

Environmental Tax Reform in Asia and the Pacific



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ABSTRACT

Environmental tax reform (ETR) is an important and integral part of a sustainable development strategy. ETR is an effective way of integrating economic, social and environmental costs into the price of goods and services while creating incentives for sustainable practices. In recent years, some developing countries in the Asia-Pacific region have introduced schemes to phase out fuel subsidies and are moving towards further reforms to modernize their fiscal governance and tax practices and make greater use of ETR as a primary component of national development strategies. Indeed, several countries in the region are forerunners for ETR outside OECD countries, including India, Indonesia, Thailand, Viet Nam and China.

This paper examines the rationale for the implementation of ETR in Asia-Pacific and its possible role in the achievement of the Sustainable Development Goals (SDGs). It offers policymakers practical guidance on how governments can reform tax systems and use fiscal policy to drive the transition to a low-carbon, climate-resilient economy while taking into account the specific challenges of developing countries in the region.

The paper is divided in two parts. Part I provides background information on ETR and looks at experiences in OECD countries. Part II focuses on ETR in the Asia-Pacific region and makes a series of recommendations for policymakers, examining strategic and political economy considerations typically encountered by policymakers during the process of implementing environmental taxes, as well as practical issues relating to tax design, policy planning and implementation. Finally, the paper looks at international and regional policy processes upon which policymakers in Asia-Pacific can draw on for support and consultation while implementing ETR measures.

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Part I: Background on Environmental Taxes and Experience in OECD Countries

1 Introduction

1.1 The context

The 2030 Agenda for Sustainable Development marks a fundamental transition in development philosophy towards a more balanced agenda that emphasizes the integration of economic, social and environmental pillars of sustainable development. Seventeen concrete **Sustainable Development Goals** (SDGs) were adopted in 2015, aiming to end poverty, protect the environment and climate, and ensure prosperity for all. Moreover, the Paris agreement, which entered into force in November 2016, represents a new impetus in global cooperation to mitigate climate change and to keep the average global temperature rise well below 2°C.

Realising sustainable development is not only the purview of the SDGs and the Paris Agreement, but also an urgent and immediate task for many countries of the Asia and Pacific region as the negative effects of an unbalanced development are reflected in enormous economic and social costs of growth (see for example the case of China in World Bank 2007). Rapid industrialization, urbanization and coal-based power generation have made the region the **largest emitter and resource consumer in the world**, resulting in serious health impacts that are reaching dangerous levels in the region's major emerging economies (World Bank 2007). The region is especially **vulnerable to climate change** related events like higher temperature, sea level rise and extreme weather and storms and the World bank expects an increase in extreme poverty of 100 million people by 2030 if no climate action is taken (World Bank 2015). Worldwide, seven of the ten countries most vulnerable to climate change and natural disasters are found in the Asia-Pacific region. Among the seven are the region's most populous LDCs (e.g. Bangladesh) and its Small Island Developing States.

The high rates of growth in much of the Asia-pacific region have so far been based on an unsustainable development model that does not price in economic, environmental and social costs. High investment in fossil-fuel based energy sources have locked in high energy, carbon and resource intensity in the region. This market failure has caused capital to be allocated to fossil fuel-based industries at the expense of greater investment in renewable energy, energy efficiency, public transportation, sustainable agriculture, ecosystem and biodiversity protection, and land and water conservation (UNEP 2011). While investment in renewable energy reached an all-time high of USD 266 billion in 2015, substantial new investment into coal and gas generation, albeit at lower levels, meant that in 2015 only 10% of electricity worldwide was generated by renewable energy sources (UNEP/Bloomberg New Energy Finance 2016).

The costs of proceeding along the current development path in a business-as-usual scenario have been predicted to reach 10% of GDP by the end of the century (UNESCAP 2016a). These costs are increasingly hampering growth rates in the region, making clear the need for taking action (World Bank 2007).

At the same time, developing countries in Asia and the Pacific are confronted with **fiscal challenges that would allow governments to pursue priority development issues**. Since the recent financial crisis, growth in the region has been hit and this lower growth (UNESCAP 2016b) is tightening the fiscal space for urgent infrastructure and development spending. Fiscal space is required for the successful implementation of the 2030 Agenda, as inadequate revenue levels are hampering the financial capacities to respond to growing domestic social-environmental pressures.

For all these reasons, rethinking and recalibrating tax and public expenditure policies for sustainable development in the region is both necessary and helpful.

1.2 Environmental tax reform: A promising instrument to meet these challenges

Market based policy tools, **environmental taxes** in particular, can be an effective way to introduce economic, social and environmental costs into pricing and create incentives for sustainable practices. They form an important and integral component of a sustainable development strategy, in addition to other regulatory and voluntary measures. Fiscal policy, taxation and public spending are important tool for a transition towards a low-carbon, climate resilient economy, as they not only can be directed to growth enhancing public investments, but could also act to address rising inequality, help to manage the negative impacts of unsustainable growth, and create incentives for more environmentally responsible practices.

Environmental taxes, including taxes on **energy, transport, pollution and resources**, are becoming more popular in the Asia-Pacific region. In recent years, some Asia-Pacific developing countries took the first step at eliminating fuel subsidies and are moving towards further reforms to modernize their fiscal governance and tax practices and make greater use of Environmental Tax Reforms (ETR) as a primary component of national development strategies. Indeed, several countries in the region are forerunners for environmental tax reform outside OECD countries, including **India, Indonesia, Thailand, Viet Nam and China**.

Even though environmental taxes have the potential of generating a double dividend¹, the **design and effective implementation** in the context of developing countries **remain a challenge**. This report will look at these unique challenges, expectations and the potential for ETR in the Asia-Pacific region. Selected case studies will highlight the important lessons learned of implementing ETRs in developing countries and policy options will be provided based both on the local experience of Asia-Pacific and international lessons and best practices.

The report will offer practical guidance on how governments can reform tax systems and use fiscal policy to drive the transition to a low-carbon, climate-resilient economy while taking into account the specific challenges of developing countries in the region. As is usually the case, policy interventions have impacts beyond the intended ones and these need to be carefully balanced. Cuts in fossil fuel subsidies, for example, often affect low-income groups the most and can be politically unpopular unless accompanied by mitigation measures. These impacts are not trivial: Indonesian cut subsidies on fossil fuel during the East Asia Crisis in 1997 and the government fell due to massive public protest. Since that time, Indonesia has learned from its earlier experiences and has successfully implemented substantial cuts in fossil fuel subsidies accompanied by social measures to ensure that the reform was successful and met with political acceptance.

1.3 The structure of this report

The report is split into two parts and nine chapters. Part I provides a background to environmental taxation and experience in OECD countries. Chapter 1 introduces the report. Chapter 2 briefly describes the challenges and opportunities for the Asia-Pacific region and explores the potential role of ETR to meet those challenges. Chapter 3 looks at the rationale and background to taxation and other fiscal measures as instruments of environmental policy (sections 3.1 and 3.2) before taking a quick look at the most important lessons learned in OECD countries and the outlook for ETR in the OECD in the future (sections 3.3 and 3.4).

¹ Environmental taxes correct market prices so that they reflect the true cost of energy while the resulting revenue can be used in reducing the burden of the overall tax system and improving the performance of the economy (Jorgenson u. a. 2013)

Part II of the report focuses on environmental taxes in the Asia-Pacific region and makes a series of recommendations for policymakers. Chapter 4 looks at similarities and differences between OECD and developing Asia-Pacific countries. Chapter 5 focuses on fossil fuel subsidy reform, as a first step towards creating a level playing field in the energy sector. Following this, chapter 6 discussed strategic and political economy considerations typically encountered by policymakers during the process. Chapter 7 goes on to look at more practical issues relating to tax design and policy planning and Chapter 8 looks at practical considerations related to policy planning and implementation.

Chapter 9 of the report draws these lessons together and looks forward to the future of environmental taxation in the Asia-Pacific region. First, the chapter draws together the lessons of the report in a short summary of recommendations for policymakers (section 9.1). Subsequently, section 9.2 looks at international and regional policy processes policymakers in Asia-Pacific can draw on for support and consultation.

2 Asia-Pacific's transition to green growth and the rationales for environmental taxes

Green growth fosters economic growth and development, while ensuring that natural assets continue to provide the resources and environmental service on which our well-being relies. To achieve this, green growth must catalyse green investment and innovation, to underpin sustainable growth and give rise to new economic opportunities (OECD 2011a). Green growth therefore ensures the compatibility of economic and environmental sustainability (World Bank 2012). One important element in the green growth policy toolkit is environmental taxation, due to its role in changing relative prices, thus directing capital investment towards green and sustainable technologies.

This chapter of the report relates green growth and environmental taxation to the Asia-Pacific context, highlighting a number of key challenges and opportunities in the region. As noted above, environmental taxes are a promising instrument to tackle multiple challenges, including lack of fiscal space and potential conflicts between economic growth, environmental protection and human health. The potential of ETR to address multiple challenges in Asia-Pacific, and windows of opportunity for ETR in the region are analysed below.

2.1 Challenges and opportunities

2.1.1 Fiscal challenges

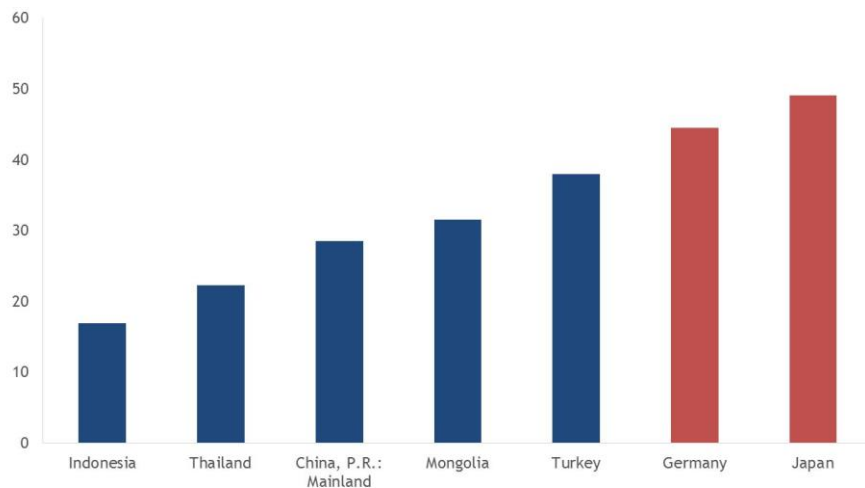
Many developing countries in the Asia-Pacific region face significant fiscal challenges to finance the physical and social infrastructure required for sustainable development.

As shown in Figure 1, developing countries in the Asia-Pacific-region tend to have tax-to-GDP-ratios below e.g. the level of OECD countries such as Germany or Japan. For example, Indonesia's tax to GDP ratio (including sub-national collection and social contributions) is below 20%. Thailand is also at the lower end of tax revenues. Where countries have a limited fiscal space, the flexibility for governments to spend budget on development issues is constrained. Domestic resource mobilization, e.g. through environmental taxes, is therefore particularly relevant for those developing countries with low tax to GDP ratios.

Improvements to the capacity and efficiency of domestic revenue raising has multiple benefits, including state-building, improved tax morale and thus rising domestic revenue potential over time (i.e. willingness to pay taxes) and improved capacity of government to provide services. The latter is in turn closely linked

to the development of a ‘fiscal contract’ - the understanding that taxpayers pay taxes in return for provision of services on the part of the state and representation (Bräutigam 2008). Professionalization of taxation and the development of the institutions of a modern economy facilitate the development of sophisticated systems of finance, enabling states to invest in infrastructure necessary to drive green economy transition, as well as ever more effective and efficient tax collection structures - in a best case scenario, creating a virtuous circle leading to sound fiscal governance (Bräutigam 2008).

Figure 1: Tax revenue (% to GDP) in 2013

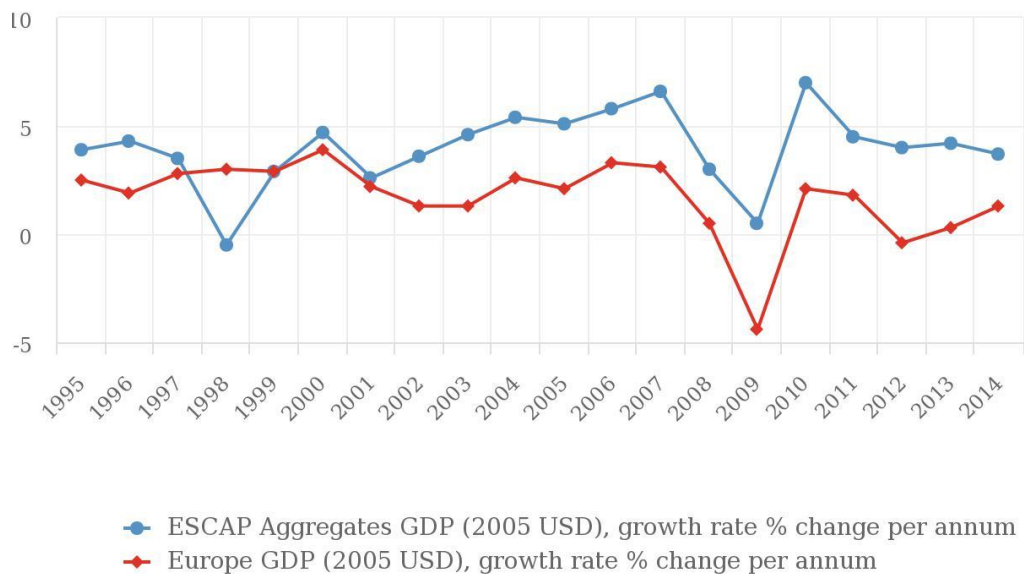


Source : IMF Government Finance Statistics, <http://data.imf.org/revenues>

2.1.2 Economic growth and environmental pressure

The East Asia region has seen unprecedented growth over the past decades, with GDP tripling over the last 20 years. The ESCAP region clearly surpassed growth rates of already industrialised regions such as Europe over the last 20 years (see Figure 2). However, the majority of developing countries in the Asia-Pacific region have high rates of growth resulting from an unsustainable growth model, which has led to high rates of fossil energy consumption and energy intensity, GHG emissions from energy, agriculture and transport, local pollution and resource degradation. All of these can be addressed by environmental taxes.

Figure 2: Growth rate (% change per year) 1995- 2014

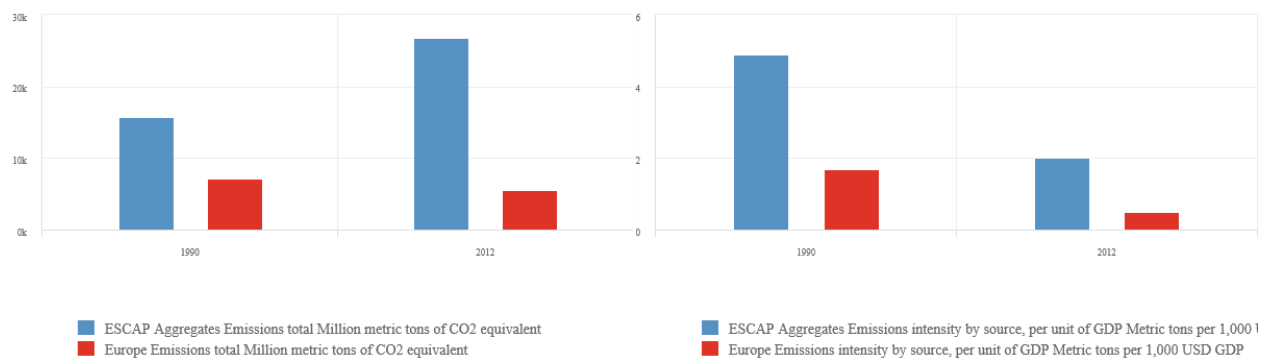


Source : ESCAP Statistical Database, http://data.unescap.org/escap_stat/#home

GHG Emissions

Between 1990 and 2012, total Greenhouse Gas emissions in ESCAP countries rose by 70%, from 15,755 kt to 26,725 kt CO₂eq. In contrast, Europe reduced its emissions from 7,153 kt to 5,475 kt CO₂e in the same period (see Figure 3), despite a steady, albeit lower GDP growth than in the ESCAP region.

Figure 3: Total Greenhouse Gas Emissions and Emission Intensity 1990 and 2012



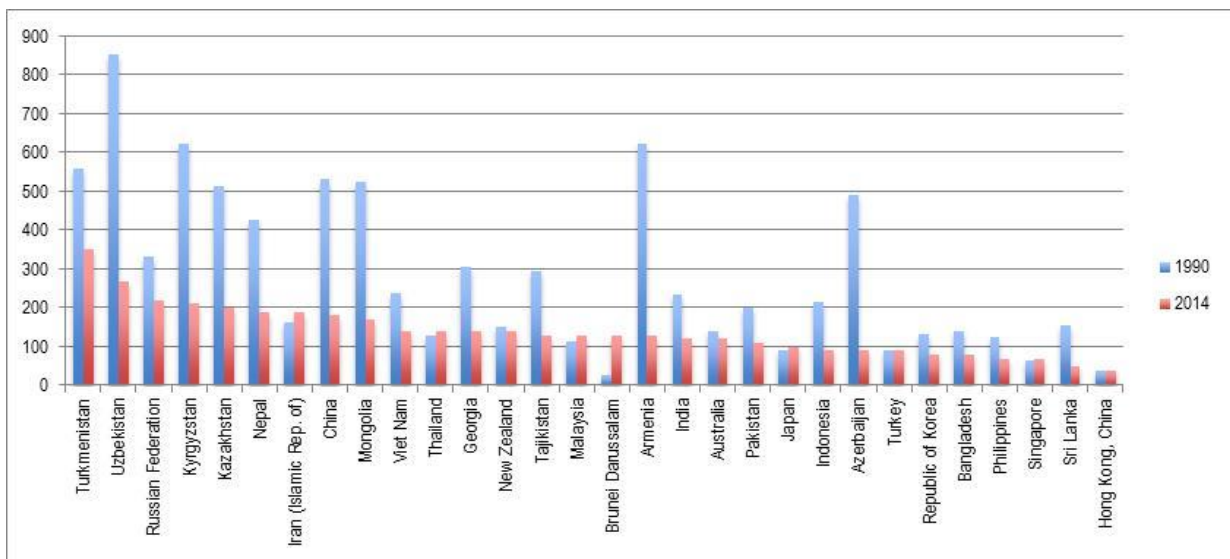
Source: ESCAP Statistical Database, http://data.unescap.org/escap_stat/#home

As a consequence, GHG intensity is now four times higher in the ESCAP region than in Europe, although it should be noted that emissions intensity has already been reduced from 4.9 to 2.0 t CO₂eq per 1,000 USD GDP. Nonetheless, the discrepancy between the two regions indicates the considerable potential for improvements in the Asia-Pacific region to be made.

Energy consumption

Energy intensity - the ratio of energy consumption to GDP - in the Asia-Pacific region is still much higher than that of developed countries, though it is being steadily reduced. For example, in 2015, energy intensity levels in China were 50 percent higher than the OECD average, but improved by 5.6 percent year-on-year, up from an annual average of 3.1 percent over the previous decade. In China's power sector, energy efficiency gains in 2015 avoided the need for over US\$230bn in investment for new (mostly coal-fired) electricity generation. This was equivalent to avoided emissions of 1.2 billion tonnes of CO₂ in 2014, as much as Japan emits annually.

Figure 4: Total energy intensity, 1990 and 2014 (kg of oil equivalent per 1,000 US\$ GDP, in 2005 PPP)

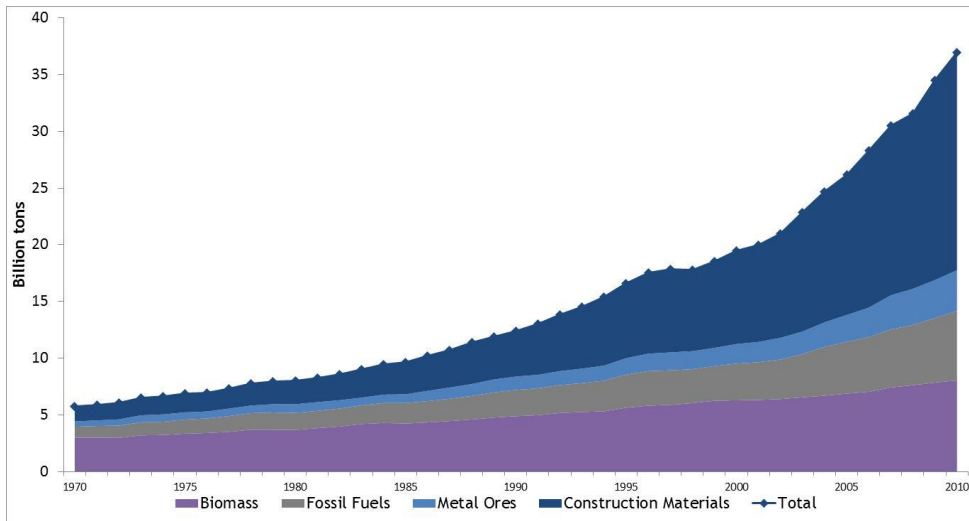


Source: ESCAP based on data from Asia Pacific Energy Portal 2017

Natural resources

In the Asia-Pacific region, there is growing pressure on natural resources. Growth in resource use has been intense in the last 45 years, putting pressure on natural resources. Total domestic material consumption increased more than six fold between 1970 and 2010, driven by growth in fossil fuel consumption and construction materials (see Figure 5). Rising rates of material extraction can be addressed by environmental taxes or charges.

Figure 5: Domestic material extraction in the Asia-Pacific (billion tons)



Source : UNEP 2017

Local pollution

At the same time, local environmental problems such as water, soil and air pollution, which are having a severe impact on human health in many countries, have made it clear that the current growth model is unsustainable and costly.

For example in the case of China, the World Bank has estimated that the total cost of air and water pollution is estimated at 5.78% of GDP (World Bank 2007). There is evidence that air pollution reduces life expectancy in northern China by five-and-a-half years and leads to 1.6 million premature deaths in the country (Science Daily 2016). The most significant costs result from health damage from air pollution and the degradation of soil nutrients.

Infrastructure and transport

Estimates for the future infrastructure investment requirements in developing countries in Asia-Pacific vary and all highlight a gap between necessary and actual investment, particularly in developing countries in the region. Requirements for investment vary considerably between countries, again with projections much higher for developing countries. Infrastructure needs, especially for transport, are very high in South Asia at 11% of GDP and Lao PDR, Mongolia, Cambodia, Viet Nam, Uzbekistan, Tajikistan, Kyrgyzstan and Afghanistan all require investment levels above 8% of GDP (Inderst, G. 2016). It has been suggested that 32 developing economies in Asia would need USD 8.2 trillion (2008 prices) from 2011-2020, with roughly half of the total for energy, one third for transport and the remainder for telecommunications, water and sanitation (Bhattacharyay, B. N. 2012). By 2020, developing economies will need to increase spending on infrastructure from the current USD 800-900 billion to about USD 1.8-2.3 trillion per annum (Inderst, G. 2016). These estimates do not take into account additional investment needs for the achievement of environmental goals or the SDGs.

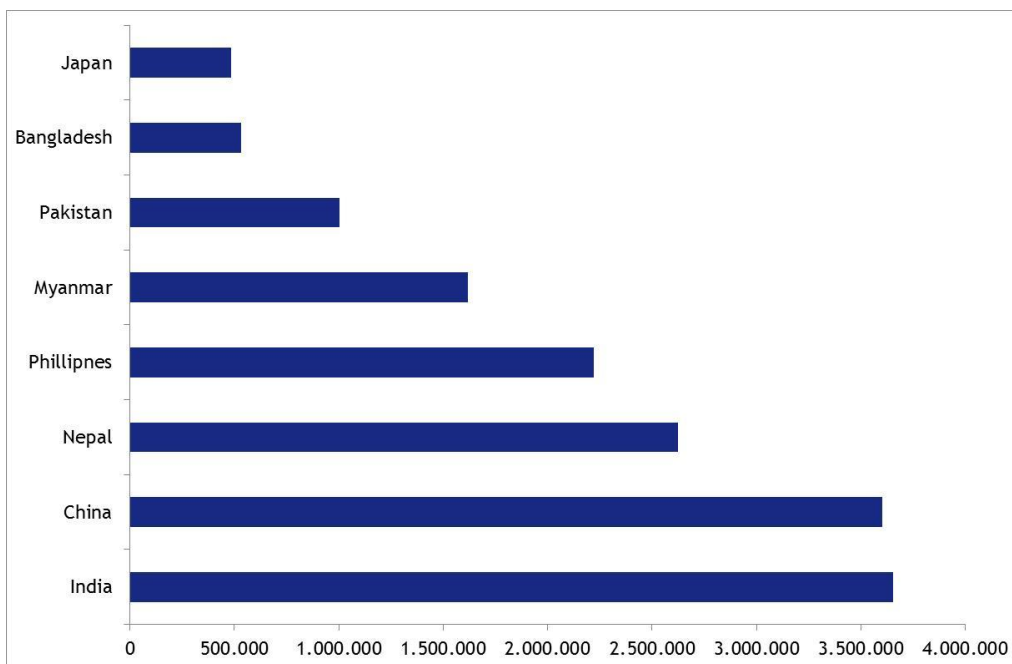
This means that the region currently has a unique opportunity to **shift investment towards a more sustainable development model** by pursuing a low-carbon, energy-efficient and resilient development

path. Investments in new infrastructure could realise this opportunity by focussing on pioneering technologies such as local renewable power generation, mobile micro-finance, or sustainable transport infrastructure (rail travel rather than roads). Alongside ETR, these investments have considerable potential to drive green economy transition in the region.

2.1.3 Vulnerability to climate change and global commitments to joint action

The negative effects of climate change are increasingly felt in the region. Statistics on vulnerability to climate change of selected UNESCAP member countries reaffirm the urgency of preventing dangerous and irreversible climate change to the region. In 2015, 84% of the 19.2 million new displacements due to natural disasters occurred in the Asia-Pacific region (UNESCAP 2016a).

Figure 6: Number of disaster related displacements in 2015



Source : UNESCAP 2016a, p. 2

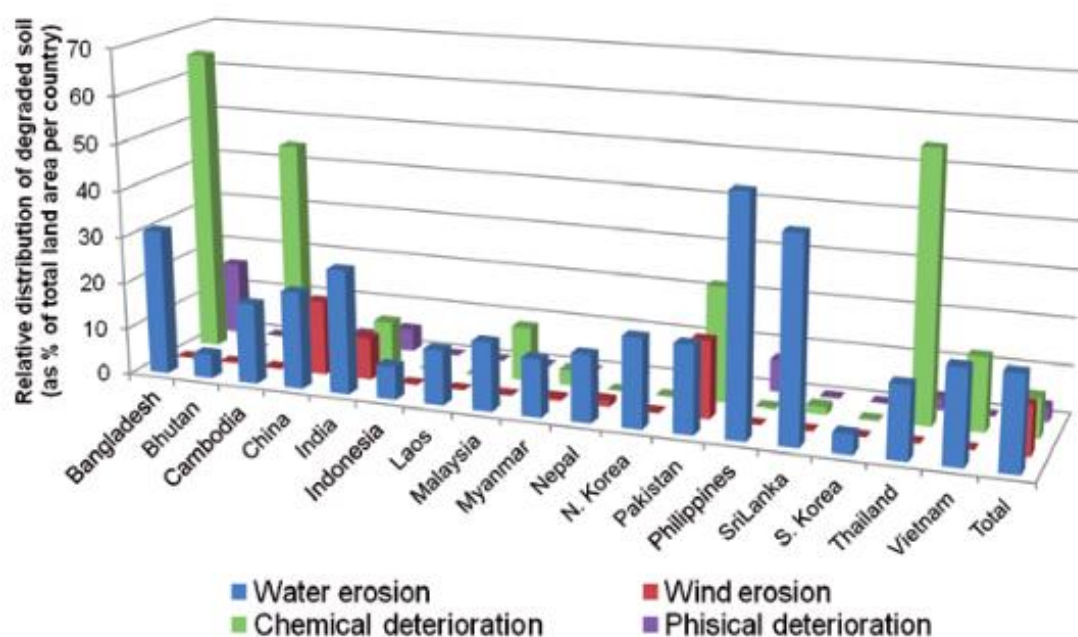
Thus there is growing awareness and commitment of governments in the region that they must address the adverse effects of climate change and effectively reduce carbon emissions. Countries from the region stated their emissions reduction strategies in their Intended Nationally Determined Contributions (INDCs) submitted to the UNFCCC. It is notable that 21 countries intend to use market based instruments for carbon pricing as well as measuring, reporting, verification (MRV) to bring down emissions (International Partnership in Mitigation and MRV 2017; UNESCAP 2016a). The main sectors the countries focus on are energy, agriculture, forestry and land use, as well as transport and waste, all of which can be targeted by environmental taxation (UNESCAP 2016a).

This sense of urgency on the climate change issue no doubt contributed to the signing and subsequent coming into force of the 2015 Paris Agreement in November 2016. In the agreement, UNFCCC member states agreed on a global transition path with the aim to keep global temperature rise this century well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C. Alongside the implementation of the Sustainable Development Goals for 2030, a set of goals to end poverty, protect the planet, and ensure prosperity, such international agreements are putting increasing pressure on policymakers from beyond their borders to implement change, a pressure compounded by pressures from inside Asia-Pacific countries, as examined in the next section below.

2.1.4 Increased awareness on environmental issues

According to the World Health Organisation’s urban air quality database, 98% of cities in low- and middle income countries with more than 100,000 inhabitants do not meet WHO air quality guidelines, while low- and middle-income countries in South East Asia have annual mean levels which often exceed 5-10 times WHO limits (WHO 2016). Human-induced soil degradation has been highest globally in the Asia region since the 1990s. Today, water erosion is a serious problem in many countries and affects 21% of the total land area; wind erosion affects 9% of the total land area; chemical deterioration affects 11% overall, but as shown on Figure 7, is a very extreme problem in some countries including Bangladesh, Cambodia, Malaysia, Pakistan, Thailand and Viet Nam (FAO 2015).

Figure 7: Threats to soils in the Asia region by country



Source: FAO 2015

The everyday experience of poor air quality and extreme soil degradation, alongside chronic congestion, loss of green spaces, marine pollution, increasingly frequent extreme weather events and biodiversity loss is driving a greater awareness of environmental issues on the part of civil society in the Asia-Pacific region.² Civil Society Organisations are growing up and becoming more organised e.g. in the Asia-Pacific Regional CSO Engagement Mechanism³. Rising awareness and growing participation have been fostered by awareness campaigns, such as the ADB-funded “Redraw the Line” campaign, which highlighted climate change issues by working with television channels to produce public service broadcasts (viewed by up to 1 million in South East Asia), organising events (an event in Viet Nam attracted 500,000 Facebook views) and working with celebrities and social media.⁴

² Growing awareness of these issues has been observed by the authors in their extensive work in the Asia-Pacific region.

³ <http://asiapacificrcem.org>

⁴ <http://www.mediaalliance.asia/climate-change>

2.1.5 Rethinking growth models

The factors described above - revenue shortfalls due to poorly developed fiscal systems, rising environmental degradation as a result of rapid growth based on an unsustainable development model, global commitments to join action on climate and environment, and rising civil society awareness of environment and climate issues - may offer policymakers a window of opportunity to implement environmental tax reforms.

Current conditions seem favourable for a transition towards sustainable development, particularly as this transition coincides with a new phase of economic transition and industrial upgrading in the leading economies of the region. China, for example, has become the largest investor in renewable energy (UNEP/Bloomberg New Energy Finance 2016) and many countries in the region have thus adopted green growth approaches and committed to green economy policies combining relatively high rates of GDP growth with sustainable development. This shift has been led by the Republic of Korea, which has a comprehensive policy framework for green growth in the short and long term in its National Strategy for Green Growth 2009-2050. Many other countries in the region have followed suit, such as China, where there is a renewed focus on quality and not only quantity of growth and India, where there is a strong focus on “made in India” industrialisation. As an example, Viet Nam’s green growth strategy is described in Box 1 below. Similarly, many countries in the region have recognised the value of green stimulus to help recalibrate their economies following the 2008/9 crisis, with the Republic of Korea dedicating 80% and China 38% of their 2008 fiscal stimulus plans to green growth projects (HSBC 2009).

Box 1: Viet Nam’s Green Growth Strategy 2010-2050

In 2012 Viet Nam adopted the Viet Nam Green Growth Strategy (VGGS). The strategy focuses on three tasks:

- Greening production,
- Reducing CO2 emissions and
- Greening lifestyles.

The VGGS is a framework for concrete policy implementation, delineated in the form of institutional Action Plans. There is potential to implement environmental taxation to price carbon or incentivise higher levels of resource efficiency. Thus, there are several directions in which broad environmental taxation could be developed in Viet Nam in the coming years: Energy-/carbon taxation could be strengthened; or other environmental taxes, charges and fees could be introduced and broadly applied; environmentally-harmful tax regulations could be phased out.

Figure 8: Targets of VGGS 2020

Double GDP per capita on 2010 levels
Reduced energy consumption per unit of GDP by 2.5-3% annually
Reduced GHG emissions intensity 10-15% on BAU scenario from 2010
Improved efficiency of natural resource consumption
Reduce or halt environmental degradation
Shift growth trajectories towards a green economy to support sustainable development

Source : Prime Minister of the Socialist Republic of Viet Nam 2012, Cottrell et al. 2016

To implement these green growth strategies and meet the targets specified by these documents, profound reforms of economic and fiscal management will be necessary. One essential element in a greener model

of economic growth to shift countries in the Asia-Pacific region on to a more sustainable development path will be environmental taxation, as examined below.

2.2 The potential role of environmental tax reform in Asia-Pacific countries

2.2.1 The role of environmental taxes in green economy transition

Environmental taxes are crucial for the transition to a greener, more sustainable growth model. Environmental taxes can reduce environmentally harmful behaviour by increasing the costs to damage the environment. Environmental taxes are particularly suitable to address market failure caused by externalities - “situations when the effect of production or consumption of goods and services imposes costs or benefits on others which are not reflected in the prices charged for the goods and services being provided” (OECD 2017). By increasing the price of a particular good or service, environmental taxes correct distorted price signals that encourage environmentally harmful behaviour. Once these external costs are internalized and hence considered in the calculations of polluters and natural resource users, markets operate more efficiently and thus social welfare is increased through optimal allocation.

Environmental taxes are thus a crucial part of the policy toolkit for green growth, as they create price signals within the economy that foster sustainable behaviour and greener decision-making. Capital misallocation is reduced, as investors anticipate a higher return on sustainable investment decisions, due to changing price signals within the economy. Without the price signals created by environmental taxes, green economy transition will come at a higher cost, as market failures and distortions will result in poorer investment decisions, locking in e.g. fossil fuels or inefficient transport modes.

Environmental taxes can at least in part address the challenges described above: Environmental taxes can raise additional revenues and boost fiscal space, meeting in part the need of developing Asia-Pacific countries to invest in infrastructure and measures to achieve the SDGs or increase resilience to climate change impacts. Environmental taxes can also address potential conflicts between growth and the environment, as they shift the economy towards a more sustainable growth model. The potential benefits of environmental taxes for the region are addressed in section 2.2.2 below.

In OECD countries, environmental taxes have already been widely used to decouple GHG emissions from economic growth and raise revenues for green investment, as described in the overview in section 3.3. Similarly in developing economies, environmental taxes have also been implemented to reduce pollution, foster conservation and reduce GHG emissions - as exemplified by pioneering countries such as Chile, Mexico, Costa Rica, Kenya, South Africa, Viet Nam, India and China. Lessons learned from these experiences are analysed and brought together as a series of recommendations in part II of this report.

As shown in section below, there is considerable potential for Asia-Pacific countries to leverage environmental taxation more effectively and efficiently to maximise their fiscal and environmental benefits. In countries that already raise a substantial proportion of revenues from environmental taxes, review and administrative improvement can enhance the performance of such taxes and ensure that their environmental impacts are maximised, as exemplified by China’s current efforts to reform its system of pollution charging into a more efficient system of environmental taxation. In those countries that have not yet implemented environmental taxes, environmental taxes can boost fiscal space, improve fiscal governance and reduce environmental impacts at the same time.

This is not to say that environmental taxes are a panacea, however, and an efficient combination of instruments is required to foster green growth, as examined in more depth in section 7.6.

2.2.2 The context: Environmental taxation in Asia-Pacific

In the Asia-Pacific region, OECD data shows that environmental taxation is generally smaller than the OECD average of 2.5%, with the exception of Korea and Turkey. At the same time, statistics show that on average the share of revenues from environmental taxation has been declining since 2000, with considerable variation between countries (see Figure 9).

Figure 9: Environmental Tax Revenue as percentage of GDP

Countries	Total Environmentally Related Tax revenue, % of GDP														
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australia	2.41	2.35	2.33	2.26	2.23	2.05	1.98	1.93	1.85	1.86	1.80	1.78	2.07	2.13	1.91
China (People's Republic of)	0.38	0.64	0.71	0.80	0.84	0.82	0.84	0.84	0.81	1.30	1.44	1.37	1.40	1.37	1.33
India*	..	..	..	..	..	1.28	1.18	1.10	1.05	1.02	1.00	1.06	1.00	0.97	0.95
Japan	1.73	1.75	1.76	1.77	1.74	1.75	1.72	1.68	1.61	1.68	1.60	1.60	1.58	1.55	1.48
Korea*	2.65	2.88	2.66	2.67	2.51	2.81	2.77	2.92	2.81	2.51	2.82	2.53	2.63	2.56	2.54
Malaysia	0.54	0.59	0.56	0.53	0.48	0.40	0.30	0.26	0.24	0.26	0.24	0.24	0.24	0.24	..
New Zealand**	1.67	1.65	1.68	1.57	1.42	1.40	1.36	1.36	1.27	1.27	1.34	1.31	1.31	1.33	1.35
Philippines	0.90	0.76	0.66	0.63	0.50	0.48	0.35	0.29	0.28	0.29	0.23	0.24	0.24	0.21	..
Turkey	2.77	2.87	3.62	4.35	3.65	4.12	3.71	3.62	3.40	3.53	3.94	3.74	3.63	4.06	3.83

Source : Reproduced from UNESCAP 2016b

There are several reasons for this decline in revenue terms. Many countries do not maintain real tax rate levels, i.e. increase tax rates in line with inflation. In addition, the economic crisis may have depressed the environmental tax base, and increasing environmental tax rates may have led to behavioural changes in the long term, resulting in a smaller tax base. There has also been in the past a tendency in developing countries all over the world to implement environmental taxes at rather low rates, or to design environmental taxes in a way which does not result in increased revenues overall, e.g. by implementing a lower (environmental) tax rate on unleaded fuels, rather than increasing taxes on leaded fuels, as was the case in both Thailand and India in the 1990s and 2000s (Cottrell et al 2016). The example of Thailand is looked at in detail in

Box 8.

It should also be noted that these figures do not cover environmental fiscal policies such as fees or charges, payments for environmental services, or indeed revenues from emissions trading schemes, which may nevertheless generate significant amounts of revenue and have a positive environmental impact. As well, more innovative environmental tax instruments may not generate a great deal of revenue, while being environmentally effective.

In addition, in a number of countries in the region, the trend of falling revenues is less evident. In Viet Nam, revenues from environmental taxes increased between 2000 and 2015 (see Box 14). In China, too, revenues have increased between 2000 and 2014, and further changes are planned which are expected to perpetuate this trend. In Thailand, new measures addressing GHG emissions in the transport sector were introduced in 2015, including a new system of vehicle registration taxes based on CO₂ emissions (introduced in 2015), expected to raise THB 10 billion, or EUR 258 million in 2016, as well as a new system of transport fuel taxation based on carbon emissions and other measures to address waste, water pollution and transport.⁵ The World Bank's Partnership for Market Readiness programme (PMR) similarly reflects a broad interest in the region for carbon pricing schemes of one sort or another.

⁵ Statistics and information from interviews with Thai officials in 2015.

The general trend of falling revenues from ETR in the region in itself highlights the potential for many governments to introduce and strengthen environmental taxation and in so-doing, increase fiscal space. Meeting the challenges and taking the opportunities the Asia-Pacific region is currently facing will require the development of wide-ranging policy packages to address market failures and drivers of unsustainable growth in the region, a process that will pose a substantial challenge to policy-makers in the coming years. An integral part of this process will be to rethink and revise fiscal systems, taking into account how they can be utilised to drive sustainable economic development and to incentivise green investment in renewable energy, energy efficiency, resource efficiency and reduced air, soil and water pollution. As shown in chapter 3, ETR measures are, if well designed and implemented, the most efficient and effective environmental policy instruments available to policymakers. Many countries in the region have already taken steps to initiate this process by reforming fossil fuel subsidies and are in the process of developing and introducing environmental taxes on pollution, road charging, and emissions trading.

The following section looks at how environmental taxes in particular can generate multiple benefits and play a role in shifting the region onto a more sustainable development path.

2.2.3 Potential benefits of environmental tax reform in Asia-Pacific countries

Broadly, the benefits of ETR instruments can be divided into four categories that help to achieve sustainable development goals: environmental, fiscal, economic and social. These are examined below.

Environmental benefits

The underlying rationale of ETR is that it results in environmental benefits as a result of reduced environmental degradation stemming from changes in behaviour as the cost of polluting or otherwise damaging the environment increases due to the tax. Put simply: Economic actors respond to the price signal created by a tax, polluting less and using resources and energy more efficiently.

In theoretical terms, market based instruments, such as ETR measures, are particularly suitable to address market failures - the failure of the market to price public goods, such as clean air, or a clean environment or scarce resources - as they correct the distorted price signals (i.e. market failures) that encourage environmentally harmful behaviour. Once these external costs are internalized and hence considered in the calculations of polluters and natural resource users, markets operate more efficiently and thus social welfare is increased through improved allocation. Environmental damage is reduced as a result of changed behaviour, incentivized by the price signal resulting from a tax.

Some environmental taxes are effective within a short timeframe, for example in cases where alternatives are readily available and so the elasticity of demand is high, i.e. responsiveness of demand to changes in prices. When the plastic bag tax was introduced in Ireland in 2002, a dramatic fall in plastic bag littering resulted: Prior to the measure, plastic bags made up 5% of litter pollution, in comparison to 0.32% of litter pollution one year later (Department of Environment, Community and Local Government 2015 pp. 27).

Environmental taxation can also reduce environmentally harmful behaviour over a longer timeframe if directed towards goods and services with lower elasticity of demand, i.e. lower responsiveness of demand in the short-term. In general, the responsiveness of demand to changes in prices, that is, the price-elasticity of demand, is higher in the long run than the short run. In the short term, business and households may adopt less polluting behaviours in response to a tax, while in the medium term, they will make structural changes and investments in response to a stable and predictable tax (OECD, 2010a). On the broadest level, the impact of high transport fuel taxes in many European countries on fuel efficiency (see e.g. (Gerlagh u. a. 2015) and thus on the environment is demonstrable and visible to the layperson: A quick glance at vehicle fleets in the USA and Europe highlights the influence of high fuel taxes on the fuel efficiency of the car fleet.

Fiscal benefits

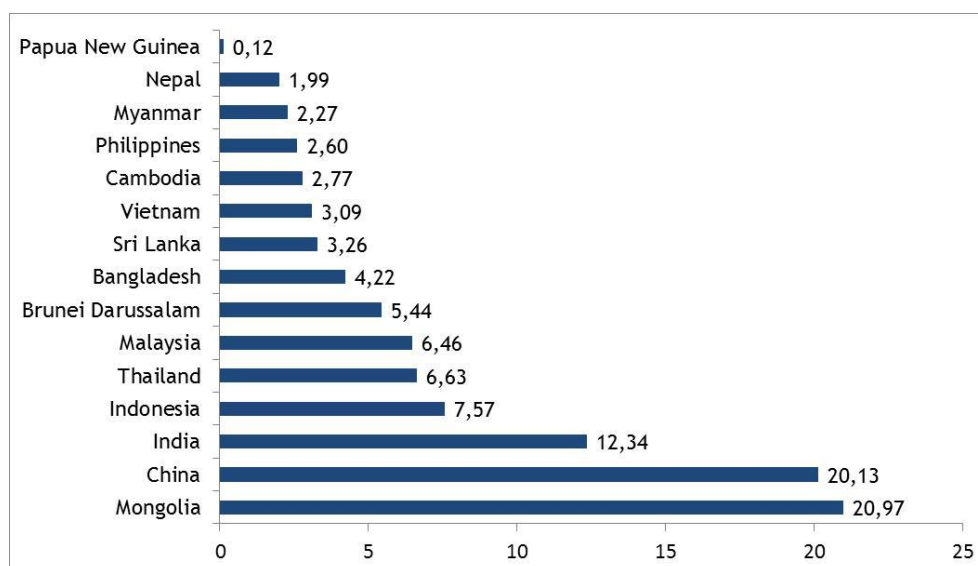
Environmental taxes have the potential to increase revenues considerably and boost fiscal space to meet the challenges and take the opportunities discussed above. Revenues can be used for environmental purposes or to cushion the effects of higher energy prices for vulnerable consumers (Schlegelmilch, Kai et al. 2016). Having fallen from a high of over 2.6% of GDP in 2002-3, since 2009 in the European Union (EU), environmental taxes have been relatively stable, raising revenues equivalent to about 2.4% of GDP, the majority from energy taxes. Some countries have very significant revenue streams from environmental taxes in the EU, including Denmark (3.9%), Slovenia (3.8%) and the Netherlands (3.6%). In Germany, for example, revenues from its 1999-2003 “ecological tax reform” amounted to almost EUR 19 billion annually, 89% of which were used to reduce pensions contributions by 1.8% (Vivid Economics 2012).

The revenue-raising potential of environmental taxation is especially important for developing countries with low tax to GDP ratios, as observed in many UNESCAP countries. Similar or higher levels of revenues from environmental taxation seem feasible in developing countries in the Asia-Pacific region, not least given the appeal of environmental taxes in more informal economies: In many instances, environmental objects of taxation constitute a more efficient and less distortive tax base than labour or capital and are as a result also harder to evade (Fay et al. 2015). Sources of carbon, for example, are concentrated and therefore easier to control and monitor. This is particularly important for developing countries, as economic activities can be easily shifted from the formal to the informal sectors.

At the same time, revenues spent on harmful subsidies are high in many Asian-Pacific developing countries and also severely limit financial capacities of governments. Phasing out subsidies in the first instance and replacing them with gradually increasing environmental taxes has the potential to unlock very significant revenue volumes in the Asia-Pacific region.

Figure 10 shows total energy post-tax subsidies as percentage of GDP in selected A-P countries as estimated by IMF 2015. Unlocking these potentials would free up very substantial amounts of revenues for additional state expenditure for e.g. infrastructure, improved fiscal governance and transition to low-carbon, climate-resilient economy, or other purposes as defined by government.

Figure 10: Total energy post-tax subsidies as percentage of GDP



Source : based on (IMF 2015a). Post-tax subsidies as defined by IMF include the costs for the failure to charge for the environmental damage from energy consumption as well as foregone revenue as energy is not taxed the same way as other consumption goods.

The benefits of reforming such subsidies are similar to those of environmental taxes: Environmental improvements, increased fiscal space, a more efficient economy and reduced market distortions and possible additional economic benefits such as increased innovation. How to reform such subsidies, many of which are tax exemptions or reduced tax rates, is examined in detail in chapter 5, where the experiences of fossil fuel subsidy reform in Indonesia and Iran are examined in depth.

Experience in OECD countries has shown that dedicated spending of a portion of ETR revenues to, for instance, energy efficiency improvements or renewable energy can amplify the environmental benefits of a tax and should result in environmental improvements being achieved at a lower cost than would be the case if ETR were implemented as a stand-alone measure. For the EU case, modelling has indicated that, in order to meet emission reduction targets in the EU 2020 strategy, a much lower carbon-energy tax rate would likely be necessary, if approximately 10% of total revenues are invested in low-carbon technologies and renewable energy (Ekins, 2009).

(Vivid Economics 2012)The benefits of using a proportion of revenues for low-carbon or green investment to facilitate a cost-effective and economically efficient green economy transition are equally applicable to developing countries in the Asia-Pacific region. While political earmarking may help to communicate the purpose of a particular environmental tax (see section 6.2), legal earmarking of revenues of environmental tax revenues for specific government programmes is not advisable, however, as the revenues raised by a tax are not an indication of the level of spending required and may result in over- or underfinancing and misallocation of resources (Cottrell, J. u. a. 2016).

Economic benefits

In addition to these fiscal benefits, environmental taxes in general are associated with a number of **economic benefits** as well. Environmental taxes are less distortive for the broader economy than other taxes such as those on labour or capital. For example, carbon and energy taxation may generate significant revenues while having a less detrimental macro-economic impact than other forms of indirect (e.g. VAT) and direct taxation (Vivid Economics 2012). Research conducted for Poland, Hungary and Spain revealed that direct taxes could have twice the negative impact on GDP that energy taxes were predicted to have.

For such reasons, economic theory proposes that green tax shifting and a stronger focus on environmental taxation, rather than personal or corporate income tax or VAT (i.e. more distortive taxes) should result in significant efficiency gains in the tax system. Thus, the IMF has suggested “carbon tax revenues should be used to alleviate distortions created by the broader fiscal system [...]” (2012, p. 27). At the same time, efficiency gains throughout the whole economy attributable to the internalisation of external also represent an economic benefit of environmental taxation, as non-internalised external costs act as a drag on green economy transition by discouraging investment in green technologies.

A further important macro-economic benefit of energy taxes is that they may lead to a reduction fossil fuel imports, as responses to rising energy prices result in energy efficiency improvements and increased deployment of renewable energies. This can improve energy security, reduce dependency and vulnerability to global price shocks, reduce loss of foreign exchange spent on energy imports and thus reduce budget and balance of payments deficits (Cottrell u. a. 2015).

Despite large amount of positive evidence for environmental tax as policy instrument (see for example, Green Fiscal Commission 2009, OECD 2006a, Andersen, M. u. a. 2007) the public discourse as well as

agenda is often times dominated by concerns regarding negative effects due to loss of competitiveness of domestic industries and possible regressive impact on society. However, several countries of the European Union can act as positive example for an effective implementation of environmental taxes (Speck 2016). For example, in Sweden greenhouse gas emissions were reduced by 23% between 1990 and 2013, while Sweden achieved overall GDP growth of about 58% in the same period (Åkerfeldt 2015). Indeed, the Porter Hypothesis indicates that increased environmental regulation, including environmental taxation, can actually boost competitiveness, as such measures create incentives for the more efficient use of energy or resources and thus may boost innovation in these sectors. ETR thereby creates advantages for businesses compared to their competitors in countries without such fiscal incentives (Porter/Van der Linde 1995).

Social benefits

The human health benefits of reduced environmental degradation are clear and as a general rule, the poor stand to gain disproportionately from environmental improvement, as they tend to live in more polluted areas, e.g. in informal settlements with poor sanitation, or in areas with poor air quality (Cottrell et al 2016).

The potential equity impacts of environmental taxation should also not be discounted, as discussed in detail in section 6.4.

3 Environmental tax reform: Background and OECD experience

3.1 Environmental Tax Reform: Definitions and instruments

3.1.1 Definitions and rationale

The underlying rationale behind environmental taxation is the **Polluter pays principle**, which states that the polluter responsible for the pollution is responsible for paying the damage done to the environment and hence should bear the cost of measures to reduce pollution (Cottrell et al. 2013). There are several types of environmental fiscal instruments available to enforce this principle (see section 3.1.2.). This report focuses solely on environmental taxes, definitions of which are listed in **Box 2** below.

Box 2: Definitions of Environmental Taxation

In the context of **industrialized countries**, the term Ecological (or Environmental) Tax Reform (ETR) refers to a revenue-neutral green tax shift, as defined by the European Environment Agency (EEA):

“**Environmental tax reform** (ETR) is a reform of the national tax system where there is a shift of the burden of taxation from conventional taxes, for example on labour, to environmentally damaging activities, such as resource use or pollution. The burden of taxes should fall more on 'bads' (such as pollution or natural resource use) than 'goods' (like employment) so that appropriate signals are given to consumers and producers and the tax burdens across the economy are better distributed from a sustainable development perspective” (EEA 2005 p. 84).

The underlying rationale for such reforms is that they tap into a "double dividend", delivering environmental benefits and economic efficiency improvements by reducing distorting labour taxes and so increasing employment. A typical case is an increase in the tax on energy, and a simultaneous reduction in labour taxes or social security contributions (EEA 2005b).

The OECD often employs a wider definition - **environmentally-related taxation** (ERT) - which does not necessarily entail a tax shift, but rather “any compulsory, unrequited payment to general government levied on tax-bases deemed to be of particular environmental relevance” (OECD 2006 p. 26). This definition is significant because the tax base is considered as the only objective basis for identifying environmental taxes: Neither the name and purpose of the tax, nor the motivation for implementing it, not the use of revenues collected, are taken into consideration.

In an even broader sense, the World Bank defines **environmental fiscal reform** (EFR) as “a range of taxation or pricing instruments that can raise revenue, while simultaneously furthering environmental goals. This is achieved by providing economic incentives to correct market failure in the management of natural resources and the control of pollution” (World Bank 2005). Besides taxes, fees and charges on environmentally harmful activities covered by the narrow definitions of ETR and ERT, EFR covers also quantity instruments such as cap-and-trade systems and the removal of environmentally harmful subsidies (EHS). EHS create an advantage on consumers and producers, to supplement their income or lower their costs, but also includes implicit subsidies, such as a lack of full cost recovery, e.g. reduced tax rates for industry or domestic consumers (IEEP 2009; OECD 2006b). Removal of EHS is hence an important element, if not prerequisite to effectively implement ETR as they create financial incentives to pollute.

In developing countries, environmental taxes focus on domestic revenue mobilization, rather than on a revenue-neutral green tax shift, which has in the past been a key rationale for industrialized countries. Environmental taxes tend to be used to **boost state revenues for additional spending** e.g. on environmental or social goals, or for **essential infrastructure investment**.

There are several reasons for this difference between developing and industrialised countries:

- The tax to GDP ratio tends to be far lower in developing countries (see Figure 1), meaning that increasing state revenues is a priority over and above keeping environmental taxes revenue neutral.
- The informal economy tends to be far larger in developing countries - meaning that bringing workers and SMEs into the tax system is a priority, rather than reducing the cost of labour.
- Developing countries require increased state revenues to cover the cost of constructing the infrastructure necessary for sustainable development and green economy transition, or to leverage private investment to achieve this goal.

The process of increasing state revenues is referred to as enhancing “fiscal space”. This approach is e.g. reflected in the 2015 Addis Ababa Action Agenda, in which countries agreed to mobilize and effectively use domestic resources: “We recognize that significant additional domestic public resources, [...] will be critical to realizing sustainable development and achieving the sustainable development goals. We commit to enhancing revenue administration through modernized, progressive tax systems, improved tax policy and more efficient tax collection. (United Nations 2015, page 11)”.

The potential benefits for developing countries in the Asia-Pacific region have been addressed in section 2.2.2. The following sections look at types of environmental fiscal instruments and their fields of application in more depth, before providing a brief overview of experiences with environmental taxation in OECD countries.

3.1.2 Types of instrument

Taxes

The focus of this report, environmental taxes are taxes where the base “is a physical unit (or a proxy of it) that has a proven specific negative impact on the environment“ (OECD 2006b). The respective tax bases are the only criterion for identifying environmental taxes, not the purpose or the underlying rationale for its introduction. For example, in most countries fuel taxes were introduced long before they were considered a form of environmental tax.

Environmental taxes, as any other tax, can be divided into quantity taxes and ad valorem taxes depending on their respective base. For most environmental taxes, the tax base is the quantity, the assessment basis can be energy (e.g. kWh), volume (e.g. litre), weight (e.g. kilograms), etc. Choosing the quantity as tax base reflects the fact that the environmental damage typically corresponds to the amount of units consumed (e.g. electricity, fossil fuels, water)- the damage is independent of the market price of the underlying good. Nonetheless, the impact of the tax on behavioural change clearly depends on the share of the tax with regard to the end user price of the taxed good. If the tax rate remains fixed, this share usually declines over time due to inflation, and revenues shrink in real terms. To prevent the devaluation of the tax in real terms through inflation, a regular adjustment to the price level is therefore required and has been implemented in some OECD countries including Netherlands, Denmark and Sweden (European Commission 2012).

Contrary to quantity taxes, ad valorem taxes are levied on prices of goods. The revenue hence depends on price levels. This makes it difficult to estimate the revenues from the tax, in particular when end user prices are linked to global market prices, as is the case for many fossil fuels. Ad valorem taxes are less commonly used in the context of ETR.

The second important distinction is between direct and indirect taxes. Direct taxes are both collected from and imposed on the same taxpayer. In contrast, an indirect tax is collected from a taxpayer who does not bear the tax burden as the costs of the tax are passed on and paid by somebody else. For example, a tax on electricity is collected from the energy suppliers, but passed on to companies and households consuming electricity. Indirect taxes require fewer collection points and thus entail less administrative effort and lower costs, which makes them attractive with regard to administrative practicability. Collecting a tax from few energy suppliers is much easier than to deal with every single company or even millions of households.

Removal of environmentally harmful and distortionary subsidies

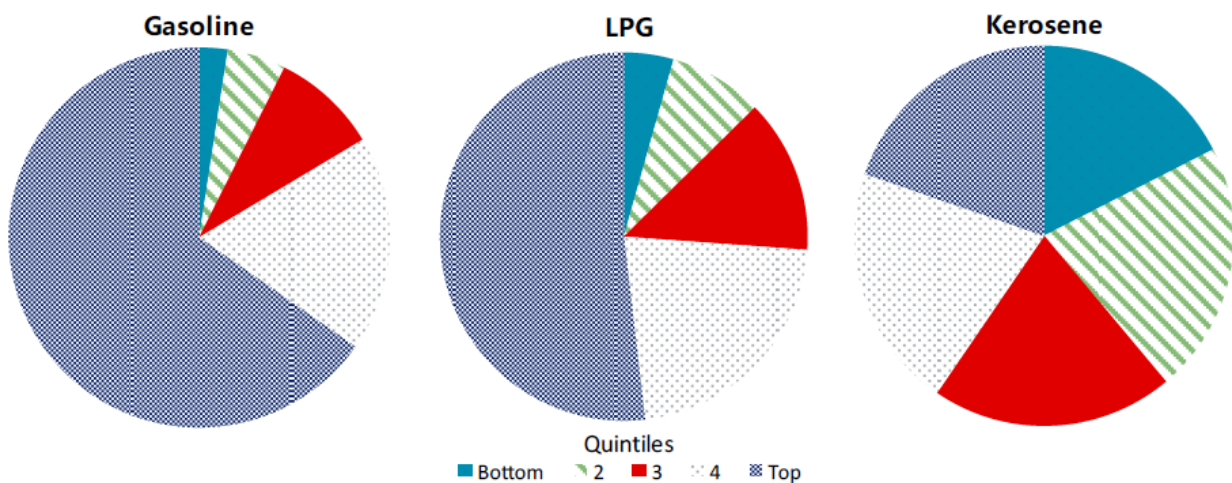
Energy subsidies are an example of an environmentally harmful subsidy. Such subsidies distort consumer choices and are hence economically inefficient. They not only incentivize pollution and hence have a negative effect on the environment; they often capture a significant proportion of government budgets, either by direct payments, e.g. transfer of funds, or through foregone revenues e.g. exemptions from payments such as energy taxes for large industries. They also include implicit subsidies such as the provision of infrastructure not paid by the user, implicit income transfers resulting from a lack of full cost pricing, and external costs such as damages to the environment which are not priced in the costs of a good. Subsidies are often found in the fields of energy, agriculture, industry or transport, but are also granted to private households. Examples for consumer subsidies in the Asia-Pacific region are subsidies on transport fuels (see e.g. **Box 6** on Indonesia) or a reduced VAT rate of 13% on coal gas and LPG for households (e.g. in China, see Produces subsidies are e.g. tax exemptions for oil consumed by refineries

for own use (G20 2016). Similar to taxes, the removal of subsidies has a beneficial effect on fiscal revenues. It likewise relieves national budgets and contributes to an internalization of external costs and therefore strengthens incentives against environmentally harmful behaviour (Schlegelmilch, Kai et al. 2016).

There are a number of reasons why energy subsidies are problematic:

- Many are regressive, mostly benefiting higher income groups, as a recent report from IMF (IMF 2015b) confirms. The research on 32 developing countries, among Bangladesh, Sri Lanka, Cambodia, India, Indonesia, Malaysia, Pakistan, Philippines, Thailand and Viet Nam shows that a very large share of benefits from price subsidies goes to high-income households, further reinforcing existing income inequalities. This is particularly true for gasoline and LPG subsidies (see [Figure 11](#))
- They encourage overconsumption of energy and undermine incentives to improve energy efficiency or reduce domestic pollution and greenhouse gas emissions.
- Fossil fuel subsidies often contribute to the deterioration of a country’s trade balance and place significant fiscal stress on the government.

Figure 11: Distribution of Subsidy Benefits by Income Group (Percent of total Subsidy Benefit)



Source : IMF 2015, p. 12

Reform of environmentally harmful subsidies represents an important first step on the way to introducing environmental taxes, because reforming subsidies shifts government expenditure in favour of less environmentally harmful behaviours and can free up substantial amounts of revenue.

Charges /Fees

Environmental tariffs, fees or charges are distinct from environmental taxes since they are paid for the provision and delivery of a specific service, for example in the areas of water supply, wastewater or waste. While taxes are by definition “unrequited” (see the OECD working definition of a tax as

„compulsory unrequited payment to the government”⁶), user charges and fees are compulsory payments made by consumers (individuals or industry) for the provision of a particular service.

Fees and charges serve a different public policy purpose from environmental taxes in that they implement the ‘user-pays’ principle, while environmental taxes serve as an instrument for implementing the ‘polluter pays’ principle, although they also provide incentives to avoid environmentally harmful behaviour.

In developing countries, while many environmental charges and fees exist (e.g. for water supply, wastewater charges), they often do not cover full costs of the service provision including the environmental damage, and costs are then covered by local, regional or national government or state-owned enterprises. To implement the user pays principle it is necessary to ensure that all (capital and operational) costs are identified and included in the charge rate and paid by service users (Schlegelmilch, Kai et al. 2016). While this is of high relevance in the developing countries, as services tend to be underfinanced as a result of lack of full cost coverage, fees and charges are not addressed in depth in this report.

Royalties

Mining royalties are a “payment due to the sovereign owner in exchange for the right to extract the mineral substance” (World Bank 2006). The key rationale for imposing royalties on the extraction of non-renewable resources is hence the compensational character of this payment, not the environmental damage created by resource extraction. Mineral resources are usually owned by the state, the crown, churches or the general public. Since mining businesses benefit from the extraction and the processing of a good they initially do not own, mining royalties are in theory supposed to provide a fair share of these benefits to the owners of non-renewable resources: the state and the general public.

In practice however, royalties are not always paid as they should due to weak governance and used to benefit the public (see e.g. EITI Indonesia 2015 on royalty payments in Indonesia). Improving collection rates and enhancing the governance of royalties payments is desirable in many developing countries, but is not addressed in this report.

Quantity instruments

Quantity Instruments such as emission trading schemes - also known as “cap and trade” - can achieve environmental objectives while increasing fiscal revenues. A quantity instrument is not a tax but a combination of a regulation and the resulting market-determined price. Quantity instruments set a ceiling on the amount of emissions permitted from an industrial process, thereby directly limiting the level of environmental impact allowed (the cap) and permit industry to trade allowances for the right to emit a certain amount of pollution (trade). Assuming that emissions allowances are sold by the regulator, cap-and-trade systems have revenue-raising potential.

Cap-and-trade systems are usually more complex than carbon taxes from an administrative perspective and hence need careful design. As experience from the European Union Emission Trading Scheme (EU ETS) shows, design errors can lead to misallocation and the scheme lacks sufficient incentives to reduce pollution and invest in clean technologies. The free allocation of a high proportion of emission allowances has resulted in prices for EU ETS allowances that are far too low (currently about 5 EUR per ton CO₂) to

⁶ <http://www.oecd.org/ctp/glossaryoftaxterms.htm#T> (accessed 23.01.2017)

achieve the desired environmental and economic incentive effects by triggering investment into no- and low-carbon technologies (Schlegelmilch, Kai et al. 2016).

Since quantity instruments depend on market-generated prices, the fiscal potential can be limited in comparison to other instruments such as taxes or subsidy reform. The administrative complexity of quantity instruments may make them less appropriate for countries still in the process of developing financial governance structures, as discussed in section 3.2.

3.1.3 Fields of application

This section provides a brief overview of the fields within which ETR could play an important role in the Asia-Pacific region, e.g. energy, traffic, natural resources, water, soil.

Environmental taxes are already commonly applied in the energy and transport sectors, for example electricity taxes or fuel taxes in Asia-Pacific countries. Taxes on buying or owning/importing cars (annual road tax/import and/or registration tax) are also well established. In many cases, existing taxes in the transport sector can be tailored to bring about improved environmental outcomes.

Taxation of natural resources is also a field in which environmental taxes can play an important role, as the extraction of non-renewable resources (mineral resources) and the (economic) exploitation of natural resources such as land and water are highly relevant from an environmental point of view. Taxes on land, water, extraction of forest resources and hunting and fishing are also relevant. Agriculture is an equally important field for the application of ETR instruments, especially in industrialised countries with protected and highly subsidized agricultural markets.

Table 1 provides a detailed breakdown of fields of application of environmental taxes and other fiscal instruments, and provides examples for policymakers of each of these instruments in OECD countries.

Table 1: Inventory of environmental taxes, fees and charges

Sector	Instrument	Example
Transport	• Registration taxes based on CO ₂ emissions	• France: Car registration tax (Bonus-malus system) (IEEP 2014)
	• Annual circulation taxes	• Spain: Mechanical vehicle circulation tax (CFE 2017)
	• Road tolls / vignette systems	• United Kingdom: Road toll London (IEEP 2014)
	• Congestion charging	• United Kingdom: Congestion charge (Transport for London 2017)
	• Air pollution charging	• USA: Air emission permit fees (EPA 2001)
Energy	• Taxes on transport fuels	• Germany: Energy tax (BMF 2016)
	• Taxes on heating fuels, e.g. oil, gas,	• India: Coal cess (IEEP 2014)
	• Taxes on energy used for power generation and taxes on electricity consumption	• Germany: Energy tax (BMF 2016)
Carbon	• Taxes on CO ₂ -content in energy sources	• Netherlands: Energy tax (IEEP 2014)
	• Taxes on CO ₂ emissions	• Canada (British Columbia): CO ₂ tax
	• Carbon price floor	• United Kingdom: Carbon price floor (Centre for Climate Change Economics and Policy 2013)

Air	<ul style="list-style-type: none"> • Air pollution charges, e.g. on SO₂, as well as VOC, NO_x, SO₂, PM, NH₂, heavy metals, CO, NH₃, etc. 	<ul style="list-style-type: none"> • Czech Republic: Air pollution charges (IEEP 2014)
	<ul style="list-style-type: none"> • Fines for failure to meet air quality standards 	<ul style="list-style-type: none"> • China: Environmental Protection Law (People's Republic of China 2014)
	<ul style="list-style-type: none"> • Ticket Tax 	<ul style="list-style-type: none"> • Germany: Air passenger duty (IEEP 2014)
Water	<ul style="list-style-type: none"> • Charges and taxes on water supply 	<ul style="list-style-type: none"> • Denmark: Water pricing (IEEP 2014)
	<ul style="list-style-type: none"> • Waste water charges 	<ul style="list-style-type: none"> • Denmark: Water pricing (IEEP 2014)
Biodiversity	<ul style="list-style-type: none"> • Payment for Environmental Services 	<ul style="list-style-type: none"> • Mexico: Scoler'te (Plan Vivo 2017)
	<ul style="list-style-type: none"> • Conservation fees, e.g. national park entry fees 	<ul style="list-style-type: none"> • South Africa: Dailey conservation fees (South African National Parks 2017)
	<ul style="list-style-type: none"> • Land tax, e.g. taxes on land use change, high rates of land tax on frontier 	<ul style="list-style-type: none"> • Australia: Multiple-outcome auction of land-use change(PP) (Ecologic 2006)
	<ul style="list-style-type: none"> • Fishery management charges 	<ul style="list-style-type: none"> • Iceland: Fisheries resource tax, system of tradable fishing quotas (IEEP 2014)
	<ul style="list-style-type: none"> • Non-compliance fees 	<ul style="list-style-type: none"> • Lithuania: Tree cutting non-compliance fees (Ecologic 2006)
Waste	<ul style="list-style-type: none"> • Landfill taxes 	<ul style="list-style-type: none"> • United Kingdom: Landfill tax (IEEP 2014)
	<ul style="list-style-type: none"> • Incineration taxes 	<ul style="list-style-type: none"> • France: General tax on polluting activities (IEEP 2014)
	<ul style="list-style-type: none"> • Pay-as-you-throw schemes (PAYT) 	<ul style="list-style-type: none"> • Germany (IEEP 2014)
Resources	<ul style="list-style-type: none"> • Taxes on natural resources 	<ul style="list-style-type: none"> • Latvia: Natural resource tax (IEEP 2014)
	<ul style="list-style-type: none"> • Royalties for resource extraction 	<ul style="list-style-type: none"> • Indonesia: Mining royalties (Natural Resource Governance Institute 2017)
	<ul style="list-style-type: none"> • Rent taxes (e.g. resource rent taxes) 	<ul style="list-style-type: none"> • Iceland: Fisheries resource tax, system of tradable fishing quotas (IEEP 2014)
	<ul style="list-style-type: none"> • User fees (e.g. signature bonus⁷) 	<ul style="list-style-type: none"> • Angola: Signature bonus (Broadway/Keen 2009)
	<ul style="list-style-type: none"> • Aggregates tax 	<ul style="list-style-type: none"> • United Kingdom: Aggregates levy (UK Government 2017)
	<ul style="list-style-type: none"> • Similar arrangements: production sharing agreements, auctions, equity participation, infrastructure provision requirements 	<ul style="list-style-type: none"> • Indonesia: Mining royalties (Natural Resource Governance Institute 2017)
Agriculture	<ul style="list-style-type: none"> • Pesticide and fertiliser taxes 	<ul style="list-style-type: none"> • Norway: Pesticide tax (IEEP 2014)
	<ul style="list-style-type: none"> • Nitrogen charges 	<ul style="list-style-type: none"> • Sweden: Tax on nitrogen oxide emissions (OECD 2013)

Source: Schlegelmilch, Kai et al. 2016, based on Withana et al. (2014), Broadway/Keen (2009)

⁷

A signature bonus is a one-off fee for the assignment and securing of a license for commercial entities to conduct exploration activities and extract natural resources e.g. oil.

3.2 Comparisons between environmental policy instruments

Environmental taxes are part of a toolkit of environmental policy instruments available to policymakers to achieve specific environmental goals. In practice, environmental taxes and market-based instruments are typically employed within a broader mix of regulatory instruments (see section 7.6). Further, as (Goulder/Parry, I. W. 2008) state, no single instrument is clearly superior along all the dimensions relevant to policy choice; even the ranking along a single dimension often depends on the circumstances involved.

Depending on the economic, social and environmental objective that should be reached, an approach to decide upon the right policy option could be as follows:

- If the risk e.g. to human health of a particular pollutant is great, then the corresponding measure should keep risk to a minimum: Highly toxic substances should be banned
- If a certain level quantity of emissions is required, cap and trade or regulation can ensure that the target is met (but price volatility for emissions allowances is a substantial risk)
- If creating a dynamic incentive for change is required a tax might be more appropriate (but cannot guarantee specific emissions reductions)

The following table provides an overview on advantages and disadvantages of the different policy instruments.

Table 2: Advantages and disadvantages of environmental policy Instruments

Policy Instrument	Advantages	Disadvantages
Standards, e.g. emission standards, technology standards	• Achievement of specific environmental targets relatively certain	• No dynamic efficiency - few incentives for regulated to improve beyond standard or to innovate
	• Relatively simple to set up	• Less efficient than market based instruments
	• Clarity for business	• Monitoring & sanctions for non-compliance
	• Experience / best practice widely available	• Vulnerable to weak governance
	• Independent from market conditions	• Information asymmetry - standards difficult to define - may be set too low
“Soft” instruments, e.g. voluntary agreements	• If government perceived to be strong, compliance with voluntary measures increases = compliance at low cost	• Enforcement not possible - so difficult to apply unless aims are in line with business interests
	• Provide greater flexibility than regulations	• Where costs of compliance are high, agreements tend not to be met
	• Encourage precautionary attitudes in industry and raise environmental awareness	• “Free riders”
	• Boost trust between industry and other stakeholders	• Evidence of effectiveness e.g. of ISO 14001 is mixed
	•	• Difficult to ensure global application
Environmental Taxes	• Dynamic incentive to reduce pollution - also in the long-term	• Can reinforce informal economic activity
	• Cost-effective and efficient, low administrative costs	• Politicised debate can result in low tax rates, numerous exemptions => less efficient and cost-effective
	• Revenue-raising potential - important where government revenues are low	• Revenues may fall over time if tax rates are not adjusted
	• Address market failures and distortions	• Market distortions may remain e.g. if harmful subsidies are not reformed
	• Can have positive social impacts e.g. on employment / poverty reduction	• Negative social impacts possible due to rising prices (“trade offs”)

Source: Reproduced from IP Consult et al. 2015

3.2.1 Regulatory measures

Regulatory instruments are information-heavy. This means that in cases where information is lacking or expensive to procure, a market-based instrument may be more appropriate to address the environmental problem. The top-down approaches inherent in regulatory measures also give the regulated few incentives to improve their performance on their own initiative and beyond what is required by law. Market-based instruments in contrast create a dynamic incentive for producers and consumers in favour of continuous environmental improvement and optimization. Because of these dynamics, taxes and other fiscal instruments result in more innovations and force the development of new and cleaner technologies (Andersen, M. S. 1995).

Environmental taxation does not prescribe specific technologies or solutions. Instead, targeted entities decide on the most appropriate and cost-efficient response, e.g. to control their output of emissions, to change their input of raw materials and energy, or to do a mixture of both. In comparison, regulations are at a cost disadvantage, because of information problems faced by regulators as well as limitations in the ability of these instruments to optimally engage the various channels for emissions reductions (Goulder/Parry, I. W. 2008). Taxes are also more appropriate measures to deal with non-point sources of pollution that typically cannot be controlled by command and control measures, but where there are proxies which can be taxed, thus enabling pollution control to take place where the marginal costs are lowest, ensuring substantial cost savings. At the same time, environmental taxes can also generate substantial revenue, which can be used for environmental or other purposes (see Section 2.2.2).

Regulatory measures however are the first choice wherever a full control of the environmental outcome is required, for example in cases where a hazardous chemical needs to be banned because of its toxic impact on the environment or on human health.

Box 3: Successful examples on the use of market-based instruments to deal with excess environmental loads

Japan introduced a **SO₂-levy** already in 1974, mainly to raise funds from smoke-stack industries to pensions for officially recognised pollution victims. Coupled to the level of revenue needed, the rate of the levy was fixed and initially rather low. Nonetheless, the levy was extremely effective in reducing SO₂-emissions: Only 10 years later Japan had the lowest SO₂-emissions per capita in the industrialised countries (Andersen, M. S. 1995).

One objective of **Denmark's energy taxes** was to generate revenue for the treasury. While industries have been exempted, households have been subject to the highest (implicit) CO₂-taxation within OECD countries. In combination with other policy-instruments, especially R&D programs and subsidies for insulation of buildings, the use of energy for heating decreased by 45% from 1972 to 1989 (Andersen, M. S. 1995).

3.2.2 Emissions trading

While there is a consensus that in theory carbon pricing is an effective market based instrument to reduce GHG emissions and the most promising instrument for climate change mitigation, outperforming regulatory measures, there is a longstanding scientific and policy debate about which policy instrument - emissions trading or a carbon tax - is the most effective and appropriate.

The greatest advantage of emissions trading over environmental taxation is that it can guarantee that certain emissions reductions (or other environmental goals) will be achieved by restricting the number of

allowances within the trading system (if the level of allowances allocated is set at the appropriate level). On the other hand, the costs of pollution abatement are less certain under a trading scheme (Fullerton et al 2010:437) and the demands of designing and administering a functioning system render emissions trading a less feasible prospect in many developing countries. Compared to a tax, emissions trading systems are more complicated to set up, place more administrative responsibility in the hands of political systems which may face problems of poor governance, and are more susceptible to international economic conditions.

An ETS is based on the principle that the market determines the carbon price, depending upon the supply and demand of emissions allowances on the market. An ETS guarantees predictability in terms of national emission levels, provided the trading system is fully functional, reliable systems of monitoring and verification of emissions are in place, and strict handling of fines for non-compliance is imposed. However, in practice, emission trading schemes face a number of challenges: During design of the ETS phases, bargaining takes place between regulator and business regarding the number of allowances to be allocated. Since the regulator is less informed than business itself, there is information asymmetry that puts business in a favourable position. During implementation, enterprises may choose to comply by cheating, with de facto emissions staying high.

In the light of this, an important advantage of carbon taxes in the context of developing countries in the Asia-Pacific region is that carbon taxes are easier to administer and implement, do not require additional institutional infrastructure and thus are associated with lower transaction costs. At the same time, a significant amount of state revenue can be raised from a carbon tax. Business has price certainty and can plan future investment based on the tax rate. Companies have to make the same decisions as under an ETS - to pay the tax, to invest in saving technology, or to reduce output if higher prices cannot be passed on - but this takes place under price certainty. This may lower initial resistance of business groups (Nugumanova/Troschke 2016).

An assessment of the two instruments against the criteria mentioned above is provided in the table below.

Table 3: Comparison of policy instruments

Criteria	Emission Trading	Carbon Tax
Predictability of emission levels	+	-
Price certainty	-	+
Use of trading instruments	+	-
Use of existing tax system	-	+
Use of existing legal system	-	+
Ease of implementation	-	+
Low transaction costs	-	+
State budget revenue raise	0 / +	+
Resistance to lobbying by pressure groups	-	-

The decision whether to implement a trading scheme must be made in the specific country context. The regulatory, institutional, human capital and financial capacities of the country should be considered. While a tax system already exists in every country, an ETS requires establishing and maintaining additional infrastructure, an additional legal basis and human capital for trading infrastructure and market oversight.

A significant advantage of environmental taxation is that, in contrast to ETS schemes, taxes do not require new institutional arrangements as they can usually build upon existing tax administration structures.

Section 7.2 compares and contrasts the experiences of China and Kazakhstan in implementing cap and trade and highlights the problems faced by countries with poor governance and weaker institutional settings in creating the new institutional arrangements necessary to implement an ETS scheme. In the developing country context, where financial governance may be poor, taxation and budgeting intransparent, and mechanisms of public accountability and control less than optimal, ETS schemes may prove too challenging to administer. At least in part for this reason, Chile, Mexico and South Africa are all recent examples of developing countries which seriously considered whether to implement an ETS or a carbon tax and subsequently opted for the latter.

Box 4: Experience from EU Emissions Trading

In the EU, the Emissions Trading System (ETS), which operates in all 28 member states plus Iceland, Liechtenstein and Norway, covers 45% of the EU's GHG emissions. It limits emissions from 11,000 industrial and energy installations as well as airlines operating between these countries. Being the cornerstone of the European strategy to manage greenhouse gases, the ETS shall contribute to the EU target of -20% GHG emissions in 2020 and -40% in 2030 compared to 1990 levels (European Commission 2016). However, the first two phases of the ETS have been widely criticized as having not created a stable climate for low-carbon investment and have faced significant problems of over-allocation and an unstable carbon price. The price for EU allowances climbed to EUR30 per ton by spring 2006 and collapsed soon after due to over-allocation of emissions permits, as the economic crisis led to a general downturn in emission levels (Goers et al. 2010). Nordhaus claims that such costly and desirable volatility is common in quantity-based systems, i.e. trading rather than taxation (Nordhaus 2007, 37ff).

As a response to these shortcomings, policy makers have been exploring ways to prevent the price of emissions allowances falling below a certain level and hence to stabilize the carbon market. For this reason, the UK government introduced a carbon floor price for power generation of initially EUR16/tCO₂ in 2013, which was supposed to rise to EUR30/tCO₂ by 2020. Currently it stands at EUR 18 per t of CO₂ and has been frozen until 2020 (Ares/Delebarre 2016). The carbon floor price is predicted to drive EUR34-EUR45 billion of new investment in low-carbon electricity generation. The policy reflects the UK government's view that a higher and more stable carbon price than that provided by the EU ETS is necessary to effectively incentivise the decarbonisation of the UK power sector. The European Commission also had similar concerns and has 'set aside' certificates to stabilise and maintain the carbon price.

State revenues from the ETS have been much less than would have been the case under a corresponding tax, as the vast majority of permits have thus far been distributed to emitters at no cost. Thus, comparatively less revenues have been available to reduce distortions in the economy, to protect vulnerable households from the impact of rising energy prices, or to subsidise renewable energies and low-carbon investment. Instead, as about half of all companies in the EU ETS factored in a high proportion of the cost of certificates in their prices, they made windfall profits (Schlegelmilch, Kai/Bunse 2008). This problem was partially reduced in the third trading period from 2013-2020, where about half of all permits are auctioned, with best available technologies (BAT) benchmarks imposed for sectors regarded as particularly vulnerable to carbon leakage.

3.3 The OECD experience

3.3.1 A brief history of ETR in OECD countries

Today, progressive environmental tax frameworks exist in many countries. Carbon, energy, and transport taxes are widely used in the OECD, and also waste-related instruments are quite common (EEA 2016). 40 countries and more than 20 cities, states and provinces around the world have implemented some form of carbon taxation or emissions trading systems (World Bank et al. 2016b). A very comprehensive system of energy taxation exists in Europe (Speck 2016) and many other countries. A wide range of vehicle sales taxes, motor vehicle taxes or road charges is in place in many countries worldwide. Pollution and resource taxes are less widespread (EEA 2016), but they are often designed to target location-dependent damages. Most common are possibly water-related taxes. Several European countries, as well as Mexico, tax the use of pesticides or fertilisers.

Over time, attitudes towards ETR have significantly changed and stakeholders are increasingly aware of environmental risks and the need for appropriate political measures (Speck 2016). This is not only true for European countries - changes are coming into force around the globe. In 2014, for example, a carbon tax entered into force in Mexico, covering approximately 40% of greenhouse gas emissions (Cottrell, Jacqueline et al. 2016). The same year, Chile announced plans to comprehensively reform their tax system, including the introduction of several ETR elements such as a carbon tax, as well as vehicle taxes based on CO₂ and air pollution (ibid.).

Since the 1990s, much experience in the field of ETR has been gained in OECD countries and a broad range of literature emerged (see e.g. EEA 2005, OECD 2010, IMF 2012, European Commission 2014, Withana et al. 2014). Many of the lessons learned are universally applicable and point out the most relevant considerations for effective and feasible ETR. Critical success factors include careful consideration of the underlying motivation of a particular tax, tax design, revenue use, policy credibility and communication, as well as implementation challenges. The sections below highlight the main lessons learned from OECD countries.

3.3.2 Lessons from the OECD experience

The primary motivation for ETR measures may be fiscal, economic or environmental

In the early 1990s, the most progressive environmental tax reforms took place in Finland, Norway, Sweden and Denmark, with the Netherlands close behind (OECD 2004). In 1999, several large countries, including France, Germany and Italy, followed. Despite its environmental effect, in the OECD, ETR was also motivated by its fiscal potential. Denmark and Sweden implemented ETR elements in response to banking crises in the late 80s, early 90s. Similarly, Ireland and Greece were looking for fiscal consolidation possibilities in the aftermath of the financial crises in 2007. Following significant increases in transport fuel taxation, for example, in Greece environmental tax revenues increased from 2% in 2009 to 2.9% by 2012 (European Commission/Eurostat 2015). In Ireland, the introduction of a carbon tax and water charging were a direct response to the country's fiscal crisis and were introduced in its National Recovery Plan in 2010 (Government of Ireland 2010). Thus, fiscal considerations and use of revenue have been a primary focus of ETR in OECD countries. At least in the EU, ETR has resulted in relatively stable tax frameworks that generate comparatively stable revenues over a long period of time.

Environment and climate policies have also clearly been high on the agenda and environmental impacts of taxes have been substantial. For example, the UK landfill tax has been extremely successful in reducing

the proportion of waste to landfill from 86% in 1996 to 36% in 2012 (Withana u. a. 2014). In France, a bonus-malus system of car registration tax resulted in reductions in average CO₂ emissions of newly registered passenger cars in France from 149.4g CO₂/km in 2007 to 130.5g/km in 2010, with resulting decreased fuel consumption leading to a saving of almost 2 million tonnes of CO₂ in 2008 and 3 million tonnes in 2009 (Withana u. a. 2014).

Other policy priorities have also played into policy formulation. For example, at a time of high unemployment in the late 1990s, Germany focussed on reducing its labour costs by shifting the tax burden from labour to environmentally damaging activities in an attempt to boost employment in the country. It has been estimated that as many as 250.000 jobs were created as a result (DIW 2002).

Tax design often deviates from economic theory to ensure political feasibility

In order to achieve high environmental benefits at low economic costs, environmental taxes need to be carefully designed (OECD 2011). Tax design includes the choice of tax base, scope and point of application, as well as an appropriate tax rate. Recommendations for tax design in Asia-Pacific and lessons most relevant to developing countries are examined in detail in chapter 7. This section takes a quick look at the lessons learned in OECD and compares theory and practice in tax design.

A **tax base** that directly targets a pollutant or polluting behaviour creates unambiguous incentives for economic actors to change their behaviour (European Commission 2014). For example, fossil fuel tax rates should ideally be applied to the fuels' carbon content, if reducing carbon emissions is the objective of the tax. However, fuel taxes in many countries are expressed per unit of volume, even though burning a litre of diesel emits more carbon than a litre of gasoline: The same tax rate per unit of volume thus distorts relative prices in favour of fuels with higher carbon content, creating adverse consumer incentives. To avoid such inconsistent incentives, the tax should directly target the pollutant (carbon in this example) if possible. Plastic bag taxes, taxes on the carbon content of fuels, and landfill taxes are all examples of taxes where tax bases can be targeted directly.

In many instances, however, a proxy has to be chosen, such as the carbon content of energy inputs to power generation, rather than the resulting carbon emissions - as in the case of the Climate Change Levy in the UK. In such cases, the possibility of creating unintended incentives should be kept in mind. For example, Sweden introduced a tax on nitrogen oxide on energy inputs in 1991 (as a proxy for SO₂ emissions), which did not apply to smaller installations (less than 25 gWh per year). To eliminate false incentives to build more smaller power generation plants, not subject to the tax, rather than larger plants, revenues were recycled to power generators on the basis of useful energy produced: Thus more efficient plants received more revenues than less efficient plants, creating a strong incentive to improve efficiency (Millock u. a. 2004).

In economic theory, the tax base should cover as many emissions sources as possible in order to enable the widest range of possible abatement options (OECD 2010b; OECD 2010a). The more sources are covered, the larger the variety of reduction possibilities. In practice, however, even broad carbon pricing schemes do not cover all carbon emissions: The EU ETS targets only large stationary emissions sources, or about 45% of the EU's greenhouse gas emissions (European Commission 2016). Mexico's carbon tax covers about 40% of the country's carbon emissions, while Chile's carbon tax will hit 4 large companies, responsible for about 55%. Often in practice the best policymakers can aim for is to introduce a tax consistent across several sectors.

Choosing the **point of application** along the supply chain is also critical for administrative costs and collection feasibility and also determines the breadth of coverage. Applying a tax at an early stage of the

supply chain usually reduces the number of entities that have to be taxed. In such cases, all secondary products are affected by the tax uniformly and the intended price incentive applies to all following production or consumption decisions. The UK Aggregates Levy, for example, at the point when aggregates first enter the market. Royalties in Germany on mineral resources are collected directly from the extractive industries sector. Taxes on (refined) fossil fuels - though passed on to end users - are collected from manufacturers /distributors. Linking to existing tax collection mechanisms can also keep administrative costs to a minimum: In Ireland, administration costs of the plastic bag tax were kept low by linking revenue collection and reporting to retailer's VAT collection systems, ensuring that net additional costs are modest, and generally lower than the savings resulting from not having to purchase and store as many bags (Convery, F. u. a. 2007). This approach is common in many countries, whether industrialised or developing, see e.g. India's clean energy cess is administered in a similar way and linked to existing self-reporting mechanisms at coalmines.

The regional dimension of an environmental problem determines the necessary **scope** of an environmental tax (OECD 2011). Some environmental damages are confined to a small or bounded area and have to be addressed at this lower level of competency. Other problems are supra-regional or even global, such as climate change or overfishing, and should be addressed at this higher level, to the greatest extent possible - although very often unilateral action or regional action represents the second best option.

In accordance with the polluter pays principle, the **tax rate** should correspond to the marginal damage costs of the pollutant under consideration. In this way, external effects to third parties can be fully internalized. This aligns prices paid by consumers to real costs and thus yields the most efficient market outcome (see e.g. EEA 2005, OECD 2010, European Commission 2014).

In practice, however, it is extremely difficult to calculate marginal damage costs and many other considerations may override any calculations made. It may be, for example, that a tax rate has to be set much higher than the marginal damage cost before it is effective in changing environmentally damaging behaviour - as in the case of the UK landfill tax, which has been described as "several times greater than any reasonable estimate of the external costs associated with landfill" (Mirrlees et al., 2011, Part 2, p. 243)." Such a high tax rate was required, however, to enable the tax to meet its objective of significantly reducing waste-to-landfill. Clearly, from an economic perspective, setting the tax rate above marginal damage costs in this way does not lead to an optimal outcome and thus decreases social welfare. From a political economy point of view, however, 'overtaxing' was in this case necessary to achieve the specified objectives.

In other cases, a very low tax rate may bring about significant changes in behaviour, particularly if alternatives are readily available. Incentivizing a transition from leaded to unleaded petrol, for example, was realised easily in many countries worldwide as a result of differentiated pricing.

When setting the tax rate, the impact of inflation on real tax values should be taken into account. Most environmental taxes are per unit taxes (ad quantum) and thus depreciate in real terms with rising price levels (Cottrell, Jacqueline et al. 2016), impairing their fiscal and environmental effectiveness. Tax rates thus have to be adjusted to the price level frequently. In some countries several tax rates are indexed to a consumer price index (ibid.) automatically sustaining the real price incentive. Tax design is examined in considerable depth in chapter 7.

Strategic approaches to revenue use are common to facilitate implementation

Environmentally-related tax revenues are no different from any other government revenues and hence should be treated accordingly (Schlegelmilch, Kai/Joas 2015). Tax revenues should be considered part of

the general budget without confining their use to a special purpose (earmarking). Revenues should always be used in their most productive and beneficial way, no matter their source. Earmarking may even be detrimental for various reasons: Governments need some flexibility in their spending policy to act appropriately under changing circumstances, a flexibility which may be restricted by earmarking. Earmarking does not guarantee appropriate funding, as tax revenues and funding needs do not necessarily match and can change over time, resulting in over- or underfinanced projects (Cottrell, Jacqueline et al. 2016).

As noted above, some governments in OECD countries have prioritised fiscal objectives when introducing environmental taxes and others have deliberately used the revenues from environmental taxes to serve political priorities and thus increase the political feasibility of the tax. Often recycling mechanisms have targeted payers of environmental taxes - such as farmers in Denmark, who profited from reduced land value tax at the same time as pesticide taxes were introduced - to boost support for tax measures. In other cases, tax revenues are used to bring important stakeholders on side, e.g. by using revenues to reduce employers' social security contributions - a trend widely seen in the EU - or to fund transitional measures. For example, Switzerland uses parts of revenues from its CO₂ levy on fuels to finance a fund for energy efficient technologies available to companies (BAFU 2015).

In the majority of developing countries, additional revenues are important to fund vital government services (e.g. health and education), infrastructure and other large-scale investment. As demonstrated in OECD countries, governments have to prioritize such projects according to the individual country context and with the goal of maximizing welfare. While in theory at least, the source of revenue should not be an influencing factor, in terms of political realities, the allocation and purpose of tax revenues often matters for public acceptance (World Bank 2005). For this reason, governments in OECD countries tend to consider carefully how to use revenues, and also how to communicate and raise awareness about their proposed use. Ultimately, the effectiveness of environmental taxes is supported by **political credibility** and clear **communication**. Experience in Europe during 1990s has shown that much ignorance and scepticism regarding the purpose and intentions of ETR existed among the public at large (OECD 2010a; PETRAS 2002). Governments have to communicate their goals clearly and credibly in order to gain public support. These issues are discussed in depth in the context of developing countries in the Asia-Pacific region in section 6.2 below.

Addressing implementation challenges - distributional impacts

In OECD countries, a common objection to environmental taxation has been its distributional impact. However, distributional impacts differ widely between different taxes and from country to country (Vivid Economics 2012). While some environmental taxes are progressive - e.g. transport taxes, taxes on air travel - others cases are less clear-cut and some taxes, e.g. household energy taxes, place a disproportionate burden on low-income households.

The regressive effect of ETR can be substantially mitigated by using a small fraction of the additional tax revenues as compensation (Vivid Economics 2012). In OECD countries, the social impacts of ETR are generally taken into consideration during the tax design phase, resulting in social compensation schemes, innovative revenue recycling, or other subsidy measures. In Germany, for example, low-income households received financial support for energy-efficiency measures funded by revenues from the Ecotax.

In many cases compensation schemes have proved sufficient to render the implementation of ETR measures politically feasible and socially equitable. This is not always the case, however: Reduced VAT rates for domestic energy users in the UK have been in place for many years and cannot be challenged by any of the main political parties, due to previous strong political opposition to reforms in the 1990s and

the ongoing issue of “energy poverty” in the country.

Addressing implementation challenges - competitiveness

A common obstacle in OECD countries to the implementation of ETR has been the assumed impact of ETR measures on the international competitiveness of particular sectors. However, recent industry-based studies show, however, that a strengthening of environmental legislation does not have a detrimental effect on growth rates in most technologically advanced countries (Albrizio u. a. 2014) and that higher energy taxes, compensated for by a reduction in labour taxation, can improve competitiveness (Barrios u. a. 2013). At the same time, some model simulations indicate that environmental taxes can cause shifts in production in certain industrial sectors, especially where the commodity is standardised and internationally traded (e.g. copper and aluminium), and equivalent taxes are not levied in other countries. In such cases, Member States often grant partial or total tax exemptions (see IEEP, 2012 and IVM, 2014 for examples), even though those reduce the incentive effect of the taxes.

Raising or implementing taxes on energy, transport etc. can potentially be a competitive disadvantage for local companies. However, environmental taxes are often found to be less detrimental to a country’s economic performance than other forms of taxation. A green tax shift through ETR, from capital or labour to environmental taxation, may thus increase economic output as modelling approaches indicate (Hewett/Ekins 2014). For example, COMETR 2007 found an increase of up to 1% in GDP as a result of ETR in six European countries. Additionally, the effect of environmental taxes may even increase competitiveness over time (ibid.). Energy and resource efficiency or the development of low-carbon technologies are incentivized by ETR and constitute a major advantage in a decarbonising world.

The OECD experience has highlighted the dangers of over-generous compensation packages for industry, which have undermined the incentive effects of energy taxes in many OECD countries. Such approaches are problematic, as they trade off environmental effectiveness due to competitiveness concerns and result in ‘lock in’ of harmful subsidies over time.

Box 5: Tax exemptions for energy-intensive industry: Leaving efficiency potentials untapped

In Germany, for example, energy-intensive companies in the manufacturing sector receive a refund of 90% of their energy and electricity taxes - even though the Federal Environment Agency has estimated that the subsidy almost completely removes the incentive impact of the Ecotax (UBA 2014). These exemptions were due to be phased out in 2012, but instead the system has been extended to 2020 and energy management systems have been made compulsory, as have annual energy savings of 1.3% (2012-15) and 1.35% (2016) (BMWi 2013, UBA 2014). Annual energy savings between 1991 and 2009 have been well above the planned rates of 1.3% and 1.35% - thus, these rules are leaving large potentials in the energy-intensive industries in Germany untapped (see Andersen, M. S./Ekins 2009, Roland Berger 2011) because of costly and environmentally harmful tax exemptions.

These issues can be addressed in a number of ways. Exemptions should be subject to regular review and limited in time: Sunset clauses can be helpful in this regard. Industry can be supported to make changes in production process to reduce energy consumption or emissions, with the support of government agencies set up for that purpose, such as the UK Carbon Trust. Introducing taxes at a low rate can ensure initial acceptance, while later increases can give businesses time to adjust to rising prices, as has been the case in many OECD countries for carbon-energy taxes, taxes on waste, landfill, aggregates, fertilisers, and packaging.

Alongside compensation or support measures, stakeholder involvement can also help to overcome such objections to ETR and give policymakers the opportunity to know and understand stakeholders' interests and derive policy implications. To create consensus, stakeholders need to be informed about the damages that environmental taxes are supposed to address and need to understand the measures that the government plans to implement. Moreover, business stakeholders can be empowered through their involvement in drafting legislation and suggesting possible measures to reduce potential negative competitiveness impacts. During the design phase of the Climate Change Levy in the UK, for example, the initial rate proposed was rather high: Industry objected and became involved in negotiations to develop an alternative policy proposal. Knowledge on the part of industry that previous high tax rates proposed by the UK government had been implemented - in the case of the Aggregates Levy - in response to a lack of compromise on the part of industry lent the threat of a high tax rate a degree of credibility. Thus in this case, industry responded by negotiating a lower tax rate in return for emissions reduction agreements.

Summary

The issues addressed here are looked at in more depth in Part II of this report, which applies lessons learned in OECD countries to developing countries in Asia-Pacific and extracts a series of in-depth recommendations for policy-makers. Detailed information on experiences in OECD countries with ETR measures can be found in the annex to Cottrell et al 2016.⁸

3.4 Outlook for environmental taxes in OECD countries

Since 2008, a number of fiscal reforms in OECD countries have focussed on fiscal consolidation and budget tightening to control the severe impact of ongoing financial, fiscal and economic crises. These crises have prompted many governments in OECD countries to explore less distortive taxes, or what the European Commission refers to as “growth-friendly” taxes. Such measures include environmental taxes, consumption taxes, and taxes on property to increase state revenues without slowing growth or resulting in unemployment (for a detailed discussion of possible reform approaches in the EU, see European Commission 2015). Many countries, including amongst others Austria, Belgium, Greece, Japan, Norway and Spain, are comprehensively shifting their tax policies towards a focus on growth by reducing taxes on labour and corporate income (OECD 2016). In the EU, aside from a focus on reducing budget deficits, the debate around fiscal reform has centred on measures to reduce distortive taxes on labour and employment, particularly for low-income earners. Concerns regarding international competitiveness have played a less important role in the fiscal policy debate.

Concretely, a very clear response to budget deficits on the part of many governments has been to increase environmental taxation: In well over half of all EU countries, taxes on energy, carbon, other sources of pollution and resources have recently been increased or introduced (European Commission 2015). In Greece, for example, taxes on transport fuels were increased by more than 5 cents per litre in response to the country's growing structural deficit and spiralling debt. In Ireland's 2010 emergency budget, a carbon tax of 15 EUR / tonne and water charging were introduced, as part of a broader package of emergency measures. In the majority of cases, EU governments have deliberately set out to raise additional revenues through environmental taxation. Similar steps have been taken in OECD countries in Latin America, with Chile implementing a broad programme of fiscal reform, which also included in the introduction of a carbon tax and Mexico introducing a carbon tax.

⁸ https://www.die-gdi.de/fileadmin/user_upload/pdfs/publikationen/studies/2016/Annex_Study_93.pdf

Environmental taxes generally do not raise sufficient revenue to address budget deficits as stand-alone measures, but at the margin, the fiscal impact of environmental taxes can be rather significant. In Ireland, the carbon tax contributed between 21.5% and 24.6% of the total tax increases required between 2010 and 2012 (Convery, F. J. u. a. 2013). While there was a clear fiscal imperative to explore new sources of revenue and implement a carbon tax, green party politicians had called for the tax since the 2000s, and the country's Green Tax Commission had made similar recommendations. Thus, while fiscal motivations were paramount, climate considerations also played a role in the implementation of the tax.

Environmental tax revenues in the EU have stabilised since 2009, raising revenues equivalent to approximately 2.4% of GDP and the number of environmental tax measures implemented has increased substantially. In OECD countries as a whole, environmental tax revenues were 785.196 Mio USD in 2014⁹. There can be many reasons for falling revenues from ETR measures, discussed in detail in section 2.2.2 in the context of the Asia-Pacific region.

A strong focus on carbon-energy and transport taxation is evident from policy changes in OECD countries (OECD 2016). In relation to transport, a strong focus on diesel fuel in the public policy debate is evident, as a result of deterioration of air quality in many European cities resulting from NO_x and particulate emissions and in response to cheating on the part of car manufacturers regarding real diesel vehicle emissions. These crises have drawn a widespread response from the media and public awareness of the issue is high, making measures to increase tax measures on diesel politically feasible. In many countries, however, annual circulation taxes and vehicle registration taxes have promoted diesel vehicles as a low-carbon mode of transport. This has made politicians reluctant to respond with environmental tax increases alone and scrappage schemes are currently also being discussed in several EU countries, including the UK. As well, several countries, including Belgium, France, Portugal and Sweden, have introduced tax measures to reduce the price gap between diesel and petrol (EEA 2016; OECD 2016). Paris, Madrid, Mexico City and Athens have all declared their intention to ban diesel vehicles altogether by 2025.¹⁰ Other countries have implemented or announced changes to motor vehicle taxes (e.g. Chile, United Kingdom) and company car taxation (e.g. Austria, Estonia and the Republic of Korea), often to support less polluting vehicles (OECD 2016).

Internationally, several institutions, e.g. IMF, OECD, World Bank and the UN institutions, are calling for the implementation of environmental taxation, particularly carbon taxation, to realise green economy transition in a cost-efficient way (see e.g. IMF 2015a). There is currently considerable international momentum in favour of carbon pricing following the UNFCCC Paris Agreement.

There is also much room for improvement, however. Approximately 60% of all CO₂ emissions in OECD countries are not subject to taxation or other state-induced pricing, and carbon pricing across sectors tends to be inconsistent, with tax rates much higher in transport than in other sectors (OECD 2016). Several OECD countries and regions, e.g. Chile, Mexico, South Africa, California, Ontario and Alberta, and in the future Canada as a whole, are introducing trading systems or carbon taxes, which will significantly increase the amount of greenhouse gas emissions covered by carbon pricing initiatives (World Bank et al. 2016b). The Carbon Pricing Leadership Coalition is also contributing to ongoing momentum in favour of fiscal measures to address climate change and may be an institution around which efforts to coordinate carbon pricing schemes internationally coalesce in the future.

In terms of environmental fiscal policy, momentum for fossil fuel subsidy reform is growing. The majority

⁹ http://stats.oecd.org/Index.aspx?DataSetCode=ENV_ENVPOLICY

¹⁰ <https://www.theguardian.com/environment/2016/dec/02/four-of-worlds-biggest-cities-to-ban-diesel-cars-from-their-centres>

of UN member countries have declared their support for fossil fuel subsidy removal in one or more international forums: The G20, the G8, APEC, the UNFCCC and the informal alliance known as “Friends of Fossil Fuel Subsidy Reform”. This includes the EU, the USA, Least Developed Countries, the Alliance of Small Island States (AOSIS), Saudi Arabia, Russia, Brazil, India and China (Oil Change International/NRDC 2012). The IMF estimates that “post-tax” energy subsidies amounted to USD 5.3 trillion, or 6.5% of global GDP, in 2015 (Coady et al. 2015). While some of these subsidies are due to price controls and direct transfers from government, a large proportion are attributable to low energy tax rates that do not fully reflect the externalities of burning fossil fuel. At the same time, phasing out fossil fuel subsidies, whether in OECD countries or elsewhere, must be implemented with care to ensure that reforms are sustainable and do not have a negative impact on the most vulnerable - as discussed in detail in section 5.

Part II: Environmental Taxes in Asia and the Pacific: Recommendations for policy-makers

4 Similarities and differences of ETR in OECD and developing countries in Asia-Pacific

In both industrialized and in developing countries, environmentally related taxes have been in place for many years. While a great range of empirical research exists for OECD countries, analyses for developing countries, particularly with regard to the Asia-Pacific-Region, remains less comprehensive. Only few ex post analyses of ETR measures have been conducted so far. Given the different in developing countries as compared to OECD countries, conclusions drawn on the basis of research conducted in OECD countries should be applied with caution in developing countries.

While the developed countries in the Asia-Pacific region face rather similar challenges to OECD countries, such as Japan, Korea or Australia, many developing countries from the Asia-Pacific region face rather different challenges due to their different institutional, social, economic and political frameworks. This section highlights some of the most important differences between these countries and identifies the major challenges they may face. These arguments will be developed further in the remaining sections of Part II.

In the past in OECD countries, ETR has focussed on tax shifting (reducing distorting taxes on labour) rather than raising more revenues for domestic mobilisation. However, one of the main challenges for developing countries is the mobilisation of domestic resources, as tax-to-GDP ratios tend to be rather low at 10-25%, restricting the capacity of governments to invest in poverty reduction, infrastructure, healthcare, education, or the transition to low-carbon, climate-resilient economies. Institutional challenges, such as weak governance but also limited capacity, inadequate or missing data, as well as poor financial governance also influence the kind of instruments which developing countries are able to implement and, equally important, enforce. Thus, policy instruments requiring limited monitoring, or monitoring of only a few large sources, or instruments where an easy-to-measure proxy for emissions can be implemented without a large burden may have greater appeal in developing countries. In OECD, in contrast, policymakers may prioritise targeting the source of pollution as accurately as possible, although they also tend to apply least-cost approaches to tax administration, such as using energy/carbon taxation for addressing classical air pollutants.

In addition, developing countries tend to have a large informal economy, making administration of indirect taxes easier. For this reason, indirect taxes tend to make up a greater proportion of total tax revenues in Asia-Pacific than in OECD countries.

For all these reasons, environmental taxation can give policymakers an administratively feasible, simple and least-cost way of raising revenues - particularly in the case of energy taxes. Furthermore, a proportion of environmental tax revenues can be used to cover monitoring, collection and enforcement costs, and a proportion used to drive green transition (GTZ 2008).

The social context tends to be more challenging in developing countries in Asia-Pacific than in OECD. First, such countries have less equal income distribution than OECD countries (see section 6.2 for details). Second, many households live in poverty or a financially precarious position. Third, welfare systems are poorly developed and are often at least implemented through wide-ranging energy or food subsidies, rather than targeted measures. This means that energy price increases due to subsidy reform can have a very significant social impact, and that price increases may hit the poorest very hard. Thus, even greater care must be taken to protect the vulnerable and ensure that environmental taxes are compatible with social improvements and reduced poverty rates. Section 6.4 looks at how this can be realised in practice.

The second part of this report focuses on applying lessons learned in Part I to the Asia-Pacific context. What are the lessons for policymakers and how have they been applied in developing countries in the region? Section 5 looks at fossil fuel subsidy reform as a first step towards the implementation of ETR. Later sections delineate a series of recommendations for policymakers on the basis of three interlinked themes: Strategic considerations and political economy (6); Design of ETR measures (7); and policy planning and implementation (8).

5 Fossil fuel subsidy reform

In the following section, two positive cases of fossil fuel subsidy reform - recent reforms in Indonesia and Iran - are presented, analysed and discussed, showing the potential for fossil fuel subsidy reform to boost government revenues and reduce environmentally harmful behaviour. The section also highlights the importance of subsidy reform as a first step towards more far-reaching fiscal reforms, including the introduction of environmental tax measures.

The low global oil price since the end of 2014 has often been seen as window of opportunity for eliminating environmentally harmful energy subsidies, as seen in the case of Mexico. Due to the low oil price and the weak peso, Mexico exports crude oil cheaply, and re-imports processed gasoline at a much higher price. The reduction of the subsidy (the gasoline price is government-set) led to angry and violent protests. The subsidies not only contributed to traffic congestion and air pollution but also encouraged car ownership and habituation to low gas prices (Agren 2017). This has made the subsidy hard to phase out or even reduce, even though its financial magnitude is unsustainable for Mexico's public budget.

This section also highlights the window of opportunity created by the falling global oil price for subsidy reform, which has been taken advantage of by several countries in the region, such as Indonesia and Iran.

Box 6: Fossil fuel subsidy reform in Indonesia

Indonesia has a long history of fixing prices for fossil fuels like gasoline, diesel, kerosene and LPG below the market price, thus providing essential commodities to the population by sheltering them from high market prices (Green Fiscal Policy Network).

In the past, Indonesia has already had a number of fossil fuel subsidy reform attempts. The main reason for it was the fiscal burden on the budget on Indonesia. Fossil fuel subsidies amounted to 20% of GDP in the 1960s and were the largest part of the fiscal deficit up until recently. The subsidies also had a large impact on consumption. Half of the country's energy consumption stems from fossil fuel. In the transport sector 96% of consumption is comprised of subsidised fossil fuel and contributes to chronic congestion, pollution, wasteful use of energy as well as negative health impacts and reduced productivity in Indonesia (IEA 2016). During the East Asia crisis of 1997 Indonesia raised the price on gasoline, diesel and kerosene causing major public protest, which contributed to the resignation of the government. In 2001 raising fuel prices were accompanied by compensation packages like health care, a rice program and village infrastructure program, but in 2003 the old prices were again reinstated due to public protest. To handle high kerosene subsidies the administration introduced a kerosene-to-LPG program in 2007 (Green Fiscal Policy Network).

Despite these negative experiences in Indonesia, the government pushed for a new fossil fuel subsidy reform in December 2014. This reform removed subsidies on premium gasoline and introduced a "fixed" subsidy on solar diesel for stationary applications, setting the price at IDR 1,000 (USD 0.08) below the market price. One of the reasons for the reform was that in 2014, the cost of subsidies was higher than planned and clearly fiscally unsustainable. Thus, the Revised State budget in 2014 allocated a total of IDR 246.5 trillion (USD 19.7 billion) for petroleum subsidies and IDR 103.8 trillion (USD 8.3 billion) for electricity subsidies. The total amount for energy subsidies of IDR 350.3 trillion (USD 28.0 billion) was 24.1% higher than originally budgeted. Equal to around 18.7% of total central government expenditures

and 3.8% of anticipated GDP, the government had to make budget reductions for several ministries and government programs in the Revised State Budget 2014 to sustain these expenditures. These high costs for energy subsidies have led to intermittent macroeconomic instability and tend to crowd out core development expenditures (iisd 2015).

Social Impacts

The Indonesian government used the window of opportunity created by falling world oil prices to implement the reform. Although the falling oil price meant that compensation was not an absolute requirement, a number of new compensation systems, including a new health card and a cash transfer system that can deliver funds directly to individual saving accounts, were introduced (iisd 2015).

Fiscal impacts

The fiscal impact of the reforms can already be seen in the Revised Budget 2015, in which the state funds for fuel subsidies were reduced by just over IDR 211 trillion (USD 16.9 billion) or over 10% of all originally planned government expenditure in 2015 (iisd 2015). The budgetary savings due to the reforms, implemented in January 2015, combined with the low world oil price, are expected to be around IDR 195 trillion (USD 15.6 billion). Originally the State Budget 2015 allocated IDR 276.0 trillion (USD 22.1 billion) for petroleum subsidies. The savings are equal to 9% of total planned government expenditure. Additionally, a number of other price reforms have been implemented. The state-owned energy company PT Pertamina increased the price of a 12 kg cylinder of LPG and PT Perusahaan Listrik Negara (state-owned electricity company) introduced a number of scheduled increases in electricity tariffs for certain groups (iisd 2015).

Use of revenue

Low global oil prices enabled the removal of subsidies for gasoline and diesel. The savings from the subsidy reform permits Indonesia to invest in its core development priorities. In the Revised State Budget 2015 the budget for infrastructure was increased from IDR 190 trillion (USD 15.2 billion) to IDR 290 trillion (USD 23.2 billion) (iisd 2015).

Recent developments: Setting up a stabilising Energy Security Fund

Along with the remaining subsidies for 3 kg LPG tanks, diesel and renewable energy, gasoline subsidies were not removed completely. Instead, the cost was transferred to the state-owned oil company Pertamina, which had to account for USD 1 billion in costs in 2015 alone to cover the difference between market prices and subsidized prices. This financial burden threatens the liquidity of the state-owned company. To counteract this, an Energy Security Fund was set up in 2016 to stabilise fuel prices, subsidising them when global fuel prices are higher than domestic prices and using additional revenues to fill the fund while global prices are low. This will only work in times of low oil prices, however. If global oil prices continue to rise, the situation will become untenable over time. There is also a risk that revenues required to supply the fund may come into conflict with budget priorities like social assistance and infrastructure development. The government had issued the biggest year-on-year increase in infrastructure investment in 2014 with the goal of removing a main barrier to development - poor infrastructure - and to reach a 7% GDP growth rate (Chelminski 2016).

Outlook

Public acceptance is likely to fall if world oil prices rise. It is therefore essential that the government continues to support the vulnerable to address the impacts of energy price volatility and resists political pressure, without falling back on fuel-price intervention. Upcoming elections may increase political pressure to withdraw the reform as political parties may follow short-run self-interest to gain popularity, disregarding the interest of the people and the long-term costs of fuel subsidies (iisd 2015).

Box 7: Fossil Fuel Subsidy Reform in Iran

As in Indonesia, the Iranian fuel subsidy reform of 2010 was precluded by failed subsidy reform efforts that led to rising energy consumption, making Iran one of the countries with the highest energy intensity in the world. The 2010 reform combined a cut of indirect subsidies with a cash transfer program for households. The goal of the Iranian government was to use the fuel subsidy reform revenue as part of a broader structural reform agenda to promote growth and job creation. Reducing waste and rationalizing consumption were key targets of the reform. A main feature of the reform was the gradual adjustment in price, i.e. an increase of domestic prices to 90% of international prices over a five-year period. The reform was supposed to be implemented in two phases: The first phase resulted in a substantial increase in prices for all major petroleum products and natural gas as well as electricity, water and bread. A major part of the revenue created by the price increase was distributed to households via deposit cash transfers in new bank accounts, which were set prior to the reform. The second phase of the reform, which would have seen an additional increase in prices and cash transfers to households, was halted when the Iranian parliament voted to cancel it (IMF 2013).

Environmental impact

The immediate and substantial impact of the reform was a decline in consumption of diesel fuel, gasoline, fuel oil and kerosene by an average of 38% (PBS 2010). As of January 2012 an estimated USD 5.3 billion in fuel consumption were saved due to the subsidy reform (Teheran Times 2010). In contrast, natural gas consumption recorded an overall growth of 6.1% (BP 2012). , These figures indicate the apparent success of the subsidy reform, with energy consumption shifting from oil to natural gas in the domestic market (Hassanzadeh 2012).

Social Impacts

About half of all savings from the subsidy reform were used for direct cash transfers to about 80% of Iranian households. All households were eligible to apply for the cash transfer, ensuring similar incentives for saving fossil fuels across all segments of the population. The cash transfer led to a larger share of income for the poor than it did for the middle class and thus the fiscal system in Iran became more progressive as a result of the subsidy reform. The International Monetary Fund had stated that the reform initially lifted “virtually” everyone out of poverty (IMF 2013).

Use of revenue, acceptance

Besides supporting the population through the cash transfer program, the government used the remaining revenue to provide assistance for enterprises to reduce their energy intensity. Selected enterprises were supported to restructure their operations by use of direct assistance and sales of limited quantities of fuels at partially subsidized rates, moderating the impact of the price increases (IMF 2013). Part of the plan to promote public acceptance was a major public relations campaign to raise awareness to the growing costs of low energy prices. The actual reform achieved public acceptance by substantially reducing poverty (IMF 2013).

There are three main elements of successfully implementing a subsidy reform (IISD 2013), as the examples from Indonesia and Iran also show. First, getting the energy price right, i.e. achieving a consistent and comprehensive phase-out of subsidies over time. Second, managing the impacts of reform by carefully analysing effects, especially on vulnerable groups and on international competitiveness, and implementing appropriate compensation measures. Third, building enough support for reform, so that reform plans are sustainable and comprehensive.

Energy pricing and energy market reform

It is important to set out a roadmap for moving toward cost-recovery and market-based pricing that includes the following four elements of energy pricing: Ending subsidies; allowing domestic prices to move

towards cost-recovery/competitive (international) prices; Enhancing transparency; Proper enforcement.

An integral part of a successful subsidy reform is to undertake additional structural reforms to create and enforce a competitive and efficient energy market. This will help to bring down energy prices for end users, so price increases from subsidy phase out can be partly compensated (IISD 2013).

Impacts of Reform

Any subsidy reform proposals should carefully analyse the potential impact of a subsidy reform on sensitive sectors such as energy-intensive industries and low-income groups and estimate the direct and indirect impacts of reform.

Mitigation measures in response to these impacts fall into three main categories (see IISD 2013):

- **Reform sequencing:** A gradual phase-out of subsidies over a longer period reduces the impacts for each individual price increase. If subsidies are applied to several types of fossil-fuels, careful sequencing can help mitigate impacts as the impact of removing subsidies can differ for each type of fuel. If those fuels are targeted where subsidies are the most regressive (i.e. where the largest share of benefits accrues to the wealthiest parts of the population) the impact on the poor can be reduced in the beginning.
- **Accompanying social and economic policies:** There are many policy instruments in place to manage the way that subsidy reform affects low-income households, vulnerable groups, businesses and key macroeconomic indicators such as inflation. Savings from subsidy phase out should be used to increase expenditure in key development sectors such as health and education, infrastructure, and agriculture, as well as in poverty reduction and targeted social protection schemes (IISD 2013)
- **Measures to counteract price rises:** A range of measures can be used to drive down prices, for example deregulation of fossil fuel downstream sector, improvements of domestic refining capacity, and distribution networks, energy-efficiency and diversification programs.

Building Support for Reform

Probably the greatest challenge policy-makers will face when introducing subsidy reforms is opposition from political parties, lobby groups and major stakeholders. There are a range of measures policy-makers can proactively use to create an enabling environment for implementation of such reform (see IISD 2013):

- **Inter-ministerial approaches:** All relevant ministries and agencies should be involved and need to be well co-ordinated, to agree on reform plans and communicate consistent messages. On an institutional level, this could be achieved by creating an inter-ministerial body or even a cabinet sub-committee to develop the reform and oversee the implementation.
- **Strong leadership:** Effective communication means that government should not send mixed signals about the reform plans. Designating a national spokesperson to speak on the issue, ideally housed in the office of the president or vice-president, can help to send out clear signals.
- **Good practice consultations:** Consultations to engage with stakeholders on substantive issues through roadshows, public inquiries, discussion groups and workshops.
- **Communication focused on clear and transparent messages,** e.g. share of subsidies on fossil fuel prices, budget spending on subsidies, steps of price increases. It is also important to articulate positive messages, e.g. by highlighting how subsidy expenditure could be better spent, such as targeted assistance to the poor or reducing urban traffic and pollution.

6 Strategic considerations and political economy

Before concrete decisions are made on the design of ETR measures, there are many strategic considerations policymakers may need to take into account to maximise the political feasibility of ETR and address obstacles and opposition to its implementation, also named political economy: These include defining the objectives they aim to achieve through ETR; or how policymakers can maximise the impact of ETR measures and ensure that they are sustained in the medium and long-term. Strategic considerations such as these often result in trade-offs between environmental effectiveness, fiscal impact and political acceptability, as discussed in detail in the subsections below.

This chapter look first at the advantages and disadvantages implementing a broad fiscal reform and single ETR measures in section 6.1. Section 6.2 looks at revenue use and political acceptance. Lessons and insights from these two sections are then applied to section 6.3, which looks at how policymakers can address competitiveness issues in the best possible way. Section 6.4 examines social protection schemes and how to design them to be as effective as possible, while section 6.5 touched on other strategic considerations, such as behavioural economics.

6.1 Comprehensive ETR or single measures: Routes to reform

6.1.1 Comprehensive tax reform

Country context is crucial in determining whether implementing a comprehensive ETR is feasible and useful or whether it is more strategic to implement single measures. In the past decade, implementing a comprehensive ETR has been attempted in Thailand, where it has failed so far, and Viet Nam, where it has been more successful. The box below compares the two cases to identify success factors and understand which factors resulted in failure.

Clearly, policymakers need to make a careful assessment of whether a broader process of environmental fiscal reform is institutionally and politically feasible. The more complex the legislation proposed, the more stakeholders both inside government - in ministries and other decision-making bodies - and outside it - business, civil society - will become involved in the decision-making process.

Section 8.2 looks specifically at strategies to involve, empower and win the support of stakeholders for ETR. In rapidly growing emerging economies, where a broad process of fiscal reform is administratively and politically feasible, policymakers should identify their priority objectives - environmental, economic and social - and develop a programme of fiscal reform that addresses as many of these issues as possible. The remainder of this chapter provides some guidance on how this can be achieved.

Policymakers can also consider introducing ETR as part of a broad general fiscal reform: In Chile, for example, the carbon tax makes up less than 2% of the total fiscal reform package (Reuters 2014). Similarly, recent fossil fuel subsidy reforms and the new carbon tax have been introduced as one element within the broader reform process in Mexico, covering personal, corporate, consumption and energy taxes (OECD 2015). Many countries have found this approach a promising route to foster political acceptance and facilitate the introduction of ETR measures, as stakeholders focus on the most important aspects of fiscal reform proposals, rather than ETR measures, which tend to be less significant in fiscal terms.

Box 8: Comprehensive environmental tax reform in Viet Nam and Thailand

In Thailand, a comprehensive reform measure was proposed in the Draft Framework Law on Economic Instruments for Environmental Management (henceforth: Framework Law) and principally approved by the cabinet in 2010. The proposal was relatively unspecific in terms of the nature of the measures proposed and included a range of possible tax rates. Has the Framework Law been agreed, a royal decree would have been all that was necessary to implement a particular instrument from the proposed list.

However, the Council of State rejected the notion of using a framework law for setting taxation, as it felt the proposal went against legal norms in enacting tax-related legislation in Thailand, in which mechanisms for tax collection and tax rates must be set out in a specific Act. The Council recommended that the government reconsider the Framework Law and implement each proposed economic instrument as a separate piece of legislation. Since this time, the Ministry of Finance (MoF) has developed a proposal for a carbon tax on transport fuels - to be implemented in a revenue-neutral way - and the annual circulation tax for vehicles has been reformed, while the original concept of introducing a broad Framework Law appears to have been put on hold.

In Viet Nam, the Environmental Protection Tax is not as broad as Thailand's Framework Law, but nevertheless covered a wide range of tax bases - transport fuels, coal, plastic bags, chemical pollutants including pesticides and HCFCs. As in the Thai case a range of tax rates were proposed. The measure came into force in 2012, with almost all taxes at the lowest tax rate proposed at the same time as the gasoline surcharge regulation, preventing an overall increase in transport fuel prices. To increase tax rates within the ranges that were set by the Parliament, agreement from the National Assembly Standing Committee is required.

Clearly a major factor in determining the different fates of these two policies was the **system of governance in the two countries**. Viet Nam is a single-party state with a powerful central government able to implement legislative changes relatively quickly given the political will to do so. In contrast, Thailand was a relatively unstable parliamentary democracy with a strongly polarised parliament at the time the Framework Law failed. Against this background, a measure with relatively little democratic oversight was thus unlikely to be agreed by the Council of State.

The importance of **political will and a policy champion** is also highlighted in both cases: In Viet Nam in 2004, prime minister Nguyen Tan Dung explicitly called for an ETR to be introduced by 2011, hence a long time for planning ahead, and since that time, he consistently supported measures to reduce the environmental impacts of rapid growth, including Viet Nam's Green Growth Strategy signed in 2012. In addition, Vice Finance Minister Mr. Tuan personally led and contributed a great deal to the process and included advice from various meetings in the draft law. No leading political figure in Thailand was playing a similar role.

Similarly, there also appears to have been a greater degree of **unity between ministries** in Viet Nam regarding the implementation of the EPT, while in Thailand, the environment and finance ministries were in conflict about the Framework Law and its proposal that the Ministry of Finance be responsible for the collection and distribution of revenues in the first instance.

6.1.2 Easy wins: Windows of opportunity for change

Given the challenges facing policymakers implementing ETR - both administrative and political - it may be advisable, particularly in developing countries with less established systems of financial governance - to focus on low-hanging fruits (easy wins) and windows of opportunity to introduce particular measures.

This can mean addressing environmental priorities high in the public consciousness, e.g. poor air and water quality and its negative impacts on people's health and thus labour productivity in cities, implementing ETR measures which can count on support from government and key stakeholders - meaning in many cases the support of influential industrial sectors - or choosing measures which are administratively feasible and easy to realise in practice. India's Clean Environment Cess, for example, is linked to existing collection mechanisms and administration systems and thus requires little additional administrative effort. In China, a relatively comprehensive package of environmental taxes which come into force in 2018 can be expected to be met with widespread political acceptance, as the measures are set to tap into widespread anger in the country due to the government's perceived failure to tackle land, water and air pollution (Reuters 2016).

Pursuing priority ETR actions can bring about easy wins in environmental policy terms and establish a policymaking culture of using market-based instruments for environmental policy. Later, more ambitious measures may be possible. The island of Mauritius provides a good example of this: The government increased ETR revenues forty-fold in the course of just 10 years on the back of its initial experiences with green taxes in the early 2000s (UNEP 2014). By 2010, ETR accounted for about 11%-12% of total tax revenues (Parry 2011). Nowadays, the country has been able to maintain ETR measures in spite of changes in government and such measures are broadly accepted.

Similarly, in Viet Nam, the EPT, Environmental Protection Tax, is often hailed as an example of international best practice with reference to its structure, direction and the level of political commitment behind the measure (Green Fiscal Policy Network 2013). The successful implementation of the tax appears to have prompted policymakers to at least consider introducing a carbon tax in the future, and to increase tax rates within the EPT.¹¹ And in fact, after its introduction in 2012, rates were tripled in 2015. Given Viet Nam's Green Growth Strategy (VGGs - see [Box 1](#)) it is very likely that further steps will follow when perceived adequate.

Box 9: Picking the low-hanging fruits: Green tax in the Maldives

The Green tax in the Maldives shows that a tax that is easy to introduce and to administer can nevertheless target a wide range of environmentally harmful behaviour and is expected to yield substantial revenues. It was part of the Maldivian Intended Nationally Determined Contribution to the UNFCCC to establish a Green Tax on tourism. Environmental management including adaptation was to be financed by the Green tax (UNFCCC 2015). (INDC). From 1 November 2015 onwards a flat rate of USD 6 per tourist per day is charged and the resorts, hotels and vessel are responsible to collect the tax from the tourists (Ministry of Economic Development Maldives 2015). The tourism industry is the most important sector and with that the largest energy consumer in Maldives. The nearly 1 million tourists have generated 29% of GDP over the last 5 years (Cottrell et al. 2015) and 60% of the electricity used is consumed in the tourist resorts (United States Department of State 2014).

The tax is a means of addressing the energy mix in the Maldives: Almost all electricity is provided by inefficient diesel generators (99.2% of installed capacity), and only 0.8% by renewable energy in form of solar PV (Cottrell et al. 2015).

¹¹ This has been observed by Kai Schlegelmilch, consultant on behalf of GIZ who supported the development and introduction of the EPT, and who advised Mr. Tuan in the years 2008-2011 and on other occasions thereafter.

6.1.3 Credibility and predictability of measures

Whether comprehensive reform or individual tax, what is absolutely crucial for long-term success and environmental effectiveness of ETR is that measures are credible and predictable, and so spur investment decisions on the basis of long-term regulatory certainty. At the same time, business and individual consumers need time to respond to ETR by installing new equipment or switching inputs and thus, policy stability is required to foster such investments.

A degree of dependence on environmental tax revenues can help foster the stability of ETR over time by “locking in” the instrument within the fiscal policy landscape of a particular country. For instance, in Viet Nam in 2015 transport taxes were increased to meet budgetary requirements, as well as bring about environmental improvements, making it more difficult for policymakers to reverse these changes.

Box 10: Japan’s 1973 Compensation Law for Pollution Related Health Damage

Japan’s 1973 *Compensation Law* (CL) introduced a charge on SO_x emissions to cover the cost of compensation to individuals with respiratory illness is an example of how lack of credibility and predictability can prevent investment. The tax rate on SO_x was determined by an estimate of compensation to be paid in the following year by region, meaning that some regions have much higher tax rates than others, depending on the pattern of compensation predicted. Because revenue was decided first, and the rate of the levy afterwards, SO_x emitters did not know the levy rate on emissions when they occurred, although this would have been crucial for their business calculations.

Neither did the levy target other sources of respiratory illness, such as NO_x or particulates. Over time, as more applicants applied for compensation scheme, this meant that no matter how much SO_x was reduced, compensation did not decline. Compensation was also linked to average wages, which led to further increases in compensation amounts year on year. Thus, despite a reduction in SO_x emissions volumes, levy rates skyrocketed, reaching 134-339 times the rate initially introduced in 1974 by 1987. Even in areas with the lowest rates, the levy was equivalent to about 40% of the fuel price.

As a result of this process, the law was reformed in 1987. However, this new policy ruled that the only parties obliged to pay the levy were firms with plants or worksites with facilities that emit SO_x as of 1 April 1987. This means that all firms will continue to pay a levy on their past emissions, while new plants are not subject to the levy, regardless of how much SO_x they emit.

Thus, the policy lacked credibility and although it resulted in reduced SO_x emissions (due to the high rate of the levy), it nonetheless exemplifies the problems policymakers may encounter should they implement an instrument which lacks predictability.

Source: (OECD 2010c)

6.1.4 Timing of measures

Providing a lead-in time before a policy comes into force, or introducing a tax at a low rate and increasing it year-on-year, or both, can give business and individual consumers time to adjust and prepare for the new measure and foster trust in government. It can also ease implementation, as stakeholders opposed to the measure do have time to prepare for the tax before it comes into force (OECD 2010a). Similarly, announcing policies in advance of their implementation - if such announcements are credible - can give business time to adjust to new measures and generate environmental improvements, even before such policies are implemented. This is known as the “announcement effect” (OECD 2006a).

Policymakers can do much to ease implementation by thinking carefully about timing of ETR elements. Introducing compensation schemes before ETR measures come into force can enhance their credibility. Taking seasonal variations in energy use can lessen the impact of new tax measures and give consumers

some time to adjust before a period of higher energy use.

In Iran, for example, fossil fuel subsidy reforms came into force in 2010 in December, when energy consumption is at its lowest, to minimise the social impacts and reduce resistance. Policymakers also introduced a highly visible and salient compensation scheme: Bank accounts were set up and account details sent out to approximately 80% of households prior to the reform. Thus, before fossil fuel subsidies were removed, families were already aware that they were entitled to compensation, and that it was in a bank account and waited for them.

6.1.5 Summary

In sum, it seems that policymakers are best advised to make pragmatic decisions on whether to implement broad packages of reform, where political will exists, or to focus on easy wins where resistance is expected to be low to establish the principle of using taxation in environmental policymaking.

Fundamental is that policymakers choose a path where it is clear that the administrative capacity exists to enforce ETR instruments proposed. In explicit terms, this will probably mean considering how ETR can best be collected using existing functioning tax collection mechanisms, which in many countries will be most established in the energy and transport sectors. Inasmuch as these sectors also offer policymakers multiple gains in terms of local air quality and climate change mitigation, these sectors are a good starting point for policymakers, particularly in countries with weaker administrative capacities. Where capacities exist, identifying environmental priorities should take priority, see section 7.1 for more details.

6.2 Revenue use and political acceptance

6.2.1 Political economy considerations

Environmental taxes can raise substantial funds and create a stable revenue stream for government expenditures. Policymakers can design ETR in a way that raises significant revenues, to finance vital government investments e.g. in infrastructure, poverty reduction, health, education, or climate change mitigation and adaptation. Prioritizing these investments should be independent of the revenue source: All tax revenue should be used to maximize welfare.

ETR revenues can also be used strategically to boost political acceptance if spending is allocated to widely recognised political priorities. Revenues can be politically earmarked - i.e. the government can explicitly state that they will be used for a particular purpose - even if revenues actually flow into the general budget and announced spending is made from that general budget. Political earmarking means that there is no legal link between the tax and the use of the revenues. Although earmarking of green tax revenues is prevalent in both developed and developing countries, the economic rationale for doing so is weak as tight earmarking can excessively constrain the effective management of the public finances (Jones 2011). Earmarking is also undesirable because ETR revenues and necessary expenditures in a given area may not match up. Nonetheless, a political link between tax-raising and expenditure can still be expressed and clearly communicated. This can boost political acceptance and facilitate the implementation of ETR measures. Political earmarking may also prevent revenue being diverted or spent on less desirable outcomes by binding governments to a certain political commitment or goal. To maintain government credibility, however, it is crucial that spending does take place as announced and that transparency of expenditure is guaranteed through reliable monitoring.

Especially in developing countries, resources tend to be relatively limited and economic stakeholders often fight hard to protect their interests. This is true for ministries as well as economic actors. Thus,

failing to earmark funds for environmental protection risks depriving environment ministries of urgently needed resources, and keeps them weak and lacking in influence.

Thus it may be necessary that a proportion of revenues are spent on getting crucial stakeholders on side, to ensure that a particular ETR measure is politically feasible as political majorities are required. Though undesirable from an environmental and economic point of view, such compromises are often unavoidable (see OECD 2006a for an analysis of such policy compromises and compensation measures in OECD countries).

Distributing revenues between several groups (i.e. “dividend sharing”) - e.g. vulnerable populations, energy-intensive industry, environmental expenditures / green infrastructure - can ensure that several groups benefit from ETR and thus boost acceptance. Using tax revenues in this way to meet multiple objectives can increase the appeal of environmental taxes to ministries and thus boost support for such measures within government (Cottrell, J. et al. 2016). In Iran, for example, when fossil fuel subsidies were reformed, all households were permitted to apply for compensation, although wealthier households were encouraged not to apply. While the aim was to use about 50% of revenues for this purpose, in the end 80% of recovered revenues were spent on compensation for households (Hassanzadeh 2012). Nevertheless, 20% of revenues remained to foster energy-efficiency in business and other purposes (Guillaume et al. 2011).

In some cases, environmental tax revenues can be channelled into a special fund, to ensure visibility and transparency of spending - for more information see [Box 11](#). Such approaches are not the norm, however, as taxes are by definition unrequited payments which are typically centrally administered - unlike charges and fees, which cover the cost of a providing a particular service and are typically administered in a fund or collected at local level.

6.2.2 Impacts of revenue use

The way revenues are spent has a crucial influence on the impact of ETR: not only on macro-economic indicators, such as GDP growth and employment, but also on the social impacts of a measure and its environmental effectiveness (see section 2.2.3).

Table 4: Impacts of revenue use: advantages and disadvantages

Revenue use	Description	Advantages	Disadvantages	Example	Recommended particularly for
General budget	Tax revenues flow into general budget without earmarking	<p>Revenues should be allocated in a productive and efficient way to harvest additional economic benefits comparable to those of other economic uses, hence minimising the cost of the policy to the economy (IMF 2012).</p> <p>Governments can prioritize their goals and spend tax money accordingly. This flexibility is especially valuable e.g. in times of unforeseen events or crises, when a sudden change of spending policy might be necessary (Schlegelmilch/ Joas 2015).</p>	<p>If the revenue use is not predetermined, the benefits of ETR remain rather abstract, and public support can be expected to be lower, because ETR is associated with higher taxes, rather than increased expenditure (World Bank 2005).</p> <p>Environmental effectiveness can be jeopardized if government policy and respective budget spending is inconsistent with environmental goals of the ETR, e.g. investments in infrastructure</p>	SCT in Turkey	Countries with narrow fiscal space
Coverage of administrative costs	Parts of the revenues are used to strengthen administrative capacities, e.g. for collection of taxes	Government levels (e.g. subnational) or authorities are encouraged to enforce revenue collection if they are supplied with adequate means to perform their duties		Differentiated power tariffs China	All countries
Environmental goals/ climate change mitigation	Parts or all of revenues are used for environmental purposes e.g. access to low-cost credit for investment in energy efficiency	Environmental effectiveness can be maximised as green economy transition is incentivised from two sides, increased costs for old, environmentally harmful technology, and reduced costs for new, clean technology	Earmarking can be legally problematic. Both amount of revenue raised and amount of spending needed are not known and hence projects may be over- or underfinanced if linked to a specific revenue source. Finance agencies and housekeepers therefore usually oppose earmarking (see e.g. World Bank 2005, IMF 2012).	Green Tax Maldives	
Social compensation for vulnerable	Parts of the revenues are used to compensate vulnerable parts of the population that are affected by the ETR. Revenues can also be used for general poverty reduction measures, or health investments.	Social impacts of reforms can be lowered, which is especially important in developing countries.		Water charges Sri Lanka	Least developing countries and countries with large share of poor population

As can be seen from the above, especially if environmental goals such as climate change mitigation are a high-priority goal, earmarking a share of environmental tax revenues can amplify the environmental benefits. Research has indicated that investing a proportion of revenues in green economy transition and green infrastructure (e.g. public transport, waste and sewage treatment), renewable energy and energy efficiency technologies can increase the efficiency of ETR and keep costs low (Ekins 2009). Thus, sound political earmarking can reduce the cost of green economy transition.

If environmental taxes are designed in a way that generates substantial revenues, i.e. if the tax base is large enough, it is easier to use government expenditure to get key stakeholders on board and protect the vulnerable from the impacts of price increases. Similarly, a degree of dependence on revenues can foster the stability of ETR over time by “locking in” the instrument within the fiscal policy landscape. For instance, in Viet Nam transport taxes were increased in 2015 to meet budgetary requirements and it will not be easy for policymakers to reverse these changes - simply because the missing revenues would have to be replaced by other tax increases, which would be politically sensitive.

6.2.3 Independent bodies to manage funds

Creating an independent body to monitor and indeed manage revenues can reduce opposition to ETR and increase transparency and accountability (Cottrell, J. et al. 2016). However, if policymakers opt for this approach, they must ensure that such independent bodies adhere to sound principles of public financial management and are not vulnerable to corruption. In many developing countries, creating such a body may pose a significant administrative challenge and may also substantially increase the cost associated with the implementation of a particular environmental policy instrument. At the same time, such bodies are in a sense simply a means of earmarking revenues and as such, the analysis of (political and legal) earmarking above (also in section 6.2) applies here. Two less successful examples of such bodies in practice are described in Box 11.

Box 11: Independent bodies to manage earmarked revenues in Thailand and India

In many countries environmental taxes are labelled “charges” or “fees” so that it is permitted for them to be directed e.g. into an environmental fund. This model of legal earmarking has not always proven successful.

In Thailand, for example, the Environmental Fund set up to administer revenues from environmental fees and charges has been subject to scrutiny due to allegations of corruption in management practices and the distribution of funds and lack of accountability and transparency. This has had regrettable consequences in the country, as these allegations have undermined the credibility of ETR measures to some extent and have sowed the seeds of competition for revenues and their management between the Ministry of Finance and the Ministry of Environment and Natural Resources (MONRE).

In India, the Government introduced the **Clean Environment Cess** in 2010. It is a carbon tax on coal, lignite and peat, which aims to finance and promote clean environment initiatives, environmental research and other related purposes (Indian Economic Service 2016). In the Union Budget speech for 2016-2017 it was announced that the rate would double, increasing from R 200 (USD 2.96) per tonne to R 400 (USD 5.94) per tonne (Minister of Finance India 2016). The revenues from the Clean Environment Cess, estimated at R 239,444 billion (USD 3.509 billion) for the year 2016-2017 (The Economic Times 2016) finance the National Clean Energy Fund (NCEF). The NCEF covers innovation and R&D in the clean energy sector as well as other developmental activities connected to the environment (Climate Home 2016).

However, the fund has also faced serious problems with mismanagement and corruption, and initially failed to redistribute revenues effectively or efficiently (see Cottrell et al. 2013).

6.3 Competitiveness

6.3.1 Possible impacts of ETR on competitiveness

How to maintain international competitiveness is extremely important in terms of the political economy of energy taxation and poses one of the most significant obstacles to ETR implementation. As shown above, a certain degree of opportunism and careful policy design (particularly strategic expenditure targeting influential and important sectors) can foster support amongst various stakeholder groups - including industry. In many countries all over the world, industry and big business are amongst the most influential stakeholders and can be decisive for the success or failure of ETR measures.

When considering how to respond to any possible impacts of ETR on competitiveness, it is important to recall the rationale for ETR - the implementation of the “polluter pays” principle (see section 3.1.1). This means that “environmentally-related taxation is by definition intended to distort production decisions and have a disproportionate impact on polluters” (OECD 2010a, p. 144). Thus, the objective of ETR is to create a competitive disadvantage for those companies that pollute more, or are less energy-efficient, and to create financial incentives for them to respond by reducing pollution by the most efficient means at their disposal. Bearing this in mind, policymakers should ensure that support measures, compensation, or tax recycling are limited in time and carefully designed so that the incentive effect of the tax is maintained. In the UK, for example, Climate Change Agreements with industry have resulted in low-hanging fruits in energy-intensive sectors not being harvested efficiently (source).

Competitiveness concerns linked to energy tax increases relate to a few energy-intensive sectors and are often exaggerated, for several reasons:

- Fluctuations in energy prices on global markets tend to be far more significant than the impact of a tax on energy;
- By no means all energy-intensive goods are highly traded internationally and, where this is not the case, increased costs can be passed on to the consumer;
- An increase in energy prices will incentivise both energy efficiency measures and innovation, which may result in stable or even falling energy costs for firms over time;
- Revenues can be used to mitigate negative impacts and support investment in reduced energy use or installation of appropriate technologies (Green Fiscal Commission 2010).

It is important to note that the impacts of ETR on competitiveness of the economy as a whole can be positive, as the 2007 COMETR report (Competitiveness Effects of Environmental Tax Reform) shows: All 6 EU countries it studied achieved an increase in GDP of up to 0.5% in relation to what would have been expected without the ETR measures. This modelling corroborates a great deal of research that suggests that environmental regulation including taxation results in improved performance and enhanced competitiveness (COMETR 2007 p. 23ff).

Fears of negative impacts of energy price increases expressed on the part of companies can prompt governments to over-compensate industry. During discussions with industry regarding the impact of ETR measures, the regulator is party to less information than business - an information asymmetry that puts business in a favourable negotiating position. It is not always the case, however, that the cheapest possible energy prices are a top priority for business, as the case in [Box 12](#) shows.

Box 12: Factors influencing foreign direct investment in Viet Nam

A review of investor sentiment in Viet Nam conducted by the International Institute for Sustainable Development in 2015 revealed that the investment decisions of those looking to make Foreign Direct Investments would not be negatively affected by increased energy prices, but by a lack of skilled human resources and an unreliable electricity supply (Garg, Bridle, & Clarke, 2015).

In general, private investment is affected far more by regulatory conditions and the political situation in the country in question. The so-called '6 no's' in policy implementation in Viet Nam are said to act as a major barrier to investment, according to representatives of government interviewed in the Viet Nam Economic Times: No transparency, no consistency, no synchronisation, no stability, no possibility (a comment which is presumably related to a lack of policy reform in the country, for instance in relation to energy market development), and no predictability as major investment barriers in the country (Viet Nam Economic Times, 2016). Environmental taxation was not mentioned.

6.3.2 Measures to address competitiveness issues

Narrow tax bases, common across the Asia-Pacific region due to various tax exemptions and concessions, not only reduce the potential for taxes to raise revenues - which is a serious concern from a fiscal point of view - but also undermine their incentive effect and thus environmental effectiveness. Hence, policymakers should evaluate carefully whether impacts on international competitiveness will be significant and develop compensation or protection measures accordingly. These impacts are dependent on a number of factors: The market power of a particular company or sector; Whether they can remain competitive while passing on the increased costs attributable to ETR measures to their customers; Or whether they have to match a global price for the good or service they produce (COMETR 2007 p. 17). In general, only the latter - typically energy-intensive industries - should be covered by compensation or targeted, conditional and time-limited exemptions from ETR measures, which should be subject to regular review.

In addition, it is important to distinguish carefully between the competitiveness of specific sectors, as well as national and international level. Policy changes that make some firms worse off will also always make some firms better off, so that at national level, negative impacts imposed on one firm or sector will tend to be moderated by positive impacts on others (OECD 2006a p.17). Only a few energy-intensive sectors produce goods that are highly traded internationally and only these companies should be considered for compensation or support measures. Thus, it may be necessary to implement some form of compensation for industry vulnerable to international competition to build the consensus necessary to implement ETR. This is not always the case, however: The EPT in Viet Nam was implemented without granting any tax reductions for industry as it set out to emulate positive examples of ETR without industry exemptions.

There are a number of options to address competitiveness issues. Tax adjustment at the border to refund exports or impose a tax on imports can ensure equal treatment for domestic and international products while maintaining competitiveness and freeing exports from the tax. There have been some examples of such tax adjustments being implemented, e.g. border adjustment on gravel taxation in Denmark - to free gravel exports from the effect of the tax on their price. The adjustment was compliant with EU and international treaties requiring the free movement of goods and while imports of such commodities are taxed, exports are not. The tax is relatively easy to administer, as gravel is a heavy commodity where private border trade hardly takes place and where it is thus companies trading mostly which can be easily controlled and asked for adequate documentation.

A second possible approach for policymakers is tax shifting, where revenue is recycled to business to reduce additional costs for companies while maintaining the incentive effect of the tax. This approach is common in industrialized countries but for developing economies with low tax-to-GDP ratios, it has less appeal, as the additional benefit of fiscal space is reduced as a result. Nonetheless, in developing countries revenues can be recycled to keep the overall tax burden on companies relatively stable, while incentives in favour of environmental improvement and energy efficiency are increased.

To keep the cost of protecting competitiveness as low as possible, where compensation is deemed necessary, it should be sector-specific. To ensure that marginal cost and therefore the incentives for efficiency are not reduced, such compensation should be granted on base of the number of employees or the economic output, rather than consumption of energy or resources. In this way, efficient companies will gain, as they receive more compensation than they pay in tax, while inefficient companies will lose out. The sector itself will hardly be affected by any outflow of capital, but can use capital for reinvestment and R&D. This approach maintains strong incentives for the entire economy, while ensuring the industrial basis in a country is kept. For example, in Sweden revenues from the NO_x charge are recycled to power generators on the basis of useful energy they produce, thus creating incentives for improved energy efficiency.

As a form of compensation, tax exemptions are the least desirable policy to protect industry from possible competitiveness impacts, as they create inefficiencies in pollution abatement and undermine the notion of the 'polluter pays' principle, representing an undesirable trade-off between environmental effectiveness and political feasibility (OECD 2006a). Reduced tax rates lower the burden on companies vulnerable to international competition, but also reduce incentives to make environmental improvements. Revenues are reduced as a result and the administrative burden increases, while market distortions result from tax exemptions for specific sectors.

In Denmark, an innovative system of carbon and energy tax exemptions on the basis of the process for which energy is used is in force. The system has been designed so that trade-offs between breadth of coverage, environmental effectiveness and fiscal impacts can be minimised. While energy-intensive industries pay the full energy and carbon tax rates on energy they consume for heating and cooling processes, their production processes are exempt from the energy tax and subject to the carbon tax at a reduced rate (Cottrell et al 2016). In the UK, industry has been awarded exemptions from the Climate Change Levy (a carbon-energy tax) in return for a commitment to meet binding energy-efficiency targets over a 10-year period (Climate Change Agreements). A wide range of industry sectors may enter into an Agreement - including energy-intensive sectors such as chemicals, paper and supermarkets, to agricultural businesses - and receive a 90% reduction on the levy on electricity, and a 65% reduction on the levy on other fuels.¹²

Viet Nam's EPT has no exemptions or reduced rates for reasons of competitiveness to industries. The government did not want to follow the example of many OECD countries, and there was also no real need for reductions, given that the tax rates are quite modest. Indeed, Viet Nam even taxes air fuel at the same rate as road fuels, see

Box 13.

¹² <https://www.gov.uk/guidance/climate-change-agreements--2>

Box 13: Tax on flight tickets- Air fuel tax in Viet Nam

According to the Viet Nameese Law on the Environmental Protection Tax, adopted by the Viet Nameese Parliament on 15th November 2010, aircraft fuel is fully taxed. The Parliament had adopted a range of tax rates for every single tax subject and then the MoF determined that in more detail which of the rates given by Parliament are really applied. Since MoF then nearly always determined the lower tax rate as the one to be applied, aircraft fuels are taxed the same rate as gasoline (1.000 VND/Liter = 0.045 USD) whereas diesel is only taxed at a rate of 500 VND/Liter = 0.022 USD).

However, substantial progress was made on 2nd April 2015, when MoF issued officer letter 4237/BTC-CST realizing the Resolution Nr. 888a/2015/UBTVQH13 regarding the revision of the environmental tax rates for gasoline, oil and grease.

Hence, since 1st May 2015, the rates are as follows:

- Gasoline, except ethanol: 3.000 VND/litre
- -Aircraft fuel: 3.000 VND/litre
- Diesel oil: 1.500 VND/litre
- Mazut, lubricants: 900 VND/litre
- Grease: 900 VND/litre

Aviation emits more greenhouse gas emissions per passenger than other transport modes. However, there is a risk that if air fuel taxes are too high, planes will avoid tanking up in Viet Nam. To reduce such problems, a coalition amongst some South-East-Asian countries could be formed to develop a joint approach to taxation of air travel. As Viet Nam applies no exemptions for aviation fuels there is already a good example in place in the region.

Awareness-raising of the positive impacts of ETR on some business and some sectors can also reduce competitiveness concerns on the part of business. If an assessment of the impact of ETR on competitiveness is carried out, it will reveal sectors set to benefit from ETR measures, as well as sectors that will be negatively affected. Policymakers can use these results to identify sectors likely to be broadly supportive of reform and thus potentially willing to support reform in stakeholder consultations and perhaps also in the media. In Germany, for example, press conferences with industries set to benefit from ETR measures have had a positive influence on the policy debate and have reduced resistance to reform measures.

The importance of time should also not be underestimated: ETR is a dynamic policy instrument. As sectors adapt to ETR and e.g. install renewable energy technologies, firms that were negatively affected initially may become winners as time progresses. It is thus important to give industry time to adjust and to offer industry a transition pathway to make such changes: Green economy transition should be facilitated and supported by policymakers.

Deep regional cooperation on ETR measures has the potential to minimize problems of international competitiveness (we will return to this topic in chapter 7, Outlook).

Because the impacts of ETR measures on these sectors will change over time, all measures to mitigate competitiveness impacts must be targeted, time-limited, subject to regular review. In this way, government subsidies will not be wasted once companies have adapted to the new conditions. Otherwise, there is a strong risk that benefits become locked-in and that path-dependencies develop which are hard to reverse.

6.4 Social protection schemes

One of the main obstacles to the implementation of ETR are concerns about negative social impacts. In Viet Nam, for example, this has acted as a barrier to the implementation of some ETR measures, and has influenced tax rate-setting as well, as described in Box 14. However, as long as ETR is accompanied by a range of well-designed and targeted compensation measures for the poor and vulnerable, the negative impacts of the ETR can be avoided. When taxes are initially introduced at rather low rates, and only later indexed to inflation or GDP growth as mentioned in section 7.4 problems with redistribution mechanisms can be addressed at an early stage, to ensure that teething troubles are dealt with before tax rates rise.

Box 14: The Environmental Protection Tax in Viet Nam

Viet Nam's Environmental Protection Tax (EPT) was included in the seventh legislative programme of the National Assembly (2007-2011) and the EPT Law 57/2010/QH12 was implemented in 2012 (Green Fiscal Policy Network 2011). A key driver behind the implementation of the tax was the Prime Minister, Nguyen Tan Dung, who championed the tax domestically and pushed through the measure in a relatively short timeframe.

Before the introduction of the EPT, Viet Nam already had a range of taxes and levies with environmental relevance, including natural resource taxes and fees on oil refining, coal, land use, waste water discharge, forests and mineral extraction. In general, however, these taxes lacked a coherent legal basis and environmental benefits arose as unintentional side effects (Sieber 2013). While these levies do yield state revenues - see Table 4 - they have failed in the past to influence the behaviour of economic actors to a significant extent, due to low rates, too many exemptions, and poor monitoring and enforcement (Mehling 2008).

A more comprehensive raft of environmental taxes was introduced with the EPT, with the explicit aim of introducing an environmental tax. The EPT introduced taxation on a wide range of tax bases and for each tax base, a range of tax rates were proposed (see Table 1). In the first instance, the lower end of each tax band was implemented. Introducing a range of possible tax rates gave policymakers flexibility to increase the tax in response to changing circumstances.

The National Assembly Standing Committee, the body responsible for setting tax rates and subsequently agreeing changes, is able to raise the tax without a repeated legislative process.

Table 1: Environmental Protection Tax - tax bases and rates

Tax base	Rate in VND
All kinds of gasoline	1,000 - 4,000 / litre
Jet fuel	1,000 - 3,000 / litre
Diesel	500 - 2,000 / litre
Paraffin	300 - 2,000 / litre
Mazut	300 - 2,000 / litre
Lubricating oil	300 - 2,000/ litre
Grease	300 - 2,000 / kg
Brown coal	10,000-30,000 / tonne
Black coal	10,000-30,000 / tonne
Anthracite	10,000-30,000 / tonne
Fat coal	10,000-30,000 / tonne
HCFC substance	1,000 - 5,000 / kg

Taxable soft plastic bags	30,000 - 50,000 / kg
Restricted-use weedkiller	500 - 2,000 / kg
Restricted-use anti-termite chemicals	1,000 - 3,000 / kg
Restricted-use preservatives for forest products	1,000 - 3,000 / kg
Restricted-use disinfect chemical used for warehouses	1,000 - 3,000 / kg
Source: Ministry of Finance, Viet Nam; authors	

Environmental effectiveness

Econometric modelling prior to the introduction of the EPT suggested that the measures proposed could potentially reduce GHG emissions by between 3 million and 9 million tonnes of CO₂ in the year 2012, depending on the tax rates applied (see (Green Fiscal Policy Network 2011)). However, computer-generated equilibrium (CGE) modelling of the impact of the EPT compared to a business-as-usual scenario suggests that CO₂ emissions were reduced by about 2 million tonnes in 2012 and 2013, or a decrease of about 1.7% (Huong 2014). This discrepancy can be explained by the tax increases on energy products in the EPT being introduced at the same time as falling oil prices, as well as the abolition of an energy charge of the same amount (Sieber 2013). In any case it should be noted that as growth in Viet Nam's GHG emissions is quite rapid, this would not lead to a reduction in overall emissions but could contribute to a slowing of emissions growth.

An informal proposal was made in clause 12 of the EPT law to channel revenues from the EPT into environmental projects, but this was not implemented: Both modelling and practical experience indicates that this would have increased the environmental effectiveness of the tax.

Impacts on growth and investment

Modelling prior to the implementation of the EPT suggested there would be an increase in production prices as a result of energy price increases, which could in turn lead to reduced competitiveness of exports and so negatively impact GDP growth (Willenboeckel 2010). This finding was corroborated by CGE modelling conducted in 2014, which indicated a small drop in investment in comparison to business-as-usual as a result of the EPT of about -0.7% in 2012 and 2013 (Huong 2014). This was presumably attributable to higher production costs as a result of higher energy prices, resulting in lower rates of return on investment.

CGE modelling conducted in 2014 indicated a small drop in household consumption of just under -0.6% in comparison to business-as-usual as a result of the EPT in 2012 and 2013 (Huong 2014). This was presumably due to higher prices of fossil fuels, which reduced household real income and shifted demand from coal and other refined fuels to other goods (Huong 2014). The poverty rate in Viet Nam declined from 11.1% to 9.8% between 2012 and 2013, representing a deviation of -0.2% from the BAU scenario in 2012 and -0.1% from that in 2013. On the other hand, income distribution improved slightly during the same period (Huong 2014).

Fiscal impacts

Environmental taxes make up a considerable proportion of total tax revenues in Viet Nam. Revenues from the EPT generate 2-3% of the total government budget and as a result of the introduction of the EPT, government revenues increased by 1.6% in 2012 and 1.2% in 2013 (Huong 2014).

EPT revenues doubled in 2015 as a result of rate increases to VND 3,000 per litre of gasoline and jet fuel, VND 1,500 per litre for diesel and VND 900 per litre of kerosene. This will result in increased government revenues in the futures.

However, these adjustments took place in parallel to import tax rate reductions on fuel products imported from ASEAN countries - accounting for 64% of total fuel imports - in accordance with trade agreements, so the impact on domestic fuel prices was minimal.

It is not legally permissible to earmark tax revenues in Viet Nam to a specific policy goal in budgetary law and thus, environmental tax revenues flow into the general budget. But some political earmarking did take place and it was predicted that the EPT would strengthen fiscal decentralisation by allocating funds to state and provincial budgets. However, these revenues appear not to have been earmarked in any way or used for environmental expenditures as initially intended and discussed.

Table 2: Environmental tax receipts in Viet Nam, 2011-2015, plan 2016

Tax in billion VND	2010	2011	2012	2013	2014	Plan 2015	Actual 2015	Plan 2016
Natural resources	26,306	38,123	42,278	36,368	39,886	38,020	27,651	30,058
EPT	0	11,201	12,680	11,654	12,034	12,939	26,404	38,472
Land rents	3,791	5,869	7,762	5,103	7,231	6,422	13,066	11,855
Land and property	49,368	54,225	45,109	39,200	39,000	39,000	57,920	50,407
TOTAL	79,233	99,418	107,829	92,325	98,151	96,381	125,041	130,792
Per cent of total budget	13.4%	13.8%	14.5%	11.7%	11.6%	10.6%	11.4%	10.8%

Source: Ministry of Finance, Viet Nam (unpublished report)

Social impacts

Modelling conducted prior to the introduction of the EPT indicated that household welfare would decline across all groups - and even more so, if high tax rates were implemented. The country has a relatively ineffective social welfare/transfer system. While the poorest income quintile receives on average 9 cents per day in government transfers, the richest quintile receives USD 1.6. In Viet Nam, the Communist Party's priority has been, in general, its own survival and the need to contain the potential for social unrest by spreading the benefits of economic growth has resulted in a fine balance between economic growth, poverty reduction and political stability (Hayton 2010)). For all of these reasons, concerns about possible social impacts had a significant influence on the ultimate design of the EPT and other taxes were reduced when the EPT came into force, to ensure that the initial impact on prices would be minimal.

In addition, the social impact of the EPT was expected to be regionally differentiated, affecting largely poor populations in rural villages who could be identified by local government. Thus, the Vice-Finance Minister at the time stated that those who would be affected would receive increased payments from local government - and that there would thus be no social/monetary impact on the population.

Strategic concerns and political economy

Energy taxes in the EPT were tagged on to existing collection systems, thus ensuring administrative feasibility and keeping costs to a minimum, as is also generally the case for energy taxes in OECD countries. Revenues were allocated to the general budget.

To minimise opposition to the EPT, the gasoline surcharge regulation was abolished at the same time, which prevented an overall increase in transport fuel prices, protecting vulnerable households (and businesses) from the impact of energy price increases. While such measures facilitated the initial implementation of the EPT, trade-offs are certainly evident between environmental effectiveness and revenue-raising potential on the one hand and political feasibility on the other. Further increases in the tax rate will be necessary to ensure that the EPT is environmentally effective. In Viet Nam, a broad review and reform of the tax structure is in the pipeline, which may enable policymakers to integrate environmental tax elements into the new policies.

It is difficult to make general statements about the best way to accurately target the poor and ensure that compensation measures are effective and efficient. These factors depend on the country context and on existing redistribution mechanisms, the quality of data on household income, and so on. For cash transfers to be effective, institutional capacity and procedural mechanisms to accurately target poor households and distribute funds must be in place (Raworth et al. 2014). However, there are many examples where cash transfers have been successful: Indeed, almost all African countries have introduced cash transfer projects on the back of a successful pilot project in the 2000s in Zambia's Kalomo District, which allocated the most disadvantaged households regular "social cash transfers". Such cash transfers are often spent on income-generating investments and thus are also associated with economic advantages and positive secondary effects. The cost of such schemes is also not prohibitive, e.g. in Zambia to cover the most vulnerable 10% of households in Zambia would cost an estimated USD 20 million, equivalent to 0.5% of GDP or 5% of Official Development Assistance (ODA) to the country (Schubert 2017).

If policymakers are not certain whether they can target vulnerable households effectively, they should aim to over- rather than undercompensate. In Iran, when fossil fuel subsidies were reformed in 2010, the government set up a bank account for approximately 80% of all households - due to problems in identifying the most vulnerable. While this was less than ideal in terms of administrative effort and cost, the measure lifted virtually the entire population out of poverty and fostered widespread political acceptance for subsidy reform at the time (Guillaume et al. 2011).¹³

Ideally, compensation measures should not undermine the incentive effect of ETR (increased prices) but should run in parallel. However, in practice the risk of negative social impacts may be too great to allow for such an approach. For example, lifeline tariffs on electricity - provision of a basic amount of electricity at low or no cost - undermine incentives for energy efficiency. Nonetheless, if there is a risk that indirect compensation schemes will prove ineffective, policymakers may have little choice but to implement such tariffs, to ensure that the poorest households can access electricity (see box below for a discussion of lifeline tariffs in the Maldives and China).

¹³ Subsequent sanctions placed on Iran after the subsidies had been phased out had a severe impact on the Iranian economy and the positive impact of subsidy reform was largely lost.

If possible, measures that facilitate behavioural change and innovation should be prioritised, as these kinds of measures enhance the efficiency and effectiveness of ETR measures and reduce the overall cost of the green economy transition and low-carbon development (Ekins 2009). A range of policy options which can better integrate social and environmental policy making have been proposed by the International Institute for Environment and Development (IIED - Raworth et al. 2014):

- **Safeguarding policies** which compensate for the social cost of green policies, such as cash transfers, social protection, redundancy payments, micro-finance access, and enterprise and skills training.
- **Co-benefits policies** which are designed to exploit win-win opportunities to drive the green transition, such as conditional cash transfers, access to sustainable and affordable energy, water, sanitation, transport and housing, sustainable produce certification, and pro-poor payments for ecosystem services.
- **Social transformation policies** which include redistributing control over assets, labour rights reform, tackling women's reproductive care burden, deepening participation, and ensuring procedural justice.

The latter two strategies are preferable because they are most likely to bring about lasting gains, as they are more transformative approaches which not only compensate directly for negative equity impacts, but also help drive the green economy transition. Revenues from ETR measures can be used to implement all three approaches, although thus far, safeguarding and co-benefits policies have been most common in developing countries.

When developing responses to equity impacts, policymakers should bear in mind that impacts of ETR may be different over time, for example, ETR may result in job losses before new jobs are created, or vice versa. Similarly, taxpayers respond to environmental taxes in different ways as time passes - in the short term, behavioural change is to be expected and, later on, changing patterns of investment.

The tendency for developing countries to introduce ETR at rather low rates might be helpful for policymakers responding to changing equity impacts over time. In the short term, policymakers can use the early stages of ETR to support households to adjust to future price increases and put social protection or redistributive mechanisms in place, so that when higher tax rates take effect, the most vulnerable will already be prepared for the changes and protected from their impacts.

Schemes to compensate or protect the vulnerable include: cash transfers or hand-outs; food stamps or subsidies; free schooling; cash or food-for-work programmes; free or subsidised health services; housing or utility subsidies; vouchers or green cheques; social or health insurance; labour market policies; provision of alternatives, such as LPG stoves to replace kerosene; and lifeline tariffs - zero or lower tax rates for the first units of consumption, targeting the poorest households (Cottrell et al. 2016; Fay et al. 2015).

Box 15: Schemes to compensate or protect the vulnerable

Such schemes include:

- Cash transfers and hand-outs;
- Food stamps
- Food cash subsidies;
- Free schooling;
- Cash or food-for-work programmes;
- Free or subsidised health services;
- Housing or utility subsidies;
- Vouchers or green cheques;
- Social or health insurance;
- Labour market policies;
- Provision of alternatives, such as LPG stoves to replace kerosene;
- Lifeline tariffs - zero or lower tax rates for the first units of consumption, targeting the poorest households

Source: Cottrell et al. 2016; Fay et al. 2015.

Box 16: Introduction of progressive electricity tariffs in Maldives, China and Viet Nam

In a 2009 economic reform the universal electricity subsidies in the **Maldives** were replaced by a targeted system. This was a measure to combat the large fiscal deficit of Maldives, one of the highest in the world (IMF 2009). By replacing the old subsidy with an **increasing Block Tariff structure** the subsidy did not longer benefit the rich most as well as minimised the impact on the poor (Cottrell et al. 2015). The Tariff rates of the state-owned electric company STELCO are set at Rf 1.5 per KWh for 0-100 KWh per month for the lowest rate peak at Rf 4.25 per KWh if the monthly consumption exceeds 600 KWh (STELCO 2016).

China introduced a **tiered electricity pricing** reform in 2010, setting specific (and increasing) prices per each block (i.e. quantity) of consumed electricity per household and meter. Under this new tariff system, the tier one keeps the old quota price (that applies to 89 per cent of households), in tier two slightly higher electricity prices are charged for the kWhs exceeding the amount of basic use, which is differentiated across regions, and the tier three sets a much higher tariff for the amount of electricity for what is called luxury use (Zhang, ZhongXiang 2014). The new pricing system was implemented as a response to growing energy security and environmental concerns, addressing the need to **improve efficiency, lower pollution while maintaining affordable consumer prices**. It is a demand-side management measure to address excessive electricity consumption. Prior to its introduction, households were charged a flat rate, regardless of individual consumption. These rates were generally low and did not cover cost of supply, heavily cross-subsidized by industry and commercial sectors. The flat rate was inefficient with regard to promote energy savings. The tariffs were also regressive as higher income groups with higher electricity consumption disproportionately benefited from the system.

Another country that looks into progressive electricity tariffs is **Viet Nam**. A policy discussion paper that was published in January 2017 proposes **a minimal price for the first 30 kWh for all electricity users per month** and elimination of cash transfers. Another option would include a freezing of the current tariff and simplifying the cash transfer, while removing the usage requirements (Institute of Public Policy and Management 2017).

Relatively accurate targeting is possible and developing countries can learn from each other's experiences. Compensation mechanisms in Indonesia are described in the Box 17, please refer also to **Box 6**.

Box 17: Indonesia's reduction of fuel price subsidies, accompanying social programmes and its potentials for an ETR

In 2000, Indonesia tried to reduce fuel subsidies and increase prices for diesel by 9%, for gasoline by 15% and for kerosene, which is mostly used for cooking, by 25%. The revenues were recycled via general spending (for example, in health-care and education) (see Beaton/Lontoh 2010).

Since price increases were mostly felt by Indonesians on low or middle incomes, violent demonstrations, mainly by students, taxi and bus drivers and small entrepreneurs broke out and plans to cut subsidies further were put on hold. In 2005, however, fuel prices had risen substantially, forcing the government to take steps to increase subsidies again. However, having learned from previous mistakes, Indonesia used well-targeted compensation programmes to keep the peace. The Indonesian government removed subsidies for industrial users and raised gasoline and kerosene prices by more than 150% within one year.

Despite this immense increase, opposition against the reform was relatively low, which can be explained through the compensation programme Bantuan Langsung Tunai (BLT). This cash transfer programme was implemented to compensate poor households. All households with monthly fuel expenditures below the threshold of 175,000 Indonesian rupiah (IDR) (EUR 15) received monthly payments of IDR 100,000 (EUR 8.6) over six months. 28% of all Indonesian households received those payments (Widjaja 2009). Between 2005 and 2006, compensatory spending for the BLT programme amounted to EUR 1.93 billion and made up more than 50% of the added revenues from subsidy cuts in 2005.

Social compensation for rising energy prices in the Indonesian case illustrates that, to maintain the economic and environmental appeal of ETR measures, policymakers may need to be prepared to recycle large parts of revenues to those who cannot easily carry the burden of higher prices (Schlegelmilch 2011).

6.5 Further political economy considerations

Tax evasion

Countries with less effective tax collection systems and a large informal economy can benefit substantially from ETR measures: Environmental taxes, if designed with these problems in mind, can be amongst the most difficult taxes to evade (Fay et al. 2015). Many environmental tax bases, such as those on energy consumption, water, agricultural inputs, carbon or waste are fairly immobile - in contrast to capital and to a lesser extent, income - making tax evasion less likely (Cottrell, Jacqueline et al. 2016).

In the UK, for example, evasion of energy taxes is less than 2%, while evasion of income tax has been estimated at around 17% - a figure which is much higher in many developing countries (Fay et al. 2015). At the same time, some environmental taxes are relatively easy to measure, monitor and collect at supplier level, e.g. carbon taxes, taxes on natural resources, royalties and the price of some tax bases - energy, carbon - are traded on open marketplaces and the prices are thus relatively transparent (Liu 2013).

Carbon-energy taxes can particularly benefit those economies with high greenhouse gas emissions and high rates of tax evasion and large shadow economies, such as India, China and many emerging and developing economies in the Asia-Pacific region. If at least a proportion of revenues from carbon-energy taxes are used to reduce conventional taxes, then this may reduce incentives for firms and individuals to stay in the informal sector: While carbon-energy taxes apply to all energy users, conventional taxes on wages, sales and profits apply only to the formal sector. Therefore, if these conventional taxes are reduced, or if revenues are recycled to taxpayers of conventional taxes, then the difference between the tax burden in

the formal and informal sectors will be reduced. Indeed, recycling a proportion of the tax revenue can mean that there are concrete economic benefits for business and individuals if they enter the formal economy. In this case, carbon taxes can boost total welfare and free up resources previously lost to tax evasion. Indeed, one recent study estimates that in countries with higher tax evasion, such as China and India, reduced tax evasion can divide the cost of a carbon price by a factor of close to 10 (Fay et al. 2015; Liu 2013).

Behavioural economics

If the design of environmental policies takes into consideration the way polluters respond to certain cues in the environment, the environmental effectiveness of a particular measure tends to increase. Labelling - including clear calculations of potential savings through the purchase of energy-efficient equipment per year - can undermine the consistent failure of individuals to value future cost savings at their current value and thus can underpin behavioural changes in response to rising energy prices. Labelling can also help rationalise concerns that new appliances will not be as effective as existing appliances, thus addressing the endowment effect (i.e. attachment to possessions) (Pollitt, M. G./Shaorshadze 2011).

Taxes seem to be more effective if their impact is salient, i.e. visible and observable: Metering to make consumers more aware of their consumption can bring about reductions. On the remote Scottish island of Eigg, a traffic light system has been used to keep energy consumption below a certain limit per household. With a reconnection of 42 USD, the system has been relatively effective in keeping consumption lower than this limit (IEA-RETD 2012). There may be considerable potential in Asia-Pacific to use systems that enhance the visibility of resource consumption in a policy package alongside fees, charges or taxation to enhance efficiency. The city of Dehli, for example, has a system of monitoring of water consumption using a mobile phone application, which could be used to enhance awareness of wasteful consumption alongside increased water rates (Hindustan Times 2015).

Language can also have an important influence on the political acceptance of environmental taxes, not least because economic actors respond differently to measures they perceive as coercive. Thus, using words that do not arouse tax aversion, such as levy or cess, rather than “tax”, can boost public acceptance (Cottrell 2015).

7 Recommendations for the tax design in the Asia-Pacific region

Experience from many countries in which ETR measures are in place shows that ETR can bring significant environmental improvement - even with exemptions or low tax rates in place. In Germany, for example, energy taxes - despite many exemptions to safeguard economic competitiveness - have made the single largest contribution to greenhouse gas emissions reductions of any policy tool.¹⁴ Another example is the successful phasing out of lead from gasoline (Lovei 1998), where most high-income and many middle-income countries, including Brazil, India and Thailand, drastically reduced or even achieved a complete phase out in the 1990s (Lovei 1998, pp. 15). Thus international organizations such as the IMF regard carbon pricing measures - either through taxes or trading systems designed to behave like taxes - as “potentially the most effective mitigation instruments” (IMF 2016 p.5).

In many countries, ETR is often implemented in a way that deviates from the theoretical ideal, as already mentioned in the OECD recommendations (see Section 3). For example, the tax base, instead of being

¹⁴ <http://dip21.bundestag.de/dip21/btd/18/078/1807854.pdf>

broad and comprehensive, is often rather narrow, exemptions are many, tax rates are not consistent and too low to trigger the desired changes, and do not increase gradually over time due to a tax escalator and indexation to inflation. In many cases, ETR measures have been environmentally effective nevertheless, but they could have been far more effective if more of such ideal design elements had been applied.

The following sections discuss tax design options available to policy-makers and possible considerations that may influence their decision-making when designing environmental tax instruments. Experience from other countries and lessons learned are included throughout.

7.1 Defining policy objectives

The primary purpose of environmental taxation is generally regarded as the correct pricing of an environmentally harmful activity, i.e. the implementation of a so-called Pigouvian tax. This objective should at least form the starting point for any discussion of the implementation of ETR measures (Goulder/Parry, I. W. 2008; (Ministry of Finance Norway 2014). At the same time, when designing ETR measures, it is critical that policymakers identify and address possible trade-offs and synergies between environmental and fiscal, economic and social objectives. Addressing such trade-offs, or synergies, may require additional measures within a broader policy package - see e.g. section 7.6 on policy packages, section 6.4 on social protection schemes and section 6.3 on competitiveness and may also demand clarity on the primary objective of an ETR measure.

There are often tensions between fiscal and environmental objectives. If the primary objective of an ETR measure is to rapidly reduce environmental damage within a relatively short timeframe, or indeed to phase out a particular kind of polluting behaviour, then this will likely conflict with a defined fiscal policy objective of generating stable revenue (Schlegelmilch, Kai/Joas 2015). In such cases it is important that policymakers are clear about their objectives and whether they wish to prioritise environmental effectiveness or revenue-raising. At the same time, many ETR measures cannot be expected to raise significant or stable revenues, e.g. plastic bag taxes, because elasticity of demand is high - meaning that taxpayers quickly respond to a price rise and change their behaviour. Other ETR measures can be of considerable fiscal relevance, such as energy or transport fuel taxes. In such cases, well-planned design of the tax instrument over a number of years can ensure that revenues increase substantially or at least remain stable over time, see section 7.4 for details.

In order to maximise environmental effectiveness, the objectives of ETR measures should be clearly defined and efforts made to effectively target incentives to the reduction of pollution or other environmental problems the tax seeks to influence (Mirlees et al. 2010). In China, for example, differentiated grid prices for desulphurised electricity have had the very clearly defined objective of driving the desulphurisation of coal generation which sent a very clear signal to power producers alongside targets in 5-year plans (for more details see [Box 24](#)). In this case, the objectives of the policy were clearly reflected by the 0.015 RMB/kWh premium paid by government for desulphurised electricity, equivalent to the average estimated cost of operating the technology. As a result of this policy, China had cut its SO₂ emissions by 13.14% relative to its 2005 levels by the end of 2009, having met the 2010 target of a 10% cut one year ahead of schedule (Zhang, ZhongXiang 2014).

Political feasibility is likely to be enhanced if policy objectives are linked to widely recognised environmental and health policy priorities in the public eye in a particular country. By communicating these health and environmental issues, policymakers can enhance the feasibility of implementing ETR measures, see section 8.2. In both Iran and Indonesia, high awareness of the unsustainable nature of spending on fossil fuel subsidies paved the way for their reform (see section 5). For this reason,

policymakers may find that tax measures to reduce local pollution tend to be well received, as awareness of local impacts tends to be high, while it may prove more challenging to garner support for measures addressing abstract global concerns, e.g. climate change. Linking use of revenues to policy priorities as well can also help boost support for reform, as described in detail in section 6.2. below

Taxes with the objective of driving a phase-out of particular substances or rapidly changing behaviour will erode their tax base relatively quickly, as has been the case with environmental taxation on sulphur or lead in transport fuels, as exemplified by the Thailand case, above. Other taxes targeting less easily avoidable pollutants or other tax bases (energy is not in itself a pollutant) will be in place over a much longer timeframe (see GTZ 2008). This is particularly important in developing countries, where revenues are much lower and tend to be more vulnerable to price shocks.

In developing countries, tax-to-GDP ratios tend to be rather low at 10-25%, whereas tax-to-GDP in OECD countries averages 30-40%. This lower proportion of tax revenues collected by developing countries restricts the capacity of their governments for poverty reduction or investment in infrastructure, healthcare, education, or the green economy transition, and thus has significant implications for policy making. This problem has been acknowledged by many developing countries, which are making a concerted effort to increase the overall tax take. In Mexico, for example, one of the key objectives of the recent tax reform was to increase overall tax receipts from 19.5% in 2014 to 24% by 2018 (OECD 2015).

7.2 Instrument choice

The advantages and disadvantages of environmental policy instruments have been discussed in detail in section 3.2. In this section, the realities of instrument choice in the context of developing countries will be briefly examined along the following four criteria for instrument choice: Environmental impact; Economic efficiency and cost-effectiveness; Distributional impacts; Political and administrative feasibility (Goulder/Parry, I. W. 2008).

Environmental impact

The specific objectives of a policy determine which instruments might be most suitable. ETR measures are particularly relevant when addressing environmental problems where wide-ranging changes in behaviour across a large number of diffuse producers and consumers are necessary. In many such cases, the cost of direct regulation would simply be prohibitive ((Mirlees et al. 2010). Implementing ETR instruments will typically create a dynamic incentive for environmental improvement.

However, responses to ETR are not always predictable and if elasticity of demand is lower than predicted, i.e. if people do not respond to an increase in price by changing their behaviour, environmental effectiveness may be compromised unless policymakers have incorporated an automatic escalator or have indexed rates to inflation or GDP growth (section 7.4 looks at designing tax escalators and indexation of taxation to inflation or growth, to retain dynamic incentives).

Economic efficiency and cost-effectiveness

In theory, market based instruments are the most economically efficient and cost-effective: They can achieve environmental objectives at the lowest cost, or achieve the best environmental outcomes possible with the resources available. ETR measures reduce distortions in the economy and thus bring about economic efficiencies and increased welfare. Administrative costs of ETR tend to be very low, as measures can often be linked to existing collection mechanisms.

Distributional effects

Concerns about equity impacts often prevent ETR measures from being implemented in both developing and industrialised countries. But this problem is particularly acute in developing countries, many of which have large inequalities and there is a clear risk that ETR, as a policy instrument that deliberately brings about an increase in prices of goods and services, can have a negative impact on the most vulnerable. The Gini index, which measures the extent to which the distribution of income among individuals/households within an economy deviates from a perfectly equal distribution, highlights the scale of this problem. More equal societies, such as Denmark (29.1) or Germany (30.1) have a much lower rating on the Gini index, that is, much more equal income distribution, than the majority of the developing countries examined in this report, such as China (42.2), India (35.2 in 2011), Indonesia (39.5 in 2013), Iran (37.4 in 2013), Lao PDR (37.9), Mauritius (35.8), Thailand (39.3) or Viet Nam (38.7) (World Bank 2016b, all figures from 2012 unless otherwise stated).

When evaluating the distributional impact of ETR measures, it is important to take the positive impact of (physical) environmental improvements on social equity into account. As a general rule, the poor stand to gain disproportionately from environmental improvements, even those resulting from carbon taxes, as they tend to live in the most polluted areas and benefit from reduced local air pollution (SO₂, particulates, NO_x) and corresponding improvements to human respiratory health (Cottrell et al. 2016). How progressive or regressive particular tax measures are depends on several factors including the tax base, the country context, and the design of the measure itself. If well designed, ETR can act to redistribute wealth in developing country populations and so improve social equity (del Granado u. a. 2010). Tax systems that increase equality can have an effect on the public sense of solidarity, fairness and trust and thus on tax morale and tax effort - which may encourage actors to pay taxes and leave the informal economy (Bräutigam 2008). As well, social equity can be safeguarded in many countries by targeted compensation schemes, see section 6.4.

In some countries social protection measures are relatively ineffective and compensation schemes lack coverage along multiple dimensions of inequality, such as gender, age, race, ethnicity and disability. In many low-income and lower-middle-income countries, coverage of such schemes does not exceed 50% (World Bank 2016b). Many transfers are inequitable and poorly targeted, benefitting the wealthy more than the poor. If state resources are limited and the middle classes do not have access to private means, they tend to be better and more able to demand and obtain support from governments at the expense of poor households (ibid). In Viet Nam, for example, the government has been in the past relatively reluctant to introduce measures which adversely affect the poor in the context of a relatively ineffective social welfare / transfer system. In the country, the poorest income quintile receives on average 9 US cents per day in government transfers, and the richest quintile USD 1.6 (World Bank 2016c).

These issues and problems have an impact on the kind of ETR measures governments can or dare to introduce. Focusing on tax bases that do not directly affect the poor, e.g. on air ticket taxes, import duties on vehicles or vehicle registration tax, may be one solution to this problem. In view of high rates of inequality in developing countries, identifying which ETR measures might have the most progressive impacts may be helpful as a means of improving the progressivity of the tax system.

Political and administrative feasibility

Administrative capacity of the state

Wherever an environmental tax is introduced, it must be administratively feasible to collect it, while costs

should be kept to a minimum. In practice, there is usually a trade-off between economic efficiency and administrative and political feasibility, and compromises have to be made (IMF 2012).

The ability to tax is constrained by the administrative capacity of the state and here there is an enormous difference between developed and developing countries (Besley/Persson 2014). While high-income economies are able to generate tax revenues in the range of 30% to 40% of GDP, this number is usually far lower in developing countries, between 10% and 20% in low-income economies (see e.g. Fuest et al. 2011, Besley/Persson 2014). Over time, high-income countries have continuously invested in their fiscal capacities – the power to tax cannot be taken for granted. Low-income countries tend to rely much more on taxation of consumption than income, as this requires less fiscal capacity (Besley and Persson 2013). As for any tax system, environmental taxation ideally requires a strong, stable governance framework, particularly in relation to financial governance and to an established tax system which is capable of levying, collecting and re-distributing revenues and of transparent, competent and accountable public financial management (GTZ 2008). However, ETR measures can also contribute to processes to improve fiscal governance frameworks, as discussed in section 6.1.

Thus, policymakers should consider whether and to what extent new ETR measures can be linked to existing and functioning tax collection mechanisms, as:

- Such taxes can be collected with little additional administrative effort and additional revenues can be raised cost-effectively;
- Well-functioning tax collection mechanisms are not easily evaded and thus provide an excellent basis for revenue-raising (see e.g. Fay et al. 2015);
- Using existing collection mechanisms, and perhaps even linking new environmental objectives to existing taxes, helps to overcome political opposition and resistance from the administration.
- Such functioning collection mechanisms are also a good means to combat corruption and weak governance.

If administrative capacity is lacking, as e.g. in Sri Lanka in the 2000s, enforcement of even relatively simple ETR measures may be lax or indeed non-existent (Speck/Datta 2007). Designing ETR measures which are too complex and demanding for administrative systems will also result in poor rates of enforcement (Mirlees et al. 2010). For example, in Lao PDR, royalties on forest products - including fruits, medicines, charcoal, firewood, mushrooms, latex, rattan and bamboo - are unenforceable as a result of the small-scale and diffuse nature of their collection and their excessive complexity and the lack of information exchange and thus cooperation between ministries.

Policymakers in developing countries in the Asia-Pacific region may thus wish to start by first focussing on introducing large and relatively simple environmental tax incentives, which raise sufficient revenues to fund their administration and enforcement while minimizing administrative complexity. In this regard, indirect taxes - taxes such as electricity taxes, which are collected from a limited number of energy suppliers rather than a large number of energy consumers - may minimise administrative costs and be more feasible to implement in the developing country context. Then, in a second step, more complex environmental tax incentives should be considered. **Box 18** below discusses the administrative challenges experienced by China and Kazakhstan when implementing emissions trading and emphasises the importance of carefully considering the administrative feasibility of market-based instruments.

At the same time, the political system and the nature of the economy in the country in question also feed in to the question of instrument choice. Countries with heavily centralised or planned economies, and economies in transition, may have highly regulated energy and food pricing systems. Policymakers will

have to design taxes carefully to ensure that incentive effects are passed on to the consumer, or impact the producer or trader if targeted accordingly. In Asia-Pacific, electricity prices are often regulated, meaning that changes to the price of inputs into power generation will not as a matter of course be passed through to business or private consumers in the form of higher electricity prices. In such cases, a downstream tax on electricity consumption can ensure that incentive effects reach the consumer. On the other hand, policymakers in market economies with relatively liberalised electricity markets can assume that more targeted upstream taxes on energy inputs to power generation will primarily address power generators and thus will encourage use of cleaner fuel inputs. In such cases, upstream measures are preferable because they differentiate between fuels and thus encourage fuel switching¹⁵. In addition, such measures are often amplified because costs from higher taxation may also be passed on to consumers in the form of increased electricity prices.

Countries with low rates of corruption and sound and transparent fiscal governance also tend to implement ETR measures more than countries struggling to implement existing tax policies. Assessing political and administrative feasibility when deciding which environmental policy instrument to implement makes a great deal of sense. ETR might be a means for countries with higher levels of tax evasion to bring companies and individuals into the formal economy (see section 6.5). At the same time, policymakers functioning of exi should consider the existing tax collection mechanisms when thinking about instrument choice and ETR design: Where an effective tax collection infrastructure exists, policymakers can exploit synergies between existing taxes and new environmental tax measures by tagging tax collection onto e.g. an existing transport fuel tax.

Box 18: Lessons learned from emission trading in China and Kazakhstan

After implementation of seven regional pilot Emission Trading Schemes for CO₂, which started operations in 2013, **China's national ETS started in 2017**. The national ETS will cover power generation, petrochemicals, chemicals, building materials, steel, non-ferrous metals, paper and aviation. The seven pilot ETSs are to be merged into the national ETS under unified rules.

Through the regional pilot schemes, **China's stakeholders** in the scheme (compliance companies, government agencies, financial institutions, auditors and project developers) **could gain important experience**, especially with regard to **allocation, monitoring & verification, and trading** of emission allowances.

Among the pilots, only Guangdong held auctions in 2015, raising CNY16 million (USD 2.4 million) of revenue. The total traded volume of allowances in the Chinese ETS pilots was 32 MtCO₂e in 2015. The China Certified Emission Reduction (CCER) scheme has continued to grow: as of August 1, 2016, 762 CCER projects were registered, and a total of 53 MtCO₂e of credits were issued by 254 of these projects. The total transaction volume of CCERs in the pilot ETSs was 64 MtCO₂e, with the Shanghai ETS accounting for 55% of this volume. Over 2015-2016, CCER prices ranged from CNY10/tCO₂e to CNY33/tCO₂e (USD 2-5/tCO₂e). The NDRC is currently working on the rules for CCER use in the national ETS (World Bank et al. 2016a).

After the past years of experience from the pilots and from ETS worldwide, the following **key issues** turned out to be crucial for smooth implementation and operation of the carbon market:

- **Market Transparency** and liquidity in the market. Without comprehensive data and information in

¹⁵

Although it should be noted that upstream taxes on energy inputs raise other questions, such as how to deal with electricity imports not affected by the tax.

the market, it is difficult for ETS participants to take informed decisions about whether to engage in emissions trading and to build effective carbon market strategies

- Compliance companies' **capacity building**.
- **Conservative allocation of allowances** and **robust monitoring & verification** to ensure emissions go down

For many years, it seemed more likely that China will introduce a **carbon tax**. A major recommendation of an international expert group invited by the influential China Council for International Cooperation on Environment and Development in 2009 was to phase in gradual, but predictable increases of a carbon or energy tax. Considering the recommendation, the Ministry of Finance prepared a report on the viability of environmental taxes in 2012. Carbon taxation was included in the five year plan 2011-2015 and in 2013, the Chinese government confirmed plans to introduce a carbon tax as part of a package of tax reforms, adding CO₂ to the existing scope of environmental levies. It was thus widely expected that a carbon tax would be introduced on large polluters at a rate of 10 yuan (approx. EUR 1) per tonne by 2015, to climb steadily up to 2020 (Cottrell, J. et al. 2016). However, it now seems that China has decided to pursue the nationwide ETS instead, presumably because the government assumes it will be easier to link CO₂ trading to the EU emissions trading system. The emissions trading approach also appeals to China as it has considerable experience of selling carbon offsets on international markets. Thus, there is already an existing institutional and regulatory framework upon which the Chinese government can build. Moreover, there is already broad experience with carbon markets in the country (China Carbon Forum 2016).

In an attempt to control air pollution and smog problems, China has passed a law at the end of 2016 that levies taxes on pollution. The law will come into effect on 1st January 2018. Polluters will be charged for contributing to air, water and noise pollution. Pollution sources taxed include air and water pollutants such as sulphur dioxide and sulphite, taxed at rates beginning at 1.2 yuan (USD 0.17) and 1.4 yuan (USD 0.20) per unit respectively. It also stipulates a monthly tax ranging from 350 to 11,200 yuan (USD 50 to USD 1612) for noise pollution. CO₂ is not among the pollution sources taxed. The new levy system will replace an earlier system of various charges which are regarded as being too low to incentivize polluters to change behaviour. While tax revenue is an important economic means for environmental protection, it is not the core purpose of the new policy. **Instead, enterprises should be encouraged to reduce emissions** (Reuters 2016).

Kazakhstan is one of the world's most carbon and energy intensive economies, due to its abundance of energy resources and subsidized energy prices (Nugumanova/Troschke 2016).

To address the high level of carbon emissions of the country, Kazakhstan launched an Emission Trading Scheme in 2013, the first to be implemented in Asia.

From the beginning, the ETS encountered various problems, most notably:

- In phase I (2013), there were no penalties imposed on companies that did not comply with their reduction targets, so there was no strong incentive to participate in the scheme.
- In the first years, due to this substantial over-allocation of allowances, as a consequence low trading activity and prices ranging only from USD 0.20 to USD 4 per tonne of CO₂. The handful of trades hardly justifies the institutional costs for maintaining trading infrastructure.

The scheme should have entered its third phase in 2016, involving around 140 large companies in the energy sector (including oil and gas), mining and chemical industry, and covering around 50% of Kazakhstan's CO₂ emissions. The allocation plan for 2016-2020 that was finally approved already conceded 9 million more allowances than established in the initial plan, in an attempt to appease the industry sector. Already in phase II, allowances were higher (155,4 Mt in 2014, compared to 147 Mt in

2013) than in phase I (CDC et al. 2015).

In February 2016 however, Kazakhstan **suspended** the ETS until 2018. According to the vice-minister of Energy, A. Magauov, industry groups raised concerns that emission allowances allocated to them did not reflect the expanding economy of the country and the rising electricity production. Another reason may have been that Kazakh economy is suffering because of the oil and metal prices downturn. The suspension demonstrates the decisive role veto groups can play in the political bargaining process around carbon pricing (Nugumanova/Troschke 2016).

There are several reasons for the unsuccessful implementation of the ETS in Kazakhstan:

- Benchmarking and methodology, developed with help of international organisations and consultants, was not fully understood and accepted by all stakeholders, so there was a lack of ownership transfer.
- Enterprises in Kazakhstan are used to pay (or evade) taxes, but due to the lack of long-standing market experience enterprises are not familiar with the handling of hardly to predict carbon prices in trading platforms.
- The necessity to participate in trading actions that cause additional transactions costs for monitoring, verification, carbon market observation and trading to keep their business running, is a new and costly thing.
- Knowledge about abatement costs is not prevalent among market actors - when technologies have to be imported, search and transaction costs for substitution arise and make investment decisions costly. Hence, business tries to evade emission trades as far as possible.
- Market imperfections due to the oligopolistic nature of the energy sector in Kazakhstan. The enterprises participating in the ETS are of high importance for the local economies due to their large size. Thus, the biggest polluters in Kazakhstan are in an extremely strong bargaining position against the regulator. Of course this is the same in the case of a tax - but taxes can be handled with greater flexibility over time.

As for the future of the ETS in Kazakhstan, the government announced that a new methodology of ETS will be developed. The amendments aim to improve the monitoring, reporting and verification (MRV) system, as well as the overall greenhouse gas emissions regulation and ETS operation. It is planned to restart in 2018 with new allocation methods and trading procedures for all market participants (ICAP 2017).

As the two examples from China and Kazakhstan show, successful implementation of emission trading depends on a number of factors - especially institutional capacity - that is likely not given in developing countries. An ETS needs robust and well-elaborated design to avoid loopholes on the one hand, and excessive transaction costs on the other hand. Hence, country-specific circumstances should be taken into account as constraining factors while choosing an appropriate policy instrument to reach environmental objectives. An ETS is efficient and effective in countries where institutions are strong, information asymmetry is low, market traditions are long and market concentration is low, but it may be unviable under circumstances that are less ideal, as the experience of Kazakhstan shows (Nugumanova/Troschke 2016). Here, a carbon tax seems to be the more appropriate instrument.

Implementation culture

The culture of policy instruments in a particular country will also influence instrument choice. For obvious reasons, environmental taxes in the EU tend to be implemented more frequently in countries with greater

trust in government as a result of perceived sound fiscal governance and low levels of corruption (Cottrell, J. 2015). If countries have previously had positive experiences with particular instruments, such as ETR measures, and are thus more open to implementing more such instruments in the future. Area licensing schemes, vehicle quota systems and later, electronic road pricing in Singapore are a case in point: Initially successful measures have been built upon by policymakers confident that these kind of measures tend to work in the Singapore context.

7.3 Tax base, coverage and scope

Identifying a feasible tax base and point of application

An important consideration for an effective ETR is the **choice of tax base** - the subject of a tax such as the carbon content of a fuel - and **the point of application** - taxes can be levied upstream at the start of the value chain, midstream at the point of manufacturing or trading, or downstream at the point of consumption. In practice, policymakers must also consider which tax bases are suitable to their country context: What administrative capacities are available? Which tax bases are easily measurable? Which taxes already exist and function effectively to which an environmental tax could be attached or integrated, or which could be changed so that more positive environmental impacts are triggered?

In economic theory, to maximise environmental effectiveness, environmental taxes should target the pollutant or polluting behaviour as accurately as possible and act on a broad tax base with as few exemptions as possible (OECD 2010a). In reality, however, policymakers will have to weigh up the pros and cons of various models of ETR, taking theoretical and practical considerations into account.

Practice has shown that by choosing a sensible tax base, a smart point of collection along the supply chain and a focus on the most important tax payers can significantly increase the feasibility of ETR measures. Some examples are:

- **Tax base:** The tax base influences the complexity of a tax. Some tax bases do not require measurement of emissions, but can be estimated on inputs, e.g. taxes on transport fuels (there is a fixed relationship between certain fuels and their carbon content and thus carbon emissions), while other taxes are less simple, e.g. taxes on water pollution. Carbon taxes and emissions trading systems often focus on energy-related CO₂ for administrative ease, although it would be ideal to include all greenhouse gases from all sources (IMF 2012). Taxing CO₂ only reduces the number of taxpayers substantially – and hence complexity – but still captures a large proportion of greenhouse gas emissions.
- **Point of application:** Upstream taxation usually implies fewer suppliers and hence fewer taxpayers, which is often a key criteria for administrations to ensure easy enforcement and collection.
- **Focus on most relevant tax payers:** A focus on large tax payers can maximize revenues with sufficient coverage at lower administrative costs (Pereira et al. 2013). Particularly in developing countries with large and complex informal economies, targeting households and small businesses implies a significantly higher administrative effort in terms of both tax collection and monitoring alongside low revenue potential. It may be advisable, certainly in the early stages of ETR implementation, to focus on a large, easy-to-target tax base and to revisit exemptions later.

Research in 13 European countries using data from 2001-2007 across 8 manufacturing sectors has investigated the effects of ETR within and across industries, using country- and year-specific input output data. The results supported the Porter hypothesis - that environmental regulation improves efficiency and

increases innovation and competitiveness (see 2.2.3). The research also revealed that taxes imposed on downstream sectors (i.e. polluting industries upstream in the supply chain) had the strongest effects on innovation (patents) and productivity (value added by country and sector) - perhaps because downstream taxes induce corresponding upstream sectors to innovate and develop new products that improve the environmental performance and energy efficiency of downstream sectors and create new markets (Franco et al 2015). Upstream taxation, on the other hand, i.e. on suppliers, seemed to impact negatively on productivity and innovation as it increased the price of intermediate inputs (Franco/Marin 2015).

Box 19: The clean environment cess in India: Upstream taxes on coal, lignite and peat

In countries with few revenue collection mechanisms in place on energy or fossil fuels in place, the IMF recommends to introduce efficient upstream taxes on energy inputs, to minimise administrative costs, maximise coverage and ensure efficient tax collection from few collection points (IMF 2012 p.29ff).

The clean environment cess introduced in India in 2010 exemplifies the advantages of this approach. The cess is an upstream tax levied on coal, lignite and peat. The cess is levied on the gross quantity of raw coal, lignite or peat raised and dispatched from a coal mine or on coal imports to the country. All producers of coal, lignite and peat are registered with the central excise authority responsible for implementing customs and sales tax. Electronic payments are made monthly on a self-assessment basis. Adjustments are made where producers over- or underpay the cess. When levied on coal imports, the cess is treated as an additional customs duty. Thus administrative effort is minimised and it the Ministry of Finance has stated that the cess is not associated with any additional costs above business as usual.

Sources: Indian Economic Service 2016, Cottrell et al. 2013; Minister of Finance India 2016

Tax evasion, the tax base and tax coverage

In developing countries early adoption of control measures is necessary to prevent a “culture of noncompliance” and to signal resolute enforcement (Pereira et al. 2013, p. 3). Because e.g. carbon emissions are concentrated at the point where they are still incorporated within a product (coal, gasoline), they are easier to control and monitor and thus, carbon-energy taxes tend to be difficult to evade than other taxes (see e.g. Fay et al. 2015). Findings from Sweden and the United Kingdom which show that evasion of carbon-energy taxes is less than 1% and 2% respectively, while evasion of income taxes in the UK is estimated at around 17%. In countries with high levels of tax evasion, ETR measures may more than pay for themselves when introduced through improvements in the efficiency of the tax system - effectively meaning zero or even negative costs (i.e. clear gains) for the regulator in terms of administration (Liu 2013). A further point to consider in this context is that most environmental tax bases are rather immobile, which also makes tax avoidance less likely. This is particularly important in contrast to taxation of capital, which can easily be shifted into tax havens.

Sometimes elites who benefit most from tax evasion overlap with, or have a strong influence on, policy-makers, rendering tax reform difficult to implement in practice. Possible routes to dealing with opposition to EFR are addressed in depth in the section 6.2.on strategic tax design and political acceptance

Box 20: Experiences in Thailand with environmental tax reductions

Climate change poses an 'extreme risk' for Thailand. Severe flooding in 2011 reduced growth to just 0.1% in that year (Macroeconomic Strategy and Planning Office 2012) and a 2015 drought led to substantial GDP losses of 0.52%. As a result, policymakers are acutely aware of the need to invest in adaptation and to stabilise and subsequently reduce GHG emissions. Thailand submitted a relatively ambitious INDC in 2015, committing to GHG reductions of 20% on business-as-usual from 2021-2030 (projection year 2005). Several 5-year plans, including the 2015 Transport Master Plan, directly refer to economic instruments and environmental taxation.

Over the past thirty years, Thailand has implemented several environmental fiscal reform measures. It also developed a detailed proposal for a comprehensive environmental tax reform, which was approved by Cabinet but rejected by the Council of State (see

Box 8).

Tax design - price differentials to bring about behavioural change

The Thai approach is interesting for a number of reasons: Not least, because several environmental taxes introduced in Thailand have not resulted in tax increases. Changing tax regimes for vehicles - cars and motorcycles - as well as a carbon tax on transport fuels drawn up by the Fiscal Policy Office - have all tended to restructure existing tax systems without significantly increasing prices.

This approach does not mean that environmental taxes are ineffective. Taxes on leaded/unleaded petrol in Thailand in the 1990s were environmentally effective in a very short timeframe. In 1991, a tax differentiation was introduced to reduce air pollution from lead, particularly in the capital city, Bangkok. The tax was one element in a package of measures, which also increased awareness of the damage caused by leaded petrol and moves to liberalise fuel markets and support oil companies to produce unleaded fuels. Consumers responded rapidly to the introduced price differential between unleaded petrol (THB (Thai baht) 14/litre) and leaded petrol (THB 15/litre) and within 30 days, the share of unleaded fuel had already risen to 30% (Institute for Global Environmental Strategies 2004).

Within two years of a price differential being introduced, lead concentrations in key monitoring stations had dropped by as much as 93%, and typically by about 70% in comparison with 1990 levels (Israngkura, 2014). By 1995, leaded petrol had been phased out altogether. The Pollution Control Department (PCD) in Thailand has estimated that health benefits of the measure were worth THB 7 billion (Institute for Global Environmental Strategies 2004), giving a cost-benefit ratio of 32:1 for the policy.¹⁶

Fiscal impacts

Tax differentiation between leaded and unleaded petrol did not result in a significant change in tax revenues because it quickly brought about changes in consumer behaviour. The design of the tax - introducing a lower tax rate for unleaded petrol rather than a higher tax rate for leaded fuel - resulted in foregone revenues for the Thai government. As a result, fiscal impacts were limited.

The Fiscal Policy Office recently proposed a new carbon tax on fuels, as mentioned above. However, this

¹⁶ The costs included in the PCD's calculations refer to the cost of converting refineries to produce unleaded fuels.

proposal also will not result in significant revenue increases, as taxation of transport fuels will be restructured in a broadly revenue-neutral way. The tax will reduce market distortions resulting from the under-taxation of carbon in diesel fuel.

In Thailand as in Viet Nam, environmental taxes have been implemented within the existing excise tax structure and collection mechanisms, minimising administrative costs. Revenues raised by price differentiations have flowed into the general budget - which was also administratively simple because the new ETR measures were linked to existing excise tax collection mechanisms.

Social impacts

In Thailand, concerns regarding social impacts have had a significant influence on tax design and have resulted in tax reductions being introduced for environmentally friendly goods or services, rather than tax increases for pollutants. However, in actual fact poorer households may have been affected more than the wealthier households by the leaded/unleaded price differentiation, because the poor were not in a position to switch to unleaded fuels for their older and less technologically advanced vehicles, and had no choice but to buy fuel at the higher rate. The lack of additional revenues raised by the tax measure also leaves the government with less fiscal space to compensate the vulnerable.

Public acceptance and political economy

Public acceptance in Thailand often seems to hinge on tax design: measures which entail carrots rather than sticks, namely tax reductions for green behaviour rather than tax increases for polluters, tend to be more accepted than measures which are regarded as punitive. This is the case in many countries - and is one of the reasons for low rates of implementation of environmental taxes in both industrialised and developing countries.

The clear disadvantage of the Thai approach to differentiated taxation is that it entails a trade-off between environmental effectiveness, political acceptance and the revenue-raising potential of a tax.

7.4 Quantity-based taxation, escalators and indexation

Environmental taxes are divided into ad quantum and ad valorem taxes. Most environmental taxes are ad quantum; i.e. the tax base is the quantity. This makes sense as environmental damage done is related to the physical emission of pollutants in quantity terms and not their market price. There is a risk, however, that ad quantum taxes lose value over time due to inflation. If an environmental tax is environmentally effective, then behavioural responses and new investment patterns will also result in shrinking revenues, unless tax rates are periodically increased or at least adjusted to ensure that revenues remain stable.

The increase can either be done regularly, e.g. in form of a preset escalator or it can be done based on discretionary decisions, which means whenever the political opportunity appears appropriate. This adjustment can take the form of a tax escalator, which should ideally include step-wise increases of the tax rate year by year and indexation to inflation (or GDP growth) which can increase or at least keep revenues stable in the face of a diminishing tax base and positive environmental effects (see (Fay et al. 2015)). In developing countries ETR revenues are generally used to raise additional revenues to increase public financial resources. Therefore, it may be even more important in developing countries to implement mechanisms to keep revenues relatively stable. Including a tax escalator and indexation to GDP

growth or inflation has many advantages. The case of Turkey provides a good example of indexation of tax rates: The Special Consumption Tax, see [Box 21](#).

Table 5: The Benefits and Risks of escalators and indexation

Benefits	Risks
<ul style="list-style-type: none"> • Environmental effectiveness: Gradual, predictable increases ensure that the price signal remains stable or increases over time, thus maintaining the positive environmental impacts of the tax • Investment flows: Creating a long-term perspective for an ETR incentivises not only the desired, but potentially reversible behavioural change in the short-term. In the longer term it provides much-needed investment certainty and hence creates an incentive for investment and innovation in clean technologies and hence enables structural change. • Fiscal impact: Government budgets are prevented against price risks and tax revenues increase or at least remain proportionally stable -an escalator can keep revenues stable when consumption of a particular pollutant falls, by increasing revenue per unit of pollution emitted. • Political feasibility: initial tax rates are low and economic actors have time to adjust • Inflation impacts tend to be short-lived: While increasing energy prices in developing countries may cause a short-term spike in inflation, in the medium-term this tends to flatten out (IISD/GSI 2013). Furthermore, other prices or taxes on other commodities can be lowered to offset this impact. 	<ul style="list-style-type: none"> • Anticipatory inflation: Developing countries are more vulnerable to price shocks and usually experience more unstable price levels than OECD countries. They also tend to have higher rates of inflation. There is hence a risk that a tax escalator may lead to anticipatory inflation.

Practice in developing countries in the Asia-Pacific region has shown that environmental taxes do not always increase the price of a particular environmental bad at all in the short-term. In Thailand, for example, tax differentiations in favour of unleaded gasoline and low-sulphur diesel took place as a result of tax reductions for unleaded fuels, rather than increases in taxes on leaded fuels. Similarly, reforms on registration taxes for motorcycles and cars over the years have also tended to follow this model: Taxes are reduced for environmental goods, rather than increased for environmental bads (Israngkura 2014). In India, too, a similar model has been pursued for unleaded and leaded fuels (World Bank 1998). Such approaches reduce the potential for ETR measures to raise revenues at the same time as being environmentally effective and magnify the risk of quantity-based taxation losing real value over time.

One response to this common problem in developing countries has been to introduce environmental taxes at an initially low rate to enhance political feasibility, while including a range of tax rates in legislation to ensure that they can be increased relatively easily - and with little political resistance - in the future. Viet Nam followed this approach when it implemented its wide-ranging Environmental Protection Tax in 2012. While all taxes were introduced at the lowest end of the range of tax rates, revenues from the tax are nevertheless quite significant, generating about 2-3% of total government budget. Revenues doubled in 2015 as a result of a tax rate increase on gasoline and jet fuel of 3,000 VND per litre, and increases of 1,500 VND per litre on diesel following a decision made in the National Assembly Standing Committee and without the need for additional legislation (Cottrell, Jacqueline et al. 2016). It should be noted, however, that the 2015 tax increases to the EPT were to compensate for a reduction in import duties on transport

fuels and transport fuel prices remained broadly stable during this period. The environmental impacts of these increases are thus expected to be minimal. Nonetheless, the case demonstrates the flexibility offered to policymakers if ranges of possible tax rates are included in legislation and way in which introducing an ETR at an initially low rate, which may seem unambitious at first, can nevertheless pave the way for more tax increases - or in some cases, even be environmentally effective at a seemingly unambitious rate (see Box 20 on Thailand).

Box 21: Special Consumption tax in Turkey

The special consumption tax (SCT), which was introduced in 2002, is levied on petrol products, natural gas, lubricant oil, solvents and derivatives of solvents but also extends to land, air and sea vehicles as well as alcoholic beverages, tobacco products and other consumption goods (Ministry of Finance Turkey 2016). The latest tax rate increase has an estimated positive budget effect of 2 billion liras (USD 681.4 million) in 2016 and 8 billion liras (USD 2.7 billion) in 2017 (Hurriyet Dailey News 2016). It is a tax used to balance the public budget.

The SCT on motor fuels is a fixed sum per litre or kg for each type of fuel. The rate is adjusted by government from time to time for inflation. If the SCT increase exceeds the inflation rate of a given year, the level is maintained in the following year(s) to ensure tax increases do not exceed the average inflation rate over time. The end-use motor fuel price hence consists of the pre-tax price, the SCT and the value added tax (VAT) of 18%. In the case of rising international market prices, the higher pre-tax price leads to an increase in VAT-revenues, which are used to balance the public budget. This is not necessarily the case, however, as VAT revenues from other commodities may fall to compensate for additional spending on transport fuel. Once the international market price decreases, and therefore VAT returns decrease, the Turkish government increases the SCT (Erdogdu 2013).

Contrary to fixed, quantity based consumption taxes on fossil fuels the SCT therefore does not decrease in real terms since it is periodically adjusted for inflation and for changes in global oil market prices.

7.5 Tax design to leverage private investment

One of the primary objectives of ETR measures is to drive private investment in climate- and environment-friendly technologies and so promote investment in green growth technologies and industries.

In general, investors are seeking to make low-risk investments with a guaranteed rate of return. However, investors commonly perceive investments in developing countries as high risk, as regulatory frameworks and political circumstances tend to be less stable and secure. To combat such perceptions, policymakers can take the following steps to reduce risk (Brown/Jacobs 2011):

- Political risk, by ensuring property rights are secure and simplifying legal procedures;
- Currency risk, by introducing a foreign exchange liquidity facility to cover losses investors may incur as a result of fluctuating exchange rates;
- Regulatory and policy risk, by ensuring as far as possible that policies are clear, stable, predictable and credible, and planned over a sufficient timeframe to reassure investors that risks are low;
- Execution risk, which can be addressed by governments providing loan guarantees and support;
- Technology risk and unfamiliarity risk.

Aside from this general guidance on reducing risk to leverage investment, understanding investor requirements in a specific country context, as well as understanding those factors may be deterring

investment, is essential to foster a more attractive investment climate. In relation to ETR, policymakers can incentivise investment by ensuring that environmental taxes are stable and sufficiently high to guarantee a rate of return on green investment, as well as by clearly communicating to investors that taxes will remain in place in the long-term.

In Viet Nam, a review of investor sentiment conducted by the International Institute for Sustainable Development in 2015 revealed that the investment decisions of those looking to make Foreign Direct Investments would not be negatively affected by increased energy prices, but by a lack of skilled human resources and an unreliable electricity supply (Garg et al. 2015). Stable and predictable environmental taxes - including regular predictable increases in tax rates resulting from a tax escalator and / or indexation - may thus act to encourage investment.

ETR can also be designed so that revenues are used for investment. In China in 2006, increases in consumer electricity prices were used as a means to help the power industry bear the costs of desulphurization of electricity, driven in turn by grid prices set RMB 0.015 per kWh for desulphurised electricity introduced in 2004. Within a short period of time desulphurization facilities worth RMB 8–13.4 billion (USD 1–1.9 billion) were built and SO₂ emissions fell by more than 1.8 million tons per year. The costs of environmental damage were cut by RMB 36 billion (USD 5 billion) (GTZ 2008). Similarly, in Iran 20% of the savings from subsidy reform were redirected to industry to facilitate investment in energy efficiency (iisd 2012). Such strategic use of revenues can reduce the overall cost of environmental tax policies (Ekins 2009).

7.6 Designing ETR as part of a policy package

Environmental policies as a whole tend to be more environmentally effective if they are part of a policy package. This is because environmental problems tend to be of a multi-aspect nature - not only does it matter how much pollution is released, but also where and how (OECD 2006a). Theorists also suggest that one instrument will be required per market failure, e.g. a tax to address an externality and labelling to address information failures, to address environmental problems ((ibid) and indeed the Tinbergen rule suggests that one instrument per objective is required (Tinbergen 1952).

Policy packages can also ensure that as responses to environmental taxes change over time - behavioural change in the short-term, changes in investment patterns and innovation in the medium and long-term - a range of complementary instruments can be developed and implemented which facilitate these differentiated responses.

If policies do not overlap, packages have the potential to act in a complementary way to achieve environmental goals while limiting compliance-cost uncertainty, enhancing enforcement possibilities and reducing administrative costs (OECD 2006a). Taxes can incentivise new investments while low-cost loans facilitate behavioural change. There are indications that using a proportion of ETR revenues to facilitate green economy transition, e.g. by investing revenues in energy-efficient technologies, can lower the cost of realising pollution reductions than would otherwise be the case (Ekins 2009; Green Fiscal Commission 2010).

Implementing environmental taxation within broader fiscal reform packages has the additional advantage of increasing political acceptance for ETR measures. In Chile in 2014 a carbon tax was introduced which is expected to raise just USD 160 million of the USD 8.3 billion tax reform package (Reuters 2014). Given that the reform will enter into force from 2017, political resistance may yet increase: But thus far proposals have been met with widespread political acceptance.

Introducing ETR specifically as one element in a broader package of fiscal policies has several advantages:

- Fiscal reform packages can reduce political resistance to ETR measures, as potential opponents have more than one measure to attack - and often, in such cases, opposition environmental taxes may prove to be a low priority.
- A bundle of reforms make space for more flexibility for policy-makers, which may facilitate e.g. social compensation schemes to revenue-shifting.
- Such reforms can also use synergies between particular taxes, e.g. by introducing collection mechanisms which can be used for more than one tax, such as excise duties and carbon taxes on transport fuels.

Box 22: Examples for policy packages in power and water sectors

Differentiated electricity pricing in China

SO₂ and NO_x emissions have become a main environmental concern in China, and given one third of China's territory reported to be affected by acid rain, and local air pollution affecting major cities across the country, reducing SO₂ and NO_x emissions has been the key environmental target in China.

Therefore, the government has offered a premium on electricity generated by coal power plants equipped with a flue gas desulphurization facility and denitrification facility respectively, supporting coal power plant operators to comply with governmental regulations that foresee installation of these facilities. While initially only newly-built installations were to be equipped with such facilities, subsequently also most of existing coal power plants needed to be retrofitted.

The premium on desulphurised electricity paid by the government is 0.015 RMB/kWh, equivalent to the average estimated cost of operating the technology. The payment scheme is supported by other policies favorable to FGD-equipped power plants such as priority given to be connected to grids, being allowed to operate longer than those plants that do not install desulphurisation capacity, and in Shandong and Shanxi provinces priority dispatching. Along with decreasing capital costs for FGD facilities (down to about 200 Yuan/kW in 2006 from 800 Yuan/kW in the 1990s), thus making it less costly to install FGD facility, the coal-fired units installed with FGD increased to 630 GW by 2011, from 53 GW in 2005, and the portion of coal-fired units with FGD rose to 90 per cent in 2011 of the total installed thermal capacity.

As a result of this policy, China had cut its SO₂ emissions by 13.14 per cent relative to its 2005 levels by the end of 2009, having met the 2010 target of a 10 per cent cut one year ahead of schedule (Zhang, ZhongXiang 2014). More ambitious targets followed the success of these policies - indeed, by 2015, all flue gas desulphurisation (FGD) and denitrification-installed facilities were required to achieve a desulphurisation rate of 95% and a denitrification rate of at least 75%, in order for the power industry to cut SO₂ emissions by 16% and NO_x emissions by 29% by 2015 relative to 2010 levels (State Council 2012).

Thus since 2011, the government has also offered a premium for electricity generated by power plants with flue gas denitrification facility. Initially the premium was set at 0.008 RMB/kWh but found to be too low to incentivize retrofitting of coal power plants. By the end of 2012, only around 28 per cent of existing coal power plants were equipped with denitrification facility. Since the beginning of 2013, the price premium has therefore been increased to 0.01 RMB/kWh, and the coal-fired units installed with denitrification facility amounted to 190 GW. NO_x emissions were estimated to cut by 3.5 per cent, the cut

for the first time below 2010 reference levels (Zhang, ZhongXiang 2014).

But estimates of China Electricity Council indicate that the cost of denitrification is still higher than the premium paid, ranging from 0.012 RMB/kWh to up to 0.020 RMB/Kwh. Given the current level of price premium for denitrification, it is unclear whether all coal-fired units will install denitrification facility.

Given that the compliance costs may be higher than the offered price premium and are increasing as emissions targets become increasingly stringent, on the one hand, and that dodging of environmental regulations is widespread and common in China, on the other hand, **compliance monitoring and enforcement of non-compliance penalties** is key and will determine whether or not to actually achieve the desired outcomes. Compliance assessments of plant operations by the government revealed improper operations of FDG facilities in some power plants. As a consequence, plant owners not only had to return the premium paid, but were also charged with high penalties, up to five times of the amount received. (Zhang, ZhongXiang 2014).

Water tariffs in Sri Lanka

Water tariffs for domestic consumption increases with consumption level to encourage water conservation. The tariff is structured progressively, guaranteeing “lifeline” level of water consumption for low level consumers and higher rates for high level of consumption. In 2009 and 2012 the tariff for domestic consumers changed in that now poor and rich consumers are charged differently. For low level consumption the higher income group is charged 150% of the amount paid by the low income group. With a sufficiently large enough consumer base that has enough high income consumers the water tariff enables the recovery of costs and the progressive structure supporting the poor. The costs are associated with operating, maintaining and extending the water networks as well as providing basic levels of service.

Non-revenue water refers to unbilled metered or non-metered consumption, apparent losses due to unauthorized or under-measured consumption as well as real losses due to leakage. **The non-revenue water causes high levels of water loss, which forces the operator, National Water Supply and Drainage Board NWSDB to raise tariffs.** A reduction in that loss would benefit the NWSDB as well as the consumers. In Colombo, where non-revenue water level are highest, key initiatives were taken by the NWSDB to reduce non-revenue water levels included customer premise surveys identifying reasons for non-revenue water on customer premises. Additionally operation and maintenance staff were empowered to assess reasons for non-revenue water, discovering deteriorated pipes as being a major issue. The repair led to a 30% reduction in non-revenue water levels and provoked other projects to replace distribution pipes and customer connections in other parts of the city. Another step was to meter and bill all outlets that were previously free and completing an assessment of the reasons for the high levels of non-revenue water in the Greater Colombo area. Furthermore in 2012 the Asian Development Bank approved a multi-tranche financing facility for non-revenue water reduction (ADB 2015).

8 Policy Planning and Implementation

This chapter of the report takes a brief look at three key issues which policymakers should consider when implementing ETR: inter-ministerial cooperation; consultation processes and communication; and issues pertaining to central and regional / local government. Many strategic and policy design considerations also pertain to policy planning and implementation: those topics are not revisited here.

In relation to policy planning and implementation, please refer in particular to sections 6.1.3 (credibility and predictability of measures), 6.1.4 (timing of measures), 6.2 (revenue use and political acceptance) 6.3.2 (measures to address competitiveness) and 6.4 (social protection schemes) in particular.

8.1 Inter-ministerial cooperation and coalition building

ETR is an inter-ministerial, crosscutting issue. It requires institutional capacities and a high level of collaboration and cooperation among several government ministries and agencies to develop sound policies and implement the new policy. It requires political, legal and financial capacities like a functioning and transparent tax system able to collect and redistribute revenues. At the very least, ministries of finance and environment have to work together. In developing countries, this can be particularly challenging where:

- Structures for inter-ministerial cooperation tend to be poorly developed,
- Environment ministries tend to have low budgets and are not as powerful as in developed countries, and
- Ministries are competing for scarce resources and budgets.

In Thailand, for example, inter-ministerial disputes regarding revenue use caused a great deal of friction during the development of the Draft Decree on Environmental Taxation in the 2000s. Today, disputes regarding revenue use continue to pose difficulties during the development of proposals for environmental tax made by the Fiscal Policy Office. Similarly, in China proposals to replace emission discharge fees with specific environmental taxes on industry have been fiercely contested by the Ministry of Environmental Protection, the Ministry of Finance, the State Administration and local governments due to their concerns relating to the loss of revenues following the introduction of the tax (Reuters 2016).

Therefore, attention should be paid to synergies between ministries and governmental agencies. For example, finance ministries are more likely to support ETR measures if these measures also work in their interest. The potential to raise a considerable amount of revenue, not at least if at least partially used for the general budget can be a strong argument on the part of environment ministries. Of course, even if nothing or very little of the revenue is used for environmental purposes, the environment ministries nonetheless stand to benefit from the environmental improvements due to the tax-incentivized changes to consumption and production patterns. Focus on economic and social policy aspects might also support the case for ETR and convince other ministries.

To establish a framework for discussion and enable all relevant institutions to provide input during the design phase of ETR measures, policy-makers may create inter-ministerial committees and reduce potential conflicts through participation. Rivalry between ministries can thereby be reduced and concerns on the part of environment ministries that insufficient revenues will be used for environmental purposes can be minimised. In both Thailand and Viet Nam, such concerns are very real - and in both cases, rivalry between ministries still has the potential today to affect ETR negotiations (Cottrell et al. 2016).

8.2 Consultation processes and communication

Raising awareness and understanding of how ETR measures work, and their benefits and advantages, what alternatives are available and how people and enterprises can benefit from them, should be communicated to a wide audience. Behavioural economic research has provided some pointers on the most effective strategies for communicating ETR.

Stakeholder consultations and hearings in the planning stages can allow for prudent planning as policymakers become aware of the concerns of business and civil society. Understand where real vulnerabilities are, empower businesses to shape ETR policies.

The underlying rationale of ETR is not clear to many stakeholders: why increasing a tax on a particular good or service improves environmental quality is rarely understood. For this reason, a number of strategies, listed briefly below, may help to improve communication of environmental taxes:

Table 6: Strategies to address arguments against ETR in public debates

Frequent arguments against environmental taxes in public debates	Strategies to address these arguments
Link between taxes and environmental improvement is not understood	Evolve vocabularies that reflect the impact of ETR in a transparent manner Demonstrate how economic actors respond to price-induced changes
Environmental taxes are coercive	Shift emphasis towards rewards and benefits Use revenue expenditure to highlight positive aspects of taxes
Environmental taxes are costly	Present ETR as a policy choice compared to cost of all fiscal and other environment-related policies and to the costs of inaction Raise awareness of ETR as a “growth-friendly” tax
Environmental taxes are unfair	Focus on whether the tax is actually regressive: Many environmental taxes are progressive, e.g. aviation taxes, road transport taxes Focus fairness discussions on equity and the polluter pays principle Demonstrate how inequitable social impacts can be addressed by policy.

Source : based on Cottrell, J. 2015

Box 23: Public consultation process on electricity pricing reform in China

China introduced a **tiered electricity pricing** reform in 2010, setting specific (and increasing) prices per each block (i.e. quantity) of consumed electricity per household and meter (see Box 16).

When the pricing system was initially announced, it was heavily criticized and has been subject of **significant debate**. Main concerns were that the reform would not sufficiently consider:

- the **financial burden** for some consumers with high electricity consumption
- **regional and socioeconomic differences** given the heterogeneity of provinces and consumption patterns between urban and rural households, as well as differences in household sizes
- **technical challenges** which complicate accurate measuring such as meters shared by several households
- **seasonal variations** (e.g. high consumption rates in summer for air conditioning)

As a result of the public consultation process that followed, most of the provinces developed an enlarged electricity volume for the first block and allowed case by case solutions at local levels (e.g. applying for an additional meter or adding another quantity of kilowatt-hours to block I if number of people is beyond a certain threshold). Furthermore, poor households (estimated at around 40 million, approximately 10% of all Chinese households) are receiving 10-15 kWh free electricity volume per month as compensation for higher tariffs.

Two **important lessons** can be drawn from this example:

- First, **transparency is vital** to build sufficient support for the reform. In China's reform, the procedures are transparent enough, but the cost structure of the tariff and how the pricing is determined lack transparency.
- Second, **the balance between accuracy and operational feasibility is a challenging task**. While a simple design facilitates implementation, accuracy is lost and hence often comes with fairness problems. A complex structure in turn would make the reform unattractive and technically difficult to implement. In both cases, there is a risk of failure for the reform. As for the Chinese case, the household unit was set as the basic unit for accounting, which is easy to operate (with clear boundaries), but accuracy is lost in terms of the household size. The electricity block and its price tier are identical across the same province, ignoring the high heterogeneity still existing within the province. Thus, there are **trade-offs between accuracy and feasibility**. **For policy-makers, to keep the balance is essential**.

Sources: GSI/IISD 2015, Zhang, ZhongXiang 2014.

8.3 Central or subnational government

The question whether environmental taxes should be levied, administered and redistributed by central government or subnational government is in the first place not different from the question at which level taxes in general are applied. Many countries, including developing countries, have concentrated taxing authority and tax administration with the central government (Mikesell 2003). This has the important advantage of collecting taxes where sound capacity exists to do so.

The dependency of local governments on central government revenue can be reduced in those cases where revenues are raised locally and where local authorities can keep the total or a proportion of the revenues for its own budget (GTZ 2008). Giving subnational governments authority to tax gives them power to adjust the size of their budgets and to establish how the tax burden from financing that budget will be distributed. Local administration has the advantage of familiarity with local business practices, but often lack administrative capacities to effectively collect the taxes. However, since taxes need not automatically be administered by the government that levies them, the problem of inadequate capacities on sub-national level can be overcome. Central administration has the advantages of scale and technical expertise and may permit a more balanced fight in disputes with powerful taxpayers. The actual administrative pattern should balance these advantages within existing national circumstances (Mikesell 2003).

Attention should be paid to the right incentives for local governments in cases where central taxes or pricing schemes need to be administered by subnational levels, as the example from China shows (see box below). If revenues collected are shifted completely to the central level, there may not be enough interest on subnational level to ensure effective tax collection.

Box 24: Differentiated power tariffs in China

In 2006, China introduced differentiated power tariffs for inefficient and highly polluting industries, with the objective to keep the expansion of offending industries under control. To this end, China's National Development Reform Commission (NDRC) ordered provincial governments to implement the differentiated tariffs that charge more for specific companies in eight energy-intensive industries, including cement, aluminum, iron and steel, and ferroalloy. But local governments were violating these provisions, offering even preferential power tariffs to struggling industries, since the additional revenue

collected had to be transferred completely to the central government. Hence, local government did not have an incentive to implement the policy. Recognising the problem, the policy was adjusted to allow local authorities to retain revenue collected, providing stronger incentives for provincial authorities to enforce the policy.

Source: Zhang, ZhongXiang 2014.

The decision whether to raise environmental taxes at subnational/local level or central level depends hence on administrative capacities, but also on the nature of the environmental tax raised. Some environmental taxes are typically levied at central level, whereas others are suitable to be applied at local level. One important factor to decide at which level the tax should be levied is whether the taxed bad has only a local impact or not, and how easy taxes can be avoided if applied only locally. For example, transport fuels should be taxed at central level to hinder tax evasion, whereas the authority to levy and spending of local congestion charges should be on the subnational level.

9 Outlook for environmental taxes in the Asia-Pacific region

9.1 Recommendations for policymakers

This report has delineated the key considerations for policymakers in the Asia-Pacific region when implementing ETR and has highlighted a range of possible approaches to the implementation of environmental taxes. Central to this report have been lessons learned in the application of ETR most relevant for developing countries, strategic considerations and possible trade-offs between economic, social and environmental benefits of ETR measures.

The report also made the following recommendations for policymakers in developing countries in Asia-Pacific as regards the implementation of ETR:

Phasing out fossil fuel subsidies is an important first step towards creating a level playing field in energy markets and paving the way for more ambitious environmental fiscal reforms later on. At the same time, subsidy reform can free up substantial revenues to fund the achievement of the SDGs. Careful planning of the process - including careful sequencing, accompanying social and economic policies and measures to counteract price rises - and strategies to build support for reform at all levels of society are essential to prevent policy reversals (see chapter 5).

When implementing ETR, policymakers should consider carefully **which political strategies they wish to pursue in view of their country context**. A strategic approach can help to ensure that policymakers maximise the potential of the ETR instrument they choose to implement to meet the policy priorities and objectives they have defined, whether environmental, economic/fiscal or social. **This may mean identifying specific measures which are politically feasible and where windows of opportunity for reform exist, or implementing a comprehensive process of environmental fiscal reform** (see 6.1).

Strategic approaches to expenditure of ETR revenues can enhance political acceptance and secure buy-in from potential opponents of reform. The political consensus can be enhanced if governments work with firms set to benefit from ETR in the media to raise awareness and so enhance acceptance amongst business and industry. If a proportion of revenues are allocated to measures to facilitate green economy transition, this can bring about greater environmental gains at lower tax rates. Accountability and

governance concerns can be addressed by increasing transparency of government budgeting and public financial management, or through the creation of an independent agency to distribute and manage funds (see 6.2).

Competitiveness concerns often pose a significant obstacle to the implementation of carbon-energy taxes in particular, and indeed environmental taxes in general. **However, in fact only a few energy-intensive sectors produce goods that are highly traded internationally and only these companies should be considered for compensation or support measures.** If deemed necessary, such measures should always be carefully targeted, time-limited and subject to regular review to prevent subsidy dependency. Due to the dynamic nature of ETR, policy-makers should also be aware that firms that lose out from reform in the short-term may stand to gain in the long-term if they respond to a tax e.g. by making new investments in energy-efficient technologies - a process which should be facilitated and supported by policymakers. **Special conditions for industry may be deemed necessary to build the consensus necessary to implement ETR** - strategic expenditure can secure “buy-in” from industry opponents (see 6.3 for details).

In developing countries with high poverty rates and income inequalities, social protection schemes must accompany all measures which increase prices to ensure that the vulnerable are protected. If possible, protection or compensation schemes **should not undermine incentive effect of an ETR measure**, and should **focus on co-benefits policies** to facilitate green transition, or **socially transforming policies** to reduce inequalities and deepen participation (for more on design of social protection measures, see section 6.4). However, sometimes it may be more feasible to grant the most disadvantaged regular cash transfers, which has helped to make welfare spending more acceptable in many developing countries (Schubert 2017).

Depending on their design, ETR measures also have the potential to **reduce levels of tax evasion and encourage formal participation of informal sectors in the formal economy** by introducing measures that recycle a proportion of ETR revenues through formal tax mechanisms, such as personal or corporate income tax (section 6.5).

In terms of tax design, it is important that policy objectives are clearly defined and instruments chosen and designed with these objectives in mind (7.1). **Environmental impact, economic efficiency and cost-effectiveness, distributional impacts, administrative and political feasibility** are the main criteria proposed here to guide instrument choice (see 7.2), while taking into account the capacity of the state to implement and the implementation culture in the country in question. These factors also feed into tax design decisions, such as identifying the tax base, the point of application and tax coverage (7.3).

Most environmental taxes are ad quantum. This makes sense as environmental damage done is related to the physical emission of pollutants in quantity terms and not their market price. There is a risk, however, that ad quantum taxes lose value over time due to inflation. In response to this risk, **ETR measures in developing countries should be indexed to inflation or GDP growth and be equipped with an escalator, so that tax rates are not devalued, but increase year-on-year.** This way, low initial rates can foster political acceptance and give stakeholders time to adjust, while increases over time guarantee stable revenues and maintain environmental effectiveness (see 7.4).

Policy stability, credibility and predictability are all crucial to ensure that firms and individuals respond to ETR price incentives. If uncertainty about the predictability and longevity of a tax rate emerges, investors may regard the risk of low-carbon, energy-efficient or pollution-reducing investments to be too high. At the same time, **incentivising private investment requires additional measures to minimise risk and create stable investment frameworks** that guarantee - or at least increase the probability of - a safe return. Such measures can include low-cost loans for private investors, accelerated depreciation, preferential interest rates or, for renewable energy, long-term power purchase agreements (Cottrell, Fortier & Schlegelmilch, 2015).

In both theory and practice, ETR measures have been shown to be most effective when they are part of a broader raft of measures to address environmental issues. Many environmental problems are a result of several market failures, rather than just one - e.g. not only pricing failures, but also imperfect information (see section 7.6 for details).

In relation to policy planning and implementation, communication and cooperation at all levels is crucial: ETR is a cross cutting issue and the cooperation of government ministries can result in better policy development and more successful implementation. Communication with all stakeholders can improve understanding and foster political acceptance of ETR. In addition, empowerment and ownership of particular ETR measures can be secured through the involvement of key stakeholders in policy development (see chapter 8 for a more detailed analysis).

9.2 International and regional processes to build support for ETR

9.2.1 International policy processes in favour of ETR

Alongside the potential for environmental taxation in Asia-Pacific to meet the challenges currently faced by developing countries in the region, several international policy processes are also ongoing, which are focussed on environmental fiscal reform. These policy processes offer governments the chance to collaborate on the development of ETR measures, agree timelines e.g. for fossil fuel subsidy phase-out, and exchange and learn from each other's experiences.

- The Paris Agreement

This climate agreement entered into force in 2016 and provides a global framework for active climate policies. It “also recognizes the important role of providing incentives for emission reduction activities, including tools such as domestic policies and carbon pricing;” (para 137).

<http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

- The Kyoto Protocol

The protocol explicitly requests the phase-out of fossil fuel subsidies: „Progressive reduction or phasing out of market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all greenhouse gas emitting sectors that run counter to the objective of the Convention and application of market instruments.”

https://unfccc.int/essential_background/kyoto_protocol/items/1678.php

- The Sustainable Development Goals (SDGs)

Several of the SDGs, adopted in autumn 2015 in the Agenda 2030, explicitly request the abolition of environmentally harmful subsidies and the introduction of incentives.

<http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

- The G20 commitments to fossil fuel subsidy phase out

The G20 first decided in Pittsburgh in September 2009 to phase out wasteful fossil fuel subsidies. This agreement has subsequently been confirmed at several G20 summits, most recently at the G20-summit in China in September 2016: “The G20 is also committed to rationalizing and phasing out inefficient fossil fuel subsidies that encourage wasteful consumption, recognizing the need to provide targeted support to the poorest.”

UNESCAP countries China, India, Indonesia, the Republic of Korea and Turkey are all G20 members

and as such, are involved in this process. In 2016, China's fossil fuel subsidy report was peer-reviewed by the USA alongside experts from OECD and the IMF. In future, the G20 may become a useful resource for its members to implement subsidy reform.

https://www.g20.org/Content/DE/_Anlagen/G7_G20/2016-09-08-g20-agenda-action-plan.pdf?_blob=publicationFile&v=4

- APEC commitments to fossil fuel subsidy phase out

In 2009, APEC leader committed to “rationalisation and phase-out of inefficient fossil fuel subsidies that encourage wasteful consumption, while recognising the importance of providing those in need with essential services”.

Similar to the G20, APEC has also undertaken peer reviews of fossil fuel subsidies and may also prove to be a valuable resource in subsidy phase out in the coming years.

http://www.apec.org/Meeting-Papers/Leaders-Declarations/2009/2009_aelm.aspx

Alongside these concrete international processes, a number of international platforms and organisations promote various aspects of environmental fiscal reform - including carbon pricing (taxes and trading) - and fossil fuel subsidy reform. These include:

- Carbon Pricing Leadership Coalition and the Carbon Pricing Panel

In political terms, the coalition and the panel are the highest-level initiatives in favour of carbon pricing instruments. The Coalition brings together leaders from governments, the private sector and civil society to advance the carbon pricing agenda. At the time of writing, the coalition had 27 government partners including Kazakhstan and Japan, well over 100 private sector partners, including large multinationals, and a very large number of strategic partners, including research institutions, environmental organisations, the OECD and the IMF.

The Carbon Pricing Panel was launched by the World Bank Group President Jim Yong Kim and the IMF Managing Director Christine Lagarde to demonstrate political leadership at the highest level in favour of carbon pricing and comprises many heads of state supporting the use and introduction of carbon pricing in form of carbon taxes and emissions trading.

<https://www.carbonpricingleadership.org/>

- Partnership for Market Readiness (PMR)

The World Bank's Partnership for Market Readiness (PMR) reflects a broad interest for carbon pricing schemes and fosters knowledge sharing between countries to develop carbon pricing systems. The PMR supports implementing country participants to develop action plans for designing and piloting market-based instruments for GHG mitigation. In Asia-Pacific, participating countries include China, India, Indonesia, Sri Lanka, Thailand, Turkey and Viet Nam.

<http://www.worldbank.org/en/news/press-release/2014/03/05/mexico-advances-carbon-pricing-scheme-climate-change>

- UNESCAP - Eminent Expert Group on Tax Policy and Public Expenditure Management (EEG)

UNESCAP is also working towards improving knowledge about and encouraging exchange of information on environmental taxation within its Eminent Expert Group on Tax Policy and Public Expenditure Management for Sustainable Development. This will develop an Asia-Pacific approach and vision for public finance reform to achieve the Agenda 2030 (the SDGs).

The group is also working towards closer regional coordination on policy priorities and focussing on filling knowledge gaps on policy design and implementation.

http://www.unescap.org/sites/default/files/Chairs%20Summary_final_09Feb2017.pdf

- Green Fiscal Policy Network (GFPN)

The GFPN facilitates knowledge sharing, learning and dialogue on fiscal policy reforms to support an inclusive green economy. The Network is a joint partnership between UN Environment (UNEP), the International Monetary Fund (IMF) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The Network also works with a number of associated partners including Green Budget Europe (GBE), the Global Subsidies Initiative (GSI) and Green Budget Germany (GBG).

The Network provides web-based resources including policy guidance, good practices and lessons learned on issues such as carbon pricing, energy subsidy reform and fuel taxes.

<http://greenfiscalspolicy.org/>

- Friends of Fossil Fuel Subsidy Reform (FFSR).

In April 2015, the Friends of Fossil Fuel Subsidy Reform - together with the United States and France - launched a Communiqué to promote the phase-out of inefficient fossil fuel subsidies. This calls for accelerated efforts to phase out fossil-fuel subsidies as a major contribution to climate change mitigation. The Communiqué has wide multilateral support: More than 30 countries have endorsed the Communiqué as well as the International Energy Agency and the OECD, but also business organisations working with thousands of leading global companies and investors.

<http://www.corporateleadersgroup.com/pricing-carbon/fossil-fuel-subsidies/pdfs/ffsr-factsheet.pdf>

- Global Subsidies Initiative (GSI)

GSI is a program of the International Institute for Sustainable Development designed to put the spotlight on subsidies and the corrosive effects they can have on environmental quality, economic development and governance. GSI is dedicated to analyzing subsidies and how they support or undermine efforts to achieve sustainable development. The GSI's goal is to encourage individual governments to undertake unilateral reforms on subsidy policy where these would deliver clear economic, environmental and social benefits and to generate a consensus in the World Trade Organization and in other forums on the need to take resolute, ongoing and systematic action to reduce or eliminate subsidies that are both trade-distorting and undermine sustainable development. The GSI also provide support for governments setting out to reform environmentally harmful subsidies (see e.g. (IISD 2013).

<http://www.iisd.org/gsi/>

9.2.2 Regional mechanisms to promote ETR

The rapid growth of developing economies in Asia-Pacific brings with it a rising risk of cross-border tax evasion and avoidance. Therefore, tax authorities must work together more than ever to counter these risks, and the importance of tax information exchange within the region is increasing. However, frameworks for regional cooperation in Asia-Pacific are not as developed as other regions, such as Europe, the Americas and Africa (Araki 2015). The foundations for cooperation on tax matters have already been laid in the region, e.g. by pre-existing tax administration bodies such as the Study Group on Asian Tax Administration and Research (SGATAR), the ASEAN tax forum, and in the UNESCAP Eminent expert group on tax policy and public expenditure management for sustainable development. These collaborations can input regional perspectives into global processes, provide a forum to discuss common issues tax administrations face, facilitate bilateral work and cooperation on international taxation and act as

enablers in the capacity development of their members and contribute to improved fiscal governance alongside international organisations (Araki 2016).

Specifically, in relation to environmental taxation, there is much to be gained from not only information exchange and cooperation, but also from the harmonisation or at least coordination of tax rates. Competitiveness concerns and possible leakage of tax impacts can be reduced if environmental taxes are introduced at similar levels in neighbouring countries. The European experience in particular has demonstrated the potential for ETR measures to be adopted in particular regions by neighbouring countries as a result of learning effects, enhanced faith in ETR instruments, and reduced competitiveness concerns. A platform focussing specifically on cooperation relating to ETR, and harmonisation of tax rates, could facilitate exchange of experiences and information between countries, as well as support steps towards harmonisation of specific environmental tax rates: In the first instance, possibly of those environmental taxes most likely to result in cross-border smuggling, such as fuel taxes.

It may be in the future that the fora mentioned above can also facilitate tax harmonisation in the Asia-Pacific region. Alternatively, an additional platform could be set up to facilitate exchange of information, experiences and expertise for policymakers and ministry staff, researchers and civil society the academic community along the lines of the European Expert Platform on Environmental Fiscal Reform, Green Budget Europe.¹⁷ Such a platform could bring together key stakeholders to share experiences and learn from the successful - or less successful - implementation of ETR, as well as provide a platform for cooperation on tax matters for governments in the future.

The extent to which regional cooperation in Asia-Pacific on environmental tax matters is feasible remains to be seen. But one fact remains: Without ETR measures, be they unilateral or multilateral in nature, poor decision-making on the basis of incorrect price signals and misallocation of capital on the part of investors will continue to lock in polluting, resource-intensive, energy-intensive and fossil fuel-intensive processes, infrastructures and technologies in Asia-Pacific and least-cost opportunities for the realisation of the SDGs and the transition to a green economy will be missed.

¹⁷ <http://green-budget.eu>

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