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Overcoming obstacles to green fiscal reform

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Overcoming obstacles to green fiscal reform

Draft paper

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Summary

Green fiscal reforms (GFR) have attracted increasing attention in recent years. This renewed interest is driven by various factors, including the push for fiscal consolidation and growing recognition of the financial burden of certain measures such as fossil fuel subsidies in many countries. Despite numerous calls for action, GFR efforts remain limited and are often constrained by various obstacles including concerns of the economic and social impacts of such reforms. While such concerns are important and merit attention, they should not be used as an excuse to avoid or halt GFR as they can be addressed through careful design and implementation of the process.

There is a need to **identify potential impacts of GFR** including the full range of costs and benefits, winners and losers, intended and unintended effects across economic, social and environmental spheres. Once impacts have been identified, there is a need to select those that require mitigation to address negative impacts (which may otherwise hinder progress) and maximise associated gains. Any **mitigation measures adopted should be carefully designed** in line with good governance principles to ensure they are effective, maintain a positive signalling effect and contribute to overall objectives of the reform. Other strategies and tools such as complementary policies, communication and engagement, monitoring and review processes can also help overcome obstacles to GFR.

The political challenges of reform remain significant and sometimes despite good intentions and due processes, GFR efforts fail or decisions are reversed in the face of political or social pressures. There are several striking examples of this from Australia to Nigeria and Bolivia. These cases highlight the importance of building **broad support and political capital** for GFR which transcends party-political lines and short-term electoral timelines. Durable GFR also depends on government credibility and links to wider **structural and good governance** challenges. In certain cases, **cooperation** between countries can help build support and overcome obstacles to reform.

Preparation and careful planning are critical to GFR efforts. There is a need to adopt a comprehensive, integrated and consultative approach to reform which reflects **good governance principles**, sets clear objectives and a timeline. GFR is a slow, dynamic evolving process, thus requiring broad political commitment and public support from the short- to the medium- and long-term, taking into account the broader policy environment and contributing to wider policy objectives. There is also a need to adopt a **pragmatic approach** to GFR, allowing for deviations from theoretical ideals (e.g. avoiding use of exemptions or compensation measures) as a politically expedient way of making progress. Such provisions should be tolerated provided they are well-designed with adequate safeguards in place.

The **current context is particularly favourable for undertaking GFR.** The recent steep decline in global oil prices provides a conducive environment to launch carbon pricing mechanisms and reform fossil fuel subsidies. Other avenues for progress include the pressing fiscal consolidation challenge facing many countries and the need to respond to agreed regional or international commitments. Some countries are already seizing these windows of opportunity, such as Indonesia and India with recently announced programmes to reform fossil fuel subsidies. Other countries should be encouraged to follow their lead and have a wealth of practical experience with GFRs to draw on. Such efforts should be based on a comprehensive reform strategy with a clear timeline and enjoy broad political and public support to ensure they are successful and sustainable.

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1 Introduction

1.1 What is green fiscal reform?

Environmental or green fiscal reform (GFR) is defined by the OECD and World Bank as a 'range of taxation and pricing measures that can raise fiscal revenues while furthering environmental goals' (OECD, 2005; World Bank, 2005). GFR includes individual instruments and measures such as environmental taxes, charges and levies, (auctioning) permits to pollute or exploit a resource, deposit-refund schemes and fines for environmentally damaging activities. It also encompasses broader packages of fiscal reform such as environmental tax reform (ETR) and the reform of environmentally harmful subsidies (EHS). GFR can be applied in a number of sectors such as energy, transport, carbon, thematic areas such as natural resources including (e.g. water, fisheries and forestry), products, biodiversity; and to challenges such as waste, pollution or congestion.

Experience with GFRs has grown over the past two decades and has attracted increasing attention in recent years. This renewed interest is driven by a range of environmental, economic and social considerations as well as a growing appreciation of the limitations of more traditional 'command and control' approaches. While GFR can help address a number of environmental challenges such as climate change and biodiversity protection; the push for fiscal consolidation and growing recognition of the financial burden of some subsidies (such as fossil fuel subsidies in many developing countries) has been another important driver of efforts, particularly in recent years. In some cases, efforts have been motivated by concerns of energy, resource and food security or in support of wider policy objectives such as employment and poverty reduction.

GFR-related commitments have been adopted at different levels from the local (e.g. charges on congestion, municipal waste collection, water), to the sub-national (e.g. in British Columbia in Canada, California in the US) and national (e.g. a number of countries in Africa and Asia, many countries in Europe). Commitments have also been adopted among regional or major groups (e.g. APEC, G20) and in several international fora (e.g. CBD, Rio+20 Conference) – see Box 1.

Box 1: Selected commitments on GFR adopted at the regional and international level

- **Group of 20 (G20) and Asia Pacific Economic Cooperation (APEC) forum** commitments to rationalise and phase out 'inefficient fossil fuel subsidies' over the medium term.
- **Rio+20** Outcome Document reiterates commitments to address trade distorting subsidies and harmful subsidies in the fisheries and fossil fuels sector. This has been picked up in discussions on the post-2015 **Sustainable Development Goals (SDGs)** and 'Means of Implementation'.
- **Convention on Biological Diversity (CBD)** Aichi Biodiversity Target 3 to eliminate, phase out, or reform 'incentives, including subsidies, harmful to biodiversity' by 2020 and Target 20 to mobilise additional resources from all sources to implement the Strategic Plan for Biodiversity 2011-2020. In 2014, Parties to the CBD also adopted milestones for implementation of Target 3.
- The **European Union (EU)** commitment to phase out EHS by 2020 taking into account the impact on people in need as reiterated in the Roadmap for a resource efficient Europe.

Source: Building on Oosterhuis and ten Brink (eds.), 2014

1.2 The many benefits of green fiscal reform

The multiple benefits from GFR and its potential role in supporting a range of policy objectives from fiscal consolidation to energy security, climate mitigation and poverty reduction is well-documented (see for example OECD, 2005 and 2010; World Bank, 2005; IMF, 2012). Benefits include, for example:

- ***Financial benefits*** such as budget savings and associated macroeconomic stability, mobilisation of revenues for other priorities. Such benefits are particularly pertinent in the current climate and a driver of recent interest in GFR. For example the package adopted by the Irish government in response to the 2007-2008 financial and economic crisis included several environmental taxes and charges such as a carbon tax, a domestic water pricing system, revisions to vehicle registration tax and annual motor tax, and a land site-value tax (Withana et al., 2013). By helping address specific social or environmental challenges, GFR can also reduce the need for future public spending (e.g. on healthcare).

- ***Economic benefits*** from revised price signals (i.e. internalising externalities) which help address technological lock-in and catalyse innovation in efficient technologies (the Porter hypothesis[2]) as firms and consumers seek new, cleaner solutions in response to the pricing of pollution (OECD, 2010). For example the carbon tax introduced in British Columbia in 2008 supported a surge in green investment and innovation in the province - see Box 4. GFR can also allow a reduction in growth-distorting taxes, e.g. on labour or corporate income, helping to stimulate growth and employment (the 'double dividend' hypothesis[3]).

- ***Social benefits*** such as health improvements from a reduction in polluting emissions. For example, the differential tax treatment of leaded and unleaded petrol in Thailand led to an improvement in air quality and a decline in levels of lead in blood among the population – see Box 2. Other benefits include employment creation and securing availability of public goods and natural resources for future generations. The latter are a particularly important equity and ethical consideration (as well as an economic concern).

- ***Environmental benefits*** such as incentives for more efficient resource use which leads to a reduction in harmful emissions and environmental impacts. For example the IMF estimates that the reform of taxes on coal, natural gas, gasoline and diesel such that prices reflect environmental damage and other side-effects, could reduce global CO_2 emissions by 23 per cent and deaths from outdoor air pollution caused by fossil fuel combustion by 63 per cent, while raising revenues of 2.6 per cent of GDP globally (IMF, 2014).

- ***Poverty reduction benefits*** - while opponents often argue that GFR has a negative impact on the poor, such concerns can be addressed through design (see sections 2.3 and 3.2). Moreover, GFR can lead to poverty reduction benefits by mobilising funds for pro-poor investments (e.g. in education and health), address problems affecting the livelihoods of the poor (e.g. unsustainable use of natural resources) and improve access to water and electricity services (OECD, 2005).

[2] For a review of empirical studies see: Ambec, S., Cohen, M., A., Elgie, S., and Lanoie, P., (2011), The Porter Hypothesis at 20: Can Environmental Regulation Enhance Innovation and Competitiveness?, RFF Discussion Paper 11-01, January 2011, Resources for the Future.

[3] The extent and prevalence of this 'double dividend' is intensely debated, see for example: Fullerton, D., and Metcalf, G., (1997), Environmental Taxes and the Double-Dividend Hypothesis: Did You Really Expect Something for Nothing?, NBER Working Paper No. 6199, September 1997; Schob, R., (2003), The double dividend hypothesis of environmental taxes: A survey, Otto von Guericke University Magdeburg and CESifo, Munich, March 2003

The benefits of GFR depend on several factors including design and implementation (which in turn depends on available resources, institutional and administrative capacities), exemptions, mitigation measures and use of revenues. Impacts of GFR are also closely related to other policies and measures in place (e.g. information tools, regulatory standards, infrastructure investment etc.) as well as external factors such as the state of the economy, energy prices, technological developments etc. (Withana et al, 2014). The credibility and durability of GFR often also depends on long-term, cross-party political commitment and broad public support of the process.

Box 2: Phasing out leaded petrol in Thailand

Concerns about the harmful effects of lead pollution on public health and the environment led the Thai Government to launch a programme to phase out the use of leaded petrol in 1991. This was a complex undertaking with effects across numerous sectors and groups, however the government managed to successfully implement an ambitious reform package which achieved its objectives in four and a half years.

An important part of the package of measures adopted by the government was fiscal incentives to encourage a switch to less harmful substitutes. Differential tax rates were applied on unleaded and leaded petrol such that the retail price of unleaded petrol was set at B0.3 (USD 0.012) per litre less than that of leaded petrol. This fiscal incentive was complemented by a regulation requiring all cars sold in the country from September 1993 to have a catalytic converter and the adoption of emission standards for new vehicles from 1995 based on EU standards.

Moreover, the government adopted a collaborative approach to the phase out which involved key stakeholders including government agencies, automobile companies, oil companies and the general public. The government also provided strong and clear leadership throughout the process, setting clear target dates and providing continual monitoring and follow-up evaluation.

The package of measures adopted by the government led to a 50 per cent increase in the market share of unleaded petrol and allowed for the eventual phase out of leaded petrol in January 1996. The reform led to an improvement in air quality in the country and a decline in the levels of lead in blood among the public, thus contributing significantly to the improved health of the Thai population.

Sources: Sayeg, 1998 cited in OECD, 2005 and GTZ, 2013

GFR is increasingly recognised as an ***important part of the policy mix***, providing a useful complement (or in some cases a substitute) to more traditional regulatory and other instruments. When carefully designed and implemented, GFR (and market-based instruments more widely) can reduce the societal cost of achieving a given level of environmental quality by shifting the cost of pollution to the polluter, reducing compliance costs and generating revenues (UNEP, 2004).

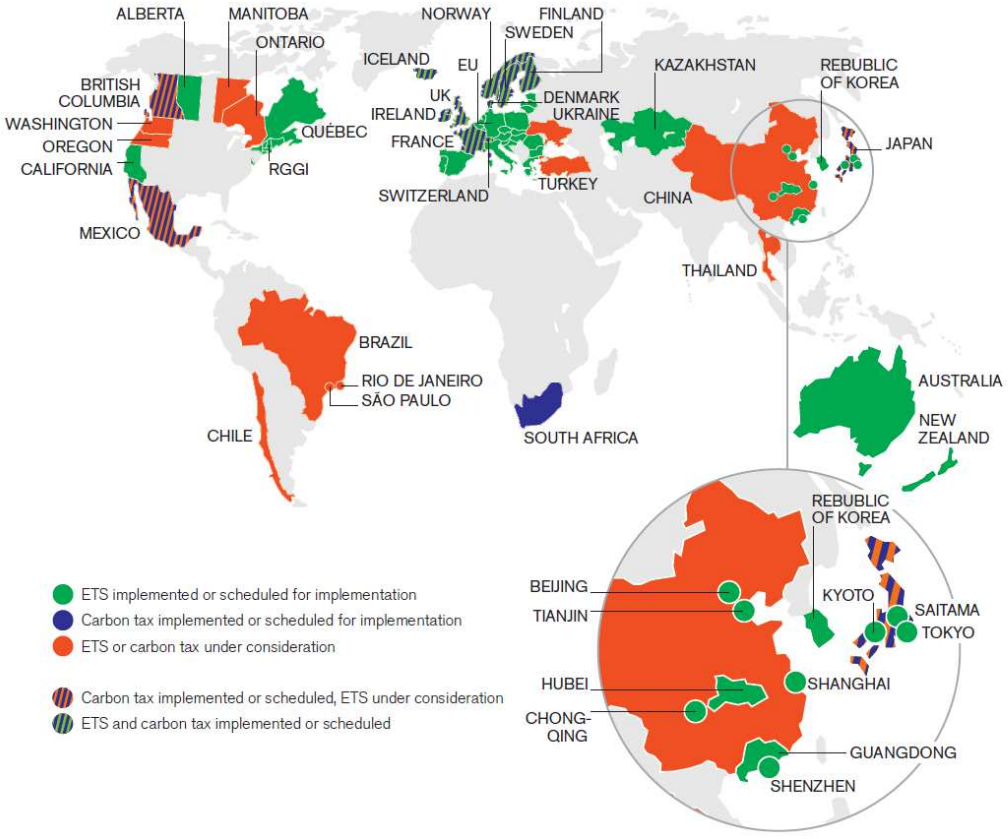
The ***current context*** is particularly favourable for undertaking GFR and the case for such reforms, particularly in the area of carbon and energy, is increasingly made by various actors including the IMF (IMF, 2013 and 2014). The recent steep decline in oil prices (by more than 50 per cent between June 2014 and January 2015 – BBC, 2015) provides a conducive environment to launch carbon pricing mechanisms (Financial Times, 2015) and reform fossil fuel subsidies. Current low prices can help cushion the impact of a price increase from the introduction of a tax or liberalisation of energy prices. Some countries are already taking advantage of this opportunity, for example Indonesia (see Box 11), and others should be encouraged to follow suit. Such efforts should be based on a comprehensive strategy with a clear timeline and enjoy broad political and public support to ensure they are not reversed when times change (i.e. oil prices start to rise).

1.3 Obstacles to GFR

Despite efforts to date, the use and application of GFR remains limited. For example, a recent World Bank report concludes that current carbon pricing instruments cover around 12 per cent of annual global GHG emissions (see Figure 1), thus approximately 88 per cent of GHGs remain un-priced (World Bank, 2014). In addition, carbon prices in many countries are set at levels that do not reflect environmental and/or social costs such as air pollution and traffic congestion and are less than what is needed to achieve long-term climate targets. Thus much of the 12 per cent of GHG emissions that are covered by a carbon pricing instrument is under-priced (with some exceptions such as Sweden). Furthermore, many carbon pricing schemes are not well targeted nor are they comprehensive or consistent in their coverage of different fossil fuel products and users (IMF, 2014). Moreover, in a number of cases how these instruments have been designed and implemented (e.g. with ample use of exemptions to protect national interests) have limited their effectiveness and has led to only marginal changes in incentives in the economy (with due exceptions, e.g. NOx tax in Sweden (Box 8) and CO_2 tax in British Columbia (Box 4).

Environmentally harmful and/or ineffective subsidies remain significant in sectors such as fisheries, agriculture and energy. In the fisheries sector, 60 percent of subsidies provided have been identified as harmful (UNEP, 2011). In the agriculture sector, price and trade distorting measures accounted for 51 percent of total support to farmers in OECD countries in 2011-2013 (OECD, 2014a). In the energy sector, fossil fuel subsidies accounted for USD 550 billion in 2013 (IEA, 2014) and USD 1.9 trillion in 2011 when taking into account negative externalities (IMF, 2013).

Figure 1: Overview of existing, emerging and proposed carbon pricing mechanisms



Source: World Bank, 2014

Further progress on GFR is often held back by various obstacles which reflect the numerous political challenges of reform. Obstacles include, for example (OECD, 2005a; Withana et al., 2012):

- ***Strength of special interests and rent-seeking behaviour*** among groups that benefit from the status quo. While GFR has the potential to generate multiple benefits (see above), it can also lead to negative impacts on specific groups which may have strong lobbying power and influence. In some cases, a culture of entitlement may exist which has become entrenched over time and is hard to break, leading to resistance to change.

- ***A lack of political will*** as policy makers are often reluctant to undertake (unilateral) GFR, unless forced to do so by an economic or environmental crisis, or in response to external pressures. This reluctance is often linked to concerns of the perceived impacts of GFR on the competitiveness of specific sectors (e.g. energy-intensive industry) and/or social impacts in particular on income distribution.

- ***Lack of transparency, information and awareness*** of the actual costs, beneficiaries and impacts of the status quo (i.e. lack of effectiveness, unintended beneficiaries). In some cases, beneficiaries invoke mantras to gain popular and political support for the status quo (e.g. that subsidised energy prices are needed to protect the poor, even though evidence suggests that such mechanisms tend to benefit the rich more – see Box 5). In some cases GFR has been hindered by limited data and analysis at the country level, including on impacts of GFR and implementation options. Recent analytical contributions provide useful insights in certain areas. For example, the Global Subsidies Initiative (GSI) has analysed options for fossil fuel subsidy reform in a number of developing countries[4], while studies by Eunomia et al. (2014 and 2015) examine the potential for GFR in 26 EU Member States.

- ***Administrative, institutional and technological constraints*** that restrict or limit the ability to undertake GFR. For example the administrative capacity of the government including financial, human and technical resources may hinder or prevent reform (UNEP/CBD/WGRI, 2014). Technological constraints such as a lack of available substitutes or infrastructure barriers such as a limited public transport system can also constrain action. Institutional rigidities or traditions may restrict the scope for GFR, for example finance or tax departments may view GFR as a peripheral issue (of primary concern to their environmental counterparts) and may thus overlook its potential to contribute to wider objectives. In some cases obstacles reflect wider governance challenges including a lack of trust in the government, limited government credibility or capacities.

As noted above, a key obstacle to GFR is a lack of political will which often reflects concerns about perceived economic and social impacts of GFR, in particular on vulnerable firms or sectors, and households. Such impacts are highly sensitive politically and relate to (and compound) a number of the other obstacles listed above, e.g. lack of information and awareness, strength of special interests. Such concerns have often contributed to stalling or slowing GFR efforts in a number of countries. However, as the analysis in this paper shows, while these concerns are important and merit attention, they should not be used as an excuse to avoid or halt GFR as they can be addressed through careful design and implementation of the reform process. Impacts of GFR on vulnerable groups should be identified, potential winners and losers identified, and where relevant appropriate measures to mitigate these impacts developed.

[4] Global Subsidies Initiative (GSI), Supporting country reform efforts, http://www.iisd.org/GSI/supporting-country-reform-efforts [accessed 18/11/2014]

1.4 Introduction to the paper

This scoping paper has been commissioned by the Fiscal Instruments Research Committee of the Green Growth Knowledge Platform (GGKP) to examine how to overcome obstacles to GFR through the use of mitigation measures for vulnerable firms or sectors, and low-income households, revenues, complementary strategies and tools. The paper draws on lessons learnt from experiences with GFR in developed and developing countries including examples of good practice, partial successes with GFR and some unsuccessful efforts. These cases help elaborate some of the issues discussed and provide insights for others considering GFR. The study is based on a literature review, comments from experts and Members of the Fiscal Instruments Research Committee, as well as feedback from participants at the 2015 GGKP Annual Conference.

This paper focuses on environmental tax and subsidy reform across different sectors and areas. It is important to keep in mind that specific GFR approaches, instruments and interventions may be more appropriate for different countries, sectors and issues depending on the country context, priorities, institutions and capacities. For example, as noted by the OECD (2005): ***natural resource pricing measures*** (e.g. forestry and fisheries fees and taxes) can play an important role in resource-rich countries; ***reforming product subsidies and taxes*** (e.g. on energy) are applicable in most countries, in the case of fuel subsidies they are particularly applicable in energy producing countries; ***cost recovery measures*** (e.g. charges on energy and water) are applicable in most countries; while ***pollution charges*** (e.g. on air) are particularly relevant for rapidly industrialising middle-income countries which face problems with industrial pollution but also have the administrative capacity necessary to implement such instruments. The nature and characteristics of the economy may lead to a preference for certain approaches, for example countries with a large informal sector and/or problems with personal income tax evasion or avoidance, may prefer to use of product taxes (e.g. fuel taxes) to meet fiscal objectives. Different types of interventions will also have different outcomes in terms of effects on the environment, economy, government budget etc.

This paper does not take a sector or issue-specific approach; rather it seeks to provide general insights on overcoming obstacles to GFR applicable across a number of sectors and areas, keeping in mind the need for tailored approaches to GFR depending on national circumstances, interests and priorities. For a sector and/or issue-specific approaches to GFR see for example: IMF 2012 and 2013, GSI 2010 and 2013, and UNEP 2008 (for energy and fossil fuels); GTZ 2005 (for forestry); OECD 2005 and World Bank 2005 (for sectors of relevance for developing countries such as water, fisheries, forestry and energy). This paper examines cases of both individual instruments and more comprehensive reform packages. It seeks to provide input to GFR discussions and processes at different levels. For example at the international level, the paper complements a recent decision by Parties to the CBD calling on countries to share lessons in overcoming obstacles when implementing policies to address incentives, including subsidies, harmful to biodiversity (UNEP/CBD/COP, 2014).

The remaining sections of the paper are structured as follows:

- ***Chapter 2*** provides a brief overview on approaches to identify impacts of GFR, potential impacts of GFR on vulnerable groups and options to mitigate these impacts.
- ***Chapter 3*** focuses on compensation measures to alleviate adverse impacts of GFR on vulnerable firms or sectors and households. It also discusses the use of revenues from GFR and concludes with good governance principles for designing compensation measures.
- ***Chapter 4*** sets out other strategies, tools and approaches for promoting GFR including design considerations, communication and engagement strategies, complementary policies, monitoring and review processes, and windows of opportunity.
- ***Chapter 5*** provides overall conclusions and recommendations on how to overcome obstacles to GFR and support the transition to a green economy.

2 Impacts of GFR and potential mitigation options

This chapter provides a brief overview of the numerous impacts of GFR in particular on vulnerable firms or sectors and households. It also sets out some of the tools which can be used to help identify such impacts and different types of mitigation options which can be considered. The latter are further elaborated in chapter 3.

2.1 Impacts of GFR and how they can be identified

While the overall objectives of GFR are to generate positive gains for the economy, environment and society, the process may lead to unwanted negative impacts in some sectors (e.g. trade-exposed, energy-intensive sectors), groups (e.g. low-income households, pensioners) and macroeconomic indicators (e.g. GDP, inflation, trade balance). Although GFR may be targeted on a specific issue, it could have impacts across different sectors and groups. Thus, the wider context of reform and impacts (both positive and negative) across different groups should be considered.

GFR tends to create winners and losers both within and between different sectors and groups through various 'transmission channels' (World Bank, 2005). An important transmission channel is direct and indirect price effects which depend on demand and income elasticities, consumption patterns etc. Other transmission channels include *inter alia* effects on employment, terms of trade, access to goods and services, overall tax burden and substitution effects (OECD, 2005).

The impacts of GFR are closely related to:

- ***Design*** (i.e. point of application of the instrument, the breadth of coverage, level);
- ***Implementation*** (i.e. evolution over time, exemptions granted, associated conditionalities);
- ***Use of revenues raised*** (including recycling mechanisms employed);
- ***Other policies and instruments in place*** (policy mix);
- ***External factors and conditions*** that drive change;
- ***Political commitment and public support*** of the process.

Impacts vary over time, thus perceived winners and losers may change in the short, medium and long-term. For example, while energy taxes may lead to higher input prices for certain firms in the short-term, higher prices should in principle incentivise investment in energy efficient technologies which could lead to cost savings in the longer-term. Similarly while higher water charges may have negative impacts on certain households, revenues from such charges could lead to improved service provision and an expanded network which increases access to water among the wider population with related health and sanitation benefits in the longer-term.

Identifying the likely impacts of GFR is a critical step in the reform process. This means setting out the full range of costs and benefits, winners and losers, intended and unintended effects across economic, social and environmental spheres so as to highlight both positive and negative impacts and potential trade-offs (OECD, 2007). Identifying impacts can inform the effective design and implementation of the process, including mitigation measures where necessary. It can also help build support among affected groups by highlighting the impact of the status quo (i.e. lack of effectiveness, unintended beneficiaries, distributional impacts) and the pros and cons of reform.

There are different tools and approaches to identify the impacts of GFR (see for example GSI, 2013; IMF, 2013; van Beers and Jeroen, 2014). These encompass both quantitative and qualitative approaches and include for example:

- ***Quantitative approaches*** such as simple analysis of available economic databases, e.g. social accounting matrices (SAMs) and income expenditure surveys; to more complex, dynamic models which estimate feedback effects, e.g. computable general equilibrium (CGE) models and sector-specific models for energy, transport or agriculture.
- ***Qualitative approaches*** such as a literature review, analysis of household consumption and input-out (I-O) data to identify income groups and economic sectors likely to be affected, stakeholder consultations to assess views of affected groups.

A comprehensive approach to identifying impacts of GFR requires a mix of quantitative and qualitative approaches to capture the range of potential direct and indirect impacts (GSI, 2013). For example stakeholder consultations could help identify impacts on certain groups or activities such as smuggling which would be difficult to identify through quantitative methods. Certain tools can provide particular insights on specific aspects and help build the case for reform. For example, SAM can be a powerful tool to assess distributional impacts across income percentiles, helping to debunk myths on the prospective losers of subsidy reforms – see Box 5 on the distributional impacts of fossil fuel subsidies. Such assessments should be timely to influence policy decisions, sufficiently broad to cover social, political, institutional and economic issues, and participatory to promote ownership and increase prospects that results are used to influence design (Hayes (2005) cited in Coady and Newhouse, 2006).

In certain cases, one may choose to focus on the most significant impacts of the GFR (in terms of overall effects), setting aside or only providing a cursory assessment of more minor impacts. Such a targeted assessment (or selective communication of results) can help distil key messages to policy makers in a comprehensible way and ensure a focus on the most important elements of the process. In some cases resource constraints, administrative capacity, a lack of data or the timing of the reform may restrict the use of certain tools such as complex economic models. For example Ghana adopted a simple, non-resource intensive approach to researching the impacts of its 2005 fossil fuel subsidy reforms based on household survey data and input-output data - see Box 3. For a more detailed discussion on methodologies for measuring impacts of GFR, see Metcalf (2015).

Box 3: The 2005 fuel subsidy reform in Ghana

In 2005 the Ghanaian government undertook a comprehensive campaign to build broad support for fossil fuel subsidy reform, following earlier unsuccessful attempts. The reform strategy was informed by a poverty and social impact assessment (PSIA) which identified consumption profiles, estimated price changes and impacts on consumption costs from the reform and examined three potential mitigation options. The PSIA estimated impacts of price changes on household income based on input-output data, distinguishing between direct and indirect impacts across different income groups. It found that rich households disproportionately benefitted from the subsidies whereas their removal would lead to an increase in consumption costs of the poor.

The findings of the PSIA were made public and were crucial in demonstrating the true costs of subsidies and how subsidies were an inefficient measure for addressing poverty objectives. The findings were used to inform a widespread public relations campaign which included a series of workshops, public forums and extensive use of media channels (including public addresses by the president and the minister of finance) to communicate the need for reform and how revenues generated would partly be used for social priorities. This helped improve understanding and build public support for the process.

A package of mitigation measures was introduced to mitigate impacts of the reform on vulnerable groups. This included in-kind transfers such as the elimination of fees for state-run primary and secondary schools, an increase in the number of public transport buses, a price ceiling on public transport fares, increased funding for health care in poor areas, an increase in the daily minimum wage,

investment in rural electrification, and continued cross-subsidization of kerosene and LPG. In addition, the government adopted a pricing mechanism which linked domestic oil prices to international prices and was overseen by an independent body – the National Petroleum Agency (NPA). The transfers, equivalent to approximately 0.35 percent of GDP, were financed by a special mitigation levy included in the pricing formula. This contrasts with government spending on fossil fuel subsidies prior to the reform which in 2004 accounted for 2.2 per cent of GDP.

The Ghanaian case is considered a partial reform as the pricing formula has periodically been abandoned due to political considerations, for example in 2008 due to escalating oil prices and in the run-up to the 2009 national election. This highlights the importance of political will to ensure durable GFR processes.

Sources: Coady and Newhouse 2006; GTZ, 2013; GSI, 2013 and 2010a; IMF, 2013a and 2006; OECD 2005

2.2 Potential impacts of GFR on vulnerable firms or sectors

The economic impacts of GFR, including on vulnerable firms or sectors are of particular concern to governments and are often used as an obstacle to GFR. Countries adopt different approaches to defining what they consider a vulnerable firm or sector. In several cases it includes a limited number of economic actors which are intensive users of the resource or product targeted by the GFR (e.g. energy-intensive firms) and operate in sectors which are open to international competition (e.g. trade-exposed sectors such as manufacturing). For example in Germany exemptions from the energy tax apply to companies that belong to specific statistical classifications (Withana et al., 2013) and in Denmark special tax provisions from the CO_2 tax are granted to specifically designed production processes (Speck and Jilkova, 2009). Other options to identify vulnerable economic groups could be to use the indicator of energy or resource input as a percentage of turn-over or the scale and timeline of expected job losses.

The perceived effect of GFR on the international competitive position of affected firms or sectors is often used to block or stall progress on GFR or to undermine the effectiveness and ambition of GFR efforts. For example, competitiveness impacts have been a concern across a number of European countries which have introduced carbon and/or energy taxes such as Denmark, Finland and Sweden (Withana et al., 2013). These concerns have been a key reason for granting exemptions in particular to energy-intensive industry - see Box 7 on the Netherlands where energy-intensive industries are exempt from energy and fuel taxes or subject to low rates.

GFR can also impact on firms, sectors and services which are not exposed to international trade impacts but may nonetheless be adversely affected by the reform. For example small-scale farmers may be affected by higher irrigation abstraction charges which could undermine the profitability of certain crops and have implications on their livelihood; small businesses may be affected by higher pollution charges and may have limited financial resources for investing in abatement activities. GFR can also have impacts on the informal sector which could be significant in certain countries, for example the smuggling of low priced fuels across borders or the sale of untaxed fuels to sectors of the economy where higher taxes apply. These wider impacts (which in some cases may be difficult to identify or quantify), should be kept in mind when considering impacts of GFR.

A key issue to clarify is the scale and nature of actual impacts of reform. Available literature on concerns about the negative impacts of environmental regulation (including GFR) on competitiveness, exports, trade flows, and relocation of companies does not reveal statistically

significant or robust evidence to support the claim[5]. Rather, available evidence seems to suggest that well designed environmental policies (including GFR) can benefit the environment without having a harmful impact on the economy. The impact of GFR on vulnerable firms or sectors depends on various factors, including:

- ***Design*** of the reform process (e.g. point of application, potential to pass through costs, exemptions and associated conditionalities, wider package of measures introduced);
- ***Use of revenues*** (e.g. whether recycled and in what way, other taxes reduced);
- ***External factors*** such as wages, education/skill of workforce, infrastructure, regulatory and fiscal framework, access to natural resources, trade barriers, exchange rate variations (Ekins and Speck, 2012) which all affect the competitive position of a firm or sector;
- ***Firm-specific factor*** as impacts may differ between different players within a given sector. For example a new tax will burden efficient and well-managed firms less than those which are inefficient or poorly managed. A recent OECD cross-country study found that increasing the stringency of environmental policy (defined as the explicit and implicit, policy-induced price of environmental externalities) leads to an overall improvement in production efficiency, with the largest gains among the most advanced industries/firms and negative effects likely among less productive firms (Albrizio et al.,2014).
- ***Timeframe -*** it is useful to distinguish between impacts in the short-term and the long-term. GFR may affect a firm's profitability in the short-term, while catalysing innovation which in turn helps improve profit margins in the long-term – see Box 4 on British Columbia.

In addition, one can ***assess the impacts of GFR at different levels*** i.e. national, sector and firm (OECD, 2003) as impacts can vary across different levels. For example, it is possible to have benefits from GFR for a particular sector, but losses for individual firms; as well as gains at a national level but losses at a sector level.

Box 4: Benefits of the carbon tax in British Columbia, Canada

A carbon tax was introduced in British Columbia (BC), Canada, in July 2008. It is one of the broadest and most comprehensive carbon taxes in the world, applying a uniform unit price on GHG emissions from the combustion of all fossil fuels in the province (plus peat and used tires when used to produce heat or energy) (although the actual tax rate applied is more modest than some countries, such as Sweden, Norway and Switzerland – World Bank, 2014). When the tax was introduced, a rate of CAD10 per ton of CO_2 equivalent was applied, with a schedule of four annual increases of CAD5 per ton to reach CAD30 per ton of CO_2 equivalent in July 2012. The tax rate has been frozen since 2012. Some exemptions are granted including for greenhouses and farmers (World Bank, 2014).

The tax is designed to be revenue neutral, revenues are used to decrease taxes on corporate and personal income, provide tax credits and benefits for vulnerable groups. However in practice, the tax has been revenue-negative as tax cuts and credits exceed revenue generated (Withana et al., 2013).

In terms of its effects, a 2012 assessment of the tax (Sustainable Prosperity, 2012) found that BC's petroleum fuel consumption per person dropped by 15.1 per cent from 2008-2011 and declined by

[5] See for example: Albrizio et al., 2014; Jaffe A., Peterse P., Portney P., and Stavins R. (1995) Environmental regulation and the competitiveness of US manufacturing: What does the evidence tell us? Journal of Economic Literature, XXXIII (March) 132-63; Smarzynska B., and S-J Wei (2001) Pollution havens and foreign direct investment: dirty secret or popular meth? World Bank, Policy Research Working Papers 2673, Washington, DG, US: World Bank; Sijm J.P.M. et al (2004) Spill overs of climate policy. An assessment of the incidence of carbon leakage and induced technological change due to CO2 abatement measures. Netherland Research Programme on Climate Change Scientific Assessment and Policy Analysis. Netherlands: ECN; Oikonomou V., Paerl M., and Worell E. (2006) Climate policy: bucket or drainers?, Energy Policy, 34, 3656-68; OECD (1996) Implementation Strategies for Environmental Taxes, Paris, France: OECD; Ekins P. and S. Speck (2012) Impact on competitiveness: what do we know from modelling? in Milne, J., and Skou Andersen, M., (Eds.) (2012) Handbook of Research on Environmental Tax Reform, Edward Elgar, Cheltenham/Massachusetts.

16.4 per cent more than the rest of Canada, while the province's per capita GHG emissions declined by 9.9 per cent between 2008-2010. This outpaced reductions in the rest of the country by more than 5 per cent. BC has also attracted green investment and green technologies at twice the Canadian average, has accounted for 20 per cent of all Canadian LEED gold building registrations since 2007. The province also saw a 48 per cent increase in clean technology industry sales from 2008-10 (British Columbia Ministry of the Environment, 2012). Furthermore, as a result of corresponding tax cuts, BC now has among the lowest income tax rates in Canada and general corporate income tax rates among the G7 nations (British Columbia Ministry of Finance, 2013).

Although it is not possible to definitively conclude that these changes have been a direct result of the carbon tax, or indeed of other climate policies in the province, the divergence in average behaviour and indicators across so many of the fuels and sectors covered by the carbon tax 'does suggest that the carbon tax may be starting to provide the broad structural incentive in the economy that was intended' (British Columbia Ministry of the Environment, 2012). For further discussion, see Metcalf (2015).

While from a theoretical, economic efficiency point of view there may not be a case for protecting specific economic groups, in particular individual firms (as one could argue that those firms that are not able to compete when prices reflect true costs should go out of business); from a political economy point of view such a blunt approach may not be realistic or acceptable. Thus, a more nuanced approach is required, for example with the use of targeted (and time-limited) compensation measures to facilitate the transition in affected sectors (see section 3.1). At the same time, GFR should be seen in the wider context of national transformation with the creation of new industries, sectors and competitive advantages to replace pre-existing ones (Joseph Schumpeter's concept of 'creative destruction'). Although such transformations have short-term costs (e.g. job losses, factory closures), they also have benefits (e.g. cost reductions, jobs in new industries, efficient allocation and use of scarce resources), and there are numerous examples of such shifts, e.g. transport, telecommunications (Cox and Alm, 2008). The process needs to be carefully managed, with swift reallocation of capital (including labour) and minimisation of barriers to entry to ensure potential efficiency gains lead to overall economic growth (Albrizio et al.,2014).

2.3 Potential impacts of GFR on vulnerable households

The social impacts of GFR, including on income distribution and vulnerable households is a highly politically sensitive and much debated issue. Countries adopt different approaches to defining vulnerable social groups. In a number of cases it is defined in relation to household income levels with low income households (e.g. in relation to income deciles, a measure of poverty such as the poverty line or a share of median income in the economy) considered entitled to some form of compensation (Bruvoll and Vennemo, 2014). Countries may also define vulnerable groups as those which are currently poor, those which could be poor after the GFR or those which are considered poor in relation to a benchmark such as total energy expenditure or access to modern energy sources (World Bank, 2014a). In some cases households with a certain status are identified as a priority (e.g. pensioners, rural households, single parent households).

The perceived or feared effect of GFR on such vulnerable groups is often used to block or stall progress or to undermine the effectiveness and ambition of GFR efforts. For example, proponents of reduced VAT rates on basic necessities such as energy, food and water argue they are needed to protect the poor, even though evidence suggests that such mechanisms tend to benefit the rich more (see Box 5 and Oosterhuis and Bachus, 2014). The distributional effects of a particular fiscal measure can be a useful guiding principle for GFR. Communicating the distributional effects of such instruments including any disproportionate benefits enjoyed by an elite or small group can also be a useful mechanism to build support for reform (see section 4.4).

A key issue to clarify is the scale of the welfare impact associated with the GFR and how it is distributed across income groups. Distributional effects of GFR can be identified and assessed through different tools including economic models (e.g. micro-simulation (MS), computable general equilibrium (CGE) and Input-Output (IO)) and empirical studies (OECD, 2014). When considering such effects one needs to take into account:

- ***Direct price effects*** from the higher prices faced by households on those products/natural resources targeted by the GFR, e.g. fuels used for cooking, heating, private transport; and
- ***Indirect price effects*** from the higher prices faced by households on other goods and services consumed which are intensive users of the products/natural resources targeted by the GFR, e.g. fuel-intensive goods and services such as public transport, food.

The scale and distribution of effects depends on consumption patterns across income groups, the extent to which consumers are able to adjust their consumption when prices change from the GFR, and the distribution and type of income-generating activities across groups (World Bank, 2014a). Although indirect effects are harder to quantify than direct effects, they can be significant (Arze del Granado et al., 2010). In some cases indirect effects can be a higher burden for low-income households, for example in countries where the poor spend a small share of their budget on transport fuels they are likely to be more affected by indirect effects of an increase in fuel prices as they have to pay higher prices on key items such as food and public transport (World Bank, 2014a). In other countries such as the US, the direct component of a potential carbon tax is found to be larger than the indirect component with the regressivity of indirect effects estimated to be less than that of the direct effects and roughly proportional between top and bottom deciles (Mathur and Morris, 2012). This variation in results highlights the sensitivity of assessments to the underlying context and structure of the economy as well as the nature of the GFR.

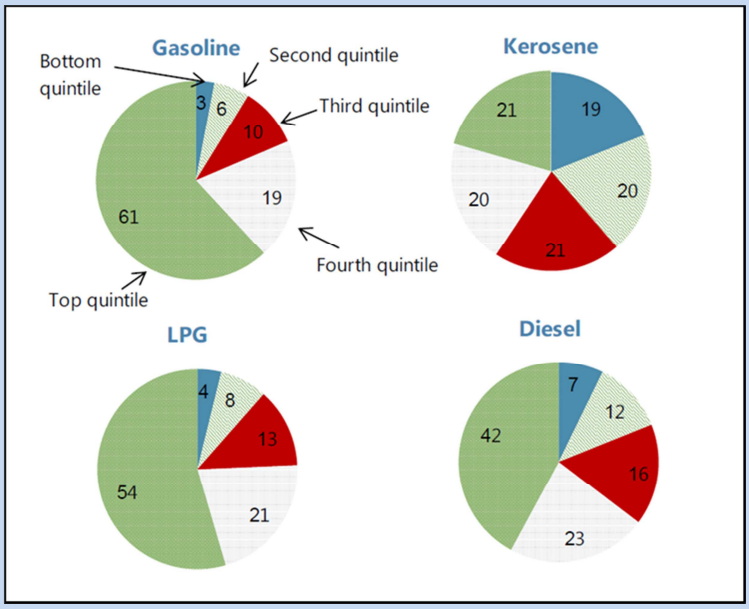
In addition to direct and indirect price effects, there is also a need to take into account ***non-price effects*** (e.g. attitudes and social norms, general socio-demographic characteristics of households, substitution effects), possible ***rebound effects and changes over time*** (e.g. benefits from improved access to water/electricity) (OECD, 2014). In some cases, the degree of regressivity depends on the metric against which it is measured. For example, using total expenditure as the basis of calculation rather than disposable annual income often makes environmental taxation appear less regressive; although it does not eliminate the regressivity of taxation for necessary household items such as heating and electricity (Kosonen, 2012).

Box 5: Distributional impacts of fossil fuel subsidies and their reform

Spending on fossil fuel subsidies is increasingly recognised as an inefficient means of protecting the welfare of low income groups. For example, it has been estimated that the richest 20 per cent of households in low and middle income countries capture six times more of the benefits of fuel product subsidies than the poorest 20 per cent of households (IMF,2013). Impacts vary across fuel types, gasoline subsidies are the most regressive, with over 80 percent of total benefits accruing to the top two income quintiles; benefits of kerosene subsidies are more uniform across income groups although there is still substantial leakage to high income groups - see Figure 2.

Subsidies to natural gas and electricity have also been found to be badly targeted as the poorest 20 percent of households receive 10 per cent of natural gas subsidies and 9 per cent of electricity subsidies (IEA, 2011). This leakage of benefits and inefficiencies could provide an important guiding principle for action on GFR. Moreover, communicating such distributional effects can be useful to build support for reform.

Figure 2: Distribution of subsidies to petroleum products by income group



Source: Arze del Granado et al. (2012) cited in IMF 2013

Even if the status quo benefits the rich more than the poor, some fossil fuel subsidy reforms could be regressive particularly in the short to medium term depending on the type of fuel taxed and characteristics of the national economy. A study by Arze del Granado et al. (2010) found that an increase in fuel prices of USD 0.25 per litre across 20 developing countries would result in an average 5.9 per cent decline in real household incomes with distributional impacts approximately neutral. However, direct effects vary across products with impacts for gasoline and electricity strongly progressive, impacts for kerosene strongly regressive and impacts for LPG differed across regions. Indirect impacts accounted for a substantial share of total impacts (with regional variation), indicating that a high proportion of total fuel use is for intermediate consumption. These results highlight the need to consider the range of effects of GFR on income distribution.

The impact of GFR on vulnerable households strongly depends on how revenues from the GFR are used, the nature of the wider GFR, other taxes reduced, elasticity of demand and substitution possibilities (including those available and those to be developed as part of the reform package). Impacts vary across applications and over time as well as within countries (e.g. between rural and urban areas) (World Bank, 2014a). Impacts also depend on the design of the GFR process, communication, wider package and context as distributional effects in developing and emerging economies can be quite different to effects in developed countries.

Even if the overall GFR process is progressive; a sharp increase in prices of certain essential products and services (e.g. energy and water), will have an impact on the budgets of poor households both directly and indirectly. GFR could also have wider impacts on poor households depending on substitution effects, for example in developing countries where access to electricity grids is limited, higher fuel prices could lead to increased use of biomass for heating and cooking with related health and environmental implications (World Bank, 2014a). Thus, there may be a need to introduce targeted mitigation measures for certain vulnerable groups to ensure the GFR process does not lead to increased poverty (Sterner, 2012) or other adverse impacts. Communicating plans to introduce such targeted mitigation measures together with messages on the wider benefits of reform to the general public can help build support for the process (see section 4.4).

2.4 Mitigation measures and approaches

Once the impacts of the GFR have been identified, there is a need to select those that may require mitigation so as to address potential negative impacts from the reform (which may otherwise hinder progress) and maximise associated gains. Criteria to assess whether or not a particular negative impact requires mitigation could take into account different economic, social or environmental considerations for example impacts on vulnerable groups defined in relation to income. In some cases they could be politically motivated and are a matter of expediency, i.e. to help pass a GFR bill in the parliament, to generate favour (or avoid disfavour) among voters or certain influential groups. See Box 6 for some considerations to keep in mind when assessing which impacts require mitigation.

Box 6: Considerations to help assess whether an impact of GFR requires mitigation

Social considerations

- Does the impact affect a group considered vulnerable based on its income or status? (i.e. low-income households, pensioners, rural poor, minority groups, gender, class).

Economic considerations

- Does the impact affect a sector which plays an important role in the national/regional/local economy? e.g. employing a large number of people, makes an important contribution to GDP. If yes, does the sector have the capacity to either absorb or pass on the impact?

- Does the GFR lead to isolated losses for a particular group? e.g. job losses in a particular sector, firm, industry (e.g. coal mining) or among a certain group of people (e.g. fishermen)

Environmental considerations

- Can the GFR lead to substitution effects which are detrimental to the environment and/or human health? (e.g. removing subsidies for heating fuel could lead to increased wood burning which in turn results in deforestation and deteriorating indoor air quality)

Political feasibility / acceptability issues

- Does the GFR impact on a politically influential group/sector? (e.g. farmers, energy-intensive industry)

Identifying the need for mitigation as well as the level and degree of compensation required is challenging, particularly given the numerous political factors at play. It is important that any decision to mitigate impacts of GFR is transparent and based on a careful analysis of:

- Who benefits from the status quo (i.e. subsidy in place) and whether the measure in place reaches intended beneficiaries;
- The impacts of the reform including winners and losers, impacts on third parties and external impacts (e.g. on trade);
- Who should be compensated and how;
- Affected stakeholder interests and concerns;
- The impacts of different mitigation options including potential trade-offs;
- What level of compensation is appropriate, over what timescale it should be provided and where relevant a clear timetable for phase out of compensation over time.

There are a number of different types of mitigation options and in most cases a package of different measures may be required with different target groups and timelines. For example some impacts require temporary mitigation measures to ease the transition and 'buy-in' support for reform, while others require longer-term or more permanent forms of support. The timeline and appropriate

speed of adjustment will depend on the resilience of the affected group and its ability to absorb or respond to changes from the GFR as well as external pressures, access to alternative options including other sources of employment and income etc. (Withana et al., 2012).

Potential mitigation options should be discussed in advance with affected stakeholders and designed to adequately take into account their concerns. Transparent preparation of the process and the introduction of mitigation measures before price rises take place can help build trust among affected groups (GSI, 2013). Moreover, it is useful to identify potential trade-offs in different mitigation measures as this may inform design of the reform so it is politically acceptable (Coady and Newhouse, 2006).

In general, one can distinguish between two types of mitigation measures and approaches as set out below (and discussed in further detail in chapter 3 and 4). The distinction between the two approaches is not clear cut and both types of measures are closely related:

- ***Design and implementation options*** which seek to avoid or minimise potential negative impacts of the reform. For example the timetable and sequencing such as a phased/gradual approach to introduction, a tax-free threshold for essential use, non-regressive tariff setting, a differentiated or narrow tax base, complementary policies (e.g. temporary reductions in taxes on substitute products). Communication and dialogue are also key. See chapter 4 for a more detailed discussion on issues of design and implementation strategies for GFR.
- ***Compensation measures*** such as payments and transfers to remunerate certain groups for a loss of welfare associated with the GFR. For example targeted lump sum transfers and incentives (e.g. support for the adoption of clean technologies), means-tested refunds and reductions, vouchers, transitional assistance to displaced workers, exemptions, support for social protection programmes (e.g. health, education services used intensively by the poor). Such measures should be carefully designed and well-targeted to ensure they reach intended beneficiaries (see section 3.2). See chapter 3 for a more detailed discussion on compensation measures and revenue use.

When considering potential mitigation options, it is important to keep in mind that the overall objective of GFR is to generate structural changes and support a shift towards a more efficient, sustainable and equitable economy in the long-term. Thus, not all impacts of GFR require mitigation. The extent to which mitigation measures are introduced and targeted at specific groups 'is a strategic decision that involves trade-offs between fiscal savings, capacity to target, and the need to achieve broad acceptance of the reform' (IMF, 2013). The package of mitigation measures adopted will depend on a number of factors including specificities of the GFR process, the sector or issue of focus, envisaged impacts, mitigation options, stakeholder perceptions, government credibility and administrative capacity to implement different measures.

While some mitigation measures may be necessary to ease the transition in the short-term, in the longer term, given the need to allocate scarce productive capacity and resources efficiently across the economy, activities that cannot compete when market prices reflect externalities should arguably not be supported with public funds and mitigation measures should be phased out over time (see section 3.4 on smart design principles for mitigation measures). Moreover compensation measures imply some opportunity costs and trade-offs (as they take up revenues which could otherwise be used to lower distortionary taxes). Thus, where mitigation measures are introduced, they should be carefully designed, well-targeted and time limited, maintaining positive incentive effects and supporting the overall objectives of the GFR process.

3 Compensation measures for vulnerable groups

This chapter focuses on compensation payments and transfers to remunerate affected groups, in particular vulnerable firms or sectors and households. It also discusses the use of revenues from GFR and concludes with some general smart good governance principles to keep in mind when designing compensation measures.

3.1 Compensation measures for vulnerable firms or sectors

As noted in Chapter 2, there are numerous potential impacts of GFR on vulnerable firms or sectors. Available literature on concerns about negative impacts of environmental policies (including GFR) on the economy, competitiveness, exports, trade flows, and the relocation of companies does not reveal statistically significant or robust evidence to support the claim[6]. While opposition to GFR on the basis of unwanted impacts on vulnerable firms is sometimes misplaced or myopic (in that it does not take into account wider, long-term transformational needs); it remains one of the major obstacles to meaningful GFR in several areas. Thus, impacts of GFR on vulnerable firms need to be carefully assessed and where relevant mitigation options introduced. These measures should be well-designed and targeted, aligning short-term concerns with long-term needs for change.

Adverse impacts of GFR on vulnerable firms can be mitigated through ***careful design and implementation of the process*** such as a phased approach to implementation with gradual expansion in coverage and a ratcheting up of rates (or reduction in subsidies) over time to overcome resistance, allow affected actors time to adapt and enable learning (see discussion in chapter 4).

A range of ***compensation measures*** can also be introduced to remunerate vulnerable firms or sectors for the loss of income associated with the reform. These measures are often closely linked to the use of revenues from GFR and have different strengths, weaknesses and trade-offs. Certain measures may be more relevant or useful in particular circumstances depending on the nature of the GFR process, targeted sector and available administrative capacities. Compensation measures should be designed so that they maintain a positive incentive effect and should be independent of the tax burden (World Bank, 2005). An overview of different types of mitigation measures, their strengths and weaknesses is provided in Table 1. This is followed by an elaboration of certain types of compensation measures, drawing on insights from practical experience across different sectors.

Table 1: Overview of potential measures to mitigate impacts of GFR on vulnerable firms or sectors

Type of measure	Strengths	Weaknesses
Design and implementation approaches		
Timetable	- Pre-announced, phased introduction allows time to adjust - Provides certainty - Reduce opposition to reform	- Could lead to backsliding and reversals of reform commitments - Risk of hoarding and shortages - Creates expectations of inflation
Stakeholder engagement	- Build ownership and legitimise process - Increase awareness of objectives of reform, pros and cons, winners and losers - Reduce opposition to reform	- Risks delaying GFR process - Opportunity for lobbying against reform and platform for opposition

[6] See Albrizio et al.,2014 and references in footnote 5.

Compensation mechanisms		
Reductions/ exemptions	- Reduce opposition and build support for reform - If linked to effective conditionalities, could be useful to encourage change and improve information asymmetry between companies and authorities - Useful for political and public acceptability purposes	- Does not provide efficient price signal or incentive, thus foregoing cost-effective opportunities to achieve objectives - If not well designed, could be over-generous - Imply advantages for certain firms and sectors, but disadvantages to others - Once established, may prove difficult to revise or phase-out as it becomes entrenched in expectations of beneficiaries
Transitional assistance to affected workers	- Reduce opposition and build support for reform - Linked to wider complementary policies, e.g. to encourage new job opportunities	- Could become entrenched in expectations of beneficiaries if not time limited
Incentives for innovation	- Facilitate transition in affected sector - Drive innovation in affected sector - Reduce opposition and build support for reform	- Could become entrenched in expectations of beneficiaries if not time limited
Minimum agreements/ cooperation between countries	- Avoid concerns of leakage and competitiveness impacts - Increase support for GFR - More effective and efficient instruments - Support more ambitious GFR - Reduce opposition and build support for reform	- Difficult to get agreement on fiscal cooperation between countries, particularly larger groupings
Border adjustments	- Avoid concerns of leakage and competitiveness impacts - Increase support for GFR - Encourage other countries to initiate pricing regimes and thus support global efforts - Reduce opposition and build support for reform	- WTO compliance - Could be administratively complicated depending on number of sectors/products covered - Political barriers given fears of adverse impacts on relations between trading nations

Source: Own synthesis

3.1.1 Partial reductions or exemptions

Some form of exemptions or special provisions for vulnerable firms and sector(s) are often relied on as a politically expedient measure when introducing GFRs. Such practices however contravene the principles of conventional economic theory and tend to impair the effectiveness of these instruments as the cheapest emission reduction potential is not exploited. For example in Germany, derogations granted to manufacturing and energy-intensive industries from the energy tax have limited the environmental impacts of the tax as the high energy efficiency potential in this sector remains largely untapped due to insufficient price signals (Speck and Jilkova, 2009). Furthermore, such practices may imply advantages for certain firms and sectors, but disadvantages to others. In some cases, exemptions can be considered to be overly generous. For example, it has been

estimated that if the Climate Change Levy (CCL) in the UK had been implemented at the full rate for all businesses, further substantial cuts in energy use could have been achieved without jeopardizing economic performance (Martin et al., 2009).

In some cases, exemptions are linked to conditionalities such as voluntary agreements – see Box 7 on case of the Netherlands. Such agreements, if well designed can be a constructive means to encourage change (ten Brink, 2002), improve the information asymmetry between companies and authorities and inform discussions on further revisions to the instrument. Specific requirements such as an environmental management system, regular energy audits and a commitment to investments or initiatives that have a short payback time to be eligible for the exemption can also give the issue due executive attention and thus encourage progress (Withana et al., 2013).

Exemptions are introduced for a number of reasons, while they tend to undermine the effectiveness of GFR, they are often necessary for political and public acceptability purposes. A critical issue is how such exemptions are designed and their development over time (see section 3.4).

Box 7: The energy tax in the Netherlands

The 'energy tax', formerly known as the 'regulatory energy tax', was introduced in 1996. It applies to energy products used for heating and electricity generation by households, small businesses and intermediate firms. It is part of the wider Dutch energy taxation regime which has developed over the last two decades into an 'output style' system whereby fuels used in electricity generation have been exempted from fuel taxes, while rates levied on electricity under the energy tax have increased. Different rate schedules are applied for electricity and natural gas, with regressive rate structures so that rates decline with the level of consumption. The rate structure was partly based on the carbon content of the fuels and indexed to inflation since 1999, however it has subsequently been changed and its basis on energy/CO_2 abolished due to purchasing power effects on low-income groups.

Exemptions are applied to help address competitiveness concerns and include:

- A refund from the energy tax for large industrial electricity consumers (>10 million kWh/year per electricity connection) if they enter long-term agreements on energy efficiency with the Government and pay on average more than the EU minimum rate.
- Reduced natural gas tax rates on the horticulture sector again on the condition of participating in energy efficiency agreements.
- Rebates and subsidies for energy distribution firms for the deployment of CHP, energy-saving technologies, and renewable electricity.

Revenues from the energy tax have increased over time from EUR 400 million when the tax was initially introduced to EUR 4.2 billion in 2010 and amounted to 2 per cent of GDP in 2011. Revenues are recycled back to the economy through:

- Lower income tax rates and higher tax free allowances for households (especially pensioners),
- Reduced employers' social security contributions, increase in tax free allowances for small and medium sized enterprises (SMEs), reduced corporate tax rates,
- Tax credit in the form of a lump sum refund on households' electricity bills,
- Until 2003 around 15 per cent of revenues were earmarked to reward the purchase of energy-efficient appliances.

Available evaluations suggest that the energy tax has supported a reduction in residential energy demand and an improvement in energy intensity among Dutch industry. The regressive elements of the tax are found to be nearly neutralised through recycling measures such as the tax free allowances, reductions and the tax credit per electricity connection (which is considered a good example of how to avoid negative distributional effects of ETR on private households). There have also been some criticisms of the system. For example Vollebergh (2008) notes that CO_2 emissions from the production

of most final energy products in the Netherlands are exempted from energy taxation either implicitly (e.g. crude oil, natural gas) or explicitly (e.g. electricity production), leading to low or zero energy taxes for those sectors with the cheapest abatement options.

Sources: Duscha et al, 2005; EEA, 2011; European Commission, 2013a; Netherlands Ministry of Finance, 2013; OECD, 2013; Peter *et al* (2007); Speck and Jilkova, 2009; Vollebergh, 2008 and 2013; Withana et al., 2013 and 2014

3.1.2 Transitional assistance for displaced workers

If GFR has significant impacts on a specific economic activity, industry or firm, targeted compensatory measures could be considered. For example payments to assist in structural change, provision of information, advice and retraining to help affected workers find other jobs or activities, provide early retirement schemes, support for scholarship programmes for young workers etc. Such transitional assistance for displaced workers has, for example, been provided in a number of European countries when reforming subsidies to the coal mining sector including in France which supported alternative economic activities in affected areas and provided various employment guarantees to affected miners, Poland which provided relatively generous severance packages to workers leaving the mines, and the UK which supported alternative economic activities in affected areas and the development of skills (Bruvoll and Vennemo, 2014). Such support can help reduce opposition to the reform and reallocate resources to other activities, thus stimulating economic growth in areas where industrial activities are to be scaled down or closed, thus creating new job opportunities in the longer-term.

Such assistance can also be controversial. The coal subsidy reforms in Europe were undertaken against a highly charged political context with questions about the appropriateness and adequacy of the transitional assistance provided. In the UK for example, although the reform enabled the country to maintain a more or less competitive coal industry, it came at the cost of extensive mine closures and significant social costs as compensation provided was considered insufficient to avoid an increase in unemployment (IEEP et al., 2007).

Transition measures thus need to be carefully designed and reviewed to ensure they are appropriate and adequate. While such measures can help buy support for the reform, they can also be costly particularly in the short to medium term. Care needs to be taken to ensure that such assistance does not become entrenched in the expectations of beneficiaries (OECD, 2005a), this requires careful design with clear review clauses and end dates (see section 3.4). Such assistance is also linked to wider, complementary policies introduced as part of the reform package such as measures to stimulate new employment opportunities in a geographic area or sector affected by the reform – see Box 17 on support to the fisheries sector in New Zealand when reforming fisheries subsidies.

3.1.3 Incentives for innovation & more efficient technologies, processes and practices

Certain countries use mechanisms to recycle revenues raised by the GFR back into the affected sector to help keep down pressure, encourage transformation and drive innovation – see Box 8 on experience in Sweden. Such mechanisms can be useful in supporting structural change in the sector over time and the transition to a more resource efficient economy. However, to do so they need to be carefully developed to ensure effective incentives and encourage due dynamics in the sector. Incentives should be performance linked (i.e. favouring more efficient or innovative players so as to reward good behaviour and penalise a lack of action. They should be targeted at the most vulnerable sectors and be time-limited, reduced gradually over time so that they do not become entrenched in the expectations of beneficiaries – see Box 12 on experience in Australia.

Box 8: The NOx tax and refund system in Sweden

In 1992, Sweden introduced a tax on emissions of nitrogen oxide (NOx) from energy generation at stationary combustion plants at a rate of SEK40/kg (USD6000/ton) of NOx emitted from stationary combustion plants producing useful energy above a specified threshold (the threshold has been reduced from 50 MWh of useful energy per year to 25MWh). All revenues raised from the tax (except administration costs) are recycled back to participating plants in relation to the amount of energy generated. Thus, plants with low NOx emission intensities are net beneficiaries of the system while those with high NOx emission intensities are net losers.

This innovative feature has provided a strong incentive for participating firms to reduce NOx emissions per unit of energy produced and has stimulated significant innovation and investment in combustion and pollution abatement technologies. For example the number of plants subject to the NOx tax with NOx abatement technologies in place increased from 7 per cent in 1992 (when the tax was introduced) to 72 per cent in 1995.

There are however some shortcomings of the system, for example the refunds mean that the tax has little impact on relative product prices (thus it does not discourage demand for such products), it goes against the polluter pays principle and maintains inefficient resource allocation patterns (as polluters do not pay the full cost of pollution). The design of the refund provides an incentive to reduce NOx emissions per unit of energy produced, but does not reduce the overall amount of energy produced, thus while the average emission intensity of participating plants was nearly halved in 1992-2005, total energy output increased by more than 70 per cent and total NOx emissions did not fall by much.

Nonetheless, the recycling mechanism has made the tax more politically acceptable. It has helped reduce concerns of negative competitiveness and distribution impacts and is thus considered a useful approach, particularly in small open economies.

Sources: OECD, 2013a and 2010; Sterner and Turnheim (2008) cited in IMF, 2012; Sterner and Hoglund-Isaksson (2006) cited in OECD, 2013a

3.1.4 Minimum agreements and cooperation among coalitions of countries

Cooperation between countries on GFR could be another mitigation measure which potentially leads to more harmonised or synchronised approaches such as an agreed minimum level or threshold of a given green fiscal measure. The EU Energy Tax Directive (2003/96/EC) is an example of such a common approach – see Box 9. Such agreements are likely to be more useful in certain circumstances, in particular depending on the ease with which a given tax or charge could be avoided for example through trade (e.g. waste exports) or movement of consumers (e.g. airline tax, fuel tax). Such cooperation could take place between neighbours (e.g. to reduce the risk of fuel tourism or smuggling of fuels (OECD, 2005) or between countries in a certain geographic region facing a common challenge (e.g. marine litter in the Baltic Sea or in identified hot spots in the Caribbean). It could help overcome obstacles to progress (as it may be easier to garner support if potential competitors work together to design and launch measures), leading to more effective (e.g. avoid carbon leakage) and efficient (e.g. compatible road pricing) GFRs (Withana et al., 2014 and 2015).

Box 9: Agreeing minimum energy taxes among 28 EU Member States

The EU Energy tax Directive (ETD) (2003/96/EC) was adopted in 2003 and provides a common framework for the taxation of energy products and electricity across the 28 Member States. It aims to

harmonise and gradually increase the minimum excise duty rates applied on energy products, however given political sensitivities it includes a number of exemptions and derogations for particular countries and sectors which has somewhat undermined its effectiveness (European Commission, 2014).

In 2011, the European Commission tabled a proposal to revise the Directive so that energy taxes would be based on two components (European Commission, 2014):

- A minimum tax rate for CO_2 of EUR 20 per ton of CO_2 for all uses of the energy products; and
- A minimum rate for energy based on the energy content of a fuel which varies depending on whether the energy product is used as a motor fuel (EUR 9.6 per GJ to be reached gradually by 2018) or as heating fuel or motor fuel used for specified purposes such as agricultural and forestry (EUR 0.15 per GJ as of 2013).

The proposal seeks to reduce distortions in competition between different fuel types and promote more efficient energy use; however it has faced significant opposition from certain countries and discussions have been stalled since 2011. The difficulties facing the proposal reflect a number of issues including the underlying economic climate (with countries particularly sensitive to pushing ahead with ambitious environmental policies for fear of impacts on competitiveness, industry relocation etc.) and institutional barriers (the fiscal unanimity rule in the EU on tax issues). It also reflects the difficulty in reaching agreement among a larger and more diverse group of countries - the initial Directive was agreed among 15 Member States, the proposed revision requires agreement among 28 Member States including a number of countries in Central and Eastern Europe whose economies are heavily reliant on fossil fuels.

In December 2014, the Commission proposed to withdraw the proposal on the grounds that there was no real prospect for Member States to reach an agreement. The Commission could put forward another proposal in this area. Another option could be for a sub-set of Member States (currently at least nine) to take forward the issue under the enhanced cooperation procedure'. Such cooperation is in principle possible but can only be undertaken as a last resort and under certain conditions (Bassi et al., 2010). There has been limited use of this approach to date (e.g patents, proposed Financial Transaction Tax), however it remains an option which could be relied on more frequently in the future, particularly given the current political context and discussions on the potential need for a 'multi-speed' Europe.

Although such cooperation between countries may be difficult (given various political considerations and sensitivities, e.g. about fiscal independence), it is likely to be more feasible when smaller groups of countries are involved. Moreover, cooperation may be more likely when countries agree to set minimum requirements (e.g. minimum tax rates) rather than specify individual rates. This allows a certain degree of flexibility among participating countries, with those wishing to go further able to do so. For example, cooperation between countries in setting waste-related taxes and fees could help avoid waste exports for energy recovery where other treatment options such as recycling, reuse or prevention may be environmentally preferable (Associate Parliamentary Sustainable Resource Group, 2013). Such cooperation could help ensure that the price of waste treatment (i.e. tax plus facility gate fees, transport costs etc.) is higher at the bottom of the waste hierarchy (landfill, incineration without energy recovery and energy recovery) and lower towards the top (recycling, reuse). This would not necessarily mean applying the same rate of tax across cooperating countries, but rather that the tax rates applied are set above an agreed minimum so as to discourage exports/imports and thus drive waste management improvements (IEEP et al., 2012 and Withana et al., 2014).

3.1.5 Border adjustments

Another option for consideration in the longer-term could be the use of trade-related measures such as border carbon adjustments (BCAs) which would adjust the prices of traded goods based on a pre-determined measure of environmental impacts (e.g. GHG emissions emitted) such that prices/costs

of imports and exports are aligned. Border adjustments could for example take the form of taxes, charges, refunds, carbon labels, carbon and/or energy-intensity standards or bans (Holzer, 2013). Such adjustments could be an effective way of encouraging other countries to initiate pricing regimes and undertake GFR as they are effectively penalised for not having a similar system in place (IMF, 2012).

Border adjustments are often raised in discussions however they are difficult to implement in practice and remain controversial. They are politically highly sensitive given trade implications and fears that they will strain relations with trading partners. Nonetheless there are some studies which suggest that well-designed BCAs could overcome concerns of feasibility and political acceptability (see for example Vivid Economics, 2012). There is a need for further analysis of such measures in particular how they could be designed and implemented to be WTO compliant, and whether they provide a feasible (and practical) option to help mitigate some of the concerns related to more ambitious GFR efforts.

3.2 Compensation measures for vulnerable households

As noted in chapter 2, adverse impacts of GFR on vulnerable households can be mitigated through ***careful design and implementation***. For example in the Netherlands, the regressive design of energy taxes is nearly neutralised through the use of tax free allowances, tax reductions and credits – see Box 7. Similarly, means-tested heating benefits are offered in Germany, mitigating the impact of energy price increases on the poorest households (EEA, 2011). Using GFR revenues to lower income taxes and social security payments could also help mitigate some potential negative impacts.

A range of ***compensation measures*** can be introduced to remunerate vulnerable households for the loss of income or welfare associated with the reform. These measures have different strengths, weaknesses and trade-offs and may be more relevant or useful in particular circumstances depending on the nature of the GFR process, administrative capacities etc. Compensation measures need to be tailored to the national context, for example providing compensation through changes in social security payments may be easier to administer in developed countries (where a dedicated administration and infrastructure already exists for such payments), whereas this may be more challenging in developing countries where other measures can be considered such as increased spending on health and education programmes at least in the short to medium term while administrative capacities and supporting infrastructure are further developed (IMF, 2013).

An overview of different types of mitigation measures, their strengths and weaknesses is provided in Table 2 below. This is followed by an elaboration of certain types of compensation measures, drawing on insights from practical experience across different sectors and issues. The need and type of compensation provided will depend on a number of factors including the consumption patterns of vulnerable households and the extent to which these households can manage their demand or secure access to alternatives (World Bank, 2014a).

Table 2: Overview of potential measures to mitigate impacts of GFR on vulnerable households

Type of measure	Strengths	Weaknesses
Design and implementation approaches		
Timetable	- Gradual introduction allows time to adjust to revised prices - Reduce opposition to reform	- Could lead to backsliding and reversals of reform commitments - Risk of hoarding and shortages - Create expectations of inflation - Foregone revenues (and

		environmental benefits) in short-term
Sequencing	- Reduce impacts on vulnerable groups	- Reduce revenues from GFR - Create distortions or negative incentives - Time for opposition to build up
Stakeholder engagement	- Build ownership and legitimise process - Increase awareness of objectives of the reform, pros and cons, winners and losers - Reduce opposition to reform	- Risks delaying GFR process - Opportunity for lobbying against the reform and platform for opposition
Compensation mechanisms		
Allowances/ reductions	- Help protect low-income groups by offering certain basic level of service - Reduce opposition and build support for reform - Ease of administration - Can provide incentives for conservation if well designed (e.g. rising block tariff)	- Limited reach as only covers households connected to the electricity grid/water system - Undermine incentives for conservation if not well designed - It measures are not means-tested or well-targeted, there is a risk of leakage (e.g. higher-income groups)
Cash transfers	- Give beneficiaries flexibility in spending - Link to conditionalities to ensure transfers spent on 'desirable' uses (e.g. investment in education) - Reduce opposition and build support for reform	- Need to be targeted to ensure transfers are manageable - Requires administrative capacity and infrastructure (e.g. bank accounts) - Increases risk of corruption - Targeting errors - Requires regular monitoring to ensure transfers reach intended beneficiaries - Could become entrenched in expectations of beneficiaries
In-kind transfers	- Useful when government lacks administrative capacity to implement cash transfers - Ease pressure on vulnerable groups - Win political and public favour as limits freedom of recipients to spend on 'undesirable' uses - Can include incentives to encourage behaviour change (e.g. energy efficient lighting)	- Limited flexibility - Distort household choices - Could become entrenched in expectations of beneficiaries - Difficult to target, risk of diversion, smuggling, corruption

Source: Own synthesis

3.2.1 Tax free allowances or targeted reductions

Tax free allowances or lifeline tariffs can be provided for basic use of an essential service by targeted groups (e.g. linked to income level or family size)**.** Such lifeline tariffs can help provide access to basic services (e.g. water, electricity) for vulnerable households and be used to mitigate the impacts of price increases on poor households. For example in Uganda a lifeline tariff of USh 100 per kWh is provided for electricity consumption of up to 15 kWhs a month by poor households; in the Philippines discounts in electricity tariffs of between 5–50 percent are provided to three million poor

households (IMF, 2013a). Such tariff schedules can help reduce the adverse effect of electricity tariff increases on poor households. Above the threshold of the lifeline tariff, a rising block tariff structure could be introduced to ensure rates increase with consumption.

However, the adoption of allowances or lifeline tariffs requires supporting infrastructure such as metering devices and connection of vulnerable households' to the grid (World Bank, 2014a), both of which may require some upfront investment or support. Such allowances should also be carefully designed and limited to modest levels of consumption to ensure they are well targeted and not appropriated by richer households (OECD, 2005). Moreover, experiences in the application of such tariffs in some countries suggest they are less effective in protecting low-income households in practice, particularly in those countries where access to the water or electricity grid is limited. For example, in El Salvador, a large proportion of low-income households do not benefit from lifeline electricity tariffs as they are not connected to the grid or their consumption levels are above the lifeline threshold given large family sizes (Arze del Granado et al., 2010).

An additional disadvantage of such tariffs is that they do not provide an incentive for reduced consumption among households receiving the tax free allowances. Thus, other measures could be considered which incentivise reduced consumption while also supporting or protecting vulnerable groups. For example, in Denmark, water pricing is based on metering, however affordability of water and waste water services is ensured by income support through existing social policy systems (OECD, 2008). This approach has the advantage of retaining an incentive element in water pricing for all water users, irrespectively of their income (EEA, 2013).

3.2.2 Cash transfers

Many countries use targeted or untargeted cash or near-cash (e.g. vouchers) transfers to compensate for some of the impacts of GFR. Such transfers can be a useful mechanism to overcome obstacles to GFR. For example in Indonesia, the government used an unconditional cash transfer programme to help overcome opposition to fuel subsidy reform- see Box 11. Cash transfers are considered an effective way of compensating households for both direct and indirect effects of GFR such as fossil fuel subsidy reform (World Bank, 2014a) and are considered economically efficient as they allow beneficiaries the flexibility to spend according to their needs (IMF, 2013). However, such transfers are also inefficient in the sense that unlike cuts in payroll taxes, personal income and corporate taxes, they do not increase incentives for work effort, capital accumulation, human capital etc., and thus do not provide as efficient an outcome for the economy overall (see section 3.3).

There are also issues of corruption and fraud, technical and administrative costs and targeting errors which have arisen in the practical application of such cash transfers. Thus, there is a need for careful design and implementation of the system, regular monitoring and review to ensure transfers reach intended beneficiaries. Such programmes may require complementary investments and capacity for example registers of eligible groups and a system to administer or distribute the cash such as bank accounts which may take time and money to set up - see Box 10 on experience in India. Technological advancements can simplify the technical and administrative costs of implementing such programmes (World Bank, 2014a), as well as helping to improve targeting and efficiency, reduce corruption and prevent leakage to unintended beneficiaries.

Box 10: Driving fuel subsidy reform in India

Fossil fuel subsidies account for a substantial share of public expenditure in India. For example in 2012-2013, 2.3 per cent of India's GDP was spent on fossil fuel subsidies (GSI, 2014). Not only are these subsidies an increasing burden on the public budget, they have also been found to be inefficient and

inequitable with the richest ten per cent of households benefitting seven times from the subsidies than the poorest ten per cent (Anand et al., 2013). Recognition of these shortcomings has led to numerous calls for reform and in recent years the government has taken some steps in this regard. In 2010, the government liberalised petrol prices. In 2013, the government introduced a policy of gradual monthly increases in retail diesel prices, a cap on the consumption of subsidized LPG cylinders per household and a policy of progressively reducing total PDS kerosene (GSI, 2014a).

Despite efforts, progress has been slow, hampered by concerns of impacts on the economy and vulnerable groups and a public backlash over price increases (WEF, 2013). Eliminating fuel subsidies will have a negative impact on household incomes (in particular from higher prices for kerosene and LPG), with impacts estimated to range from 4 per cent for the lowest income groups to 5 per cent for higher income groups (Anand et al., 2013). Subsidy removal may also lead to wider impacts, for example as higher prices drive poor households to rely more heavily on traditional fuels such as firewood and animal dung with associated negative impacts on indoor air quality, health etc. (GSI, 2014a).

Supporters of fuel subsidy reform hope that India's new Prime Minister Narendra Modi will provide leadership and impetus to the process. Fossil fuel subsidy reform (and food subsidy reform) is part of a wider package of good governance and reform being driven by Mr Modi. One of his key election pledges was to reform India's inefficient public services and get public finances in order. His popularity and wider reform agenda could help build broad-based support for fossil fuel subsidy reform.

In October 2014, the government announced a number of reforms including: the immediate decontrol of diesel prices, an increase in the regulated price of natural gas, fix the total subsidy per LPG cylinder, reintroduce the Direct Benefit Transfer for LPG (DBTL) scheme, and is considering adoption of the Direct Benefit Transfer for kerosene (DBTK) scheme (GSI, 2014a). Support measures need to be better targeted to ensure coverage of genuinely poor households currently excluded from support programmes, entitlements from non-poor households withdrawn (Anand et al., 2013). This can be supported through careful design of programmes as well as technology assisted measures. For example, a scheme to increase the number of bank accounts among households (Pradhan Manrei Jan Dhan Yojana) will help implement cash transfers (as households can receive payments directly in their newly created accounts) while the Aadhaar unique identification scheme, currently being rolled out nationwide will help reduce corruption and leakage of benefits (The Economist, 2014).

There are also concerns that such transfers may be spent on 'undesirable' uses and in some cases, these transfers are linked to specific conditionalities with eligibility for the transfers linked to a commitment to use the transfer to improve the welfare of the household, for example by investing in education or health of members. Such conditionality, while challenging to implement, could help alleviate the impacts of GFR and at the same time address some of the root causes of poverty in the country (IMF, 2013). Such conditional cash transfers have been successfully used in a number of countries including Brazil, Mexico and Columbia. They do not require complex administration or governance systems and can be distributed through existing structures such as schools or local post offices (GSI, 2010a).

3.2.3 In-kind transfers

Where cash transfers are not feasible (e.g. due to limited administrative capacity), another compensation measure to consider are in-kind transfers which can help cushion the direct and indirect impacts of GFR on vulnerable households by reducing spending on other items or services on which they are reliant. This could, for example, include investments in existing social programmes which can reduce pressure on the budgets of low-income households and thus alleviate the negative impacts of the GFR. See, for example, Box 3 on fuel subsidy reform in Ghana and Box 11 on fossil fuel subsidy reform in Indonesia.

In-kind transfers can also include incentives to encourage behaviour change which can in turn ease pressure on household budgets. For example programmes for energy efficiency improvements and insulation, tax breaks on public transport to reduce costs of public transport, support households to convert from the use of kerosene for cooking to low-cost LPG. Although such in-kind transfers are less favoured from an economic efficiency point of view (as they distort household choices), they are sometimes favoured by policy makers and the public as they ensure spending on 'acceptable' uses and are often relatively easy to implement as they can make-use of existing mechanisms and processes (World Bank, 2014a).

Box 11: Fossil fuel subsidy reform in Indonesia

Fossil fuel subsidies are a politically sensitive issue in Indonesia which has had mixed experiences with reform efforts since the late 1990s. Given concerns of the growing fiscal pressure from fuel subsidies, in 2005 the government began a process to gradually liberalize the fuel market and eliminate fuel subsidies. This reform process entailed a substantial rise in fuel prices, which increased by an average of 125 per cent in 2005 and 29 per cent in 2008. These reforms were supported by a public information campaign and an extensive programme of cash and in-kind transfers which also made use of existing social protection programmes. The package of compensation measures included:

- Temporary, unconditional cash transfer payments targeted at poor households, e.g., in 2005 the transfers covered 19 million poor families over six months. Vulnerable households were identified through local community leaders and cash was distributed through local post offices,
- Savings from reform used to finance investments in education, rural development and health through existing social protection programmes,
- Incentives to shift from use of kerosene for cooking to low-cost LPG including provision of a free starter pack and a program to educate the public on the safety of LPG.

This package of measures helped reduce opposition to the reform (and reduced the intensity of protests to the price increases). Existing social protection programs facilitated timely delivery of the compensation measures. The popularity of then President Yudhoyono and the credibility of his government is considered another factor which helped the reform (in contrast to previous efforts in 1998 and 2003 which met with significant public opposition). Assessments of the reform highlighted the success of the cash transfer programme and concrete achievements from other elements of the package such as the repair and development of new roads, bridges, irrigation systems etc. Such assessments can help maintain public support for the reform and build government credibility.

However the reform also had some shortcomings, in particular it lacked a long-term strategy which together with other factors resulted in the reintroduction of subsidies in 2009 in the lead up to national elections. The reform was put back on track in 2013 when fuel prices were increased to slightly above 2008 prices. This was accompanied by a package of compensatory measures which amounted to USD 2.9 billion and included a temporary unconditional cash transfer scheme and the provision of support through existing social welfare programmes including assistance for poor students, subsidized rice, basic infrastructure and a conditional cash transfer program targeted at very poor households.

The newly elected President, Joko Widodo, has prioritised fossil fuel subsidy reform given its impacts on the current account deficit. In November 2014, the government raised gasoline and diesel prices and in January 2015 it announced the elimination of gasoline subsidies and a reduction in the diesel subsidy to a fixed 1,000 rupiah (USD 0.08) per litre. Falling global oil prices have helped mitigate the impacts of these reforms as unsubsidised fuel prices are less than previously subsidised prices. Revenue savings are expected to support social spending programmes including cash transfers of 200,000 rupiah (USD 15.75) per month to the poor (intended to mitigate impacts of the subsidy reform) and infrastructure investments including in port and rail connections (The Economist, 2015).

Sources: IMF, 2013a; GTZ 2013; GSI, 2013 and 2014; World Bank 2014a

3.3 Using GFR revenues

As noted above, compensation measures are closely related to the use of revenues from GFR. Careful use of these revenues can mitigate some of the adverse impacts on vulnerable groups and help overcome obstacles to the reform. How revenues are used has an important influence on the impact and effectiveness of the GFR as well as on its political and public acceptability. There are different options for how revenues from GFR are used from contributing to a wider tax shifting programme, to raising revenues, recycling revenues back into the economy or the affected sector, or a mix of these approaches.

How revenues are used and the proportion used for mitigation measures depends on various factors including the objectives and specificities of the GFR process, the sector or issue of focus, envisaged impacts of the reform and of potential mitigation options, stakeholder perceptions and government credibility. Different options for using revenues from GFR are summarised in Table 3 which is followed by some insights and lessons from practical experience in relation to recycling mechanisms and earmarking for specific expenditures.

Table 3: Overview of potential options for revenue use from GFR

Revenue use option	Strengths	Weaknesses
Tax shift	- Part of wider tax shifting programme - Can help with economy wide efficiency by allowing reduction in more distorting taxes (e.g. on labour) which can help stimulate growth, increase incentives for employment etc. - Help 'lock-in' GFR as any future change would require an increase in other taxes (IMF, 2012) - Allows overall tax burden to remain the same, thus avoid concerns of tax increase	- Only affects people who are working/pay taxes (except for VAT reductions which affects all) - Needs to be combined with additional measures to address regressivity concerns - Immediate benefits may be less clear than other options (see below), which can lead to less public acceptability
Raise revenues for general budget	- Allows flexibility in government spending to support different priorities including fiscal consolidation - Maintains rigour in budgetary allocation systems - Support fiscal consolidation needs	- May not be favoured by public as benefits are not visible, revenues disappear into 'black box' of government revenues with no way to track related expenditure - Against public perceptions that revenues from 'green' reforms should be used for environmental purposes
Recycle into economy or affected sector	- Can help transform a sector and maintain international competitiveness - Increase acceptance among affected sector/group, reducing transition costs - Revenue neutrality can help increase	- Limit signalling effect and incentives for change if not well designed - Should be time limited

	political acceptability as overall tax burden on the sector as a whole remains the same	
Earmarking (full or partial)	- Facilitate/catalyse innovation - Ease transition costs among affected group(s) - Ensure resources available for relevant activities (e.g. enforcement) - Can be useful way of building support including among the public which believes revenues from GFR should be used for environmental purposes	- Usually no relation between amount of revenue from GFR and the efficient amount of spending on a particular earmark - Can create distortions, lead to a prioritisation of certain spending over others - Once in place, may be difficult to reverse or revise - Creates obstacles and rigidities in the tax system - Conflict between revenue raising potential and achievement of environmental objectives - Legal obstacles to earmarking in some countries - Not favoured by finance/economic departments as it reduces flexibility in the public budget

Source: Own synthesis

Revenue recycling mechanisms include reductions in income tax rates, a reduction in social security contributions, lump-sum transfers to those who do not pay income tax or social security contributions but face higher bills such as pensioners, tax credits for households etc. While some consider there to be a potential trade-off between efficiency and equity as recycling revenues through lump sum transfers rather than a reduction in distortionary taxes is more inefficient and costly; other studies conclude that carefully designed revenue recycling mechanisms can both mitigate negative distributional effects and foster growth (OECD, 2014). Which recycling mechanisms are used and what share of revenues is distributed to different groups depends on the impacts of the GFR on particular sectors or groups and political considerations. Revenue recycling can be a useful way to increase the acceptability of GFR by industry – see Box 8 on Sweden (OECD, 2005).

Such mechanisms need to be carefully designed to ensure effective incentives and encourage due dynamics in the sector – see Box 12 on experience in Australia. Recycling mechanisms may also need to be revised in light of changes to tax rates over time, for example to maintain revenue neutrality or to ensure the system does not become regressive. This was for example the case in British Columbia (see Box 4) where according to Lee (2011), while the impact of the tax on lower-income households was initially fully offset by corresponding tax cuts and credits; successive increases in the tax rate have not been matched by sufficient increases in the low income tax credit and has resulted in an increasingly regressive carbon tax regime. This reflects the needs for regular monitoring and review to ensure such issues are identified and appropriate action taken.

Box 12: Lessons from the carbon tax experiment in Australia

A carbon tax was introduced in Australia in July 2012. The tax applied to the largest emitters and was to be replaced by a tradable permit system from July 2015; however it was repealed in July 2014. Although no longer in existence, the Australian carbon tax had a number of interesting mechanisms to mitigate impacts on vulnerable groups worth highlighting which may provide insights to others considering reform.

The system had rather detailed revenue recycling mechanisms to ensure the tax was revenue neutral. This included support for around eight million households through increases in pensions, allowances, family payments and income tax cuts. Businesses benefited from incentives to invest in cleaner energy programmes and shift to cleaner production processes. This support was targeted to 'emission-intensive trade-exposed' industrial activities, it was varied according to the degree of exposure of industries and was to be reduced by 1.3 per cent/year. It thus provided targeted assistance to the most affected sectors while ensuring due dynamics in the sector through a gradual reduction over time.

Despite this rather comprehensive package of compensating measures, the carbon tax was the target of major attack in the lead up to the national elections in 2013 with critics arguing it would lead to substantial job losses and costs for the economy (despite previous modelling results from the Treasury which suggested otherwise). Abolishing the tax was the central campaign pledge of the newly elected Prime Minister Tony Abbott. Political interests and a very strong mining lobby led to the eventual unravelling of the tax which was repealed by the Senate in July 2014. The tax has been replaced by a 'Direct Action Plan' which will offer competitive grants to companies voluntarily reducing emissions (BBC, 2014). This experience highlights the numerous political challenges facing GFR as well as the importance of building broad support and political capital for reform which transcends party-political lines and short-term electoral timelines.

Sources: Australian Government 2011 and 2012; Withana et al., 2013

Earmarking revenues (partially of fully) for specific purposes is another option for revenue use. For example in the Netherlands until 2003, 15 per cent of revenues from the energy tax were earmarked to reward purchases of energy-efficient appliances – see Box 7. Although earmarking is controversial given a number of economic efficiency arguments, it can be useful in some circumstances. For example the OECD (2005) and World Bank (2005) argue that despite concerns, partial earmarking of revenues from GFR 'may be a price worth paying' to ensure the financing of environmental monitoring and enforcement efforts, particularly in countries where such activities are underfunded, improve tax collections and build public support for the GFR – see Box 13 on experience in Columbia. Another use of revenues, particularly important in developing countries is to help improve government administrative capacities to implement the GFR measure and the supporting policy package including compensation measures.

Box 13: Waste water pollution charges in Columbia

A national discharge fee programme was established in 1993 with adoption of Law 99 which mandates Regional Autonomous Corporations (CARs) and Urban Environmental Authorities (AAUs) to apply retributive charges (tasas retributivas) on water effluents. Each region sets its own pollution reduction goals, applies national base charges, and tracks discharges for six months. The charge is applied progressively over five years, with increases every six months by pre-set amounts until the regional environmental quality objective is achieved. The programme has benefitted from successful collaboration between the regional environmental agencies, local businesses and communities. Funds raised from the charges are used by environmental authorities for environmental investments in industries and capacity building in environmental agencies.

Despite some problems (including limited implementation in many regions, noncompliance by municipal sewerage authorities), pollution discharges have dropped significantly in some watersheds since the program was introduced in 1997. In addition to incentivising emission reductions, the scheme has helped enhance transparency and accountability while the prospect of increased revenues from the charges has incentivised some local regulators to improve permitting, monitoring, and enforcement of wider water pollution related legislation. This has in turn boosted the effectiveness of pre-existing emission standards as well as the new discharge fees, thus highlighting benefits of such an approach.

Sources: Blackman, 2007; GTZ 2013; ECLAC/UNDP,2001 cited in World Bank, 2005

Revenues from GFR could also be used to support positive incentive schemes such as payments for ecosystem services, thus supporting wider environmental objectives – see Box 14. Where such an approach of (partial) earmarking of revenues from GFR is adopted, this needs to be carefully evaluated and designed with a clear target, level and timescale which take into account the needs and absorption potential among the target group or sector. Provisions should be regularly reviewed and adequate safeguards in place to ensure correct management and use of funds (OECD, 2005).

Box 14: Supporting forestry conservation in Mexico

In 2003, the Mexican government launched the hydrological environmental services (PSAH) programme which pays forest owners to conserve forests. The objective is to support watershed protection and aquifer recharge in forest areas that are important for water supply and at risk. Payments are made annually and are conditional on performance (CBD, 2011).

The programme is financed through an earmarked share of water use fees charged by the municipalities and channelled to the federal authorities. Initially this earmarking was to be based on 2.5 per cent of total revenues however it was later changed to a fixed amount which started at 200 million Mexican pesos (approximately USD 20 million) in 2003 and increased to 300 million Mexican pesos (approximately USD 30 million) in 2005 (Porras and Neves, 2006). This approach with earmarking based on a fixed amount of revenues reduced the possibility that the PSAH would benefit from future increases in water fees (Alix-Garcia et al., 2009).

This mechanism proved very popular and is generally oversubscribed; however impacts in terms of avoided deforestation have varied. Since its introduction, a series of weights for water scarcity, deforestation risk and poverty have been integrated in the application grading system to improve targeting and efficiency (CBD, 2011).

When considering the development of revenues from GFR over time, one should keep in mind the issue of ***revenue erosion*** which could be a concern from a finance perspective whereas from an environmental perspective a lack of revenue erosion could be a concern as it implies a limited environmental effect of the instrument in stimulating behaviour change. In the short to medium term, there are different measures which can help address possible shrinking revenues from GFR:

- ***Indexing rates to inflation*** for example as done in the Netherlands (see Box 7) where indexation of energy tax rates provides constant real incentives and support to avoid falling real tax revenues (European Commission, 2012).
- ***Dynamic development of rates*** for example through scheduled increases in the rates each year (i.e. ramping up rates to better reflect supply costs and environmental damages) and/or a broadening of the tax base (i.e. to cover more products) over time.

- ***Performance related indicator*** which links the increase in rates to performance against set targets. For example in Switzerland, if emission reduction targets are not met in a given year, a higher CO_2 tax rate is applied (Withana et al., 2013).
- ***Gradual reduction in exemptions and reductions*** over time to ensure positive incentives. Moreover, in some cases such provisions can be considered a harmful or ineffective subsidy needing reform (Oosterhuis and ten Brink, 2014).
- ***Mix of instruments*** for example one tax could be targeted at emissions and another on a less mobile tax base such as vehicle ownership or electricity.

These measures should be complemented with a ***monitoring system*** which takes into account developments with regard to affordability, changes in the tax base and external factors (e.g. events affecting energy security). This will allow an ambitious escalator to be set with options to reduce it depending on needs (e.g. if world prices rise above a certain threshold, the escalator would not be waved in that year) or where a rate increase is not needed (e.g. target has been met), thus helping to avoid political fall-out while offering clarity (Withana et al, 2013). This can form part of a ***formal review*** of the GFR to assess progress and needs for change in light of experience in implementation.

In the **long-term**, if environmental policies and instruments (including GFR) and technological innovations lead to a situation where many environmental challenges have been addressed and the shift to a low carbon, resource efficient and green economy has been achieved, this would lead to real downward pressure on revenues from GFR given the smaller tax base. If environmental progress of this scale is achieved, then the rationale for GFR will not be the same as it is today and new sources of government revenue will need to be explored. This is an issue for the longer term which should be carefully monitored and kept under review to ensure timely action when necessary (Withana et al., 2014).

3.4 Smart principles for the design and implementation of compensation measures

As discussed above, in certain cases, compensation measures are required to mitigate impacts of GFR and help overcome obstacles. These measures need to be carefully designed and monitored to ensure they achieve intended objectives and ensure that the costs of compensation programme do not spiral out of control (UNEP, 2004a). Careful design can also help avoid entrenchment of measures in the expectations of beneficiaries, thus making it easier for revisions in light of changing circumstances. Some general principles to guide the design and implementation of compensation measures are set out in Box 15 (building on Withana et al., 2013). To the extent possible, such measures should maintain a positive signalling effect, not undermine incentives and contribute towards overall objectives of the reform.

Box 15: Smart principles for the design and implementation of compensation measures

- Measures should be ***targeted*** at the most exposed or vulnerable groups. This could for example be energy-intensive industries that operate in a highly competitive market and in a sector with significant international trade. Criteria for granting exemptions (including definition of the target group) should be developed with tax authorities to ensure they are practical and enforceable.

- Measures should have a ***clear timeline*** including where relevant a schedule for progressive phase out (sunset clauses) specified upfront to avoid beneficiaries becoming 'hooked'.

- Develop measures in an ***open, participatory approach*** with key stakeholders to reflect concerns, ensure more effective measures and secure buy-in.

- Measures should be ***simple to administer*** and build on existing systems and procedures to the

extent possible. This will avoid the need for new administrative capacities and procedures which are costly and take time to set up.

- Exemptions should be ***gradually reduced or phased out over time*** towards a more restrictive system as such preferential treatment is understood to no longer be needed (e.g. capacity of the affected sector to absorb impacts improves through technological advancements).

- Use ***partial reductions*** rather than full exemptions to keep marginal incentives positive. This can help reduce the feeling of entitlement among beneficiaries, provide an opportunity to review provisions and maintain a positive signalling effect within target groups (e.g. boards and finance directors of companies).

- Exemptions (and other relevant compensation measures) should be ***linked to effective conditionalities*** such as specific agreements or general commitments which contain different elements such as audits, environmental management systems, and/or requirements for information flow. Conditionalities can be designed such that they are more demanding for more significant exemptions and less demanding for smaller advantages.

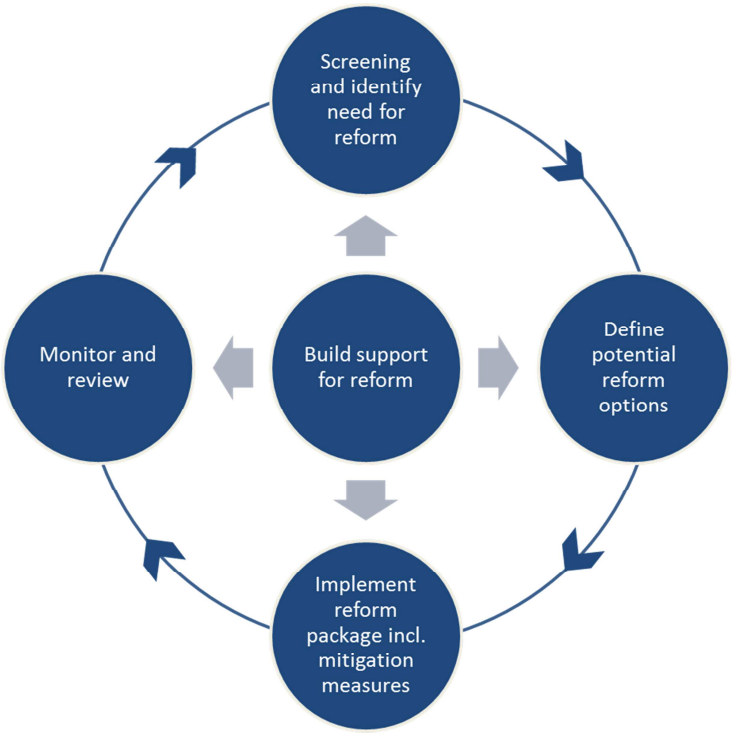
- Exemptions should have some sort of ***reporting agreement*** which requires beneficiaries to demonstrate the merits of the exemption (proof of effectiveness). This can help address information asymmetry, feed into evaluations and help authorities better understand the potential for future reform which is positive in terms of incentive effects and sensitive to industry realities.

- A ***monitoring and review system*** should be put in place to assess the effectiveness of measures (i.e. are they well targeted) and undertake revisions where necessary (i.e. increase tax rate, tighten eligibility criteria). This should include a review of the use of revenues to assess implementation of government commitments to reform (i.e. are revenues being spent as promised), reduce risk of fraud and corruption, maintain public support and trust in the process.

4 Strategies, approaches and tools to drive GFR

In addition to the compensation measures discussed in chapter 3, there are a number of other strategies, approaches and tools which can be used to overcome obstacles to GFR. These measures form part of a ***clear and comprehensive GFR strategy*** which encompasses all stages of the GFR policy cycle from initial screening and identification of the need for reform, defining potential reform options, building support for reform, implementing the reform and related mitigation measures to manage the transition, monitoring and review processes – see Figure 3. The strategy should have clear objectives and a timetable for reform; be presented as a comprehensive package of reform including complementary policies and measures to mitigate adverse impacts and ensure long-term sustainability; include an extensive communication campaign; and be prepared in close consultation with relevant internal and external stakeholders.

Figure 3: Stylised representation of GFR policy cycle



Source: Own representation

GFR processes should make use of relevant windows of opportunity to drive reform forward, link to wider policy commitments and processes at different levels and take into account the underlying context in the country including wider structural reform needs. Any GFR effort is part of a wider policy context and cannot be seen as separate or self-sanding. Moreover, efforts should be sustainable (economically, socially and environmentally) to avoid future reversals or set-backs. Thus, GFR processes should be comprehensive and have a long-term perspective, taking into account the broader policy environment, the complex interconnections and interdependencies therein and seek to contribute to wider policy objectives. These various elements are discussed in more detail below. They form part of a wider GFR strategy and can help overcome some of the obstacles to the process.

4.1 Processes and tools to support GFR

Before deciding on whether or not to undertake a GFR process there is a need to identify potential needs for GFR and priority areas for action at different levels. Such an assessment could begin with a more strategic process to identify the role and potential for GFR in the wider policy context. This was for example the approach taken in South Africa - Box 16. Such an approach could be helpful in developing a consistent overall fiscal policy framework to support wider sustainable development objectives (Schlegelmilch et al., 2010).

Box 16: Promoting a comprehensive and coherent approach to GFR in South Africa

In the early 2000s, the South African National Treasury launched a process to identify the role of economic instruments in supporting sustainable development. In 2003, the Treasury commissioned a study to identify criteria for developing and evaluating proposals on environmental taxes, which was financially supported by the UK Department for International Development (Speck, 2010). In 2006 the Treasury published a 'Draft Policy Paper: A Framework For Considering Market-Based Instruments To Support Environmental Fiscal Reform In South Africa' which sets out the preliminary thinking of the Treasury on current and possible future use of EFR in South Africa and aimed to facilitate an open and honest discussion on the issue (South African National Treasury, 2006). Studies analysing the impacts and potential of specific GFR designs were also undertaken by academics (Schlegelmilch et al., 2010).

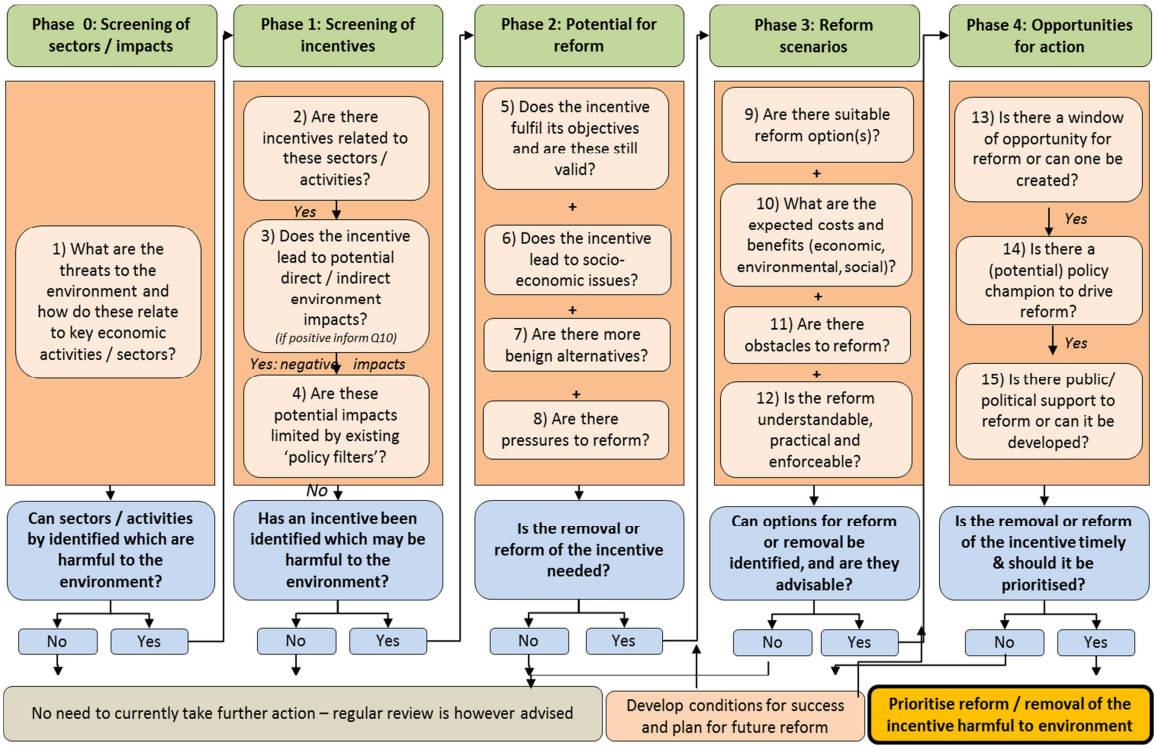
This process was followed by the introduction of a number of GFR related initiatives in the 2009/2010 Budget including an increase in the general fuel levy, an electricity tax, incandescent light bulb levy, air passenger departure tax and a plastic bag levy (Speck, 2010). This initial leadership and political support by the Treasury has been important in generating interest in GFR and supported implementation of a number of reforms (Speck, 2010). Recent efforts have focused on a waste water charges and carbon pricing with a carbon tax scheduled to come into effect in January 2016 at a rate of R120 (USD12) per tonne of CO_2, increasing by 10 per cent per year until the end of 2019 (World Bank, 2014).

Countries can also launch an assessment or screening of the status quo. For example in relation to subsidies, this could include identification of intended and unintended beneficiaries of the subsidy, the scale and impact of the existing subsidy, both in terms of its (lack of) effectiveness/efficiency and its negative social, economic and environmental effects (see for example van Beers and Jeroen, 2014). Such an assessment will help establish which subsidies are harmful and require action and are thus priorities for reform. This is by no means an easy task, however a number of quantitative and qualitative tools and approaches have been developed which can support this process. For example, OECD tools developed to support EHS reform include:

- ***Quick scan*** which *inter alia* shows that there is no direct linkage between the amount of and nature of support and the environmental impact (OECD, 1998);
- ***Checklist*** which enables the assessment of whether, given the circumstances, removal of a subsidy will benefit the environment (OECD, 2005a);
- ***Integrated assessment framework*** which includes a sustainability perspective and ensures that social and economic trade-offs are included in the assessment (OECD, 2007).

A subsidy reform flowchart developed by IEEP (ten Brink et al., 2012) for the UK Department for Environment and Rural Affairs (Defra) to help identify subsidies needing reform in the context of meeting Target 3 under the Strategic Plan for Biodiversity 2011-2020 is provided in Figure 4. This flowchart was piloted in the UK and builds on previous work by IEEP. It can be adapted to national priorities to provide an initial screening to identify potential focus areas and where more in-depth analysis is merited.

Figure 4: Subsidy reform flowchart



Source: Adapted from ten Brink et al., 2012, building on Valsecchi et al., 2009 and Lehmann et al., 2011

Such tools can be used to improve transparency of public expenditure and inform future GFR efforts. For example, the OECD tools could be used to establish transparent and comprehensive inventories of existing subsidies which could cover focus on one or more priority area(s) (e.g. transport), on a particular environmental problem and contributing factors (e.g. biodiversity and problems of eutrophication, wetland loss), on responding to legislative requirements or specific commitments (e.g. G20) (Withana et al., 2012). Such efforts could build on existing work to identify and quantify subsidies, which is particularly advanced in the area of fossil fuel subsidies. For example IMF (2014) provides estimates of revenue, health and environmental benefits of implementing corrective taxes on fossil fuels in over 150 countries which can inform and help prioritize reform efforts.

Countries could establish ***commissions or committees on (green) fiscal reform*** to help identify needs for action, potential reform options and proposals, engage stakeholders etc. Such commissions have been set up in a number of countries and in some cases have supported GFRs. For example in Portugal, the government established a 'commission to the reform of environmental taxation' in January 2014 to investigate the potential to shift the fiscal burden towards green taxation as part of wider discussions on addressing the fiscal consolidation challenge. The commission undertook extensive stakeholder consultations and its final report covered a number of issues including energy, transport, water, waste, urban and spatial planning, forestry and biodiversity. Some of the commission's proposals were subsequently taken up by the government and put forward in legislative proposals including a proposed tax on GHG emissions and a plastic bag charge. However some concerns have been raised about the ambition of the proposals, revenue recycling mechanisms and potential redistributive impacts (Soares, 2014).

Country efforts could ***be linked to international commitments*** (e.g. CBD, Rio+20) and regional processes (e.g. APEC, G20) to support the case for action (see section 4.6). Efforts could also be technically supported through ***external agencies and bodies*** including international bodies such as UNEP's Green Economy Advisory Service[7] to implement subsidy reforms; the GTZ-IMF-UNEP Green Fiscal Policy Network[8] which facilitates knowledge sharing on GFR; and the World Bank's Energy Subsidy Reform and Delivery Technical Assistance Facility[9] which supports countries in the design and implementation of subsidy reforms. County efforts could also be promoted through national agencies or civil society organisations. For example the UK government provided financial support for an initial study on ETR in South Africa – see Box 16. The focus of such efforts could be expanded to cover different types of reform (i.e. beyond fossil subsidy reform to reflecting externalities in taxes and charges applied) as well as supporting GFR across different sectors and areas (natural resources such as water, fisheries, forestry; waste, materials, biodiversity etc. Such external support should be carefully managed and reflect domestic circumstances to avoid allegations of 'undue external influence' which could be used as an avenue to mobilise groups against the process.

4.2 Design and implementation options

The timetable adopted to introduce a GFR is important and can help overcome some obstacles to the process. In a number of cases, a step-by-step or phased approach to GFR may be easier to implement (and face less obstacles) than a more sudden or immediate approach. For example one could start with low rates and progressively scale them up over time. This was the approach taken in British Columbia (see Box 4), where the carbon tax rate had four scheduled annual increases of CAD 5 (EUR 4) per tonne of CO_2. A gradual phasing-in of GFR allows actors time to change and can help reduce resistance to the process. While such a phased approach is attractive, it also has some shortcomings including the risk of backsliding or derailment of the process (particularly over longer timelines) where support for reform is not sufficiently broad and the reform lacks a clear long-term strategy – as for example in Indonesia in 2009 (see Box 11) and in Australia in 2014 (see Box 12).

In some cases a more rapid approach may be necessary, for example where there is significant political opposition and a gradual approach risks being derailed (GSI, 2013). There are some cases where such a swift reform has been successful, particularly when accompanied by a wider package of reform and economic transformation – see Box 17 on experience with reforming fisheries subsidies in New Zealand. There are however significant risks associated with such a sudden price hike - for example in Nigeria, an overnight increase in gasoline prices of 117 per cent in January 2012 led to mass public riots and the government had to subsequently scale back the price increase to 49 per cent (IMF, 2013a). Similarly in Bolivia, the government decision to end subsidies in 2010 (in an effort to reduce smuggling to neighbouring countries) led to an unexpected and sudden increase in prices by over 80 per cent. This led to widespread protests, with the government eventually reinstating subsidies (WEF, 2013 and UNEP/CBD/WGRI, 2014). These experiences illustrate that even a sudden GFR requires appropriate planning and communication to avoid reversals (World Bank, 2014a) and needs to be accompanied by a wider package of measures to ensure acceptability (see section 4.3).

The timing of the GFR is another important consideration which can help neutralise opposition. For example, one could introduce GFR at a time when its effects would be minimised such as in a summer period when heating costs are lowest or when fuel prices are falling (as is the case with falling oil prices today). This would help to mitigate impacts of higher prices from reform and reduce potential opposition. Another option could be to introduce it when the effects of inaction are

[7] http://www.unep.org/greeneconomy/AdvisoryServices/tabid/4603/language/en-US/Default.aspx
[8] http://www.greenfiscalpolicy.org/
[9] http://www.esmap.org/node/3043

particularly evident, for example in winter when the litter problem is most visible as was done with the introduction of a plastic bag charge in Ireland – see Box 19. One could also coordinate the GFR with other measures, for example increases in electricity tariffs in Uganda coincided with an expansion in grid capacity which helped build broad public acceptance for the reform (IMF, 2013).

The sequencing of GFR is important and can be a temporary measure to alleviate impacts on vulnerable groups. For example in the case of subsidies to fossil fuels, the reform process could start by focusing on those subsidies which benefit the rich most (e.g. subsidies to gasoline) while adopting a slower pace of reform for subsidies that are most important to the budgets of the poor (e.g. kerosene) – see Box 5. This should however only be considered a short-term or temporary solution as large price differentials between different types of fuels could lead to distortions such as the redirection of subsidised kerosene to the transport sector and/or an increase in cross-border smuggling (GSI, 2013).

Another option related to the design and implementation of GFR which could help improve acceptance of the reform could be to implement a pilot scheme or a test programme of the GFR. Such an approach would enhance transparency and provide an indication of expected effects of the reform, as well as providing the opportunity to revise and fine-tune the reform before its more widespread implementation. Such an approach was for example adopted when introducing a congestion charge in Stockholm, Sweden, which was implemented on a permanent basis from August 2007 after a seven-month trial period (De Borger and Proost, 2012).

4.3 GFR as part of a wider reform package and policy context

Another option to help overcome obstacles to GFR is presenting it as part of a wider package of reform (e.g. major tax reform) accompanied by a range of complementary policies and measures which seek to alleviate some of the adverse impacts of the reform and create opportunities for affected groups for example in terms of future employment and income prospects – see Box 17 on experience from New Zealand. Making GFR part of a wider reform package which includes compensation mechanisms and complementary policies can help ease transition costs of reform and potentially also contribute to the long-term sustainability of the reform (Lehmann et al., 2007).

GFR could be part of wider efforts to reduce distortions in the economy and correct market price signals to better reflect externalities. In relation to fossil fuels, this could for example include depoliticising energy price setting through increased independence and transparency, establishing automatic price adjustment mechanisms, delegating decisions on pricing to an independent body and over the longer-term moving towards a fully liberalised pricing structure (IMF, 2013). It could also entail investments in substitution possibilities which support the reform, for example the development of public transport systems – see Box 3 on Ghana.

Box 17: Reforming fisheries subsidies in New Zealand

New Zealand undertook a major reform of its fisheries policy in the late 1980s. The reform was justified on the basis of a fiscal crisis facing the government which required cuts in public expenditure across different sectors (CBD, 2011). Subsidies to the fisheries sector were eliminated abruptly, virtually overnight. However the reduction was combined with more fundamental changes to the fisheries management regime which dampened the effect of the subsidy removal. The wider reform package included the introduction of a rights-based management system and individual transferable quotas (ITQs) combined with a minimum buy-out of existing rights from fishermen. These complementary measures helped create a sustainable fishing sector by giving those actors wishing to remain in the sector an opportunity to create a profitable environment, while allowing those who wished to leave the sector to be bought out.

The package of measures helped avoid potential negative social and environmental impacts of the sudden removal of the subsidies and increase public acceptability of the reform. The subsidy removal and introduction of the new management regime contributed to more effective management of fish stocks and in some cases a recovery of certain stocks from overexploitation (CBD, 2011).

Sources: CBD, 2011; Lehmann et al., 2007; OECD, 2007; ten Brink et al., 2014

It is also useful to **link GFR to wider policy commitments and processes at different levels**. For example in France work to identify and analyse biodiversity-harmful incentives (including a report by the Committee to Evaluate Tax Expenditures and Social Security Contribution Exemptions and a report by the Strategic Analysis Centre on government subsidies harmful to biodiversity) were launched in the context of the wider Grenelle de l'environnement process. This helped maintain momentum and focus on the issue as it was anchored in a wider programme of work which led to the adoption of legislation in the Grenelle 1 and Grenelle 2 (Withana et al., 2012). GFR commitments can also be framed in relation to commitments at the regional level (e.g. G-20, APEC, EU), or international level (e.g. in the context of the CBD) which can help increase pressure for action on policy-makers, build the case for reform and overcome resistance.

When developing GFR strategies it is important to take a comprehensive approach which includes consideration of wider impacts, including unintended effects across sectors and groups as well as impacts over time. For example promoting GFR for certain purposes, e.g. to meet short-term fiscal consolidation challenges, should keep in mind wider impacts including on vulnerable groups to ensure the process is sustainable. The wider context is also important in identifying potential unintended effects of GFR, for example in terms of substitution effects where higher prices for energy could lead to poor households in developing countries substituting kerosene with wood which leads to deforestation and adverse impacts on health. Such unintended effects could be mitigated through complementary policies such as incentives to shift household behaviour, for example as in Indonesia with incentives to shift from kerosene to low-cost LPG – see Box 11.

GFR should be linked to wider structural changes and efforts which in some countries may relate to efforts to build credibility and trust in the government as well as efforts to strengthen implementation and enforcement capacities. Trust in government is for example considered one of the factors underlying the success of ETR efforts among Scandinavian countries. Addressing issues of corruption and governance could be an important entry point for reform efforts in some countries. This is by no means a trivial task. It encompasses multiple dimensions and challenges which are at the core of the debate on international development including how to improve good governance, enhance transparency and accountability, build administrative capacities, engage stakeholders etc. The tools and strategies to support GFR (as discussed in preceding sections of this report) can support these different elements, for example encouraging communication and stakeholder dialogue, building administrative, implementation and enforcement capacities through careful revenue use, supporting objectives of budgetary transparency and more efficient use of public funds etc. GFR can thus be seen as a process to support wider structural change and governance reform – see experience in Cameroon Box 18.

Box 18: Forestry reform in Cameroon

The forestry sector is an important contributor to the economy of Cameroon accounting for a large share of employment and export earnings. Corruption was endemic in the sector with estimated lost revenues of over USD 100 million each year from illegal logging and low rent collection. In the late 1990s, the government initiated a number of transparency and governance reforms in the forestry sector to improve

its international credibility (which was facing pressure over corrupt practices) and also increase fiscal revenues from the sector. The reform included the participation of independent observers in the process of bid evaluation and commissioning of concession award; of independent observers in field control operations; a system of guarantees to ensure forest taxes are paid in full and on time; and public availability of records of crimes against forestry observers (OECD, 2005; World Bank, 2005).

The reform was driven by the Ministry of Finance which was interested in collecting increased revenues from the sector. The publication of data on lost revenues from the sector also helped the government build support for the reforms. The reform successfully engaged a number of key stakeholders including environmental agencies, NGOs, civil society, different ministries and external observers (OECD, 2005; World Bank, 2005).

The reforms increased revenues from the sector (from about USD5 million to USD50 million per annum in fiscal revenues to the state, and from close to zero to USD9 million per annum in fiscal revenues to local governing bodies from1994-2002) (OECD, 2005; World Bank, 2005). The reforms have also led to substantial environmental improvements including a well-conserved forest resource, helped contain deforestation, improved and internationally recognized forestry management practices. It has also increased recognition of customary rights and the social welfare contributions from forest resources as well as encouraged collaboration between forest institutions and civil society and improved forest governance and transparency (Topa et al., 2009).

4.4 Communication and engagement

Building support for the GFR is critical to ensure the success of the process and requires a strong strategy for communication and engagement targeted at specific actors both **externally** (with key stakeholders, interest groups, wider public, parliamentarians) and **internally** (between different government departments to ensure consistent messaging and a 'whole of government' approach). This needs to be integrated throughout the GFR process from:

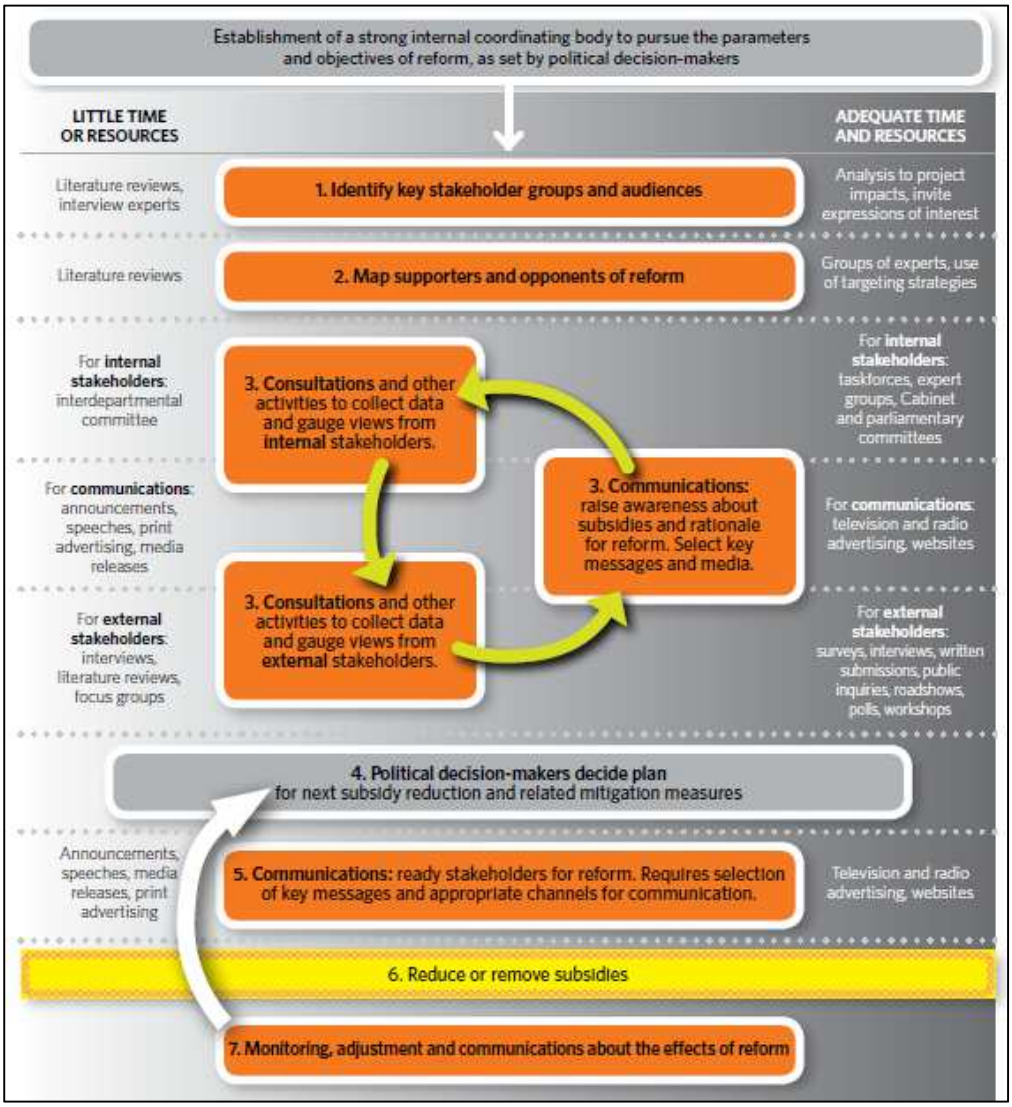
- Identifying the need for reform (i.e. clarifying who benefits from the status quo including unintended beneficiaries such as smugglers),
- Likely impacts of reform and potential mitigation options,
- Design of the process including mitigation measures,
- Implementation, review and follow-up including how revenues from GFR are used.

Effective communication and stakeholder engagement can help increase awareness of the problem and the benefits of GFR, neutralise potential opposition to the process and build broad political and public support which can help drive GFR forward. For example an IMF review of experiences with subsidy reform in 40 countries between 2002 and 2006, found that the likelihood of success almost tripled with public support and an engaging public communications campaign (IMF, 2011). Communicating an early commitment to compensate vulnerable groups can also help generate goodwill (World Bank, 2014a).

There is also a need for ex-post assessments of experiences with GFR to show the actual impacts and benefits of reform. Such assessments can engage the academic community and can be used to identify insights on specific factors of the design and implementation of GFR that affect the efficiency and effectiveness of the process. Similarly it can highlight lessons from experiences that did not go as planned. Such assessments can provide useful proof that GFR works and how, providing valuable input to policy-makers considering GFR, and building broad support among the public by showing that other countries have already successfully undertaken similar reforms.

Figure 5 sets out key steps in a communication and engagement strategy for both internal and external stakeholders and potential tools which can be used depending on available resources. This flowchart has been developed by the Global Subsidies Initiative (GSI) and is focused on fossil fuel subsidy reform; however it includes a number of common elements and tools which are relevant to wider GFR processes.

Figure 5: Developing a communication and engagement strategy for fossil fuel subsidy reform



Source: GSI, 2013

In terms of **external communication and messaging**, using a positive narrative on the overall benefits and expected outcomes of the GFR can be a powerful mechanism to build support for the process. Similarly, cases of successful reforms can be useful to illustrate that reform can work and how. Progress in one sector or one country creates a precedent and may help generate momentum for change in other countries (Withana et al., 2012).

It is important to carefully target and develop communication strategies for specific groups, use a variety of media and frame or repackage messages for different audiences, while remaining

coherent and consistent in overall messaging. GFR in itself is a rather dry concept which few people would relate to. Thus, it is important to frame messages on GFR in relation to the concrete benefits/impacts it will have on people's everyday lives. These messages should focus on the objectives of the reform, overall benefits to society, including those beyond the environment, e.g. impacts on the economy, health, public budget etc., and how those adversely affected by the reform will be supported. One could also develop synthetic 'myth-busting' facts e.g. on energy poverty, real beneficiaries of subsidies (e.g. a small group of elite, smugglers) which could build public support.

Being transparent on the distribution of benefits and costs, winners and losers, intended and unintended effects of the reform can allow an honest, balanced discussion of pros and cons. Telling stories about the 'winners' of reform could help generate support for reform for example the GFR could lead to improved service provision and expanded coverage of the electricity network. One could also draw on examples in other countries which have successfully implemented GFR, or have managed to do without the subsidy in the first place. The government's approach to introducing a plastic bag charge in Ireland highlights the importance of good communication and engagement – see Box 19.

Box 19: Plastic bag levy in Ireland

The Irish plastic bag levy was introduced in 2002 with the aim of reducing consumption of disposable plastic bags, reduce the presence of plastic bags in the landscape and increase public awareness of littering. The levy was introduced at a rate of EUR 0.15 per bag in March 2002 and increased to EUR 0.22 from July 2007. Revenues from the levy are earmarked to an environment fund which is used to cover the administrative costs of the levy and to support waste management, recycling centres, litter clean-up and other environmental initiatives.

Following its introduction, plastic bag use fell from an estimated 328 bags per capita before the introduction of the levy in 2002 to 21 bags per capita at the end of 2002. Following this reduction, however, there was a slight increase in plastic bag usage to 33 bags in 2007 which was countered by an increase in the levy in July 2007 and led to a reduction in usage to 14 bags per capita in 2012.

In preparing legislation for the levy, the then Irish Environment Minister ensured close collaboration between various arms of government and was influential in ensuring a robust legislative and regulatory base for the levy. The government undertook extensive advance consultation on the design and implementation of the scheme with the general public, the Irish Business and Employers' Confederation, and leading retailers. This helped increase support for the levy. A national publicity campaign reiterated the message that revenues from the levy would be used for environmental purposes which helped address concerns among retailers that they would be blamed for profiting from the levy. The levy was also introduced at the end of the winter, when littered plastic bags are especially visible, as there is little vegetation.

Sources: Convery et al, 2007; GTZ, 2013; Lyons, 2013; O'Connell, 2013; Withana et al. (2014)

There is also a need for **internal communication and engagement** within government. In some cases, the interests of different departments may be aligned, e.g. budget savings, while in others they may not be, e.g. agriculture and transport. Thus there is a need for wider consultation and engagement to secure support for the process across relevant government departments. This could for example entail setting up a cross-departmental working group/task force to carry the reform forward and ensure momentum is kept up (Withana et al., 2012). Cooperation between different government departments can help ensure the successful implementation of a GFR process, as for example seen in Cuba - see Box 20.

Box 20: Havana Bay User Tax in Cuba

Since 2002, the Cuban government has applied a tax on all users of Havana Bay. The tax covers tourism, recreation, and commercial activities which impact on the harbour. The tax rate is calculated based on use of the entrance channel to the harbour and use of the shore including use of harbour infrastructure. Revenues from the tax (estimated to be 1.6 to 2.6 million Cuban Nonconvertible Pesos (CUP) per year) are earmarked to an environmental fund which finances clean-up activities in the Bay (CBD, 2011 and Garrido, 2009).

The tax was designed and promoted by an inter-ministerial group established to clean-up Havana Bay. The "Grupo Estatal para el Trabajo (GET) de Saneamiento de la Bahía de la Habana" helped coordinate efforts of the ministries of transport and environment (CITMA) and the Havana city government. This high-level of coordination between economic and environmental policy-makers is considered an important factor which led to the successful introduction of the tax. The work of the group was supported by experts from ministries of economy, finance and environment which carried out relevant studies, prepared the proposed tax and supported its implementation (Garrido, 2009).

The tax has helped reduce emissions of industry effluent by 50 per cent and has led to the recovery of the ecosystem including reappearance of fish and phytoplankton species in the Bay. Building on this success, the government has introduced similar taxes in other Cuban bays including Matanzas Santiago de Cuba, Cienfuegos and Mariel, it has also increased the tax rate applied, expanded the number of users covered by the tax and introduced an additional payment for waste water spill in watersheds and in selected bays (CBD, 2011 and UNEP/CBD/WGRI, 2014).

4.5 Monitoring and review

The impacts of GFR can change over time, thus it is important to regularly review the process to reassess impacts over time and ensure mitigation measures are indeed effective, i.e. reaching their intended beneficiaries and achieving set objectives (UNEP, 2011). Regular and transparent reporting on progress on GFR is essential to determine the effectiveness of the process and inform future revisions to the instrument. It can also help maintain the commitment to reform and keep up momentum by ensuring regular communication and visibility of the issue. For example in China, the Pollution Levy System (PLS) which has been in place since the late 1970s is regularly monitored and amended in light of identified shortcomings. In the early 2000s, despite raising significant revenues for enforcement activities of local environmental protection agencies, the system was not considered effective as rates applied were too low and were not promoting behaviour change or reduced emissions across the economy. In light of these shortcomings, the system was revised in 2003 to cover a larger tax base and higher rates were introduced (World Bank, 2005). However, despite the reforms, rates are still considered too low to incentivise pollutant abatement (Xu, 2012). Given continuing challenges of water pollution, water scarcity and waste; the government is considering further revisions to the system and the introduction of several environmental taxes to cover resource extraction, discharges of polluted water and CO_2 emissions (GTZ, 2013).

Monitoring and reporting of GFR can be done at different levels, for example:

- At the ***national level*** revenues raised and revenue use should be monitored to assess implementation of government commitments to reform, reduce risk of corruption, review the need to change mitigation measures (e.g. as revenues decline, behaviour changes, technology improves) or design of the instrument (e.g. increase tax rates, widen tax base) over time. Being transparent on how revenues from GFR are used and how compensation measures are implemented can maintain support for the process, strengthen accountability and help build trust in the government (which can be useful for future reform processes). A

number of countries have set up fiscal 'watchdogs' to provide independent analysis of public finances, for example the Office of Budgetary Responsibility in the UK, the Parliamentary Budget Officer in Canada, the Mexican Centre for Public Finance Studies, Parliamentary Budgetary Office in Georgia etc.[10] Such organisations can be used to provide independent reviews of the use of revenues from GFR to ensure spending commitments are upheld, ensure transparency, avoid potential issues of fraud or backsliding on reform commitments.

- At the ***regional level*** voluntary peer-review processes have been initiated under the G20 and APEC in relation to commitments to review, rationalise and phase out inefficient fossil fuel subsidies. China and the US have been the first countries to volunteer to undergo such a process in the G20; among the APEC countries Peru and New Zealand have been the first volunteers (FFFSR, 2014). In the EU, regular reporting by the 28 Member States under the European Semester process of economic governance is being used as an avenue to drive forward reform including GFR in a number of countries (Withana et al., 2013a).

- At the ***international level,*** reporting could build on efforts to monitor progress on relevant international commitments. For example the latest Conference of Parties (COP 12) of the CBD calls for regular reporting by Parties on progress on Aichi Biodiversity Target 3, setting out a clear timeline and milestones for action (UNEP/CBD/COP, 2014). These reports to the CBD Executive Secretary could be used as a mechanism to monitor and review a country's GFR efforts in the area of biodiversity and progress in light of international obligations. One could also make use of developments in relation to wider reporting frameworks such as the development of the UN System of Environmental and Economic Accounting (SEEA).

4.6 Windows of opportunity

Smart use of potential windows of opportunity could provide wider justification for GFR and help ensure the success of reform efforts. For example the ***current economic context and pressing needs for fiscal consolidation*** given high levels of public debt seems to be a particularly pertinent window of opportunity for taking GFR forward. A number of countries in Europe including Italy and Portugal have taken advantage of this window, using it to drive forward a number of interesting GFR-related initiatives at the national level in the past few years (Withana et al., 2014). Thus, a crisis (such as an economic or financial one) can be a useful trigger to mobilise action. However in some situations a crisis can also prompt countries to stall or backtrack on reform commitments, for example as seen in Ghana in 2008 where subsidy reform was put on hold due to escalating oil prices - see Box 3.

Several windows of opportunity are evident at the ***national level***. This could for example include taking advantage of a post-election period (e.g. India – see Box 10), a period of economic growth, pressures such as deteriorating public energy or water infrastructure, dwindling national energy reserves (e.g. Indonesia - Box 11). The recent steep decline in oil prices provides a conducive environment to launch carbon pricing mechanisms (Financial Times, 2015) and reform fossil fuel subsidies with some countries such as Indonesia (see Box 11) already taking advantage of this opportunity. Such efforts need to be well planned and based on a comprehensive strategy and timeline to ensure they are not reversed when times change. Addressing issues of corruption and governance could also be an important entry point for reform efforts in some countries (e.g. Cameroon – see Box 18).

Commitments made at the ***regional or international level*** can also be seen as useful windows of opportunity for action to support and drive GFR efforts. For example windows could be framed in

[10] http://budgetresponsibility.org.uk/links/#overseas

relation to commitments adopted at Rio+20 Conference (e.g. on fisheries subsidies), in the context of financing commitments on mobilising financing for biodiversity and climate change adopted at the CBD and UNFCCC, or in the context of emerging commitments such as the post-2015 Sustainable Development Goals.

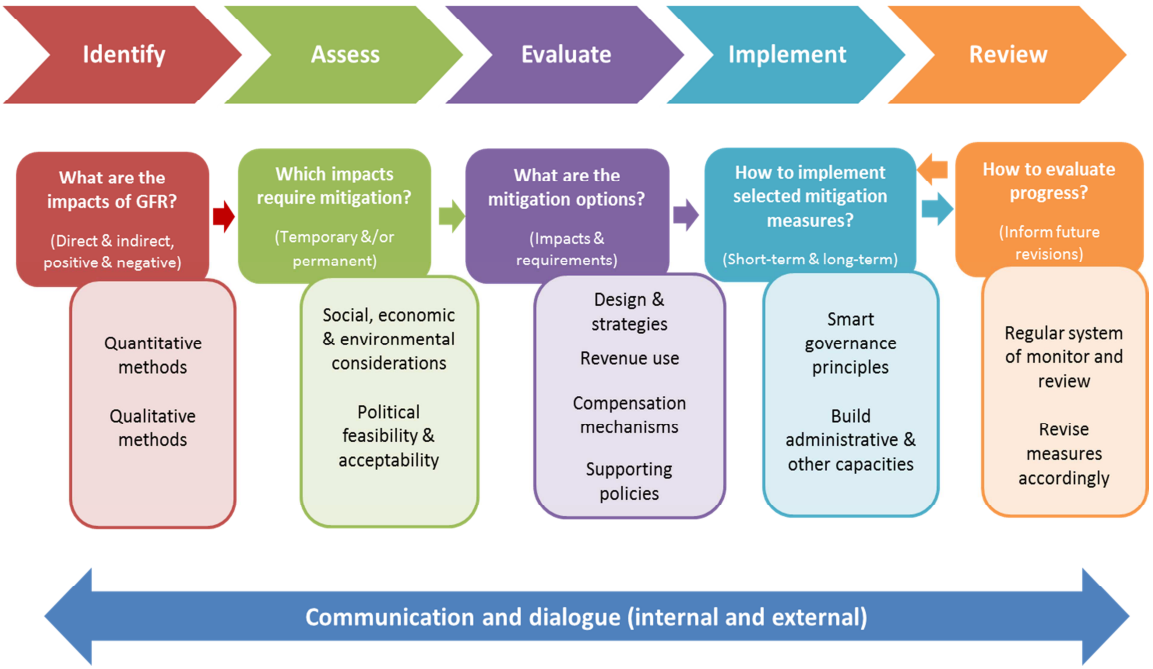
It is also possible to create ***new windows of opportunity and avenues for progress*** on GFR. For example in the EU, the launch of the European Semester process in 2010 provides a new and potentially powerful mechanism to monitor Member States' progress on various issues, including GFR and recommend improvements in this regard (Withana et al., 2013a). A future avenue for progress could appear in a possible revision of the Regulation on European Environmental Economic Accounts No. 691/2011 (which has already started to provide useful data including on environmental taxes and subsidies in EU Member States) to include an additional modules on 'Environmentally Related Transfers (Subsidies)' (ten Brink et al., 2014b).

5 Moving forward with GFR

GFR can lead to multiple benefits and has attracted renewed interest in recent years driven by a number of environmental, economic and social considerations from the need for fiscal consolidation, to addressing environmental challenges, alleviating energy security concerns and supporting poverty reduction. Further progress is often held back by various obstacles which include competitiveness and distributional concerns, lack of transparency, information, legal, administrative and technological constraints as well as wider governance challenges including a lack of support and trust in the government. This scoping paper has examined how obstacles to GFR can be overcome through the use of targeted and well-designed mitigation measures for vulnerable firms or sectors and households, careful use of revenues, and complementary strategies and tools. It has focused not so much on the 'why' countries should explore GFR but rather on the 'how' to best do so in order to maximise associated benefits and minimise or avoid potential adverse impacts of GFR.

As elaborated in this paper and illustrated from practical experiences with GFR in a number of developed and developing countries, well-designed mitigation measures can help overcome some obstacles to GFR. A synthesis of key steps in the identification, design and implementation of mitigation measures for GFR is set out in Figure 6. It is important that selected mitigation measures are carefully designed in line with good governance principles (see Box 15) to ensure that they are effective and efficient, maintain a positive signalling effect and contribute to overall objectives of the reform. This paper seeks to provide general insights on overcoming obstacles to GFR building on practical experiences in a number of countries which can be applicable across a number of sectors and areas. It is of course important to keep in mind that a 'one-size-fits-all' approach is not appropriate and there is a need to tailor GFR approaches to national circumstances, interests and priorities.

Figure 6: Identification, design and implementation of mitigation measures for GFR



Source: Own representation

As reiterated throughout this paper, preparation and careful planning are critical to GFR efforts. There is a need to adopt a comprehensive, integrated and consultative approach to reform which reflects good governance principles with clear objectives and a timeline. GFR is a slow, dynamic evolving process given the time it takes to prepare, build support for and implement a given reform. Thus, to be robust and sustainable, GFR requires a strong and broad commitment to the process in the short, medium to long term. There is also a need to be pragmatic in the approach to GFR, allowing for deviations from theoretical ideals (e.g. no earmarking, avoiding the use of exemptions or compensation measures), as such departures are likely to be inevitable and may be a politically expedient way of making progress. Such provisions should be tolerated provided they are well-designed with adequate safeguards in place including regular monitoring and review mechanisms (World Bank, 2005).

However, the political challenges of reform remain significant and sometimes despite good intentions and due processes, GFR efforts fail or decisions are reversed. A striking recent example of this is the case of Australia where the government repealed the carbon pricing mechanism (see Box 12). In other countries, governments have back-tracked on reform commitments in light of political circumstances for example before an election as in Ghana (see Box 3) or in the face of mass protests as in Nigeria. These cases highlight the importance of building broad support and political capital for reform which transcends party-political lines and short-term electoral timelines. Durable reform also depends on government credibility and the independence of relevant bodies including those responsible for pricing decisions. GFR thus links to wider structural changes and good governance. This is by no means a trivial task and encompasses multiple dimensions and challenges. However, the tools and strategies for GFR can contribute to these wider processes (e.g. encouraging communication and stakeholder dialogue, building administrative capacity, improved implementation and enforcement capacities, supporting objectives of budgetary transparency and more efficient use of public funds), and thus can be seen to support wider structural change and governance reform in a country.

In some cases, a country's efforts on GFR have been hindered or complicated by a lack of action in others given concerns about the unilateral introduction of measures, particularly in relation to impacts on competitiveness. Thus, in certain cases some form of cooperation and coalitions between groups of countries can help build political and public support for reform (Withana and ten Brink, 2015). Lessons from past experience suggest that such cooperation is likely to be more feasible between smaller groups of countries (e.g. neighbours or a regional grouping facing a common challenge) and when the adopted approach allows a certain degree of flexibility among participating countries (e.g. setting minimum requirements) as this may be more politically palatable.

GFR is recognised as an important enabling condition in the transition to a green economy (UNEP, 2011; ten Brink et al., 2014a) and can help address market failures and stimulate change. Additional research on impacts of GFR including on competitiveness, innovation, jobs, as well as insights on design and implementation can further support the case for GFR. There is also a need to better understand the role of GFR in the wider policy mix as GFR is not a panacea or 'silver bullet'. Identifying the scope and space for action through GFR will help focus future efforts. GFR is one, albeit important, element of the wider policy mix needed to support the transition to a green, inclusive global economy. Finally, there are several attractive windows of opportunity to further promote the GFR agenda including current falling oil prices. Some countries are already seizing these windows of opportunity and creating new avenues to promote GFR; others should follow their lead.

6 References

Albrizio, S., Botta, E., Koźluk, T., Zipperer, V., (2014), Do environmental policies matter for productivity growth? Insights from new cross-country measures of environmental policy, OECD Economic Department Working Papers No. 1176, OECD 2014.

Alix-Garcia, J., de Janvry, A., Sadoulet, E., Manuel Torres, J., (2009), 10 Lessons Learned from Mexico's Payment for Environmental Services Program, Payment for Environmental Services in Agricultural Landscapes in Natural Resource Management and Policy Volume 31, 2009, pp 163-188

Anand, R., Coady, D., Mohommad, A., Thakoor, V., Walsh, J.P., (2013), The Fiscal and Welfare Impacts of Reforming Fuel Subsidies in India, IMF Working Paper Asia and Pacific Department, WP/13/128, International Monetary Fund 2013

Arze del Granado, J., Coady, D., Gillingham, R., (2010), The Unequal Benefits of Fuel Subsidies: A Review of Evidence for Developing Countries, IMF Working Paper, WP/10/202, International Monetary Fund 2010.

Associate Parliamentary Sustainable Resource Group (2013), 'Exporting Opportunity? Putting UK waste to work at home and abroad'. URL http://www.sita.co.uk/downloads/APSRG-ExportingOpportunityReport-web.pdf [accessed 23/04/2014].

Australian Government (2011), Securing a clean energy future: The Australian Government's climate change plan in summary, Commonwealth of Australia 2011, http://www.cleanenergyfuture.gov.au/wp-content/uploads/2011/07/securing-a-clean-energy-future-summary.pdf [accessed 12/3/2013].

Australian Government (2012), An overview of the Clean Energy Legislative Package, http://www.cleanenergyfuture.gov.au/wp-content/uploads/2012/05/CEF-overview_Apr2012.pdf [accessed 13/3/2013]

BBC, (2015), 'Brent crude oil price dips below USD 50 a barrel', 7 January 2015, http://www.bbc.com/news/business-30707638, [accessed 7/1/2015]

BBC, (2014), 'Australia votes to repeal carbon tax', 17 July 2014, http://www.bbc.com/news/world-asia-28339663 [accessed 15/01/2015]

Bassi, S., Pallemaerts, M. and ten Brink, P. (2010), 'Exploring the Potential of Harmonizing Environmental Tax reform Efforts in the European Union', in C. Dias Soares, J.E. Milne, H. Ashiabor, L. Kreiser and K. Deketelaere (eds.), *Critical Issues in Environmental Taxation – International and Comparative Perspectives Volume VIII,* New York: Oxford University Press.

Blackman, A., (2007), Colombia's Discharge Fee Program - Incentives for Polluters or Regulators?, Discussion Paper, October 2007: RFF DP 05-31 REV, Resources for the Future, http://www.rff.org/rff/Documents/RFF-DP-05-31-REV.pdf [accessed 22/11/2014].

British Columbia Ministry of Finance (2013), Carbon tax review and carbon tax overview, http://www.fin.gov.bc.ca/tbs/tp/climate/carbon_tax.htm [accessed 3/3/2013]

British Columbia Ministry of the Environment (2012) Making Progress on B.C.'s Climate Action Plan http://www.env.gov.bc.ca/cas/pdfs/2012-Progress-to-Targets.pdf [accessed 4/3/2013]

Bruvoll, A., and Vennemo, H., (2014), Reform of environmentally harmful subsidies: distributional issues, Chapter 12 in *Environmentally Harmful Subsidies and their Reform*, F. Oosterhuis and P. ten Brink (eds.), Edward Elgar Publishing, Cheltenham, UK and Massachusetts, USA.

CBD (2011), Incentive measures for the conservation and sustainable use of biological diversity - Case studies and lessons learned, Secretariat of the Convention on Biological Diversity, Montreal.

Coady, D., Newhouse, D., (2006) GHANA - Evaluating the Fiscal and Social Costs of Increases in Domestic Fuel Prices, In A. Coudouel, A.A. Dani and S. Paternostro, Poverty and social impact analysis of reforms: Lessons and examples from implementation, Chapter 11, pp. 387-413, World Bank: Washington DC, http://siteresources.worldbank.org/INTPSIA/Resources/490023-1120841262639/ch11_ghana.pdf [accessed 7/1/2015]

Convery, F., McDonnell, S. and Ferreira, S. (2007) 'The Most Popular Tax in Europe? Lessons from the Irish Plastic Bags Levy'. In: Environmental and Resource Economics, Vol. 38, No. 1, pp. 1-11

Cox, W., M., Alm, R., (2008) *Creative Destruction,* The Concise Encyclopaedia of Economics. David R. Henderson, (ed.). Liberty Fund, Inc. 2008, Library of Economics and Liberty [Online] available from http://www.econlib.org/library/Enc/CreativeDestruction.htm [accessed 8/1/2015]

De Borger, B., and S. Proost (2012), A political economy model of road pricing. *Journal of Urban Economics* 71, pp. 79-92

Duscha, M., Seebach, D., Grießmann, B., Rath, U., Thomas, S. (2005) 'Politikinstrumente zum Klimaschutz durch Effizienzsteigerung von Elektrogeräten und -anlagen in Privathaushalten, Büros und im Kleinverbrauch', Endbericht im Auftrag des Umweltbundesamtes (FKZ 201 41 137). Institut für Energie- und Umweltforschung (IFEU): Heidelberg.

EEA (2013), Assessment of cost recovery through water pricing, EEA Technical Report No 16/2013, European Environment Agency, Copenhagen.

EEA, (2011), Environmental tax reform in Europe: implications for income distribution, EEA Technical Reports No 16/2011, European Environment Agency, Copenhagen.

Ekins P. and S. Speck (2012) Impact on competitiveness: what do we know from modelling? in Milne, J., and Skou Andersen, M., (Eds.) (2012) Handbook of Research on Environmental Tax Reform, Edward Elgar, Cheltenham/Massachusetts.

Eunomia and Aarhus University (2014), Study on Environmental Fiscal Reform Potential in 12 EU Member States - Final Report to DG Environment of the European Commission, 28/02/2014, http://ec.europa.eu/environment/integration/green_semester/pdf/EFR-Final%20Report.pdf

Eunomia, Aarhus University and IEEP (2015), Study on Environmental Fiscal Reform Potential in 14 EU Member States – Final Report to DG Environment of the European Commission, Forthcoming

European Commission (2014), Taxation and Customs Union - European Commission proposes to overhaul energy taxation rules, http://ec.europa.eu/taxation_customs/taxation/excise_duties/energy_products/legislation/index_en.htm [accessed 12/1/2014]

European Commission (2013) Tax reforms in EU Member States 2013 - Tax policy challenges for economic growth and fiscal sustainability, DG TAXUD Working Paper No. 38 – 2013.

European Commission (2013a), 'Taxation Trends in the European Union: Data for the EU Member States, Iceland and Norway', Eurostat Statistical Books, Luxembourg.

European Commission (2012) *Tax reforms in EU Member States: Tax policy challenges for economic growth and fiscal sustainability*, 2012 Report. Taxation papers working paper series N34, DG TAXUD.

FFFSR (2014), Roundtable on Fossil Fuel Subsidy Reform April 11, 2014, Organised by Friends of Fossil Fuel Subsidy Reform, United States and World Bank, White House Conference Center, 726 Jackson Place, NW, Washington, DC, Summary of Presentations and Discussion, Available at: http://www.mfat.govt.nz/fffsr/tabs/events.php [accessed 24/11/2014]

Financial Times (2015), 'Let this be the year we put a proper price on carbon', Comment by Lawrence Summers, Monday 5 January 2015, Financial Times, http://www.ft.com/cms/s/2/10cb1a60-9277-11e4-a1fd-00144feabdc0.html#ixzz3O7jnblee [accessed 7/1/2015]

Fischer, C., Morgenstern, R., (2009) US industry and cap-and-trade: Designing provisions to maintain domestic competitiveness and mitigate emissions leakage, Policy Brief 09-06, Brookings Energy Security Initiative.

Garrido, R., (2009), The Cuban environmental policy – experiences on positive measures for biodiversity, Officer of the Environmental Directorate, CITMA, Cuba

GTZ (2013), Environmental Fiscal Reform Case Studies, Federal Ministry for Economic Cooperation and Development.

GSI (2014), Financing the Sustainable Development Goals Through Fossil-fuel Subsidy Reform: Opportunities in Southeast Asia, India and China, Laura Merrill with Vivian Chung, Working paper September 2014, Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD), Geneva, Switzerland.

GSI (2014a), India Energy Subsidy Review - A biannual survey of energy subsidy policies, Issue 1. Volume 2. December 2014, Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD), Geneva, Switzerland.

GSI (2013), A Guidebook to Fossil Fuel Subsidy Reform for Policy Makers in South-East Asia, Authors: C. Beaton, I. Gerasimchuk, T. Laan, K. Lang, D. Vis-Dunbar, P. Wooders, International Institute for Sustainable Development (IISD), 2013.

GSI (2010), Untold billions: fossil-fuel subsidies, their impacts and the path to reform, A summary of findings, Series of papers produced by GSI with support of the Royal Norwegian Ministry of Foreign Affairs, Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD), Geneva, Switzerland.

GSI (2010a), Strategies for reforming fossil fuel subsidies: practical lessons from Ghana, France and Senegal, April 2010, Prepared by T. Laan, C. Beaton and B. Presta, Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD), Geneva, Switzerland.

GTZ (2005), Environmental Fiscal Reform and National Forest Policies - An overview of forest fiscal revenue systems in 18 countries, Author: Johannes Scholl (GTZ-Brazil), Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH.

Harrison, K., (2012) The political economy of British Columbia's carbon tax, Centre for Tax Policy and Administration, Environment Directorate, OECD, COM/ENV/EPOC/CTPA/CFA(2012)42.

Heine, D., Norregaard, J., Parry, I., (2012) Environmental Tax Reform: Principles from Theory and Practice to Date, IMF Working Paper, WP/12/180.

Holzer (2013) cited in ECOPLAN / WTI / Uni Zürich (2013) Border Tax Adjustments - Can energy and carbon taxes be adjusted at the border?, Schlussbericht, 6 Juni 2013, zuhanden des Staatsekretariats für Wirtschaft SECO und der Eidgenössischen Finanzverwaltung EFV, http://www.efv.admin.ch/e/downloads/finanzpolitik_grundlagen/els/Ecoplan_2013_e.pdf.

IEA (2014), World Energy Outlook 2014, Executive Summary, Paris, OECD/IEA, 2014.

IEA, (2011), Development in Energy Subsidies - Chapter 14 of the 2011 World Energy Outlook, Paris, OECD/IEA, 2011.

IEEP, Eunomia, BIO IS, Umweltbundesamt, Ecologic and Arcadis (2012) 'Economic instruments to improve waste management', Final report, Contract ENV.G.4/FRA/2008/0112, European Commission (DG ENV), http://www.ieep.eu/publications/2012/04/economic-instruments-to-improve-waste-management.

IEEP et al (2007), Reforming environmentally harmful subsidies Final report to the European Commission's DG Environment, March 2007.

IMF (2014), Getting Energy Prices Right: From Principle to Practice, Chapter 1 - Summary for Policy Makers, Parry, I., Heine, D., Lis, E., Li, S., International Monetary Fund, 2014.

IMF (2013), Energy Subsidy Reform: Lessons and Implications, Washington, International Monetary Fund, 2013.

IMF (2013a), Case studies on Energy Subsidy Reform: Lessons and Implications, Washington, International Monetary Fund, 2013.

IMF (2012), Fiscal Policy to Mitigate Climate Change A Guide for Policymakers. Mooij, R. Keen, M., Parry, I., (eds.), Washington, International Monetary Fund, 2012.

IMF (2011), Regional Economic Outlook: Middle East and Central Asia, World Economic and Financial Surveys, Washington, International Monetary Fund, 2011.

IMF (2006), The Magnitude and Distribution of Fuel Subsidies: Evidence from Bolivia, Ghana, Jordan, Mali, and Sri Lanka, Washington, International Monetary Fund, 2006.

Kosonen, K., (2012), Regressivity of environmental taxation: myth or reality?, DG TAXUD Working paper No. 32 – 2012, Luxembourg, European Union, 2012

Lee, M., (2011) Fair and effective carbon pricing: Lessons from BC, February 2011, CCPA–BC and Sierra Club BC, http://www.ldlc.on.ca/uploads/2/7/8/8/2788943/ccpa-bc_fair_effective_carbon_full_2.pdf [accessed 4/3/2013]

Lehmann, M., ten Brink, P., Bassi, S., Cooper, D., Kenny A., Kuppler, S., von Moltke A., Withana, S., and Shine, C., (2011), Reforming Subsidies. In The Economics of Ecosystems and Biodiversity in National and International Policy Making, pp.259-297. Edited by P. ten Brink, Earthscan, London and Washington

Lyons, L. (2013) DYNAMIX policy mix evaluation - Reducing plastic bag use in the UK and Ireland. URL http://dynamix-project.eu/sites/default/files/Plastic%20bags_Ireland%20and%20UK.pdf [14-04-2014]

Martin R., de Preux L. B., Wagner U. J. (2009) The Impacts of the Climate Change Levy on Business : Evidence from Microdata, URL : http://www.cccep.ac.uk/Publications/Working-papers/Papers/1-9/Working_Paper7.pdf.

Mathur, A., Morris, A., (2012) Distributional effects of a carbon tax in broader US fiscal reform – Brookings Climate and Energy Project, Climate and energy economics discussion paper - December 14, 2012

Metcalf, G., (2015), Green Fiscal Reforms: A conception framework, GGKP commissioned paper - *forthcoming*

Netherlands Ministry of Finance (2013), The energy tax, Presentation by Leo van den Ende, OECD in-depth review

O'Connell, H. (2013) The plastic bag levy has raised over EUR 200 million since 2002. URL http://www.thejournal.ie/plastic-bag-levy-revenue-1040128-Aug2013 [14-04-2014]

OECD (2014), Addressing social implications of green growth – Energy sector reform and its impact on households, Issue note prepared for Session 1 of the Green Growth and Sustainable Development Forum, 13-14 November 2014, OECD, Paris, Authors: Heindl, P., Germany M., and Lösche, A.

OECD (2014a), Agricultural Policy Monitoring and Evaluation 2014 – OECD countries, Organisation for Economic Co-operation and Development, 2014.

OECD (2013), Inventory of estimated budgetary support and tax expenditures for fossil fuels, http://www.oecd.org/site/tadffss/48786631.pdf [11/03/2013].

OECD (2013a), The Swedish Tax on Nitrogen Oxide Emissions: Lessons in Environmental Policy Reform, OECD Environment Policy Paper No. 2, December 2013, Paris, Organisation for Economic Co-operation and Development, 2013.

OECD (2010), Taxation, innovation and the environment, Paris, Organisation for Economic Co-operation and Development, 2010.

OECD (2010a), Innovation impacts of the Swedish NOx Charge, Paris, Organisation for Economic Co-operation and Development, 2010.

OECD (2008), OECD Environmental Performance Reviews: Denmark 2007, Paris, Organisation for Economic Co-operation and Development, 2008.

OECD (2007), Subsidy Reform and Sustainable Development - Political Economy A*spects,* Paris, Organisation for Economic Co-operation and Development, 2007.

OECD (2005), Environmental Fiscal Reform for Poverty Reduction, DAC Guidelines and Reference Series - A DAC Reference Document, Paris, Organisation for Economic Co-operation and Development, 2005.

OECD (2005a), *Environmentally Harmful Subsidies. Challenges for Reform.* Organisation for Economic Co-operation and Development, Paris.

OECD (2003) Environmental taxes and competitiveness: An Overview of Issues, Policy options and Research Needs, Organisation for Economic Co-operation and Development, Paris.

OECD (1998), Improving the environment through reducing subsidies, Organisation for Economic Co-operation and Development, Paris.

Oosterhuis, F., and Bachus, K. (2014), 'Agriculture, food and water' in Oosterhuis F. and ten Brink P. (eds.) (2014) *Paying the Polluter. Environmentally Harmful Subsidies and their Reform.* Edward Elgar 2014.

Oosterhuis F. and ten Brink P. (eds.) (2014), *Paying the Polluter. Environmentally Harmful Subsidies and their Reform.* Edward Elgar 2014.

Peter, M., Lückge, H., Iten, R., Trageser, J., Görlach, B., Blobel, D. and Kraemer, R. A. (2007), *Erfahrungen mit Energiesteuern in Europa — Lehren für die Schweiz*, Infras/Ecologic im Auftrag des Schweizerischen Bundesamtes für Energie (BFE).

Porras, I., Neves, N., (2006), Mexico- National Programme for Hydrological Environmental Services (PSAH), Markets for Watershed Services -Country Profile, IIED and Watershed Markets

Soares, C. (2014) 'A green tax proposal to address fiscal and environmental issues', Presentation at 15th Global Conference on Environmental Taxation (GCET-15), 25 September 2014, Copenhagen, http://conferences.au.dk/fileadmin/conferences/gcet/PowerPointPresentations/Panel_Soares_Portugal_GCET2014.pdf [accessed 13/01/2015]

Schlegelmilch, K., Speck, S., Maro, P., (2010), Options for Promoting Environmental Fiscal Reform in EC Development Cooperation – Final report for the European Commission, Soges S.p.A, July 2010.

South African National Treasury, (2006), A Framework for Considering Market-Based Instrument to Support Environmental Fiscal Reform in South Africa – Draft Policy Paper, Tax Policy Chief Directorate, Pretoria, South Africa

Speck, S., (2010), Options for promoting Environmental Fiscal Reform in EC Development Cooperation - Country case study South Africa, February 2010

Speck S. and Jilkova J. (2009), Design of environmental tax reforms in Europe, In: *Carbon-Energy Taxation: Lessons from Europe*. Andersen MS, Ekins P (Eds.). Oxford University Press, Oxford, 24-52.

Sterner, T. (ed.) (2012), *Fuel Taxes and the Poor: The Distributional Effects of Gasoline Taxation and Their Implications for Climate Policy,* Washington: RFF Press.

Sustainable Prosperity (2012) British Columbia's carbon tax shift: The first four years, June 2012, University of Ottawa

ten Brink P., (ed.) (2002), *Voluntary environmental agreements - Process, practice and future use*, Sheffield, UK: Greenleaf Publishing.

ten Brink, P., Lehmann, M., Kretschmer, B., Newman, S., Mazza, L. (2014), 'Environmentally harmful subsidies and biodiversity' in Oosterhuis F. and ten Brink P. (eds.) (2014) *Paying the Polluter. Environmentally Harmful Subsidies and their Reform.* Cheltenham, UK and Northampton, MA, USA: Edward Elgar 2014.

ten Brink P., Mazza L., Badura T., Kettunen M. and Withana S. (2014a) 'Governance of the Transition to a Green Economy – Responding to the Values of Nature', In Nunes, P., Kumar, P., Dedeurwaerdere, T., (eds.) Handbook on the Economics of Biodiversity and Ecosystem Services.

ten Brink P., Withana S., and Oosterhuis F. H. (2014b), 'The way forward: reforming subsidies in the transition to a green economy', in Oosterhuis F., and ten Brink P. (eds.), *Paying the Polluter. Environmentally Harmful Subsidies and their Reform*. Cheltenham, UK and Northampton, MA, USA: Edward Elgar 2014.

ten Brink, P., Bassi, S., Badura, T., Hart, K., Pieterse M. (2012), Incentive Measures and Biodiversity – A Rapid Review and Guidance Development Volume 3 – Guidance to identify and address incentives which are harmful to biodiversity, Report for the Department for Environment, Food and Rural Affairs (DEFRA).

Topa, G., Karsenty, A., Megevand, C., Debroux, L., (2009), The Rainforests of Cameroon - Experience and Evidence from a Decade of Reform, The International Bank for Reconstruction and Development / The World Bank, 2009.

The Economist (2015), 'Indonesia's economy – A good scrap' and 'Indonesia's anti-poverty plans – Full of promise', The Economist, January 10th 2015, Volume 414, Number 8920

The Economist (2014), 'Remaking India – Yes, prime minister', The Economist, October 18th 2014, Volume 413, Number 8909

UNEP/CBD/COP (2014), Decision XII/3 on resource mobilization, Conference of Parties to the Convention on Biological Diversity, Twelfth meeting, Pyeongchang, Republic of Korea, 6-17 October 2014, Available at: http://www.cbd.int/decisions/cop/?m=cop-12

UNEP/CBD/WGRI (2014), Modalities and milestones for the full operationalization of Aichi Biodiversity Target 3 and obstacles encountered in implementing options identified for eliminating, phasing out or reforming incentives that are harmful for biodiversity, Note by the Executive Secretary, June 2014

UNEP (2011), Towards a green economy: Pathways to sustainable development and poverty eradication, Geneva, UNEP, 2011.

UNEP (2008), Reforming Energy Subsidies - Opportunities to Contribute to the Climate Change Agenda, United Nations Environment Programme - Division of Technology, Industry and Economics, United Nations Environment Programme, 2008.

UNEP (2004), The use of economic instruments in environmental policy: Opportunities and challenges, UNEP/ETB/2003/9, UNEP, 2004.

UNEP (2004a), Energy subsidies: Lessons learned in assessing their impact and designing policy

Valsecchi C., ten Brink P., Bassi S., Withana S., Lewis M., Best A., Oosterhuis F., Dias Soares C., Rogers-Ganter H., Kaphengst T. (2009), *Environmentally Harmful Subsidies: Identification and Assessment*, Final report for the European Commission's DG Environment, November 2009.

Van Beers, C., Jeroen, C.J.M. (2014), 'Quantifying the impacts of environmentally harmful subsidies', in Oosterhuis F. and ten Brink P. (eds.) (2014) *Paying the Polluter. Environmentally Harmful Subsidies and their Reform.* Edward Elgar 2014.

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

Vollebergh, H. (2013), 'De belasting op energieproducten, CO2 en elektriciteit'. Presentation at the Dutch Ministry of Finance, Expertbijeenkomst belastingen op energie, on 16 April 2013

Vollebergh, H. R. J. (2008), Lessons from the polder: Energy tax design in The Netherlands from a climate change perspective. *Ecological Economics* 64, 660-672.

WEF (2013), Lessons Drawn from Reforms of Energy Subsidies, World Economic Forum, Switzerland

Withana, S., ten Brink, P., (2015), 'Motivating environmental tax reform through coalitions of like-minded countries', in Kreiser, L., Skou Andersen, M., Speck, S., Egelund Olsen, B., Milne, J., Ashiabor, H., (eds.), *Critical Issues in Environmental Taxation,* Volume XV, Edward Elgar 2015 – forthcoming.

Withana, S., ten Brink, P., Illes, A., Nanni, S., Watkins, E., (2014), Environmental tax reform in Europe: Opportunities for the future, A report by the Institute for European Environmental Policy (IEEP) for the Netherlands Ministry of Infrastructure and the Environment, Final Report, Brussels, 2014.

Withana, S., ten Brink, P., Kretschmer, B., Mazza, L., Hjerp, P., Sauter, R., (2013), *Evaluation of environmental tax reforms: International experiences*, A report by the Institute for European Environmental Policy (IEEP) for the State Secretariat for Economic Affairs (SECO) and the Federal Finance Administration (FFA) of Switzerland, Final Report, Brussels, 2013.

Withana, S., Kretschmer, B., Farmer, A., (2013a), Environmental policy in the European Semester: Assessing progress to date, A report for the Greens/EFA Group of the European Parliament, Final report, Institute for European Environmental Policy (IEEP), London/Brussels, December 2013

Withana, S., ten Brink, P., Franckx, L., Hirschnitz-Garbers, M., Mayeres, I., Oosterhuis, F., and Porsch, L. (2012). *Study supporting the phasing out of environmentally harmful subsidies.* A report by the Institute for European Environmental Policy (IEEP), Institute for Environmental Studies - Vrije Universiteit (IVM), Ecologic Institute and VITO for the European Commission – DG Environment. Final Report. Brussels. 2012.

World Bank (2014), State and trends of carbon pricing, World Bank Group and Ecofys, Washington, International Bank for Reconstruction and Development / The World Bank, 2014.

World Bank (2014a), Transitional policies to assist the poor while phasing out inefficient fossil fuel subsidies that encourage wasteful consumption, Contribution by the World Bank to G20 Finance Ministers and Central Bank Governors, 18-20 September 2014.

World Bank (2005), Environmental fiscal reform – What Should Be Done and How To Achieve It?, The International Bank for Reconstruction and Development/The World Bank, Washington, 2005.

Xu, Y., (2012), 'Environmental taxation in China: the greening of an emerging economy', in Milne, J., and Skou Andersen, M., (eds.), *Handbook of Research on Environmental Taxation*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar 2012.