produced from biomass or oil-shale processing retort gas under an efficient cogeneration regime (Latosov et al. 2011).	
Legal basis and timeline	The Electricity Market Act from 2003 is the legal basis for the subsidy. In its present, amended form (RT I 2003, 25, 153)[12] this Act regulates the support for both renewable energy and cogeneration (synonymous for CHP). It was changed several times; for instance before 2007 it had not supported cogeneration and between 2007 and 2010 it enabled cogeneration support either through a feed-in tariff or a purchase obligation for network operators (Latosov et al. 2011). The national legal basis also helps transpose EC Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources and EC Directive 2004/8/EC on the promotion of cogeneration into national law.	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	The rationale of the subsidy is two-fold: 1) the feed-in tariff rates to be paid by network operators generate a moderate profit for the most cost-efficient CHP plants (efficient cogeneration regimes) as the rates are considered close to the range of electricity generation costs (Latosov et al. 2011). Thus, this support contributes to ensuring "a continuous, sustainable power supply at a justified price in Estonia" (Latosov et al. 2011: 140). 2)the feed-in tariff contributes to the competitiveness of the oil shale energy production sector in Estonia in comparison with other fossil and renewable fuel sources (Latosov et al. 2011).	
Does the subsidy fulfil its objectives?	The feed-in tariff helps to decrease the electricity cost price for biomass-based electricity; for large-scale CHP plants the cost price could even near 0 €/MWh (Latosov et al. 2011).	
Is the rationale for the subsidy still valid?	Yes, because oil shale continues to be the most important energy source in Estonia and efforts to ensure a sustainable and affordable power supply are still needed in Estonia (Volkova and Siirde 2010, Latosov et al. 2011).	
Who is **responsible** for the subsidy?	Estonian government	
Are there any key problems with **subsidy design?**	According to Latosov et al. (2011) the feed-in tariff does not account for specific technological features of electricity production technologies, plant capacity, fuel types or available operation time. However, if the latter factors were integrated into feed-in tariff formation, they could significantly increase the reasonability and efficient distribution of funds. In order to design the feed-in tariff more efficiently, Latosov et al. consider it "reasonable to look for cooperation with other countries and organisations, as an example of the International Feed-In Cooperation". (Latosov et al. 2011: 149)	
Does the subsidy represent an **infringement of existing EU legislation**?	There is no infringement of existing EU legislation evident. The subsidy is meant to support implementation of EC Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources and Directive 2004/8/EC on the promotion of cogeneration based on a useful heat demand in the	

[12] See http://www.konkurentsiamet.ee/?id=19475.

<table>
<tr><td></td><td>internal energy market.</td><td></td></tr>
<tr><td colspan="3">Key social impacts</td></tr>
<tr><td>Who are the intended recipients / beneficiaries?</td><td>Electricity producers generating electricity from efficient cogeneration processes using oil-shale retort gas or biomass (wood chips)</td><td></td></tr>
<tr><td>Does the subsidy reach them?</td><td>Yes as the feed-in tariff helps to decrease the electricity cost price for biomass-based electricity</td><td></td></tr>
<tr><td>What are the unintended social effects, if any?</td><td>Since the network operators or sellers of electricity may pass on the feed-in tariff costs to customers, the latter may face higher energy prices. Some Estonian institutions consider the subsidies too high and too burdensome for electricity consumers, thereby potentially counteracting the first rationale of the subsidy outlined above (Latosov et al. 2011).</td><td></td></tr>
<tr><td colspan="3">Key environmental impacts</td></tr>
<tr><td>Nature and degree of impacts on the environment</td><td>Since the feed-in tariff also applies to cogeneration using oil shale retort gas, according to Latosov et al. (2011), the feed-in tariff may help to some extent in maintaining the competitiveness of the Estonian oil shale production sector vis-à-vis other fossil and renewable fuel sources. The use of oil shale is causing large-scale environmental damage through oil shale mining and emissions from fuel use (Volkova and Siirde 2010; Kuhi-Thalfeldt et al. 2010). The feed-in tariff contributes to maintaining the environmental damages associated with oil shale, but at the same time helps to foster environmentally friendlier use of wood chips. The following table contrasts the pollution charges of biomass-based (mainly wood chips) cogeneration processes with fossil energy carriers, in Estonia in particular oil shale. More than 80% of domestic energy is produced from local oil shale (Sepp and Buchenrieder 2009), peat, natural gas:

EMISSION FACTORS IN TONS PER ONE MWh OF FUEL ENERGY CONTENT

<table><tr><td></td><td colspan="4">FUELS</td></tr><tr><td>POLLUTANT</td><td>Oil shale</td><td>Peat</td><td>Natural gas</td><td>Wood chips</td></tr><tr><td>Carbon dioxide, CO_2[1]</td><td>360</td><td>374</td><td>201</td><td>0</td></tr><tr><td>Sulphur dioxide, SO_2</td><td>13.0</td><td>0.72</td><td>0</td><td>0</td></tr><tr><td>Nitrogen oxides, NO_x</td><td>0.54</td><td>1.08</td><td>0.22</td><td>0.36</td></tr><tr><td>Carbon monoxide, CO</td><td>0.36</td><td>0.36</td><td>0.14</td><td>0.72</td></tr><tr><td>Particulates[2]</td><td>3.60</td><td>0.29</td><td>0</td><td>0.25</td></tr><tr><td>Volatile organic compounds[3]</td><td>4.32</td><td>0.36</td><td>0.014</td><td>0.17</td></tr><tr><td>Heavy metals</td><td>0.0039</td><td>0.00028</td><td>0.00</td><td>0.000104</td></tr></table>
[1] – kg/MWh_{fuel}
[2] – except for heavy metals and compounds of heavy metals.
[3] – except for mercaptans.

(Table taken from Latisov et al. 2010: 59)

Energy production from wood builds mainly on firewood and to a lesser extent on wood by-products (such as wood chips), forest residues and waste wood – further harvesting of firewood from forests for energetic use in CHP plants is considered unsustainable (Sepp and Buchenrieder 2009). Therefore, a potential contribution</td><td></td></tr>
</table>

	of the feed-in tariff for firewood based CHP energy production could encourage overharvesting. Furthermore, the use of agricultural products, such as rape seed, as biomass for CHP plants led almost to a tripling of the area under cultivation for rape seed from around 29,000 ha in 2000 74,000 ha in 2007 (Wolz et al. 2011). This may in certain cases be associated with monocultural landscapes and a related reduction in biodiversity.	
Policy filters	No policy filters could be identified	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	The rate for the obligatory feed-in tariff, which is valid for 12 years, is 53.7 EUR/MWh (up to May 2007 it was 51.77 EUR/MWh) for electricity produced from biomass or oil-shale processing retort gas under an efficient cogeneration regime (Latosov et al. 2011). Network operators or sellers of electricity bear the costs of the feed-in tariff and may transfer higher costs to customers.	
What are the **unintended economic impacts** if any?	Since the network operators or sellers of electricity may pass on the feed-in tariff costs to customers, the latter may face higher energy prices. Some Estonian institutions consider the subsidies too high and too burdensome for electricity consumers, thereby potentially counteracting the first rationale of the subsidy as noted above. Furthermore, the subsidy is considered to impede free competition (Latosov et al. 2011).	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**No**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	At present, there is no reform planned	
Opportunities for EHS reform		
What are the **main arguments for reform**?	Arguments for reform could be as mentioned under problems with policy design: re-designing the feed-in tariff so that it accounts for specific technological features of electricity production technologies, for plant capacity, for fuel types or for available operation time. This could significantly increase the reasonability and efficient distribution of funds (Latosov et al. 2011).	
What are the **main barriers to reform?**	According to Volkova and Sirrde (2010) the main barriers to a reform of the Estonian energy legislation are related to administrative and infrastructure issues – high bureaucracy is considered to be an obstacle for successful wood-fired cogeneration and wood fuel supply infrastructure is considered weak.	
Is there a **window of opportunity** for subsidy removal or reform?	At present, there is no known window of opportunity	
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3 FISHERIES

3.1 Subsidies for the modernisation of fishing vessels in Denmark

EHS Description		
Brief description of subsidy	Investments on board fishing vessels - investments co-financed by the EFF (Axis 1 -fleet measures) may include upgrading safety, working conditions, hygiene, conservation, energy efficiency or selectivity, without increasing catch capacity. Engine replacement may be eligible, provided this leads to lower fuel consumption, less pollution and, for vessels over 12 metres in length and vessels under 12 metres using towed gear, reduced power.	
Economic type	Direct transfer of funds	
Sector	Fisheries (within that, the catching sector)	
Member State(s)	Denmark	
Other Member	ES, PT, FR, IT, BE, CY, EE, PL, SE, NL, DE, FI, BG have all allocated	

States where the subsidy exists	funds towards this measure within their operational programmes (Ernest and Young 2011)	
Nature and unit size of subsidy	The grant represents up to 40 per cent of the approved eligible costs. For investments that relate to engine replacement, a subsidy of up to 20 per cent of the approved eligible costs may be granted. Eligible investment in the programming period for each vessel cannot exceed 80 per cent of the vessel's insured value as from 1 Jan, two years prior to the time of application. For example, if the vessel's insured value is DKK 1,000,000, they may be eligible to investments over the whole programming period of up to DKK 800,000. (Directorate of Fisheries, 2011)	
Legal basis and timeline	The legal basis for this subsidy is the European Fisheries Fund (Council Regulation (EC) No 1198/2006 of 27 July 2006), the main funding instrument for the Common Fisheries Policy. The programme runs from 1 January 2007 to 31 December 2013, and the activities take the form of an operational programme (one per Member State). The Danish Operational Programme was validated on the 17 December 2007, after which the programme could be commenced and the projects implemented. Within the Operational Programme the eligibility of expenditures are from the 1 January 2007 to 31 December 2015. The midterm evaluation was performed in 2010 in accordance with Article 49 of the EFF-regulation.	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	• Create opportunities for low cost and high value added in the fishery within the framework of a sustainable fishery. • Create the opportunity for an efficient, up-to-date fleet that serves the interests of both off-shore and coastal fishing. • Manage catches and the level of activity within the fisheries sector in a way that ensures the sustainable exploitation of resources. • Reduce unwanted by-catches and reduce environmental impact • Improve gear selectivity to reduce discard. • Improve the working environment and reduce the risk of occupational accidents. (Ministry of Food, Agriculture and Fisheries, 2007)	
Does the subsidy fulfil its objectives?	Yes The mid-term evaluation states that: “The Danish fishing fleet has increased its energy efficiency in the form of lower fuel consumption per landed ton fish/per sea mile. Likewise, the program has helped to lower the operation costs of the industry. The working environment has also been improved, and there has been an improvement in the handling and quality of the catch.” The exception here is with respect to selectivity: “Only a moderate share (18%) of the projects has contributed to more selective fishing methods and reduced discards of fish.” (Teknologisk Institut, 2011).	
Is the rationale for subsidy still valid?	Yes/Partially. The rationale and objectives of the subsidy are valid, but problems	

	may arise during implementation. There is a potential contradiction in providing funding for investments on board fishing vessels and at the same time requiring that the investments do not increase the ability to catch fish. This is difficult to enforce.	
Are there any key problems with **subsidy design?**	Yes, some problems. There is a potential contradiction in providing funding for investments on board fishing vessels and at the same time requiring that these investments do not increase the ability to catch fish. According to the European Court of Auditors (2011), the prohibition of subsidies to investments which increase fishing ability is not clearly defined and varies depending on the language version of the EFF regulation, and the Commission has not issued sufficient guidance on the interpretation of this regulatory requirement. In practice some eligible investments on board a vessel could increase its ability to catch fish. For example, investments in energy-efficient engines and improvements in working and safety conditions can make it faster for fishing vessels to get to fishing grounds and can make fishers more productive. The effect of such EFF-funded investments on any increase in the ability to catch fish is difficult to quantify, due to other relevant factors such as changes in weather conditions and other non-funded investments on board.	
Does the subsidy represent an **infringement of existing EU legislation**?	No The legislative basis for the subsidy does not infringe EU legislation.	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	The intended recipients are commercial fishermen.	
Does the subsidy reach them?	Yes	
What are the **unintended social effects**, if any?	No	
Key environmental impacts		
Nature and degree of impacts on the environment	This measure has the potential of increasing the ability of fishing vessels to catch fish, which may have the effect of increasing fishing pressure on fish stocks to unsustainable levels of exploitation. The effect of such investments on any increase in the ability to catch fish is difficult to quantify, due to other relevant factors such as changes in weather conditions and other non-funded investments on board. In Denmark, applicants for EFF aid for on - board investments have to confirm on their aid application forms that the investments would not increase fishing ability. However they were also asked to indicate their expected fish captures in the years after the	

	investment. In the sample of projects examined by the European Court of Auditors (2011), more often than not, applicants indicated that captures would increase. However, following analysis of catch data from a large sample of Danish fishing vessels which had benefited from on board investments, the Court found that no direct causal link could be established between EU funded on board investments and catch increases. The investments may also have some environmental benefits: increased energy efficiency of vessels (fewer GHG emissions); more selective fishing gear (less by catch); less harmful fishing gear (reduced impact on benthic habitats). It is difficult to determine the size of the environmental impact of this subsidy, both positive and negative, and therefore is it even more difficult to establish these costs/ benefits in monetary terms. The European Court of Auditors found that no direct causal link could be established between EU funded on board investments and catch increases, there is no evidence to suggest the environmental cost is significant	
Policy filters	The text of the subsidy itself contains 'safeguards' against harmful spending: • According to Article 25 (2) in the EFF regulation, investments increasing the ability to catch fish are not eligible for support. • To be eligible for support for the replacement of engines, it is a condition that the vessel's engine power must be reduced by at least 20 per cent. An exemption for vessels of less than 12 metres exists that do not use trawling equipment that the engine power must not exceed the previous engine power. For vessels of more than 24 metres, a rescue and restructuring plan must be available, and a switch to a less fuel-intensive fishing method must take place. However, according to the European Court of Auditors, who took account of a series of Member States' experiences with this subsidy, the rules in the current EFF (2007 - 2013) were not sufficient to ensure that investments on board did not increase the ability to catch fish.	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	Denmark committed EUR 11,932,886 to this measure by 31.10.2010, and had paid EUR 4,300,000 by the same date –equivalent to 36 per cent of its Axis 1 envelope, making it the Member State with the highest level of commitment for this measure. The national and EU budget bears cost (co-financing). Unintended costs from increased pressure on stocks would be borne by the general public.	
What are the **unintended economic impacts** if any?	Support for industry, increased profitability. Size of fleet in Denmark has been brought into line with available resources, so it does not artificially maintain a bloated fleet –but it does make them more profitable than they would be without the subsidy.	

Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Yes**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	The measure needs to be reconsidered in light of the difficulties in avoiding investments which increase fishing ability and the Commission needs to clarify which investments on board are eligible for public aid and which are not.	
Opportunities for EHS reform		
What are the **main arguments for reform**?	If the measure had sufficient safeguards, it would have environmental, economic and social benefits (see above).	
What are the **main barriers to reform?**	It is likely that there is pressure from certain fishing interests and MEPs to retain this measure in its current form.	
Is there a **window of opportunity** for subsidy removal or reform?	Yes. The EFF runs until 2013, and review process has started following the publication of Commission proposals for a new funding instrument (the European Maritime and Fisheries Fund (EMFF)). This provides a very important opportunity to review and reform the measure in question and the EFF generally. Recognising the criticisms and failures of the modernisation measure, the Commission, in its proposals for the EMFF tightened up the definition of eligible on board investments in an attempt to solve the problems described above. Article 39.2 of the proposal states that: "Support shall not contribute to the replacement or modernisation of main or ancillary engines. Support shall only be granted to owners of fishing vessels and not more than once during the programming period for the same fishing vessel." These proposals were met with disappointment from many environmental NGOs as they considered that investments on board fishing vessels should not be funded under the EMFF at all. Other stakeholders argue that the measure should remain as it is in the EFF. Fiscal constraints on the post-2013 EU budget may present additional 'opportunities' to reduce the envelope available to such measures.	
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	http://bit.ly/xdMSZJv Teknologisk Institut (2011) Mellemliggende evaluering af Fiskeriudviklingsprogrammet 2007 – 2013, Analyse og Erhvervsfremme, June 2011. (Interim Evaluation of the Fisheries Development Programme 2007-2013, Policy and Business Analysis, June 2011) http://www.google.co.uk/url?sa=t&rct=j&q=Mellemliggende+evaluering+af+Fiskeriudviklingsprogrammet+2007+-+2013&source=web&cd=1&ved=0CCIQFjAA&url=http%3A%2F%2F2.naturerhverv.fvm.dk%2FAdmin%2FPublic%2FDWSDownload.aspx%3FFile%3D%252FFiles%252FFiler%252FPublikationer%252FFiskeri%252F2011%252FEndelig_rapport_24-6-2011.pdf&ei=811OT8m3L8WAOu_nuLwC&usg=AFQjCNGNOrelbj8_KGOk-b-QNFqlENeJjg See also: Decree on subsidies for modernization of fishing vessels and selectivity - No. 201 of 27 March 2008 Executive Order No. 201 of 27 March 2008 https://www.retsinformation.dk/Forms/R0710.aspx?id=115916

3.2 Subsidies for vessel scrapping in Spain

EHS Description		
Brief description of subsidy	The subsidy provides public aid for the permanent cessation of fishing activities, provided that such cessation forms part of a fishing effort adjustment plan. It is co-funded under the European Fisheries Fund (EFF) and can be achieved in three ways: a) The scrapping of the fishing vessel; b) Its reassignment in the Community to activities outside of fishing; c) Its reassignment for the creation of artificial reefs.	
Economic type	Direct transfer of funds	
Sector	Fishing (catching) sector	
Member State	Spain	
Other Member State(s) where the subsidy exists	Applicable to all EU 27, though not relevant to the land locked Member States	
Nature and unit size of subsidy	Member States are free to set the level of public aid, taking into account for example the price of the vessel on the national market, the turnover, its age and tonnage or engine power. In Spain the amount of aid per vessel is calculated based on the following scale: ***Table 1. Maximum amounts of compensation for 2011, 2012 & 2013. Applies to vessels fishing in international waters and the waters of third countries.***	

Category of vessel by tonnage (GT)	Maximum amount of the premium per ship (In euros)
<10	11.550xGT + 2100
> 10 <25	5.250xGT + 65 100
> 25 <100	4.410xGT + 86 100

	<table><tr><td>> 100 <300</td><td>2.835xGT + 243 600</td></tr><tr><td>> 300 <500</td><td>2.310xGT + 401 100</td></tr><tr><td>> 500</td><td>1.260xGT + 926 100</td></tr><tr><td colspan="2">Total expenditure may reach a maximum of EUR 28, 028 119.81</td></tr></table> The measure applies to vessels which are older than 10 years of age, and which meet the activity requirements of 90 days the previous two years or 120 days in the last year (to prove the vessel is still active).	
Legal basis and timeline	The legal basis for this subsidy is the European Fisheries Fund (Council Regulation (EC) No 1198/2006 of 27 July 2006), the main funding instrument for the Common Fisheries Policy. The programme runs from 1 January 2007 to 31 December 2013, and the activities take the form of an operational programme (one per Member State). The Spanish Operational Programme was validated on the 13 December 2007, after which the programme could be commenced and the projects implemented.	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	The objective of the measure is to "adjust the fishing capacity of their fleets in order to achieve a stable and enduring balance between such fishing capacity and their fishing opportunities" (Article 11, Regulation (EC) No 2371/2002). The rationale is that by giving fishers a financial incentive to leave the fishery there will be a greater balance between fishing capacity and fishing opportunities, thus vessels that remain in the fishery will benefit and overall efficiency can improve. In theory the expected effects will include a significant improvement in the economic results of the fisheries companies, through a reduction in fixed costs, improved catches, and greater competitiveness.	
Does the subsidy fulfil its objectives?	No. Despite EUR 1.7 billion spent on scrapping since 1994, actual fishing capacity has not decreased in most EU fleets (European Commission, 2011 (SEC(2011)1416)). The effectiveness of scrapping is further put into question as 50% of recent reductions of capacity (in terms of number of vessels) was achieved without EFF support and seems to be the result of increases in fuel costs and reductions in income (European Commission, 2011 (SEC(2011)1416)). According to a recent study by the European Court of Auditors (2011), measures taken to date to reduce fishing overcapacity by adapting the fishing fleet to fishing resources have been unsuccessful. Although permanent cessation of fishing activities is not the only measure responsible for reducing overcapacity, it is the most significant in terms of funding allocation, and was therefore expected to have the most significant effect on the fleet. The Court identified a number of reasons for the lack of success:	

	Firstly, publicly funded fishing vessel decommissioning schemes need to be well targeted by Member States at fisheries where there is evidence of fishing overcapacity. Like most Member States, Spain sets public aid rates according to the vessel's fishing capacity in terms of tonnage (GT), with aid based on a fixed element and a variable element linked to vessel's GT. While this practice is transparent and easy to administer, it does not take into account specific characteristics of applicants' vessels and their impacts on fish stocks in most need. Furthermore, the CFP Regulation requires the withdrawal of the fishing license and 'fishing authorisations as defined in the relevant regulations' when fishing vessels are decommissioned with public aid. However this requirement is contradicted by the annual Total Allowable Catch regulations which allow for the reallocation of fishing rights related to such vessels in certain cases. In Spain, certain fishing rights may be transferred to other fishing vessels or other fishers. This provides the beneficiaries with additional resources to contribute to the restructuring of their remaining fishing activities or to pursue other interests. This is in addition to the public aid co-financed from the EFF for decommissioning their vessel. This is not the case in all Member States, some assign rights according to the vessel, so when the vessel is decommissioned, the allocation is also deleted. Differences in the application of this article are the result of different national systems; in some of them, fishing licences include fishing rights while in others this is not the case. Thus there are issues relating to the fact that the schemes are not properly targeted so 'deadweight' vessels are being scrapped with EU money when they are not actually active anymore. Furthermore, reallocation of fishing rights of decommissioned vessels means that the quota is concentrated in fewer hands and is still available to those to catch it.	
Is the rationale for the subsidy still valid?	Partly. The rationale that providing fishers a financial incentive to leave the fishery will create a greater balance between fishing capacity and fishing opportunities, thereby increasing sustainability, efficiency and profitability, remains valid, but attaching that incentive to the fishing vessel, rather than the fishing right itself, has been shown to be ineffective.	
Who is **responsible** for the subsidy?	Public aid for vessel decommissioning has been in existence for decades in various forms. Prior to the EFF, structural adjustment measures were implemented under the Multi-Annual Guidance Program framework for the twenty-year period 1983-2006. Until now, the subsidy has received support from the Commission and relevant Member States.	
Are there any key problems with **subsidy design?**	Yes. To be effective, publically funded fishing vessel decommissioning schemes need to be targeted at fisheries where there is evidence	

	of fishing overcapacity. Therefore there needs to be appropriate criteria for selecting the specific vessels to ensure they are actively engaged in fishing, rather than ceasing activity anyway ('deadweight'). It is difficult to establish the degree to which the scheme has failed to reduce overcapacity in Spain, the lack of definition and quantification of fishing capacity is one of the problems with the scheme. Moreover, the extent to which public funds for decommissioning may have been reinvested into other fishing activities within a fleet is also unknown. What is known is that overcapacity is a key driver of overfishing. In Spain, the eligibility conditions were that the vessel must have been fishing for at least 90 days in each of the two years before the application date or must have been fishing for at least 120 days in the year before the application date. However, the European Court of Auditors (2011) audited ten decommissioning projects, two of which were inactive, although in one case the eligibility condition was fulfilled: (1) In June 2008 the Spanish authorities accepted an application for the decommissioning of a fishing vessel which was inactive since September 2007 following a severe fire which occurred while the vessel was in South America. The beneficiary provided evidence that the vessel had been fishing for over 120 days in the year before the application date. The fishing vessel was scrapped in Uruguay. Decommissioning aid of EUR 1 611 641 was paid, of which EUR 983 101 was funded by the EFF (European Court of Auditors, 2011). (b) In July 2008 the authorities accepted an application for the decommissioning of a fishing vessel which was inactive since May 2007. The beneficiary provided evidence that the vessel had been fishing for over 120 days in 2006, but did not provide evidence that the vessel was active in 2007, the year before the application date. Decommissioning aid of EUR 780 794 was paid, of which EUR 468 477 was funded by the EFF (European Court of Auditors, 2011).	
Does the subsidy represent an **infringement of existing EU legislation**?	No.	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	The catching sector.	
Does the subsidy reach them?	Yes	
What are the **unintended social**	None.	

effects, if any?		
Key environmental impacts		
Nature and degree of impacts on the environment	Resource depletion; depletion of biodiversity and ecosystem services (i.e. aquatic flora and fauna, and fisheries opportunities they provide).	
Policy filters	There are other instruments aimed at reducing the impacts of fisheries on fish stocks, such as technical measures (gear restrictions, closed areas) and limits on catches and effort. However as explained previously this subsidy is supposed to be the main measure within the CFP framework for adjusting fishing capacity to resources. Other Member States have implemented transferable fishing rights which have proven to be effective at reducing capacity, without public funding.	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	Compared to other Member States Spain has the most significant level of commitments to this measure, comprising 51 per cent of its EFF Axis 1 commitment. Up until October 2010 Spain's commitments to this measure totalled EUR 162 518 828 (of which EUR 87 284 818 was from the EFF), and actual payments already totalled EUR 111 592 883 (EUR 58 613 647 from the EFF) despite delays in implementation (Ernst and Young, 2011). Unfortunately the number of projects financed is not available.	
What are the **unintended economic impacts** if any?	There is evidence to suggest that the continued presence of decommissioning aid may actually contribute more to capacity problems by reducing investment risk and injecting funds into businesses (European Court of Auditors, 2011; Salz, 2009; Coffey, 2011). In the case of multi-vessel firms, scrapping funds reinforce their capital position, at least in the short and medium term (Salz, 2009). According to the Commission (2001, (SEC(2011)1416), the existence of a possible scrapping fund is factored in the investment decisions made by vessels owners, and they might decide to build a new vessel even if its cost cannot be covered by the income generated only by fishing. Therefore it could be claimed that decommissioning schemes prolong the activity of economically weak fishing companies (European Commission, 2011 (SEC(2011)1416); Salz, 2009).	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Yes**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	The only option for the reform of this subsidy presented in the three scenarios of the CFP Impact Assessment (SEC(2011)891) is the removal of the subsidy altogether.	

Opportunities for EHS reform	
What are the **main arguments for reform**?	The argument for removal of the subsidy is that it has been ineffective at reducing capacity, and other measures (transferable fishing concessions) have shown to be more effective. This is supported by analysis by the Commission, and coincides with criticism from some Member States and many NGOs.
What are the **main barriers to reform?**	There are some Member States and Parliamentarians who argue that scrapping premiums are necessary. There are also suggestions that without them, safety will be compromised as old vessels will be kept active.
Is there a **window of opportunity** for subsidy removal or reform?	Yes. The Commission, in its proposals for a new funding instrument (the European Maritime and Fisheries Fund) has stopped provision of public funds for vessel decommissioning.
References	COUNCIL REGULATION (EC) No 1198/2006 of 27 July 2006 on the European Fisheries Fund http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:223:0001:0044:EN:PDF Coffey, C (2011) Reforming EU Fisheries Subsidies. A joint NGO discussion paper and technical resource. Copyright WWF European Commission (2011) Proposal for a Proposal for a Regulation of the European Parliament and of the Council on the European Maritime and Fisheries Fund [repealing Council Regulation (EC) No 1198/2006 and Council Regulation(EC) No 861/2006 and Council Regulation No XXX/2011 on integrated maritime policy, COM(2011)804 final, 2.12.2011, Brussels European Commission (2011) Impact Assessment SEC(2011)1416 European Court of Auditors (2011) Have EU measures contributed to adapting the capacity of the fishing fleets to available fishing opportunities? Special Report No 12, Luxembourg. http://eca.europa.eu/portal/pls/portal/docs/1/10952727.PDF Ernst& Young (2011), *Interim Evaluation of the European Fisheries Fund (2007-2013)* Final report http://ec.europa.eu/fisheries/cfp/eff/op/list_of_operational_programmes/spain_es.pdf Salz, P. 2009. Towards Elimination of Subsidies in Fisheries prepared for Baltic Sea 2020 Foundation http://ec.europa.eu/fisheries/reform/docs/balticsea2020_subsidies_report_en.pdf

4 FOOD

4.1 Reduced VAT rate for food in Luxembourg

EHS Description		
Brief description of	Several MS apply a reduced VAT rate to food. Luxembourg has a	

subsidy	'super reduced rate' of 3% that applies to all foodstuffs. In this case study, we focus on meat and dairy products.	
Economic type	Foregone government revenues: Tax exemptions and rebates	
Sector	Food industry Consumers	
Member State	Luxembourg	
Other Member State(s) where the subsidy exists	Most other MS also apply a reduced VAT rate to food (or to specific types of food). The only MS which apply the standard VAT rate to all food are: BG, DK, EE, LT, RO.	
Nature and unit size of subsidy	VAT is an *ad valorem* tax on final consumption. The standard rate in Luxembourg is 15%; food is taxed at the 'super reduced' rate of 3%. The final consumption of food is thus subsidized at 11.7% of its value (incl. VAT).	
Legal basis and timeline	Loi du 12 février 1979 concernant la taxe sur la valeur ajoutée, art. 40.1.2°. The subsidy has been in place since the introduction of VAT in Luxembourg in 1970, and no review or end date is foreseen. The VAT Directive (2006/112/EC, art. 98 and Annex III) gives MS the opportunity to apply a reduced VAT rate to foodstuffs. Furthermore, art. 110 of the same Directive allows MS which, at 1 January 1991, were applying reduced rates lower than the minimum (of 5%) to continue to apply those reduced rates.	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	The application of a (super) reduced VAT rate to food is usually motivated on social grounds: by taxing the consumption of 'basic needs' at lower rates than the consumption of 'luxuries', low-income households are supposed to benefit.	
Does the subsidy fulfil its objectives?	No. Low-income households do benefit from the subsidy, but high-income households benefit more. Nowadays, the share of food expenditure (including in restaurants etc., which in Luxembourg also come under the super reduced rate) in total household expenditure is relatively equal between income groups. For example, in 2009 the share of food and non-alcoholic beverages in total consumption expenditure in Luxembourg was 10% among the lowest income households (< EUR 1850 per month), and 8% among the highest income households (> EUR 6200 per month). If restaurant expenditures are included, the figure is 15% for both groups (calculated on the basis of STATEC, 2011, Annexe 3). In absolute terms, therefore, the main part of the subsidy goes to high-income households.	
Is the rationale for the subsidy still valid?	Probably not. As in all EU MS, the share of food (incl. non-alcoholic beverages) in total household expenditure has decreased dramatically over the years. In Luxembourg, it was 15.1% in 1988 and 9.3% in 2005; the lowest among all EU MS (source: Eurostat). Another indication that the rationale may have lost its validity is the fact that Luxembourg has the highest per capita average income in the EU, whereas the two MS with the lowest per capita income (Bulgaria and Romania) do not apply the reduced VAT rate to food.	
Who is **responsible**	The Administration de l'Enregistrement et des Domaines is the	

for the subsidy?	VAT authority in Luxembourg.	
Are there any key problems with **subsidy design?**	The subsidy has been in place for a long time and lacks an in-built review process.	
Does the subsidy represent an **infringement of existing EU legislation**?	No. The VAT Directive (2006/112/EC, art. 98 and Annex III) gives MS the opportunity to apply a reduced VAT rate to foodstuffs. Furthermore, art. 110 of the same Directive allows MS which, at 1 January 1991, were applying reduced rates lower than the minimum (of 5%) to continue to apply those reduced rates.	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	Low income households	
Does the subsidy reach them?	Yes, but (as indicated above) high income households benefit more (in absolute amounts)	
What are the **unintended social effects**, if any?	This depends on the assumed counterfactual situation. If the standard VAT rate would be applied to food, other taxes could be reduced. Depending on the design of this tax reduction, this could be either more or less beneficial for low-income groups than the present situation.	
Key environmental impacts		
Nature and degree of impacts on the environment (e.g. biodiversity and ecosystem services, quality of air, water, soils, climate, resource availability)	According to the EIPRO study (Tukker *et al.*, 2006), food and drinks are responsible for 20-30% of the various environmental impacts of total consumption, and in the case of eutrophication for even more than 50%. Within this consumption area, meat and meat products are the most important, followed by dairy products. Demand for food is price-inelastic. Empirical studies show elasticities of around -0.5, i.e. a price increase of 1% leads to a demand decrease of 0.5%. Demand for meat is somewhat more elastic (elasticity about -0.7 to -0.8) than for food in general, including dairy products (see e.g. Andreyeva *et al.*, 2010; Bouamra-Mechemache *et al.*, 2008). Without the VAT subsidy in Luxembourg the demand for food would be about 6% lower, and demand for meat about 9% lower. The environmental impact associated with this consumption would be reduced accordingly, but the net impact would of course depend on the substitution in consumption that would occur. Low prices may also be an incentive for a more wasteful treatment of food. In Luxembourg, food waste arisings from households are estimated at 126 kg per capita per year (calculated after BIO, 2010, table on page 12). This is the second highest figure in the EU. Only in the UK (where most food is taxed at a 0% VAT rate) households produce more food waste: 131 kg per capita per year. The EU average is 75 kg per capita per year.	
Policy filters	The food chain is subject to a wide range of environmental regulations and other policy instruments. However, these do not	

	completely neutralize the environmental impact of the additional food demand caused by the subsidy. For example, the agricultural sector and the transport sector have no caps on their total emissions of GHGs.	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost (i.e. national budget, consumers, general public through creation of public 'bads' or reduced access to public goods, future generations via loss of resources/natural capital)	Household final consumption expenditure on food and non-alcoholic beverages in 2010 amounted to EUR 1,343 million (source: www.statistiques.public.lu) , so with a subsidy rate of 11.7% (see above) the overall size of the subsidy can be estimated at EUR 146 million. In 2007, the share of meat, milk, cheese and eggs in the total consumption expenditure on food (incl. beverages and catering services) in Luxembourg was 21% (source: Eurostat). The value of the subsidy to meat and dairy products can thus be estimated at EUR 33 million per year (EUR 65 per capita). The cost is borne by the taxpayer (assuming other taxes could be reduced if the standard VAT rate were applied to food / meat and dairy).	
What are the **unintended economic impacts** if any?	N.a.	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Yes**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	The standard VAT rate could be applied either to food in general, or to the categories of food causing the most environmental problems (i.e. meat and dairy products).	
Opportunities for EHS reform		
What are the **main arguments for reform**?	The subsidy is not an efficient instrument for the intended objective (protecting low-income households). It mainly benefits high-income households and contributes to the environmental problems related to the food (meat/dairy) chain.	
What are the **main barriers to reform?**	Probably social and political resistance. Food prices are always a very sensitive issue.	
Is there a **window of opportunity** for subsidy removal or reform?	The need for budget reform. EU review of existing legislation on VAT reduced rates.	
References	Andreyeva, A., *et al.* (2010), The Impact of Food Prices on Consumption: A Systematic Review of Research on the Price Elasticity of Demand for Food. *American Journal of Public Health* 100 (2), pp. 216-222. BIO (2010), Preparatory Study on Food Waste Across EU 27. Executive Summary. BIO Intelligence Service, Paris, October 2010. Bouamra-Mechemache, Z., *et al.* (2008), Demand for dairy products in the EU. *Food Policy* 33 (6), pp. 644-656. Eurostat (2008), Food: from farm to fork. 2008 edition.	

	STATEC (2011), Bulletin N° 6/2011 Enquête permanente sur le budget des ménages. Tukker, A., *et al.* (2006), Environmental impact of products (EIPRO).Analysis of the life-cycle environmental impacts related to the final consumption of the EU-25. Summary of the final report by DG Environment and DG Joint Research Centre, May 2006. www.statistiques.public.lu

5 FORESTRY

5.1 Subsidies to improve forestry on peat lands in Finland

EHS Description		
Brief description of subsidy	Low-interest loans granted by the government/authorities to forest owners for peatland drainage were part of a government initiative and accompanying laws launched in the 1950s to improve forestry and silviculture investments in Finland.	
Economic type	Direct transfer of funds / foregone government revenue	
Sector	Forestry	
Member State(s)	Finland - now reformed	
Other Member States where the subsidy exists	SE (Vasander et al 1999, p54), UK (JNCC 2011, p25; Bain et al 2011) - both have now been phased out	
Nature and unit size of subsidy	No information easily accessible	
Legal basis and timeline	● The 1958 Building Act mainly sought to build forestry infrastructure e.g. forest roads and ditches in peatlands and improve drainage (Hirakuri, 2003). ● In the early 1960's a new phase of intensifying yield (making forests grow faster) was instituted, and in the 1960's and 1970's several forest improvement programs were implemented for peatland drainage, artificial regeneration, tending of young stands, construction of logging roads and fertilization of forests (Kotilainen and Rytteri, 2011; Hirakuri, 2003).	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	The main rational was to improve forestry and increase timber production i.e. via the building of forest infrastructure on, draining and afforestation of peatlands (Kotilainen and Rytteri, 2011; Hirakuri, 2003).	
Does the subsidy fulfil its objectives?	There is considerable indication that it has: ● According to Minkkinen et al. (2001) the annual tree growth in Finland has increased since the 1950s by approximately 10.4 million m^3 due to forestry drainage on peatlands (more than 50% of the total growth increase in Finland's forests in the same time period) ● In the early 1960's, peatland drainage on private lands started to	

	increase rapidly, almost tripling from around 70,000 to more than 210,000 hectares by the early 1970's (see Kotilainen and Rytteri, 2011, p. 435, Fig. 3). ● From the early 1980's to the early 1990's, the allowable cut increased by about 10 million m^3/a, most of which is estimated to have taken place on drained peatlands as a result of forest improvement work (Juurola, 1998; Nuutinen et al., 1998).	
Is the rationale for the subsidy still valid?	The rational is still valid, but not via the building on, drainage and afforestation of peatlands (see section on reform below) (Hirakuri, 2003; Kotilainen and Rytteri, 2011).	
Who is **responsible** for the subsidy?	Finnish government launched the subsidy in the 1950ies	
Are there any key problems with **subsidy design?**	None identified	
Does the subsidy represent an **infringement of existing EU legislation**?	None identified	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	Forest owners	
Does the subsidy reach them?	Yes - In the early 1960's, peatland drainage on private lands started to increase rapidly, almost tripling from around 70,000 to more than 210,000 hectares by the early 70's (see Kotilainen and Rytteri, 2011, p. 435, Fig. 3).	
What are the **unintended social effects**, if any?	There were unintended social impacts of subsidies to increase yield, *though the literature does not specify whether they were due to building on, drainage and afforestation of peatlands specifically*: ● Increased mechanization sparked debate about the disappearance of local forest use practices ● The indigenous Sami population had to adapt their livelihoods to the methods of intensive yield production (Kotilainen and Rytteri, 2011).	
Key environmental impacts		
Nature and degree of impacts on the environment	One quarter of all managed forests in Finland are located on peatlands, while altogether about 54% of the total peatland area (approximately 100 000 km^2) is drained for forestry in Finland. Peatland drainage peaked in the late 1960s and early 1970s where approximately 2,000 km^2 (or 210,000 hectares) of pristine peatlands were drained annually (Kotilainen and Rytteri, 2011; Koivusalo et al., 2008). General environmental impacts include: ● Changes in the landscape and deterioration of the water environment through reduced water storage capacity, water loss, subsidence and the export of suspended solids and nutrients through ditches into lakes and rivers - runoff in case study sites	

	increased by 38% through drainage and ditch maintenance, (Koivusalo et al., 2008) ● Despite the leaching of dissolved carbon from drained peatlands into the atmosphere (through accelerated decomposition of organic matter in aerobic conditions), which has been calculated to be around 10 to 15g carbon per m² per year, drained nutrient poor peatlands may serve as a sink for CO_2 and CH_4 (methane) because forest soil and the roots of trees and other plants in nutrient poor conditions take up carbon. In the Kalevansuo drained peatland, the sink function for CO_2 amounted to 240±30 g carbon per m² annually and for CH_4 to 0.12 g per m² per year (Lohilla et al., 2011) Impacts on biodiversity and ecosystem services associated with peatland drainage include: ● Loss of natural peatland habitats and associated biodiversity. Forestry drainage is accountable for draining more than 50% of the original 100,000 km² of peatland area in Finland (Lohilla et al., 2011); on a global scale, forestry is responsible for 30% of the total loss of around 800,000 km² of peatland (Parish et al., 2008); through changing the hydrology, peat accumulation as well as acidity and nutrient conditions, peatland drainage affects biodiversity, alters habitats and may reduce the overall numbers and species diversity habitat types (Parish et al., 2008).	
Policy filters	None identified (however, there is a policy filter in the reformed version in that the 2006 Decree on EIA requires an EIA statement for permanent alterations of peatland; see below)	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	No estimate identified. The national budget bears the cost.	
What are the **unintended economic impacts** if any?	There were unintended economic impacts of subsidies to increase yield, *though the literature does not specify whether they were due to building on, drainage and afforestation of peatlands specifically*: ● Many forestry workers and small farmers, especially in lumberjack-smallholder villages in the East and North, lost a significant part of their income due to increased mechanisation financed through state support; however, this impact is not linked to the low-interest loans (Kotilainen and Rytteri, 2011).	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**No – already reformed**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	The subsidy has been phased out as part of a reform of Finnish forestry policy and legislation.	
Opportunities for EHS reform		

What are the **main arguments for reform**?	As the environmental effects of peatland drainage and forestry intensification in general became clear (see section on key environmental impacts above), forestry policy and management in Finland – though still characterized as intensive silviculture – was revised to consider sustainability and biodiversity conservation (see section on reform insights below) (Hirakuri, 2003; Kotilainen and Rytteri, 2011).
What are the **main barriers to reform?**	None identified
Is there a **window of opportunity** for subsidy removal or reform?	It can be assumed that a window of opportunity opened up through the increasing general concern for a more sustainable forestry, which then triggered the general reform process of Finnish forestry policy. Though in this process the subsidy was phased out, it was not a specific aim of the policy reform
Insights on past or existing reform	
Insights from EHS that have been (or are in the process of being) **reformed or phased out**	The growing awareness of sustainability and biodiversity issues in forestry affected the building on, drainage and afforestation of peatland mainly via the 2006 Decree on Environmental Impact Assessment (no information on the reform's success or applicability identified). This Decree is linked to prior legislation: ● In 1987 Finland passed the **Forest Improvement Act** ´´in order to promote timber in privately-owned forests´´; funds are to be drawn annually from the state budget and made available in the form of subsidies, loans or advance financing (ecolex). Passed in 1994, the **Act to Amend the Forest Improvement Act** requires that all projects for financing obtain an environmental impact assessment (EIA) statement in order to be approved by any Forestry Office (ecolex). ● Also passed in 1994, the **Act on EIA Procedure** determines the EIA procedure, ● which was supplemented in 2006 by the **Decree on EIA** to include ´´permanent alteration of natural forest, peatland or wetland over what can be considered a unified area above 200 hectares in size´´ as projects requiring an EIA statement (unofficial translation).
References	Bain, C.G. et al (2011) 'IUCN UK Commission of Inquiry on Peatlands'. Edinburgh, IUCN UK Peatland Programme (available at: http://www.iucn-uk-peatlandprogramme.org/resources/188) Douthwaite, R. and Healy, D. (2004) 'Subsidies and Emissions of Greenhouse Gases from Fossil Fuels' (available at: http://www.feasta.org/documents/energy/fossilfuels.pdf) Hirakuri, S.R. (2003) 'Can law save the forest? Lessons from Finland and Brazil.' Center for International Forestry Research (CIFOR). JNCC (2011) 'Towards an assessment of the state of UK peatlands'. Joint Nature Conservation Committee report No 445 (available at: http://jncc.defra.gov.uk/page-5861#download/) Juurola, M. et al. (1999) 'Outcomes of Forest Improvement Work in Finland.' Silva Fennica 33(3): 217-224). Koivusalo, H., E. Ahti, A. Laurén, T. Kokkonen, T. Karvonen, R. Nevalainen, and L. Finér (2008) 'Impacts of ditch cleaning on hydrological processes in a drained peatland forest.' Hydrology and Earth System Sciences 12: 1211–1227 Kotilainen, J. and Rytteri, T. (2011) 'Transformation of Forest Policy Regimes

	in Finland since the 19th Century.' Journal of Historical Geography 37: 429-439. Lohila, A., K. Minkkinen, M. Aurela, J.-P. Tuovinen, T. Penttilä, P. Ojanen, and T. Laurila (2011) 'Greenhouse gas flux measurements in a forestry-drained peatland indicate a large carbon sink.' Biogeosciences 8: 3203–3218. Minkkinen, K., Laine, J. & Hökkä, H. (2001) 'Tree stand development and carbon sequestration in drained peatland stands in Finland – a simulation study.' Silva Fennica 35(1): 55–69. Nuutinen, T., Hirvelä, H., Härkönen, K., Kilpeläinen, H., Salminen, O. & Siitonen, M. (1998) 'Metsien puuntuotantomahdollisuudet.' In: Hänninen, H. (ed.). Puuvarojen käyttömahdollisuudet. Metsälehti kustannus. p. 67–79. (In Finnish.) Parish, F., Sirin, A., Charman, D., Joosten, H., Minayeva, T., Silvius, M. and Stringer, L. (Eds.) (2008) 'Assessment on Peatlands, Biodiversity and Climate Change: Main Report.' Global Environment Centre, Kuala Lumpur and Wetlands International, Wageningen. Act on Environmental Impact Assessment Procedure. Unofficial translation, Ministry of Environment, Finland. Ecolex: the gateway into environmental law. FAO, IUCN, UNEP. http://www.ecolex.org/start.php

5.2 Exemption from land tax for reforestation and afforestation on wetlands in France

EHS Description		
Brief description of subsidy	In France, reforestation and afforestation are exempt from property land taxes on non-built land. This may favour the establishment of plantations in biodiversity-rich lands such as wetlands.	
Economic type	Off-budget subsidy - foregone government revenues	
Sector	Forest sector	
Member State	France	
Other Member State(s) where the subsidy exists	In Ireland the Afforestation Grant and Premium Scheme, approved under the National Development Plan 2007 to 2012, include tax exemptions for afforestation projects.	
Nature and unit size of subsidy	The land tax on non-built land (taxe foncière sur les propriétés non bâties, TFPNB) is calculated in France on the basis of the rentable cadastral value which is the value of the property calculated on the basis of valuations regularly updated by authorities. In order to calculate the TFPNB, the cadastral value is multiplied by 80% (the 20% reduction reflects the costs of ownership) and by a coefficient, which is annually set by local authorities. The TFPNB amounts to between €4 and €16/ha, but can reach €30/ha or more (Michel CHAVET Forestry Consulting Office, 2006). A TFPNB exemption scheme is established for reforested or afforested land (General Tax Code, article 1395), i.e.: - 100% annual TFPNB exemption for reforestation or afforestation in the first part of the trees' production cycle (10 years for poplar trees, 30 years for coniferous trees, 50 years for leafy trees); - 100% annual TFPNB exemption for natural regeneration (30	

	years for coniferous trees, 50 years for leafy trees) - Up to 25% annual TFPNB exemption for a balanced irregular forest (i.e. forests with at least 100 free stems per hectare of classical forest species, with a height of between 3 and 10 metres and diversity in both diameters and ages of the trees) for a period of 15 (renewable) years Other afforestation/reforestation subsidies that may have an impact on biodiversity-rich land are the following (Sainteny et al., 2011): - Regional or local subsidies for afforestation projects –it is difficult to assess the overall level of subsidies at the local or regional level given different approaches to measuring and accounting for subsidies at these levels. Thus, there is often a lack of consolidated information on the overall level of support provided; - Partial exemption of transfer duty for woodland (General Tax Code, Section 793: €25 million in 2010). One of the conditions for benefitting from the exemption is that wastelands and moors must be capable of reforestation and present a forest vocation, with a shorter period than five years. This condition can lead to the impoverishment of ecosystems rich in biodiversity as it may encourage land owners to afforest their land in order to obtain the exemption (Sainteny et al 2011).	
Legal basis and timeline	The TFPNB exemption for afforested and reforested land is established by the General Tax Code (Code Général des Impôts), article 1395. It was created in 1941, and the last modification dates back to 2001 (law 2001-602 of 9 July 2001).	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	The tax exemption was devised to support the forestry sector.	
Does the subsidy fulfil its objectives?	Yes, because it reduces the costs of reforestation and afforestation, and therefore increases the profitability of the forestry sector.	
Is the rationale for the subsidy still valid?	Yes, in the sense that forest activities are characterised by low profitability, and no because forests have been steadily expanding in France thus the rational for their support may not be as strong as in the past.	
Who is **responsible** for the subsidy?	The French Ministry of the Economy, Finance and Industry (Ministère de l'Économie, des Finances et de l'Industrie)	
Are there any key problems with **subsidy design?**	A problem with the subsidy design is the lack of environmental criteria to prevent the afforestation of wetland areas being granted a tax exemption (see below).	
Does the subsidy represent an **infringement of existing EU**	No	

legislation?		
Key social impacts		
Who are the **intended recipients / beneficiaries**?	The forestry sector.	
Does the subsidy reach them?	Yes. However, the TFPNB represents only a small part of the overall expenses related with silviculture activities, which are estimated by Michel CHAVET Forestry Consulting Office (2006) at: - €300-1,000/ha for soil preparation - €500-800/ha for seedling supply and planting - €80-250/ha for weeding and stand maintenance	
What are the **unintended social effects**, if any?	None identified	
Key environmental impacts		
Nature and degree of impacts on the environment	After the disappearance of 50% of French wetlands between 1960 and 1990, a slowdown in the loss has taken place in the last two decades, partly because almost 70% of the area covered with wetlands now benefits from at least one protection/management measure. However, disturbance of wetlands continue especially for wet meadows, peat bogs, moors and alluvial valleys (Ministère de l'Ecologie, de l'Energie, du Développement Durable et de la Mer, 2010b). In particular, loss of "ordinary" wetlands (those considered less valuable) is of particular concern as the cumulative effect of their degradation can lead to alteration in water flow regimes, increase transport of toxic substances, flood risk and biodiversity loss (information from the web page of the French National Wetland Observatory, http://www.zones-humides.eaufrance.fr). According to the French National Wetland Observatory (http://www.zones-humides.eaufrance.fr), some wetlands that were previously used for agriculture are being afforested because of their low profitability as agricultural land and the presence of public policies encouraging afforestation (e.g. financial support, tax exemption, guidance). In particular, wet meadows, valley mires, heathland wetlands and bogs are mostly threatened by poplar plantations, which cover approximately 250,000 ha in France (information from the web page of the French National Wetland Observatory, http://www.zones-humides.eaufrance.fr).The TFPNB exemption for reforested and afforested land may contribute to these developments by encouraging afforestation in wetland areas (Sainteny et al. 2006).	
Policy filters	In 2005, the Act on the Development of Rural Territories (DTR) established a 50% TFPNB exemption for certain wetlands, i.e. those defined by a very old land classification (instruction of 31 December 1908) as category 2 (meadows, grasslands and pastures) and category 6 (natural prairies, meadows, grasslands, pastures, moors, marshes, empty and waste land). In order to obtain the exemption,	

	wetlands must be subject to a five year management commitment relating to bird and wetland conservation (article 1395D of the General Tax Code). The exemption applies for five years and is renewable (Cizel O./Grupe d'histoire des zones humides, 2010). The wetlands in category 8 (alluvial and riparian forests, lakes, ponds, unnavigable canals, salines and salt marshes) and peat exploitation are excluded from the exemption (Seyrig, 2007). In addition, the 2006 Finance Act allows for a permanent exemption of up to 20% from the TFPNB for all wetlands, which can be combined with the partial exemption of the DTR law. The combination of exemptions allows up to 60% TFPNB exemption (Seyrig, 2007). Finally, wetlands located in protected areas and Natura 2000 areas benefit from a 100% TFPNB exemption. The exemptions from the TFPNB for wetlands acts as a policy filter, since it reduces the incentive to afforest these areas. However, forests and plantations also benefit from other kinds of tax reductions and are thus more profitable than wetlands. For example as noted in Roquet Estelle, 2011): - Exemptions from TFPNB for reforestation, natural regeneration, high forests and forests located in Natura 2000 areas, for a period of 30 years; - Partial exemptions from gift tax; - The payment of transfer duties may be paid by delivery of forests or natural areas which may be incorporated in the forest property of the State; - Income related to tree felling are exempted from tax; - Exemptions from part of the property tax, if a management plan ("plan simple de gestion") is developed. Other policy filters include the following laws (Roquet Estelle, 2011): - Circular of March 25 1998, which bans the poplar and conifer plantations in bogs and peat swamps; - Circular of September 11 1998, which limits the plantation of poplars, including plantations in wetlands; - Decree No. 99-112 of 18 February 1999, which requires an authorization for plantations affecting areas with a specific landscape character or affecting natural environments and the sustainable management of water as defined by the Water Act - Framework law on forests of July 9 2001, which regulates the clearing of wetlands (floodplain forests and swamps), plantations on riversides (some species are prohibited), and wetlands which are left fallow. This law establishes a compulsory scrub clearing upon the Prefect's decision. Another policy filter was introduced in 2001, differentiating the number of years a tax exemption can be granted to the different	

	kinds of plantations (see below).	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	The total TFPNB exemption for afforestation/reforestation amounted to €7 million both in 2010 and in 2011 (Allain E., 2012, page 9). This equals to 0.8% of the total TFPNB amount, i.e. €900 million in 2010 (Public Finances General Directorate. Tax Policy Directorate, 2011). The national budget bears the costs.	
What are the **unintended economic impacts** if any?	None identified	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**No**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	Afforestation on wetlands should not benefit from the TFPNB exemption. In addition, all wetlands, and not only those wetlands in protected areas, should be granted a 100% TFPNB exemption to encourage their conservation.	
Opportunities for EHS reform		
What are the **main arguments for reform**?	Wetlands are biodiversity hotspots and deliver many valuable ecosystem services (e.g. water provision and purification, flood prevention, landscape maintenance). Their loss has been slowed down but not halted by the establishment of protected areas and other protection measures in France (see above). On the contrary, forests are expanding in France, with an average increase of 68.000 ha per year between 1980 and 2006 (Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer, 2010a). In addition, tree plantations are in general characterised by low biodiversity and may cause environmental impacts (e.g. soil impoverishment, water consumption). Thus tax exemptions on non-built land should be carefully designed to not encourage tree plantations in wetland areas.	
What are the **main barriers to reform?**	The main barrier is possibly the slow pace at which reforms are carried out. In fact, nine years passed from when the reform on the differentiation among the number of years of tax exemption for different tree species was proposed and when it was carried out (see below).	
Is there a **window of opportunity** for subsidy removal or reform?	One window of opportunity is represented by the National Biodiversity Strategy 2011-2020 (NBS), which is derived from the French commitments under the Convention of Biological Diversity (CBD), ratified by France in 1994. The objective of the NBS is to halt the loss of biodiversity, and wetlands play a crucial role in biodiversity conservation. Moreover, the application of the Water Framework Directive, the Habitats directive and the Birds Directive at the European level provide a favourable environment for wetland protection and could be used as further justification for reform.	

Insights on past or existing reform	
Insights from EHS that have been (or are in the process of being) **reformed or phased out**	The TFPNB exemption was reformed in 2001 (law 2001-602 of 9 July 2001), when the number of years a tax exemption is granted for was differentiated according to the plantation species (i.e. 10 years for poplar trees, 30 years for coniferous trees, 50 years for leafy trees). Since wetlands are often afforested with poplars, the incentive to afforest was significantly reduced by this reform. The reform was suggested in 1992 by dr. Sainteny, who was commissioned a report on environmentally harmful subsidies by the Ministry for Ecology, Energy, Sustainable Development and Land Planning (Sainteny, 1993). When dr. Sainteny started working at the Ministry in 1995 he promoted the reform through various conversations with the Ministry of Agriculture, Food and Forestry (input from dr. Sainteny, consulted for this study).
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	Environnement, Editions Victoires; Seyrig R. (2007).'Fiscalité et protection des zones humides. Mémoire de fin d'études', Institut d'Etudes Politiques de Lyon, Université Lyon 2, http://www.pole-lagunes.org/ftp/fiscalite_zh_850Ko.pdf.

6 MATERIALS

6.1 Indirect subsidy to rock extraction in Malta

EHS Description		
Brief description of subsidy	Quarrying has been on the rise in the past few years in Malta as have the adverse environmental impacts associated with these mining activities, especially given the proximity of the quarries to human settlements. The stones (a limited resource of national heritage value) are extracted for free, i.e. there is no charge or tax on stone extraction that would account for the fact that this resource is finite and internalise the environmental externalities (and costs imposed on the community) associated with these activities.	
Economic type	Off budget subsidy: lack of full cost pricing, forgone government revenues	
Sector	Extractive industry & building sector	
Member State	Malta	
Other Member State(s) where the subsidy exists	Although this cannot be said with certainty, Malta is not the only EU MS not to have introduced taxes and charges on aggregates extraction. Even where such taxes or charges exist, they are not necessarily set at a level which allows to consider that the subsidy has been fully removed or do not apply to all types of aggregates. Indeed, even where they have been introduced (which is now the case in a majority of EU Member States - examples include the Czech Republic, Italy, the United Kingdom and Sweden (EEA, 2008) these might not be set at levels that allow a full recovery of administrative costs from permitting and control procedures, address negative environmental externalities associated with these activities, or provide a sufficient incentive to encourage recycling and reuse rather than use of virgin materials.	
Nature and unit size of subsidy	Not quantified. In principle the scale of the subsidy would be equivalent to size of the external costs combined with the shadow price (de facto the opportunity cost) of the resource. This has not been calculated and would be site specific and difficult to calculate. A practical approach is to look at the tax levels in other countries as an indicator - The income generated from the tax in some countries can be considered an indication of the lost income for public authorities. In the UK, the fiscal year 2008/2009 the Aggregates Levy received a total of EURO 380 million in tax revenue (Ecorys, 2011). It needs to be stressed, however, that this cannot be considered an indication for the size of the subsidy in Malta as such an amount would have to be adjusted inter alia to the size of the country, the size of the sector, the nature and scarcity of the	

	resource, the nature of external impacts and the level of the prices.	
Legal basis and timeline	There is no legal basis for this type of subsidy – as this relates to "non-action" rather than government action.	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	No specific purpose/ rationale, although arguably it might exist as a means to support jobs in the extraction and building sectors, ensuring they remain competitive and provide cheap building material which would otherwise be expensive if adequately priced or imported. The fact that substitutes to primary (virgin) materials exist in Malta, such as construction/building waste that can be recycled and extraction waste of the same rock, means that this rationale is arguable. Given the high costs of transportation of aggregates it is more likely that jobs lost locally would be compensated through local job creation, e.g. in the building waste recycling sector.	
Does the subsidy fulfil its objectives?	No as there is no specific objective for this subsidy, although as noted above, it might continue to exist given its support to the building sector.	
Is the rationale for the subsidy still valid?	Partially if one considers that support for the extraction and building sector is still required. It seems like, taking all negative environmental externalities into account, society could be better off overall if more building material was recycled (an activity which could compensate for jobs lost in extraction) and less primary (virgin) material extracted as a result.	
Who is **responsible** for the subsidy?	Public authorities who have so far failed to produce an appropriate policy response.	
Are there any key problems with **subsidy design?**	N/A.	
Does the subsidy represent an **infringement of existing EU legislation**?	No. Although there are no binding EU provisions in this area the environmental impacts of the activities run counter some basic principles (e.g. polluter pays principle) and some commitments in the area of impact assessment, biodiversity and health related objectives.	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	Extractive industry, building sector and consumers (i.e. arguably, building in Malta would be more expensive if the price of locally sourced materials would internalise environmental externalities and prices were set at a level that would provide an incentive to extract less primary construction materials (i.e. rock) from the island's quarries.	
Does the subsidy reach them?	Probably only to a limited extent. The subsidies main contribution might be the protection of jobs in the extractive sector.	
What are the **unintended social effects**, if any?	The key social impacts associated with quarrying include impacts arising through the generation of noise, vibration, dust and visual intrusion (Office of the Prime Minister, 2011; Entec UK Limited, 2003).	

	The extraction leads to a decline in the amenity value of the landscape (through alteration of the landscape, noise, pollution, dust, damage to biodiversity etc.) and has potential impacts on health of nearby inhabitants (e.g. linked to respiratory diseases -it is estimated that the 67 active open pit quarries which lie in close proximity (0.2 to 2 km) to urban centres generate, annually, about 1200 t of PM10 dust. Considering that dust emission occurs mainly during the dry summer months, the average PM10 emission rate from quarries during this period is 11 500 mg m^{-2} day^{-1} which is well above international guideline values (100 – 350 mg m^{-2} day^{-1}) (Vella et al, 2005). Quarrying activities generally also have effects linked to the transportation of the materials (noise, dust) and on groundwater reserves (which are another scarce resource on the island (observers estimate that groundwater in Malta as a strategic and economic resource will become extinct within the next 15 years (Cremona, 2011). The loss in groundwater production will need to be compensated by an increase in reverse osmosis water production, which currently is 6-8 times more expensive than groundwater or from energy intensive desalination plants).	
Key environmental impacts		
Nature and degree of impacts on the environment	Adverse environmental impacts of rock extraction include: noise pollution, especially from blasting activities; dust (see in social impacts for health impacts); visual intrusion; damage to biodiversity; potential effects on the groundwater reserves; groundwater contamination; also effects from dumping of mounds of construction debris and excavated sediments. Given the limited size of Malta and the high population density (and hence proximity of people to the quarries), the spatial extent of local quarries is significant: almost 100 quarries (28 hard stone and 66 soft stone) are operational with annual extraction estimated in the region of 2.5 million tonnes (in 1999, the overall surface area occupied by licensed soft stone quarries, was approximated 1.1km2, while that occupied by hard stone quarries was estimated to be some 1.3km^2).	
Policy filters	The development of the most important quarrying activities should be granted a permit/license by authorities following an Environmental Impact Assessment report submitted by the project developer. The fact that the 2011 draft of the National Environmental Policy Report foresees the introduction of environmental permitting for minerals extraction operations suggests that to date, the procedures followed are not entirely satisfactory in terms of addressing adverse environmental impacts.	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	There is no monetary information for the size of this subsidy but there are some elements of quantification of the scale of the activity which provides an indication of the approximate size of the externalities that are not appropriately addressed through taxation and/or charges. Figures dating back 10 years estimate level of annual extraction at 2.5 million tonnes/ year. Had a levy equivalent to the one in the UK been applied (i.e. since 2011 it is set at EUR	

	2.33 per tonne), this would have generated a tax income of approximately EUR 5.8 million annually. In light of the size of the Maltese economy, this is not insignificant.	
What are the **unintended economic impacts** if any?	The decline in the amenity value of the landscape from extraction activities could have a negative impact on local tourism. Moreover, in the long run, running down limited resources at the current rate means that prices for building materials risk rocketing once the current stocks are depleted. The Minerals Subject Plan of 2002 (Entec, 2003) estimates existing stocks of building stock as 29 years and 28 years for soft stone and hard stone respectively (extrapolating from historical extraction rates). In addition, the low prices of Maltese quarry products perpetuate an inefficient and unsustainable use of the locally quarried rock. The absence of any strong incentives for the industry to invest in recycling of construction and demolition waste and investigating other alternative building materials is currently rather low. Providing such an incentive could be done through taxes, charges or regulation and acquisition of rights (if MBIs considered difficult to administer).	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Yes**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	The introduction of taxes and charges at levels which appropriately reflect the scarcity of the resource and adverse environmental externalities from quarrying activities would address the need for reforming this subsidy. The introduction of such a tax would provide an incentive to the extraction and building sectors to investigate alternatives to locally quarried building stone. Alternatively, if considered challenging to administer (a tax which can't be properly administered would not prove effective; in this case regulation and possibly the acquisition of extraction rights by the Government could be a better option. The Minerals Subject Plan (2002) identifies the following alternatives: (1) the recycling of construction and inert demolition wastes and wastes derived from quarrying (mainly from soft stone quarries); (2) the importation of aggregates and (3) other possible supplies, such as from the sea through dredging or through sea-mining. The latter poses many ecological hazards. There are some alternatives being explored, e.g. blemished building stone dismantled from derelict buildings, is increasingly used in the construction of roadside rubble walls.	
Opportunities for EHS reform		
What are the **main arguments for reform**?	The main argument would be to reduce the negative environmental externalities from resource extraction and transportation and achieve more sustainable rates of resource extraction by increasing incentives to use alternatives, such as recycled construction and demolition waste, and secondary materials and to encourage the more efficient use of aggregates.	
What are the **main barriers to reform?**	Given Malta is an island competitiveness impacts of the tax should be negligible as much of the aggregates are used nationally. There might however be resistance from the buildings/extraction sector.	

Is there a **window of opportunity** for subsidy removal or reform?	In the February 2012 National Environment Policy Report the intention to carry out, by 2015, an assessment on the best method for internalising environmental costs into the price of the resource is announced (MTEC, 2012). The draft report suggests that internalising these costs could encourage greater use of re-used and recycled material and reduce construction, demolition and excavation waste. The draft report also announces the intention to regulate minerals extraction operations through the introduction of environmental permitting. In addition, Malta was placed in the Excessive Deficit Procedure (EDP) by the Council in 2009 (EC, 2010). The need to consolidate public finances might be an opportunity for introducing a charge or tax at a level appropriate for changing the currently unsustainable trends in resource extraction and internalizing the (environmental) externalities.
Insights on past or existing reform	
Insights from EHS that have been (or are in the process of being) **reformed or phased out**	A whole range of EU MS have introduced taxes and charges on materials extraction in the 1990s (e.g. Czech Republic, France, Latvia, Lithuania, Sweden), a few even earlier (e.g. Denmark, Germany). In a few of them, charges to cover the cost of associated administrative procedures have been in place for a long time but only a limited number of reforms have tried to factor environmental externalities of the mining activities in the level of the tax or the charge. The attempt to do so is what makes the UK example (introduction of an aggregates tax) of particular interest (also see in-depth reform case example on this). The UK aggregates tax was introduced in April 2002 and justified by the presence of external costs of aggregates extraction. The tax was introduced at a rate of EUR 2.35 (or GDP 1.60) per tonne, which equates to approximately 20% of the average price per tonne of material. The basis for the tax was underpinned by a contingent valuation study that estimated the total external costs of aggregates extraction in the region of EUR 558 (or GDP 380) million per year (EEA, 2008). Since 2009, the rate has been EUR 2.28 per tonne, and from 2011 EUR 2.33. (EEA, 2008), Ecorys (2011). The objective of the UK aggregate levy has been principally two-fold. The primary aim has been to reduce the environmental costs associated with quarrying operations, e.g. noise, dust, visual intrusion, loss of amenity and damage to biodiversity. Secondly, the tax aims to reduce the demand for aggregates and encourage the use of alternative materials, such as secondary aggregate materials exempt from the levy or recycled aggregate materials. Two additional policy measures were associated with the introduction of the aggregate levy (EEA, 2008): • Revenues raised from the aggregates levy are recycled to business through a 0.1 % age point cut in employer NICs. • Revenues are also recycled through an Aggregates Levy Sustainability Fund (ALSF) aimed at delivering local environmental benefits to areas subject to the environmental costs of aggregates extraction. The first objective of the ALSF is to reduce demand of primary aggregates through promoting the greater use of recycled and secondary aggregates. The latter policy measure was specifically targeting the negative externalities associated with aggregate extraction. The UK

	approach of applying two policy levers (aggregate tax and ALSF) to correct market failures contrasts with the methods adopted by other EU Member States, which have typically introduced the tax instrument in isolation. According to a study from the EEA (2008) the aggregate levy has acted as a stimulus towards environmental improvements. However, it would be unfair to attribute the entire effect to the aggregate levy in isolation. It is the combination of policies that have given a signal to producers of the need to change production methods and practices. For further information, see reform case in Annex II on the aggregates levy and landfill tax on construction and demolition waste in the UK.
References	Aggregates & Recycling Information Network (2002) Quarrying in Malta, URL: http://www.agg-net.com/case-study/quarrying-in-malta Alan Deidun, Dust in the Wind, published in Sunday Circle, URL: http://www.sundaycircle.com/2012/02/dust-in-the-wind/ BALM, R.: 'Big holes in a small place', in Geography: The changing world, 1996.Building Industry Consultative Council, Annual Report 1999, Ministry for the Environment, Malta, p26.EEA (2008) Environmental taxes on aggregate materials in the EU: towards sustainable construction, URL: http://www.eea.europa.eu/highlights/environmental-tax-on-aggregate-materials-in-the-eu-towards-sustainable-construction-1 Interview with Marco Cremona (2011) The Population of Malta has no idea about the disastrous state of its water sources, URL:http://water.thinkaboutit.eu/think5/post/the_population_of_malta_has_no_idea_about_the_disastrous_state_of_its_water/ EC (2010) Public finances In EMU – 2010, DG for Economic and Financial Affairs, URL: http://ec.europa.eu/economy_finance/publications/european_economy/2010/pdf/ee-2010-4_en.pdf EEA (2008) Effectiveness of environmental taxes and charges for managing sand, gravel and rock extraction in selected EU countries, EEA Report No 2/2008, URL: http://www.eea.europa.eu/publications/eea_report_2008_2 Entec UK Limited (2003) Minerals Subject Plan for the Maltese Islands 2002, A report for the Malta Environment & Planning Authority – Malta, URL: http://www.elistore.org/Data/products/3764.pdf Ecorys (2011) The role of market-based instruments in achieving a resource efficient economy, Client: European Commission: DG Environment, URL: http://ec.europa.eu/environment/enveco/taxation/pdf/role_marketbased.pdf European Commission: 'Construction and demolition waste practices and their economic impacts', Symonds (UK), 1999.GATT, P.: 'Environmental impact statement for an extension of a hard stone quarry at wied iz-Ziju', M.E.P. Consultants, Malta, 1999. Mineral Subject Plant, Entec (UK) Ltd, Planning Authority, 2001 MTEC – Ministry for Tourism, the Environment and Culture (2012) National Environmental Policy, URL: https://secure2.gov.mt/tsdu//environment-nep The Quarrying industry in the Maltese Islands, URL: http://www.ambjentahjar.org/library/quarry.htm Office of the Prime Minister (2011) National Environmental Policy; Draft for

	Consultation, September 2011 Vella A.J., Camilleri R. (2005) Fine dust emissions from soft one quarrying in Malta, URL: http://staff.um.edu.mt/jgri1/xjenza/articles/10/10_047_vella.pdf

7 TRANSPORT

7.1 Tax deductions for commuters in Austria

<table>
<tr><th colspan="4">EHS Description</th></tr>
<tr><td>Brief description of subsidy</td><td colspan="3">Commuters in Austria can deduct a fixed amount from their taxable income related to their travel costs between home and work. In Austria this is known as the ‘Pendlerpauschale’. Most ‘Bundesländer’ in Austria offer additional tax breaks for commuters. The present case only deals with the federal scheme.</td></tr>
<tr><td>Economic type</td><td colspan="3">Foregone government revenues: tax rebates</td></tr>
<tr><td>Sector</td><td colspan="3">Transport
Households</td></tr>
<tr><td>Member State</td><td colspan="3">Austria</td></tr>
<tr><td>Other Member State(s) where the subsidy exists</td><td colspan="3">Several MS offer some form of tax rebate for commuting costs. In 2000, only six of the then 15 MS did not apply this type of fiscal facility: EL, IE, IT, PT, ES and UK (Faber, 2000). A study with data from 2003 confirmed that there is no tax rebate for commuters in PT, ES and UK (Borck and Wrede 2009)</td></tr>
<tr><td>Nature and unit size of subsidy</td><td colspan="3">The subsidy depends on the distance travelled and on whether the commuter can (be reasonably expected to) use public transport. The current (2012) amounts per year are:
<table>
<tr><td>Distance</td><td>Public transport available (‘small’ Pendlerpauschale)</td><td>No public transport available (‘big’ Pendlerpauschale)</td></tr>
<tr><td>2 - 20 km</td><td>-</td><td>EUR 372</td></tr>
<tr><td>20 - 40 km</td><td>EUR 696</td><td>EUR 1,476</td></tr>
<tr><td>40 - 60 km</td><td>EUR 1,356</td><td>EUR 2,568</td></tr>
<tr><td>> 60 km</td><td>EUR 2,016</td><td>EUR 3,672</td></tr>
</table></td></tr>
<tr><td>Legal basis and timeline</td><td colspan="3">Legal basis: Einkommensteuergesetz, § 16 (1) 6.</td></tr>
<tr><th colspan="4">Objectives and design</th></tr>
<tr><td>Subsidy rationale/objectives (original and evolving)</td><td colspan="3">Making commuting costs an allowable deduction reflects a principle that employees should be able to deduct the ‘necessary costs to obtain, assure and maintain work’ in computing their income tax liability. Such provisions could be very important in some areas as a stimulus to the labour market, particularly if travel distances are long and accessibility constraints are significant (Faber, 2000). In Austria, the introduction of the Pendlerpauschale scheme also had</td></tr>
</table>

	the objective to counteract the depopulation of the countryside (Umweltdachverband, 2010b).	
Does the subsidy fulfil its objectives? **Is the rationale for the subsidy still valid?**	The validity of commuter income tax rebates as an instrument for labour market and taxation efficiency is a controversial issue. On theoretical grounds, it is sometimes judged negatively (e.g. Richter, 2004; Potter *et al.*, 2006) and sometimes positively (e.g. Wrede, 2001; Hirte and Tscharaktschiew, 2011). Empirical evidence on the effectiveness of commuter tax rebates is hard to find.	
Who is **responsible** for the subsidy?	The Austrian Finance Ministry (Bundesministerium für Finanzen)	
Are there any key problems with **subsidy design?**	The Austrian system does not make a distinction between the modes of transport actually used for commuting and therefore does not include an incentive to use less polluting modes (such as train or bicycle). In fact, it rewards commuters living in areas with bad public transport connections by offering them substantially higher tax rebates. It also rewards long travel distances by offering rebates that increase with commuting distance.	
Does the subsidy represent an **infringement of existing EU legislation**?	No.	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	Employees traveling to their work.	
Does the subsidy reach them?	Yes, except those who live less than 20 km from their work and have good access to public transport.	
What are the **unintended social effects**, if any?	As with all income tax deductions (in a progressive tax system), the subsidy mainly benefits the highest income groups. Almost half of the tax benefit accrues to people with an income above EUR 35,000 per year (TT, 2012). Ten per cent of the beneficiaries have a gross income above EUR 70,000 per year (VCÖ, 2012). The Austrian system also has a bias in favour of people traveling by car (if public transport is unavailable) and people having full time jobs (the tax rebate is not available for people traveling to their work on less than 11 days per month).	
Key environmental impacts		
Nature and degree of impacts on the environment	Deductibility of commuter transport expenses can lead to an increase in transport, compared to a situation without such a fiscal facility. The environmental impact depends, among others, on the mode(s) of transport chosen by the commuter. In addition, the subsidy may contribute to 'urban sprawl'.	
Policy filters	Policies such as emission standards for cars and land-use planning mitigate the environmental impacts to some extent, but do not neutralize them.	
Key economic and financial impacts		

Estimated size of the subsidy per year and who bears the cost	The Pendlerpauschale is a significant burden for the Austrian treasury. Its abolition would lead to an estimated increase of public revenues of EUR 250-260 million (TT, 2012; Umweltdachverband, 2010a) or even EUR 320 million (VCÖ, 2012). Furthermore, it is estimated that the system overcompensates the real costs of commuting by EUR 80 million (Umweltdachverband, 2010b).	
What are the **unintended economic impacts** if any?	N.a.	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Yes**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	The Pendlerpauschale could either be reformed so as to reduce its negative environmental and social impacts (e.g. by creating incentives for the use of public transport and making part-time workers eligible as well), or it could be removed altogether. The VCÖ (2012) has presented a proposal for reform of the subsidy, including a.o. the possibility for employers to provide a tax free 'Jobticket' for public transport to their employees. The Umweltdachverband (2010b) suggests to put the subsidy for car and public transport commuters on an equal footing by ending the distinction between the 'big' and the 'small' Pendlerpauschale. Both organisations also recommend changing the conditions of the scheme so as to remove its present bias in favour of high-income groups.	
Opportunities for EHS reform		
What are the **main arguments for reform**?	Budgetary arguments; unproven effectiveness; environmental and social impact	
What are the **main barriers to reform?**	Political resistance; vested interests; high fuel prices	
Is there a **window of opportunity** for subsidy removal or reform?	Budget reforms	
Insights on past or existing reform		
Insights from EHS that have been (or are in the process of being) **reformed or phased out**	See reform case in Annex II on income tax deductions for commuters in the Netherlands.	
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7.2 Absence of road pricing for freight and passenger transport in the Netherlands

EHS Description		
Brief description of subsidy	Absence of kilometre based road pricing for freight and passenger transport in the Netherlands	
Economic type	- Provision of infrastructure: (m) Implicit subsidies, e.g. resulting from the provision of infrastructure; - Lack of full cost pricing: (o) Implicit income transfers resulting from non-internalisation of externalities	
Sector	Transport	
Member State	The Netherlands Note: Other MS could also be considered. The Dutch case study has been chosen since road pricing issues have been discussed for many years (Ministerie van Verkeer en Waterstaat, 2008) in the Netherlands, which culminated in the approval of a road pricing scheme by the cabinet in November 2009. However, in the spring of 2010 the plans were abolished (Jonkmans & Taken, 2011). Nonetheless, the introduction of a road pricing scheme in one form or another remains on the political agenda.	
Other Member States where the	For passenger transport kilometre based road pricing is currently limited to tolling on selected parts of the motorways in a number	

<table>
<tr><td>subsidy exists</td><td>of Member States. In addition, some cities (London, Stockholm, and Milan) apply a form of road pricing. No examples of road pricing on the full network exist in the EU.

For freight transport, the existing applications of km based road pricing are either tolls with physical barriers on motorways or full electronic toll collection systems on motorways and a selection of major roads. The latter system is applied in Austria, the Czech Republic, Germany, Poland and Slovakia. No examples of road pricing on the full network exist in the EU.</td><td></td></tr>
<tr><td>Nature and unit size of subsidy</td><td>In general the level of the subsidy is equal to the difference between the social cost caused by driving an additional km and the private cost (incl. existing taxes) per km. This corresponds with the external costs (congestion, environmental, accidents, oil dependency) that are not paid for via existing taxes.

The level of the implicit subsidy will depend on the time and location where the vehicle is driven since these determine the level of the congestion externality, and the characteristics of the vehicle (vehicle type, emission class, noise class, etc.) which influence the environmental externality.

Kozluk (2010) summarizes the external costs of transport in the Netherlands as follows (cents per vehicle kilometre, 2017, 2005 prices)

<table>
<tr><td></td><td></td><td>Road wear</td><td>Safety</td><td>Noise</td><td>CO_2</td><td>Non CO_2</td></tr>
<tr><td>Passenger car</td><td>Gasoline</td><td>0.2</td><td>2.7</td><td>0.3</td><td>1.0</td><td>0.3</td></tr>
<tr><td></td><td>Diesel</td><td>0.2</td><td>2.7</td><td>0.4</td><td>0.9</td><td>1.1</td></tr>
<tr><td></td><td>LPG</td><td>0.2</td><td>2.7</td><td>0.3</td><td>0.7</td><td>0.3</td></tr>
<tr><td>Van</td><td>Diesel</td><td>1.1</td><td>2.3</td><td>0.7</td><td>1.2</td><td>3.9</td></tr>
<tr><td>Trucks</td><td>Diesel</td><td>9.6</td><td>5.4</td><td>2.4</td><td>5.5</td><td>3.9</td></tr>
</table>

Currently, the tax structure (fixed taxation of vehicle purchase and ownership, fuel taxes) bears little relation to the externalities caused by vehicles.</td><td></td></tr>
<tr><td>Legal basis and timeline</td><td>Not applicable</td><td></td></tr>
<tr><td>Objectives and design</td><td></td><td></td></tr>
<tr><td>Subsidy rationale/objectives (original and evolving)</td><td>Several factors may play a role in explaining the absence of kilometre based road pricing. Below we provide a list. We also describe briefly how the Dutch scheme put forward by the cabinet in 2009, but stopped afterwards, tried to tackle these arguments. These elements are based on Ministerie van Infrastructuur en Milieu (2011), Jonkmans & Taken (2011) and Kozluk (2011).

a) A road charge is a direct cost for the road haulage sector, which</td><td></td></tr>
</table>

	is under intense competitive pressure. It also increases the costs of car users. The set-up of the Dutch road pricing scheme tried to counter this factor by aiming for a scheme in which the general revenues were neutral w.r.t. vehicle taxation. b) It is not clear what proportion of external costs caused by the road sector is already covered by existing taxes imposed on the sector (but which do not bear a direct relationship with the external costs caused). c) The operational costs of the scheme In order to counter this argument, the unsuccessful Dutch road pricing scheme had to meet the condition that the system and operational costs should not exceed 5% of revenues. d) Public acceptability Public acceptability of road pricing schemes may be low because people are not familiar with such schemes, are uncertain about the benefits in terms of travel time savings, fear the complexity of such schemes, fear privacy problems, or are uncertain about the efficient use of the revenues raised. The Dutch proposal tried to tackle the last point by aiming at a budgetary neutral tax reform, and by earmarking the revenues for an infrastructure fund. A survey among the members of the car user association ANWB showed that a majority was in favour of a shift from fixed to variable taxation. However, the congestion charge, the registration system and the transition phase were identified as problems in this survey.	
Does the subsidy fulfil its objectives?	Not applicable	
Is the rationale for the subsidy still valid?	The main factors that explain the absence of road pricing are still present. However, the discussion on road pricing in the Netherland still continues. The changing economic climate and its implications for the government's budget might also change attitudes towards road pricing schemes.	
Who is **responsible** for the subsidy?	Not applicable.	
Are there any key problems with **subsidy design?**	Not applicable	
Does the subsidy represent an **infringement of existing EU legislation**?	For trucks the recently revised Eurovignette directive (Directive 2011/76/EU) applies. The absence of a km based road charging does not entail an infringement of this Directive. The new revised Eurovignette directive allows Member States to charge heavy lorries, not only for infrastructure costs, but also for the costs of air and noise pollution. It also enables Member States to better manage congestion problems with the possibility to vary charges	

	for heavy lorries according to the time of the day. The introduction of a km based road pricing scheme would allow the move in the direction of the internalisation of external costs as put forward in the 2011 White Paper (European Commission, 2011). It would be in line with wider EU objectives of 'polluter-pays' and 'user-pays' principles and the long-term goal to have user charges applied to all vehicles and on the whole network to reflect at least the maintenance cost of infrastructure, congestion, air and noise pollution.	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	Road freight transport sector Passenger car users	
Does the subsidy reach them?	Yes, since no road pricing is imposed.	
What are the **unintended social effects**, if any?	Health effects of transport emissions A well-designed system of road pricing is beneficial to society as a whole, when taking into account both the impacts on transport users (higher monetary costs, lower congestion) and the impact on the government budget. The extra revenue can be used for various purposes that may benefit the transport users or society in general. Studies on the welfare impacts of road pricing show that before taking into account this revenue recycling, the transport users are worse off on average when road pricing is introduced. This is because, on average, the time gain does not compensate them for the increase in monetary costs. A good use of the extra revenues generated by road pricing is therefore essential to get the support of the average road user. However, for road users with a high value of time (some categories of freight transport, business travellers, …) the benefits in terms of lower congestion are larger than the extra costs they have to pay and the system is beneficial for these road users even when the additional revenues are not yet taken into account.	
Key environmental impacts		
Nature and degree of impacts on the environment	Studies performed prior to the approval by the cabinet in 2009 of the road pricing scheme, present estimates of the expected environmental impacts of such a scheme. Jonkmans & Taken (2011) give a description of the scheme. It involved a shift away from fixed taxation towards a kilometre charge combined with a congestion fee, applicable in congested	

	areas and during peak times. The system would apply to all cars and trucks and on all roads, with a full introduction in 2017. The km charge would be a function of vehicle type, weight, CO2 emissions and emission class. The analyses of this scheme – as summarised in Kozluk (2010) – showed important expected benefits: • The number of kilometres travelled in 2020 would fall by 15% • Traffic jams would be halved • Thanks to the fall in road travel and a switch to more environmentally friendly modes and vehicles, NO_x and PM emissions were expected to fall by some 11% in 2020, potentially resulting in a substantial improvement of local air quality. • CO_2 emissions would be reduced by 6%. • A reduction in noise pollution could also be expected. The intention was for a 5% collection surcharge to cover the operational costs of the road charging system while the general revenues were to be neutral with respect to vehicle taxation which would be phased out. Given the magnitude of the scheme and the limited number of examples in other countries, the degree of uncertainty of these estimates is high. In addition, other configurations of the scheme could have different impacts. Nevertheless, the figures do give some indication of the impacts that can be expected. The economic activities/sectors causing or exacerbating these threats to the environment are the road transport users (both freight and passenger transport).	
Policy filters	'Policy' filters are measures that mitigate the environmental effects of the absence of road pricing. However, they can be considered "second-best" instruments, since they do not differentiate according to the time and location of the km driven and not always according to the number of km driven or the environmental characteristics of the vehicles. The overview of existing Dutch instruments below is based on Kozluk (2011): - European environmental standards for vehicles - fuel taxes - vehicle purchase tax (based on vehicle type, fuel and emissions) - vehicle ownership tax (based on vehicle type, fuel type and weight) - income tax on company cars - Eurovignette for lorries on Dutch highways	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost (i.e. national budget,	The estimated size of the implicit subsidy may be large, depending on the level of the externalities.	

consumers, general public through creation of public 'bads' or reduced access to public goods, future generations via loss of resources/natural capital)		
What are the **unintended economic impacts** if any?	- Lower prices of factors of production and intermediate inputs that are transported by road and used by non-target industries - Impact on location decisions of households and firms	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Yes**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	Possible reform options include: - Fully-fledged road pricing: cf. 2009 plan for road pricing scheme - Flat road pricing: cf. proposal of the Wetenschappelijk Instituut CDA on a flat fee per km - Use of existing measures with congestion charges in congested areas only	
Opportunities for EHS reform		
What are the **main arguments for reform**?	See section on "nature and degree of environmental impacts": Travel time savings Environmental benefits In addition, road pricing may generate revenues that can be used to reduce distortionary taxes or finance infrastructure investments	
What are the **main barriers to reform?**	See section on "subsidy rationale". One should also note the change of government coalition in the Netherlands. Moreover, congestion in The Netherlands has decreased significantly in the recent past, even in the absence of congestion pricing: According to the Dutch automobiles association ANWB, congestion levels in the Netherlands have decreased by 27% in 2011 compared to average levels of the five preceding years (ANWB (2011)). This decrease is to a large extent due to investments in road infrastructure. The Dutch governments intends to further speed up new investments in road infrastructure (see Rijksoverheid (2011a, b, c)). With decreased congestion levels, political support for congestion charges can be expected to decrease further.	
Is there a **window of opportunity** for subsidy removal or reform?	As noted above, a window of opportunity was lost when it was decided not to proceed with the planned road pricing scheme, despite years of preparatory work. Some recent developments may yet lead to reconsideration of this position. First, the Netherlands has exceeded the emission limits for NO_x set by the EU	

	National Emission Ceilings (NEC) Directive (EEA 2012). Therefore, it can be expected that the Netherlands will have to take additional measures (probably also in the field of transport) to meet these limits in the future. According to RIVM (2011, 2012), ambient concentrations of NO_x and PM exhibit a decreasing trend. Nevertheless, RIVM estimates that in 2008, 2090 people in the Netherlands died prematurely due to short term exposure to PM – this corresponds to 1.6 of the total. 5% of deaths due to respiratory problems can be attributed to PM. Second, forecasts indicate that, in 2013, the Netherlands will face a budget deficit of 4.5% of GDP, which exceeds the 3% limit enshrined in the euro zone's new fiscal pact (The Economist 2012). Also, in 2012, the Dutch government intends to spend 2.5 billion EUR on road construction, management and maintenance (Rijksoverheid (2011d)). Road pricing could be an additional source of income for the government; including for infrastructure funding (although one has to keep in mind that the cancelled scheme was meant to be budget neutral).
Insights on past or existing reform	
Insights from EHS that have been (or are in the process of being) **reformed or phased out**	See for example reform case in Annex II on road charging in Austria.

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7.3 Company car taxation in Belgium, the Netherlands and the United Kingdom

EHS Description	
Brief description of subsidy	Company car taxation • **Belgium:** current system and gradual reform since January 2005 • **The Netherlands:** gradual reform since 2001, current system, new system that will enter into force summer 2012 • **United Kingdom:** gradual reform since 2002, current system and forthcoming changes Note: we restrict ourselves to the tax treatment of passenger cars that are provided by the employer to the employee (often with coverage of all costs) and that can be used for both professional and private trips at the discretion of the employee. We do not consider the taxation of cars that are used solely for professional purposes. Whether commuting is considered "professional" or "private" travel varies from country to country.

Economic type	**Belgium** Foregone government revenues due to a favourable tax treatment of company cars; lack of full cost pricing.
	The Netherlands Foregone government revenues due to a favourable tax treatment of company cars. A recent reform will tackle this first issue (partly), but at the expense of the second: lack of full cost pricing (pricing is not directly linked to actual CO_2 emissions and only very indirectly linked to other externalities).
	United Kingdom Lack of full cost pricing, especially of local pollutants; Foregone government revenues due to reduced tax rates for cars with low CO_2 emissions.
Sector	Transport
Member State	MS1: Belgium MS2: Netherlands MS3: United Kingdom
Other Member State(s) where the subsidy exists	Copenhagen Economics (2010) gives an estimate of the tax subsidies in the different EU countries, indicating that it is a problem in a large number of Member States. The subsidy rate varies according to country and car segment, ranging from less than 10% to more than 30%. For details, see Table 1.2 on p. 6 of Copenhagen Economics (2010).
Nature and unit size of subsidy	Under an optimal tax system, the company car should be considered as part of the employee's income, the value of which should be based on the employer's cost of providing the car net of the costs related to professional use of the car (Gutiérrez-i-Puigarnau & Van Ommeren, 2011). This amounts to a tax neutral treatment of these cars. Moreover, De Borger & Wuyts (2011) show that if optimal congestion tolls are unavailable (so that drivers are not confronted with the marginal external congestion cost that they cause), the optimal tax imputed value should be higher than the net employer's cost. This extends to the case when other externalities are present. **Belgium** Company cars provided by employers are strongly encouraged by the current tax system. In light of the existence of high labour taxes in Belgium, employers consider company cars as a cheap non-wage compensation. Employers would have to pay much higher direct wages to give the same equivalent income to their employees. In the study by Copenhagen Economics (2010) the subsidy rate in Belgium was estimated to range between 33% and 38% in 2008. This was calculated by comparing the employee tax base with the employer cost. Wuyts (2009) set the imputed tax value at 60% of the total annual value of the company car. According to OECD (2001) the taxable value was between EUR 630 and EUR 2 400 per year depending on emission class. Company car taxation has recently been revised in Belgium as discussed below. New estimates of the subsidy rate are not yet available. An analysis of the tax treatment of company cars in Belgium should consider both the tax rules that apply to the employees and those that apply to the employers. Here we discuss the system that applies as of May 2012 (Belgium, FOD Financiën, various sources).

	We consider the case where the *employees* are provided with a company car that they can use for private purposes. Very often they also get a free fuel card (in a survey among company car users, 69% could use an unlimited fuel card (KPMG, 2012)). In the tax system the availability of the company car is considered as a benefit in kind that is added to gross income and that is subject to the personal income tax. Crucially, the value of the benefit in kind is not related to the distance travelled for private purposes (commuting and non-commuting). It is based on 6/7 of the catalogue price of the car (including the value of the options and the VAT and excluding rebates). This value is multiplied by a CO_2 rate that is a function of the fuel type and the CO_2 emissions per km. The CO_2 base rate is 5.5% for a reference CO_2 emission of 95 g/km for diesel cars and 115 g/km for gasoline, LPG or CNG cars. When the CO_2 emissions are higher than the reference rate, the base is increased by 0.1% per g of CO_2 with a maximum of 18%. When the CO_2 emission rate is lower than the reference rate, it is decreased by 0.1% with a minimum of 4%. Cars with a purely electric motor pay the minimum percentage of 4%. The age of the vehicle is taken into account: every year the catalogue value is decreased by 6%, until a minimum value of 70% of the original catalogue value is reached. If the employee pays compensation to the employer for his private use of the car, the benefit in kind is reduced by this amount. The *employers f*ace the following tax rules: - The tax deductibility of the costs of a company car depends on the fuel type/propulsion technology and CO_2 emissions per km and ranges between 50% and 120% (for electric cars). However, the tax deductibility of the fuel costs is 75%. - Employers pay a social security contribution on the income in kind. This contribution is calculated on the basis of the CO_2 emissions per km and is annually adjusted for inflation. - The employers must register a percentage of the benefit in kind on the company car as (additional) 'non-deductible expenses'. This taxable part is set at 17% of the benefit in kind and makes it less advantageous to provide a company car. - Depending on the year in which the car is bought, employers can either recuperate the VAT by 50% and pay VAT on the benefit in kind (old system), or recuperate the VAT by the percentage of professional use with a maximum of 50% (new system). The new system reduces the attractiveness to the employers of providing a company car with a large share of private mileage (keep in mind that the benefit in kind is independent of the actual annual number of km driven for private purposes).
	Netherlands If an employee uses a company car for private purposes (non-commuting only), the employer is required to add the benefit in kind to the taxable wage income – the amount to be added is called the “bijtelling”. The effect of the “bijtelling” is an increase in income taxation and social security contributions, and thus a decrease in net wages (website Rijksoverheid, Autobelastingen).

The actual magnitude of the "bijtelling" depends on the type of car the employee drives with. As a rule, the annual in kind benefit is supposed to correspond to 25% of the catalogue price of the car (website Rijksoverheid, Autobelastingen).

There are a number of exceptions (website Belastingsdienst):

- If the employee reimburses his employer for the private use of the company car, then the amount of the payment is deducted from the "bijtelling".
- If the employee uses the company car for less than 500 km on a yearly basis, then he is exempted from "bijtelling".
- If the in kind benefit corresponding to the private use is higher than 25% of the catalogue price, then the "bijtelling" is equal to the actual benefit in kind.
- If the car is 16 years or older, then the "bijtelling" is equal to 35% of the current market value of the car, rather than of the catalogue price.
- There are special rules for environmentally friendly cars, which will be discussed in detail below.

There are also a series of special cases, which will not be discussed in detail here because they would distract us from the main features of the system.

The concept of "company car" needs to be interpreted in a broad sense, and includes for instance lease cars, or cars owned by the employee but reimbursed by the employer (website Belastingsdienst).

The actual "bijtelling" is lower for "environmentally friendly" cars, where the "environmental" criterion refers to the CO_2 emissions per km only. Note though that, in the current system - different rates apply to diesel cars, so that local pollution is taken into account indirectly. This will change in the future – see further.

The following rates apply:

CO_2 emissions per km	**Fuel type**	**Percentage of the catalogue price**
50 grams or less	Electric cars or hybrids without diesel engine	0%
95 grams or less	Diesel	14%
116 grams or less but more than 95 grams	diesel	20%
110 grams or less and more than 50 grams	All fuels but diesel	14%
140 grams or less but more than 110 grams	All fuels but diesel	20%
All other cars		25%

If, in practice, the benefit in kind exceeds the value of the "bijtelling" as calculated in the table above, then the "bijtelling" is calculated as follows: actual value of the benefit in kind minus 11% of the catalogue price.

Whether or not this scheme can be considered as a "subsidy" depends on several parameters, such as the prize and the CO_2 emissions of the car on the one hand, the employee's income and his actual private driving patterns on the other hand.

However, for "typical" cases, the scheme is clearly beneficial for the employee. For instance, Graus and Worell (2008) estimate that with the scheme applicable in 2005 ("bijtelling" equal to 22% of the catalogue price), the "bijtelling" leads to an increase in tax income ranging from 2,000 to 2,500 EUR, depending on the employee's income and the actual value of the car.

More recently, van Ommeren and Gutierrez-i-Puigarnau (2011) have calculated that, with a "bijtelling" of 22%, a car with a purchase price of 17,000 EUR leads to an increase of annual taxable income by 3,700 EUR, while the annual cost of providing such a car is about 8,700 EUR. Moreover, workers who use a company car avoid paying VAT. The combined effect is that company cars are typically provided at an implicit unit price that is 30% below its market price.

United Kingdom

A percentage of the car's new list price is added to an individual's income for tax purposes – this percentage depends on a car's *test* CO_2 emissions.

As from 6 April 2011, the bands were as follows:

CO2 emissions (g/km)	Percentage
0	0%
1-75	5%
76-120	10%
121-125	15%
With increases of 1% for every rise of 5 g CO2 per km until:	
225 and above	35%

There is a diesel surcharge of 3% for all EURO classes. The tax applied to the cash benefit of free fuel offered by the employer is independent of the actual amounts of free fuel consumed, but is applied to a fixed scale charge of £18,000. This fixed charge is weighted by the same percentage as the one that is applied to the list price. The £80,000 limit for the price of a car for car benefit purposes no longer applies. There are no longer reductions for alternative fuels such as LPG and CNG (HM Revenue & Customs, 2012). Employees can drop out of the free fuel scheme if they consider that they will spend less on their fuel than the additional taxes they will have to pay if they opt for free fuel (Porter and Atchulo, 2012).

Thus, if the CO_2 emissions of a car are low enough, this system subsidizes the use of company cars as in-kind benefit. Except for the diesel surcharge (to be abolished – see further) and the reduction for alternative fuels (abolished), the system provides no incentives for purchasing cars with low emissions of local

	pollutants.
Legal basis and timeline	**Belgium** Before January 2005 the tax treatment was based on a default mileage and the fiscal horsepower (fiscal concept that is a function of the cylinder content) of the car. The default mileage was a function of the home-work distance and did not reflect the actual private mileage. It was set at 5000 km for employees living at a distance up to 25 km from work and 7500 km for the others. Environmental considerations did not play a role in the fiscal treatment of company cars. Since January 2005 steps have been undertaken to increase the fuel efficiency of company cars, by changing different components of the tax system. However, these changes have not gone far enough to account for the negative impacts of under-priced car use since the value of the benefit in kind remains lower than the employer's cost of providing the car net of the costs related to professional use of the car. The system has been reformed along the following lines since January 2005: - In January 2005, the rules for calculating the social security contribution levied on the benefit in kind were changed. They were based on the basis of the CO_2 emissions per km, annually adjusted for inflation; the benefit in kind continued to be determined on the basis of a default mileage (5000 km or 7500 km depending on the distance between home and work) and the fiscal horsepower. - In April 2007 the tax deductibility of the car costs in the corporate taxation was made dependent on the CO_2 emissions per km and fuel type. - In January 2010 the definition of the CO_2 classes for the tax deductibility in the corporate taxation was changed and the tax deductibility of the fuel costs was decreased from 100% to 75% (both for professional and for private mileage). - In January 2010 the calculation of the benefit in kind was based on the CO_2 emissions per km and car type (gasoline, diesel, electric) and no longer on the fiscal horsepower. A default value for private km (based on home-work distance) continued to be used. - In December 2011 the VAT system was changed: for cars bought after 1/1/2012 the VAT can be recuperated only by the percentage of professional use of the car with a maximum of 50%. For cars bought in 2011 one can choose to apply this new rule or to recuperate the VAT by 50% and pay VAT on the benefit in kind (old system). For older cars, the old system applies. - As from January 2012 the income in kind is based on the catalogue value of the car (including options and excluding rebates). This increases the tax base compared to the previous system. The income in kind also depends on the fuel type, the CO_2 emissions per km and the age of the car (decreasing with age); its value is no longer based on a (default) mileage for private purposes and is independent of the private mileage; employers must register a percentage of the benefit in kind on the company car as (additional) 'non-deductible expenses'. This taxable part is set at 17% of the benefit in kind.
	Netherlands

	Until 2006, the benefit in kind linked to the private use of a company car was subject to income taxation, but not to wage taxation. In concrete terms, this meant that the role of the employer was limited to notifying the tax authorities that he had provided an employee with a company car. Between 2001 and 2003, the taxable income in kind was proportional to the car usage, up to 25% of the catalogue price of the car. In 2004, a default benefit in kind corresponding to at least 22% of the catalogue price was introduced. Since 2006, these benefits are covered by the law on wage taxation, which implies that they are deducted at the source by the employer and thus directly affect monthly wage payments (see van Dorp 2011). As explained in Geilinkirchen et al. (2012) and Ecorys (2011), the provision of incentives for the purchase of fuel efficient cars has been introduced in steps. Moreover, the changes in the tax treatment of company cars are an integrated part of a broader change in car taxation: • In 2006, the registration tax (BPM) was modified: a tax rebate was introduced for "fuel efficient" cars and a surcharge for "fuel inefficient" cars. • In 2008, an additional surcharge was introduced for "very fuel inefficient" cars. Also, the concept of "very fuel efficient" cars was introduced (diesel cars with CO_2 emissions below 95 grams per km or other cars with CO_2 emissions below 110 grams per km). • By the end of 2008, the then government has decided to reform the registration tax and to make it entirely dependent on a car's CO_2 emissions. • Since 2010, the "very fuel efficient" cars are exempted from both the registration tax (BPM) and the annual circulation tax (MRB). • In 2008, the "bijtelling" (which is the subject of the current paper) was reduced from 22 to 14% for "very fuel efficient' cars. It was increased to 25% for the other categories. In 2009, a 20% rate was introduced for "fuel efficient" cars. Finally, since 2010, "zero emission" cars (electrical cars) are subject to a 0% "bijtelling". In May 2011, a study on tax incentives for fuel efficient cars was finalised on behalf of the Dutch government (Ecorys, 2011). Its main conclusion was that the increase in fuel efficiency observed in the last few years had come at a very high price in terms of decreased government revenues. The study suggested that tax incentives should only be provided for the most fuel efficient cars. This study was presented in June 2011 to the Dutch parliament in the so-called "Autobrief", and has resulted in a new law ("Wet uitwerking autobrief"). The new law does not only reform the rules for company car taxation, but also for the registration tax (BPM) and the annual circulation tax (MRB). Following the publication of the Autobrief, concerns were raised that the proposed new regime would make fuel efficient cars relatively less attractive (see Geilinkirchen et al. 2012) – these expected effects will be discussed in more detail below. From the point of view of "company car taxation", the most important clauses of this law are as follow. As from 1 July 2012, the CO_2 criteria for the reduced

	14% and 20% tax tariffs will become stricter. From then on, the differentiation between diesel and gasoline cars will gradually be reduced to disappear completely from 2015 on. At that moment the "bijtelling" will be 20% for all cars whose CO_2 emissions do not exceed the 110 grams per km, and 14% for those that do not exceed the 83 grams per km. Thus, the preferential rate for cars emitting between 110 and 140 grams of CO_2 per km will completely disappear. The preferential rate of 14% will only be applicable for very fuel efficient cars. The period during which the reduced "bijtelling" applies to an individual car will also be limited in time. In the future, the lower "bijtelling" for an individual car will be applied during the usual length of a leasing contract. At the end of this period, it will be verified whether the car can still enjoy the reduced rates that are applicable at that moment for the category the car belongs to. As a transitional measure, for passenger cars purchased in the period 2012-2015 with CO_2 emissions of 50 grams per km or less, the "bijtelling" will remain 0% for the period corresponding to a standard leasing contract. (website Rijksoverheid).
	United Kingdom The widespread use of company cars in the United Kingdom as an "in kind" source of income took off in the 1970s as a loophole around anti-inflation income policies. When companies realized that this also offered an opportunity for tax avoidance, the share of company cars kept on increasing even after the original rationale disappeared. The UK Treasury was aware of this issue, and tax rates were increased up to the point that, by 2000, the tax loophole all but vanished (Porter and Atchulo, 2012). As in most other countries, a cash equivalent value was added to an individual's income for tax purposes. By 2001, this was assessed at 35% of the car's new list price. The tax charge was reduced to 25%, however, if users drove more than 2,500 miles for business reasons and to 15% if they drove more than 18,000 miles for business purposes. There were also discounts for older cars. Note that commuting is considered private travel in the UK (Porter and Atchulo, 2012). This system was criticized because it provided incentives for purchasing high CO_2 emitting vehicles that were driven further in order to reduce the tax liability (Porter and Atchulo, 2012). In order to reduce the environmental impacts of transport, the UK government undertook a major overhaul of the taxation regime of cars, including the company car taxation system. "Environmental" in this context needs to be interpreted as "CO_2 emissions". Thus, in the 2002 reform, the new list price of a car was weighted by a factor that depends on a car's test CO_2 emissions. The discounts for high business mileage and most age-related discounts were abolished (Porter and Atchulo, 2012). Since the introduction of the system, the bands defining the percentage to be applied to the new list price have gradually been made more stringent. This provides an incentive for ever increasing fuel efficiency, and also reflects improvements in the fuel efficiency of new cars. Since 2010, electric cars are

	rated at 0% and ultra-low emission cars (75 g CO_2 or less) at 5% (Porter and Atchulo, 2012). Compared to the current situation (see above), the following changes have been announced (see website HM Revenue&Customs): - Between 2011 and 2014, the lower threshold for the 15% rate will decrease from 130/km to 115g/km. - The percentages applicable per band will also gradually decrease - The fuel multiplier will increase - Special rules for QUALECs (qualifying low emissions cars, those with CO_2 emissions not exceeding exactly 120 g/km) will be abolished. From 2015-16, the percentage for zero emission cars will revert to 9% and the special rules for cars with CO_2 emissions not exceeding exactly 75g/km will be abolished. The 3% diesel tax charge will be abolished from April 2016.
Objectives and design	
Subsidy rationale/objectives (original and evolving)	**Belgium** The main rationale lies in the high labour taxation in Belgium. The implicit labour tax rate in 2010 was estimated to be 42.5%, which is among the highest in the EU (Eurostat, 2012). This is the ratio between taxes and social contributions paid on earned income and the cost of labour. The company car tax system allows employers to pay a certain amount of income at a much lower cost than if they would pay it in direct wages. The system therefore partly compensates for the high taxes on labour. In recent years, the government has become more aware of the negative environmental impacts of the system, leading to a number of reforms aiming at a greener company car fleet (smaller and more fuel efficient cars). The latest reforms (2012) also seem to have been driven by revenue raising considerations and social corrections (taxation in function of the catalogue price).
	The Netherlands As we have already shown above, the favourable treatment of company cars results in an effective decrease in taxable income for a "typical" employee. Thus, the fundamental motivation for this favourable treatment is similar to what we have observed in Belgium. However, from 2006 on, the Dutch government has corrected some of the most blatant perverse incentives of this tax scheme. This correction has been successful in terms of environmental impact. As explained in the annexes ("Memorie van toelichting") of the "Wet uitwerking autobrief", between 2007 and 2010, the decrease in the average CO_2 emissions of newly sold cars in The Netherlands was more important than anticipated when the tax incentives were introduced (6.1% on a yearly basis). In 2011, 33% of newly sold cars in The Netherlands were in the category "very fuel efficient". The increase in sales of "very fuel efficient" *diesel* cars was even more pronounced, from close to zero in 2009, to 50% of all new diesel cars in the first

	semester of 2011. As a result the average CO_2 emissions of new cars in The Netherlands decreased from 164 grams per km in 2007 to 128 grams per km in the first semester of 2011. This means that The Netherlands were four years ahead of schedule for the achievement of the European 130 grams per km norm (Geilenkirchen et al. 2012). Although Ecorys (2011) have not quantified the changes in the average CO_2 emissions of new company cars, they point to a marked decrease in the sales of "large medium" and "large" cars in this market segment (from 100,058 in 2007 to 61,700 in 2010). The sales of "city/compact" cars and of "small medium" cars have decreased from 25,200 to 18,500 and from 42,300 to 39,700, respectively. Sales in the "mini/small" segment have increased from 7,700 to 10,400. As discussed above, these changes were the result of a policy mix, of which the rules for company car taxation were just a part. Therefore, it is difficult to isolate the effect of individual measures. The move to more fuel efficient cars may also have been reinforced by the economic crisis. As a side-effect of the changes in the composition of the new car sales, tax revenues decreased significantly: registration tax (BPM) revenues decreased from 3.6 billion EUR in 2007 to 2.1 billion EUR in 2010 (Geilenkirchen et al. 2012). According to Ecorys (2011), the differentiation of the "bijtelling" has had a limited effect in net sales of company cars, but has led to a significant 'downsizing' of company cars. They reckon that this differentiation has led to a decrease in the gross value of the "bijtelling" with 35 million EUR in 2009, and 75 million EUR in 2010. Ecorys (2011) therefore concluded that the increase in fuel efficiency had come at a very high price in terms of decreased government revenues. In the view of the authors, the proposed new scheme (which has been almost entirely been taken over in the new legislation) would still provide incentives for the purchase of fuel efficient cards, but would also lead to more stable tax revenues.
	United Kingdom When companies started using company cars as fringe benefits in the early 1970s, neither the Treasury nor the companies seemed to be aware that the company car taxation regime undervalued the private use of these cars. The primary motivation for companies to promote company cars at the time was to get around anti-inflation income policies. It was only gradually that the tax benefit became clear as well. By the mid-1980s, policy makers started realizing that the tax treatment of company cars was regressive in nature (i.e. favoured high income individuals) and provided perverse incentives in terms of fuel economy. By 2000, the tax advantage had to a large extent vanished through gradual increases on the tax rates (Porter and Atchulo, 2012). However, the system still provided incentives for purchasing fuel inefficient cars and for driving extra miles for business purposes. The reforms since 2000 only focused on the test cycle CO_2 emissions of the car, and on the mileage driven

	for business purposes. For cars with sufficiently low CO_2 emissions, the cash equivalent that is added to one's income is so low that the system effectively subsidizes them when used as company cars (Porter and Atchulo 2012).			
Does the subsidy fulfil its objectives?	**Belgium** It lowers the labour cost, as is shown by the high popularity of the system. The share of company cars in the passenger car fleet of 5.8 million vehicles was 15% in 2011 (DIV). In 1997 this share was approx. 10%. Of the company cars in 2011 approx. 50% were leased cars and 50% non-leased. According to Mossakowski (2011) approx. 300000 cars fall under the system of benefit in kind. However, there is some uncertainty about this number. The reform of January 2012 aims at greening the fleet of company cars, raising revenue and implementing social corrections. However, as this reform is still very recent, it is still too early to judge whether these objectives have been met. **The Netherlands** Gutiérrez-i-Puigarnau and Van Ommeren (2011) have shown that the system typically leads to a decrease in a company car's implicit price by 30%. They report that, in the Netherlands, 10% of employees have a company car, but that 80% of company cars in The Netherlands are not used for business purposes. These figures indicate that, for some categories of employees, company cars are an attractive benefit. As discussed before, the changes introduced since 2006 have led to a marked increase in the fuel efficiency of newly purchased cars. However, they do not affect the number of km actually driven, and this can compensate for the increased fuel efficiency. Recent reforms aim at stabilising tax revenues while still providing incentives for fuel efficiency. The expected effects of recent reforms are discussed in detail below.	**BE**	**NL**	**UK**

	The United Kingdom The reforms of the company car taxation regime need to be interpreted in the context of a general overhaul of the taxation regime that aimed at providing incentives for low carbon vehicles (see Committee on Climate Change (2008) and Fergusson (2012) for more elaborate discussions of this point). The objectives of the reforms since 2002 were thus mainly environmental in nature, and are discussed in more detail below.			
Is the rationale for the subsidy still valid?	**Belgium** Since the labour tax rate remains high, the rationale for the subsidy remains valid. **The Netherlands** Since the labour tax rate remains high (with an implicit labour tax rate of 36.9% in 2010 according to Eurostat), the main rationale for the subsidy has not changed. **United Kingdom** There is a clear rationale for promoting the purchase of more fuel efficient cars. However, it can be questioned whether the system that is applicable in the UK is optimal (see below "problems with subsidy design").	**BE**	**NL**	**UK**
Who is **responsible** for the subsidy?	**Belgium** The Belgian Federal Government determines the rules for the determination of the income in kind, the social security contribution levied on the income in kind and the corporate taxation. Company cars are also subject to other taxes such as the registration tax, the annual traffic tax, the fuel taxes, etc. The registration tax and the annual traffic tax are currently determined by the regions; the fuel tax rates are determined by the federal level. **The Netherlands** Registration taxes, circulation taxes and rules for the tax treatment of benefits in kind are all determined by the central government. **The United Kingdom** All relevant parameters are determined by the			

	central government.			
Are there any key problems with **subsidy design?**	**Belgium** The company car is not provided in a tax neutral way. Moreover, if account is taken of the absence of optimal road pricing that confronts the transport users with their external costs, the tax value should be higher than the net cost to the employer of providing a company car. The benefit in kind does not increase with a higher private mileage and therefore does not reflect the mileage related costs that are paid by the employer. If a free fuel card is provided, the marginal monetary cost to the employee of a private trip made by the company car is zero, which will encourage its use for private purposes. Since the tax treatment in the current system depends on the catalogue price, the emissions, the fuel type and the age of the car, it can be expected to affect the composition (in terms of these characteristics) of the company car stock. Moreover, since both the social contribution and the tax deductibility depend on the CO_2 emissions, employers are encouraged to increase the fuel efficiency of the cars. However, the green design of the tax system only takes into account the CO_2 emissions per km. Environmental costs related to air pollution and noise are only addressed indirectly by the fact that the tax depends on the age of the vehicle. **The Netherlands** Up to a limit corresponding to 25% of the catalogue price (or lower for fuel efficient cars), the benefit in kind does not increase with a higher private mileage. This implies that, as soon as the 500 km threshold has been exceeded, there is no incentive to reduce driving until the 25% limit has been reached. Since the tax treatment in the current system depends on the catalogue price, the CO_2	**BE**	**NL**	**UK**

	emissions, the fuel type and the age of the car, it can be expected to affect the composition (in terms of these characteristics) of the company car stock: employers are encouraged to increase the fuel efficiency of the cars they offer to their employees– this has been confirmed by the Ecorys (2011) study. However, the differentiation according to the expected CO_2 emissions per km is only indirectly linked to the total amount of CO_2 emissions: a fuel efficient car that drives a lot (because the unit cost of driving is low) may end up emitting more than an efficient car that does not drive a lot. The green design of the tax system only takes into account the CO_2 emissions per km. The environmental costs related to air pollution are affected only indirectly by the fact that different rates apply to diesel cars (but this differentiation will disappear with the new scheme that is about to enter into force). As argued by Gutiérrez-i-Puigarnau and Van Ommeren (2011), for a given set of technologies, a car's weight and size is largely proportional to its CO_2 emissions. As some external costs (congestion costs, parking space used, unit damages in case of accidents) depend on a car's weight and size, one could argue that the differentiation according to CO_2 emissions also indirectly affects these externalities. The link is indirect, though. Of course, it can be expected that this type of scheme leads to self-selection, in that it will only be provided to employees who expect to drive a lot of kilometers for non-professional purposes. As mentioned above ("Legal base and timeline"), until 2003, the taxable income in kind was proportional to car usage, and thus also to some externalities. It is not clear from the information we have identified why there was a move to a fixed (within limits) deduction, but one possible motivation may have been to simplify enforcement. **The United Kingdom** Since 2002, the bands determining the taxable			

	benefit were made dependent on the car's CO_2 emissions. Despite the existence of a diesel surcharge and special rates for unconventional fuels, the main effect has been a significant increase in the number of diesel cars being purchased (from 13% in 2000 to 26% in 2009) although these cars perform worse in terms of local pollution. However, it was expected that the creation of new bands for very low emissions cars would rectify this problem by making petrol-electric hybrids relatively more attractive (Porter and Atchulo, 2012). There are also concerns that drivers who favour large cars drop out of the company car system and claim allowances for the use of their own car, which partially compensates for the lower CO_2 emissions of new company cars (Porter and Atchulo, 2012). To our knowledge, this effect has not been quantified. Finally, because the cash benefit of free fuel is independent of the actual amounts of free fuel consumed, people have no incentive to reduce their mileage once this mileage has reached the threshold where it becomes fiscally attractive to opt for this scheme. The Committee on Climate Change (2012) is of the opinion that the announcement in the Budget 2012 that the company car tax exemption for zero and ultra-low emission vehicles would be withdrawn in 2015 will limit incentives for uptake in this key sector while raising very limited revenues. The Committee asks that this measure be reversed. It estimates that the removal of the company car tax exemption could increase the cost of electric vehicles by around £2,000 compared to conventional alternatives. The basic problem with the design of the system is that it does not satisfy the basic principle of economic policy that instruments should be targeted as closely as possible to the problem they address. The UK system provides incentives for reducing the CO_2 emissions of cars, and is very effective in doing so. However, actual CO_2 emissions do not only			

	depend on the test cycle emissions per kilometer, but also on the number of kilometers driven. Therefore, the preferred instrument to address the externality would be fuel taxation. Also, it is unknown to what extent the (to be abolished) diesel surcharge correctly reflects the worse performance of diesel in terms of local pollution.			
Does the subsidy represent an **infringement of existing EU legislation**?	**Belgium**: No **The Netherlands:** No **United Kingdom:** No	**BE**	**NL**	**UK**
Key social impacts				
Who are the **intended recipients / beneficiaries**?	In both **Belgium and the Netherlands** the main beneficiaries are the employers who make use of the system to compensate their employees; and the employees who receive a company car that may be used for private purposes, and their families. In the **United Kingdom** the main beneficiaries are the same as in Belgium and the Netherlands, but only to the extent that they buy fuel efficient cars. Indirectly, the subsidy also benefits the manufacturers of the cars in the lower bands.			
Does the subsidy reach them?	In all three case of **Belgium, the Netherlands and the UK** the subsidy reaches its target beneficiaries	**BE**	**NL**	**UK**
What are the **unintended social effects**, if any?	**Belgium** Benefits in kind such as company cars and fuel cards mostly benefit higher-income groups (HCF, 2009). Scrapping these subsidies would increase the progressivity of the tax system (OECD ,2011). **The Netherlands** The same consideration as in Belgium applies. To the best of our knowledge, this has not been quantified, though. **United Kingdom** The same consideration as in Belgium and the Netherlands applies. Copenhagen Economics (2010) estimates that the subsidy in the "large" car segment is less than 10% (expressed as percentage gap in the imputed tax base), and between 11 and 20% in the "medium" segment. It is only in the "small" segment that the subsidy exceeds the 30%. (which is what we would expect, taking into account that the subsidy depends on CO_2	**BE**	**NL**	**UK**

emissions). Thus, compared to Belgium and the Netherlands, the system is less regressive.

Key environmental impacts

Nature and degree of impacts on the environment

Belgium

The favourable treatment of company cars may affect emissions in the following ways (Gutiérrez-i-Puigarnau & Van Ommeren, 2011):

- it may have an impact on the type of car that is used for private mileage: if the company car is cleaner (dirtier) than the car one would have bought privately, then the emissions will be smaller (larger). Ideally, one should compare the environmental performance of the company car with that of the private car that the employee would have chosen in the absence of the favourable tax treatment. Unfortunately, this information is unavailable and we have to resort to fleet averages. Moreover, the data do not allow for making a distinction between company cars that fall under the benefit in kind system and other company cars. Keeping these caveats in mind, we present some data of the DIV ("Dienst inschrijving voertuigen") for 2011:

	Owner			
	Nat. person	**Legal person – leased car**	**Legal person – non-leased car**	**Total**
Size – share in car stock (%)				
Small	34	8	31	30
Medium	57	81	58	59
Large	9	11	11	11
Average CO_2 emission per km (g/km)				
Car stock	158	138	170	158
New cars	123	126	142	127
Share of diesel cars (%)				
Car stock	60	95	81	64
New cars	66	91	86	75

From this table it is clear that in 2011 the average company car was larger than the average private car. This was most pronounced for non-leased company cars.

The average CO_2 emissions per km in the car stock were 148 g/km for cars owned by natural

BE NL UK

	persons, 137 g/km for leased and 166 g/km for non-leased company cars. For new cars the average CO_2 emission in 2011 met the EU objective of 130 g/km. It fell from 147.7 g CO_2/km in 2008 to 127.3 gCO_2/km in 2011. Finally, Belgium is one of the countries with a high diesel share. The share is the highest for company cars and especially leased cars. Diesel cars perform better in terms of CO_2 emissions but worse in terms of traditional air pollution, although this drawback diminishes for the most recent cars. - it may have an impact on the number of car miles travelled for private purposes: if the tax treatment of company cars leads to a higher private car mileage, this will increase emissions; given the fact that the monetary cost per private km is zero or small, the system can be expected to have this impact. Unfortunately, no data are available for the magnitude of this impact. - it may have an impact on the number of cars owned: if the number of cars increases, this may lead to a higher private mileage and higher emissions. It may also affect land use because these cars all have to be parked somewhere, and this entails infrastructure costs, soil sealing, biodiversity loss, etc. - since the benefit in kind does not depend on the private mileage, the system may also provide an incentive to live further away from work, thereby affecting land use **The Netherlands** According to Graus and Worrell (2008), between 1995 and 2005, the number of company cars has increased from 548,000 to 771,531 – their share in the total car fleet had increased from 10% to 11% (with a peak of 11.7% in 2002). In 2002, 47% of company cars were diesel cars (compared to 10% of private cars) – all other things being equal, the "diesel" factor implies higher NO_X and PM emissions and lower CO_2 emissions for company cars. 90% of company cars were less than five years old– all other things being equal, the "age" factor implies lower emissions			

	for company cars. Company cars tended to be larger than private cars (as a result, a high share of company cars also lead to a large share of heavy cars on the second hand market) – all other things being equal, the "weight" factor implies higher emissions for company cars. Finally, the average mileage of company cars (31,348 km in 2001) was almost twice the mileage of private cars (16,435 km) – all other things being equal, the "mileage" factor implies higher emissions for company cars. Interestingly, the use of company cars for commuting (13,000 km) was larger than with private cars (5,500 km), but the private use was marginally smaller (8,500 km for company cars compared to 8,750 km for private cars). Graus and Worrell (2008) have then estimated that reducing the average commute of company cars to the average commute of private cars would lead to a reduced energy consumption of 16 PJ per annum (as compared to a saving of 4PJ per annum if the average size of company cars was reduced to the average size of private cars). They have not estimated the impact on actual emissions, though. Of course, this observation does not prove where the causal links lie. For instance, it may also be that company cars are used mostly by high income categories, who live farther from their workplace, independently of the availability of a company car. Also, as the authors acknowledge, this study was undertaken before the introduction of incentives for fuel efficient company cars in 2008. More recent work by Gutiérrez-i-Puigarnau and Van Ommeren (2011) addresses some of these points – see the "Belgium" case for a general discussion of their arguments. They have estimated that the welfare loss corresponding to the choice of more expensive cars ranges from 420 EUR to 600 EUR per year per car. The following points are particularly noteworthy: • As "commuting" is not considered "private use of the company car", some drivers do not pay any tax at all.			

	These drivers choose even more expensive cars. • Following the 2009 tax reforms, the tax was reduced for energy efficient cars (see above). Some households would have chosen a company car anyway from this set, even without reduced rates. Under the new rules, these households now chose a *larger* car within the set. Of course, some households have also demanded cheaper cars as a result of the changes. The net effect is an empirical issue, but the Ecorys (2011) study suggests that the environmental gains have come at a significant budgetary cost. • Gutiérrez-i-Puigarnau and Van Ommeren estimate that company cars are 18% larger in weight and size than private cars. They reckon that this implies that average parking costs are 405 EUR higher for company cars (even without accounting for numerous indirect effects), and that accident externalities will be 58 EUR higher (even without accounting for longer distances travelled). They have not quantified the increases in other externalities, though). The welfare loss corresponding to longer travel distance is about 180 EUR per company car – this includes 80 EUR in external costs (mainly congestion and accidents). Their results confirm that the main effect of company cars is that they lead to longer commutes, rather than to longer private travel. The total welfare loss for the Dutch economy is then estimated at 470 to 612 million EUR per year. In a companion paper, Van Ommeren and Gutiérrez-i-Puigarnau (2011) have also estimated how the reduced price of company cars leads to an increase in car ownership in two-adult households in The Netherlands. They estimate that the tax treatment of company cars induces a deadweight loss per company car of maximally 120 EUR due to			

	increased ownership. The annual welfare loss of distortionary company car taxation through increased household car ownership is about €70 million. However, allowing for productivity effects of company cars and the presence of other distortionary taxation, the estimated welfare loss is much more moderate (about 30 EUR per year). This is relatively small to the costs that have been identified in Gutiérrez-i-Puigarnau and Van Ommeren (2011). **United Kingdom** He and Bandivadekar (2011) have concluded from an international survey of fiscal policies associated with new passenger vehicle CO_2 emissions that "the United Kingdom's policy provides the strongest direct incentive for CO_2 reduction." Note that this conclusion applies to the entire existing package of policies (including the first year registration tax and annual vehicle ownership tax), not specifically to the company car taxation regime. Black (2008) also puts the approach used in the UK forward as a "best practice". In terms of CO_2 emissions, there is indeed a clear benefit. The assessment studies undertaken by the government (Inland Revenue, 2004 and HMRC, 2006) have concluded that, compared to a business-as-usual scenario, the company car reform has led to a decrease in CO_2 emissions of around 0.2-0.3 MtC for 2005. This annual decrease may reach 0.4-0.9 MtC by the end of this decade. There are several reasons for this. First; the withdrawal of the tax advantage of high business mileage has had a clear effect on the number of kilometres driven. Between 1997 and 2009, annual kilometres driven for business purposes by company cars decreased from 19,140 km per year to 10,610 km per year (Porter and Atchulo, 2012). Of course, this effect is partly offset by the increasing number of people claiming allowances for the use of their own car, but this indirect effect has not been quantified. Second, there has been a discernible impact on the CO_2 emissions of new company cars. In			

	2009/10, about 60% of company car drivers have cars emitting under 165g/km of CO_2. About 75% of company cars use diesel fuel with about 23% using petrol (HMRC, 2012). However, as pointed out above, the initial design of the bands provided mainly an incentive for purchasing diesel cars (despite the diesel surcharge and the specific treatment for unconventional fuels). The recent creation of new, lower CO_2 bands, together with the development of more competitively priced petrol-electric hybrids, has now made petrol-electric hybrids relatively more attractive *with the current incentive structure*. Despite pure battery cars being in the 0% band, range issues still limit their attractiveness as company cars (Porter and Atchulo, 2012; Fergusson, 2012). As already mentioned before, the announcement that the company car tax exemption for zero and ultra-low emission vehicles would be withdrawn in 2015 will limit incentives for further uptake in this sector.			
Policy filters	**Belgium** - Euro standards for car emissions - Recent reform of the car registration tax in the Flemish region depending on fuel type, Euro norm and CO_2 emissions per km **The Netherlands** - Euro standards for car emissions - Since 2006: gradual reform of all types of car taxation **United Kingdom** - Euro standards for car emissions - Since 2000: gradual reform of all types of car taxation	**BE**	**NL**	**UK**
Estimated size of the subsidy per year and who bears the cost	**Belgium** For 2008 Copenhagen Economics (2010) estimated the direct fiscal losses to be 1.2% of GDP or 4.1 billion euro compared to a situation with tax neutral treatment of company cars. However, in the meantime the tax system in Belgium has changed. The reforms have increased the tax base and give more incentives to increase the fuel efficiency of the cars (Eurostat, 2012). No recent estimates of	**BE**	**NL**	**UK**

	the foregone government revenues exist. Apart from this, the burden is also carried by the general public through the externalities induced by the system (see below). **The Netherlands** The burden is carried mainly by the national budget and by the general public through the externalities induced by the system (larger cars, more driving, more cars). We have no knowledge of a comprehensive estimate. However, the two recent papers by Van Ommeren and Gutiérrez-i-Puigarnau suggest that the total welfare cost for the Dutch economy lies somewhere between the 500 million and 1 billion EUR per year. Copenhagen Economics (2010) have estimated that the total fiscal loss in 2008 was 1.5 billion EUR (Table 3.6). Note that there is some overlap with the welfare costs estimated by Van Ommeren and Gutiérrez-i-Puigarnau: the welfare costs for instance include the cost of households choosing more expensive cars than they would in the absence of the favourable tax treatment. The other welfare costs are externalities, however, and are not included in the estimate of the budgetary impact. As regards the budgetary impact, we have shown above the reforms of the company car taxation generally go hand in hand with reforms of other aspects of car taxation, and that it is not possible to isolate individual effects. However, Ecorys (2011) have shown that the efforts to reduce the environmental impact of the taxation regime have led to significant decreases in tax revenues (see above). **United Kingdom** The budgetary impact of the reforms has been larger than anticipated. HMRC estimates that the budgetary losses amounted to around £40 million for 2002/3, £135 million for 2003/4, £145 million for 2004/5 and £120 million for 2005/06.			

	Several factors are reckoned to have played a role in this: the behavioural shift towards lower-emission cars but also a more general shift away from the company car (HMRC, 2006). In 2009/10, about 1.0 million car users received £3.7billion of taxable value in company car benefit and about 270,000 individuals received £0.8bn of taxable value in free car fuel benefit (HMRC, 2012). Copenhagen Economics (2010) estimate that, in 2008, the fiscal losses corresponded to 0.4% of the UK GDP, which puts the UK close to the average of the sample considered by Copenhagen Economics (2010). However, one has to keep in mind that this budgetary shortfall reflects the success of the policy in terms of providing incentives for reduced CO_2 emissions.			
What are the **unintended economic impacts** if any?	If the system leads to a higher private car mileage, it exacerbates not only the environmental costs of transport but also the congestion and accident costs. These are associated with substantial welfare losses. Related to this, De Borger and Wuyts (2011) show that the abolishment of the favourable tax treatment of company cars can be a second-best instrument for tackling congestion if congestion tolls are unavailable. Since the benefit in kind does not depend on private mileage, this may induce people to live further away from work. This will affect land use. The considerations above apply mainly to Belgium and The Netherlands. In the United Kingdom, the main unintended economic impact was the larger than expected shortfall in revenues. In order to compensate for this, the Government has gradually modified the percentages that are applicable.	**BE**	**NL**	**UK**
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**BE** **Yes**	**NL** **Poss.**	**UK** **Poss.**
What are the main	**Belgium**			

options for the reform of this subsidy?	- Introduce a tax neutral treatment of company cars that can also be used for private purposes. - Extend the environmental considerations of the tax rules to non-CO_2 related environmental impacts
	The Netherlands In theory, the same options as in Belgium apply. However, it should be kept in mind that the reform that is taking effect from July 2012 onwards, means a move away from the second option, while the first issue (the tax neutrality) has not been addressed. Indeed, as explained more in detail above, the differentiation between diesel and gasoline cars will be completely phased out by 2015. Therefore, the worse performance of diesel in terms of local air pollution will not be penalized. However, with new emission standards taking effect, it has been argued that this difference in environmental performance becomes relatively less important compared to CO_2 emissions.
	United Kingdom The main issue is that the current system provides only limited incentives (the diesel surcharge) for reducing local pollution, and that this incentive will disappear in the future. Also, the incentives for reducing CO_2 are only indirectly linked to actual CO_2 emissions.
What are the **main arguments for reform**?	In **Belgium and the Netherlands** the main arguments for reform are: - The elimination of the welfare losses that are related to the impact of the current system on the type of vehicle that is chosen, the private mileage, the number of cars and the choice of residential location (see above). - The potential for increasing tax revenues in times of budgetary austerity - Increasing the progressivity of the tax system In the **United Kingdom** the current system does not sufficiently take local pollutants into account, and is not directly linked to actual CO_2 emissions.
What are the **main barriers to reform?**	**Belgium** The current system generates important benefits to both employers and employees in light of the high labour taxation in Belgium. Abolishing the preferential treatment of company cars can therefore be expected to meet resistance. The reform of the system should probably be part of a more general reform that also encompasses labour taxation (and possibly road pricing). Such a reform is likely to be complex and subject to a long political and social process.
	The Netherlands The same arguments as in Belgium apply. Moreover, as the whole car taxation system has just been modified, it is unlikely that another reform would gather a lot of support.
	The United Kingdom The changes announced in the most recent budget are to a large extent motivated by budgetary concerns (although the Climate Commission (2012) doubts the magnitude of the impacts of the proposed reforms). As the UK Government has clearly committed itself to a policy of budgetary austerity, this factor is unlikely to change any time soon.
Is there a **window of opportunity** for subsidy removal or	**Belgium** Possible windows of opportunity could include the need for a budgetary balance of the government and recent discussions on shifting taxation in Belgium from

reform?	taxation on labour to taxation on pollution and energy consumption
	The Netherlands There are currently no windows of opportunity for further reform of this subsidy because the car taxation system has recently been revised as described above.
	United Kingdom No, as noted above, the UK Government has clearly committed itself to a policy of budgetary austerity and this factor is unlikely to change any time soon.
Insights from EHS that have been (or are in the process of being) **reformed or phased out**	**Belgium** The regime that is currently in place, applies only since January 2012. The main reforms with respect to the previous system are as follows: - the income in kind is based on the catalogue value of the car (including options and excluding rebates). This increases the tax base compared to the previous system. The income in kind also depends on the fuel type, the CO_2 emissions per km and the age of the car (decreasing with age); its value is no longer based on a (default) mileage for private purposes and is independent of the private mileage; - employers must register a percentage of the benefit in kind on the company car as (additional) 'non-deductible expenses'. This taxable part is set at 17% of the benefit in kind. Apart from environmental considerations, revenue raising considerations and social corrections seem to have played a role in this reform.
	The Netherlands As described above, the Dutch system for company car taxation has been modified; the modified law (de "Wet uitwerking autobrief") is currently entering into force. The main expected effects are described in the annexes ("Memorie van toelichting") of the "Wet uitwerking autobrief": • The changes in the rules for company car taxation are part of a broader reform of passenger car taxation. It is expected that the specific effects of the company car taxation reform will be budgetary neutral in the long run. However, due to the temporary extensions of the zero tariffs for cars with CO_2 emissions below 50 grams per km, revenues will decrease by a few dozen million EUR per year in the transition period 2012-2015 (see Table 7 in the annexes). • The Ecorys study therefore suggested that tax incentives should only be provided for the most fuel efficient cars. • It was expected that, with existing policy measures, CO2 emissions in 2015 would be 0.22 Mton lower than in 2010. The Netherlands Environmental Assessment Agency ("Planbureau voor de Leefomgeving") was charged with a rigorous assessment of the environmental impact of the proposed law, but this was not available at the time the law was voted. A back-of-the-envelope calculation in the Annexes suggests that the average emissions CO_2 of newly sold cars in 2015 would be 114 grams per km under the new law, rather than 111 grams per km with existing measures. Compared to the baseline, this would mean an annual increase with 0.02 Mton CO_2 on an annual basis by 2015. Geilinkirchen et al. (2012) have recently summarized the expected effects of the new policy mix as follows:

	• The proposed changes will lead to a slightly heavier and less fuel efficient fleet. Indeed, sales of heavy cars are expected to increase, and sales of fuel efficient cars are expected to decrease. The net expected effect is a small decrease in new sales and car use. The Environmental Assessment Agency expects that by 2020, total CO_2 emissions will be 0.1 to 0.2 Mton higher than in the "business as usual" scenario (this is, without the measures in the "Wet uitwerking autobrief"). • However, even after the most recent policy changes, the net environmental effect of the measures that were introduced in 2006 is still positive compared to the "business as usual" scenario in 2006 (this is, without the incentives that were introduced from 2006 on). It has been estimated that the cumulative effect of the measures that were taken since 2006 corresponds to a 0.5 to 0.7 Mton decrease in CO2 emissions in 2020 compared to a "before 2006 measures business as usual scenario"). • The changes in the annual circulation tax (MRB) would favour gasoline cars at the expense of diesel cars, while the changes in the sales tax (BPM) would favour diesel cars. The expected net effect is an increase in the number of diesel cars. The expected NO_x emissions in 2020 will therefore be 0.2 to 0.3 kton higher than in the "business as usual" scenario, while the emissions of PM10 and PM2.5 will slightly decrease. • An important caveat is that the Dutch policy is based on the CO_2 emissions as measured in the European test cycle for type approval, which are reportedly lower than emissions in real traffic. The specific effect of the changes in the "Bijtelling" have not been estimated, though.
	United Kingdom In the last decade, the United Kingdom has overhauled its system of car taxation in order to provide incentives for buying cars with lower CO_2 emissions – the changes in the company car taxation regime are part of this broader picture. The changes have been effective in terms of their stated objective, but have had marked budgetary implications. Moreover, they have led to undesirable side-effects in terms of local pollution. The precise extent of these side-effects has not been quantified. The policy has also partly been offset by an increase in the number of people using private cars for business purposes. Budgetary austerity has recently led to some changes in the system which will reduce incentives for purchasing very low emission cars, and will further increase incentives for buying diesel cars.
References	**Company car tax rules:** **Belgium, FOD Financiën** - Fiscaal Memento 2012 http://docufin.fgov.be/intersalgnl/thema/publicaties/memento/pdf/FM2012_V01_volledig.pdf - Nieuwe berekeningsregels en faq voordeel van alle aard dat voortvloeit uit het persoonlijk gebruik van een door de werkgever kosteloos ter beschikking gesteld voertuig http://www.minfin.fgov.be/portail2/nl/themes/advantages/company-car-benefit.htm - Beslissing BTW nr. ET 119.650/2 dd. 23.12.2011.

	http://ccff02.minfin.fgov.be/KMWeb/document.do?method=view&id=3a355d85-1953-446e-8f1b-99c5899480f8#findHighlighted - http://www.minfin.fgov.be/portail2/nl/current/spokesperson-11-12-23-04.htm **Netherlands** http://www.rijksoverheid.nl/onderwerpen/autobelastingen http://www.rijksoverheid.nl/onderwerpen/autobelastingen/auto-van-de-zaak http://www.belastingdienst.nl/wps/wcm/connect/bldcontentnl/belastingdienst/prive/auto_en_vervoer/u_reist_naar_uw_werk/auto_van_uw_werkgever/ Kamerstukken II 2010/11, 32 800, nr 1 ("autobrief"). Wijziging van de Wet op de belasting van personenauto's en motorrijwielen 1992, de Wet op de motorrijtuigenbelasting 1994 en enige andere wetten ("Wet uitwerking autobrief") **United Kingdom** http://www.hmrc.gov.uk/calcs/cars.htm http://www.hmrc.gov.uk/cars/rule-changes.htm HM Revenues & Customs, 480(2012). Expenses and benefits A tax guide **Other references** Black (2008), Fringe benefits and the company car Aligning the tax with environmental policy. University of Sidney. Sydney Law School. Legal Studies Research Paper No. 08/60. Committee on Climate Change (2008), Building a low-carbon economy - the UK's contribution to tackling climate change. Chapter 7: Reducing domestic transport emissions. Committee on Climate Change (2012), Annual Progress Report. Chapter 5: Progress reducing transport emissions. Copenhagen Economics (2010), Company Car Taxation, European Commission, DG Taxation and Customs Union, Taxation Papers. De Borger, B. and B. Wuyts (2011), The tax treatment of company cars, commuting and optimal congestion taxes, Transportation Research B 45, 1527-1544. Ecorys (2011) Fiscale stimulering (zeer) zuinige auto's. Onderzoek aanpassing zuinigheids-grenzen Eurostat (2012), Taxation Trends in the European Union, Data for EU Member States, Iceland and Norway, 2012 Edition, Eurostat Statistical Book, European Union. Fergusson, M. (2012), A Feebate Scheme for the UK. Arguments in Favour and Suggestions for Scheme Design. Paper commissioned by the Campaign for Better Transport. Geilenkirchen G, van Meerkerk J, Hoen A, Doet het kabinet de zuinige auto in de ban? Milieu 2012(1), pp 56-59 Graus, W. and E. Worell (2008), The principal-agent problem and transport energy use: Case study of company lease cars in The Netherlands, Energy Policy 36 (2008) 3745-3753. Gutiérrez-i-Puigarnau, E. and J. Van Ommeren (2011), Welfare Effects of Distortionary Fringe Benefits Taxation: The Case of Employer-Provided Cars, International Economic Review 52(4), 1105-1122.

	HCF (Hoge Raad voor Financiën) (2009), Het belastingbeleid en het leefmilieu, Hoge Raad voor Financiën, D/2009/11.691/8, Brussel. HMRC (2006), Report on the Evaluation of the Company Car Tax Reform Stage 2 HMRC (2012), Benefits in kinds statistics. Hé, H. and A. Bandivadekar (2011), Review and comparative analysis of fiscal policies associated with new passenger vehicle CO_2 emissions. Inland revenue (2004), Report on the evaluation of the company car tax reform. KPMG (2012), "Studierapport Company Vehicles, Een vlag die vele ladingen dekt", study financed by FEBIAC, RENTA and FEDERAUTO, 6 June 2012. Mossakowski, M. (2011), Is Taxation of Company Cars in Belgium Environmentally Harmful?, presentation at the workshop "Is the tax treatment of company cars environmentally harmful in the European Union?", Brussels, 28 February 2011. OECD (2011), OECD Economic Surveys, Belgium 2011, OECD, Paris. Potter, S. and A. Abukari (2012), The role of company car taxation to promote low carbon vehicle technologies. In: Universities' Transport Studies Group Annual Conference, 4-6 January 2012, Aberdeen. SEAT, Guide to company car tax. 2012/13 Van Dorp, R. (2011), De regeling van de 'Auto van de zaak'. Total loss of toe aan een kleine beurt? Master thesis. Erasmus Universiteit Rotterdam. Van Ommeren J. and E. Gutiérrez-i-Puigarnau (2011), Distortionary Company Car Taxation: Deadweight Losses through Increased Car Onwership, Tinbergen Institute Discussion Papers, 11-100/3. Wuyts, B. (2009), Essays on Congestion, Transport Taxes and the Labour Market, PhD thesis, University of Antwerp.

7.4 Car fleet renewal schemes in Germany

EHS Description		
Brief description of subsidy	Car fleet renewal scheme ('Umweltprämie'): The subsidy was introduced in Germany in 2009 in a time of economic downturn. To prevent damage to German car manufacturers, the incentive to buy new cars was enhanced. Owners of cars older than nine years were granted EUR 2,500 in government support to buy a new car, the old car had to be verifiably scrapped.	
Economic type	Direct transfer of funds	
Sector	Transport	
Member State	DE	
Other Member State(s) where the subsidy exists	BE-Wa, FR	
Nature and unit size of subsidy	Owners of old cars (at least nine years old) can get a government grant of EUR 2,500 to buy a new, supposedly environmental friendlier car. The subsidy was limited to a certain amount that was doubled to EUR 5,000 million in the course of the events but lasted only about nine months before it was used up.	
Legal basis and timeline	"Richtlinie zur Förderung des Absatzes von Personenkraftwagen" (directive to enhance sales of passenger	

	cars) from 20 February 2009. The Directive was reviewed twice (17 March 2009 and 26 June 2009). The reviews were meant to prevent fraud and simplify the application process – they did not focus on nor yield any environmental improvement.	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	Preventing damage from economic downturn for German car manufacturers; decreasing CO_2 and other emissions from car use.	
Does the subsidy fulfil its objectives?	Partially: The subsidy did increase the demand for new cars while it was in place. However as the automobile market is global, more than half of the subsidy went to foreign car manufactures, e.g. Skoda, Fiat and Toyota. (BAFA 2010, p. 16). The subsidy did decrease the fuel consumption and CO_2 emission of the renewed car fleet (see section on environmental impacts).	
Is the rationale for the subsidy still valid?	No	
Who is **responsible** for the subsidy?	German federal government	
Are there any key problems with **subsidy design?**	Old cars needed to be scrapped and a scrapping certification needed to be provided to authorities in order to get the financial support. That reduced the potential for re-use of old cars (see section on environmental impacts). The directive dictated Euro 4 standard for new cars, but this was a common standard anyway and already out-dated	
Does the subsidy represent an **infringement of existing EU legislation**?	No infringement of existing EU legislation identified.	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	National Automobile industry (including manufacturers, dealers and related businesses) and owners of cars older than nine years.	
Does the subsidy reach them?	Yes – car sales went up by about a quarter compared to the average number of sales during a similar time frame. In the first seven months of 2009 there were 2.4 million car sales, about 450,000 or 27% more than average. (Ifeu 2009, p. 5)	
What are the **unintended social effects**, if any?	The 'Umweltprämie' only applies when buying a new car. Therefore, people who cannot afford to do so do not benefit from the subsidy and potentially might even suffer from money that is not spent on social benefits because of the 'Umweltprämie'.	
Key environmental impacts		
Nature and degree of impacts on the environment	The subsidy had a negative impact on the environment as many cars were replaced and scrapped earlier than they would have been without the subsidy. The necessary proof of scrapping reduced the amount of re-usable cars in favour of scrapping and recycling of car parts, which caused an increase in resource	

	use and detracted from top levels of the waste hierarchy (notably prevention and re-use) ; The subsidy did however decrease the fuel consumption, CO_2 emissions and other pollutant emissions of the renewed car fleet. The average CO_2-emission of the old cars was 200g/km, while it was 142g/km for new cars (Ifeu 2009, p. 8f). This however had little effect on the car fleet as a whole.	
Policy filters	None (The directive dictated Euro 4 standard for new cars, but this was a common standard anyway and already out-dated)	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	The German government granted EUR 5,000 million from the national budget (the "Konjukturpaket II") for 1,933,090 discarded and newly bought cars. The "Konjukturpaket II" was financed by an increase in the national debt by EUR 36,800 million.	
What are the **unintended economic impacts** if any?	- Possible threat to used-car dealers – potential customers buy a subsidised new car and there is a reduced supply of used cars - Increase in national debt and interest rates	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**No**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	Establishing criteria for environmental improvements in new cars compared to old ones, like decreased CO_2 and NO_X emissions.	
Opportunities for EHS reform		
What are the **main arguments for reform**?	The directive allows trading in a small car for a new bigger, heavier car, even if the new one produces similar or even higher emissions.	
What are the **main barriers to reform?**	Main purpose was economic not environmental driven by the a strong automobile lobby.	
Is there a **window of opportunity** for subsidy removal or reform?	The subsidy was meant to be temporary and could be designed differently next time.	
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8 WASTE

8.1 Reduced environmental charge rate for waste incineration in Flanders, Belgium

EHS Description		
Brief description of subsidy	The environmental charge rate for waste incineration is lower than for landfilling.	
Economic type	Foregone government revenues (tax reduction)	
Sector	Waste	
Member State(s)	Belgium	
Other Member States where the subsidy exists	In 2008, the following MS had taxes on landfilling with a rate higher than the tax rate on waste incineration (in most cases: no tax on incineration at all, or a zero rate): NL, AT, DK, UK, IT, IE, ES (Catalan region), FR, EE, PL, LV. Only BE (Walloon region) and SE had a tax on incineration with a rate equal to or higher than the tax on landfilling. The other MS had no tax on landfilling or incineration at all.	
Nature and unit size of subsidy	The charge rate for waste incineration is EUR 7.93 per tonne (in 2012). For landfilling the general rate (for combustible waste) is EUR 84.89 per tonne (in 2012). The subsidy therefore amounts to almost EUR 77 per tonne of combustible waste, assuming that the difference in charge rates can be seen as an implicit subsidy for incineration. This estimate does not take into account the difference in external costs between landfilling and incineration (which may be quite small; see below).	
Legal basis and timeline	Decree of 2 July 1981 concerning the prevention and management of waste, articles 47-48. The structure of the charge has been changed several times, and the rates are increased annually so as to keep abreast of inflation. There are no plans to terminate the charge rate differentiation. In a new Decree (concerning the sustainable management of material cycles and waste streams, adopted by the Flemish Parliament in December 2011), the subsidy (i.e. the difference in charge rates) will become a bit smaller (charge rate for landfilling EUR 70 per tonne; for incineration EUR 7 per tonne).	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	The subsidy is related to the Flemish government's preference ranking in waste management (based on the 'Lansink ladder'), in which incineration is preferred to landfilling (Bachus *et al.*, 2004, p. 124). The subsidy (i.e. the difference in charge rates between landfilling and incineration) is therefore primarily intended to bridge the gap between the cost of the two waste management options, so as to make incineration competitive with landfilling.	
Does the subsidy	The subsidy has been successful in the sense that it has made	

fulfil its objectives?	landfilling municipal waste a more expensive option than incineration (Bachus *et al.*, 2004, p. 136). Between 2000 and 2010 the amount of municipal waste in Flanders that was incinerated increased from 784 to 875 kilotonnes, whereas the amount landfilled decreased from 423 to 117 kilotonnes (MIRA, 2011). However, this cannot be ascribed solely to the subsidy, since many other factors were at work simultaneously.	
Is the rationale for subsidy still valid?	It is still valid if one accepts the priority ranking for waste management (incineration preferred to landfilling). However, this priority ranking may itself be questionable. For example, Dijkgraaf (2004) argues that (even in a densely populated country such as the Netherlands) the social costs of incineration exceed those of landfilling. Bartelings *et al.* (2005) arrive at a similar conclusion: point estimates for external costs of landfilling of EUR 10 per tonne and for incineration EUR 18 per tonne (but with broad uncertainty ranges: EUR 7 - EUR 79 for landfilling; EUR 12 - EUR 25 for incineration). The subsidy can also be seen as superfluous, since the Flemish Regulations on Waste Prevention and Management (VLAREA, article 5.4.2) contain a general prohibition to landfill combustible municipal waste. Exemptions from this prohibition are possible, however. Perhaps the charge rate difference could still act as a disincentive to apply for such an exemption.	
Who is **responsible** for the subsidy?	The Flemish regional government has the power to determine the charge rates.	
Are there any key problems with **subsidy design?**	The subsidy has been in place for a long time and lacks an in-built review process.	
Does the subsidy represent an **infringement of existing EU legislation**?	This seems unlikely (unless one would see it as a kind of unjustified state aid)	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	Incineration plant operators	
Does the subsidy reach them?	Yes	
What are the **unintended social effects**, if any?	Pollution and dis-amenities mentioned under 'environmental' impacts below.	
Key environmental impacts		
Nature and degree of impacts on the environment	The impacts on the environment depend on the assumptions regarding the baseline/counterfactual/reference situation. It is assumed here that the subsidy does not divert waste from landfilling to incineration (since there is a general ban on landfilling, albeit with exemptions). However, it reduces the incentives for waste prevention and recycling, implying that some	

	of the associated environmental benefits (e.g. resource saving) are foregone. The subsidy also increases the environmental impacts related to incineration (several kinds of emissions to air and discharges to water with potential impact on human health and nature; dis-amenities for the population living close to the incineration plant).	
Policy filters	There are several policy filters in place that reduce the environmental impact of the subsidy, e.g.: • emission limits in accordance with the EU Waste Incineration Directive; • a ban on the incineration of separately collected, recyclable waste and un-separated waste (VLAREM article 5.4.2); • several policy instruments intended to promote waste prevention and recycling.	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	In 2010, 875 ktonnes of municipal waste were incinerated in Flanders. The size of the subsidy can therefore be roughly estimated at EUR 67 million per year. The costs are borne by the taxpayer (assuming that other taxes could be decreased if the charge rate for waste incineration were increased to the level of landfilling).	
What are the **unintended economic impacts** if any?	The subsidy encourages the construction of new waste incineration plants. Since these plants have a long lifetime and high capital costs, this creates a technology 'lock-in' situation in which waste incineration will remain the preferred option for quite some time: the operators will have strong economic incentives to keep the plants running at full capacity as long as possible. This may reduce the market opportunities for other options such as advanced recycling technologies	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform? [There may be disagreement on the question if this is really an EHS, depending on how one values the external cost of waste incineration and landfilling.]		**Maybe**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	Reforming the subsidy in accordance with 'Pigovian' principles would mean that the taxes on landfilling and incineration would reflect the external cost of either option. This would actually mean a small increase in the rate for incineration, together with a substantial *decrease* in the rate for landfilling (see the estimates of external costs mentioned above).	
Opportunities for EHS reform		
What are the **main arguments for reform**?	• non-level playing field between landfilling and incineration overcapacity in incineration	
What are the **main barriers to reform?**	• incineration generally seen as preferable to landfilling • strong interests and lobby	
Is there a **window of**	Probably not	

opportunity for subsidy removal or reform?	
Insights on past or existing reform	
Insights from EHS that have been (or are in the process of being) **reformed or phased out**	A similar subsidy was recently 'reformed' in the Netherlands. There, a waste tax existed since 1995, with a high rate for landfilling (EUR 103 per tonne in 2011) and a zero rate for incineration. As of 1 January 2012, this tax was abolished, implying that the subsidy for incineration also does not exist anymore (clearly, there is still a subsidy for both options in the sense that their external effects are not taxed).
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8.2 Incomplete producer responsibility for WEEE in Slovenia

EHS Description		
Brief description of subsidy	Producers of WEEE are exempt from: a) individually financing collection of WEEE put on the market after 13 August 2005 (new WEEE), and b) providing a financial guarantee showing that management of all WEEE will be financed. This incomplete producer responsibility means that a considerable part of the costs (financial and environmental) of managing WEEE are shifted from consumers and producers to taxpayers and local authorities. (Ecologic and IEEP 2009, Oekopol et al. 2007, van Rossem et al. 2006) Therefore, the incomplete internalisation of external costs conveys an implicit income transfer to producers.	
Economic type	Off budget, Lack of full cost pricing (incomplete internalisation of external costs)	
Sector	Waste	
Member State	Slovenia	
Other Member State(s) where the subsidy exists	According to Oekopol et a. 2007, incomplete producer responsibility in terms of exempting producers from individually financing management of new WEEE also applies in Bulgaria, Denmark, Finland, France, Greece, Latvia and UK.	
Nature and unit size of subsidy	a) In 2008, between EUR 173,000 and EUR 531,000 (or EUR 350,000 on average) was paid by municipalities instead of by the producers due to incomplete producer responsibility for WEEE management (Oekopol et al. 2007) b) Based on fees charged in Germany per guarantee (EUR 1,320 per guarantee per producer), Oekopol et al. (2007)	

	calculated that establishing individual financial guarantees to be held by producers could lead to annual costs for producers between EUR 0.65 and 3.25 billion (EUR 1.97 billion on average) in individual Member States.	
Legal basis and timeline	Article 8 of the WEEE Directive (2002/96/EC) obliges producers to a) individually finance the management (at least the collection, treatment, recovery and disposal of WEEE deposited at collection facilities from households) of new WEEE (put on the market after 13 August 2005) and collectively finance the management of historical WEEE (put on the market before 13 August 2005), b) provides a financial guarantee showing that management of all WEEE will be financed (the guarantee may be participation in appropriate management financing schemes, a recycling insurance or a blocked bank account). However, according to clauses 7 and 8 of the Decree on treatment of waste electrical and electronic equipment (Official Gazette of the Republic of Slovenia No 107/06), which transposes the WEEE Directive in Slovenia and entered into force on 01 November 2006: a) producers must only **collectively finance management of all WEEE**. b) Furthermore, **municipalities and retailers**, not only producers, are **obliged to set up and finance the collection of WEEE from households,** thus paying for most of the costs concerning WEEE-collection even though the producer is legally obliged to do so. c) Producers which are members of a collective compliance scheme do not need to provide any form of **financial guarantee** for WEEE management. Thus, a considerable part of the costs of managing WEEE are borne by general taxpayers and environmental costs associated with WEEE are not internalised as they are shifted from consumers and producers to taxpayers and local authorities. (Ecologic and IEEP 2009, Oekopol et al. 2007, van Rossem et al. 2006)	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	This is an implicit subsidy resulting from the incomplete transposition of the provisions of the WEEE Directive on extended producer responsibility. However, it is difficult to fathom whether or not the rationale/objective of this implicit subsidy is to protect and foster the electronic and electrical equipment sector. The rather low economic importance of the sector provides an argument against this notion. According to Oekopol et al. (2007) there are 665 registered producers of WEEE in Slovenia and both arisings (approximately 26,000 tonnes of WEEE in 2006, expected to rise to more than 50,000 tonnes annually by 2020) and total market share of WEEE in the Slovenian economy is not considered very significant (see also UNU et al. 2007). Furthermore, if the full costs for WEEE management were shifted according to extended producer responsibility from municipalities to producers, this would amount	

	to approximately EUR 350,000 annually to be paid by producers. Establishing individual producer financial guarantees could amount to EUR 0.65 to 3.25 billion, which if split among the 665 registered producers would mean EUR 5,000 in the worst case. Therefore, assuming cost savings for the EEE-industry does not appear justified as a rationale for this subsidy.	
Does the subsidy fulfil its objectives?	The implicit subsidy fulfils its objectives in terms of exempting producers from their individual financial responsibility for management of new WEEE.	
Is the rationale for the subsidy still valid?	Available data does not suggest growth nor decline in the EEE sector in Slovenia, thus it is difficult to assess whether the potential rationale of protecting and fostering the sector is still valid.	
Who is **responsible** for the subsidy?	Government of Slovenia, Ministry of Environment, Energy and Spatial Planning, through transposing the WEEE Directive	
Are there any key problems with **subsidy design?**	The incomplete producer responsibility results from a partially faulty transposition of the WEEE Directive (which does not provide individual producer financial responsibility for new WEEE nor individual financial guarantee for WEEE management). This incomplete / incorrect transposition may become subject to an inquiry by the European Commission	
Does the subsidy represent an **infringement of existing EU legislation**?	Whether or not the Slovenian transposition of the WEEE Directive is considered an infringement and might become subject to infringement procedures by the Commission remains to be seen. According to available literature as of May 2012, the Commission has not yet taken any action in this regard.	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	The incomplete producer responsibility benefits producers of WEEE and transfers the financial burden of WEEE management onto municipalities and thus taxpayers.	
Does the subsidy reach them?	Yes, because according to Oekopol et al. 2007 incomplete producer responsibility saves producers on average EUR 350,000 annually for individually financing management of new WEEE and EUR 1.97 billion for establishing individual producer financial guarantees.	
What are the **unintended social effects**, if any?	The general tax payer is paying for the majority of WEEE management instead of producers (Oekopol et al. 2007).	
Key environmental impacts		
Nature and degree of impacts on the environment	The per capita generation of WEEE amounts to 4 kg/capita (Buday-Malik 2009).) In Slovenia more than 17,500 tonnes of electronic and electrical products were put on the market in 2008. From these, 3,660 tonnes were collected of which more than 2,000 tonnes were treated in Slovenia and more than 700 tonnes were treated in another EU Member State (Eurostat 2011).Recycling rates for WEEE are not published. Incomplete producer responsibility reduces producers' incentives to appropriately design electrical and electronic equipment (EEE) in order to increase recyclability and hence may lead to reduced recycling rates (Oekopol et al. 2007). Therefore, the amount of substances in EEE as well as their composition likely differs from what could otherwise have been possible.	

	Since many of the substance used in EEE are either valuable minerals (e.g. gold, copper, rare earths) or must be considered environmentally hazardous (e.g. mercury, arsenic, polychlorinated biphenyls, but also SO_2 and CO_2 emissions) this reduced recycling could potentially lead to greater pressure on the environment arising from greater extraction of virgin resources or greater disposal of hazardous substances containing WEEE and potential subsequent leaking of contaminants. (UNEP 2009) than may otherwise have occurred. According to UNEP (2009), "production of 1 kg aluminium by recycling uses only 1/10 or less of the energy required for primary production, and prevents the creation of 1.3 kg of bauxite residue, 2 kg of CO2 emissions and 0.011 kg of SO2" (UNEP 2009, pp10). In addition, lower recyclability design may encourage the (legal and illegal) export of WEEE to other countries for treatment. A 2011 UNEP report shows that some African countries import substantial volumes of WEEE (e.g. Nigeria 1,200,000 tonnes per year) and recycle them through practices which are environmentally harmful and have negative impacts on health practices, such as open-burning of materials to recover metals and open-dumping of residual fractions without sufficient protective devices (UNEP 2011).	
Policy filters	No policy filters could be identified/are known	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	a) Incomplete financial producer responsibility for WEEE management amounts to a range of EUR 173,000 to 531,000 (or EUR 350,000 on average) annually paid by municipalities instead of by the producers (Oekopol et al. 2007) b) Based on fees charged in Germany per guarantee (EUR 1,320 per guarantee per producer), Oekopol et al. (2007) calculated that establishing individual financial guarantees to be held by producers could lead to annual costs for the producers between EUR 0.65 and 3.25 billion (EUR 1.97 billion on average) in individual Member States. These payments will then be used, inter alia, to cover the administrative costs of the authorities for monitoring compliance with the financial guarantees Municipalities and hence the general taxpayer largely bear the costs.	
What are the **unintended economic impacts** if any?	The exemption of producers from bearing costs for most WEEE management creates a distortion of competition within the EU's internal market as producers in Slovenia are not obliged to individually finance WEEE management. This may act as a disincentive to innovation (e.g. in terms of improving the recyclability of products) and a barrier to companies in Slovenia to set up individual schemes (Oekopol et al. 2007). Experience from other countries where multiple competing compliance schemes are in place shows that costs for WEEE management have been driven down through competition between the different schemes. In Slovenia, only three compliance schemes are in place (Oekopol et al. 2007). Fewer competing schemes	

	therefore reduce competition and economic opportunities for companies to create competitiveness gains through individual schemes or for new companies to enter the market. (Arcadis Ecolas and RPA 2008)	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Yes**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	In comparison to other EU Member States having transposed the WEEE well in regards to complete producer responsibility (e.g. Belgium, Czech Republic and The Netherlands), Slovenia is lagging behind and should therefore improve its performance. In this regard, the Commission could request Slovenia to revise its transposition of the WEEE Directive to reflect the true principle of producer responsibility.	
Opportunities for EHS reform		
What are the **main arguments for reform**?	Create incentives for producers of EEE to improve recyclability of EEE in order to help save virgin materials and prevent environmental harm arising from the disposal of WEEE through recycling practices which are environmentally harmful or have negative impacts on health in developing countries; Remove distortion of competition within the EU's internal market by ensuring EU-wide complete producer responsibility for WEEE management and its financing. Cost savings for municipalities and retailers by transferring cost of WEEE collection to producers	
What are the **main barriers to reform?**	Though no explicit barriers to reform could be identified from the literature, potential barriers may result from producers' resistance to take over WEEE management costs from the municipalities and hence potentially exercising political influence / lobbying. However, as outlined above, the EEE industry does not appear to play an important role in the Slovenian economy, thus its lobbying power may be limited.	
Is there a **window of opportunity** for subsidy removal or reform?	Though there appears to be no explicit window of opportunity, in particular the high financial burden put on municipalities and thus the general tax payer to pay both for management of new WEEE and for monitoring compliance with guarantees could lead to building up pressure from authorities on the government to revise these sections of the transposing Decree.	
References	Arcadis Ecolas and RPA (2008) 'Study on RoHS and WEEE Directives' N° 30-CE-0095296/00-09 Final report. Study for European Commission DG Enterprise and industry. URL http://ec.europa.eu/environment/waste/weee/pdf/rpa_study.pdf Buday-Malik, A. (2009) 'Cooperation-Coordination-Communication: Opportunities to a more sustainable WEEE management in Central and Eastern Europe', In: Greener Management International, Winter 2009, Edited by Maria Csutora, ISSN 0966-9671, 2009.) URL http://www.norria.hu/files/647/OPPORTUNITIES_FOR_MORE_SUSTAINABLE_WEEE_MANAGEMENT_B-M.A_NORRIA.pdf Ecologic and IEEP (2009) 'A Report on the Implementation of Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE)' URL	

	http://ec.europa.eu/environment/waste/reporting/pdf/WEEE_Directive.pdf Eurostat, (2011) WEEE collection Rate, kg per capita, http://epp.eurostat.ec.europa.eu/portal/page/portal/waste/data/wastestreams/weee [accessed 9/5/2012] Oekopol, iiiee and RPA (2007) 'The Producer Responsibility Principle of the WEEE Directive' Final Report, DG ENV. Study Contract N° 07010401/2006/449269/MAR/G4. URL http://ec.europa.eu/environment/waste/weee/pdf/final_rep_okopol.pdf Public Interest Network for WEEE management (WEEE PIN) (2008) 'WEEE PIN Position Paper, Updated version after the WEEE-PIN meeting on 26th March 2008.' URL http://www.acrplus.org/upload/documents/webpage/document538.pdf UNEP (2011) 'Where are WEee in Africa? Findings from the Basel Convention E-waste Africa Programme' URL http://www.basel.int/Implementation/TechnicalAssistance/EWaste/EwasteAfricaProject/Publications/tabid/2553/Default.aspx UNEP (2009) 'Recycling- From E-Waste to Resources' Sustainable Innovation and Technology Transfer Industrial Sector Studies. URL http://www.unep.org/PDF/PressReleases/E-Waste_publication_screen_FINALVERSION-sml.pdf UNU (United Nations University), AEA Technology, GAIKER, Regional Environmental Center for Central and Eastern Europe, TU Delft (2007) '2008 Review of Directive 2002/96 on Waste Electrical and Electronic Equipment (WEEE). Final Report.' URL http://ec.europa.eu/environment/waste/weee/pdf/final_rep_unu.pdf van Rossem, Chris, Naoko Tojo and Thomas Lindhqvist (2006) 'Lost in Transposition? A study of implementing Individual Producer Responsibility in the WEEE-Directive.' Report commissioned by Greenpeace International, Friends of the Earth Europe and the European Environmental Bureau (EEB), IIIEE Other publications, Lund University, Sweden. URL http://www.greenpeace.org/eu-unit/Global/eu-unit/reports-briefings/2009/3/lost-in-transposition.pdf

8.3 Feed-in tariffs for the generation of energy from waste incineration and landfill gas in Czech Republic, Hungary and Portugal

EHS Description	
Brief description of subsidy	Several Member States pay feed-in tariffs (FIT) for the generation of energy (electricity and/or heat) from various types of waste, deeming waste to be a renewable resource. This case study concentrates on waste incineration and landfill gas, as FIT are paid for these in several MS. • The **Czech Republic** pays FIT and premiums for landfill gas and sewage gas used for RES-E (electricity) and RES-H (heat). • **Hungary** pays FIT for gas from waste yards and gas from sewage treatment facilities. • **Portugal** pays FIT for landfill gas and for both unsorted and sorted/prepared urban waste. (Franhofer Institute et al, 2009)
Economic type	These are off-budget subsidies, and more specifically regulatory support

	mechanisms (feed-in tariffs).
Sector	Waste
Member State	Czech Republic Hungary Portugal
Other Member State(s) where the subsidy exists	Feed-in tariffs for energy (electricity and/or heat) from various types of waste (including biomass, biogas, landfill gas, sewage gas, wood waste, forestry waste, anaerobic digestion, waste incineration and urban waste) are also present in **many other Member States**, including Austria, Belgium, Bulgaria, Cyprus, Estonia, Spain, Finland, Ireland, Italy, Luxembourg, the Netherlands and the UK.
Nature and unit size of subsidy	The nature and unit of the FIT varies between Member States and according to the types of waste material for which the FIT is provided. • In the **Czech Republic** €89.2-€91.1/MWh is paid as a FIT **or** €32.4-€55.3 as a premium for landfill gas and sewage gas. The plant owner chooses whether to use a FIT or a premium. • In **Hungary** between €3.9-10.7/MWh is paid as a FIT for gas from waste yards and gas from sewage treatment facilities. The rate varies according to peak and non-peak periods. • In **Portugal** indicative average tariffs of €102-14 are paid for landfill gas, €53-54 for unsorted urban waste, and €74-76 for sorted/prepared urban waste. (Franhofer Institute et al, 2009)
Legal basis and timeline	• In the **Czech Republic**, RES-E generation is promoted primarily through price regulation, managed by the Energy Regulatory Office (ERO). The systematic support of RES-E started at the beginning of 2006 based on Act 180/2005. It is regulated by the following legislation: Law on Energy No.458/2000 [1], Act on Promotion of Electricity Generation from RES and Amending Several Acts No. 180/2005 [2], Amendment of Energy Regulatory Office Decree No. 475/2005 introducing several statutory provisions on the promotion of RES No. 364/2007 [3]. FITs for all kinds of RES-E generation excluding small hydro are guaranteed for a period of 20 years. • **Hungary** has introduced a non-central-budget-based FIT scheme which is guaranteed until 2020. The Hungarian Energy Office (HEO) sets the period of payment and the maximum amount of eligible electricity in compliance with the statutory provisions (§ 11 (3) Act Nr. LXXXVI of 2007). The FIT levels are set annually and adjusted to the rate of HUF PPI inflation (Annex Nr. 13 Decree Nr. 389/2007). A review of the FIT system was due to conclude around March 2010. The scheme is governed by Act Nr. LXXXVI of 2007, and the price is regulated by Government Decree Nr. 389/2007. (XII. 23.) and by Decree Nr. 287/2008. (XI.28.). The scheme will run until 2020. The HEO as the energy sector regulator has set up maximum duration period beyond which the FIT is not applied based on differentiation by technologies. • **Portugal** introduced a legislative framework to regulate the production of renewable electricity with decree 189/88 (Decreto-Lei n.° 189/88 de 27 de Maio). The scheme has since been reviewed several times and is commonly known as “Tarifa Verde”, or green tariff. The scheme applies to all production of renewable electricity, except hydropower plants larger than 10 MW. Renewable electricity production is included in the regulation PRE, Produçao en Regime Especial (Special Regime). Decree 339-C/2001

	(Decreto-Lei n.° 339-C/2001 de 29 de Dezembro) introduced tariffs differentiated by technology. Decree 33-A/2005 (Decreto-Lei nº 33-A/2005, de 16 de Fevereiro) established a cap to the maximum energy production per installation which can receive the FIT for certain technologies. This has most recently been amended by decree 225/2007 (Decreto-Lei n.° 225/2007 de 31 de Maio). The scheme is controlled, monitored and reviewed by the DGEG (Direcção Geral de Energia e Geologia), the official governmental entity for Energy and Geology. FIT for landfill gas and for unsorted and sorted/prepared urban waste are paid for 15 years. (Franhofer Institute et al, 2009)			
Objectives and design				
Subsidy rationale/objectives (original and evolving)	All of the FIT featured in this case study aim to promote the generation of electricity and/or heat from 'renewable' energy sources, i.e. sources other than fossil fuels, in order to generate energy more sustainably (e.g. reducing GHG emissions, using renewable sources and making use of what would otherwise be waste, contributing to security of supply). These FIT therefore contribute to helping the countries to meet their renewables targets. As the FIT are usually guaranteed in the medium-term (typically 15-20 years) they provide some certainty for the technologies being used, to ensure that investments in the technologies are worthwhile. • In the **Czech Republic** the aim of support is to increase the use of RES-E and RES-H and to promote co-generation, including on biogas, and waste and sewage gas • Until 2020, grid operators in **Hungary** are statutorily obliged to purchase RES-E and to pay a guaranteed price. • No extra detail has yet been found for **Portugal**. (Fraunhofer Institute et al, 2009)			
Does the subsidy fulfil its objectives?	At least partially – energy generated from 'combustible renewables and waste' (defined by the World Bank as industrial waste and municipal waste, but also other solid biomass, liquid biomass and biogas) has been increasing in all three countries covered by this case study, although the source used does not have separate figures for waste alone: • In the **Czech Republic** combustible renewables and waste reportedly made up 6.05% of total energy in 2010, 5.65% in 2009 and 4.92% in 2008, according to the World Bank. • In **Hungary** combustible renewables and waste reportedly made up 7.23% of total energy in 2010 7.08% in 2009 and 5.76% in 2008, according to the World Bank. • In **Portugal** combustible renewables and waste reportedly made up 14.24% of total energy in 2010, 13.64% in 2009 and 12.96% in 2008, according to the World Bank. (Trading Economics, 2012)	**CZ**	**HU**	**PT**
Is the rationale for	It can be argued that the rationale is still valid	**CZ**	**HU**	**PT**

the subsidy still valid?	as it makes some use of types of waste that would otherwise just be landfilled or incinerated without energy recovery. However care needs to be taken to ensure that FITs are not provided for waste that could be recycled or reused (this is of particular concern in the case of **Portugal** where FIT are apparently provided for unsorted urban waste), and the main focus with regards to waste should always be on prevention of waste.			
Who is **responsible** for the subsidy?	• In the **Czech Republic**, FIT related to RES-E are managed by the Energy Regulatory Office (ERO) and regulated by national government legislation. • In **Hungary** the FIT scheme is managed by the Hungarian Energy Office (HEO) and governed by national government legislation. • In **Portugal** the FIT scheme is controlled, monitored and reviewed by the DGEG (Direcção Geral de Energia e Geologia), the official government entity for Energy and Geology, a general directorate of the Ministry of Economics, Innovation and Development. Various national government legislation regulates the scheme.			
Are there any key problems with **subsidy design?**	The level of the FIT (i.e. the actual price paid for the energy generated) are regularly reviewed in the three countries covered by this case study (annually in the **Czech Republic** and **Hungary** and monthly in **Portugal**). The fact that FIT are guaranteed in the medium term (typically for 15-20 years) could mean that in the future FIT continue to be paid for technologies (e.g. for energy from unsorted urban waste in **Portugal**) that are not best practice in environmental terms.	**CZ**	**HU**	**PT**
Does the subsidy represent an **infringement of existing EU legislation**?	The FIT in all three countries covered by this case study could be argued to be somewhat contradictory to the application of the waste hierarchy as laid down in the EU Waste Framework Directive. The payment of FIT for landfill gas (in all three countries) could be seen as contradicting efforts to meet the targets of the Landfill Directive to reduce the amount of biodegradable waste sent to landfill (biowaste produces the most gas as it degrades, therefore paying FIT for this gas may perversely encourage – or at least not discourage – the placing of biowaste in	**CZ**	**HU**	**PT**

	landfill, rather than treating it by composting or anaerobic digestion). However, it remains preferable for landfill gas to be collected and used for energy rather than simply releasing it into the atmosphere, so the FIT could also be argued to be providing an environmental benefit. The case appears to be more clear-cut in **Portugal** where FIT are apparently paid for energy from unsorted urban waste. In order to meet the requirements of the waste hierarchy, as much waste as possible should be sorted to remove reusable/recyclable/compostable fractions, therefore the use of unsorted waste to generate energy should not be encouraged. This is why **Portugal** is marked as red, and the **Czech Republic** and **Hungary** only as orange.			
Key social impacts				
Who are the **intended recipients / beneficiaries**?	The intended recipients/beneficiaries are the producers of energy/electricity/heat from landfill and sewage gas and (in **Portugal**) urban waste. Developers of the relevant technologies also benefit as the FIT help to guarantee medium-term support to ensure that investment in these technologies is worthwhile.			
Does the subsidy reach them?	The subsidy does reach the intended recipients/beneficiaries as the FIT are paid to the energy producers.	**CZ**	**HU**	**PT**
What are the **unintended social effects**, if any?	There may be some health impacts from incentivising the incineration of waste or the production of biogas from waste sent to landfill, but these are likely to be very limited.	**CZ**	**HU**	**PT**
Key environmental impacts				
Nature and degree of impacts on the environment	The environmental impacts of the FIT in all three countries covered by this case study are arguable. On the one hand, the payment of FIT for landfill gas (in all three countries) could be seen as discouraging – or at least not encouraging – efforts to reduce the amount of waste (in particular biowaste) sent to landfill, as this waste generates the most gas as it degrades in landfill. Waste placed in landfill sites can impact on air and water quality, in particular sites that fail to meet requirements for water and air emissions. However, when waste cannot be avoided, recycled or composted, it remains preferable	**CZ**	**HU**	**PT**

	for landfill gas to be collected and used for energy rather than simply releasing it into the atmosphere, so the FIT could also be argued to be providing an environmental benefit. There is potentially a more substantial environment impact in the case of **Portugal's** FIT for energy from unsorted urban waste. As much waste as possible should be sorted to remove reusable/recyclable/compostable fractions, therefore the use of unsorted waste to generate energy should not be encouraged, as it may represent a loss of resources. There are unlikely to be notable biodiversity related impacts from the FIT. This is why **Portugal** is marked as red, and the **Czech Republic** and **Hungary** only as orange.			
Policy filters	• No specific policy filters to mitigate the environmental effects of the FIT have been identified in the **Czech Republic**. • No specific policy filters to mitigate the environmental effects of the FIT have been identified in **Hungary**. • In **Portugal**, the FIT are defined on a monthly basis, according to a rather complicated formula that includes *inter alia* consideration of the cost of avoided CO2 emissions, weighted by a technology factor, called factor "Z".	**CZ**	**HU**	**PT**
Estimated size of the subsidy per year and who bears the cost	The following figures are for 2009: • In the **Czech Republic** 106,755 MWh of energy from biogas, landfill gas, sludge gas and mine gas from closed gas received FIT support totalling €6.52 million. Premiums were paid for 431,558 MWh of energy from the same sources, totalling €27.13 million. 4% of electricity in the country received RES support (NB this includes all renewable energy sources, not just biogas/landfill gas etc.). The burden of RES incentives on consumers' expenditure (calculated as the overall incentives divided by gross electricity consumption) is roughly estimated at €2.19/MWh. • In **Hungary** 1,603,988 MWh of energy from biomass, gas from waste deposit, sewage gas and biogas received FIT support totalling €67.12 million. 5.9% of electricity in the country received RES support (NB this includes all renewable energy sources, not just biomass, gas from waste deposit etc.). The burden of RES	**CZ**	**HU**	**PT**

	incentives on consumers' expenditure (calculated as the overall incentives divided by gross electricity consumption) is roughly estimated at €2/MWh. • In **Portugal** 457,581 MWh of energy from urban waste received FIT support totalling €16.31 million, and 1,542,593 MWh of energy from CHP (biomass, biogas – NB this may not all be from waste) received FIT support totalling €69.63 million. 27.4% of electricity in the country received RES support (NB this includes all renewable energy sources, not just biomass and biogas). The burden of RES incentives on consumers' expenditure (calculated as the overall incentives divided by gross electricity consumption) is roughly estimated at €12.33/MWh. In the **Czech Republic** and **Hungary**, support schemes are financed by the possible pass-through to the end-user of the costs borne by the Distributor/Supplier via a specific surcharge which can be visible in the electricity bill. (CEER, 2011)			
What are the **unintended economic impacts** if any?	The long guarantee periods of the FIT could potentially contribute towards locking in the use of landfilling (and more specifically the use of certain technologies to capture landfill gas), or the use of certain incineration technologies, possibly to the detriment of newer or more advanced technologies in the future. However, it should be stated that no impacts of this kind, or other unintended economic impacts, have been identified in the information sources used so far.	**CZ**	**HU**	**PT**
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**CZ** **No/ possible**	**HU** **No/ possible**	**PT** **Yes**
What are the main options for the reform of this subsidy?	For **Portugal**, consideration should be given to removing the FIT for unsorted urban waste, and perhaps also to reducing the FIT for sorted urban waste. For **all three countries (and others that apply FIT)**, (more) careful consideration could be given to setting the FIT rates so that they correspond better with the waste hierarchy, i.e. so they do not promote the burning/landfilling of waste that could otherwise be prevented, reused, recycled or composted/treated through anaerobic digestion.			
What are the **main arguments for reform**?	As outlined above, the main argument for reform is to ensure that the waste hierarchy as laid down in the EU Waste Framework Directive is adhered to.			
What are the **main**	One of the main barriers to reform is that existing FIT are typically guaranteed			

barriers to reform?	for a 15-20 year period to ensure market/technology stability, meaning that it would be difficult to remove the FIT sooner. Other potential barriers could include political reluctance to reform FIT, and lack of available alternative facilities to deal with waste higher up the waste hierarchy (ie recycling plants, reuse chains).
Is there a **window of opportunity** for subsidy removal or reform?	The rates of the FIT are revised on a regular basis (usually annually or even monthly) so one option could be to use this process to gradually reduce the level of the FIT for types of waste that could be dealt with through environmentally preferable alternatives (e.g. prevention, recycling). However, this would need to be done taking into account any guaranteed levels or durations of the FIT.
References	Franhofer Institute et al (2009), RENEWABLE ENERGY POLICY COUNTRY PROFILES, URL http://www.reshaping-res-policy.eu/downloads/RE-SHAPING%20Renewable%20Energy%20Policy%20Country%20profiles%202009.pdf Trading Economics (2012), URL http://www.tradingeconomics.com/czech-republic/combustible-renewables-and-waste-percent-of-total-energy-wb-data.html (and similar pages for Hungary and Portugal), accessed 30 May 2012 CEER – Council of European Energy Regulators (2011), Report on Renewable Energy Support in Europe, URL http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Electricity/2011/C10-SDE-19-04a_RES_4-May-2011%20final.pdf

8.4 Subsidies for the construction of waste incineration plants in Poland

EHS Description		
Brief description of subsidy	To reduce landfilling of municipal waste in Poland through increasing thermal use for energy recovery, financial support for the construction of waste incineration (waste-to-energy, WTE) plants is provided in the form of co-financing through National Funds for Environmental Protection and Water Management / Operational Programme Infrastructure and Environment POIiŚ (e.g. grants or capital investment) in combination with EU subsidies (in particular the Cohesion Fund and the European Regional Development Fund - ERDF).	
Economic type	Direct transfer of funds	
Sector	Waste management	
Member State	PL	
Other Member State(s) where the subsidy exists	Similar subsidies exist in CZ (two waste incinerators are planned in Most and in Chotíkov, to be financed through the Cohesion Fund with more than 200 Million €, see Bankwatch 2011a) and LT (in Vilnius two waste incineration plants were planned to be constructed with more than 130 Million € from Cohesion Funding, but due to public resistance those plans were dropped, see Bankwatch 2011b).	
Nature and unit size of subsidy	In order to reduce landfilling of municipal waste by overcoming the shortage of incineration plants, 12 WTE plants are to be built. This is to be financed both the National and Regional Funds for	

	Environmental Protection and Water Management and the Operational Programme Infrastructure and Environment POIiŚ in combination with EU funds, such as the Cohesion Fund and the ERDF. EU funding typically covers the major part of the co-financing. POIiŚ is a National operational programme within the framework of the 'Convergence' objective and co-funded both by the Cohesion Fund and the ERDF. According to the European Commission (2012a), the Cohesion Fund will contribute EUR 22.18 billion and the ERDF EUR 5.67 billion with the aim to develop "technical infrastructure, and simultaneously protecting and improving the condition of the natural environment and health as well as preserving cultural identity and developing territorial cohesion." (European Commission 2012a) Here, WTE may be supported under the two priorities Priority 2: Waste management and the protection of the earth (Cohesion Fund) and Priority 10: Energy security, including the diversification of energy sources (ERDF). The National Funds for Environmental Protection and Water Management (NFEP&WM) co-funds mainly large investments intended for environmental protection with nationwide and supra-regional significance that contribute to fulfilling Poland's EU obligations (NFEP&WM 2012a). Financial support for WTE may be targeted under priority 3.1 – Municipal waste management or priority 3.6. – Co-financing of the Priority Axis II of the Operational Programme Infrastructure and Environment (waste management and the protection of Earth), and it may take the form of grants or capital investments (NFEP&WM, 2012b). The NFEP&WM constitutes the backbone of the Polish system for financing environmental protection projects – inter alia WTE plants – and as of March 2011 had helped co-financing projects for a total amount of EUR 2.4 billion (NFEP&WM, 2012; WorldBank, 2011; European Commission, 2012b). It is assumed that the investment volume for the 12 WTE plants will be approx. between EUR 1.1 and EUR 1.4 billion, of which up to 85% (likely around 60% in practice) is to be subsidised by EU funds (Deloitte Poland, et al. 2011, Beyer and Klysz 2011)	
Legal basis and timeline	The former Act on Waste from 27 April 2001 (Journal of Laws of 2010, No. 185, item 1243, NO. 203, item 1351) is being amended through provisions amending the Act on waste, which were introduced with the Act on Maintaining Cleanliness and Order in Municipalities, adopted in July 2011 and entered into force in January 2012 (Deloitte Poland, et al. 2011). This law transposes the Waste Framework Directive 2008/98/EC into national law – the transposition deadline of 12 December 2010 was not met. According to this legislation, local governments are responsible for municipal waste management. In addition, in 2010 the	

	government adopted the 2014 National Waste Management Plan. Both foresee the practical application of the waste hierarchy, with waste prevention being the top priority of waste management and preferring re-use and material recycling to energy recovery from waste, where and insofar as they are the best ecological options (Deloitte Poland, et al. 2011; EEA, 2011). Furthermore, the National Waste Management Plan indicates thermal treatment of municipal waste and plants for mechanical and biological treatment (MBT) of waste as the most desired installations for waste management: incineration plants to be preferred in the case of waste management regions with at least 300 thousand inhabitants, MBT are recommended for smaller areas (Deloitte Poland, et al. 2011; EEA 2011).	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	The subsidy is to help improve waste management by reducing the amount of municipal waste being landfilled – mainly through overcoming the existing shortage of incineration plants in Poland which currently has only one plant (which is in Warsaw in the Targówek district and has a total processing capacity of 42,000 t). In 2008 around 87% of municipal waste was landfilled, 9% recycled, 4% composted and 1% incinerated (BIPRO, 2011). In 2009, these figures changed to 78.2% landfilled, 14.1% recycled and 6.7% composted – thermal treatment (incineration) remained at 1.0% (Deloitte Poland, et al. 2011). For this purpose, 11 additional waste incineration plants are to be constructed in Poland with a planned capacity of 2.4 million tons – they are to be located *inter alia* in Kraków, Gdansk, Szczecin or Poznań. Based on the assumption that about 1/3 (4 million tons) of municipal waste will need to be thermally treated, altogether 16 incinerating plants with the capacity of 250 thousand tons per year are required – they would produce 2.2 TWh of electricity and approx. 6.5 TWh (23,6 PJ) of heat per year. (Deloitte Poland, et al. 2011)	
Does the subsidy fulfil its objectives?	Very likely yes, because according to Deloitte Poland et al. (2011) for the three planned WTE plants in Kraków, Szczecin and "Bydgoszcz, Toruń" a subsidy agreement with the EU for approx. 50% of the total costs has already been signed.	
Is the rationale for the subsidy still valid?	The rationale for the subsidy appears to still be valid given that the targets of the 2014 National Waste Management Plan in relation to waste incineration still need to be achieved and also because the planned WTE partly still have to ensure co-financing.	
Who is **responsible** for the subsidy?	Polish government, national and local authorities	
Are there any key problems with **subsidy design?**	No problems with subsidy design could be identified. However as noted below construction of the WTE plants discourages waste prevention and recycling and thus runs counter to the waste hierarchy of the Waste Framework Directive 2008/98/EC and related targets	

Does the subsidy represent an **infringement of existing EU legislation**?	No infringement of existing EU legislation could be identified. However as noted below construction of the WTE plants discourages waste prevention and recycling and thus runs counter to the waste hierarchy of the Waste Framework Directive 2008/98/EC and related targets, e.g. 50 % municipal waste recycling target for plastic, paper and glass (GAIA, 2010; Bankwatch and Friends of the Earth Europe 2012).	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	Operators of WTE plants	
Does the subsidy reach them?	Very likely yes, because according to Deloitte Poland et al. (2011) for the three planned WTE plants in Kraków, Szczecin and "Bydgoszcz, Toruń" a subsidy agreement with the EU for approx. 50% of the total costs has already been signed so that the plants can actually start being built.	
What are the **unintended social effects**, if any?	While in Poland the experience of public acceptance of WTE is limited because only one such plant currently exists, experience from many Western European countries indicates that both design (in terms of how it is integrated in the landscape) and logistics (e.g. delivery of waste to the plant) of such plants need to be carefully considered in order to avoid negative social effects, such as nuisance (in particular odours or noise) or reduced visual amenity (e.g. scenery) (Deloitte Poland, et al. 2011). According to a survey conducted by Deloitte Poland et al. in seven cities (and in which most WTE are planned), almost ¾ of the respondents would agree to have a modern WTE – if environmental and safety standards are met so that fears of e.g. foul odours do not materialise. Thus negative social effects could materialise through subsidising WTE plants and must be taken seriously, as for instance shown in the 'Petition to the European Parliament concerning the failure to meet the EU legislation requirements in public consultations and waste management planning in Krakow, Poland' from February 2008.[13] There are also some positive side effects which are expected to materialise, such as local employment opportunities and local generation of heat and electricity.	
Key environmental impacts		
Nature and degree of impacts on the environment	Prioritisation of thermal use interferes with the waste hierarchy according to the Waste Framework Directive. According to the International Law Office (2011) the new act aims to ensure that companies investing in WTE plants will be provided by municipalities with a steady flow of municipal waste for such plants (see also Deloitte Poland, et al. 2011). This discourages	

[13] See http://bankwatch.org/documents/Petition_Krakow_incinerator_Feb08.pdf.

	waste prevention and recycling strategies and therefore runs counter to the waste hierarchy of the Waste Framework Directive 2008/98/EC and related targets, e.g. 50 % municipal waste recycling target for plastic, paper and glass (GAIA, 2010; Bankwatch and Friends of the Earth Europe 2012). Furthermore, incineration of waste is generally considered to be counterproductive in relation to the EU climate goals, because the prevention, re-use and recycling of waste – instead of burning them – may save large amounts of energy and emissions, in some cases up to 25 times the energy produced by incineration (GAIA 2010). However, as the increased amount of waste being thermally used will help to reduce the large share of municipal waste being landfilled, incineration definitely benefits the environment in relation to landfilling despite its abovementioned adverse environmental impacts. Nonetheless, as NGOs such as Bankwatch, Friends of the Earth Europe and GAIA justifiably criticise, instead of fostering incineration to reduce landfilling, efforts should rather be directed to waste prevention and recycling.	
Policy filters	Policy filters exist through the EU Waste Incineration Directive 2000/76/EC, which in Article 7 in combination with Annex V sets air emission limit values for environmentally harmful and health impacting emissions, inter alia for NO_x, dioxins and furans. However, CO_2 for instance is not covered by this policy filter.	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	There is no data on the exact amount of subsidies available. However, according to the World Bank (2011) EUR 1.43 billion are allocated to Priority 2 "Waste management and the protection of the earth" of POIiŚ. As noted above it is assumed that the investment volume for the 12 WTE plants will be approx. between EUR 1.1 and EUR 1.4 billion, of which up to 85% (likely around 60% in practice) is to be subsidised by EU funds (Deloitte Poland, et al. 2011, Beyer and Klysz 2011). Subsidy costs are borne both by the NFEP&WM and EU funds.	
What are the **unintended economic impacts** if any?	The subsidy encourages the construction of new waste incineration plants. Since these plants have a long life-time and high capital costs, this creates a technology 'lock-in' situation in which waste incineration will remain the preferred option for quite some time: the operators will have strong economic incentives to keep the plants running at full capacity as long as possible. This may reduce the market opportunities for other options such as advanced recycling technologies (Deloitte Poland et al. 2011) However, the subsidy could also have some positive side effects	

	such as local employment opportunities and local generation of heat and electricity.	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**No**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	Two main options for reform could be a. the comparably huge costs required for building and operating WTE plants, and b. the technological lock-in situation, which may serve as valuable arguments to shift state and EU Cohesion Funding towards less costly waste prevention strategies or recycling facilities, which thus would also help to target the higher waste hierarchy priorities and help break the technological lock-in. For instance, according to Bankwatch (2011b), alternative technologies discussed in the context of regional waste management plan for the Lithuanian county of Vilnius should focus on the collection and treatment of biodegradable waste and involve the burning of refuse-derived fuel (RDF) after recycling – and would require only 29.4 Million € of Cohesion Fund as compared to 130 Million € for the previously planned incinerator.	
Opportunities for EHS reform		
What are the **main arguments for reform**?	Main arguments for reform could centre around a) the waste hierarchy and achieving set related targets such as the 50% recycling target for plastic, paper and glass b) climate change objectives, e.g. from the EU2020 strategy to cut greenhouse gas emissions by at least 20% compared to 1990 levels	
What are the **main barriers to reform?**	Though no explicit barriers to reform could have been identified, the unilateral support of one technology not only creates a technological lock-in, but very likely also strong interest groups among the WTE operators.,	
Is there a **window of opportunity** for subsidy removal or reform?	There may be a window of opportunity in the review of the operational programme of the Cohesion Policy for the next round of programmes covering the period from 2014 to 2020. In this context, the EU Commission could revisit the EU spending for Poland and, inter alia, develop environmental criteria for waste management projects.	
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9 WATER

9.1 Reduced VAT rate for drinking water in Greece

EHS Description		
Brief description of subsidy	Several MS apply a reduced VAT rate to water supplies. In Greece, water supplies are exempted when the water is supplied by public authorities. Other water supplies are subject to a reduced VAT rate of 13% (on the islands, except Crete: 9%).	
Economic type	Foregone government revenues: Tax exemptions and rebates	
Sector	Water supply sector Consumers	
Member State	Greece	
Other Member State(s) where the subsidy exists	The majority of EU MS apply a reduced VAT rate to water supplies. Ireland has a similar system to the Greek one (exemption for water supplied by local authorities). The only MS which currently apply the standard VAT rate to all water supplies are: BG, DK, EE, LV, LT, HU, RO, SK, FI, SE.	
Nature and unit size of subsidy	VAT is an *ad valorem* tax on final consumption. The standard rate in Greece is 23%. Water supplies by public authorities are exempted, which means that no VAT is levied, but also that no VAT is refunded that was paid in preceding stages in the water chain. The unit size of this subsidy can therefore not be determined without detailed information on the accounts of the public water supply sector. For other water supplies, the VAT rate is 13%, implying a subsidy of almost 9% of the water price (incl. VAT). On the islands (except Crete) the VAT rate is 9% and the subsidy 13%. More than half of the water supplies are provided by two semi-public companies on the Greek mainland (EYDAP and EYATH, serving the metropolitan areas of Athens and Thessaloniki, respectively) and are thus subject to the 13% VAT (9% subsidy) rate. The remainder of Greece is supplied by public (municipal) bodies (DEYA), to which the VAT exemption applies.	
Legal basis and timeline	The subsidy exists since the introduction of VAT in Greece in 1987. The legislative base is the VAT Code (2859/2000). No expiration date is foreseen.	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	The application of reduced VAT rates and exemptions for drinking water are usually motivated on social grounds: by taxing the consumption of 'basic needs' at lower rates than the consumption of 'luxuries', low-income households are supposed to benefit.	
Does the subsidy fulfil its objectives?	No. Low-income households do benefit from the subsidy, but high-income households benefit more. This is due to the fact that water consumption increases with income. In their meta-analysis, Dalhuisen *et al.* (2003) found a mean value for the income elasticity of residential water demand of 0.43, and a median value of 0.21. This means that a doubling of household income implies an increase in water consumption by something like 30%. The VAT subsidy applies not just to water used for drinking and washing, but also for garden watering and swimming pools. In absolute	

	terms, therefore, the main part of the subsidy goes to high-income households.	
Is the rationale for the subsidy still valid?	Probably not. An indication is the fact that the two MS with the lowest per capita income (Bulgaria and Romania) do not apply the reduced VAT rate to water supplies.	
Who is **responsible** for the subsidy?	VAT in Greece is administered by the Ministry of Finance.	
Are there any key problems with **subsidy design?**	The subsidy has been in place for a long time and lacks an in-built review process.	
Does the subsidy represent an **infringement of existing EU legislation**?	No. The VAT Directive (2006/112/EC, art. 98 and Annex III) gives MS the opportunity to apply a reduced VAT rate to water supplies. The same Directive (art. 375 and Annex X, part B, point 8) contains a derogation clause permitting Greece to exempt "the supply of water by a body governed by public law" from VAT.	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	Low income households	
Does the subsidy reach them?	Yes, but (as indicated above) high income households benefit more (in absolute amounts)	
What are the **unintended social effects**, if any?	This depends on the assumed counterfactual situation. If the standard VAT rate would be applied to water, other taxes could be reduced. Depending on the design of this tax reduction, this could be either more or less beneficial for low-income groups than the present situation.	
Key environmental impacts		
Nature and degree of impacts on the environment	Water supply in Greece (apart from agriculture and industry) amounted to almost 1 billion m^3 in 2007 (source: EEA, 2010). Assuming an average subsidy rate of 10% due to the VAT reduction/exemption, and given an estimated average price elasticity of demand for drinking water of about -0.4 (Dalhuisen *et al.*, 2003), the impact of the subsidy can be roughly estimated at an additional demand of 40 million m^3 water per year. This adds to the pressure on water resources in Greece, with the associated environmental impacts (see EEA, 2010). According to EUREAU (2009), drinking water delivered for domestic use in Greece amounted to 218 litres per capita per day in 2008. This is higher than in other Mediterranean countries such as Italy (200 litres), Malta (75 litres), Portugal (71 litres) and Spain (190 litres) , but lower than in Cyprus (269 litres).	
Policy filters	Greece has policies in place to reduce water demand and improve water efficiency (see EEA, 2010), but the VAT subsidy reduces the effectiveness of these policies.	
Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	Mean water prices in Greece ranged from EUR 0.99 to EUR 3.76 per m^3 in the period 2004-2007 (Kanakoudis and Tsitsifli, 2009). Given 1 billion m^3 residential water consumption and about 10% subsidy on average, the total amount of subsidy can be estimated	

	at about EUR 200 million. Assuming that these foregone tax revenues have to be compensated by other taxes, it is the taxpayer who bears the cost. Future generations also may be 'victims' in the sense that they may be confronted with depleted aquifers.	
What are the **unintended economic impacts** if any?	N.a.	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Yes**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	Applying the standard VAT rate to water supplies.	
Opportunities for EHS reform		
What are the **main arguments for reform**?	The subsidy is not an efficient instrument for the intended objective (protecting low-income households). It mainly benefits high-income households and contributes to the environmental problems related to the (over-)exploitation of water resources.	
What are the **main barriers to reform?**	Probably social and political resistance.	
Is there a **window of opportunity** for subsidy removal or reform?	The need for budget reform.	
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9.2 Irrigation subsidies in Cyprus, Spain and Italy

EHS Description	
Brief description of subsidy	An irrigation subsidy is the difference between all costs related to irrigation and the revenues received as payment from the beneficiary. In the three analysed countries, the subsidised price has led to the expansion of irrigated land (which

	is responsible for 68% of total water use in Cyprus, 68% in Spain and 57% in Italy, see Berbel et al., 2007). Spain and Italy are responsible for over 70% of the total European use of water for irrigation (Massaruto, 2003). • **Cyprus** invested substantial amounts of public money (including money borrowed from international institutions, such as the World Bank) in infrastructure for irrigation water, e.g. in the 'Southern Corridor Project'. • In **Spain** between 1997 and 2008 a large amount of investments by the national and regional governments and by the EU allowed modernizing about 1.4 million ha of irrigated land. This policy built on a set of publicly-funded water policies carried out in the past century, which allowed expanding the use of irrigation in the agricultural sector. As in other Southern European countries, the construction cost of infrastructures for irrigation was covered in **Italy** with public funds and mostly not recovered, whereas Operation and Maintenance (O&M) costs are only partly recovered. This situation leads to the absence of incentives to the sustainable use of water (Zoumides and Zachariadis, 2009)
Economic type	Lack of full-cost pricing.
Sector	Water
Member State	Cyprus Spain Italy
Other Member State(s) where the subsidy exists	According to a questionnaire recently sent out to OECD countries (OECD, 2010), subsidised prices for agriculture are in place in all Southern European countries. For example, the cost recovery rate of capital and O&M costs in Portugal in 2002 was estimated at 23% for agriculture and 82% for urban users. In Greece, the average level of full cost recovery (O&M costs, capital costs, environmental and resource opportunity costs) in 2007 was estimated at 22% for agriculture and 57% for all water uses (OECD, 2010).
Nature and unit size of subsidy	In most areas of the three analysed countries, the price for irrigation water is well below its cost: • In 2007 a uniform price for irrigation water of CYP 0.11 (EUR 0.19) per m^3 was introduced in **Cyprus**, which means that irrigation water is still subsidized by 72% (Socratous, 2011). This implies a subsidy of about EUR 0.50 per m^3. • According to Calatrava and Garrido (2010), in **Spain** the average price of surface water for irrigation is 0.02 EUR /m³ (except for farmers serviced by the Tajo-Segura Transfer waterworks, who pay around 0.09 EUR /m³). Since the average financial costs for water supply is estimated at 0.12 EUR /m³ (Arcadis et al., 2012), this tariff implies a subsidy of 0.1 EUR /m³. Water charges are not applied to groundwater, which is mostly under private ownership (water distribution is carried out by water user associations, which charge the farmers directly). The total subsidies to irrigated agriculture in the most important Spanish basins are calculated at about EUR 911 million per year by Calatrava and Garrido (2010) and at EUR 1,120 million per year by Ministerio de Medio Ambiente (2007). These figures include capital and O&M costs. In **Italy** the water tariff is based (with very few exceptions) on the irrigated area and not on the volumetric usage, which does not incentivise water savings (Zoumides and Zachariadis, 2009; Arcadis et al., 2012). Water tariffs for farmers are lower than for other users and do not cover investment or depreciation

	costs, but only part of O&M costs (Berbel et al., 2007).			
Legal basis and timeline	• Subsidized irrigation in **Cyprus** has existed since its independence in 1960. Irrigation water charges are decided on by the Council of Ministers. • In **Spain** the State financed the expansion of the use of irrigation in agriculture during much of the twentieth century. Significant investments were made between 1997 and 2008 to rehabilitate and modernize the irrigation infrastructure (Calatrava and Garrido, 2010). The responsible authorities are the River Basin Agencies (RBA). According to Royal Decree 1/2001, approving the Spanish Water Law, the statutes or ordinances of the user communities, which are approved by the RBAs, establish the irrigation tariffs (Ligüerre et al., 2008). In Spain the WFD, including the full cost recovery principle is transposed with the law 62/2003. • In **Italy** a considerable amount of money was invested in water infrastructures for agriculture from the second half of the century. The Reclamation and Irrigation Boards (RIBs, Consorzi di Bonifica e Irrigazione) distribute 90% of the water used for irrigation, and are managed by associations of landowners. The government finances all project capital costs and RIBs manage and maintain the distribution infrastructures and charge the farmers (Berbel et al. 2007). The legislative decree 152/2006 transposing the WFD establishes the full cost recovery principle (article 119) and establishes the rules for calculating prices (Annex 10). However, the transition towards full cost recovery is still in the early stages.			
Objectives and design				
Subsidy rationale/objectives (original and evolving)	The subsidy aims to support the agricultural sector and to increase farmers' income. Irrigation improves productivity and reduces vulnerability to harsh climate conditions. In the three countries, irrigation spurred production for exportation.			
Does the subsidy fulfil its objectives?	Yes, in the sense that it reduces the cost of an important input in irrigated agriculture, contributing to increased productivity. On the other hand, despite the subsidy the relative importance of agriculture in the three economies and the share of people employed in the sector decreased: • In **Cyprus**, between 1990 and 2008 the share of agriculture in the national GDP decreased from 6.9 to 2.1 (World Bank data), and its share in employment has fallen from 20 to 7% since the mid-1960s (Zoumides and Zachariadis, 2009). • In **Spain** between 1990 and 2010 the population working in the agricultural sector decreased from 1.7 to 1.0	**CY**	**ES**	**IT**

	million people (from 11% to 4% of active population, data from the Statistical Yearbook of Spain). Also, the share of agriculture in the national GDP decreased from 5.6% to 2.7% (World Bank data). • In **Italy** between 1990 and 2010 the population working in the agricultural sector decreased from 1.9 to 0.9 million people (from 9 to 4% of active population, data from the Italian National Institute of Statistics). The share of agriculture in the national GDP decreased from 3.5 to 1.9% (World Bank data). The choice of water intensive crops may contribute to a general decrease of productivity in years of drought. For example, during the heat wave of 2003 cereal productivity decreased in Italy from 5.0 to 4.3 tonne/year and in Cyprus from 2.4 to 2.2 tonne/year (however the overall productivity of vegetables did not decrease in the three countries and the cereal productivity in Spain increased in the same year). During the 2008 drought in Spain, (which was the most severe in 70 years) cereal and vegetable productivity dropped respectively from 3.9 to 3.6 and from 36.2 to 35.7 tonne/ha with respect to the previous year. In the same year, cereal productivity in Cyprus decreased from 1.5 to 0.2 tonne/ha, mainly due to a decrease in wheat productivity. However, the impact of droughts should be estimated at the river basin level, since it may depend on local conditions such as climate factors, water availability and the distribution of water rights.			
Is the rationale for the subsidy still valid?	Not really, unless one accepts that the countries should maintain a strong agricultural sector, including export-oriented agriculture growing water-intensive crops.	**CY**	**ES**	**IT**
Who is **responsible** for the subsidy?	• In **Cyprus** the price of irrigation water is proposed by the Water Development Department (TAY), whose recommendation is discussed by an advisory committee at the Ministry of Agriculture, Natural Resource and the Environment presided by the Minister him(her)self.			

	Depending on the recommendations of the committee, the Minister proposes alterations (if necessary) to the original pricing recommendation of the TAY and subsequently a final proposal is formed which needs to be approved by the Council of Ministers. • In **Spain** storage and transportation of surface water falls under the responsibility of RBAs, which are autonomous governmental bodies that depend on the regional governments (intraregional basins) and on the Ministry of Environment and Rural and Marine Affairs (interregional basins). Regional governments carry out their own environmental policies and some of them apply additional water charges aimed at encouraging efficiency. • In **Italy**, the programming of national funding for agriculture falls under the responsibility of the Ministries of Agriculture, Environment and Infrastructure, in coordination with the River Basin Authorities (OECD, 2010). RIBs establish their own pricing systems, usually through area-based tariffs aimed at covering their own costs (Bartolini et al., 2010).			
Are there any key problems with **subsidy design?**	In the three countries the subsidy has been in place for a long time and lacks an in-built review process.	**CY**	**ES**	**IT**
Does the subsidy represent an **infringement of existing EU legislation**?	In the three countries the price of water for agriculture does not respect the WFD principle of full cost recovery: • In **Cyprus**, according to the government, the current tariff meets the 'cost recovery' requirements of the WFD, but given the 72% subsidy rate this seems questionable, and in any case the cost recovery does not include environmental and resource costs (Socratous, 2011). • In **Spain** and in **Italy**, even though most of O&M costs are recovered in many areas, the capital cost and the externalities are by and large not recovered.	**CY**	**ES**	**IT**
Key social impacts				

Who are the **intended recipients / beneficiaries**?	Farmers			
Does the subsidy reach them?	• Cyprus: yes • Spain: yes • Italy: yes	**CY**	**ES**	**IT**
What are the **unintended social effects**, if any?	As a consequence of the irrigation subsidy, part of the costs of irrigation has to be paid by taxpayers.	**CY**	**ES**	**IT**
Key environmental impacts				
Nature and degree of impacts on the environment	Depending on the local conditions, low water prices may encourage an excessive use of water for irrigation (although it should be noted that low water prices do not necessarily translate into high abstraction rates as water abstractions are also affected by regulatory issues and to the distribution of extraction rights). IEEP (2000) summarizes the environmental impacts arising from irrigation as follows: • water pollution from nutrients and pesticides; • damage to habitats and aquifer exhaustion by abstraction of irrigation water; • intensive forms of irrigated agriculture displacing formerly high value semi-natural ecosystems; • gains to biodiversity and landscape from certain traditional or 'leaky' irrigation systems in some localised areas (e.g. creating artificial aquatic habitats); • increased erosion of cultivated soils on slopes; • salinization, or contamination of water by minerals, of groundwater sources; • both negative and positive effects of large scale water transfers, associated with irrigation projects. In addition, water subsidies can distort the choice of the crop to be cultivated, leading to a more intensive agricultural model and higher environmental impacts. An indirect (positive) environmental impact of the subsidy could be that it might prevent farmers from drilling illegal boreholes, which could have even more harmful impacts (e.g. depletion and contamination of aquifers) (Massaruto, 2003). Dono et al. (2012) argue	**CY**	**ES**	**IT**

	that increasing irrigation prices could encourage farmers to use alternative water sources, such as private groundwater or rivers.			
Policy filters	A policy filter that mitigate the effect of the subsidy is the set of policy measures to mitigate episodes of drought: • In **Cyprus** in times of drought, water use is reduced by means of restrictions and rationing. However, there are no general policies that discourage water-intensive agricultural practices (apart from CAP reforms; see Zoumides and Zachariadis, 2009). • In **Spain**, in dry summer months water abstraction charges for farmers are increased (OECD, 2010). • In **Italy** the drought mitigation policies consist of limited support for new irrigated areas and policies aimed at improving water efficiency (OECD, 2010). However, agricultural water use is preferred over other uses (excluding human consumption) (Arcadis et al., 2012).	**CY**	**ES**	**IT**
Estimated size of the subsidy per year and who bears the cost	The irrigation subsidy is largely borne by taxpayers. Its size in the three countries is difficult to calculate due to limited availability and comparability of data. However some estimations have been made: • Agriculture in **Cyprus** consumes some 180 million m^3 water per year, of which 55% is provided through government irrigation schemes (Zoumides and Zachariadis, 2009). The total amount of subsidy can therefore be roughly estimated at about EUR 50 million per year. • According to Calatrava and Garrido (2010), in **Spain** the recovery rate of capital costs of diversion, storage and transportation of surface water ranges between 30% and 50%, whereas the recovery rate for O&M costs ranges between 90% and 99%. This is coherent with the information collected by OECD (2010), which states that the infrastructure O&M cost is recovered by 90%. However, the cost recovery rate may be much lower in some areas. Calatrava and Garrido (2010) estimate the total subsidies to	**CY**	**ES**	**IT**

	irrigated agriculture at EUR 906 million per year between 1998 and 2008, whereas the Ministry for the Environment (Ministerio del Medio Ambiente, 2007) calculates EUR 1.120 million per year. • According to OECD (2010), the total cost recovery rate in **Italy** ranges between 20 and 30% in the South and between 50% and 80% in the North. The cost recovery rate can be very different in different areas. For example, Rocchi (2007) calculates a recovery rate of 14.3% (including the environmental externalities) for the Alto Tevere district in the Umbria region. Massaruti (2003) calculates the cost recovery rate of three different Italian areas to be between 50% and 80%. In general, the capital cost is financed by the state and is not covered by the water price, whereas the O&M costs are at least partly recovered. Massarutto (2003) indicates a cost recovery rate for O&M costs ranging from 20 and 100% in the South and from 70 to 100% in the North. There are huge differences between water tariffs in the different basins, ranging from EUR 30 to EUR 100 per ha, and in some cases up to EUR 700 (Arcadis et al., 2012).			
What are the **unintended economic impacts** if any?	Subsidised water prices have an impact on the choices of the farmers. In the three analysed countries, the irrigation subsidy encourages water intensive crop production in areas that are not suitable for that, and also spurs production for exportation. For example, in Italy even though only 30% of the total agricultural land is irrigated, about 60% of exports are from irrigated crops (Bartolini et al., 2010, data of 2003).	**CY**	**ES**	**IT**
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**CY** **Yes**	**ES** **Yes**	**IT** **Yes**
What are the main options for the reform of this subsidy?	Modifying the tariffs for irrigation water may be possible in the policy process aimed at applying the River Basin Management Plans (RBMPs): • **Cyprus** submitted the RBMP of its only river basin district on 9 June 2011, including a Drought Management Plan. The RBMP states that there is a policy of full cost recovery for the consumption of drinking water (although it does not specify which kind of costs the full recovery			

	policy includes, whether only the O&M costs, or also the capital costs and the externality costs). However it acknowledges that pricing of irrigation water is based not on the principle of full cost recovery but on the purchasing capacity of farmers. Current prices of water are considerably low –at EUR 0.17 per m^3 for agriculture. Irrigation water provided privately (i.e. not directly by the Water Development Department (TAY)) through private water drillings and wells is not charged. In many circumstances there is very limited control on whether the agreed conditions stipulating water drilling are met. The Ministry of Agriculture, Natural Resources and the Environment estimates that a reasonable range of increased water prices for irrigation is between EUR 0.21-0.25 per m^3, which would not cause disruption to economic activity in the agricultural sector. Currently the pricing scheme is a two-part-tariff system consisting of a fixed and variable component. A large part of the final price is currently covered by the fixed component, and hence prices provide a poor incentive for water savings. For this reason it has been proposed that the fixed component only accounts on average for 15% of the final price. With a proposed fixed charge of EUR 44.01 per water meter and a variable rate of EUR 0.22 per m^3, there is expected to be a 71.6% of cost recovery for irrigation water. Penalties imposed on illegal water drilling are also established as a means of preventing distortions in water management, although they are poorly enforced. • **Italy** reported the RBMP of its 8 river basin districts to the EU in 2012. **Spain** has 25 river basin districts. Only 14 of them completed the required participation process so far, and among them the RBMP of Catalonia was the only one approved.
What are the **main arguments for reform**?	Environmental problems caused by irrigation and inefficient use of a scarce resource
What are the **main barriers to reform?**	Strong resistance from farmers. Moreover, a rise in irrigation prices is likely to give an incentive for further mismanagement and depletion of groundwater resources (illegal boreholes). For example, in Cyprus even the relatively small increase in water prices in 2007 already provoked vehement opposition by the agricultural lobby in spite of the fact that the increase was accompanied by various compensatory financial measures (Socratous, 2011).
Is there a **window of opportunity** for subsidy removal or reform?	In the three analysed countries, the need for budget reforms (reduced public spending) may stimulate a reduction of the irrigation subsidy. In addition, the full cost recovery principle established by the WFD may stimulate reform.
Insights from EHS that have been (or are in the process of being) **reformed or phased out**	See for example reform case in Annex II on water abstraction charges in Northrhine-Westphalia (Germany)
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9.3 Implicit subsidy to the use of nitrogen-rich fertilisers in agriculture in France

EHS Description		
Brief description of subsidy	In France, poor water quality due to high concentrations of nitrates (NO_3) and associated environmental impacts remain significant in many regions. This pollution mostly finds its origin in the use of fertilisers rich in nitrogen (N) (including livestock slurry) in agriculture. Indeed, while these increased levels of nitrates can be attributed to agriculture, domestic consumption and industrial production, agriculture is responsible for about 90% of the total nitrogen production (Centre d'analyse stratégique, 2011). In contradiction to the polluter pays principle, the costs relating to water treatment (to produce drinking quality tap water) is mostly paid by households (through their water bills) and the costs of addressing the adverse impacts resulting from the high concentration of nitrates (NO_3) in water (such as green algae plagues on the coast) by local authorities, rather than the agricultural sector.	

	This constitutes an implicit subsidy to those farmers whose activities are the source of the pollution and does not provide them with the necessary incentives to reduce their use of nitrogen-rich fertilisers to acceptable levels (Centre d'analyse stratégique, 2011, DREAL Bretagne, 2011).	
Economic type	Off budget, lack of full-cost pricing	
Sector	Water	
Member State	France	
Other Member State(s) where the subsidy exists	Probably. According to Eurostat statistics (2010) the four countries with the most intensive use of nitrogen fertilisers (kg/ha) are the Netherlands, Slovenia, Germany and Belgium/Luxemburg. Depending on who bears the costs of dealing with the resulting nitrates pollution in water in those (as well as other) EU MS, a similar subsidy might be considered to exist there as well.	
Nature and unit size of subsidy	The cost of treatment of the nitrates pollution can be inferred from the unit cost of nitrates treatment by water treatment plants producing water meeting drinking water quality standards; which is between EUR 59 and 106 per kg of treated nitrogen. In a scenario in which all 716 000 tonnes of excess nitrogen introduced annually in natural habitats would be treated to keep natural habitats in their original state, an annual expenditure on water treatment in the range of EUR 42 to 76 billion would be required (Centre d'analyse stratégique, 2011). Producing such an amount of tax revenues from a base 2 370 000 tonnes of mineral nitrogen (i.e. mostly from fertilisers) would mean that a charge in the range of EUR 17 to EUR 32 per nitrogen unit (kg) would be applied. This would correspond to 30-60 times the purchasing price of nitrogen (Centre d'analyse stratégique, 2011).	
Legal basis and timeline	The law n° 2004-338 of 21st April 2004 (transposing the Water Framework Directive 2000/60/EC) sets outs the system of water charges applied by regional water agencies. The 2006 *Law on Water and Aquatic Environments* adopted in December 2006 established a "cattle-breeding charge/fee" based on a large livestock unit (i.e. corresponding to a dairy cow responsible for 85kg of nitrogen emission/year). This charge however only applies to agricultural holdings which have above 90 large livestock units and is not meant to target nitrogen emissions alone (there are other harmful emissions). It must also be pointed out that there is no specific taxation in place for nitrogen of a mineral origin (ie marketed fertilisers) (Centre d'analyse stratégique, 2011). The law has been criticised for not adequately implementing the polluter pays principle (Cour des comptes 2010).	
Objectives and design		
Subsidy rationale/objectives (original and evolving)	This subsidy has no intended purpose as it is an implicit subsidy, consisting in insufficient internalisation of environmental externalities from agricultural production relying on nitrogen-rich fertilisers and the lack of the full application of the polluter pays principle. The implicit rationale which has resulted in French authorities failing to address the issue to date might have been the	

	historically strong support to an intensive agriculture sector with a focus on increasing agricultural productivity and stability in farmer's incomes (Cour des comptes, 2010).	
Does the subsidy fulfil its objectives?	No, it is increasingly out-dated.	
Is the rationale for the subsidy still valid?	No, subsidies to the agricultural sector are increasingly decoupled from productivity. Hence, incentives for farmers to reduce the use of nitrogen-rich fertilisers could be introduced without putting their livelihoods at risk, especially since increasingly famers can claim support for preventive measures as part of the Common Agricultural Policy.	
Who is **responsible** for the subsidy?	Ultimately responsibility lies with public authorities who do not take the steps necessary for full implementation of the polluter pays principle. Water agencies are also responsible as far as they fail to encourage farmers to claim funds available for preventive actions, which means more needs to be spent on water purification (Cour des comptes, 2010).	
Are there any key problems with **subsidy design?**	This is not a smart subsidy as it leads to unsustainable practices resulting in environmental externalities. Overall, if costs of dealing with the pollution are taken into account, the subsidy makes society as a whole worse off.	
Does the subsidy represent an **infringement of existing EU legislation**?	Nitrates concentrations have been on the rise, in multiple places in France they pass the thresholds set in EU legislation for drinking water (50 mg NO_3/l) (Cour des comptes, 2010; Nitrates Directive (91/676/EEC)). Furthermore, the WFD establishes the polluter pays principle, which, some argue, could have been better implemented in the 2006 law (Cour des comptes, 2010).	
Key social impacts		
Who are the **intended recipients / beneficiaries**?	The part of the agricultural sector relying on intensive agriculture and high input of nitrogen-rich fertilisers. Potentially also consumers of the products put on the market by these agricultural holdings; if one considers that the additional costs of production resulting from the taxation of e.g. nitrogen-rich fertilisers (or from their substitution) would be passed on to those consumers. In addition, the producers of nitrogen-rich fertilisers might also benefit from this subsidy not being addressed.	
Does the subsidy reach them?	Yes.	
What are the **unintended social effects**, if any?	The total direct economic costs to households for the treatment of nitrogen polluted water was estimated to be in the range of €380 and €780 million/year. Additional costs include the substitution cost of tap water by bottled water as high nitrogen concentration can cause health problems, in particular for infants (Centre d'analyse stratégique, 2011). In addition, as a nutrient fostering the development of various	

	organisms, nitrogen water pollution is responsible for the rise of phytoplankton and bacteria, which can be toxic for human health. As these make various seashells inedible, shellfish gathering activities can also be impeded when these toxic microorganisms develop (Centre d'analyse stratégique (2011). The algae pollution resulting from high nitrates concentration along some French coastline is dealt under economic effects (see below), but it is also clear that it has social effects, in particular on the population living near the cost affected by this phenomenon.	
Key environmental impacts		
Nature and degree of impacts on the environment	In France, the average concentration of nitrates (NO_3) in surface water rose from 3mg/l at the beginning of the 20st century to 16 mg/l at the beginning of the 21st century. Over the same period, nitrates concentrations in underground water rose from 2mg/m to 21 mg/l (Centre d'analyse stratégique, 2011). In some areas, thresholds set by EU legislation (concentrations above 50 mg/l of nitrates) have occasionally been at risk of being crossed/been crossed in places intended for the abstraction of drinking water. The concentration of 5 to 10 mg/l, beyond which green algae form, has regularly been crossed in recent years (Cour des comptes, 2010). Nitrates pollution in water may lead to eutrophication and the development of toxic bacteria and phytoplankton and threaten animal and plant diversity in aquatic habitats (Centre d'analyse stratégique, 2011). As noted above, the main source of this pollution is the use of fertilisers rich in nitrogen in the agriculture sector. 4,4 gramme of NO_3 correspond to 1 gramme of nitrogen.	
Policy filters	Existing contributions of the agriculture and farming sector ("cattle-breeding charge" and "diffuse pollution charge") to the water agencies' budget are not high enough to address the pollution from nitrates. Although there are aid mechanisms aimed at reducing the nitrogen released into the environment which are meant to be distributed by the water agencies, they do not seem to have been distributed in an effective manner (Centre d'analyse stratégique, 2011). They do for support the sector in improving storage and treatment capacity for livestock manure. These measures have not proved to be applied sufficiently to achieve measurable improvements (Cours des Comptes (2010). In addition, specific legislation address nitrogen pollution: for instance, action programs establish periods during which no nitrogen rich fertilizer can be used, or limitation on the possible use of livestock manure. Implementation of the associated measures has however been at best only partial, leading to a limited effectiveness of the measures.	

Key economic and financial impacts		
Estimated size of the subsidy per year and who bears the cost	As mentioned above, the cost of treatment can be inferred from the unit cost of nitrates treatment by the water treatment plants producing water meeting drinking water quality standards; which is between EUR 59 and 106 per kg of treated nitrogen. Nationally, the direct economic costs from nitrogen pollution were estimated to range between EUR 840 and 1310 million a year, of which EUR 740 to 1160 million is borne by households and 100 to 150 million are borne by local authorities (CGDD, 2011).	
What are the **unintended economic impacts** if any?	The above described costs include in particular (CGDD, 2011): • additional households spending related to water treatment of nitrate pollution are estimated between EUR 1,000 million and EUR 1,500 million, of which between EUR 640 million and EUR 1,140 million are charged through water bills, representing 7 to 12 % of average water and wastewater bills • populations living in the most polluted areas could face additional costs reaching some EUR 494 per household representing an extra cost of 140% of the standard yearly water bill (2006) • eutrophication costs and green algae invasion along parts of the French coast are estimated to lead to tourism losses and costs for cleaning up to coastal municipalities in the range of EUR 100 to 150 million a year (losses to the tourism sector alone are estimated to be between EUR 70 and EUR 100 million annually; annual costs of managing the green algae plague in coastal areas; borne mostly by the local authorities, is estimated to range between EUR 30 and EUR 50 million/year (Centre d'analyse stratégique, 2011). • In the catchment areas of drinking water supplies, conventional farming practices generate yearly treatment costs estimated between EUR 800 and EUR 2,400 per cultivated hectare.	
Based on the above, should this subsidy be considered for inclusion in a roadmap for reform?		**Yes**
Reform scenarios/options		
What are the main options for the reform of this subsidy?	Available options for reform include: (a) creating a tax on fertilisers containing nitrogen and other nitrogen-containing products (OECD, 2005) (b) setting up a market of manuring rights (Centre d'Analyse Stratégique (2011) (c) Lowering the threshold (number of cattle units) of the agricultural holding) after which a farm is required to pay the cattle-breeding charge/fee	
Opportunities for EHS reform		
What are the **main arguments for reform**?	Under current conditions farmers are not provided with sufficient incentives to reduce the use of nitrogen-rich fertilisers and adopt agricultural techniques to reduce water pollution from mineral nitrogen. Research found that investing in the reduction and management of nitrogen pollution up-front would be cheaper than having to improve the quality of water with excessive nitrogen concentrations or having to deal with the impacts (e.g.	

	algae, phytoplankton) of the pollution. In the most heavily affected regions, households are increasingly aware that they are subsidising parts of the agricultural sector through higher water bills and increasingly unwilling to do so. Finally, France regularly fails to comply with the thresholds set in European legislation (WFA, Nitrates Directive) and needs to show that it takes action to address the problem. (Cours des comptes, 2010, Centre d'analyse stratégique, 2011).
What are the **main barriers to reform?**	The agricultural lobby in France is powerful and this in part explains that the current legal basis does not allow the introduction of measures which would allow full implementation of the polluter pays principle and internalization of the costs of nitrogen pollution.
Is there a **window of opportunity** for subsidy removal or reform?	According to the 2011 report of the centre d'analyse stratégiques, the quantitative data to set a tax to cover the costs resulting from excessive use of nitrogen-rich fertilisers is available and thus availability of information is no longer a challenge (see above for some of the data available). In addition, a recent joint report from the Ministry of Agriculture and the Ministry of Environment provides an assessment the state of scientific knowledge about the causes of green algae proliferation (CGEDD et al, 2012). This report reiterates the current state of knowledge on this issue. This can be seen as a response to the repeated questioning of the scientific evidence on the link between agriculture and nitrates pollution, possibly in view of preparing additional measures to address the problem given the scientific evidence seems to be unquestionable. The new French government has announced that in September 14/15, 2012 a Conference on the environment focusing on the issues of energy transition and biodiversity will be held. An issue on the agenda will be environmental fiscal reform, suggesting an attempt will be made to further distinguish between environmentally beneficial and harmful tax measures/incentives. On biodiversity, a framework law is to be prepared to replace the previous one, which dates from 1976. This process can be seen as an opportunity to turn recent findings and recommendations regarding environmentally harmful subsidies/incentives into concrete reform commitments. Experiences elsewhere show that effective policy responses exist (see below).
Insights on past or existing reform	
Insights from EHS that have been (or are in the process of being) **reformed or phased out**	In Denmark the introduction of nitrogen quotas (coupled with a tax on pesticides) has led, over a 10 years period, to a 30% fall in nitrogen, pesticide and phosphorous outputs/emissions from agriculture while overall agricultural production increased by 3% over the same period (Cour des comptes, 2010). Some German landers have established programmes through which farmland is bought back and agricultural holdings converted to organic agriculture. The city of Munich program resulted in a price increase of 0.0087 cent/m3 of water to the final consumer; which needs to be seen against the cost of removing nitrogen from water polluted at levels above 50 mg/l amounts to 0.23euro/m3. The cost of preventive action has therefore proven to be much cheaper than treatment in some cases (Cour des comptes, 2010).

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ANNEX II: EHS REFORM CASES IN EU MEMBER STATES

Key:

	There were no particular problems relating to the criteria.
	There were some concerns with the criteria. It was not, however an over-riding problem.
	There were significant concerns with this criteria and further attention was considered necessary.

1 Elimination of reduced excise tax rate for diesel used in agricultural machinery in the Netherlands

Summary assessment		
Brief description of the subsidy that has been / is in the process of being reformed	The Netherlands applies two distinct excise tax rates to diesel. Diesel used as a propellant for motor vehicles that use public roads ('white' diesel) is taxed at a rate of EUR 0.43 per litre, while diesel used for other purposes ('red' diesel) is charged at EUR 0.26 per litre. Within the framework of recently agreed proposals for the 2013 budget, this distinction will disappear - all diesel will be taxed at the 'white' rate as of 1 January 2013.	
Context	Most EU MS apply a higher excise duty rate to diesel used for road vehicles than to diesel used for other purposes. Some MS (e.g. BE, LU) treat the agricultural sector even more favourably (exemption / zero rate).	
Objectives		
Original subsidy **rationale/objectives**	The subsidy was introduced in 1972, when the diesel excise tax rate for motor vehicles was increased. A reduced rate was introduced that applied to gas oil used for heating (untaxed until then), for vehicles that do not use public roads, and for agricultural tractors that use public roads only incidentally. Later on, this was extended to other vehicles that use public roads only incidentally. The rationale behind the differentiation is clearly related to road use: the excise tax is (at least to a large extent) seen as a contribution to road construction and maintenance from those who use the roads. Those who do not (or only incidentally) use roads should therefore pay a (much) lower rate.	
Reasons for reform		
Was it that:		
The subsidy did not fulfil its **objective** and/or reach its **target audience**?	Partly. 'Red' diesel is known to be used (illegally) to a substantial extent for road use purposes. According to inspections by the Customs, 2% of the checked diesel cars, vans and trucks had 'red' diesel in their tank (Ecorys, 2010).	
The **rationale** for the subsidy was no longer valid?	Partly. It was acknowledged that excise taxes on (motor) fuels are not only 'road use contributions', but increasingly also a way to internalize the externalities of fuel use (PBL, 2011). These externalities (e.g. air pollution) are caused by non-	

	road vehicles and machinery as well.	
There were problems with the **subsidy design**?	Yes. The subsidy did not have a sunset clause or a built-in review process. Moreover, it is susceptible to fraud and involves high administrative costs.	
The subsidy **infringed existing EU legislation**?	No. Directive 2003/96/EC (Art. 8) allows MS to tax gas oil used as motor fuels certain 'off-road' purposes (including agriculture and construction) at a (substantially) lower rate than for road vehicles (minimum rates resp. € 21 and € 330 per 1000 litres). For agriculture, even a zero rate is allowed (art. 15.3).	
There was a **requirement or political commitment** for reform?	No.	
There were negative **social impacts** which inspired the reform?	No.	
There were negative **economic impacts** that inspired the reform?	No.	
There were expected **budget savings** through reform?	Yes. The abolition of 'red' diesel is estimated to lead to an increase in tax revenues of € 250 million per year.	
There were negative **environmental impacts** which inspired reform?	Yes. The reform was presented as a 'green' tax measure, even though it was admitted that the (short term) environmental benefit would be small.	
There were **public pressures** or calls for reform?	To some extent. Environmental organisations have often suggested removing the subsidy.	
Process of reform		
What has the reform entailed?	As of 1 January 2013, there will be a single excise tax rate for gas oil. The State Secretary for the Environment has suggested that part of the additional tax revenues (EUR 20 million) should be recycled to the agricultural sector, e.g. as subsidies for animal housing systems with low emissions (Duurzaam Nieuws, 2012).	
What was the process of reform?	The reform has been under consideration for quite some time. The two Committees on Greening the Fiscal System addressed the issue (Werkgroep Vergroening, 1996, and Werkgroep Vergroening II, 2001). However, they concluded that the introduction of the energy tax in 1996 had already led to a decrease of the price difference between 'white' and 'red' diesel, and therefore advised against a further (excise) tax increase on 'red' diesel. In 2008, an evaluation report on excise tax expenditures (Ministerie van Financiën, 2008) concluded that the efficiency of the tax differentiation between 'red' and 'white' gas oil was decreasing, due to the high labour intensity of monitoring and the frequently occurring abuse.	

	A study for the Ministry of Finance (Ecorys, 2010) confirmed the finding that fraud with 'red' diesel is a common phenomenon. Concerning a possible abolition of the tax differentiation it stated that most present users of 'red' diesel would simply switch to 'white' diesel, due to a lack of alternatives. Furthermore, the report found limited opportunities to recycle the increased tax revenues to the affected sectors by means of 'green' incentives. The Ecorys report provoked a motion in Parliament to gradually phase out the preferential tax treatment of 'red' diesel. However, this motion was rejected (November 2010). The issue came on the agenda again during the discussions on the government budget in spring 2012. The termination of the excise tax reduction for 'red' diesel was now also accepted by the centre-right coalition parties. After the fall of the Rutte cabinet (April 2012), the measure was retained in the budget agreement that was reached by a parliamentary majority in May 2012. It will take effect as of 1 January 2013.
How did the process take place?	The reform is currently in the stage of a political agreement. It still needs to be implemented by a change of the excise tax law (Wet op de accijns).
Key social impacts of reform	
Who was affected by the reform?	The reform will primarily affect the income of farmers, who will usually not be able to pass the tax increase on to their customers. According to agricultural organisation LTO Nederland, dairy and crop farmers will see their income decrease by EUR 5000 per year on average (Leeuwarder Courant, 10 May 2012).
Key environmental impacts of reform	
What were/are the main **environmental impacts** of the reform?	It is generally acknowledged that the environmental impact of terminating the fiscally favourable treatment of diesel for agricultural use will be limited. It could create an incentive to switch to more efficient engines, but to what extent this will actually affect investment behaviour is unclear (Ministerie van Financiën, 2011).
Key economic and financial impacts of reform	
What were the main **economic** and/or **financial** impacts of the reform?	The reform is expected to lead to an increase in tax revenues of about EUR 250 million. Part of this (EUR 20 million) will be recycled to the agricultural sector by means of 'green' subsidies. Agriculture and construction are the two main sectors using 'red' diesel. While the construction sector is expected to be able to pass on the cost increase to their clients (albeit with some delay), for agriculture a full pass-on is unlikely, since this sector has to compete on an international market (Ecorys, 2010).
Barriers to reform	
What were the main **obstacles to reform**?	Probably the vested interests of the sectors benefiting from the subsidy. Traditionally, the agricultural lobby has been strong in NL, with much influence in the political arena (see e.g. Frouws, 1994).

Drivers of reform	
What were the main **enabling / success factors** that allowed the reform to take place?	The main reform driver has probably been the pressing need to find ways to reduce the public budget deficit, in combination with the awareness of the high administrative cost and susceptibility to fraud of the excise tax differentiation.
Key lessons learnt	
What **are the overall lessons** that can be learnt from the case, particularly in terms of its potential for **replicability** in other Member States considering EHS reform?	• Opposition against a subsidy reform measure may be easier to overcome if it is presented as part of a large package. • The prospect of compensatory measures for the affected sector(s) may increase the political acceptance of the reform, even if this compensation is only partial.
References	Duurzaam Nieuws (2012): http://www.duurzaamnieuws.nl/bericht.rxml?id=81839&photo) Ecorys (2010), *Tariefdifferentiatie tractoren en mobiele werktuigen. Eindrapport.* Rotterdam, March 2010. Frouws, J. (1994), *Mest en macht. Een politiek-sociologische studie naar belangenbehartiging en beleidsvorming inzake de mestproblematiek in Nederland vanaf 1970.* Dissertation, Wageningen Agricultural University. Ministerie van Financiën (2008), *Evaluatierapport Belastinguitgaven op het terrein van de accijnzen.* The Hague, 23 April 2008. PBL (2011), *Milieuschadelijke subsidies*. Publicatienummer 500209001, 14 September 2011. Werkgroep Vergroening van het Fiscale Stelsel (1996), *Tweede Rapportage.* The Hague, 14 March 1996. Werkgroep Vergroening van het Fiscale Stelsel II (2001), *Fiscale vergroening. Een verkenning van de fiscale mogelijkheden om het milieu te ontlasten.* The Hague, July 2001.

2 Reduction of energy tax exemptions for companies in Germany

Summary assessment	
Brief description of the subsidy that has been / is in the process of being reformed	"Spitzenausgleich bei der Ökosteuer": The tax on electricity consumption has three different relief schemes for companies: • Total exemption: Some very energy intensive industries do not pay the tax. • Companies that consume more than 25 MW/h (so all middle and large manufacturing companies), received a tax relief of 40%of the tax. After the reform in announced in 2011 this tax relief has been reduced to 25%. • Peak equalisation scheme for eco tax – energy-intensive enterprises in the manufacturing sector received a refund of 95% of the remaining electricity and energy consumption tax payments that exceed the relief on pension scheme contributions (paid for by the eco tax), that the company benefits from. The refund has been reduced to 90% after the reform of 2011. (Federal

	Environment Agency 2010)	
Context	Energy tax exemptions exist in many Member States of the EU. The exact beneficiaries of these exemptions and the amount of refund differ across Member States.	
Objectives		
Original subsidy **rationale/objectives**	- The exemptions were introduced to ensure the international competitiveness of German companies. - The revenues of the tax are used to lower social insurance contributions. Energy intensive companies, which do not profit from the lower social insurance contributions in proportion to their potential energy tax payments, received therefore generous exemptions.	
Reasons for reform		
Was it that:		
The subsidy did not fulfil its **objective** and/or reach its **target audience**?	No – The costs of energy did not increase significantly for companies with high energy costs.	
The **rationale** for the subsidy was no longer valid?	No – the rational to defend German competitiveness is still valid.	
There were problems with the **subsidy design**?	The rationale would imply that only companies with international (not taxed) competition should benefit from the exemptions. However the exemptions apply also to companies which sell their products exclusively in Germany, for which therefore the rationale does not apply. This means that a significant part of the exemption is paid to companies that could pay the energy tax without any loss in competitiveness.	
The subsidy **infringed existing EU legislation**?	Partially: The subsidy had to be approved by the European Commission. To be prolonged, an obligation to increase energy efficiency of the industry in question had to be introduced.	
There was a **requirement or political commitment** for reform?	Yes – There is a requirement of the EU commission to link tax cuts to the industry's commitment to increase energy efficiency and the introduction of energy management systems or audits.	
There were negative **social impacts** which inspired the reform?	In the context of the switch of German power generation to renewable energy, consumer prices have been hotly discussed. In this discussion the exemptions of companies to the energy tax and the renewable energy levy were criticized, as shifting the burden of adjustment to the private customer.	

There were negative **economic impacts** that inspired the reform?	The tax exemptions reduce the incentive to invest in energy savings for most companies and especially so for the most energy intensive companies.	
There were expected **budget savings** through reform?	No – According to a study by the FÖS (FÖS, DENEFF 2012, p.1; Bundesregierung 2012a, p.1) the overall budget impact of the reform was negligible as the total value of the exemptions did not change (€2.3 billion). The changes to eligibility and the changes to the rate of tax exemption did balance each other out.	
There were negative **environmental impacts** which inspired reform?	Partially – Higher energy prices would increase the economic pressure on industry to save energy, this pressure is reduced by the tax cut implying higher CO_2 and other emissions.	
There were **public pressures** or calls for reform?	Partially – there was some pressure by environmental NGOs for sharper cuts to the exemptions.	
Process of reform		
What has the reform entailed?	2011: The possible tax refund was reduced from 95% to 90% (peak equalization scheme for energy intensive industries) and from 40% to 25% for other industries. 2012: a number of conditions have been introduced on those organisations applying for the tax reduction: • Major enterprises have to introduce an energy management system; • Small and medium sized businesses have to make use of energy audits. • The manufacturing trade as a whole has to increase its energy efficiency by 1.3% per year in 2013-2015 and 1.35% in 2016 .	
What was the process of reform?	The German legislature was obliged by the European Commission to either introduce energy efficiency targets as prerequisite for tax exemptions into the laws on energy and electricity taxes or not to prolong exemptions at all after January 1st 2013. The "Entwurf eines Zweiten Gesetzes zur Änderung des Energiesteuer- und des Stromsteuergesetzes" (draft of a second law changing the laws on energy and electricity taxes) was discussed by politicians, NGOs and industry and approved by the "Bundeskabinett" (federal cabinet) on August 1st 2012. The law is about to be voted on in the parliament and to come in to force by the end of the year 2012.	
How did the process take place?	Legislative change	
Key social impacts of reform		

Who was affected by the reform?	Smaller companies will need to pay slightly higher energy taxes as they did until now. As these companies are not strongly dependent on energy there will be only a small impact. Overall the impact will be negligible.
Key environmental impacts of reform	
What were/are the main **environmental impacts** of the reform?	The new law requires organisations applying for the tax reduction to undertake an audit of energy consumption. However the commitment to save energy is weak as current trends are stricter than the commitments. This leads to some awareness for but probably no or little decrease in GHG emissions. It is important to note that the energy efficiency targets are weaker than those already in place. The average annual increase in energy efficiency has been 1.7% during the last five years, and in its sustainability strategy Germany committed itself to an annual increase of 2.1 % per year. (FÖS, DENEFF 2012).
Key economic and financial impacts of reform	
What were the main **economic** and/or **financial** impacts of the reform?	Industries entitled to the tax cut have to invest in the introduction and maintenance of an energy management system. 50% of the costs of the audit system are taken over by the national budget and therefore the general public. (Bundesregierung 2012b) The "Deutsche Umwelthilfe" (DUH) estimates a loss of tax money of the reformed exemption of about 20 billion € in ten years. (DUH 2012)
Barriers to reform	
What were the main **obstacles to reform**?	A strong industrial lobby that was not willing to lose its tax privileges or commit to ambitious increases in energy efficiency.
Drivers of reform	
What were the main **enabling / success factors** that allowed the reform to take place?	Energy prices for private consumers have been a sensitive political issue over the last two years in Germany due to the energy tax and the rising renewable energy levy. German energy prices for private consumers are among the highest in Europe and there is some political pressure from the opposition and other pressure groups to relieve consumers. A stronger limiting or even abolishing the tax exemptions for energy intensive industries would have been one way to do this. The window of opportunity was the deadline on the exemption which was included in the original law (End of 2012). This sunset clause enabled the reforms in 2011 and 2012 to take place.
Key lessons learnt	
What **are the overall lessons** that can be learnt from the case, particularly in terms of its potential for **replicability** in other Member States considering EHS reform?	The reforms in 2011 and 2012 are both in the right direction but can be considered small steps towards the objective of abolishing the EHS. The exemptions for the most energy intensive industries stayed fully or nearly fully in place meaning the positive environmental impacts of the reform are likely to be smaller than possible. The DUH (Deutsche Umwelthilfe – a German environmental pressure group) considers to call on the European Commission not to approve the law, it characterizes

	the tax cuts as unwanted subsidy, the industry's service in return not being sufficient. (DUH 2012) A key factor behind the reforms to date has been the prominent link to consumer prices, which was politically the main argument against a blanket extension of the exemptions. For future attempts of abolishing those exemptions it would therefore be recommend to make the link to consumer prices even more transparent and use it better in the political discussion.
References	Bunderegierung (2012a): Entwurf eines Zweiten Gesetzes zur Änderung des Energiesteuer- und des Stromgesetzes. URL: http://www.bundesfinanzministerium.de/Content/DE/Publikationen/Aktuelle_Gesetze/Gesetzentwuerfe_Arbeitsfassungen/2012-08-01-stromsteuer-gesetz.pdf?__blob=publicationFile&v=4 Bundesregierung (2012b): Vereinbarung zwischen der Regierung der Bundesrepublik Deutschland und der deutschen Wirtschaft zur Steigerung der Energieeffizienz vom 1. August 2012. URL http://www.bundesfinanzministerium.de/Content/DE/Publikationen/Aktuelle_Gesetze/Gesetzentwuerfe_Arbeitsfassungen/2012-08-01-stromsteuer-anlage-vereinbarung.pdf?__blob=publicationFile&v=2 Deutsche Umwelthilfe e.V. - DUH (2012): Ökosteuer: Weiterführung von Spitzenausgleich „für lau" verstößt gegen EU-Recht. URL http://duh.de/pressemitteilung.html?&tx_ttnews[tt_news]=2907 Federal Environment Agency (2010): Environmentally harmful subsidies in Germany. URL: http://www.umweltdaten.de/publikationen/fpdf-l/3896.pdf FÖS, DENEFF (2012): Hintergrundpapier – Bewertung des aktuellen Vorschlags zur Energie- und Stromsteuernovelle vor dem Hintergrund der Energiewende in Deutschland, Berlin. URL: http://www.foes.de/pdf/2012-07-FOES-Deneff-Spitzenausgleich-Hintergrund.pdf

3 Reduction of exemptions from energy and CO_2 taxes for certain fossil fuels in Sweden

Summary assessment	
Brief description of the subsidy that has been / is in the process of being reformed	This case study is based on the 2009 tax reform package and more specifically the reductions in the subsidies (or rather subventions) for the CO_2 tax. The use of energy and CO_2 taxes has a long history in Sweden with the tax on fuels being introduced in the late 1920s and the energy tax being introduced in the 1950s. The focus of the energy tax moved towards climate change in the 1980s and the CO_2 tax was introduced in the 1991 with Sweden being the first country in the world to introduce such a measure. The tax was introduced to serve as an incentive for consumers to switch to fuels with lower carbon content, improved utilization efficiencies and the implementation of new technologies. Hence, Sweden has a long tradition of using these taxes to achieve its climate change

	targets. This case study will examine the CO_2 taxes for certain fossil fuels as part of the 2009 tax reform.	
Context	Examples of other EU countries with a CO_2 tax in place are: • Finland - introduced in 1990, now per ton CO_2 €60 for traffic fuels and €30 for heating fuels; 50% CO_2 tax on sustainable 1st generation biofuels. • Denmark – introduced in 1992, now €21 per ton CO_2; lower rates for industry's process heating. • Slovenia – introduced in 1997, now €15 per ton CO_2. • Ireland introduced in 2010; introduced at €15 per ton CO_2 now €20 per ton CO_2. • Italy: Announced in 2012 ; (Åkerfeldt 2012)	
Objectives		
Original subsidy **rationale/objectives**	The original aim was to maintain the competitiveness of certain industries and avoid carbon leakage.	
Reasons for reform		
Was it that:		
The subsidy did not fulfil its **objective** and/or reach its **target audience**?	**No** The main reason for these subsidies was to maintain the competitiveness of industry and avoid carbon leakage. However, the reform acknowledges that to achieve the aims of reducing the greenhouse gas emissions by two million tonnes by 2020, further measures were required. The IA of the Proposal for the tax reform 2008/09:162 states that the tax will create new incentives to use non-fossil fuels for heating. At the same time the IA acknowledges that it is also likely that carbon leakage is likely to occur but that this will be highly dependent on the kind of instruments to reduce greenhouse gas emissions outside the ETS that are in place in other Member States. In other words the objective was fulfilled but overridden by more pressing objectives.	
The **rationale** for the subsidy was no longer valid?	**Partially** As explained above, the rationale is valid but overridden by more important considerations.	
There were problems with the **subsidy design**?	**No** No problems with the design.	
The subsidy **infringed existing EU legislation**?	**No** The subventions have not infringed existing EU legislation but over the years some aspects of the energy and CO_2 subventions have been challenged by the Commission but in the end the subventions have deemed not to violate the state aid or energy taxation regulations. (Stigson, 2007)	
There was a **requirement or political commitment** for reform?	**Yes** The main reason for the reform was the political commitment to meet the long-term aim of the	

	Swedish Government of a sustainable energy supply that makes efficient use of resources and gives rise to zero net emissions of greenhouse gases to the atmosphere by 2050 (Government Bill 2008/09:162). By 2020, greenhouse gas emissions in Sweden, from activities outside the EU ETS, are to be reduced by 40% (in comparison with 1990) (Hammar and Åkerfeldt, 2011).	
There were negative **social impacts** which inspired the reform?	**No** There were no adverse social impacts. However, the subventions as part of the tax reform are likely to increase the outgoings of some households. However, households can also avoid these taxes by changing their consumption patterns and transport choices. However, as the CO_2 tax is regressive it is likely that low income households are proportionally more affected by the tax. Therefore the Swedish Government will keep the option open of using the increased tax revenues to potentially support low income households (Government Bill 2008/09:162). The tax changes are also implemented stepwise so that households and companies have time to adapt. Moreover, so far tax increases for companies and households in the energy and environmental areas have been offset by tax reliefs in other areas, for example labour taxation. (Government Bill 2008/09:162)	
There were negative **economic impacts** that inspired the reform?	**Partially** A study by the Swedish think tank Fores looked into the winners and losers of the CO_2 tax reform. The study argues that the losers will be larger companies (more than 50 employers) and the winners are SMEs that can quickly adapt and innovate. Based on this argument the subventions in place have been stifling innovation for SMEs and hence have had a negative economic impact. (Bahr et al, 2010)	
There were expected **budget savings** through reform?	**Yes** It is estimated that the reduction in the subventions in CO_2 tax for fossil fuels used in heating will bring additional taxes of about 40 million Swedish crowns (almost €5 million). (Government Bill 2009/10:41)	
There were negative **environmental impacts** which inspired reform?	**Yes** It has been estimated that the taxes on CO_2 and energy have by 2010 provided a reduction of 20% in GHG emissions compared to a situation where the taxes would have remained the same as in 1990. As already mentioned the subventions in place were hampering the achievement of further reductions and hence the tax reform is a step towards this aim. And hence the reform is to achieve a more positive	

	environmental impact and in relative terms, could be seen as a measure to address a negative environmental impact. (Government Bill 2009/10:41)	
There were **public pressures** or calls for reform?	**No** The tax reform has been taken forward by the central government with the support form NGOs.	
Process of reform		
What has the reform entailed?	The tax reform makes changes to the tax code as well as changes to the legislation. In October 2009, the Swedish Government proposed a number of tax changes in the climate and energy sectors (Government Bill 2009/10:41). The principles behind the proposals had been laid down in the Government's Climate Bill earlier that year (Government Bill 2008/09:162) and the proposals were adopted by the Parliament later during the autumn and enter into force in steps in 2010, 2011, 2013 and 2015. (Hammar and Åkerfeldt, 2011) Measures entering into force in 2013 and in 2015 include a further increase of the CO_2 tax on natural gas and LPG as motor fuels (to 80% of the general CO_2 tax in 2013 and to the full CO_2 tax in 2015). The amount of reimbursement of the CO_2 tax on diesel used in agriculture will be further reduced. The reduced CO_2 tax rate for industry and certain other sectors outside the EU ETS will in 2015 be subject to an increase to 60% of the general CO_2 tax. The special provisions, giving a limited number of industrial and horticultural companies an additional tax relief are also phased out. The scheme was made stricter in 2011 and will be fully abolished in 2015. The various tax measures in the 2009 package are estimated to reduce greenhouse gas emissions and contribute to achieving the set goals for the share of renewable energy and energy efficiency. (Hammar and Åkerfeldt, 2011) The use of tax instruments is motivated by the consideration that it is the most cost effective way to achieve emission reductions. Both the energy and CO_2 taxes are levied on fossil fuels used for heating purposes. Since the two taxes are levied on the same basis, they in practice function as one tax with two components. The provisions for collection and chargeability as well as the control provisions are identical and both taxes are presented together to the taxpayers for the purposes of their tax return. Not only the CO_2 tax, but also the energy tax, has an environmental steering effect on the consumption of fuels. In order to achieve the desired steering effect, the Swedish Government has adjusted the tax levels of either the energy tax or the CO_2 tax over the years. (Lannering et al, 2003) The CO_2 tax has several aspects and Figure 1 gives an overview of the energy and CO_2 taxes, as of 1 January 2011 (Hammar and Åkerfeldt, 2011). It is evident from this figure that the CO_2 tax reform has several features and hence it is not possible as part of this case study to provide a detailed and comprehensive overview	

	of all the aspects of the CO_2 tax and interlinkages with other taxes and policy instruments. Rather this case study aims to provide an understanding of the rationale behind the reform based on specific examples. Hence as part of this case study we will look in more detail at the increased CO_2 tax for heating fuels as well as the abolition of the tax reductions for industry. The industry was able to apply for a tax reduction for the share that exceeds 0.8% of the sales value, which is meant to improve the energy intensive basic industries' international competitiveness. The reduction was allowed to an amount that does not exceed 24% of the surplus tax of the fuel. The reduction is allowed by the EU as long as the EU minimum tax rates for different fuels is not surpassed and the rules for deductions, stipulated in the Energy Tax Directive (2003/96 /EC), is adhered to (Stigson, 2007). The tax reform increased the reduction limit to 1.2% in 2011 and it will be totally abolished in 2015. The CO_2 tax for heating fuels used outside the ETS will be increased from 21% to 30% in 2011 and to60 % in 2015. Here the basic principle was to have the same level of CO_2 taxation for both heating fuels and motor fuels (Åkerfeldt 2012). Note that the CO_2 tax for industries that are part of the EU ETS will be abolished and instead the CO_2 tax will be increased for those sectors, such as agriculture, forestry and transport. Transport and agriculture are responsible for 46% of total CO_2 emissions. (Bahr et al, 2010).
What was the process of reform?	The reform was led by the Government with the support from a wide range of stakeholders (apart from those industries that were mostly benefitting from the subventions in place)
How did the process take place?	The process took place through a Government Proposal (2008/09:162), followed by a consultation and the Government Bill 2009/10:41 was approved in 2009.
Key social impacts of reform	
Who was affected by the reform?	A study by the Swedish think tank Fores looked into the winners and losers of the CO_2 taxes. The study argues that the losers will be larger, carbon intensive companies (more than 50 employers) and the winners are SMEs that can quickly adapt and innovate. Based on this argument the subventions in place have been stifling innovation for SMEs and hence have had a negative economic impact. However, the IA of the Proposal points out that larger companies have the benefit of higher financial potential to invest into changes, in contrast to many SMEs. (Bahr et al, 2010)
Key environmental impacts of reform	
What were/are the main **environmental impacts** of the reform?	It is estimated that the tax reform as a whole will reduce GHG emissions by 0.68 million tonnes by 2015. (Prop 2009)

Key economic and financial impacts of reform	
What were the main **economic** and/or **financial** impacts of the reform?	It is estimated that the reduction in the subventions in CO_2 tax for fossil fuels used in heating will bring additional taxes of about 40 million Swedish crowns (almost €5 million) (Government Bill 2009/10:41). In terms of administrative costs it is estimated that these have are around 0.1% of total revenues for energy and CO_2 taxes. (Åkerfeldt, 2012)
Barriers to reform	
What were the main **obstacles to reform**?	Apart from the predictable opposition from industries that mostly benefitted from the subventions, there were no obstacles to the reform as such.
Drivers of reform	
What were the main **enabling / success factors** that allowed the reform to take place?	The reform is a continuation of a proactive effort by the Government to meet Sweden's ambitious GHG targets and a long tradition of using environmental taxes in Sweden and hence is part of an on-going process rather than a specific event /opportunity that would have been the driver for the tax reform.
Key lessons learnt	
What **are the overall lessons** that can be learnt from the case, particularly in terms of its potential for **replicability** in other Member States considering EHS reform?	The reduction of subventions for fossil fuels in certain sectors in spite of potential carbon leakage is an indication of long term planning by the Swedish Government, recognising that the changes will promote innovation as well as being essential for Sweden to be able to meet its ambitious GHG targets. There are also some interesting issues of interest to the development of the Energy Taxation proposal. There are some concerns within the Government that changes in the Energy Taxation Proposal could hamper the national efforts by Sweden to meet its GHG targets. For example the Swedish EPA is concerned that the link between the tax and the price of carbon in the EU ETS will lead to a low carbon tax and hence prefers that MS are allowed to differentiate their own carbon tax, i.e. to have a higher carbon tax for those sectors that are less sensitive to carbon leakage and a lower for those that are sensitive. SwEPA points out that the link in the Energy Taxation Proposal between the carbon tax and the carbon price works in theory but not in practice as the ETS is not working optimally and therefore the problems in the ETS are now expanded to also affect the non-ETS sector. (SwEPA 2011) Another issue of concern to SwEPA is that the proposal does not allow a carbon tax for non-industrial "heating installations". Sweden has a carbon tax for these installations and considers it important that they are maintained in order for Sweden to meet its renewable energy commitments by 2020 (SwEPA 2011).
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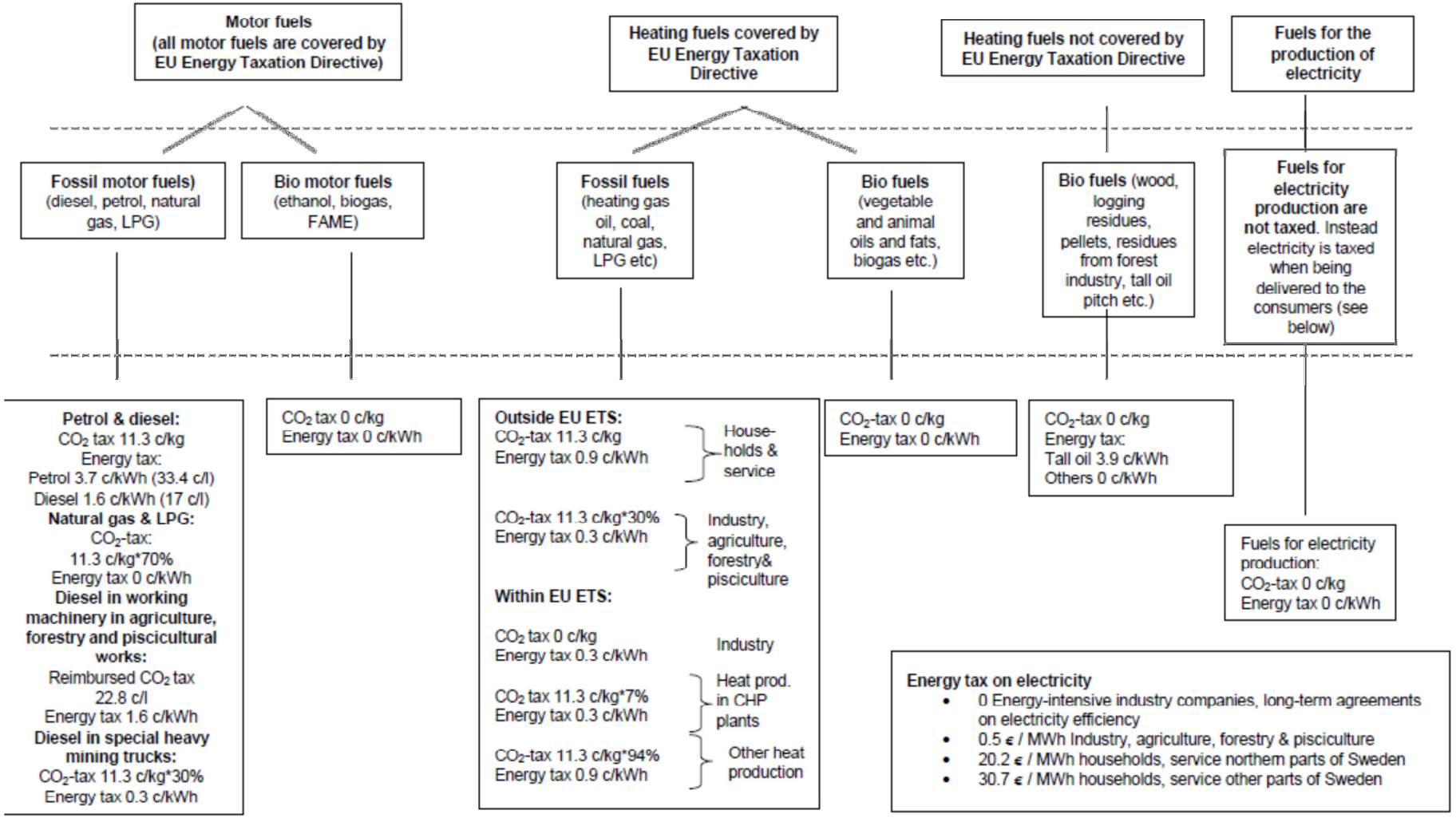
	politik, http://www.regeringen.se/content/1/c6/12/27/78/4ce86514.pdf Government Bill 2009/10:41, Vissa punktskattefrågor med anledning av budgetpropositionen för 2010, http://www.sweden.gov.se/content/1/c6/13/41/92/e1533dc6.pdf Hammar H, and Åkerfeldt S,., (2011) CO_2 taxation in Sweden, 20 years of experience and looking ahead Lannering, J. and Renner-Loquenz, B. (2003, State aid and eco-taxes for state aid assessment, Competition Policy Newsletter, Number 3, Autumn 2003. Stigson, L (2007), Reducing Swedish carbon dioxide emissions from the basic industry and energy utilities, Master Thesis, Mälardalen University, 2007. SwEPA (2011) Europeiska kommissionens forslag till andring av Direktiv 2003/96/EG om omstrukturering av gemenskapsramen for beskattning av energiprodukter och elektricitet, m.m, Yttrande, 19.8.2011

Figure 1: Overview of CO_2 and energy taxes in Sweden based on the 2009 tax reform



4 Aggregates levy and landfill tax on construction and demolition waste in the UK

Summary assessment	
Brief description of the subsidy that has been / is in the process of being reformed	Before the introduction of the Aggregates Levy in the United Kingdom (UK) in 2002, costs associated with the adverse environmental impacts linked to aggregates extraction and transportation were not borne by the extractive industry, the building sector nor the final consumer. This was not in line with the polluter's pays principle, calling for correcting such externalities through a price-based measure. The aggregates levy (AGL) came into effect on 1 April 2002, and was introduced to address the environmental costs associated with quarrying that were not already covered by regulation, including noise, dust, visual intrusion, loss of amenity and damage to biodiversity. The levy aims to bring about environmental benefits by making the price of aggregates better reflect these costs and encouraging the use of alternative materials such as recycled materials and certain waste products (HMRC, 2012). Originally, the Aggregates levy was introduced at the level of £1.60 per tonne. It rose progressively to £2.00 (April 2009). The landfill tax (tax on the disposal of waste by way of landfill), also applying to construction and demolition waste, that was introduced on 1st October 1996, can also be seen as having been part of the "EHS" reform package. One can indeed consider that, together with the aggregates levy, the "package" of measures addresses the adverse impacts of the use of "aggregates" over their whole life cycle, from "cradle to grave".
Context	Similar reforms have progressively been introduced in a whole range of MS over the last couple of years. The scope and rationale of the introduced taxes and charges has however been variable. In some cases, the levels of the charges introduced are merely meant to cover the costs associated with permitting procedures and not attempt is made to set the tax or charge at a level which would provide an incentive to reducing the overall amount of aggregates extracted (thus reducing associated negative environmental externalities), slowing down the extraction activities to levels considered more sustainable and encouraging recycling. Keeping this in mind, the MS which now have taxes and charges on aggregates include: Belgium (year of introduction: 1993), Bulgaria (1997), Cyprus, the Czech Republic (1993), Estonia (1991), France (1999), Germany (1980), Hungary, Italy, Latvia (1996), Lithuania (1991), Poland, Slovakia, Sweden (1992) (EEA, 2008, OECD/EEA database, ETC/RWM, 2005).
Objectives	
Original subsidy **rationale/objectives**	There may be different rationales behind not fully correcting externalities from economic activities resulting in adverse environmental impacts. Generally, such a subsidy is maintained with the rationale that the sector would become less competitive (i.e. jobs could be lost) or that the prices of the final product (here building materials) to the consumer could increase, with implications on people's purchasing power. In a case like aggregates extraction, however, which is not exposed to competition to the same extent as other sectors (transportation of building material over longer distances is very expensive because of its weight), negligence and a limited evidence as regards adverse impacts is more likely to have been the origin of the persistence of the subsidy.
Reasons for reform	
Was it that:	

The subsidy did not fulfil its **objective** and/or reach its **target audience**?	No, as a target audience had never really been identified is was more about weighting the benefits of the reform against the costs of the reform and clarifying who would be those losing out and who would be the winners.	
The **rationale** for the subsidy was no longer valid?	The increasing amount of information on the adverse environmental impacts of aggregates extraction and associated cost meant that it was decreasingly perceived as acceptable/fair.	
There were problems with the **subsidy design**?	N/A.	
The subsidy **infringed existing EU legislation**?	Not directly but not fully in line with the polluter pays principle the implementation of which has been promoted and encouraged by the EU.	
There was a **requirement or political commitment** for reform?	When the Labour government came in power in 1997 it set out a "statement of intent on environmental taxation" to shift the burden of taxation from 'goods' to 'bads' (House of Commons Library, 2009). So this corresponds indeed to an overall commitment to implementing the polluter pays principle.	
There were negative **social impacts** which inspired the reform?	Yes, some of the below described environmental impacts would also fall under the 'social' category, especially those associated with health.	
There were negative **economic impacts** that inspired the reform?	No, these do not seem to have played a major role.	
There were expected **budget savings** through reform?	Not really given this was an off-budget subsidy. As far as the effects of the adverse environmental impacts did however result in costs to society at large (e.g. negative effects on health due to noise and dust, biodiversity loss…), cost savings could be expected from the introduction of a tax resulting in reduced primary materials extraction.	
There were negative **environmental impacts** which inspired reform?	The environmental impacts of the extraction and transportation of the construction materials, including noise, dust, vibrations, visual intrusion, loss of biodiversity, etc.	
There were **public pressures** or calls for reform?	Public pressures were not very important but the Institute for Public Policy Research published a report in 1996 which made a strong case for imposing a tax on quarrying (see below for further information). A report commissioned by the government showed that there would be willingness to pay to avoid the adverse environmental effects of quarrying for construction aggregates	

	(DETR, 1999).
Process of reform	
What has the reform entailed?	A centralised ad quantum tax (quantity tax) by weight was introduced in the UK in April 2002. Understood as a "green tax", it was designed to address and internalise the environmental impacts of the extraction and transportation of the construction materials (see above). The levy applies to all extraction and imports to the UK, but it excludes exports (Söderholm, 2011). The most important aims of the levy was therefore to (1) compensate for environmental externalities, (2) reduce the demand for primary aggregates (i.e. sand, gravel and crushed stone), (3) encourage the more efficient use of aggregates and (4) maximise the use of alternatives, such as recycled construction and demolition waste, and secondary materials, such as china clay waste (Ecorys, 2011). As regards "flanking measures", it must be pointed out that the aggregates levy is embedded in a set of progressive initiatives and policies in the UK that should be taken into account, in particular the above mentioned landfill tax introduced in 1996 which is thought to have had a major impact in terms of increasing the amount of recycled construction and demolition waste (and therefore recycled building materials for construction on the market, which constitutes a good substitute for at least part of the virgin materials that would otherwise have been extracted). More secondary policies which can nevertheless be seen as part of the reform "policy-mix" are the Strategy for Sustainable Construction, a joint industry and Government initiative intended to deliver benefits to both the construction industry and the wider economy (Ecorys, 2011). It must be pointed out that the AGL is not be levied on materials that arise as by-products or waste products from other processes. According to the United Kingdom authorities, such products include slate waste, china clay waste, colliery spoil, ash, blast furnace slag, waste glass and rubber. Nor is the AGL be levied on recycled aggregate, which includes rock, sand or gravel that has been used at least once (Judgement of the General Court, March 2012). According to the United Kingdom authorities, the purpose of excluding such products from the scope of the AGL is to encourage their use as construction materials and reduce the need for unnecessary extraction of virgin aggregate, thereby encouraging resource efficiency. Thus, the environmental objective of the AGL is essentially designed to encourage a shift in demand for 'primary' aggregates in the construction industry towards 'secondary' aggregates, which are the by-products of or waste from other processes, as well as towards 'recycled' aggregates (Judgement of the General Court, March 2012).
What was the process of reform?	The possibility of imposing a tax on quarrying was discussed in a significant report on environmental taxation, published by the Institute for Public Policy Research in 1996 (Tindale et al., 1996). On the question of a quarrying tax, it was thought that a new tax charge would be unlikely to have much of an effect on demand, implying that it might be a good innovation from the perspective of

	the Exchequer. It suggested that "there is 70 million tonnes of construction and demolition waste every year. Little of this is re-used, partly because landfilling for construction waste is very cheap and partly because the market price for primary aggregates is so low and argued that "a package of measures to reduce quarrying and increase the use of secondary aggregates would need to include a quarrying tax to make primary aggregates more expensive, a landfill tax to make the disposal of construction waste more expensive (…)" (Tindale et al., 1996). In his first Budget in July 1997, the Chancellor Gordon Brown, set out the Government's priorities in environmental taxation, which included a review of the possibility of charging a tax on quarrying. In the March 1998 Budget the Labour Government confirmed that its initial research had been completed which indicated "that there are environmental costs attached to quarrying which a tax might capture" though "further work is needed … both to build on the initial research findings, to consider the range of options for addressing these costs, and to examine how a tax might work". The government commissioned a study on the environmental costs of quarrying (DETR, 1999). The study estimated how much people valued avoiding the adverse environmental effects of quarrying for construction aggregates (rock, sand or gravel) both in their locality and in landscapes of national importance. From the results of the surveys, national estimates were calculated for the average amount that people are willing to pay for the environmental benefits obtained from early enclosure of a quarry. The national average, weighted by the type of output, was calculated to be £1.80 per tonne (Library of the House of Commons, 2011; DETR, 1999). After the research into the environmental costs of aggregate extraction – and discussions with the industry about the use of voluntary measures to improve its environmental performance – Mr Brown confirmed in the 2000 Budget that a levy would be introduced in April 2002 (House of Commons, 2011). In light of this research the Government indeed noted in its Pre-Budget Report it was "minded to introduce a tax" in the 2000 Budget, unless the industry was able to "further improve" on its package of voluntary measures. Further discussions with the industry followed. Apparently the industry made delivery of the voluntary package "conditional on undertakings from the Government on procurement policy which were unacceptable," and as a consequence the Government announced in the March 2000 Budget that a levy would be introduced from 1 April 2002 (House of Commons Library, 2011).
How did the process take place?	The reform of the harmful subsidy was introduced through budgetary decisions. The landfill tax, which was to contribute to the aggregates levy success, became effective on the 1st October 1996. The new budget tabled by the Chancellor of the exchequer in 2002 (after general elections) included the AGL. Sections 16 to 49 of Part II and schedules 4 to 10 of the Finance Act 2001 ("the Act") impose a levy on aggregates ("the AGL") in the United Kingdom. The AGL was brought into force on 1 April 2002, by statutory implementing regulations. Section 16(2) of the Act, as amended, states that the charge to the AGL is to

	arise whenever a quantity of taxable aggregate is subjected, on or after the commencement date under the Act, to commercial exploitation within the United Kingdom. It therefore applies to imported aggregates in the same way as to aggregates extracted in the United Kingdom. Regulation 13(2)(a) of the implementing regulations makes a tax credit available to the operator when taxable aggregate is exported or removed from the United Kingdom without further processing (Judgement of the General Court, March 2012).
Key social impacts of reform	
Who was affected by the reform?	Anyone commercially exploiting aggregate in the United Kingdom. In most instances this is likely to be the operator of the site where the aggregate is extracted, although under certain circumstances it could be the owner of the aggregate. Anyone importing aggregate from outside the UK and agreeing to supply it or using it for construction purposes. The economic sectors associated with mining for aggregates, i.e. extractive industries mining for "aggregates" (includes sand, gravel and crushed stone and marine aggregates) might have lost out although this effect is likely to be very limited given all tax revenues are transferred back to business, through a 0.1 reduction in employer NIC's (National Insurance Contribution) for firms working within the sector. Industry has however contested this, claiming that reduction was immediately overtaken by further increases in NIC and that the 0.1. reduction was not specifically targeted at the aggregates industry (personal communication, Mineral Products Association). As far as this tax has contributed to the increase in the price of, in particular virgin, construction materials (the larger part of the additional costs has been passed on to the consumer), the construction sector, and more generally the purchaser of the aggregates, might have witnessed a small increase in prices that could arguably be linked to the introduction of the tax (Leggs, 2007). An economic sector which might have benefitted greatly from the reform is the building waste/materials recycling sector. In addition, identified potential benefits to business arising from the tax have included (Ecorys, 2011): • Increasing profitability by using resources more efficiently • Increased resource efficiency • Increased process efficiency • Minimisation of waste and waste charges • Enhancing company image and profile in the market • Opportunities for firms which supply recycling and secondary • aggregates • Reduced reliance on non-renewable resources (quarried mineral • products) • Reduced embodied carbon content. Finally, some of those who might have suffered from the adverse environmental impacts of aggregates extraction and transportation might also have benefitted from the reduction in extraction of virgin materials.
Key environmental impacts of reform	

What were/are the main **environmental impacts** of the reform?	There have been limited direct effects on the environment; mostly indirect effects that are linked to the reduced demand for virgin/primary aggregates and the associated fall in aggregates extraction. The primary effect is indeed the levy's contribution to decreasing the extraction of aggregates from 2002 onwards. Together with the landfill tax, the aggregates levy has increased the demand for recycled materials in construction: the recycling of material has risen to 68 million tonnes (equivalent to approximately one quarter all aggregates required) (EEA 2008, Ecorys, 2011). Notable declines in the sales of virgin materials as early as 1996 and also in 2002 were mostly ascribed to the landfill tax and a general decline in road construction in the same period (Leggs, 2007) as well as technical improvements in the construction industry allowing a lower intensity of the use of virgin raw materials (EEA, 2008). In the Government's view, the levy has been a significant factor in reducing sales of virgin aggregates by about 18 million tonnes between 2001 and 2005 (UK Government in Söderhom, 2011). In the 2005 Budget the labour government published a series of assessment of its use of environmental taxes, including an assessment of the aggregates levy according to which early indications suggested that the aggregates levy had been effective in achieving its objective: • Sales of primary aggregate in the UK fell by 8 per cent between 2001 and 2003, to their lowest level since 1982. The falls are against a backdrop of buoyant construction activity, including higher levels of road building since 2000, and GDP growth; • In England, the estimated production of recycled aggregates increased by 3.1. million tonnes between 2001 and 2003; • When surveyed, expanding recycled aggregate businesses gave the levy as the most frequent reason for growth since 2001; and • There was a marked increase in the volume of china clay waste and slate waste sold as aggregate as a result of the economic incentive presented by the aggregates levy exemptions granted to these products. Between 2001 and 2004 china clay waste sold as aggregate in the UK increased by 14 per cent to 2.5 million tonnes. National sales of slate for 'fill and other' uses increased by 65 per cent in 2003, compared to the pre-levy year of 2001. Some studies come to the conclusions that "there were no direct effects on the environment" (Ecorys, 2011). What must be acknowledged is that, as far as the tax has had effects in terms of addressing environmental externalities, this has primarily been indirectly, by having reduced demand for the extracted product rather than by providing specific incentives to ensure that polluting behaviour is changed (Söderhom, 2011). The use of 10 per cent of the tax revenues to fund research (via an Aggregate

	Levy Sustainability Fund (ALSF)) aimed at minimising the effects of aggregate production should also result, over the long run, in a reduction of adverse environmental externalities from aggregates extraction. The fund has for example contributed some funding to the WRAP (Waste & Resources Action Programme) Aggregates Programme which aimed to reduce the demand for primary aggregates by promoting greater use of recycled and secondary aggregates. Following the Spending Review completed by the new Coalition Government in October 2010, the Fund was discontinued from March 2011, despite an independent evaluation of the fund's programme of work for the years 2008-2011 which was positive in that the programme delivered against its objectives and did provide value for money. Concern was raised in the evaluation that the ALSF will not have achieved its full potential if the activity and the collaboration it has galvanised simply stop (IHPR, 2010).
Key economic and financial impacts of reform	
What were the main **economic** and/or **financial** impacts of the reform?	A tonne of mined "aggregates", which includes sand, gravel and crushed stone (including marine aggregates), was initially taxed at EURO 1.8. This represents approximately 20 per cent of the average raw material price. Since 2009, the rate has been EURO 2.28 per tonne, and from 2011 EURO 2.33 (Ecorys, 2011). In the financial year 2011/2012 the Aggregates Levy resulted in total cash receipts (tax revenue) of EURO 360 million (HMRC, 2012). According to Leggs (2007) these revenues amount to less than 0.9 per cent of total environmental tax revenues without energy taxes, and 0.1 per cent of total tax revenue. The competitive impacts of the tax are negligible as it is costly to transport aggregates over long distances, imported aggregates are subject to the levy when they are first sold or used in the UK and exported aggregates are exempt from the tax. (Ecorys, 2011).
Barriers to reform	
What were the main **obstacles to reform**?	The Quarrying Product Association did not support the introduction of the tax and lobbied for tighter environmental regulation as a substitute for the tax. There was lobby for the exemption of recycled aggregate from the tax (which proved successful). There was also a strong lobby for the relief of silica sand from the tax the exemption of lime and industrial uses of limestone. These arguments were based on the fact that silica sand and limestone are used in industry for their chemical properties rather than as aggregates (HM Customs & Excise, 1999). In the Pre-Budget Report in November 1998 the Labour Government noted that voluntary measures adopted by the industry might obviate the need for a tax. The Quarry Products Association did indeed put forward, in November 1998, a ten-point plan to deal with the environmental impacts of quarrying. In the March 1999 Budget the Labour Government announced that it would pursue the possibility of an enhanced package of voluntary measures with the industry. If this proved successful, it was anticipated that a phased implementation over 3 years could begin by January 2000, with independent annual reviews and a final assessment no later than the end of 2002; if not an aggregates levy would be introduced. This is what happened in the end.

Drivers of reform	
What were the main **enabling / success factors** that allowed the reform to take place?	When the Labour government came to power in 1997 it set out a "statement of intent on environmental taxation" to shift the burden of taxation from 'goods' to 'bads' (House of Commons Library, 2009). The use of independent research to verify the environmental costs associated with quarrying (i.e. the study commissioned by the government that estimated to £1.80 per tonne how much people valued avoiding the adverse environmental effects of quarrying for construction aggregates) and the fact that the industry made delivery of the voluntary package "conditional on undertakings from the Government on procurement policy which were unacceptable," are both elements that seem to have been triggered the introduction of the tax in April 2002. In addition, the Government argued that the revenues from the levy would be fully recycled to the business community through a 0.1 percentage point reduction in employers' National Insurance contributions (NICs) and a new Sustainability Fund, thus being able to present the introduction of the tax as a shift in the burden of taxation from "goods" to "bads".
Key lessons learnt	
What **are the overall lessons** that can be learnt from the case, particularly in terms of its potential for **replicability** in other Member States considering EHS reform?	A tax like the aggregates levy needs to be carefully designed to achieve its objectives and the reformed process needs to be carefully planned for the reform to be regarded as acceptable and justified. The uniform rate at which the tax was introduced in order to give a clear signal to purchasers of primary aggregates to use more sustainable materials has been contested. The government however considered it unpractical to attempt to introduce a variable levy which would differentiate between quarries with different environmental performance because of difficulties relating to assessing compliance, defining environmental performance, the treatment of imports, EU state aids rules and UK competition policy. The justifications behind the tax exemptions for some aggregates have been questioned. Apart from the exemption for exported virgin materials on the ground that they might not be used as "aggregates", there are indeed a range of exemptions/reliefs for certain rocks (coal, lignite, slate, shale) and industrial minerals (such as metal ores, gypsum, fluorspar); for the production of lime or cement from limestone and for silica sand or limestone used in certain agricultural and industrial processes (such as glass-making and fertiliser production). The rationale behind their exemption is both that some of them are not solely used as aggregates (i.e. for building) but are also important inputs in the production processes in some industries, or secondary materials (i.e. misplaced as the result of quarrying activities but not marketed as aggregates). As much of the benefits (reduction in environmental impacts via a reduction in primary material extraction) were achieved by increasing the cost of landfilling, thus making recycling a more viable commercial option, the introduction of aggregates could have been approached from a different angle. Rather than taking the starting point of internalising externalities (a

	Pigouvian tax) the level of the tax could have been set with the primary objective to create a level playing field in terms of costs / prices between virgin material and recycled material. Hence, have a 'quantitative' policy target focusing on increasing the business case for recycled materials. This corresponds to the Baumol – Oates standard price approach, implying that the tax is used for achieving policy objectives and is of significance in the context of the design of the policy objectives.
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5 Income tax deductions for commuters in the Netherlands

Summary assessment		
Brief description of the subsidy that has been / is in the process of being reformed	The commuter subsidy was a fixed amount that taxpayers could deduct from their taxable income to allow for the cost of traveling between home and work. This amount was not differentiated according to mode of transport, and increased with commuting distance.	
Context	Similar subsidy schemes exist in several EU MS. Especially in Germany it has been a subject of much discussion and several reforms and reform attempts have taken place there. Since 2004, the German 'Entfernungspauschale' is a fixed amount of € 0.30 per km, independent from transport mode. An attempt to abolish the 'Entfernungspauschale' (with a few exemptions) failed in 2008, when the federal Constitutional Court decided that it was unconstitutional.	
Objectives		
Original subsidy **rationale/objectives**	The Dutch subsidy was introduced in 1964. At the time, there was a serious housing shortage and many employees were forced to travel long distances from home to work. It was found reasonable to consider the cost of commuting as necessary costs to obtain income, and therefore to leave these untaxed.	
Reasons for reform		
Was it that:		
The subsidy did not fulfil its **objective** and/or reach its **target audience**?	No; the subsidy did have the intended impact of compensating employees for their commuting travel costs.	
The **rationale** for the subsidy was no longer valid?	Yes. In 1991, a tax reform committee proposed to remove the commuter subsidy, arguing that there was no longer a quantitative housing shortage in NL. In 1996, another tax reform working group also noted that the argument of housing shortage had lost much of its significance since the 1960s (Feimann and Drissen, 1999).	
There were problems with the **subsidy design**?	The subsidy did not have a sunset clause or a built-in review process, and until 1989 there was hardly any discussion on it.	
The subsidy	No. MS have substantial autonomy in this area.	

infringed existing EU legislation?		
There was a **requirement or political commitment** for reform?	No (apart from environmental commitments; see below).	
There were negative **social impacts** which inspired the reform?	Partially. For example, the above mentioned working group noted that there were also people who pay high housing costs in order to be able to live close to their work.	
There were negative **economic impacts** that inspired the reform?	Yes. The negative economic impacts of the ever growing traffic congestion (especially during rush hours) were an important argument in the reform process. Another argument was the fact that the rules were very complicated and susceptible to fraud.	
There were expected **budget savings** through reform?	Yes. Estimates of the foregone tax revenues ranged from NLG 655 million to NLG 900 million (€ 300-400 million) per year.	
There were negative **environmental impacts** which inspired reform?	Yes. The first attempts at abolishing the commuter subsidy were made within the framework of the first National Environmental Policy Plan (NMP, 1989). At the time, reducing car use was seen as an important measure to deal with the environmental problems caused by transport.	
There were **public pressures** or calls for reform?	Partially. For example, the NMP (1989, p. 200) noted that employers' organization VNO had already come up with the possibility to replace the commuter deduction by a general labour deduction in the income tax.	
Process of reform		
What has the reform entailed?	The initial reform attempts (in the framework of the 1989 NMP) failed, due to opposition from the right-wing VVD coalition party, and led to the fall of the Lubbers cabinet. A new government (with the social-democrats) introduced a restriction on the commuter subsidy: as from 1990, it was only available for commuting distances up to 30 km if travelled by car, whereas this limit did not apply to commuters using public transport. Within the framework of a major income tax reform in 2001, the commuter subsidy for travel by car was abolished altogether. Commuters using public transport remained eligible; up to a maximum amount (presently this is EUR 2000 per year for commuters traveling 2x80 km or more on at least 4 days per week).	
What was the process of reform?	The first stage of the reform was initiated by the Ministry of Environment. It managed to make the phase-out of the commuter tax deduction an element in the first NMP, as one of the measures that would contribute to a reduction in private car use. After the fall of the Lubbers cabinet and the subsequent initial limitations to the subsidy, politicians became more reluctant to propose new steps in the reform process. Suggestions by a tax reform committee in 1991 (Commissie-Stevens) to do away with the	

	commuters' tax deduction completely were rejected. The 'Working Group on the Greening of the Fiscal System' (Werkgroep Vergroening, 1995) recommended the government to change only some details of the system (mainly in terms of simplification and providing stronger incentives to public transport users). It noted that the commuter tax deduction had hardly any influence on the total amount of commuting kilometers, since other factors (labour and housing market dynamics) dominated people's choice of residence. Suggestions to do away with the subsidy were done now and then by other actors in society, e.g. trade unions (Klein, 1996). Employers' organisation VNO-NCW, considering the negative economic consequences of ever growing congestion on the main roads, was also prepared to accept commuter subsidy reforms, in exchange for the prospect of major investments in road and rail infrastructure. Interestingly, the motorists' lobby organisation ANWB remained silent in this discussion (Schiethart, 1996). In the second stage of the reform, the Ministry of Finance and the financial experts in the political arena were the leading actors. In this stage, the removal of the commuter tax deduction for car users was just a small element in a major income tax reform, which was led by the Minister and State Secretary of Finance (Zalm and Vermeend).
How did the process take place?	Both stages in the reform entailed changes to the income tax legislation (Wet inkomstenbelasting). These were of course preceded by preparatory plans and discussions. The main plan that laid the foundations for the first stage was the NMP (1989). The 2001 tax reform was initiated by the policy document 'Belastingen in de 21ste eeuw' ('Taxes in the 21st century'), presented in December 1997.
Key social impacts of reform	
Who was affected by the reform?	As with all income tax reductions (in a system with progressive rates), people with high incomes benefit most, and therefore they also lose most when the tax deduction is abolished. One should keep in mind, however, that the measure was just a small part of a major tax reform.
Key environmental impacts of reform	
What were/are the main **environmental impacts** of the reform?	As a result of the first reform in 1990 (tax deduction for cars only up to 30 km travel distance), commuter traffic by car decreased by 0.3% (AD, 1992). This was less than the 1% (1.4 billion car kilometers) that had been predicted by the Finance Minister when it was introduced (NRC, 1990b). The impact of the measure had been attenuated by employers who compensated their employees for their commuting costs, and by an increase in company cars. The *ex ante* impact of completely abolishing the car commuter subsidy (the second stage) was estimated to be a reduction of the amount of home-to-work-kilometres driven by car by 1-2%, compared to the reference situation. This would imply a reduction of CO_2 emissions of 0.05 to 0.1 Mt (Feimann and Drissen, 1999). The *ex post* evaluation of the 2001 tax reforms (Tweede Kamer, 2005) did not find any significant shift in the percentages of commuter traffic by car and by public transport. However, it noted that it was hard to single out the impact of the commuter subsidy reform, since several other fiscal rules

	relating to commuters had changed simultaneously.
Key economic and financial impacts of reform	
What were the main **economic** and/or **financial** impacts of the reform?	The 1990 reform was expected to lead to an increase in public revenues of NLG 205 million (almost € 100 million) (NRC, 1990a). On the other hand, it entailed additional administrative costs to process and check the 'public transport declarations' which commuters needed to be eligible for the (higher) deduction rates for public transport at distances above 30 km. The work load was estimated at 20 person-years (NRC, 1990b). In 2000, the public revenue foregone due to the commuter subsidy amounted to € 528 million. In 2001, after the second reform, this had been reduced to € 166 million and in 2002 to € 139 million (Tweede Kamer, 2005).
Barriers to reform	
What were the main **obstacles to reform**?	Initially, there was strong political opposition to the reform (which at that time entailed the complete abolition of the subsidy), leading to the fall of the government in 1989. Opponents argued that car users would be 'punished' for something beyond their control: as a result of previous government policies, new residential areas had been built far away from the main cities, and commuters were 'forced' to make long home-to-work trips (public transport often not being a reasonable alternative). Another obstacle that had to be overcome were the administrative costs related to making a distinction between commuters traveling by car and those traveling by public transport.
Drivers of reform	
What were the main **enabling / success factors** that allowed the reform to take place?	The main success factor for the first stage of the reform was mainly a political one. In 1990, the new government (Christian-democrats, CDA, and social democrats, PvdA) was determined to proceed with the commuter tax reform that had led to the fall of its predecessor (the right-wing CDA-VVD cabinet) in 1989. The fact that this measure would release a substantial amount of public money, which could be used for public transport and other 'green' purposes (NRC, 1990a) has probably also been helpful. The primary driver for the second stage was quite different. In this stage, the removal of tax deductions for car commuters was part of a large scale tax reform. Public and political support for this entire reform package had been secured by designing the reform to the effect that it would not lead to larger differences in income distribution, and no short term losses for any of the various socio-economic groups (De Beus, 2001).
Key lessons learnt	
What **are the overall lessons** that can be learnt from the case, particularly in terms of its potential for **replicability** in other Member States	• It may be difficult to 'sell' an EHS reform by highlighting the environmental improvements that will be achieved. These improvements may be small and politically irrelevant (even if they are real and undisputable). • In addition to higher public revenues (or lower public spending) the reform may have other side benefits that can enhance its acceptance (in this case for instance: reduced congestion).

considering EHS reform?	• EHS reform has the best chances if it also entails simplification. This may reduce administrative costs and the risk of fraud. Adding new detailed and specific rules, e.g. to make the reform acceptable to certain groups, may be attractive to enhance feasibility, but will also neutralize some of the gains. • When removing a specific subsidy scheme, one should be aware of the risk that the beneficiaries will look for related schemes that would mitigate the 'damage' rather than changing their behaviour (e.g. in this case: the relatively 'friendly' fiscal treatment of company cars and commuting costs covered by employers). • EHS reform can take place relatively quietly if it can be 'piggybacked' on another, major (tax) reform (but such occasions are likely to be exceptional).
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6 Reform of car registration tax system in Flanders (Belgium)

Summary assessment	
Brief description of the subsidy that has been / is in the process of being reformed	• Type of EHS: Lack of full cost pricing: non-internalisation of transport externalities • Member State: Belgium – Flemish region • Reform: Reform in 2012 of the car registration tax ("Belasting op de inverkeerstelling" or BIV) for new and second-hand cars, taking into account the environmental performance of vehicles.
Context	Transport contributes a large part of emissions of greenhouse gases (16% in 2010) and air pollutants (30% for $PM_{2.5}$ and 52% for NO_x in 2010) in Flanders. At this moment Flanders does not meet the European ambient air quality objectives. Belgium also faces the objective of reducing CO_2 emissions from

non-ETS sectors by 15% in 2020 compared to 2005.

Within this context the government of the Flemish region has set the goal of greening the Flemish car fleet. The following table gives some data about the Belgian car stock and purchases in 2011, with a distinction according to the type of owner. The high share of diesel cars is one of the main characteristics of the car stock. For reasons given below, the Flemish reform only concerns cars bought by natural persons and non-leasing firms in Flanders.

	Owner			
	Nat. person	**Legal person – leased car**	**Legal person – non-leased car**	**Total**
Size – share in car stock (%)				
Small (0-1400cc)	34	8	31	30
	57	81	58	59
Medium (1400-2000cc)	9	11	11	11
Large (>2000cc)				
Average CO_2 emission per km (g/km)				
Car stock	158	138	170	158
New cars	123	126	142	127
Share of diesel cars (%)				
Car stock	60	95	81	64
New cars	66	91	86	75
Share of EURO 4 and 5 cars (%)				
Car stock	56	99	79	61

Source: DIV (Department for the registration of vehicles)

There are many countries where the registration tax already depends on the environmental characteristics of the cars (CO_2 and sometimes other pollutants). On the basis of the ACEA tax guide of 2011 and some additional sources, this is the case in the following countries: AT, CZ, CY, DK, FI, FR, IE, IT, LT, MT, NL, PT, ES. Environmental aspects are not taken into account in the registration taxes of the following countries: DE, EL, HU (except for electric and hybrid cars), LU, RO, (except for electric and hybrid cars), SE and UK. However, environmental considerations may play a role then in the annual taxes (ACEA 2011).

Objectives

Original subsidy **rationale/objectives**	The original car registration tax was a function of fiscal horsepower (a fiscal concept that is a function of the cylinder capacity) and engine power (kW). Its main objective was revenue raising. Social considerations were included by levying a higher tax on cars with a higher fiscal horsepower or engine output power. At this moment the original tax system is still in force in the Brussels and Walloon regions. In the Walloon region it is accompanied by an ecobonus-ecomalus system.

	The original car registration tax also continues to apply to leased cars, since in that case the three regions need to reach an agreement on its reform, because of the risk of massive re-allocations of lease office headquarters to the region with the most favourable tax system in the case of region-specific taxation. The Flemish region could reform the tax for non-leased cars on its own.	
Reasons for reform		
Was it that:		
The subsidy did not fulfil its **objective** and/or reach its **target audience**?		
The **rationale** for the subsidy was no longer valid?		
There were problems with the **subsidy design**?	The original car registration tax did not take into account the environmental performance of the cars.	
The subsidy **infringed existing EU legislation**?		
There was a **requirement or political commitment** for reform?		
There were negative **social impacts** which inspired the reform?		
There were negative **economic impacts** that inspired the reform?		
There were expected **budget savings** through reform?	The reform is intended to be budget-neutral. The raising of additional revenues was not put forward as a motivation when the reform was submitted.	
There were negative **environmental impacts** which inspired reform?	Flanders faces the problem that it does not reach the air quality objectives set by the EU. In addition, Belgium has to reduce non-ETS greenhouse gas emissions by at least 15% in 2020 w.r.t. 2005. In this context the government of the Flemish region decided to take measures to make the vehicle fleet greener. As the existing car registration tax did not take into account the environmental performance of cars, a reform was called for.	
There were **public pressures** or calls for reform?		
Process of reform		

What has the reform entailed?	As from March 2012 cars registered by a private individual or company cars owned by the company itself are subject to the new registration tax. The new registration tax replaces the old system based on the combination cylinder capacity/engine output power in Flanders. After the reform the tax is a function of the CO_2 emissions (in g/km), the fuel type, Euro standard, age and registration year of the vehicle. The following formula is used: $$BIV = \left[\left(\frac{CO_2 \times f + x}{250}\right)^6 \times 4500 + c\right] \times LC$$ The parameter *f* is lower than 1 for LPG and CNG cars, and 1 for other cars. The air pollution component *c* depends on the fuel type and Euro standard. For a given Euro standard it is higher for diesel than for gasoline cars, except for Euro 6 cars for which the reverse (albeit only slightly) is the case. Euro 3 and Euro 4 diesel cars with a particulate filter pay a slightly lower BIV than those without such a filter. The parameter *x* is zero at the start (2012) and is increased annually to account for the exogenous improvement in energy efficiency over time. The parameter *LC* falls with the age of the vehicle so that - *ceteris-paribus* - second-hand vehicles have to pay a lower registration tax. For a detailed discussion on the specific values used for each of the parameters, we refer to the relevant decree published in the Belgian law gazette (Belgisch Staatsblad, 2012). The parameters are revised in July of each year to take into account the change in consumer prices. PHEVs, hydrogen-powered and full-electric vehicles are exempt from the car registration tax in Flanders. Transitional provisions are included for second-hand cars registered between March 2012 and December 2013.
What was the process of reform?	Plans for reforming the registration tax were first communicated by the Flemish government in 2006 (Flemish government, 20/7/2006). Since 2011, the three Belgian regions are authorized to set and collect traffic taxes (the registration tax, the annual traffic tax and the Eurovignette) in their respective territory. The Flemish Region was the first region to reform the car registration taxes. The Ministers in charge were the Minister for Environment, Nature and Culture and the Minister for Finance, Budget, Work, Spatial Planning and Sport.
How did the process take place?	The reform entailed a change of the Tax Code. The first draft of the decree dates from 15 July 2011. This immediately generated a public debate on the impacts on the diesel share, the social impacts, etc. The rest of the process included a consultation of the different strategic advice councils (the Environment, Nature and Energy Council (Minaraad), the Mobility Council (MORA) and the Socio-Economic Council (SERV), the consultation of the Council of State and the organisation of public hearings of stakeholders in the Flemish Parliament. As a result of this, the original draft was modified on several counts, including amongst others the extension of the reform to non-leased company cars, a less favourable treatment of diesel cars by allocating a higher weight to the air pollution component. The final version was approved in February 2012. The new tax rule came into force in March 2012. The frequent changes made to the tax rules during the process and problems

	with communication have led to the critique of non-transparency. Because of the publication of the tax parameters before they were approved by the Parliament and uncertainty about the date at which the new regime would enter into force, a temporary regime needed to be set up by the end of April 2012 in which the most advantageous of the final and previously communicated BIV level applies.
Key social impacts of reform	
Who was affected by the reform?	The reform will have an impact on the buyers of new and second-hand private and non-leased company cars. Not all car buyers will be affected equally and there are some indications that the reform may be regressive. In the first week after the reform one has observed an increase in the number of registrations in the luxury segment. These were cars of which the registration was postponed until after the reform because the reform led to a fall in the BIV (De Standaard, 4/3/2012). It may also have been associated with the temporary regime that was described above. Car owners may also be affected through the impact of the reform on second-hand car prices. The social dimension of the reform was a topic in the political debate preceding the reform. However, it was not analysed beforehand. In the Parliamentary debates the administration mentioned that the tax is such that in each segment people have a choice between cars with a higher and a lower tax. A temporary regime for 2012 and 2013 was also put in place for second-hand cars. However, this implies that in some cases the BIV is higher for second-hand than for further identical new cars.
Key environmental impacts of reform	
What were/are the main **environmental impacts** of the reform?	As the new car registration tax only came into force in March 2012, the data about its impacts are still very limited. Nor was the reform process supported by modelling exercises that could shed light on the environmental impacts. In the first half of 2012 the share of diesel cars in new registrations was lower than in 2011. The extent to which this is due to the new BIV regime is unclear, as other factors have also changed: since the beginning of 2012 the federal subsidies for cars with low CO_2 emissions (mainly diesel cars) were abolished. Moreover, the diesel price at the pump is also relatively high (and the discount compared to gasoline further diminishes). One should therefore be cautious in attributing the changes to the BIV reform. In general, while the air pollution component in the BIV rule is larger for diesel than gasoline cars (except for Euro 6) and the weight of the CO_2 component has been reduced w.r.t. to the original draft decree, it can still be expected that the incentive to shift from diesel to gasoline cars will not be as large as initially hoped for. Moreover, the reformed registration tax only has to be paid at the time of registration of the new or second-hand cars. The impact on the environment would be larger if the annual traffic tax and the taxes on car use would be included in the reform. The discussion on the reform of these taxes is still on-going.
Key economic and financial impacts of reform	
What were the main **economic** and/or	The reform was set up to be budget neutral. However, no preliminary study taking into account the behavioural change of the car buyers was performed

financial impacts of the reform?	regarding the number of cars, the type of cars or the shift from or to the leasing market. Therefore, the budget neutrality will have to be assessed later. Related to this, in the consultation round it was mentioned several times that the impacts of the reform should be monitored closely.
Barriers to reform	
What were the main **obstacles to reform**?	The fact that the registration tax should be reformed in order to mitigate the environmental impacts met little resistance. Moreover, it was communicated that the tax reform was meant to be revenue neutral. Most of the critiques concerned the actual definition of the tax rule, the implementation and the communication process. A selection of these criticisms is presented below: • The economic, social and environmental impacts of the reform are uncertain, due to the lack of simulations. This led to a call for close monitoring of the impacts. • It was claimed that the registration tax would increase substantially for small and energy efficient family cars and city cars. This led to a reformulation of the originally proposed formula. The minimum amount of the tax was also reduced. • The need was expressed for a more encompassing reform that would also involve the annual traffic tax and variable taxes in order to obtain substantial effects. These points are still on the agenda. The timing is uncertain. • It was pointed out that the tax rule is based on the limit values of the Euro standards, while these do not always reflect actual emissions. In response to this the tax rule was adapted. • There was dissatisfaction with the speed and non-transparency of the reform process. The need was expressed for a clear communication about the implications of the new car registration tax for the car buyers.
Drivers of reform	
What were the main **enabling / success factors** that allowed the reform to take place?	The window of opportunity for the reform was created by the transfer of the legal competence for the registration tax to the Flemish region in 2011. The plan for the reform was set up by the administration for the responsible Minister of Environment, Nature and Culture and Minister for Finance, Budget, Work, Spatial Planning and Sport. Together with other factors, dissatisfaction with the reform process turned against the latter Minister, who was confronted with a non-successful vote of no-confidence in January 2012 (De Standaard, 25/1/2012). In response to the comments and critiques about the original draft proposal the proposal for the reform was changed in several ways (see above). This allowed the final approval of the Flemish Parliament to be granted in February 2012. Another important factor was that the tax reform was presented to be budget neutral.
Key lessons learnt	
What **are the overall lessons** that can be learnt from the case, particularly in terms	The reform of the car registration tax in Flanders is interesting because for the first time the tax is based on the environmental characteristics of the cars. It was introduced after the transfer of the legal competence about this tax to the regions and supported by the generally accepted notion that the

of its potential for **replicability** in other Member States considering EHS reform?	tax should be based on environmental considerations. The evaluation of the tax reform is difficult, because of two reasons. First of all, it is very recent and therefore the available data are still limited. Secondly, in the preparatory stage no modelling analyses were made about the impact of the tax reform on the purchase behaviour and car prices and the implications of this for the tax revenues and the social and environmental impacts. It is therefore still too early to evaluate its impacts. The Flemish government managed to introduce the reform relatively quickly. However, the process preceding its introduction was perceived to be quite tortuous and not always transparent. Moreover, there were some communication problems. These problems should be avoided in other countries by better project management and communication.
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7 Road charging in Austria

Summary assessment	
Brief description of the subsidy that has been / is in the process of being	• Type of EHS: absence of road charging • Reform: In Austria, introduction in 2004 of the Lkw-Maut and the subsequent changes to the Maut. The Lkw-Maut is a distance based toll that applies to vehicles with a maximum gross vehicle weight of

reformed	more than 3.5 t	
Context	The recent White Paper on Transport (COM (2011) 144 final) reiterates the Commission's long-standing position that transport charges and taxes must be restructured in the direction of a wider application of the 'polluter-pays' and 'user-pays' principles. The Commission's long-term goal is to have user charges applied to all vehicles and on the whole network to reflect at least the maintenance cost of infrastructure, congestion, air and noise pollution. The absence of road charges thus belongs to two economic types of EHS: • Provision of infrastructure: Implicit subsidies, e.g. resulting from the provision of infrastructure; • Lack of full cost pricing: Implicit income transfers resulting from non-internalisation of externalities The absence of kilometre based road charging is evident in several EU Member States, see for example case on absence of road pricing for freight and passenger transport in the Netherlands in Annex I.	
Objectives		
Original subsidy **rationale/objectives**	In the 1950s the decision was taken in Austria to finance road infrastructure from the general budget. Since the 1960s specific road sections with high costs were tolled. In 1978 a vignette was introduced for heavy duty vehicles over 12 t, the revenues of which were not earmarked. The possibility of using a more generalized toll or vignette for financing infrastructure needs already came up in the late 1980s and the 1990s. It took many studies and a long political process before the Lkw-Maut was introduced in 2004. It seems that several factors may explain the long political process: • a road charge is a direct cost for the road haulage sector, which is under intense competitive pressure. • Transport taxes in Austria were already relatively high and there was a fear that one should pay twice for the use of roads. • Concerns with the technological implementation of the scheme. • Public acceptability may have been low because people were uncertain about the benefits, feared the complexity of such scheme, feared that its implementation would hinder traffic flows, or were uncertain about the efficient use of the revenues raised.	
Reasons for reform		
Was it that:		
The subsidy did not fulfil its **objective** and/or reach its **target audience**?		
The **rationale** for the subsidy was no longer valid?		
There were problems with the **subsidy design**?		
The subsidy	When Austria became a member of the EU in 1995, the Directive	

infringed existing EU legislation?	93/89/EEC specifying which costs can be taken into account in the calculation of road tolls and which sections can be charged, became relevant. This led to a call for revision of the existing tolls and vignette.	
There was a **requirement or political commitment** for reform?		
There were negative **social impacts** which inspired the reform?		
There were negative **economic impacts** that inspired the reform?		
There were expected **budget savings** through reform?	The main reason for the introduction of the Lkw-Maut was financial. Its principal objective is to collect sufficient funds for the maintenance, operation, upgrading and further development of the Austrian motorway network. Together with the revenues from the Vignette on vehicles with a maximum gross vehicle weight up to 3.5 t and the revenues from specific toll sections, the revenue from the Maut is earmarked for the use on the tolled road network. The general budget does not provide additional funds for the tolled network. In addition, as Austria is a country with a lot of transit transport, there was a wish for developing a fair cost coverage system, in which all users of the network pay for its use.	
There were negative **environmental impacts** which inspired reform?	In the original set-up of the Lkw-Maut, the environmental transport externalities were tackled only indirectly by basing the toll on the distance travelled. Since January 2010 the toll takes into account the emission class of the vehicles in order to mitigate the air pollution impacts of trucks.	
There were **public pressures** or calls for reform?	There was a public concern with the growth in transit transport on the Austrian road network, and the associated externalities.	
Process of reform		
What has the reform entailed?	Since the 1960s a selection of Austrian motorway sections that were associated with high costs were tolled and since 1978 large heavy duty vehicles had to pay a vignette (the later Straßenbenutzungsabgabe or StraBA). In the early 90s the interest in the application of a more generalised toll to the entire motorway network grew. The main motivation was financial together with the wish that all users pay for their use of the Austrian motorways and expressways.	

In 1997 an earmarked vignette (time-based sticker) was introduced for all vehicles as an intermediate solution. At this moment it is still in place for vehicles with a maximum gross vehicle weight up to 3.5 t. Since the beginning of 2004 the distance based charge is in place for vehicles with a maximum gross vehicle weight of more than > 3.5 t. It must be paid on motorways and expressways and is collected by means of an electronic toll system. The revenues are earmarked for infrastructure.

The toll is differentiated according to the number of axles and the environmental performance (EURO emission classes) of the vehicles. In January 2010 the emission class was introduced as an additional determinant of the toll.

The following rates apply since January 2012 (euro per vehicle km):

Category	Number of axles		
	2	3	≥ 4
A (Euro VI)	0.145	0.203	0.3045
B (EEV)	0.15	0.21	0.315
C (Euro IV & V)	0.165	0.231	0.3465
D (Euro 0-III)	0.187	0.2618	0.3927

On specific road sections that are associated with higher construction and maintenance costs, the toll rate is higher. In addition, trucks with four and more axles that use the A 13 motorway at night have to pay a night rate which is double the day rate.

What was the process of reform?

Austria has a long experience (since the 1960s) with road tolls on specific road sections and with vignette (since 1978 for heavy trucks). Due to growing financing problems for the road network, there was a growing interest in the early 1990s for a network-wide toll. Still, the introduction of a network-wide Lkw-Maut took a long time and was preceded by a large number of studies. A good overview is given in Estermann et al. (2007).

Because of Austria's accession to the EU in 1995 and the provisions of the Maastricht Treaty, budgetary discipline became more important. It was decided to transfer the complete high level road network, including the debts, into the private sector. ASFINAG, the existing stated owned financing company, was granted the rights of usufruct over all motorways and expressways in Austria in 1997. It was given the responsibility for designing, constructing, maintaining, operating and financing the whole motorway sector. It took over the financial obligations concerning motorways and received the right to collect toll and user charges on the entire motorway and express road network in its own name.

In 1997 a Vignette (time based sticker) was introduced for all vehicles with a maximum permissible weight (mpw) up to 12 t. Such a vignette was already in place for heavier vehicles. The vignette was meant as an intermediary

	measure which helped to finance the infrastructure needs. In 2004 the distance based charge was introduced for vehicles with a maximum gross vehicle weight of more than 3.5t, with a differentiation according to the number of axles. In 2010 a further differentiation according to the environmental characteristics of the vehicles was introduced. Vehicles with a maximum gross vehicle weight up to 3.5 t still fall under the vignette regime, although the implementation of a distance based toll was also considered in the preparatory studies and decision process.
How did the process take place?	The ASFINAG Authorisation Act of 1997 granted the rights of usufruct over all motorways and expressways in Austria to ASFINAG. ASFINAG is a public limited company that was set up by the ASFINAG Act. It is owned entirely by the Republic of Austria. The Federal Road Tolls Act of 2002 gives the right to ASFINAG to collect time or distance related tolls on motorways and expressways. ASFINAG has to determine the Tolling Regulations which have to be approved by the Federal Minister of Transport, Innovation and Technology in Agreement with the Federal Minister of Finance.
Key social impacts of reform	
Who was affected by the reform?	The introduction of the distance based toll on trucks increased the cost per vehicle km, both for Austrian and foreign trucks. The amount of the toll depends on the number of axles and (since 2010) the emission class of the vehicles.
Key environmental impacts of reform	
What were/are the main **environmental impacts** of the reform?	The Lkw-Maut has an impact on the truck transport costs per kilometer. According to de Jong et al. (2010) a change in the vehicle kilometer price may act on emissions via a change the mode that is used, a change in transport demand and a change in transport efficiency. de Jong et al. (2010) review the available evidence for Austria: • As regards the impact on transport volumes, no evidence was found. • In the period after the introduction of the Lkw-Maut up to 2006 a reduction on the average distance per tonne was found. This could be explained by a change in the routes that were taken by the trucks or a shift of transit transport to other countries. In 2007 the average distance per ton rose again, probably due to the introduction of a toll in Czechia. • There might have been a small shift towards rail transport As regards the impact of the differentiation of the Lkw-Maut on the basis of the emission classes since 2010, some evidence is presented in the 2011 annual report of ASFINAG: at the beginning of 2010 the share of Euro 0 to III trucks in mileage on Austrian tolled roads was still around 65%. By the end of 2011 it was only around 35%. The share of EEV (enhanced environmentally friendly vehicles) trucks grew from less than 1% to 16% in the same period.
Key economic and financial impacts of reform	
What were the main **economic** and/or **financial** impacts of the reform?	The toll revenue from trucks accrues to ASFINAG and is earmarked for the construction and maintenance of the tolled network and for covering the financial obligations from past road construction. The following table gives an overview of the toll revenues from trucks since 2006 and the distance travelled by these trucks

	2006	2007	2008	2009	2010	2011
Revenues (million euro)	825	984	1062	926	1031	1062
Distance travelled by vehicle > 3.5t (million vkm)	2752	3261	3254	2838	3027	3139

Source: ASFINAG, annual reports

By far the largest share of mileage is driven by trucks with 4 axles or more (75% in 2007 according to Schwarz-Herda, 2008).

In 2011 the toll revenues from trucks accounted for 68% of total toll revenues collected by ASFINAG.

In 2005 the annualized costs of the system were approximately 12% of the revenues (ECMT, 2006).

Barriers to reform

What were the main **obstacles to reform**?

For many years the Maut was very present in the political debate because of several reasons (Estermann et al., 2008): the application of the Maut to an existing network of which people believed that they already paid for it through other taxes, the relatively high transport taxes in Austria, the coupling of the introduction of the Maut to important issues such as meeting the objectives of the Maastricht Treaty and the themes of transit transport and the Brenner toll. Political opinions diverged a lot and also changed over time.

Traffic management objectives (traffic avoidance, traffic reduction, more environmentally friendly transport) often came to the foreground in the political debate, but according to Estermann et al. the financial aspects have played the most important role since they were the main consideration each time important decisions were taken.

Drivers of reform

What were the main **enabling / success factors** that allowed the reform to take place?

Windows of opportunity

- The accession of Austria to the EU in 1995 and the objectives of the Maastricht treaty required the reconciliation of need for budgetary discipline with financing needs for the construction and maintenance of infrastructure. This led to a growing interest in infrastructure financing instruments such as a vignette or a network-wide toll.
- The explicit enumeration in Directive 93/89/EEC of the costs that can be taken into account in the calculation of the toll and of the road sections that can be charged, led to a call for revision of the existing tolls

Overcoming of obstacles

According to Estermann et al. (2008) a number of measures have led to an increase in the acceptability of the Lkw-Maut. These include the reduction of the vehicle tax (Kfz-Steuer), the abolition of the previously existing vignette on heavy trucks (Strassenbenutzungsabgabe or StraBA), the earmarking of the toll revenues for financing road infrastructure, the set-up of a free flow toll collection system that is clear and well organized and the use of complementary measures (driving and weight restrictions), to reduce traffic diversion to untolled routes. In addition, the system answered the concerns

	that the infrastructure costs should be borne by both Austrian and foreign road users.
Key lessons learnt	
What **are the overall lessons** that can be learnt from the case, particularly in terms of its potential for **replicability** in other Member States considering EHS reform?	The implementation of the Lkw-Maut in Austria shows that it is both politically and technically possible to introduce such a system. As pointed out by ECMT (2006) "The political decision to implement a charging system is driven by the perceived urgency of the congestion, financing or environmental problems that the system is designed to address". In the case of Austria the decision was driven mostly by financial concerns. Moreover, as Austria is a country with a high share of transit transport, there was a wish to also make foreign users pay for their use of the infrastructure. In countries with a smaller share of transit transport the distributional issues would be different. Transport and environmental aspects have been present in the debate, but were less important. Estermann et al. (2008) point out that the introduction of such a system requires first of all good preparatory studies, but also good management. The importance of good management is also stressed in ECMT (2006). Measures were taken to increase the acceptability of the system (see above), among which the earmarking of the revenues. However, while this is generally found to improve the public's acceptance of road pricing schemes, it should be borne in mind that from an efficiency point of view it would be better to assign the revenues to the general budget. Finally, while the Austrian Lkw-Maut is a step in the direction of road pricing, one has to keep in mind that it still applies only to part of traffic (only trucks on the high level road network) and that it is not yet differentiated according to certain factors e.g. time of day.
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	and Spain: opportunities of the revised Eurovignette Directive", Barcelona, April 2008.

8 Pay-as-you-throw schemes in Italy

Summary assessment		
Brief description of the subsidy that has been / is in the process of being reformed	In Italy, households and other producers of urban waste must finance their municipal waste management system by paying either a tax or a tariff/pay-as-you-throw (PAYT) charge. The waste tax is a fairly 'blunt' instrument, which was determined according to data on the numbers of rooms of houses/business establishments and therefore not taking real account of the amount of waste generated (Expert input). PAYT tariffs are composed of a) a fixed part (to fund essential infrastructure), and b) a variable element which is determined by (i) the quantity of waste generated, (ii) the standard of the service provided by the municipality, (iii) the costs of waste management. The variable component is determined by using either a presumptive calculative method (based on estimates of waste generated) or a precise method (based on actual quantities of waste generated)(Watkins et al, 2012). In the case of Italy, for pragmatic reasons waste tariff calculations for the variable component were based on surface area in square meters and on the number of inhabitants (Expert input)	
Context	17 Member States currently have PAYT schemes in place, although the number and coverage of schemes (in terms of population/number of municipalities covered) varies widely, e.g. only one region in Spain (Catalonia), over 20% of municipalities in the Netherlands, 40% of the population in Luxembourg, and up to nationwide coverage in Austria, Finland and Ireland. (Watkins et al, 2012) In all cases the aim is to charge the producer of waste (usually households) based on the amount of waste generated, with the goal of encouraging a reduction in the amount of waste generated.	
Objectives		
Original subsidy **rationale/objectives**	The 'original subsidy' in this case is that until 1999 there was only a flat charge for waste; this took the form of a waste management tax (Tassa sui Refuti Solidi Urbani, or TARSU) that was related to the size and type of property, not taking into account actual waste generation. The introduction of PAYT therefore allowed households to be charged based on the actual amount of waste generated, which encourages households to take steps reduce their waste. The environmental objective is therefore to reduce household waste, and as a result the environmental impacts of waste management/landfill/incineration etc. The economic/social objective is to ensure that those who produce the most waste pay the most for its treatment.	
Reasons for reform		
Was it that:		
The subsidy did not fulfil its **objective**	No	

and/or reach its **target audience**?		
The **rationale** for the subsidy was no longer valid	Partially – the idea was to introduce a system whereby charges were incurred according to the actual amount of waste generated, rather than a flat fee that was not linked to actual waste behaviour.	
There were problems with the **subsidy design**?	Partially – as above, flat charges do not fully take account of actual amounts of waste generated and consumers' waste behaviour, whereas PAYT schemes enable this to happen. PAYT schemes also enable more transparent charging structures compared with flat taxes. In the case of Italy, it was suspected that the flat tax for waste management did not necessarily cover as much of the cost of waste management as expected. The waste management tax (Tassa sui Refuti Solidi Urbani, or TARSU) was intended (by law) to cover at least 80 per cent of waste management costs, but in some cases (notably Southern Italy) the coverage of costs was much lower. The efficiency of waste management expenditure was also low in some cases, suggesting that waste management expenditures were used partly to make transfer payments to citizens (usually as wages) to maintain political consensus. Part of this expenditure was, in turn, being met by Government transfers. (Eunomia, 2003)	
The subsidy **infringed existing EU legislation**?	No	
There was a **requirement or political commitment** for reform?	Partially. The idea of PAYT was first given voice in 1997 with the National Waste Management Act (Decree 22/97, also called the Ronchi Decree) (Eunomia, 2003); this allowed municipalities to apply variable charging to households for waste management. The method of calculation is regulated by Decree n. 158 of 1999. The initial intention was that over time there would be a full transition from taxes to tariffs; however this is now in doubt as in late 2011 the Monti Government decided to refiscalise waste services. It is yet to be confirmed when and how this refiscalisation will take place, but it does not seem that it will lead to the abolition of existing PAYT systems. According to an expert contacted during the study, existing PAYT schemes will remain in place and full cost pricing for waste management services will be part of a general city tax on all city services (called TARES), which requires all city services to operate according to the principle of full cost pricing. However, because of the calculation method for waste tariffs (surface area + number of inhabitants) the relation to quantities of waste being generated – and therefore any incentive to reduce waste generation – is completely lost.	

	PAYT tends to lead to improved separation of waste by households, which is beneficial for recycling, composting etc. This in turn can contribute to meeting waste targets e.g. separate collection and recycling targets in the Waste Framework Directive, and targets in the Landfill Directive to reduce biodegradable waste sent to landfill.	
There were negative **social impacts** which inspired the reform?	No	
There were negative **economic impacts** that inspired the reform?	Partially – as PAYT allows for more flexible and accurate charging of households, it can help to ensure that the economic costs of waste management are more accurately covered based on the real amount of waste generated. PAYT also tends to lead to improved separation of waste by households, which can help to reduce the cost of sorting for recycling/composting etc.	
There were expected **budget savings** through reform?	Partially – as explained in the economic impacts section above, PAYT can help to ensure that the economic costs of waste management are more accurately covered. PAYT also tends to lead to lower waste generation and improved separation of waste by households, which can help to reduce the costs of collection and sorting for recycling/composting etc. On the other hand, PAYT can (at least in the initial stages) incur higher management costs that result from the need for more expensive equipment and the cost of monitoring inappropriate behaviour. (Bucciol et al, 2011) The 1997 Waste Reform planned that, with the shift from a tax to tariff, there would also be a shift to the full cost recovery principle. This seemed to imply a significant increase of the cost of the waste service, perhaps in the region of 10-50%, and also the application of VAT at 20% (or possibly the 10% reduced rate). In 2011, a Constitutional Court sentence declared waste a public service, meaning that VAT should not apply, so in theory, any city that applied VAT since 1997 would have to reimburse it to citizens.	
There were negative **environmental impacts** which inspired reform?	Partially – the generation of waste, and low levels of separating waste prior to collection, have environmental impacts. They result in more waste being sent to landfill or incineration as recycling is impeded by recyclable waste being mixed with non-recyclable waste.	
There were **public pressures** or calls for reform?	No	
Process of reform		
What has the reform entailed?	The introduction of PAYT in Italy has been somewhat limited. The 1997 Ronchi Decree (see below) planned that, with the shift from a tax to tariff, there would also be a shift to the full cost recovery principle. This seemed to imply a significant increase of the cost of the waste service, perhaps in the region of 10-50%, and also the application of VAT at 20% (or possibly the 10% reduced rate). Many mayors were therefore reluctant to make the change to	

	a tariff system, and no deadline was set to require such a change. As a result, by the end of 2010 only around 1,500 of 8,100 cities (about 25% of the population in relation to surface area and number of inhabitants) had shifted to a tariff system – however, actual PAYT-coverage in relation to the population is only between 0.1 and 1% (Expert input). However, some interesting and successful experiences of PAYT have occurred. In 2000, the Priula consortium introduced in some municipalities a door-to-door waste collection program paired in the following year with a PAYT scheme based on the volume of residual non-recyclable dry waste (i.e. not recyclable or compostable waste) produced. The volume is measured by counting the number of times during the year that 120 litre bins are emptied (each bin contains a chip that collates this data); they are emptied no more often than every 2 weeks. The reform entailed changing the charging structure for domestic/ household waste disposal. This charging structure tends to be designed so that accumulating residual waste costs more than accumulating sorted waste, and also often features a system of monitoring and sanctioning (i.e. fines for incorrectly sorting waste) (Bucciol et al, 2011).
What was the process of reform?	The reform was enabled by national legislation (see below) but after that led by the municipalities, often in a 'consortium' consisting of a group of municipalities. These consortia can decide how to design and implement the PAYT schemes in their area.
How did the process take place?	The idea of variable charging (i.e. PAYT) was first given voice in 1997 with the National Waste Management Act (Decree 22/97, also called the Ronchi Decree) (Eunomia, 2003). The method of calculation is regulated by Decree n. 158 of 1999. The tariff is not currently compulsory, but may be enforced voluntarily by a municipality. The initial intention was that over time, there would be a full transition from taxes to tariffs; the deadline for this was planned to be set by the Ministry of the Environment according to article 238 of the Decree n. 152 of 2006. (Gianolio, 2011) However, in late 2011, the Monti Government decided to refiscalise the waste service. It is yet to be confirmed when and how this refiscalisation will take place, but it does not seem that it will lead to the abolition of existing PAYT systems. According to information from an expert contacted during the study, existing PAYT schemes will remain in place and full cost pricing for waste management services will be part of a general city tax on all city services (called TARES), which requires all city services to operate according to the principle of full cost pricing. However, because of the calculation method for waste tariffs (surface area + number of inhabitants) the relation to quantities of waste being generated – and therefore any incentive to reduce waste generation – is completely lost.

Key social impacts of reform	
Who was affected by the reform?	There do not seem to be any major winners or losers as a result of the reform. Citizens may spend more time/effort to sort their waste at home, but as it is now mainly collected from their doorstep (including recyclable waste, which before often had to be taken to collection centres) they save time and effort in that way. In the area covered by the Priula Consortium, the employment benefits of door-to-door service (as opposed to collection centres) have been suggested to be as follows: • Operative staff: 31 more staff for door-to-door (100 rather than 69 for street bins) • Non-profit organisation staff: 25 more (25 rather than none) • Non-operative staff: 14 more (31 rather than 17) • 17.5% of the staff employed have a disability • Plus additional (unquantified) linked activities/ employment as a result of sorted material being taken to recycling plants (Rossi, 2011)
Key environmental impacts of reform	
What were/are the main **environmental impacts** of the reform?	The amount of selective waste collection (i.e. waste sorted by households at home) increased significantly following the introduction of PAYT in the Priula consortium of municipalities, with a doubling of selective collection in the year following the introduction of PAYT, and more gradual increases in subsequent years: 2000: 27.18% 2001: 33.64% (introduction of PAYT) 2002: 65.64% 2003: 70.42% 2004: 73.82% 2005: 75.63% 2006: 76.99% 2007: 77.59% (Rossi, 2011) In 2008 the municipalities in the Priula consortium achieved a sorted waste ratio of 77.06%, gaining first place in the national rankings. In 2008 the average number of bin emptyings per year was between 5 and 8, depending on the number of people in the household. (Bucciol et al, 2011) In the Treviso province of Italy, the implementation of PAYT had a significantly positive effect on the sorted waste ratio (i.e. the amount of waste sorted by households prior to collection); this increased by 12.2% after the introduction of PAYT, and even neighbouring municipalities that did not implement PAYT saw their sorted waste ratio rise by 3.7% just through an 'emulation effect' of citizens in neighbouring municipalities replicating the new waste sorting behaviour. No significant impact was observed, however, on the amount of per capita total waste generated. (Bucciol et al, 2011)
Key economic and financial impacts of reform	
What were the main **economic** and/or	According to the Priula association of municipalities, the application of PAYT results in almost no cost increase to households. The Priula consortium

financial impacts of the reform?	reported that in 2008, households with PAYT paid €140.11 for waste management and those without PAYT paid on average €140.84. This evidence contrasts with the potential concern that PAYT carries high user costs. (Bucciol et al, 2011). In municipalities where disposal costs exceed 100€/ton, depending on the local context and the model adopted, PAYT with door-to-door collections can be cheaper to run than street collection centres. A comparison of collection and disposal costs in three municipalities of the Chierese consortium (in the Turin Province) showed that in all cases collection costs increased but disposal costs decreased after the switch to door-to-door. Taking collection and disposal costs together, the switch resulted in 32.9% lower costs in Cambiano municipality, 5.5% lower costs in Carmagnola municipality, and 6.8% higher costs in Chieri municipality. (Rossi, 2011)
Barriers to reform	
What were the main **obstacles to reform**?	Some concerns were raised that PAYT might carry high user costs, but this did not prevent its introduction, and seems to have been refuted since PAYT has been implemented. (Bucciol et al, 2011) The shift from a tax to tariff was intended to create a shift to the full cost recovery principle. This seemed to imply a significant increase of the cost of the waste service, perhaps in the region of 10-50%, and also the application of VAT at 20% (or possibly the 10% reduced rate). Many mayors were therefore reluctant to make the change to a tariff system, and no deadline was set to require such a change. As a result, by the end of 2010 only around 1,500 of 8,100 cities (about 25% of the population in relation to surface area and number of inhabitants) had shifted to a tariff system – however, actual PAYT-coverage in relation to the population is only between 0.1 and 1% (Expert input).
Drivers of reform	
What were the main **enabling / success factors** that allowed the reform to take place?	One of the main drivers of reform was the national legislation that allowed municipalities to have more latitude to decide their waste management and waste collection systems.
References	Watkins et al (2012), Use of Economic Instruments and Waste Management Performances, Final Report, URL http://ec.europa.eu/environment/waste/pdf/final_report_10042012.pdf Gianolio, U., (ERICA) (2011), PowerPoint presentation for conference 'Use of economic instruments and waste management performances', URL http://ec.europa.eu/environment/waste/pdf/strategy/6.%20Umberto%20Gianolio%20PAYT%20Italy%2024%2010%2011.pdf Bucciol, A., Montinari, N., Piovesan, M. (2011), Do Not Trash the Incentive! Monetary Incentives and Waste Sorting, URL http://www.hbs.edu/research/pdf/11-093.pdf Eunomia (2003), Waste Collection: To Charge or not to Charge?, URL http://www.massbalance.org/downloads/projectfiles/1850-00484.pdf Expert input – In preparing the case study, the team was in contact with an expert at the Italian Ministry of Environment, Territory and Sea who clarified

	some of the latest developments in this area. Rossi, R. (2011), Italian best practices in waste management (presentation), URL http://www.ecotech.cat/grecia/Athens%20Esper-1_ENG.pdf http://www.acrplus.org/economic_instruments

9 Reform of water pricing in the Czech Republic

Summary assessment		
Brief description of the subsidy that has been / is in the process of being reformed	The Czech Republic reformed water prices according to the cost recovery principle. Between 1990 and 2004, the water and wastewater tariff for households increased from 0.8 to 48 CZK/m^3, covering an increasing fraction of the extraction, treatment and distribution costs related to water provision. The reform also increased the fees for the extraction of both surface and ground water, as well as for the discharge of waste water.	
Context	In other EU Member States, in particular in Southern European Member States, water prices often do not comply with the principle of cost recovery. For example, the cost recovery rate of capital, operation and maintenance costs in Portugal in 2002 was estimated at 23% for agriculture and 82% for urban users. In Greece, the average level of full cost recovery (operation and maintenance costs, capital costs, environmental and resource (opportunity) costs) in 2007 was estimated at 22% for agriculture and 57% for all water uses (OECD, 2010).	
Objectives		
Original subsidy **rationale/objectives**	To subsidise the provision of basic goods and services in order to ensure access to all citizens.	
Reasons for reform		
Was it that:		
The subsidy did not fulfil its **objective** and/or reach its **target audience**?	No - the subsidy fulfilled its objective, i.e. it allowed the Czech citizen to pay less for their water consumption	
The **rationale** for the subsidy was no longer valid?	Yes - the rationale for the subsidy was no longer valid because of the transition from a centrally planned to a free market economy. The previously state-owned assets underwent a very rapid liberalization and privatisation process (the Czech Republic was the first country in the region that underwent mass privatisation). In this context, state intervention in the establishment of prices was gradually reduced and eventually completely phased out.	
There were problems with the **subsidy design**?	The subsidy had been in place for a long time (from 1953 to 1991 the water and wastewater tariffs for household were held constant) and was no longer coherent with the new economic model of the Czech Republic.	
The subsidy **infringed existing EU legislation**?	No – the reform of water pricing took place before the Czech Republic joined the EU in 2004.	
There was a **requirement or**	The reform took place in the wider political changes taking place in the country in the transition from a centrally planned to free	

political commitment for reform?	market economy.	
There were negative **social impacts** which inspired the reform?	No – the social impacts were positive for much of the period of the subsidy as low water prices allowed all citizens to have more disposable income than they would have had in the case of higher prices. However, there would have been negative impacts if the policy had been maintained as financial sustainability of water infrastructure would have been at risk with low tariff incomes.	
There were negative **economic impacts** that inspired the reform?	Yes - the subsidy had a negative economic impact on the state budget.	
There were expected **budget savings** through reform?	Yes - the reform allowed the gradual phasing out of public expenditure for subsidised water prices.	
There were negative **environmental impacts** which inspired reform?	Yes - low water prices encouraged excessive water consumption. There were also concerns related to the state of water resources (see below).	
There were **public pressures** or calls for reform?	No.	
Process of reform		
What has the reform entailed?	Between 1953 and 1991, water and wastewater tariffs were capped at a constant level, which was the same across the country. The reform led to an increase in the water and wastewater tariffs from 0.8 CZK/m^3 in 1990, to 3 in 1991, 9 in 1992, 12 in 1993 and 15 in 1994. In the following years, the tariff steadily increased and reached 48 CZK/m^3 in 2004. This increase is well beyond the inflation rate. In fact, water prices increased by 275% in 1991, 200% in 1992, 33% in 1993 and 25% in 1994, whereas the yearly inflation rate in those years was respectively 57%, 11%, 21% and 10%. Between 1995 and 2004 the average annual increase was 12% and the average annual inflation rate was 5% (input from expert consultations carried out for this study). According to Baltzar et al. (2009), the Czech Republic now has a 100% operating-cost recovery rate, as opposed to other Eastern European countries (e.g. only 2% in Albania, 25% in Bosnia and Herzegovina or 58% in Romania). Also, all households have a meter to allow them to control their water consumption (GHK et al., 2006). No compensation measures or lower prices were introduced for low income households.	
What was the process of reform?	The increase in water and wastewater tariffs occurred in the Czech Republic in the context of the privatization of previously state-owned water management companies. The liberalisation and privatization process took place in the early 1990s and was initiated with the Resolution of the Government of the Czech Republic No 222 of 3 July 1991 laying down the principles for the reform and	

	reforming the drinking water supply and wastewater collection and treatment systems and the Large Privatisation Act (Law 92/1991) on the transfer of state property to private agents (Naumann, 2003; Sohail and Maslyukivska, 2009; input from expert consultations carried out for this study). At the time, the state of the water resources was considered particularly critical, due to high pollution, insufficient drainage and waste water treatment in cities, decreasing biodiversity and destruction of groundwater sources caused by long-term pollution. In order to address all these issues a set of policy measures were put in place to encourage better water management (e.g. establishment of emission limits, construction of waste water treatment plants) (UNDP, 2003). As regards water supply, the government decided to phase out the water price subsidy and to transfer the infrastructure and operational assets to municipalities (see below).
How did the process take place?	With the Act of Municipalities (1992), the ownership of the public water supply was transferred, at no cost, from the central government to municipalities. The original 11 large state-owned companies were transformed into about 40 district-level water management companies (plus more than 1200 additional small operators, with different forms of infrastructure ownership). More than two thirds of the municipalities decided to separate the infrastructure from the operational assets and privatise the latter. As a consequence, most water utilities ended up being managed by private companies (currently about 800 water companies operate in the Czech Republic). In 1996 the Amendment to Small Business Act allowed to transfer rights over water supply and sewerage systems to private operators (Sohail and Maslyukivska, 2009, Naumann, 2003; input from expert consultations carried out for this study). The reform implied that prices were established by the operating companies and were different from region to region, without a centrally determined cap. As indicated by the Act on Prices (Act no. 526/1990 Coll.), potable water and wastewater are soft-regulated commodities in the Czech Republic. As regards tariff calculation, in 1991, when the price liberalization process began , maximum water and wastewater tariffs were set at different levels for households and other customers. In 1992, water tariffs were deregulated and the maximum tariffs increased. In 1993, maximum tariffs were ended, and instead guidance on tariff setting was introduced for households and other customers. By May 1993, the reform was completed and since then the operations of water supply and sewerage have not been subsidised. There are few remaining examples of water services provided at a reduced price through city or community subsidies (Sohail and Maslyukivska, 2009; input from expert consultations carried out for this study). The Act no.27/2001 on Water and Wastewater Management, amended in 2006, established that the Ministry of Finance sets the guidelines for the calculation of tariffs, which were unified for households and other customers, thus making it impossible to apply lower tariffs for households

	and higher tariffs for other customers as was done before. Water prices are calculated by water companies on the basis of justified costs, reasonable profit and projected volume and are audited by the Financial Directorates of the Ministry of Finance. From 2002 it is possible to apply a two-component water and wastewater tariff (fixed and variable tariff components). (Naumann, 2003, Candole Partners, 2006; input from expert consultations carried out for this study). In spite of the reform, water price is still below the European average (for example by 20% in 2003, Naumann, 2003).
Key social impacts of reform	
Who was affected by the reform?	The increase in water prices had impacts on household expenditure patterns. It has been calculated that for some households the price increase has been up to 190% and for other users up to 626% (Naumann, 2003). There are different estimates of the acceptable threshold for water expenditure. According to a literature review performed by Fankhauser and Tepic (2005), this may vary between 2.5 and 5% of total household income/expenditure. Different estimates of the share of water expenditure on total available income in the Czech Republic can be found in the literature, e.g. 1.2% (1.5% for the bottom income decile) (Fankhauser and Tepic (2005) and 3.5% (Wah Chan, 2012). According to Candole Partners (2006), the share of the per capita disposable income spent on water in the Czech Republic was 1.49% in 1994 (as compared with 2.42% for electricity; 1.15% for gas and 4.47% for heat). This share slightly decreased in the following years, and was 1.42% in 2004 (as compared with 3.74% for electricity; 2.35% for gas and 3.50% for heat).
Key environmental impacts of reform	
What were/are the main **environmental impacts** of the reform?	The volume of household consumption decreased by 40%, from 171 litres per capita per day in 1989 to 103 litres in 2002 (UNDP, 2003). As a consequence of the reduced demand, water abstraction and water pollution also declined (Naumann, 2003). The reform also led to a decline in energy consumption (related to water pumping) (IEEP, 2007). Between 1990 and 2000 the total surface and ground water abstraction decreased from 3,623 to 1,918 million cubic metres (-47%), the water used for irrigation decreased from 97 to 9.3 million cubic metres (-90%) and the water used by the manufacturing industry decreased from 889 to 370 million cubic metres (-58%) (OECD data). Such a large reduction in water abstraction does not only depend on the increased water prices, but it can partly be explained by the reduced leakage in water pipelines, due to the improvement in infrastructures allowed by privatisation and the consequent increase in investment from private actors (Naumann, 2003). As regards agriculture, the reduction in water consumption can be explained by the modernisation process that the sector experienced in the early 1990s (UNDP, 2003), and does not result from a decrease in cultivated land (in the last two decades the amount of agricultural land has remained substantially the same).
Key economic and financial impacts of reform	
What were the main	The reform reduced public expenditure on water infrastructures and also

economic and/or **financial** impacts of the reform?	increased the (mainly private) financial resources available to cover investment and operational costs (UNDP, 2003). The reform was partly spurred by the need of new investments in infrastructure. When under state ownership, the water supply infrastructure had not benefitted from investment for a long period of time and there were high losses in pipe networks. After ownership was transferred to municipalities, the latter did not have enough financing capacity to improve the infrastructure and sought external funding from the private sector. Privatisation allowed an increase in available financing for investing in infrastructures and a consequent increase in efficiency (Naumann, 2003). As regards agriculture, it is interesting to note that the decrease in water consumption didn't translate into a reduction in the agricultural productivity. For example, the cereal and vegetable yield increased respectively from 40 to 54 and from 162 to 188 tonnes/ha between1993 and 2004 (FAO data).
Barriers to reform	
What were the main **obstacles to reform**?	The reform was generally accepted because it was part of a wider process of economic reforms that characterised the transition from a centrally planned economy to a liberalised one (IEEP, 2007).
Drivers of reform	
What were the main **enabling / success factors** that allowed the reform to take place?	The opening of markets and privatization processes in the late 1980s that followed the political changes offered a unique window of opportunity for reforming water prices in the Czech Republic. The transition to a market system also changed previous conceptions of public responsibility for the provision of goods and services (IEEP, 2007). The fact that water prices were gradually increased in a step-by-step manner before full liberalisation may have improved their acceptability among the public.
Key lessons learnt	
What **are the overall lessons** that can be learnt from the case, particularly in terms of its potential for **replicability** in other Member States considering EHS reform?	The Czech Republic case shows that fundamental improvement in water quality and management can be achieved in a relatively short period of time through legislative, organizational, institutional and economic reforms that are accepted by society (UNDP, 2003). Increasing water prices towards full cost recovery can reduce resource use and improve efficiency. Furthermore, it demonstrates that price reforms can be achieved even in the midst of a recession: the GDP growth rate in the Czech Republic was -11.6% in 1991, -0.5% in 1992, -0.1% in 1993 and +2.2% in 1994 (World bank data). In addition, it indicates that higher water prices increase the resources available for new investments. In the Czech Republic, as a consequence of the increased investments on water infrastructures, water leaks and losses significantly decreased and water quality increased (Sohail and Maslyukivska, 2009). The reform in the Czech Republic was facilitated by the transition process towards liberalization and privatisation of the previously centrally planned economy, and in general by the many reforms that were taking place at the time. As such, the reform was carried out in a rather unique context, which is not reproducible in EU MS today. Nonetheless, reforming water pricing to encourage a more efficient use of resources is a message that is replicable across EU MS, especially given the current economic crisis and subsequent need for reducing public

	expenditures. Policy action towards water pricing is under way in many European countries, as required by the WFD. For example, in Malta water charges were increased using a rising block system (i.e. socially disadvantaged groups benefit from low tariffs); Austria, Denmark, Finland, Norway, Sweden and UK achieved 100% cost recovery of capital, operation and maintenance costs of irrigation water (OECD, 2010). However, cost recovery is not yet achieved in most other EU MS.
References	Baltzar E., Kapoen C.,Kis A., Sevic D., Varbova V., Zhechkov R. (2009), 'Strategies for Reform. A Manual for Water Utilities in South Eastern Europe', URL http://web.rec.org/documents/PEIPWaterManuaFinal.pdf. Candole Partners (2006), 'Water regulation in Czech Republic. Deal fairness opinion, URL http://www.candole.com/files/Candole%20Partners%20-%20%20Transactions%20sample%20-%20Water%20regulation%20in%20Czech%20Republic.pdf. Fankhauser S. and Tepic S. (2005), 'Can poor consumers pay for energy and water? An affordability analysis for transition countries', Working paper No 92, European Bank for Reconstruction and Development, URL http://www.ebrd.com/downloads/research/economics/workingpapers/wp0092.pdf. GHK, Ondrej D. and Vermoote S. (2006), 'Strategic evaluation on environment and risk prevention under Structural and Cohesion Funds for the period 2007-2013'. National Evaluation Report for Czech Republic, URL http://ec.europa.eu/regional_policy/sources/docgener/evaluation/pdf/evalstrat_env/cz_main.pdf. IEEP et al (2007), 'Reforming environmentally harmful subsidies'. Final report to the European Commission's DG Environment, March 2007 Naumann M. (2003), 'Current Status of Water Sector in the Czech Republic', Working paper published by the EU-project Intermediaries, URL http://www.irs-net.de/forschung/forschungsabteilung-2/intermediaries/WP1_CzechRepublic.pdf. OECD (2010), 'OECD Member Country Questionnaire Responses on Agricultural Water Resource Management', URL http://www1.oecd.org/dataoecd/7/31/44763686.pdf. Sohail M. and Maslyukivska O. (2009), 'Learning from partnership experiences and water sector reforms in the Eastern and Central Europe and Central Asia region', Proceedings of the Institution of Civil Engineers - Management, Procurement and Law, 162(MP3), pp 107-116. UNDP (2003), 'Czech Republic: A Case Study on Commitments-Related Best Practice or lessons Learned in Water', URL http://europeandcis.undp.org/WaterWiki/images/0/0f/CzechWaterReport.pdf Wah Chan N.W., (2012), 'Urban water pricing: Equity and affordability. Discussion Paper 1209', URL http://www.globalwaterforum.org/wp-content/uploads/2012/04/Urban-water-pricing-Equity-and-affordability-GWF-1209.pdf?9d7bd4

10 Water abstraction charges in North Rhine-Westphalia (Germany)

Summary assessment		
Brief description of the subsidy that has been / is in the process of being reformed	Before the introduction of the water abstraction charge in North Rhine-Westphalia (NRW) in 2004, costs associated with the adverse environmental impacts linked to water extraction were not covered by water users such as agriculture, industry or households. This was contrary with the polluter-pays principle, calling for correcting such externalities through a price-based measure. The implementation of water abstraction charges often aims at [Ingenieurkammer 2012; UFZ 2012a]: ▪ demonstrating to water users that water is an economically scarce commodity and in this way optimising the incentives for conservation and protection of water resources, thus leading to a more efficient use of water resources, ▪ reducing negative impacts of water extraction on the environment and improving the ecological status of water bodies, ▪ supporting the development of water efficient production technologies and increasing innovation potential	
Context	A water abstraction charge has been introduced in various EU Member States, e.g. Denmark, Estonia, France, Germany, Hungary, Latvia, Lithuania, Netherlands, Poland, Romania, Slovenia, United Kingdom.[14] In Germany twelve out of 16 *Bundesländer* have implemented a water abstraction charge which differs considerably regarding designated use, exceptions, charge rate, etc. Charge rates differ e.g. between 0.0025 and 0.31 Euro per m³ whereby Berlin is the only state charging more than 0.10 Euro per m³. [Gawel et al. 2011]	
Objectives		
Original subsidy **rationale/ objectives**	The original subsidy consisted in not charging water users for water abstraction and its impacts, therefore not internalising external costs. The following arguments are presented against a reform of the original subsidy [UFZ 2012a; Gawel et al. 2011]: ▪ Imposing a water abstraction would involve the risk of distortion of competition for commercial water users and would lead to unacceptable burdens for private households. ▪ Another controversially discussed reason stated is that it is not necessary to save water in Germany, since on the one hand there is sufficient water available and on the other hand water saving increases costs for the technical water supply and discharge infrastructure.	
Reasons for reform		
Was it that:		
The subsidy did not fulfil its **objective** and/or reach its **target audience**?	No, the subsidy fulfilled its objective with regard to costs for commercial and private water users. It allowed the German industry and private households to pay less for their water usages.	

[14] [EEA/OECD 2011]; [Speck 2004]

The **rationale** for the subsidy was no longer valid?	Partially, the rationale for the subsidy is still valid for those who want to subsidise the industry. The rationale behind water saving strategies is controversially discussed in a context of sufficient water availability. However water saving strategies may be valid when considering local and seasonal water shortages and uncertainties with regard to regional effects of climate change. With regard to costs for technical infrastructure associated with reduced water consumption, the rationale behind the original subsidy might be underlined by demographic changes and a decreasing population in Germany.	
There were problems with the **subsidy design**?	No problems could have been identified	
The subsidy **infringed existing EU legislation**?	Yes, it contradicts EU legislation, in particular the Water Framework Directive (WFD) 2000/60/EC which requires MS in Art. 9 to apply the user-pays principle and the principle of full cost recovery, including environmental and resource costs. The previous subsidy was not in line with this internalisation of environmental and resource costs.	
There was a **requirement or political commitment** for reform?	Yes, because WFD (Art. 9) requires the implementation of the user-pays principle and cost recovery principle in water pricing, including environmental and resource costs.	
There were negative **social impacts** which inspired the reform?	No, the social impacts were mostly positive, as low water prices allowed the industry to produce at lower costs and allowed private households to pay less for water usage.	
There were negative **economic impacts** that inspired the reform?	Yes, the subsidy had a negative economic impact on the federal state budget and that may have delayed innovations with regard to water saving technologies (assuming an incentive for the reduction of water consumption through the reform).	
There were expected **budget savings** through reform?	Yes, budget savings are expected by reducing public expenditures for subsidised water prices.	
There were negative **environmental impacts** which inspired reform?	Yes, though for the federal state of NRW there were no concrete risks for the water bodies as regards the quantitative status, both sustainability strategies and integration of potential climate change impacts also encouraged reform (Ewringmann and Vormann, 2003). Moreover, especially when the revenues are earmarked for requirements of the WFD and invested in water resource management, the reform allows improving the state of the German water bodies.	
There were **public pressures** or calls for reform?	No pressures or calls could have been identified	
Process of reform		
What has the	The water abstraction charge (WAC) in NRW was implemented to charge	

reform entailed?	water abstraction from ground and surface waters. It was designed to address and internalise the environmental impacts associated with water abstraction. It pursues an incentive function and a financing function. The incentive function aims to reduce water use through increased water prices. The financing function aims at financing measures for water body conservation (Gaulke, 2010). The charge is based on the withdrawn water quantity and charges 4.5 ct/m³. Water abstractions for cooling purposes are charged with a lower rate and depend on the cooling system. Some usages are exempted from the WAC. The revenues are dedicated to measures for the implementation of the WFD and are made available for remediation of contaminated sites. (Bezirksregierung Düsseldorf, 2012)
What was the process of reform?	The WAC was first introduced by the federal state parliament (a coalition of the Social Democratic Party of Germany – SPD and the BÜNDNIS 90/DIE GRÜNEN – Green Party) of NRW in 2004. The coalition governing in 2009 (Christian Democratic Union (CDU) and Liberal Democratic Party – FDP) decided to phase out the WAC by 2018 decreasing continuously the abstraction charge. This decision was amended by the ruling coalition (SPD and Green Party) in 2011, annulling the phasing-out and increasing the charge (as described above). Since water abstraction charges in Germany are the responsibility of the federal states, regulations differ considerable between the states. In future it should be aimed at a nationwide adjustment of the regulations. (UFZ, 2012)
How did the process take place?	On 30 July 2011 the "Gesetz über die Erhebung eines Entgelts für die Entnahme von Wasser aus Gewässern – Wasserentnahmeentgeltgesetz des Landes Nordrhein-Westfalen (WasEG)" (Act on water abstraction fees) was amended. Accordingly, any water abstractor is obliged to declare the quantity of water abstracted and the type of water usage as well as to provide the required documentation once a year by 1 March. Advance payment is required until 1 July of the assessment period. (Bezirksregierung Düsseldorf 2012)
Key social impacts of reform	
Who was affected by the reform?	The increase in water prices had impacts on commercial and private water expenditure patterns, e.g. on agriculture and industry.
Key environmental impacts of reform	
What were/are the main **environmental impacts** of the reform?	A water abstraction charge causes patterns of substitution especially for commercial water users. However between varying sectors the water intensity and quality demands of production processes may differ considerably, resulting in deviating water conservation potentials. In retrospect only a few expectations linked to the introduction of the water abstraction charge were confirmed[15]: Between 1991 and 2001 the specific water use (water use per gross value added) in the chemical water industry was reduced by 26% and in the paper industry by 34% whereas the reduction

[15] This conclusion was withdrawn from a nationwide study in Germany and does not only reflect results in Northrhine-Westphalia. [Gawel 2011]

	was less than 7% in the food production industry. However, these increases of water intensity are not clearly attributable to the impact of the WAC. The may also be caused by generally increased water process and technological innovations. A partial influence of the WAC on the water price development and as a stimulus for innovations may be assumed, but based on the given data cannot be verified. (Gawel, 2011)
Key economic and financial impacts of reform	
What were the main **economic** and/or **financial** impacts of the reform?	The amended Act charges 4.5 €cents/m³; for abstractions relating to cooling water usage 3.5 €cents/m³ and for abstractions relating to continuous flow cooling water that will be immediately re-fed into the water 0.35 €cents/m³. The abstraction fees will be used for public expenditure on measures related to the WFD.
Barriers to reform	
What were the main **obstacles to reform**?	There was a political opposition to the reform from the side of the Christian Democratic Union (CDU) and Liberal Democratic Party – FDP.[16]
Drivers of reform	
What were the main **enabling / success factors** that allowed the reform to take place?	Both the European obligations from the WFD and a slight relief for the tight federal state budget through incomes from the water abstraction fee paved the way for the reform to take place. The political capital for reform relates mainly to the political majority of the ruling parties SPD and the Green Party in the federal state parliament. Despite existing political resistance from the opposition, the government succeeded in securing a majority vote in favour of the amendment.
Key lessons learnt	
What **are the overall lessons** that can be learnt from the case, particularly in terms of its potential for **replicability** in other Member States considering EHS reform?	The incentive function to reduce water usage of the water abstraction charge in NRW is controversially discussed. The rates charged are criticised as being too low to provide an incentive for an actual reduction of water consumption (Speck, 2004; Grüne Liga, 2012). However, the incentive function towards a sustainable resource management is relevant in view of the requirements of the WFD as well as in view of uncertainties regarding seasonal and regional climate change effects on water availability. With regard to WFD requirements a cancellation of the WAC would oblige the NRW government to justify the reasons for cancellation – however, the reasons were in fact rather political than factual and objective (Gawel, 2011). Introducing water abstraction charges to encourage a more efficient use of resources is replicable across EU MS, especially given the current economic crisis and subsequent need for reducing public expenditures.
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[16] See for instance a plenary discussion from October 8th 2009, URL www.wolfgangheinrich.de/file_download/754.

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