



Environmental Fiscal Reform in Europe

An overview of policy and politics of implementing environmental fiscal reform in Europe between 1990 and 2013

Chris Hewett & Paul Ekins

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EXECUTIVE SUMMARY

Environmental fiscal reform

The concept of environmental fiscal reform (EFR), sometimes referred to as ecological fiscal reform, or green fiscal reform (GFR), has been an active area of policy research and implementation for three decades across Europe.

Broadly speaking, environmental fiscal reform uses environmental taxes and reduction of government expenditure harmful to the environment – fossil fuel subsidies are a prime example – to raise revenue. The proceeds, depending on the fiscal position of the country, can be used:

- To reduce other taxes, e.g. labour taxes;
- To reduce budget deficits;
- For specific purposes of investing in environmental infrastructure;
- To stimulate innovation in clean technology.

This paper is a review of the many different efforts across Europe, since the early 1990s to the present day, to implement EFR. It draws on the numerous academic studies as well as the practical experience of countries such as Sweden, Denmark, Germany, The Netherlands, UK and Ireland.

EFR: Using the power of the market to reduce emissions

The case in favour of implementing EFR starts with the need to reduce emissions or resource consumption to levels which are sustainable based on scientific evidence.

Using taxation to create market incentives to reduce emissions became more common during the 1990s, backed up by the economic rationale that pollution is an external cost on the economy that market prices would not reflect without a policy intervention. If taxes are used to increase the price of polluting activities and decouple them from economic growth, then the revenues can be used to reduce labour taxes or stimulate eco-innovation. There have been many economic modelling studies which show the positive economic benefits of such a shift in the tax base.

Research has shown that the benefits of this approach, if well-designed and successfully implemented, can be numerous and multi-faceted:

- Distortions within the economy are reduced as a result and efficiencies enhanced;
- EFR measures may also raise substantial revenues, which can be used e.g. to reduce labour costs, or facilitate transition towards a green economy;
- Changing relative prices can foster innovation and encourage investment;
- A positive impact on employment may result, as tax shift reduces the cost of labour;
- Growth may also increase – indeed, environmental taxes are referred to as “growth-friendly” taxes by the European Commission in its Annual Growth Survey (see e.g. European Commission, 2014).

Policy risks and barriers to the implementation of EFR and how to address them

1. Impacts on international competitiveness

Any such reform faces barriers to implementation and risks of disrupting the existing economy in ways that are unwanted. A very common objection is that a unilateral energy or carbon tax will harm the international competitiveness of the implementing country.

In political debate, the notion of competitiveness is often used as a catch-all term. In fact, the concept of competitiveness is different depending on the level at which it is applied. For firms, it is simply the ability to sell their products in competitive markets, at home or abroad. For sectors in a particular country, it is their ability to maintain their market share in markets at home and internationally. For countries, it is their ability to engage in international trade such that they maintain or increase their national income and employment with a reasonable balance of payments. When discussing these issues it is very important to be clear about the implications of environmental fiscal reform for competitiveness at these different levels.

There is no theoretical reason why a tax shift through EFR should have negative effects on national competitiveness, provided that reductions in other business taxes compensate for increased environmental taxes on business. In fact, where a country has involuntary unemployment, and the increased environmental taxes are offset by reduced taxes on business or labour, then employment and output might increase.

2. Low-income households

The potential for EFR packages to have a negative impact on low-income households is frequently cited in literature and political debate. There is little argument over the fact that environmental taxes can be regressive, particularly comparing them to income tax. However, as with competitiveness, the issue can be oversimplified. Some environmental taxes are progressive, like taxes related to car ownership and driving, while for instance tax on water is normally regressive. There is also a great deal of analysis and experience in designing EFR packages that compensate for regressive effects.

3. Environmental effectiveness of EFR measures

Opponents of EFR will often question the environmental effectiveness of the proposed measure before it is introduced, casting doubt on the reason for the tax changes. With many *ex post* studies of implemented environmental fiscal measures, there is a body of evidence from independent and government evaluations to show the positive environmental impact of EFR measures.

Diminishing tax base – rarely a concern in the real world

Another common criticism of EFR is that if the objective is to reduce emissions, and emissions are also the source of government revenues, then if the fiscal reform is successful it will also undermine the tax base, so reducing the revenue to the government. The key issue here is elasticity. Many environmentally relevant products in widespread use in society, such as fossil fuels or vehicles, have a relatively low price elasticity of demand, i.e. elasticities between 0 and -1. When such products are the bases for environmental taxes, then revenues from tax increases on these bases will increase even while the environmental damage is reduced.

Overview of the politics of implementing EFR across Europe

The paper reviews the political experience of the countries in Europe that have at some point in the last two decades, introduced some EFR policies. Some have done this on several occasions, others have run into political difficulties and the issue has never been revisited. Some countries are only now trying it out. Each country has its own political context and it is impossible to draw direct parallels from any experience of one country to another, but it is clear there are recurring challenges for any government which seeks to bring in an EFR package.

EFR is only pursued when environment is high on the political agenda, which was seen more during the 1990s, or when policymakers need more revenue, which has been the case in recent years. The industry lobby has been the most powerful force in blocking or shaping EFR, but if public opinion turns against an environmental tax, politicians soon follow. Overall, EFR is a long term reform that can only be properly delivered with a degree of political consensus.

Are the alternatives to EFR any easier to implement?

Alternatives to EFR include direct support and subsidies for low-carbon energy supply, increased investment into energy efficiency, further developing the EU Emissions Trading Scheme, tougher regulation on products and vehicle fuel efficiency and greater support for sustainable transport. The evidence suggests that each of these face equally challenging paths to implementation, and all would be more effective if carried out **alongside** an EFR.

Lessons for the future

EFRs are best sustained in an atmosphere of political consensus, but whilst the environment is the main policy driver it is hard for mainstream political movements to take the risks of implementing it. Using EFR to help in fiscal consolidation is likely to be the strongest driver in the present political climate, but even then it will not be easy.

The best examples of EFR from across Europe have taken into account the transitional needs of the international competitiveness of those sectors most affected, as well as any specific design features to avoid, or compensate for, distributional impacts.

Closer co-ordination or co-operation at European level, such as through tax harmonisation or minimum tax rates, could address some aspects of the competitiveness issues. However, today very little of the politics of EFR can be dealt with at a European level, because the Treaty requires unanimity in respect of tax issues. Under current arrangements, EFR will need to be initiated and led by single member states, or groups of like-minded member states.

In conclusion, perhaps the best way to frame the debate has to be that of shaping the future of the European economy as one on a green, low-carbon path, a pioneer of eco-innovation. A strong political consensus could be built around the case that this is the only credible economic growth path available to Europe, and it cannot be achieved without a higher carbon-energy price and implementation of EFR across the whole EU.

1. What is Environmental Fiscal Reform?

“Environmental tax reform (ETR) is a reform of the national tax system where there is a shift of the burden of taxation from conventional taxes, for example on labour, to environmentally damaging activities, such as resource use or pollution” (EEA 2005, p.83). ETR is generally implemented and modelled in a revenue-neutral way, with increases in taxes on pollutants, resources or energy use balanced by reduced taxes on labour costs or income tax. The terms ‘green tax shift’, ‘ecological tax reform’ and ‘green tax reform’ are also used.

To counterbalance the possible adverse effects of an increase in green taxes, other taxes are reduced using the revenues generated by the ETR implementation – a process referred to as ‘revenue-recycling’). The purpose of such a revenue-neutral policy is to shift the tax burden so that it falls more on ‘bads’ (pollution and resource depletion, which it will tend to reduce) and less on ‘goods’ (which it will tend to encourage) by ensuring that price signals, as a result of the introduction of ETR, give an incentive to households and industries to alter behaviour.

Environmental fiscal reform (EFR), sometimes referred to as ecological fiscal reform (EFR) or green fiscal reform (GFR), is a broader approach, which “focuses not only on shifting taxes and tax burdens, but also on reforming economically motivated subsidies, some of which are harmful to the environment and may have outlived their rationale” (EEA 2005, p.83). Thus, EFR tends to emphasise the revenue-raising potential of environmental taxes, and has less of a focus on balancing tax reductions. EFR may also include the removal of environmentally harmful subsidies, which can also improve a country’s fiscal position.

This report uses the term ‘ecological fiscal reform (EFR)’ except in cases when a revenue-neutral tax shift is being explicitly discussed, when the narrower term ETR will be used to make this clear, unless the text quotes directly from sources using different terminology.

Both EFR and ETR have in common the characteristic that they envisage a greater use of environmental taxes over time, which implies a shift in, or at least a broadening of, the tax base. A shift in the tax base is not something that can be achieved quickly, but over a number of years. It can also be implemented in a variety of different ways. Sometimes it might be a specific package of tax changes which are strictly revenue neutral when looked at overall, so the total tax burden does not increase as a result. In other cases, particularly in the current context where many European governments need to reduce structural deficits, it might mean an explicit decision to use green taxes to raise revenue instead of labour or income taxation. It might also entail using revenues to fund specific activities to improve the environmental effectiveness of a measure, facilitate behavioural change or a transition to a green economy, or simply to make it easier to sell to the electorate.

Both EFR and ETR have been an active area of policy research and implementation for three decades. This paper presents a short review of the implementation efforts of the past 30 years across Europe, highlighting good examples, summarising the main benefits and risks of such policies, and looking at what has been learnt about the politics of implementing EFR.

The first section will review the policy research and practice of European EFR, based on the many reviews that have been undertaken in this area. The second section will look at the political handling of EFR across Europe, based on the experience of a number of experts from countries where experiments in EFR have been tried. The final section sets out to draw some conclusions and explore ways of enhancing the climate for further implementation of EFR in the future.

2. EFR Policy in Theory & Practice

During the period from the early 1990s to the present day, there have been many academic studies of EFR, based on modelling exercises, policy analysis and evaluations of actual tax measures on the ground. A substantial literature has therefore been established, so the benefits and risks of EFR are now relatively well known. This section will summarise the current state of knowledge in this area, largely by drawing on a number of recent literature reviews and mapping out the evidence. This is not a comprehensive literature review in itself, but more a 'review of reviews'. The main studies used for this exercise are:

- **Environmental Tax Reform – a policy for Green Growth (Ekins and Speck, 2011)**
Published as part of the PETRE project – (Resource Productivity, Tax Reform and Sustainable Growth) funded by the Anglo-German Foundation.
- **Handbook on Research in Environmental Taxation (Milne & Skou Andersen, 2012)**
- **Environmental tax reform in Europe: opportunities for eco-innovation (European Environment Agency, 2011)**
- **Carbon Taxation and Fiscal Consolidation: the potential for carbon pricing to reduce Europe's fiscal deficits (Vivid Economics, 2012)**
This report was prepared for the European Climate Foundation and Green Budget Europe
- **Carbon Energy Taxation (Andersen and Ekins, 2009)**
- **The Case for Green Fiscal Reform – Final Report of the UK Green Fiscal Commission (2009)**
The UK Green Tax Commission was a high level stakeholder group involving politicians, business leaders, academics and NGOs which examined the case for a major environmental fiscal reform in the UK.

In addition, the OECD has been producing reports on environmental taxes taxation since the 1990s, sometimes as overview documents on the OECD as a whole, sometimes as part of country reports, which have been influential in shaping the discourse on and understanding of environmental taxation.

2.1 Rationale for why we need Environmental Fiscal Reform

2.1.1 The environmental imperative

The case in favour of implementing any kind of environmental fiscal reform starts with its environmental purpose, whether this is the need to reduce excessive energy consumption, waste and greenhouse gases, whilst promoting renewable energy, to prevent dangerous climate change, or reduce landfill, urban air pollution or chemical inputs to soil and rivers. Over the years, climate change has become the most important of these issues, but green taxes have also been used to address many other environmental problems.

2.1.2 The growth of economic instruments in support of environmental targets

Scientific evidence about the potential harm of polluting emissions to human health or the wider environment, including ecosystem services and the climate system itself, has been used to derive targets for emission levels at national and international level. In some countries these targets have become legally binding, either in response to international agreements, such as the Kyoto Protocol,

or driven by European legislation, such as the Landfill Directive. In other areas, such as urban air pollution, it may be the national government that takes the initiative due to local conditions and human health effects. In all of these cases green taxes are often used as part of a package of policies to address an issue. During the 1970s and 1980s, the main environmental issues of concern were from industry, such as sulphur emissions from power stations, or effluent from factories polluting waterways. Traditional forms of regulation by setting limits for each factory were an effective way of controlling such pollutants. However, during the 1990s, as these problems had been substantially reduced, concern about greenhouse gas emissions grew and the sources of remaining pollutants, such as traffic and agriculture, were more diffuse,— the effectiveness of regulation as the main policy tool began to diminish. More sophisticated measures, including market mechanisms to create price incentives to reduce pollution and consumption of resources have become a common feature of policy packages to address these issues.

2.1.3 Economic rationale of internalising external costs

There are also strong economic reasons for environmental fiscal reform. Resource consumption and pollution create costs in the economy due to impacts on health and welfare, reduced agricultural yields, loss of tourism in blighted areas and the impact of extreme events such as floods, droughts and storms due to climate change. Such costs resulting from polluting or natural resource extracting activities, such as burning fossil fuels or coal-mining, tend not to be included in the price of these activities. If the economy operates without internalising these external costs, then it will deliver undesirable and inefficient outcomes for society. If the externality can be measured accurately and internalised into prices with a tax measure, then society will gain. Of course, measuring the externality value is not easy to do, but such considerations provide a strong theoretical basis and economic rationale for environmental fiscal reform. If the price of a polluting activity to individuals is 'corrected' first by the removal of any subsidy and then by imposing a tax to reflect the external costs, then there will be an incentive on them to change their behaviour and reduce the associated pollution.

2.1.4 Using prices to decouple economic growth from carbon emissions

For any kind of pollutant that is pervasive in the economy, such as carbon dioxide from energy use, it becomes very strongly linked to economic growth. As income increases, even if the efficiency in the use of energy improves, new products and innovations come forward that create new ways to consume energy. This has been seen in particular with information and communications technologies where the rapid growth in the use of computers, mobile technology and the internet have meant far more electronic devices used in households than even a decade ago. Another result of increases in energy efficiency, in the absence of energy price increases, is that consumers will have more money to spend on energy-using goods and services, which will reduce the energy savings from the efficiency increases (a phenomenon known as the rebound effect). Such effects reduce the options available to policymakers in their search for ways of decoupling carbon emissions and energy use from economic growth.

There is an important distinction to be drawn between two types of decoupling. *Absolute* decoupling is when emissions fall in absolute terms in a context of economic growth. With relative decoupling emissions continue to grow, but at a slower rate than the economy. With carbon and other greenhouse gas emissions, it is absolute decoupling that is required for carbon targets to be met.

It is hard to see how emissions can be reduced without a rising energy price, or more specifically, a rising carbon price. International, EU and national climate targets require higher carbon pricing in order for them to be delivered efficiently (i.e. at least cost), and taxation and the auctioning of emissions permits are the main policy tools that could achieve this. In fact, carbon and energy price increases are the only policy that can contribute to EU targets on renewable energy, energy efficiency and carbon emissions reductions simultaneously. This is because, depending on the economic activity concerned, the response to higher carbon prices could be to switch to a lower-carbon fuel, to improve energy efficiency so reducing tax liability, or to stimulate innovation in renewable energy alternatives in order to create a new market.

2.1.5 Double dividend – cutting labour taxes create jobs

If governments were to use taxation or auctioning of emission permits as a means to increase the price of carbon or energy, this would not only create incentives for companies and individuals to reduce their consumption, but also raise potentially significant amounts of revenue.

If the aim is to keep the macro-economic impact of these measures broadly neutral, the overall fiscal position could be maintained by cutting other taxes. There is a strong economic rationale for reducing taxes, such as those on labour or business, which affect the economic incentive to work or make profits, and so distort the economy. In most countries where significant environmental fiscal reforms have been implemented, there has been some reduction in social security contributions, income taxes or taxes on business profits. The fiscal reform may also be part of a wider policy package, with some of the revenues being used to support clean technology or energy efficiency.

Governments have also used green taxes to increase tax revenues overall, rather than reducing other taxes, if there is need for tightening fiscal policy. The same positive environmental and economic outcomes can be achieved by reducing environmentally harmful subsidies as well as by increasing environmental taxes.

Reducing economic distortions from the tax system by reducing labour taxation is another of the main economic rationales of environmental fiscal reform, in pursuit of what is sometimes called the 'double dividend'. This refers to the idea that not only does an increase in taxes on pollution deliver less environmental impact, but if labour taxes can be reduced, such reductions stimulate job creation, thus reducing unemployment: two major societal benefits of EFR. Many studies of EFR have tried to estimate these two dividends, both using economic modelling of future tax changes and also ex-post evaluations of actual tax reforms.

The extent to which employment may be increased through EFR differs across studies, depending on such factors as the extent of unemployment, or features of the labour market and how it is modelled. Most studies suggest that in a context other than full employment, EFR will result in employment growth. Whether this will also lead to income (GDP) growth is less clear, with two effects working in opposite directions: the inflationary effects of the environmental taxes will tend to reduce GDP, while growth in employment will tend to increase it.

A modelling exercise exploring EFR across the EU economy, considering a similar package of measures designed to reduce CO₂ emissions by 20% by 2020 at a European level, was carried out as part of the PETRE project. The measures were modelled in the E3ME and GINFORS macro-economic models of the EU economy, which have similar structures but are based on slightly different assumptions about the economy. The results were that employment levels rose in both models, but

GDP was slightly higher than business as usual in the E3ME results and GDP slightly lower in the GINFORS model.¹

A more recent study carried out by Vivid Economics looked at the economic impact of different ways of raising revenues to reduce deficits. The study compared the impacts of raising the same amount of revenue from income taxes, VAT or energy tax in Hungary, Poland and Spain. Given the urgent need for additional revenues in several EU countries, revenue recycling was not a feasible option at the time and so the study modelled an increase in the overall tax burden on each economy.

The study found that energy taxes did less economic harm per unit of revenue than the other options.² For Spain, an energy tax raising 10 billion Euro annually by 2020 would reduce GDP by 0.3%, but if direct taxes raised the same revenue then GDP would be reduced by 0.5% compared to the baseline. Hungary and Poland produced similar results, with the energy tax package reducing GDP only by 0.2-0.25% and direct taxes reducing it by 0.5% compared to baseline.

2.1.6 Stimulating green innovation and growth

The final core reason for pursuing EFR is its potential to help stimulate innovation and economic growth, helping to put the economy on a greener development path. Romani et al. (2011) argue that a low-carbon growth path is the only feasible growth path ultimately available to the world, as the impacts of climate change will increasingly undermine economic progress and cost the economy far more than the cost of scaling up low-carbon technologies and industries.³

A study for the European Environment Agency in 2011 looked in detail at the impact of environmental taxes on eco-innovation. Through a detailed literature review and an economic modelling exercise on the economy of the EU-27, their conclusion was that EFR can deliver environmental objectives, create additional jobs and trigger eco-innovation, while having negligible impacts on GDP.⁴ This echoed another study by the OECD in 2010, which concluded that environmental taxation can spur innovation. Two macro-econometric models were used in the study: E3ME and GINFORS, the same models as were used in the PETRE study, reflecting their suitability for such investigations. Their conclusions were consistent, despite different approaches and assumptions.

2.2 Policy risks and barriers to implementation of Environmental Fiscal Reform

2.2.1 Competitiveness effects

Depending on the focus of the EFR package, a very common objection is that a unilateral energy or carbon tax will harm the international competitiveness of the implementing country. In political debate, the notion of competitiveness is often used as a catch all term. In fact, the concept of competitiveness is different depending on the level at which it is applied. For firms, it is simply the ability to sell their products in competitive markets, at home or abroad. For sectors in a particular country,

¹ Ekins, P. and Speck, S. (2011). Environmental Tax Reform – a Policy for Green Growth.

² Vivid Economics (2012). Carbon taxation and fiscal consolidation: the potential for carbon pricing to reduce Europe's fiscal deficits, Report prepared for the European Climate Foundation and Green Budget Europe. May 2012.

³ Romani, M. Stern, N, Zenghelis, D (2011). The basic economics of low carbon growth in the UK. Grantham Institute of Climate Change & the Environment. LSE.

⁴ European Environment Agency (2011). Environmental tax reform in Europe: opportunities for eco-innovation .

it is their ability to maintain their market share in markets at home and internationally. For countries, it is their ability to engage in international trade such that they maintain or increase their national income and employment with a reasonable balance of payments. When discussing these issues it is very important to be clear about the implications of environmental fiscal reform for competitiveness at these different levels.

National Competitiveness

There is no theoretical reason why a tax shift through EFR should have negative effects on national competitiveness, provided that reductions in other business taxes compensate for increased environmental taxes on business. In fact, where a country has involuntary unemployment, and the increased environmental taxes are offset by reduced taxes on business or labour, then employment and output might increase. This is what is often shown in modelling of a green tax shift, although the output increase tends to be small. In addition of course, the environmental tax produces an environmental improvement, which is its primary purpose.

Box 1 below summarises a comprehensive modelling exercise from the COMETR project, which looked at the ex-post impacts of EFR in six countries which had implemented reforms on energy demand, greenhouse gas emissions and GDP. It found that national GDP had not been adversely affected by EFR. On the contrary, the average effect on GDP had been slightly positive.

Box 1: Modelling the impacts of ETR

The most comprehensive modelling of European ETRs was carried out as part of the European research project COMETR⁵. The model used was again the macro-econometric European model (including the 25 countries which were members of the EU in 2006, plus Norway and Switzerland) called E3ME.

Modelling ETR with E3ME: Methodology and Approach

Environmental tax reform typically shifts the burden of taxation from conventional taxes to environmentally-related taxes. This shift is referred to as “revenue recycling” and may take effect through:

- Reductions in direct taxes (income tax, corporation tax);
- Reductions in social security contributions
 - paid by employers;
 - paid by employees;
- Other measures
 - Support schemes for investment expenditure (and depreciation); and
 - Increases in benefits or other compensatory measures to counter regressive effects.

In order to model the effects of ETR, a number of scenarios were generated by E3ME over the period 1995 to 2012 (the projection period therefore includes Phase 2 of the EU ETS). Carried out in 2005, the modeling therefore consisted partly of historic economic data (1995-2004) and partly of projections into the future (2005-2012). The two scenarios reported here are:

- the Reference Case (R) which is a counterfactual projection without the ETR, but including current and expected developments in the EU economy, e.g. the EU ETS
- the Baseline Case (B) which reflects the actual situation to 2005, and a projection from then by E3ME to 2012. Thus the Baseline Case includes the ETR in each Member State covered by the project, exemptions or special treatment for the industries most affected and the compensating reduction in another tax. This scenario is calibrated closely to the observed outcome through using historical data which include the effects of ETR implementation.

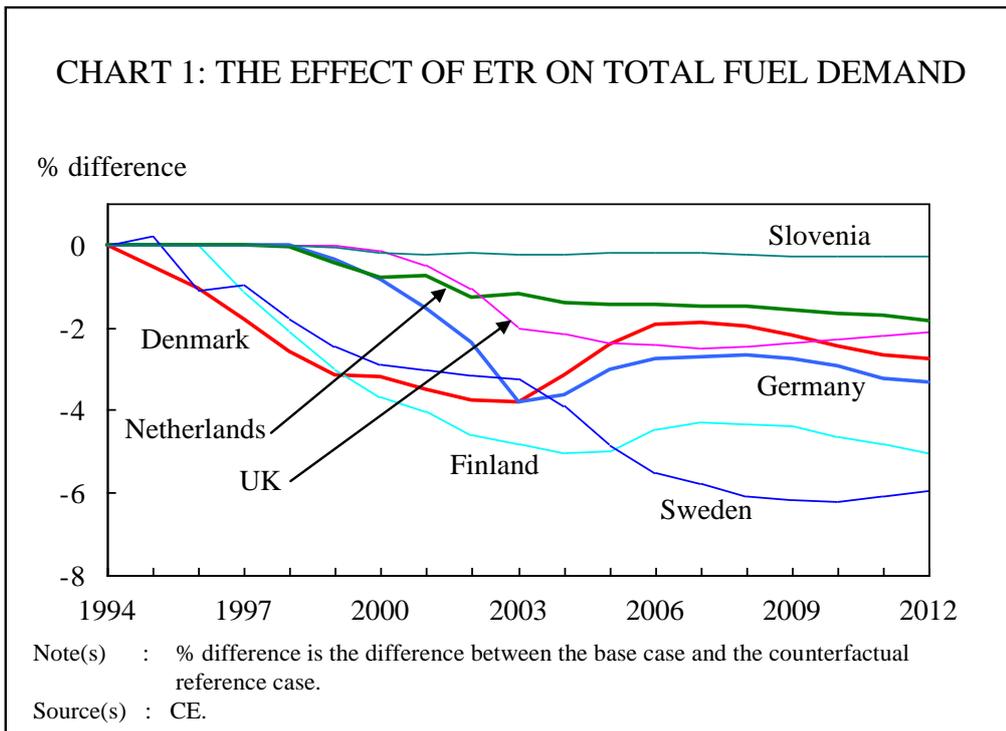
Results

The effects of the ETR were examined by comparing the Baseline solution with the Reference case for the countries that pursued ETR in the 1990s. This illustrates the difference between what actually happened with the ETR (the Baseline) and what would have happened had there been no ETR (the Reference). Revenue neutrality is implemented in each case through the revenue recycling mechanisms. Exemptions, non-payments and negotiated agreements are included as accurately as possible as they happened, subject to the total revenues matching the published figures in each case.

⁵ COMETR – Competitiveness effects of environmental tax reforms’, (2004-2006), FP6 Proposal 501993 funded by DG Research of the European Commission, the results of which are reported in detail in Andersen, M.S. and Ekins, P. (2009). *Carbon-Energy Taxation: Lessons from Europe*. Oxford University Press.

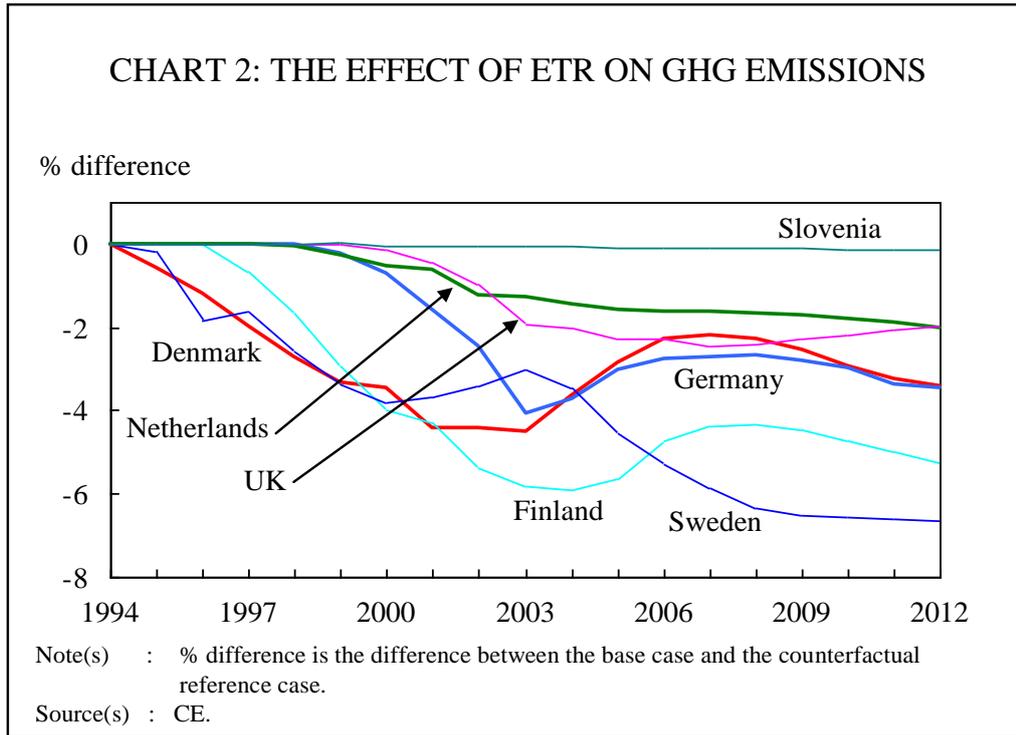
All the six European countries that have implemented an ETR show a reduction in fuel demand from the ETR (see Chart 1). In most cases the reduction in fuel demand was in the region of 4%, although it was slightly larger in Finland and Sweden than the other regions.

Chart 2 shows that the scenarios also exhibit reductions in GHGs resulting from the ETR in all six ETR countries. The effects closely follow the results for total fuel consumption, with the largest reductions occurring in regions with the highest tax rates. It should be noted that in most cases the fall in emissions is relatively larger than the fall in fuel demand, indicating that the tax policies succeed in reducing use of the more carbon-intensive fuels.



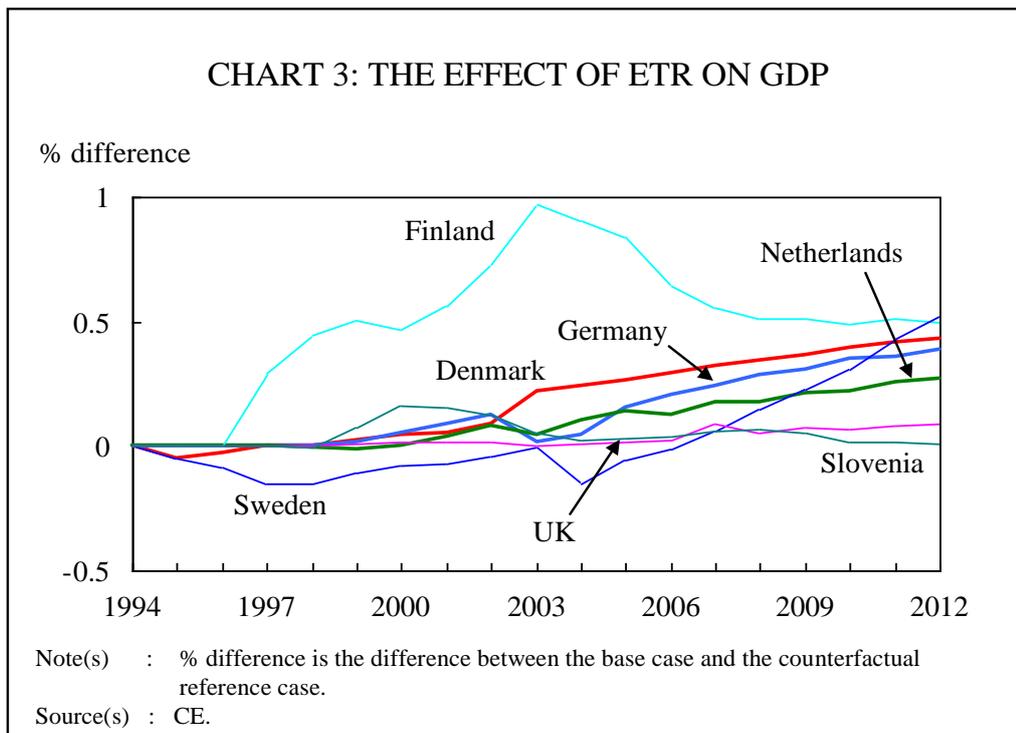
Source: COMETR 2007

: COMETR 2007



Source: COMETR 2007

Finally, Chart 3 shows that all six of the ETR countries show a small increase in GDP as a result of the ETR.



Source: COMETR 2007

Firm and Sectoral Competitiveness

There is little evidence that environmental policies in general, or environmental (mainly carbon/energy) taxes and EFRs in particular, have had negative effects on the competitiveness of any individual sector. The main reasons for this are because:

- only a few sectors – those with high energy and trade intensities, and low market power – are vulnerable to carbon/energy taxes;
- these sectors have been protected by special tax provisions (which also have the effect of reducing the effectiveness and efficiency of the taxes);
- even these sectors have shown that they have significant opportunities to improve their energy efficiency to offset the effect of the tax; and
- taxes and EFR measures implemented so far have been relatively small.

Any individual sector will oppose a policy that they perceive forces them to face increased costs, especially if these do not affect their competitors in other countries. If the policy leads to relocation of their activities, or displacement of a potential new investment to other countries, this will reduce and may cancel out entirely the emission reduction in the implementing country, a phenomenon known as ‘carbon leakage’. In the case of EFR these problems are more acute for energy-intensive industries such as steel, chemicals, cement, and aluminium, but often many other industries that are not very energy-intensive also raise these concerns.

There have been many studies looking at this problem, and a wide range of solutions put forward to address it, such as lower tax rates for energy-intensive industries conditional on energy efficiency agreements. The OECD carried out a number of studies on sectors such as cement and steel, to estimate potential carbon leakage from unilateral carbon taxes. Their modelling did find evidence that it may happen, but found that if all developed countries were to act together, the leakage could be significantly reduced.⁶ In reality, the full potential sectoral competitiveness implications of the environmental taxes applied to most of the economy have not been revealed, because those industrial sectors perceived to be most vulnerable have always been granted special treatment, or even complete exemption, from the taxes. Sometimes this has been necessary for the EFR to get adequate political support to be implemented.

In the future more stringent energy and climate policies, such as through a tightening cap on the EU ETS, have the potential to increase the threat to competitiveness of vulnerable sectors. This threat could be addressed either through the kinds of protective measures used in the past, which reduce the efficiency and environmental effectiveness of the tax, or by tackling the trade effects directly through border tax adjustments or international sectoral agreements.

Towards New Low-Carbon Competitiveness

In a world in which carbon emissions are an increasing cost and liability, the development of international comparative advantage in new low-carbon technologies could become a major new source of competitiveness. The development of such new technologies will require large-scale investment, which, if it is to be private investment, will have to be profitable for the companies concerned.

⁶ Numerous OECD studies are summarised and quoted in Braathen, N. “The political economy of environmental taxation” in Milne, J. & Anderson, M.S. (2012). Handbook of Research on Environmental Taxation. Edward Elgar Publishing.

Through ambitious EFR, while making appropriate arrangements to protect vulnerable sectors from the worst short-term competitiveness effects, governments can create the context for this investment and long-term competitiveness in the future. The implementation of the policy, in terms of its speed and timing, needs to strike an appropriate balance between building up new industries, whilst not subjecting existing sectors to too much competitive pressure too soon.

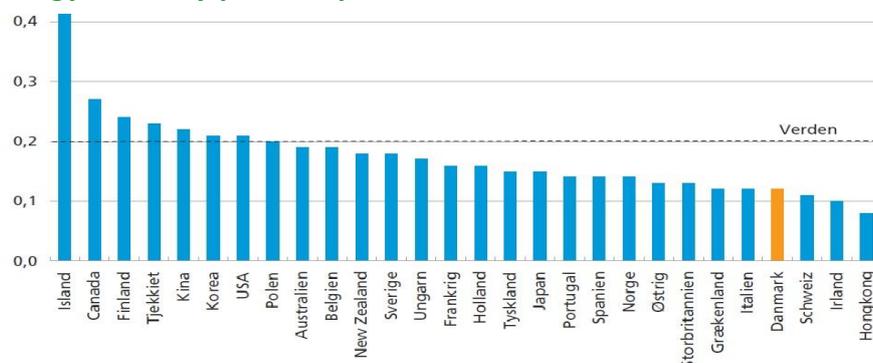
BOX 2: Tax Exemptions for Energy-intensive processes in Denmark

In Denmark two in-depth governmental reviews conducted in 1999 and 2011 concluded that the Danish CO₂ tax reduced CO₂ emissions substantially, and that energy intensity had decreased 22% from 1990 to 2008 (Danish Ministry of Taxation and Competitiveness, 2011).

These reviews also concluded that the widespread use of green taxes does not have a negative impact on overall competitiveness. Indeed, they highlighted the possibility of increasing tax rates substantially without impacting on general competitiveness or employment, if tax-rates escalate slowly over a longer period so that enterprises have time to adapt and maintain their competitiveness, and if revenues are recycled to companies to reduce ancillary wage costs, or public fees, or revenues were used to fund support schemes for energy efficient investments.

As in other countries, a limited number of energy-intensive enterprises were at risk of not being able to maintain their competitiveness in Denmark. In response, the government introduced energy and carbon tax exemptions for energy-intensive processes and offered these companies contracts to facilitate increased investments in energy-efficient technologies, secure reduced CO₂-tax rates, and provide financial support for large investment projects.

Energy intensity per unit produced in industrial countries



The Danish government reports concluded that the CO₂ tax has helped to make Denmark one of the most competitive and energy efficient economies in the world.

2.2.2 Distributional impacts on households

The potential for EFR packages to have a negative impact on low-income households is frequently cited in literature and political debate. There is little argument that environmental taxes can be regressive, particularly in comparison with income tax. However, as with competitiveness, the issue can be oversimplified. There is also a great deal of analysis and experience in designing EFR packages that compensate for regressive effects.

Distributional effects of EFR have a number of different aspects, which are considered in turn below in order to assess the overall distributional impact.

Possible distributional impacts of environmental taxes

The impacts of environmental taxes are different for rich and poor households, between employed and non-employed, and between rural and urban members of the population. It may be that these variations in household characteristics result in larger in-decile variations of impacts than across-decile variations, i.e. households with similar incomes may be affected very differently by environmental taxes.

The challenges of understanding the complexity of distributional impacts of environmental taxes are highlighted in the German case, where some studies suggest that the household sector was a net loser compared to business – mainly due to the fact that energy-intensive industry was exempted from the energy tax, but not from the revenue recycling. However, later studies, which looked in more detail into the way the revenue recycling was designed, showed a more balanced impact between household and business sectors and an overall minor regressive impact. Particular household types, such as large families or single parents were losers, compared to childless couples or individuals. This complex set of impacts has a profound influence on the politics of implementation, as discussed later.

Environmental and particularly household energy taxes, when introduced on their own, are very likely to have regressive impacts, as spending on energy is likely to make up a higher proportion of total expenditure for low-income groups than for higher-income groups. This is exacerbated in countries such as the UK, where energy efficiency in housing is also poor, meaning more heat is needed to keep a home warm enough to maintain a healthy temperature.

This regressivity is not as clear cut when looking at transport taxes, where the lowest income groups do not use cars or aeroplanes as much as richer households.

Distributional effects also result from the economic and environmental improvements brought about as a result of EFR. Job creation has both direct benefits for those who get the new jobs and indirect benefits in terms of increased rates of GDP growth. If urban air quality is improved, for example, lower-income groups will get more benefits from cleaner air than other groups as they tend to live in areas with heavier pollution. This category is the hardest to evaluate but should not be neglected as a result.

Green taxes also influence the prices of other goods and services. Estimating the extent of this requires economic modelling. One effect, for example, may be that labour-intensive goods and services become relatively cheaper than energy-intensive ones. However, these indirect effects are less important than the direct factors above, and are diluted by the amount of imported goods and services, which experience no EFR effect at all.

Tax design to address regressive impacts

Studies which have looked at European EFR experience show some overall distributional effects, but also how they have been counteracted by good policy design. A chapter in the book resulting from the PETRE project investigated this topic in detail and what follows is summarised from this work.⁷

The impact of EFR design, including exemptions or tax allowances, can make an important difference to the distributional impact. For example, taxes primarily targeting business will have less impact on households, and vice versa, while tax exemptions for recipients of social security benefits would protect poorer households from severe distributional impacts.

The overall effects of an entire tax reform package should be analysed alongside the distributional effects of the environmental tax increases: If an increase in energy or other environmental taxes is compensated by a reduction in income taxes or social security contributions, distributional impacts may be less regressive. Generally, the distributional impact of reducing employers' pension contributions, for example, leads to a minimal amount of regressivity, as some groups, such as pensioners, the low-paid and unemployed, may not be paying income or labour taxation, and so will not benefit from such reductions, while being subject to the extra tax.

If possible revenue-raising measures are compared, such as direct income taxes, VAT, and carbon-energy taxation, modelling suggests that every social group may be better off under an energy-tax reform, because the overall macroeconomic impact of the energy tax package is expected to be less damaging than alternative tax increases (Vivid Economics, 2012).

Possible models to address regressive impacts

There are three obvious ways to address regressive impacts:

Compensation which reduces the price of energy

Direct compensation by reducing the energy price undermines the incentive effect of environmental taxation and is this not an optimal choice.

In the UK, carbon-energy taxes have targeted business. The decision not to tax household energy was strongly influenced by concerns over the impact on low-income groups, and has led to a reduced rate of VAT on household energy use (5% instead of 20%), as well as the exemption of households from environmental taxes.

Similarly, the Netherlands introduced a tax-free allowance for household energy use, so basic energy needs were untaxed, creating a more progressive structure for the energy tax element of the EFR.

Compensation which reduces the quantity of energy consumed

Grants for the installation of energy-efficiency equipment or household insulation may help compensate poor households if well-targeted, but comes at a high up-front cost for government and may not be targeted to those households most in need of support.

⁷ Blobel et al. (2011). 'Implications of ETR in Europe for Household Distribution' in Environmental Tax Reform – a policy for Green Growth. In Ekins, P. and Speck, S. (2011). Environmental Tax Reform – a Policy for Green Growth.

In Germany, low-income households were provided with financial support to retrofit poor-quality housing and install energy-efficient heating.

Compensation in the form of revenue-recycling or universal refunds

Compensation in this form does not detract from the incentive to economise on energy and shields those who receive compensation from welfare losses resulting from higher energy prices. However, low-income groups outside the tax system – the unemployed, pensioners – will not be compensated if income taxes or social security contributions are reduced.

Sweden applied this approach very effectively, using the recycling of revenues from environmental taxes to favour households over business, which ensured any distributional effects of the environmental taxes were neutralised. Sweden also has a very well insulated housing stock so energy price increases are less regressive than in some other countries.

2.2.3 Environmental effectiveness

Opponents of EFR often question the environmental effectiveness of the proposed measure before it is introduced, casting doubt on the reason for the tax changes. With now many *ex post* studies of implemented environmental fiscal measures, there is a body of evidence from independent and government evaluations to show the reductions in emissions that occurred after environmental fiscal measures have been put in place. The UK Green Fiscal Commission documented this evidence showing that carbon and energy taxes from Finland, Norway, Denmark, Sweden, Germany, The Netherlands and the UK had all been studied and carbon reductions have been attributed to the fiscal reforms (see Table 1)⁸.

Table 1: The impact of energy and carbon-based taxes

Country and tax	Period evaluated	Impact
Finland carbon/energy tax	1990-2005	CO2 emissions 7% lower than BAU Shift from carbon tax to output tax on electricity in 1997 may have lessened impact
Norway carbon dioxide and sulphur dioxide taxes	1991-2007	21% reduction in CO2 from power plants by 1991-1995 14% national reduction in CO2 in 1990s, 2% attributed to carbon tax 12% reduction in CO2 emissions per unit of GDP
Denmark - carbon tax and energy tax	1992-1997	CO2 emissions in affected sectors down by 6% in the context of economic growth of 20% between 1988 and 1997 5% reduction in emissions in one year in response to tax increase

⁸ Green Fiscal Commission (2009). The Case for Green Fiscal Reform. See http://www.greenfiscalcommission.org.uk/images/uploads/GFC_FinalReport.pdf

		In the 1990s, 23% reduction in CO2 from business as usual trend, and 26% increase in energy efficiency Subsidy to renewables may have accounted for greater proportion of emissions reductions than tax
Sweden energy and carbon taxes	1990-2007	Emissions reductions of 0.5 million tonnes per annum Emissions would have been 20% higher than 1990 levels without tax
The Netherlands energy tax	1999-2007	Emissions 3.5% lower than BAU Low tax rates may have resulted in limited impact
Germany - green fiscal reform, taxes on transport, other fuels and electricity	1999-2005	CO2 reduced by 15% between 1990 and 1999, due to restructuring associated with reunification Further reduction of 1% between 1999 and 2005 (BAU would have seen a return to growth in CO2 emissions) CO2 emissions 2-3% lower by 2005 than they would have been without tax
UK - industrial energy tax	2001-2010	UK CO2 emissions reduced by 2% in 2002 and 2.25% in 2003 Cumulative savings of 16.5 million tonnes of carbon up to 2005 Reduction in UK energy demand of 2.9% estimated by 2010

Source: Table 3.1 (p.21) from The Case for Green Fiscal Reform – Final Report of the UK Green Fiscal Commission (2009)

In addition to these studies of examples of small-scale EFRs that have actually been implemented, there have been many different economic modelling exercises looking at far more ambitious EFR packages. Many have assessed the impact of EFR on projected emissions and energy use, as well as on the macro-economic indicators of GDP, employment etc. They have also used different types of economic models, using different assumptions. A recent review of many of these studies was carried out as part of the COMETR project, which also commissioned new modelling work for a Europe-wide EFR package, details of which are in Box 1, as already discussed. Both, the *ex post* studies summarized in the report of the Green Fiscal Commission and the *ex ante* studies reviewed in the COMETR report show that both energy demand and greenhouse gas emissions can be significantly reduced in countries where EFR is implemented.

2.2.4 Impacts on revenue stability

Another common criticism of EFR is that if the objective is to reduce emissions, and emissions are also the source of government revenues, then if the fiscal reform is successful it will also undermine the tax base, so reducing the revenue to the government.

In order to address this issue it is necessary to distinguish between two types of green taxes. First, there are those which will indeed reduce, over a relatively short period, the use of certain sub-

stances from a particular part of the economy or from society overall. Examples might be chlorinated solvents and CFCs, or plastic bags, all of which have been subject to taxation in Denmark. Taxes in this category may be desirable because of the environmental improvements to which they lead and should thus be included in an EFR, but they will not generate stable, long-term revenues, and so are not suited for the kind of EFR that is intended to generate a significant tax shift.

The second category of environmental taxes relate to products in widespread use in society with a low price elasticity of demand, such as fossil fuels. These have been subject to relatively high taxes in some countries for some time, and while they have certainly reduced the demand for these products, and associated impacts from them, their use, and the revenues from them, remain substantial.⁹ Given the need to reduce emissions from fossil fuel use further, and the desirability of an increasing tax rate as part of the policy mix to accomplish this, it may be envisaged that energy and carbon tax revenues will remain substantial for a considerable time to come. Furthermore, if corresponding reductions in labour taxes bring about increased employment, this will generate extra tax revenues as well.

As an example, if a 10% increase in an environmental tax produces an 8% reduction in the tax base (carbon emissions, say), then revenues from the tax will *increase* (by 2%), along with the emissions reduction. The fact that many environmental tax bases (e.g. energy, car ownership) have elasticities between 0 and -1 means that revenues from tax increases on these bases can increase even while the environmental damage is reduced.

Even with the more radical EFR packages that have been modelled, the revenue streams have been shown to be sustained and fairly predictable, so that they should not be a concern for finance ministries when significant revenue streams are expected. Even these proposals do not envisage more than around 20 per cent of tax revenues coming from green taxes, leaving 80 per cent still coming from other sources. The recent report from Vivid Economics specifically modelled the revenue-raising potential for carbon taxes, and found this to be considerable in countries such as Poland, Spain and Hungary.¹⁰

In comparison to other types of taxes, the administrative burdens of environmental taxes are usually generally quite low. This is because they are often structured as simple excise duties and their collection can typically be tagged onto existing mechanisms.

There have not been many detailed studies of the transaction costs associated with environmental taxes – the implementation costs incurred as a result of negotiation, policing and enforcement. However, a review of existing studies carried out by Pavel & Vitek (2012) and drawn mainly from an analysis of energy and mineral oil duties suggested that the administrative burden is quite low.

Pavel & Vitek also concluded that some other green taxes may have higher transaction costs, but still much lower than those for income tax.¹¹ An exception is road charging/road pricing and congestions charges where transaction costs can be higher than for income tax, although this depends on both the purpose and design of the tax. This can be seen from the differences in the congestion charges in London, Stockholm etc, and in the German “Maut” road tax for heavy vehicles.

⁹ Non-environmental examples of such taxes are those on tobacco or alcohol, use of which has undoubtedly been reduced by such taxes, but which have remained over long periods sources of considerable tax revenues.

¹⁰ Vivid Economics (2012). Carbon Taxation and Fiscal Consolidation: the potential for carbon pricing to reduce Europe’s fiscal deficits. Report prepared for the European Climate Foundation and Green Budget Europe.

¹¹ Pavel & Vitek (2012). ‘Transaction costs of environmental taxation: the administrative burden’ in Milne, J. & Anderson, M.S. (Eds.) *Handbook of Research on Environmental Taxation*. Edward Elgar Publishing.

3. The politics of EFR in Europe, and barriers to its implementation

There is now more than twenty years of experience across Europe in the practice and politics of implementing EFR in different countries. Many European countries have, at some point in the last two decades, introduced some EFR policies. Some have done this on several occasions, others have run into political difficulties and the issue has never been revisited. Some countries are only now trying it out. Each country has its own political context and it is impossible to draw direct parallels from any experience of one country to another, but it is clear there are recurring challenges for any government which seeks to bring in an EFR package. Vested interests across Europe have fought very hard to prevent EFR from affecting them, whether big business, motorists or trade unions in those sectors perceived likely to be negatively affected. Especially when taxation is involved, it is also difficult to communicate a complex package to an electorate that, at least in some countries, is likely to be sceptical about any revenue recycling proposed. Balancing the need for simplicity to communicate the concept to the media and public, at the same time as introducing complex design changes in order to accommodate vested interests or make a measure politically acceptable is also a difficult task. In most cases the amount of political capital required to push through changes has been very large, and as environmental issues are not usually at the top of the political agenda for long, the most challenging aspect of EFR has been to sustain the reform beyond its first phase.

3.1 Political experiences of EFR in some individual European countries

There follow a few of the stories of the political challenges of implementation faced in some of the countries that have partially implemented EFR. These stories are based on papers by, and in some cases interviews with, EFR experts who have followed the debate in their country for many years.

3.1.1 Sweden (1991-2015)¹²

Sweden, along with other Scandinavian countries, was one of the first movers in the EFR debate. The CO₂ tax was first introduced in 1991, as part of a much wider tax reform aimed at reducing the overall tax burden. There was a greater tax shift in favour of reducing non-wage labour costs than any compensatory revenue-raising from green taxes. Thus, the majority of citizens and businesses saw an overall fall in the tax bill at this time, making the whole package less controversial and a political consensus around its introduction easier to achieve. At the same time industry was given a lower CO₂ tax rate than households and this differential has stayed in place ever since.

Recommendations on green taxes were made by an independent Green Tax Commission, which also looked at further measures in the late 1990s. As the political backdrop remained one of reducing the overall tax burden, political parties remained committed to the idea of EFR, developing a political consensus that has made implementation easier for governments of the left and right alike.

The Swedish government has consistently implemented EFR measures since the first measures were introduced in 1991. Between 2000 and 2009, the general CO₂ tax, which applied to households and motor fuels, was increased further, while other taxes were reduced, such as income and labour taxes. For motor fuels, an existing energy tax was reduced at this time, so the overall tax burden on petrol and diesel didn't change a great deal, at a time when world oil prices were high. The CO₂ tax

¹² Information from Hammer, H, Sterner, T. & Akerfeldt, S. (2013). Sweden's CO₂ tax and taxation reform experiences, in Genevey, R., Pachauri, R., Tubiana, L. (Eds.), *Reducing Inequalities: A Sustainable Development Challenge*, TERI Press, New Delhi.

on industry remained the same during this period. In 2008, all industry covered by the EU ETS was exempted from the CO₂ tax. It is worth noting that the administrative costs of the tax amount to just 0.1% of carbon/energy tax revenues.

In Sweden, political economy considerations have resulted in reduced CO₂ tax rates for industry, to reduce impacts on competitiveness, as shown in the table below. Nonetheless, a 5-year package announced in 2009 increased CO₂ tax for non-ETS industry substantially, while keeping household tax levels the same.

Table 2: Developments in carbon tax rates per ton CO₂ in Sweden

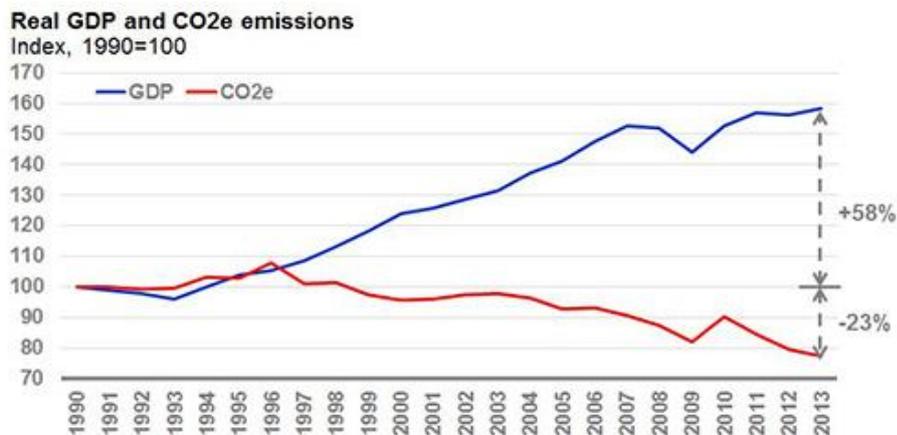
	1991	2014
Households and service sector	27 EUR / ton CO ₂	125 EUR / ton CO ₂
Sectors subject to international competition	7 EUR / ton CO ₂	34 EUR / ton CO ₂ (sectors outside EU ETS) EU ETS sectors are exempt

New tax increases have been announced for 2016 for transport fuels, amounting to an increase of about 5 Euro cents per litre for diesel and gasoline.¹³

Since carbon-energy taxation was introduced in 1991, GDP and CO₂ emissions have decoupled in absolute terms, i.e. the emissions have decreased in absolute terms at the same time as GDP has increased, as shown in figure 1.¹⁴

¹³ Government of Sweden (2015). The Budget Bill for 2016 – Investing in Sweden’s future. See <http://www.government.se/press-releases/2015/09/the-budget-bill-for-2016--investing-in-swedens-future/>

¹⁴ World Bank (2015). Sweden: Decoupling GDP Growth from CO₂ emissions is possible. See

Figure 1: Real GDP and CO₂e emissions in Sweden, 1990-2013

CO₂ = approximately 80%
of CO₂e emissions

Sources: Swedish Environmental Protection Agency, Statistics Sweden

Ministry of Finance, Sweden



The achievement of the Swedish EFR, which is almost unique in Europe, is the degree of political consensus that has allowed governments of left and right to support EFR and a gradual increase in CO₂ tax rates over 20 years. The foundations for this appear to be that the country started this period with a higher overall tax burden. EFR has therefore taken place against a backdrop of falling taxes, thus taking a lot of the political heat out of the argument. Unfortunately this is not a position that many other European governments can envisage for themselves in the near future.

3.1.2 Denmark (1991-2013)

The other main Scandinavian country in the EFR debate has been Denmark, which has constantly innovated with environmental tax measures, often based on the principles of EFR. For decades Denmark has had a relatively high registration tax on cars. This has been seen as a “luxury tax”, but at the same time it is also a green tax, which has led to a lower car ownership in Denmark than in countries with a similar income level. From 2007 the registration tax was changed, so that it is partly dependent of the fuel consumption of the car. The first carbon tax was introduced in 1993 on household energy, alongside reductions in labour taxation. As with other countries there had been a building up of academic and NGO research and advocacy on EFR, with support at that time from trade unions that were keen to promote green jobs and reductions in non-wage labour costs to stimulate more employment. Further measures came in 1996 and increases in 1998, including an extension of carbon taxation to business, with lower rates for energy-intensive industries on condition of the signing of energy efficiency agreements.

However, political consensus was not achieved and the new, conservative government of 2001 implemented a freeze on environmental taxes, although they did not reverse them. This held for a number of years until the financial crisis of 2007/8, and subsequent Euro crisis, changed the priorities of all European governments dramatically. The revenue from energy taxes was reduced by 1.3 billion euros per year in 2009 compared to 2001 because of the tax freeze – corresponding to about 25% of the total annual revenue of the green taxes.

The need to reduce budget deficits across Europe brought new pressures on the fiscal position of most governments. And in Denmark, the prime minister changed his mind about energy taxation –

in part inspired by the fact that Denmark was going to be the host of COP 15 on climate change in December 2009. The centre-right government then introduced a new package of tax reforms which re-introduced index-regulation of energy taxes (but not other environmental taxes), and increased carbon taxes again in order to fund cuts in income tax, which had become their political priority. Some of these carbon tax measures increased the levels for industry, which created a debate on competitiveness resulting in a study for the Department of Economics and Business in 2010 stating that the carbon tax levels were affecting industrial competitiveness. The tax reform was then watered down in 2011, and after elections in September 2011, the new centre-left government further cut back some of the green taxes on industry.¹⁵ In order to finance reduction of certain electricity taxes¹⁶ in autumn 2012, and fund the removal of a tax on sugar and fat in food, the income tax was increased once more. On the other hand the government has maintained other parts of the EFR, e.g. the tax on nitrogen oxide pollution, untouched, in spite of opposition.^{17,18}

2013 saw the introduction of the so called Security of Supply tax, which is partly implemented as an increase in existing taxes on fossil fuels used for space heating and cooling. The legislation proposes a separate tax on biomass and other renewable fuels used for space heating and cooling, including the use of biomass for co-generation as well as private woodstoves. The two purposes of the measure are to create new revenue to substitute revenue from the decreasing use of fossil fuels, and to enhance energy conservation, also related to biofuels, recognising that there are also problems relating to this energy source (not carbon neutral, indirect land use change etc.)

The issue of competitiveness has been the main catalyst for the various political twists and turns on EFR in Denmark. Household energy tax rates have not been the centre of controversy in the same way as industrial rates. This controversy has meant that political consensus on EFR has been hard to reach in Denmark, despite the fact that, at different times, pro-EFR proposals have been put forward by parties of the left and the right.

3.1.3 United Kingdom (1995-2001)

The UK experience of EFR is one of a period of intellectual debate permitting the grasping of political opportunity, followed a few years later by public backlash and political retreat. During the late 1980s and early 1990s there had been a growing academic interest in using market mechanisms to address environmental problems, particularly related to issues like waste generation and fossil fuel use. The Conservative administration rejected the idea of a European carbon-energy tax in the early to mid-1990s, largely on grounds of subsidiarity, being of the view that taxation should remain a competence of Member States and not the European Commission. Nevertheless, by the mid-1990s when the country was coming out of a recession and government needed tax revenues, the Treasury began to turn to environmental taxes to raise revenue, bringing in VAT on the household use of fuel, introducing a landfill tax, and increasing road fuel duty by 3%, and then 5%, above inflation per year (the fuel duty escalator). At the same time, the Treasury were also cutting income tax and corporation tax. No attempt to make an explicit link between the green tax increases and cuts in other taxes was made, as the political goal was to take credit for tax cuts in the run up to an election.

¹⁵ Danish Ecological Council (2013). Environmental taxation – changes since 2009.

¹⁶ Tax on electricity for heating – heat pumps and traditional electrical heating.

¹⁷ PSO= Public Service Obligation – not a tax, but a levy on electricity consumption, where the revenue is used for financial support for new investments in renewable energy.

¹⁸ Danish Ecological Council (2013). Environmental taxation – changes since 2009.

Whilst the increases in road fuel duty were not controversial at the time, introducing VAT on domestic heating and electricity was very unpopular and taken up as a cause by the Labour opposition. There was a strong social motivation for this opposition as VAT on fuel was a regressive tax, and the Labour defeat of the government over this tax increase was a real political 'feather in the cap' for Tony Blair and Gordon Brown. The psychological importance of this victory made it impossible for a future Labour government to contemplate any kind of tax on household energy.

When Labour came to power in 1997, they increased the road fuel duty escalator to 6%, and introduced a landfill tax escalator, and also introduced a business energy tax, the Climate Change Levy (CCL). The latter was introduced explicitly as an ETR measure, with revenues being used to cut labour taxation, although energy-intensive industry was given a partial exemption if they signed voluntary agreements to improve energy efficiency. At the time, it was this business energy tax that was the focus of political debate with very strong opposition from business groups (even those which were not energy-intensive). Considerable work had been done by think tanks and advocacy groups before the election in anticipation of a strong opposition lobby, so the tax survived, but it would never be increased in the way originally envisaged. Road fuel duty, meanwhile, was raising significantly more revenue than the CCL ever would. As with the previous government, Labour was also simultaneously cutting income tax, but not making the explicit link to fuel duty. There was also no detailed attempt to address the needs of the 'loser' groups, such as those in rural areas who had no access to public transport, so were dependent on their cars for access to jobs and public services.

When, in 2000, the international price of oil started to rise, pushing up petrol and diesel prices, a protest led by lorry drivers and farmers received huge public support and made fuel duty a massive political issue overnight. Having never made the case for its increase, the government struggled to defend the tax, despite having evidence that it had reduced emissions and provided enough revenue to allow for income tax cuts. It also found it difficult to win the argument in the media that the price rises were driven by the market, not their tax policy. The fuel duty 'escalator' policy was abandoned and with it any chance of increasing energy or fuel taxes for many years to come.

Both main political parties in the UK have flirted with the idea of EFR, and partially implemented it. Neither, however, was prepared to communicate it honestly to the public. The instinct was to try to take credit for any tax cuts in a package, without drawing attention to the tax-raising parts. This reinforced the mistrust amongst the electorate about the motives of politicians on tax issues, and allowed green taxes to be labelled in the media as 'stealth taxes', further undermining public support for them. In opposition, each party has been equally happy to make alliances with 'loser' groups in order to score political points. Labour did this on VAT on household energy, and the Conservatives did the same with farmers and hauliers on road fuel duty. So, whilst there was potential to create political consensus on the EFR concept, neither party appeared to want to be seen to be implementing it, so in practice they found it far easier to generate conflict and prevent any progress.

3.1.4 Germany (1999-2011)¹⁹

Germany was not an early mover on the implementation of EFR in Europe, although there has been a great deal of intellectual debate and academic work on the concept throughout the last 30 years. During the mid-1990s all political parties were in favour of the principle, but had not developed specific proposals. It was during this phase of policy development that industry and agricultural

¹⁹ Information largely from Schlegelmilch, K. (2005). Insights in Political Process on the Ecological Tax Reform from a Ministerial Perspective. Applied Research in Environmental Economics, Volume 31.

lobby groups mounted serious opposition to the ideas and eventually persuaded the ruling Christian Democrats, under Helmut Kohl, that they should not introduce eco-taxes.

During the same period, the main opposition Social Democrats, along with the Green Party, continued to develop specific proposals, against a background of increased support for EFR from a growing coalition of NGOs, academics, businesses and trade unions. The prospect of the double dividend from reducing labour taxation was an important factor in building this coalition and there was considerable debate about the job creating or destroying characteristics of EFR. Industry groups funded research which contradicted the double dividend thesis, which reinforced the divide in political debate, and consequently made any focus of EFR on business harder to implement than on households and motorists. This contrasts with the debate in the UK (see above) where household energy use was the hottest political issue. In both cases, increasing taxation on motor fuels was less controversial at the time, in part because such taxes were not new and increases had happened in the past.

The prospects for EFR rose considerably when the SPD and Greens formed a coalition government in 1998, where EFR was an area both parties agreed upon. Taxes on motor fuels, household energy and some business energy consumption were introduced, with manufacturing industry, and even more so the energy-intensive and agricultural sectors, being given special treatment. The majority of revenues were recycled primarily to reduce non-wage labour costs via employers' and employees' pension contributions, with some used to support investment in renewable energy, and later in modernising the building stock. Whilst the revenue recycling for reducing labour taxes was not widely understood by the electorate at the time of its introduction, reducing labour costs to boost employment was a top priority for the government. Thus, keeping increases in pensions contributions to a minimum depended on EFR revenues. For this reason, the leadership stood by the EFR proposals during a period of rising global oil prices and negative media coverage of high fuel costs incorrectly attributed to government tax measures, and subsequent governments did not reverse them.

The same government also reduced or phased out environmentally harmful subsidies (e.g. for housing/buildings, for commuters, for the coal sector), as they were considered inconsistent with the polluter pays principle. The removal of subsidies for the coal sector was the most significant, but hardest political decision to make. Whilst the economic logic of cutting coal subsidies was widely understood, the potential regional impact on jobs in the mining areas provided a strong vehicle for industry to work together with trade unions and politicians to block reform. The ultimate result has been a long timescale for the reduction of coal subsidies, ending in 2018.²⁰

Further elements of an EFR were introduced in 2005, based on a broad consensus. For example, for the first time ever, a satellite-based system was set up to levy vehicle charges on motorways for heavy goods vehicles from 12 tonnes. The distance and emissions-based charge has made an important contribution to reducing 'fuel tank tourism' (cross-border travel to take advantage of lower fuel prices in other countries). The political consensus in favour of the measure was broad because tremendous damage to the road infrastructure, caused to a great extent by foreign trucks, was not being paid for equally by all road users. Introducing the 'user pays principle' ensured that all HGV operators were obliged to make a contribution to the costs of any damage caused by their vehicles. Given the political consensus and the ease with which the satellite-based system could be expanded, the charge was extended to cover several other roads in 2012.

²⁰ Cottrell, J. (2014) 'Reforming EHS in Europe: success stories, failures and agenda' in *Paying the Polluter. Environmentally Harmful Subsidies and their Reform*. Oosterhuis, F. and ten Brink, P. Edward Elgar Publishing.

The importance of a fiscal driver is particularly evident in the German case. The Christian Democrats in opposition had argued in favour of the withdrawal of the ETR, but this was quietly forgotten when they entered government, partly due to the importance of the revenues the tax raised, and perhaps because they did not disagree with EFR in principle.

Furthermore, when the fiscal crisis struck and substantially increased the need for revenues, several EFR measures were implemented in 2011: a nuclear fuels tax, an air ticket tax, and the reduction of industry subsidies within the eco-tax. Since this time, at least in theory, there has been some degree of cross-party consensus on EFR, although willingness to promote it actively is quite limited in all political parties, including the majority of the Greens. Nevertheless, its' appeal as a revenue raiser remains.

3.1.5 The Netherlands (1996-2013)²¹

During the 1990s, The Netherlands was one of the leading countries on using environmental taxes, with an EFR package first adopted in 1996, following two Green Tax Commissions which had recommended taking forward such measures. The revenues from carbon- and energy-based taxes were recycled into reductions in income tax, employers' social security contributions and corporation tax.²² It was The Netherlands which designed the most innovative way of ensuring household energy taxes were not regressive, by introducing a tax-free 'basic energy needs allowance', whereby higher energy consumption was subject to a higher tax rate.

But soon the country started to face the limitations of being a small, open economy. Arguments about negative impacts on the competitiveness of business resonated in a country which traded 70% of its goods. Also, being a small country with shared borders makes it hard to raise road fuel tax significantly above those of neighbouring countries without encouraging a lot of cross-border fuel tank tourism. In 2001, there was another Green Tax Commission, but as many of the politically easier measures had already been introduced, it did not have the political impact of earlier Commissions.²³ During the 2000s, therefore, not as many instruments were introduced, and 2010 saw a rowing back on some measures, following a government commissioned Study Group which concluded that environmental taxes would have a damaging impact on competitiveness and further international agreement on emissions reductions was required.

More recently, however, Hans Vos has argued that there is new political interest in the Netherlands in environmental taxation due to the fiscal crisis.²⁴ Throughout 2011 and 2012, measures relating to environmental taxes and environmentally harmful subsidies were proposed and negotiated between the many Dutch political parties forming different blocs in the parliament. These included changes to energy and motor fuels tax, tax breaks for car commuting, and subsidies for renewable energy and fossil fuels. A package of measures was eventually put forward in the 2013 budget, primarily to raise revenue, but public opposition to some of them meant they were ultimately withdrawn, for example the so-called 'commuter tax', which entailed the removal of tax breaks for fuel used in commuting. At the same time, primarily for revenue reasons, some green energy subsidies

²¹ Information largely from Vos, H (2012) Market based instruments in environmental policy: the Dutch case.

²² Ekins, P. and Speck S. (2011). Environmental Tax Reform – a policy for Green Growth

²³ Ekins, P. and Shaw, B. (2013) Green Fiscal Commissions in Europe. In Mori, A., Speck, S., Lee, S. and Ueta, K. Eds. 2013 *The Green Fiscal Mechanism and Reform for Low Carbon Development*, Routledge, London/New York, pp.152-186.

²⁴ Vos, H. (2012) Market based instruments in environmental policy: the Dutch case. [see footnote 22]

(for renewables and energy efficiency) were also withdrawn, along with the abolition of a coal tax exemption for power plants.

One legacy of the early developments of environmental taxation in The Netherlands is a lot of small tax measures aimed at particular behaviour changes, such as a tax on packaging. Recent developments are seeing some of these removed in the name of tax simplification, or in response to the disappearance of the tax base, e.g. the abolition of the landfill tax, landfill having been largely replaced by incineration. It is of note that not all proposed changes were implemented, and there were no significant amendments to energy and transport taxation, which account for 90% of total environmental tax revenues (Withana et al., 2014).

3.1.6 Ireland²⁵

There had been debate about a carbon tax in Ireland for many years, but at the time of the proposed European carbon-energy tax debate in the early to mid-1990s, Ireland was officially opposed to the measure. The creation of the Irish Environmental Taxation Group by the Finance Ministry in 1996 started a process of internal government consideration of green tax options and a series of recommendations to the Finance Ministry. Without much political support, these measures took years to become actual government proposals. Eventually there was a proposal adopted by the government for a carbon/energy tax in 2003. This went to public consultation, but was eventually dropped in 2004.²⁶

After the financial crisis of 2008, however, the degree of urgency and political will changed dramatically. A combination of fiscal need, political conviction from The Green Party, which was in the government coalition over 2007-2011, and appropriate design were the determining factors in getting implementation of a carbon tax in 2011. The same government also introduced water charges for the first time, removing some of the environmentally harmful subsidies that existed in the water industry.²⁷

The 2008 fiscal crisis not only dominated political and economic debate, but created a new imperative for raising revenue. The Green Party sections of the coalition pushed for the inclusion of a carbon tax in Ireland's rescue package, and public opposition was muted, largely because far more significant policies of austerity and public spending cuts were dominating public thinking. Even within that context, however, the government moved carefully on the agenda, establishing a commission to look at the case, exempting the powerful agricultural industry from the tax and making use of the considerable evidence that had been put together over years by academics and EFR advocates.

Given that the main industry opposition to carbon tax was immediately exempted, the dominant political issue was that of the distributional impacts. Some of the revenues were used to boost energy efficiency and fuel poverty programmes, but since then, some of these subsidies have come under budgetary pressure and are being cut back. The tentative conclusions from those following

²⁵ Convery, F. et al. (2012). *Ireland's carbon tax and the fiscal crisis*. OECD Environment Working Papers No. 59.

²⁶ Ekins, P. and Shaw, B. (2013). Green Fiscal Commissions in Europe. In Mori, A., Speck, S., Lee, S. and Ueta, K. (Eds.), *The Green Fiscal Mechanism and Reform for Low Carbon Development*, Routledge, London/New York, pp.152-186.

²⁷ Cottrell, J. (2014) 'Reforming EHS in Europe: success stories, failures and agenda' in *Paying the Polluter. Environmentally Harmful Subsidies and their Reform*. Oosterhuis, F. and ten Brink, P. Edward Elgar Publishing.

the debate in Ireland are that the economic crisis did provide the political opportunity for carbon tax introduction, and that it is still too early to tell whether the political consensus will hold, or enable future governments to build on these reforms.²⁸

3.1.7 Estonia (2005-2011)²⁹

Estonia has used economic instruments for environmental protection since the 1990s, at first, largely in the form of pollution charges, which from 1996 were increased by 10-20% year-on-year. In 2005, the Estonian government introduced its first EFR package aiming at doubling environment user fees, introducing an electricity excise tax and fixing tariff levels, with 20% annual tariff increases for the then coming five year period 2005-2009. In order to keep the overall tax level unchanged, the personal income tax was reduced gradually.

This was followed by further revenue-raising using environmental charges and resource fees as part of the government's policies to reduce the fiscal deficit in 2008/9. These changes continued until 2011. Again environmental user fee tariffs doubled almost for all charged components and tariffs were fixed for the period 2010-2015. A small increase in some components of the tariffs, including the fees for water use and oil shale extraction, followed in the first quarter of 2012, aimed at filling a revenue gap in the state budget.

A third phase of EFR is expected to be proposed for the period of 2016-2020, although the implementation of any new measures will be dependent on some evaluation of the effects of the first two phases. An assessment was carried out in 2012 with the major outcome that the impact of the fees has been weak, with the major driving force for resource efficiency in resource-intensive industries being the adoption of new environmental regulations e.g. the EU Industrial Emissions Directive, replacing the Large Combustion Plants Directive. In the second half of 2013, discussions with major stakeholders took place in order to agree the further direction of environmental taxation in Estonia beyond 2015. It must be noted that each of the subsequent governments since 2005 has committed to implement ETR Strategy adopted in that year.

3.2 An overview of the politics of implementing EFR

EFR is only pursued when environment is high on political agenda...

A major driving force behind the introduction of EFR has always been environmental objectives, with the potential double dividend of job creation seen as an additional extra bonus. So already this has restricted the times when EFR might be adopted to those when the environment has been high on the political agenda. More recently, an additional factor has come into play – climate change has given added impetus for environmental taxes to that generated by more general environmental concerns.

Or when policymakers need more revenue...

²⁸ Convery, F. et al. (2012). *Ireland's carbon tax and the fiscal crisis*. OECD Environment Working Papers No. 59.

²⁹ Information based on a communication from Valdur Lahtvee of the Stockholm Environment Institute (SEI), Tallinn Centre.

Other times when policymakers have been more inclined towards environmental fiscal reform measures have been when the need for increasing revenue has been more acute, as has recently been seen in some European countries. This more opportunistic type of EFR has succeeded politically in the short term, but without good communication of the objectives to the public, the taxes are vulnerable to opposition and have often been stopped within a few years, although rarely actually reversed. In some countries, when the political heat has died down, parties that opposed green taxes when they were unpopular then turn to them again as revenue raisers in the future.

The industry lobby has been the most powerful force in blocking or shaping EFR...

Without question the most powerful stakeholder interest in shaping the design and implementation of EFR policies is that of industry. In every example of EFR in Europe, there has been some form of special treatment for industry. Sometimes this has been restricted to the very energy-intensive sectors that face competitiveness issues, but often other business sectors have also been exempted, given reduced rates or not even included in the original proposals, even though this can reduce the environmental effectiveness of the tax, with no clear justification. Early and sustained involvement with the policy process has been the method of this influence. This has meant that often the bulk of revenue-raising has fallen on households, or motorists.

The general public often misunderstands the rationale of EFR, and if public opinion turns against an environmental tax, politicians soon follow...

A number of surveys and reports have revealed a general lack of understanding of the underlying rationale of EFR measures amongst the general public and thus a lack of support for environmental taxation – despite widespread support for the polluter pays principle (see e.g. Cottrell 2014). Coupled with sensitivity to energy price increases in many countries, this has resulted in high opposition to environmental taxation, in spite of the need to design an EFR so the distributional impacts are addressed from the outset being widely understood and applied across Europe.

When there has been a combination of high global energy prices and increasing environmental taxes, for example, it has often been the policy of taxation that has become the focus of public and media opposition. In this context, the temptation for a political opposition to jump on the bandwagon and use the issue as a way of attacking the incumbent government has usually been too powerful for them to resist.

EFR is a long-term tax reform that is much easier to deliver with a degree of political consensus

More often than not, EFR has been initiated by centre-left parties, but the impetus can come from the right as well. It is also true to say that parties of the left and right have been active in stopping or reversing EFR reforms, but sometimes also in establishing a relative cross-party consensus. Indeed, the only countries that have been able to sustain EFR, or have implemented more than one package of substantial tax changes, are Sweden and Denmark, where some degree of political consensus was achieved. Even in these examples, however, the consensus was not always maintained, and was originally formed at a time when the overall tax burden on the population was falling. On the other hand, when the Danish centre-right parties came into government in 2001, they did not reverse existing EFR measures adopted by the former centre-right government, although they did abandon the consensus on EFR measures.

In countries where government and opposition parties have taken an opposite view of EFR, all reforms have been short lived, whereas in some other countries, party views on EFR have changed depending on political tactics. This has kept the concept of EFR alive in countries like Germany, UK and The Netherlands, but has probably reinforced public scepticism about the motives of governments when proposing EFR changes.

4. Are the alternatives to EFR any easier to implement?

If EFR faces such challenges in terms of implementation, design and politics, are there other policy solutions that could make the same impact on decoupling environmental impacts from economic growth, but would be easier to put in place? The alternatives include direct support and subsidies for low-carbon energy supply, increased investment in energy efficiency, further developing the EU Emissions Trading Scheme, tougher regulation on products and vehicle fuel efficiency, and greater support for sustainable transport.

4.1 Subsidy measures are not feasible in times of austerity

In times of austerity, the options which require major increases in public spending on energy efficiency, renewables or sustainable transport, for example, are very unlikely to be implemented. These options would need government to cut other aspects of the public sector, raise other taxes to pay for the investment, or borrow more from capital markets.

None of these options are any more politically feasible than EFR – indeed, reductions in feed-in tariffs for renewable energy have already been a feature of austerity policies across Europe.

However, there are other reasons why, on their own, increases in investment in energy efficiency would not deliver the environmental objectives required. As argued earlier in the paper, if households and businesses are saving money on energy by being more efficient, in an economy where energy prices are still relatively low, some of those savings will be spent on other items and activities which will consume energy (the rebound effect). Only if the price of energy is also rising, will those savings be more likely to go on less energy-intensive activities. EFR is a necessary complementary policy to more investment in energy efficiency, if the full environmental benefits of energy efficiency are to be realised.

4.2 Regulation has similar competition impacts and is less cost-effective

Another alternative would be to use regulation to mandate more energy-efficient products and vehicles. This would, in effect, require investment in energy efficiency and clean technology to be made by the manufacturers. These policies, such as with the Ecodesign Directive, are already being pursued at a European level, but face the same arguments from manufacturers on the competitiveness impacts of stringent standards as EFR, so that if the standards are only to be enforced on European companies, then there will be major opposition from industry. If they are to apply to global manufacturers then international trade negotiations are required. Again, this cannot be said to be generally easier to implement than EFR.

A further advantage of EFR instruments is that they are the most efficient and cost-effective environmental policy instruments available to policy-makers. When mandating technology standards, regulators are at a disadvantage in terms of the amount of information available to them when

drawing up efficiency or performance standards and the like. In addition, regulations fail to optimally engage different channels for emissions reductions, rendering them less effective than a price signal in favour of more energy-efficient behaviours.

4.3 Further development of the EU Emissions Trading System

Another option to would be to further develop the EU Emissions Trading System (EU ETS).

When the EU ETS was proposed and accepted as a policy option, negotiations moved onto what the cap should be for the emissions trading system. However, the effectiveness of the European Emissions Trading Scheme has been severely damaged due to the excessive permit allocation as a response to industrial lobbying driven by worries about competitiveness, in combination with the dramatic economic downturn of 2008. It is now clear that the cap, through the permit allocation process, has resulted in very little emissions reductions beyond 'business-as-usual' being required of industry. The collapse in the carbon price following the fiscal and economic crisis which started in 2008 has demonstrated that permit allocation was far too generous, so that the ETS does not provide an incentive for industrial emissions reductions.

Thus, the main underlying reason for the generous emissions cap stems from fears of the impact of measures to regulate emissions reductions on international competitiveness of European industry. This is also the main underlying reason for opposition to more radical EFR measures, such as carbon tax increases. It is therefore not clear that reform of the EU ETS would necessarily be any easier to implement than a reform of the EU ETS – indeed, negotiating reform with 28 EU Member States would likely prove considerably more challenging than introducing unilateral EFR measures in single EU countries.

In addition, there are several sectors where inclusion in the EU ETS is not the most appropriate policy option, e.g. the transport sector, where large numbers of small and diffuse emitters are unlikely to respond to the price increase which could be generated by adding the cost of EU ETS allowances to the price of transport fuels.³⁰

4.4 EU-wide policy processes

The best current opportunity for widespread EFR in Europe might be through various pan-European efforts towards closer fiscal co-operation. On the other hand, this then begs the question as to how closer European co-operation can address the most important political constraints impeding EFR implementation, namely impacts on competitiveness and distributional effects.

Clearly, on the one hand there will be fewer competitiveness issues raised between European Union countries if environmental tax rates are harmonised. One area where this is a concern, which has held back more progressive EU Member States, is that of road fuel taxation. Whilst there is a Directive setting minimum energy tax rates, this minimum rate is very low and does little to address concerns about road fuel tourism. A more concerted increase in minimum rates could certainly be possible under closer co-ordination of EU fiscal policy.

On the other hand, the biggest competitiveness issues that have been a barrier to EFR are not EU-based, and relate to the perceived danger of European energy-intensive industries losing business

³⁰ For more details, see the Transport&Environment briefing available under http://www.transportenvironment.org/sites/te/files/publications/2014%2009%20transport%20ets_FINAL_EB_clean_v2.pdf

to the US, Japan and the emerging economies in the developing world. Without a global agreement on e.g. a carbon tax, no amount of fiscal co-ordination at an EU level will be capable of protecting EFR proposals from the political potency of extra-EU competitiveness arguments, unless an effective way can be found to introduce border tax adjustments.

Thus far, EU-wide processes to coordinate or harmonise fiscal policies have faced considerable difficulties due to the unanimity requirement for taxation and fiscal policy. A revision of the Energy Tax Directive proposed by the European Commission in 2011 could not be agreed in spite of 4 years of negotiations, and the proposal was withdrawn in 2015.

Similarly, the distributional impact of carbon or energy taxes is different across European Member States, and frequently has many complex aspects even within countries themselves. As a Europe-wide solution to these problems would be neither appropriate nor effective, no such attempts at micro-design are being proposed. The politics of distributional impacts will remain a national issue.

The European Semester of Economic Policy Coordination was set up in 2010 to coordinate the achievement of the EU's 2020 targets for employment, research and development, climate and environment, education and fighting poverty and social inclusion.³¹ However, just one of the country-specific recommendations in 2015 related to environmental or climate targets, and thus the role of the Semester as a driver of EFR implementation in the EU seems at present to be in doubt.

Other mechanisms also exist to coordinate fiscal policy between EU Member States – such as the Open Method of Coordination, or Enhanced Cooperation – but these have thus far been little-used in relation to tax or fiscal policy.

There is a certain risk associated with shifting EFR to EU-level, however. The best examples of EFR from across Europe have taken into account the competitiveness-related needs of those sectors most affected, as well as any specific design features to avoid or compensate for distributional impacts. Even then, however, it is clearly very difficult for any politician to convince a sceptical public that a tax increase is a good, or even necessary, thing to do, even if there are corresponding tax cuts. For this reason, there are attractions within national politics to move the EFR debate to a European level, in order to deflect the blame and either share or delegate the responsibility to a supra-national body. If, in a situation where the unanimity requirement for EU fiscal policy had been relaxed, opposition groups to EFR can credibly lay the 'blame' for carbon taxes with European institutions, whilst national politicians retain the credit for any reductions in labour taxes, then any backlash will be aimed at the European idea itself, which does not need further sources of pressure.

4.5 Final comments on policy alternatives

For the most part, EFR would actually make a good complementary policy to all of the above suggestions. In single EU countries, for example, EFR can raise revenues to fund subsidy policies and complement regulations by creating economic incentives to change behaviour.

EFR can also complement the EU ETS by covering sectors not included in the emissions trading system, or by ensuring a minimum emissions price within it. The latter is exemplified by the UK carbon floor price, in effect a carbon tax introduced in the UK to create long-term incentives for low-carbon investment by keeping the price of carbon above a certain level.

³¹ The targets are listed here: European Commission (2015). Europe 2020 targets. Retrieved from http://ec.europa.eu/europe2020/europe-2020-in-a-nutshell/targets/index_en.htm.

5. 5. Conclusions

5.1 EFR is the best option available to policy-makers

The evidence still holds that EFR is the most efficient policy tool for environmental policy, and the only tool which modelling suggests can bring about significant emissions reductions and potential economic benefits. In

If policy-makers communicate EFR well, EFR could well become a politically feasible policy option as well, particularly in times of fiscal discipline and EU-wide reform. EFR has considerable potential to raise revenues, while the majority of other environmental policy measures are a drain on scarce government budgets, while also contributing to broader reform processes within the EU.

5.2 Mainstreaming EFR in the fiscal and economic policy debate

To mainstream EFR, its long-term economic benefits have to become more central to political debate. In the past, the main positive driver of EFR has been the environment, and because environment is never top or indeed high on any domestic political agenda for very long, it has proven difficult for any mainstream political movement to maintain the required desire to take the risk of upsetting vested interests with unwelcome reforms for a highly uncertain electoral reward. However, arguably this can be said for any policy solution to environmental problems, not just taxation.

Introducing EFR at a time of rising taxes is the reverse of how Scandinavia built political consensus for EFR, when taxes were cut overall. But economic times have changed and the European economy will be going through a transition in the coming years. A very real political opportunity does exist to ensure that EFR, including the reduction of environmentally harmful subsidies, becomes more central to that transition.

5.3 EFR as a tool for fiscal consolidation

There have been many examples of partial EFRs across Europe. Most of these have been one-off reforms, often enabled by specific political opportunities or drivers. In the rare cases where EFRs have been sustained or repeated, the common factor has been the ability to build and maintain a degree of political consensus.

Today most European governments are facing budget deficits. In this context, the case for EFR is quite convincing for parties in government and opposition and that some form of consensus can be forged over the revenue raising potential of green taxes. Moreover, the revenue-raising capacity of EFR has appeal for all mainstream political parties. For as long as fiscal consolidation is required in Europe, the drive to reduce deficits and introduce fiscal discipline could provide an opportunity to integrate EFR in broader fiscal reform packages.

5.4 A new narrative for EFR – as driver of innovation

If such a discourse about EFR is to move even partially to a European level, then reductions in labour or other taxes arising from EFR must also be part of the European narrative, as are the continued reduction of environmentally harmful subsidies.

A shift in the balance of taxation in the context of fiscal consolidation needs to become the new orthodoxy of European fiscal policy, in the same way as austerity was adopted in the immediate aftermath of the financial crisis. Here the potential benefits of stimulating innovation through EFR, to create new competitive industries, could be a key economic and political counter-argument to offset the competitiveness concerns of traditional industry lobbies. The case must be made that new investment into the EU is far more likely in low-carbon, innovative and growing sectors, than resource-hungry, fossil fuel-based industries of the past. If a future European economy with a low carbon price, but high non-wage labour costs starts to look like an unattractive place for this investment, then a co-ordinated attempt by European governments to prevent that from happening through EFR could begin to look appealing.

As stated earlier in the paper, the evidence is clear that a low-carbon economy cannot be delivered without higher carbon prices, and using the revenues to reduce non-wage labour costs and stimulate innovation is the best way of helping the economy through that transition. If the debate over EFR is held in this wider context of a new economy, and the need to support its growth, this may neutralise some (but not all) of the power of the vested interests in the high-carbon economy.

The European economy is facing a transition in any case. The challenge and opportunity is to make this transition based on a low-carbon economy, and that will be far easier with EFR across the continent than without. That such an approach will be politically difficult cannot be denied, but wasting the current opportunity will intensify Europe's problems in the future, economically, socially and environmentally.

Annex: History of Implementation of EFR in Europe 1990-2012

Year			
1990	Finland – CO2 tax		
1991		Sweden (1)	
1992		CO2 tax included in broad tax reform cutting overall burden of tax	
1993			
1994	Denmark (1)		
1995	CO2 tax on households Cuts in labour taxation	UK	
1996		Road fuel duty increased by 3%, then 5% then 6% per year above inflation	The Netherlands
1997			
1998		Income tax cuts at the same time but no link made between the two	Revenues raised from energy taxation on households and business used to cut income tax, labour taxes and corporation tax.
1999	Denmark (2) CO2 tax extended to some businesses Cuts in labour taxation		Germany Eco tax on household energy, motor fuels and some businesses Reduction in employer and employee pension contributions
2000			
2001	Sweden (2) Increases in CO2 tax on households Motor fuel CO2 tax increased, energy tax decreased	UK Business energy tax Cuts in Employer's National insurance Contributions	
2002			
2003	Cuts in labour and income taxes		
2004			
2005		Estonia	
2006			

2007		Increases in energy taxation Cuts in income tax	
2008		Switzerland CO2 tax	Czech Republic
2009	Sweden (3)	Denmark (3) Increase in carbon tax on industry Cuts in income tax	Energy tax on households Cuts in labour taxation
2010	Increases in CO2 tax for industry, to continue until 2015	Subsequently partially reversed	
2011			Ireland CO2 tax
2012			The Netherlands

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