Environmental Research Plan of the
Federal Ministry of the Environment,
Nature Conservation, Building and Nuclear Safety

FKZ 3714 41 502 0
UBA-FB-00 [trägt die UBA-Bibliothek ein]

Final Report:
Potentials and Limitations of Different Requirements (Offsetting) in Bilateral and Global Carbon Pricing Systems

by

Hanna Wang-Helmreich[1], Nicolas Kreibich[1], Marie-Jeanne Kurdziel[2], Carsten Warnecke[2], Thomas Day[2], Markus Gornik[1], Wolfgang Obergassel (geb. Sterk)[1], Christiane Beuermann[1]

[1] Wuppertal Institute for Climate, Environment and Energy, Döppersberg 19, 42103 Wuppertal

[2] NewClimate Institute for Climate Policy and Global Sustainability gGmbH, Am Hof 20-26, 50667 Köln

On behalf of the German Environment Agency

May 2016

Kurzbeschreibung

Dieser Bericht analysiert die Einführung von Verbrauchsteuern auf Kohlenstoffemissionen (CO_2-Steuern) mit einer nationalen Offsetting-Komponente und ihre Auswirkungen auf andere Politikfelder. Diesbezüglich werden im Bericht Empfehlungen erarbeitet. Die Einführung von CO_2-Steuern in Chile, Mexiko und Südafrika steht hierbei im Zentrum der Analyse. Mit der Möglichkeit, Offsets im Rahmen der Steuer zuzulassen, verfolgen Südafrika und Mexiko hierbei einen neuen Ansatz. Auch Chile untersucht diese Option. Der Bericht identifiziert die Ziele, die die drei Länder mit der Einführung der neuen Systeme verfolgen sowie die Bedingungen, die sie für den Einsatz von Offsets definieren. Darüber hinaus untersucht er Wechselwirkungen einer nationalen Offset-Politik mit anderen Politikfeldern, im Besonderen in Bezug auf Co-benefits, Co-costs und langfristige Emissionsminderungspfade. Es werden Möglichkeiten aufgezeigt, wie Synergien gestärkt und negative Wechselwirkungen verringert werden können. Darüber hinaus untersucht der Bericht prozedurale und institutionelle Vorkehrungen, die für die Zulassung eines Transfer von Minderungseinheiten über Ländergrenzen hinweg in die (geplanten) CO_2-Steuersysteme benötigt werden. Nachdem Unterstützungsbedarfe sowie mögliche Quellen internationaler Klimafinanzierung identifiziert werden, konzentriert sich der Bericht auf ausgewählte Aspekte der Ausgestaltung nationaler Offsetpolitiken und leitet Empfehlungen für politische Entscheidungsträger bzgl. der Ausgestaltung nationaler Offsetpolitiken ab, die darauf abzielen, ihr Potenzial zu maximieren.

Abstract

This report explores the introduction of carbon taxes with a national offset component and their interactions with other policy areas, and makes recommendations on this topic. In this task, the study focuses on the approaches Chile, Mexico and South Africa have chosen for elaborating their carbon taxes. By allowing the use of offsets for compliance with the tax load to some extent, South Africa and Mexico are pioneering a novel approach. Chile, too, is assessing this option. The report identifies the objectives the three countries pursue by introducing these new systems as well as the requirements they establish for the use of offsets. Furthermore, it analyses the interaction between the use of offsets and other policy areas, in particular on co-benefits, co-costs and long-term emissions mitigation trajectories, and defines options to maximise synergies and reduce negative impacts. It sheds light on procedural and institutional provisions needed to allow for the transfer of mitigation outcomes into the (proposed) carbon tax systems and identifies support needs as well as possible sources of international climate finance. The report provides recommendations on how national offset policies for carbon taxes should be designed to maximise their potential.

Table of Content

List of Figures

List of Tables

List of Abbreviations

AAU	Assigned Amount Units
BAU	Business-as-usual
BCAs	Border Carbon Adjustments
CCB Standards	Climate, Community and Biodiversity Standards
CDM	Clean Development Mechanism
CCER	China Certified Emission Reduction
CER	Certified Emission Reduction
CHCP	Commission of Finance and Public Credit, Mexico
CMA	Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement
CMM	Coal mine methane
COP	Conference of the Parties
DEA	Department of Environmental Affairs, South Africa
DEHSt	German Emissions Trading Authority (Deutsche Emissionshandelsstelle)
DEROs	Desired Emission Reduction Outcomes
DNA	Designated National Authority
DTU	Technical University of Denmark (Danmarks Tekniske Universitet)
EE	Energy efficiency
ERU	Emission Reduction Units
Endesa	Empresa Nacional de Electricidad Sociedad Anónima, Chile
ETS	Emission Trading System
FVA	Framework for Various Approaches
GCF	Green Climate Fund
GDP	Gross domestic product
GHG	Greenhouse gas
GS	Gold Standard
INDC	Intended Nationally Determined Contribution
ITL	International transaction log
ITMO	Internationally transferred mitigation outcomes
JI	Joint Implementation
LGGC	General Law on Climate Change (Ley General de Cambio Climático), Mexico
LIEPS	Law on the Special Tax on Production and Services (Ley del Impuesto Especial sobre Producción y Servicios), Mexico
LULUCF	Land use, land use change and forestry
LyD	Libertad y Desarrollo, Chile

MMA	Ministry of the Environment (Ministerio del Medio Ambiente), Chile
MRP	Market Readiness Proposal
MRV	Measurement, reporting and verification
NAEIS	National Atmospheric Emissions Inventory System
NAMAs	Nationally appropriate mitigation actions
NCCR-WP	National Climate-Change Response Policy-White Paper
NDC	Nationally Determined Contribution
NGO	Non-governmental organisation
NMM	New market mechanism
NT	National Treasury, South Africa
OCC	Climate Change Office (Oficina de Cambio Climático), Chile
PECC	Special Programme on Climate Change 2014-2018 (Programa Especial de Cambio Cambio Climático 2014-2018), Mexico
PoA	Programme of Activities (CDM project modality)
PRTR	Pollutant Release and Transfer Register (Registro de Emisiones y Transferencias de Contaminantes – RETC)
PMR	Partnership for Market Readiness
PPD	Peak, plateau and decline
PPD (Chile)	Partido Por la Democracia, Chile
PUC	Pontifical Catholic University of Chile (Pontificia Universidad Católica de Chile)
REDD+	Reducing emissions from deforestation and forest degradation
RENE	National Emissions Registry (Registro Nacional de Emisiones), Mexico
RETC	Registro de Emisiones y Transferencias de Contaminantes (Pollutant Release and Transfer Register - PRTR)
RMUs	Removal Units
SAAQIS	South African Air Quality Information System
SACCI	South African Chamber of Commerce and Industry
SARS	South African Revenue Service
SD	Sustainable development
SDM	Sustainable Development Mechanism
SEMARNAT	Secretariat of Environment and Natural Resources (Secretaría de Medio Ambiente y Recursos Naturales), Mexico
SHCP	Secretariat of Finance and Public Credit (Secretaría de Hacienda y Credito Publico), Mexico
TCAF	Transformative Carbon Asset Facility
UBA	Federal Environment Agency (Umweltbundesamt)
UNEP	United Nations Environment Programme

UNFCCC	United Nations Framework Convention on Climate Change
UNU-WIDER	United Nations University – World Institute for Development Economics Research
VCS	Verified Carbon Standard
WWF	World Wide Fund for Nature

Executive Summary

The overall objective of this report is to explore the introduction of carbon pricing instruments, in particular carbon taxes, and the interactions of national offset policies with other policy areas, and make recommendations on this topic. In this task, the study focuses on the carbon tax approaches Chile, Mexico and South Africa have chosen. All three countries have introduced or are planning to introduce national carbon taxes. Moreover, by allowing the use of offsets for compliance with the tax load to some extent, South Africa and Mexico are pioneering a novel approach. Chile, too, is assessing this option. Political discussions regarding the use of offsets are pending at different stages in the three countries.

The Paris Agreement, Nationally Determined Contributions (NDCs), Carbon Pricing and Linking with Offsets

The background of carbon pricing instruments and interactions with offsets is set in chapter 2. With the Paris Agreement, a new structure of the international climate regime has been created. This new regime is fundamentally different from the Kyoto Protocol: The Paris Agreement calls on all Parties to contribute to climate change mitigation. This truly global participation, however, comes at a double cost: lack of legal bindingness *and* increasing complexity due to possibility for all Parties to determine their nationally determined contributions (NDCs) on their own terms, instead of using a uniform formula.

The use of carbon pricing instruments as a means to reduce emissions is spreading worldwide. With the establishment of an emissions trading system (ETS) or a carbon tax, emitters can choose how to reduce their greenhouse gas (GHG) emissions in the most cost-effective way. Since each tonne of GHG emitted represents a financial burden for the emitter, emission reductions are becoming an asset, triggering investments in low-carbon technologies and fostering technological and social innovation.

These effects can be further intensified by linking carbon pricing systems across national borders. ETSs and carbon tax systems can either be linked directly (bilateral or multilateral link) or indirectly using international market mechanisms (multilateral link). With Art. 6 of the Paris Agreement, the basis for any future interactions among domestic carbon pricing systems from 2020 onwards has been established, though regulations still have to be worked out in detail.

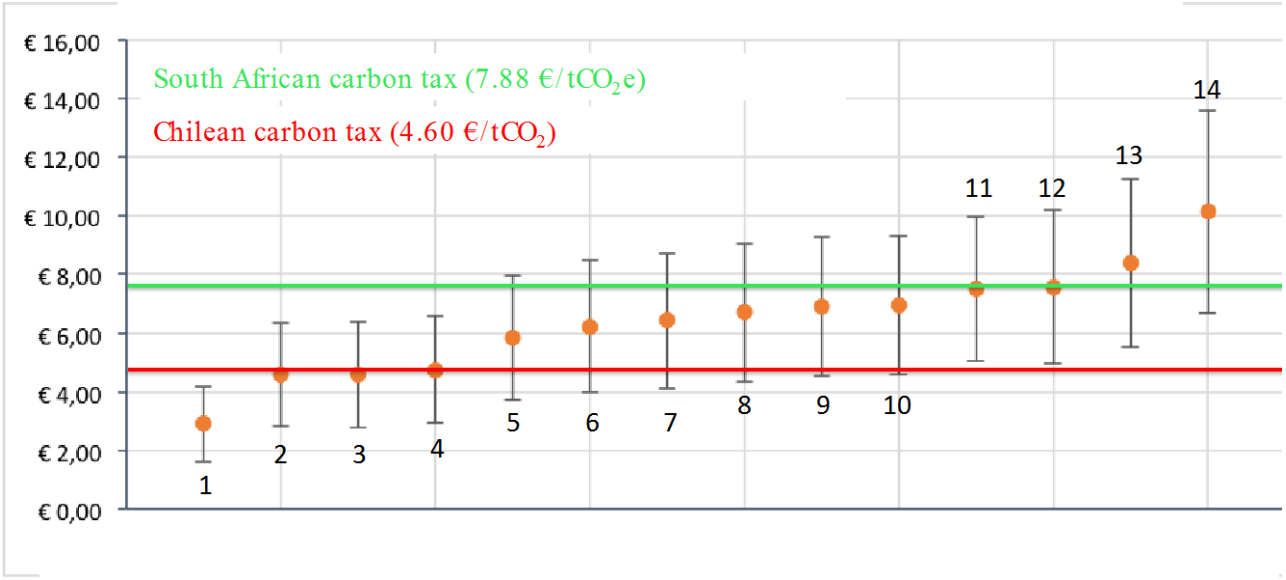
The linking of trading or taxation systems with an offset component has various advantages including that the offsetting component will open up additional cost-effective potentials, create more flexibility and potentially have co-benefits. A national offsetting component is only possible for cases where domestic carbon pricing instruments are not applied to the overall economy (existence of non-carbon pricing sectors).

The effect of offsets on emissions in a carbon taxation system depends very much on the level of the carbon tax. Regarding the overall impact on emissions, taxation systems with low tax rates and consequently low direct mitigation outcomes benefit from the indirect mitigation achieved in sectors outside the carbon tax incentivised through the offset component. Funds spend for the purchase of offsets are invested in emission reduction activities while funds transferred to the government based on the tax bill will only be invested in mitigation actions if the government decides to do so. When tax rates are increased the incentives for taxable entities to identify and use own mitigation opportunities instead of just manage the financial aspect of the tax rise. On the other hand, increased tax rates are also required to incentivise the offset generation with project types that have medium or higher costs per tonne of CO_2.

Economic Feasibility of Offset Project Types

Using offsets for complying with a carbon tax is only attractive for tax payers if this option results in costs that are lower than the actual tax rate. To obtain an idea about the economic feasibility of offset project types, cost ranges required for the continuation of existing CDM projects by project type are depicted in relation to the (envisaged) tax rates of the carbon taxes in Chile and South Africa in Figure 1. Mexico's carbon tax was not included in this figure because in Mexico, tax payers are given the option to pay part of their tax bill with Certified Emission Reductions (CERs) from Mexican CDM projects, with the value of CERs being determined on the basis of global CER prices at the moment of paying the tax. Therefore, the relation between the tax rate and the costs of individual mitigation projects is not relevant in the case of Mexico, but only CER prices.

Figure 1: Costs Ranges for the Continuation of Existing CDM Projects by Project Type



1 = N_2O
2 = Wind
3 = Solar
4 = HFCs
5 = Hydro <20MW
6 = EE own generation
7 = EE industry
8 = EE households
9 = Methane avoidance
10 = Fossil fuel switch
11 = Landfill gas
12 = Biomass energy
13 = Coal bed/mine methane
14 = Cement

Source: Own illustration with data from Warnecke, Day & Klein, 2015.

Country Analysis: Chile, Mexico and South Africa

Overview of Main Results

After setting the scene with background information, chapter 3 analyses the current status of introducing a carbon tax in Chile, Mexico and South Africa. Each country section

- sheds light on the general context in which the carbon taxes are being introduced,
- describes the main characteristics of the (proposed) carbon taxes
- including options for offsets, if available, and
- examines the political process and stakeholder positions regarding the introduction of a carbon tax and the use of offsets.

The analysis of the introduction of carbon taxes and the (potential) use of offsets in the three countries shows that its current status varies significantly. Thus, while the carbon tax in Mexico has entered into force in January 2014 and the carbon tax in Chile will become operative in January 2017, the legislative process regarding the carbon tax in South Africa is still to start and its outcome unclear. While there was going to be a political process in 2016 to decide whether the tax would proceed or not, as one of the interviewees explained, another interviewee seriously doubted that the carbon tax would enter into force as envisaged in current plans or maybe even not at all.

Huge uncertainties also exist regarding the option to use offsets for compliance with (part of) the tax load. Thus, Chile is currently focusing on the implementation of the carbon tax and has so far no concrete plans of allowing offsets for the tax. Nevertheless, it engages in research on this topic. In South Africa, there are ongoing discussions and National Treasury has developed a proposal on offsetting. This proposal points to the CDM, Verified Carbon Standard (VCS), the Gold Standard (GS) and the Climate, Community and Biodiversity (CCB) Standards as potential certification standards for offsets. As of end of May 2016, the announced update of the proposal has not been published yet. However, so far, there is no legislative basis neither for the carbon tax nor regarding the potential use of offsets. Therefore, Mexico is the only one of these three countries who has actually introduced legislation including the option to use credits from climate change mitigation projects to cover part of its tax on fossil fuels. The fact that the secondary regulation for the use of CERs has not yet been published two years after entry into force of the carbon tax may be an indication for the difficulties associated with the chosen approach: Submitting CERs and having the tax bill reduced according to the CERs' market value at the moment of paying the tax provides little additional benefits for the taxpayer. It remains to be seen how final procedures for using CERs as a way of paying the carbon tax in Mexico will be elaborated. However, an early issuance of the detailed offsetting regulation seems questionable, as the general focus of attention is now being put on other issues, such as the national energy reform. In addition, there seems to be little interest from the Ministry of Finance to issue the regulation, while the Ministry for Environment is already focusing on the next step: the introduction of an ETS, possibly by 2018.

Chile

Chile was the first country in South America to pass legislation on a carbon tax (impuesto al carbono) in September 2014 as part of a broader tax reform. While the tax enters into force on January 1st 2017, the first year of tax liability is 2018 with 2017 being limited to measuring of emissions. Starting in 2018, a carbon tax of 5 US$ (4.60 EUR) has to be paid for every ton of CO_2 emitted in energy generation from installations that are composed of boilers or turbines and have an individual or combined thermal power equal to or above 50 MWt. Unconventional renewable energy generation is exempted from the carbon tax. This refers to biomass energy which can be used directly as a fuel or which can be converted into other liquid, solid or gaseous biofuels. Furthermore, it includes the biodegradable fraction of residential and non-residential solid waste. In total, about 55% of Chile's CO_2 emissions will be covered by the tax.

Studies by the Pontifical Catholic University of Chile (Pontificia Universidad Católica de Chile - PUC) estimate the carbon tax to increasingly reduce more and more emissions over the years with emissions reductions of 3 million tCO_2 (equalling 6% of total emissions from electricity generation) in 2020 and 6 million tCO_2 (equalling 11% of total emissions from electricity generation) in 2030. Accumulated emissions reductions in the period 2017-2030 are expected to amount to 59 million tCO_2. According to the study, the emission reductions mainly result from the replacement of 3% of energy production from coal with wind and hydropower.

Initially, the use of carbon offsets as a way of complying with the carbon tax is not allowed in Chile. However, currently, there are a couple of on-going studies regarding this issue. Furthermore, interviewees said that this may be an option for the future.

Mexico

The tax on fossil fuels (impuesto a los combustibles fósiles) was introduced in Mexico as part of a larger fiscal reform initiated by President Peña Nieto. The tax entered into force in January 2014 and covers around 40% of Mexico's total GHG emissions. The tax is imposed on the sale and import of fossil fuels. The reformed Law on the Special Tax on Production and Services (Ley del Impuesto Especial sobre Producción y Servicios – LIEPS), which establishes the tax, contains a list of nine fossil fuels. This list does, however, not specify natural gas, which is exempted from the tax. For each of the other fossil fuels, a tax rate is calculated based on the additional amount of CO_2 that would be generated if the respective fossil fuel were used instead of natural gas. The tax rates are adjusted annually to the consumer price index. The tax rates in force since 1 January 2016 range between 6.29 MXN cents (0.0033 €) per litre of propane and 38.93 MXN (2.05€) per ton of coal coke. For fossil fuels not listed the tax rate was set at 42.37 MXN (2.23 EUR) per tonne of carbon.

With the adoption of the tax on fossil fuels, the option to use credits from climate change mitigation projects was introduced. Eligibility is restricted to CERs from CDM projects approved by the UNFCCC and hosted in Mexico. Relevant procedures are still to be elaborated by the Secretariat of Finance and Public Credit (Secretaría de Hacienda y Credito Publico - SHCP). Notably, however, it will not be possible to use CERs directly to reduce the overall volume of taxed carbon. Instead, the taxpayer can pay part of the tax amount using CERs. According to the law, the value of the CERs is to correspond to the market value at the moment of paying the tax. The fact that the secondary regulation for the use of CERs has not yet been published two years after entry into force of the carbon tax may be an indication for the difficulties associated with this approach.

South Africa

According to the latest proposal, the Draft Carbon Tax Bill released for public comments on 2 November 2015, the carbon tax in South Africa will cover GHG from all sectors divided into a total of 88 sub-sectors. The latest proposal for the carbon tax envisages the tax to enter into force on 1 January 2017. In the first phase of the tax up until 2020, the tax rate is envisaged to amount to 120 R (7.88 EUR) per tCO_2e. However, the government has planned a number of options to reduce the tax liability. With a basic tax-free allowance of 100%, no tax liabilities are envisaged for the residential sector and livestock in the first phase. In other sectors, maximum free allowances amount to between 75 and 95%, setting the minimum of the effective carbon tax rate at 6R (0.39 EUR) per t CO_2e. According to the National Treasury, the percentage for tax-free thresholds might be lowered starting 2020 and/or may be converted to absolute emission thresholds for the second phase.

In 2014, National Treasury published its "Carbon Offsets Paper" which includes the proposal to allow for the use of offsets to cover up to 10% of total emissions affected by the carbon tax. The latest proposal on the carbon tax, the Draft Carbon Tax Bill, takes up this option and envisages allowing for the use of offsets for 5 or 10% of the carbon tax, depending on the sector. The current proposal envisages that only domestic projects that generate offsets outside the scope of activities subject to the carbon tax may be eligible. However, carbon offset projects registered or implemented before carbon tax implementation are to be accepted depending on certain conditions and within a specific timeframe that are still to be determined in the legislative process. Furthermore, projects that already receive benefits from other government incentives, such the Energy Efficiency Tax Incentive, are to be put on the ineligible projects list. The CDM, VCS, Gold Standard and the CCB Standards are currently being discussed for use in the carbon offset scheme. Further aspects concerning the use of offsets in the South African carbon tax are likely to be clarified in the new proposal on carbon offsets announced by the National Treasury.

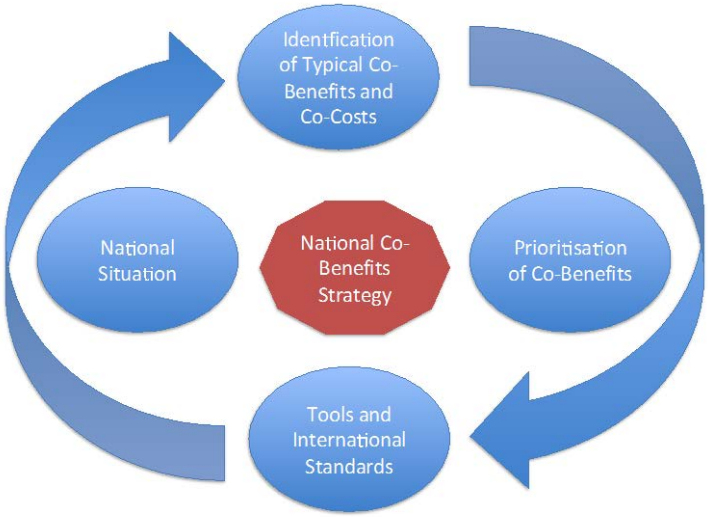
Interactions of National Offsets with Other Policy Areas

Chapter 4 analyses interactions of a national offset policy with other policy areas. These policy areas are examined in four sub-chapters focusing on the realisation of co-benefits by use of offsets (chapter 4.1), the impacts of the use of offsets on long-term emissions mitigation trajectories (chapter 4.2), procedural and institutional provisions to allow for a transfer of mitigation outcomes (chapter 4.3) and support by international

climate finance (chapter 4.4). The situation regarding the topics in Chile, Mexico and South Africa is depicted, were appropriate.

Sub-chapter 4.1 regarding the realisation of co-benefits by use of offsets explores how carbon taxes can be complemented by an offsetting option which supports governments in achieving co-benefits as well as in avoiding co-costs. For this purpose, a procedure was developed that can guide the development of a national co-benefits strategy for offsetting in the context of the carbon tax. This procedure can be perceived as a cyclic process consisting of four interrelated steps that are depicted in Figure 2 and explained in detail in this chapter.

Figure 2: National Co-Benefits Strategy Process



Source: Own Illustration.

Findings from sub-chapter 4.1 indicate that the role of co-benefits varies significantly across the three countries analysed: Despite the fact that Mexico is the only country with an operational carbon tax and offsetting provisions in place, there is currently no strategy for the realisation of co-benefits through offsetting. However, Mexico could build on its CDM infrastructure to establish a dedicated co-benefits strategy. With the offsetting scheme building on the CDM scheme for GHG certification, the use of voluntary CDM premium labels (such as the Gold Standard and CCB Standards) seems the most promising strategy. In South Africa, co-benefits of offsets were a crucial part of the discussion on the carbon tax from the very beginning. Official government documents highlight the potential to achieve co-benefits and different certification standards are being discussed. The choice of the standards to be applicable can be expected to depend on the offsetting sectors, since most voluntary certification standards only focus on certain sectors. Chile, in contrast, is still in the process of assessing whether to introduce an offsetting option or not. Given this early stage of the discussion, no information on the potential role for co-benefits in the context of offsetting was available. So far, neither one of the three countries addresses co-cost in any way.

Sub-chapter 4.2 regarding **long-term emissions mitigations trajectories** argues that, from a static perspective, in case both the sectors covered by the carbon pricing instrument and the sectors eligible for the generation of offsets are included in the trajectory, the use of domestic offsets should have no net impact on long-term emissions mitigations trajectories. Thus, allowing for the use of offsets should have no net impact on INDC-based emissions trajectories in neither one of the three countries analysed in this study. However, the section also concludes that the use of offsets may well influence the effectiveness of other policies and measures as well as the political will to reduce emissions. The following tables provide an overview of the

opportunities and risks which the use of offsets can have regarding long-term emissions mitigation and options to increase and reduce them, respectively.

Table 1: Opportunities Arising from the Use of Offsets and Options to Increase Them

Area	Opportunities	Options to Increase Opportunities
Environment	Real emissions reductions in offset sector replaces additional revenue from carbon tax	Design of regulation Higher tax rates
Economy	Reduction of costs	Increasing the scope of offset sector(s) and the amount to which offsets may be used
Environment	Positive spill-over effect of efforts to reduce emissions from sector covered by carbon tax to other sectors of the economy	Discounting of emissions reductions of offset sector(s) Net emission reductions in offset sector(s) beyond crediting period
Politics	Bargaining chip in political negotiations facilitating the introduction of policies and measures and/or stronger mitigation commitments	Stakeholder involvement

Source: Own compilation.

Table 2: Risks Arising from the Use of Offsets and Options to Reduce Them

Area	Risks	Options to Reduce Risks
Environment	Compromising environmental integrity	Design of regulation
Environment	Reduction of incentives to reduce emissions in main carbon pricing system	Tying option to use offsets to increased levels of ambition in main carbon pricing system
Technology	Lock-in effects in sectors covered by the carbon pricing system	Tying option to use offsets to increased levels of ambition in main carbon pricing system
Politics	Opposition to further climate policies and measures in sectors generating offsets as these would reduce potential income via offsets in this sector	Stakeholder involvement
Politics	Opposition to introduction of offsets may hinder introduction of carbon pricing instruments and/or offsets	Stakeholder involvement

Source: Own compilation.

Sub-chapter 4.3 explores **procedural and institutional provisions needed to allow for the transfer of mitigation outcomes** across borders by importing mitigation outcomes into the (proposed) carbon tax systems of Chile, Mexico and South Africa. After shedding light on key issues regarding environmental integrity and relevant provisions under the Paris Agreement, this chapter presents additional readiness elements which are required complementary to those of the Paris Agreement and discusses issues at the carbon tax level related to linking provisions.

The chapter concludes that the ability to import mitigation outcomes varies significantly among the three countries analysed. In terms of Parties' INDCs, Mexico and Chile are the countries with the best conditions for participating in such transfers. Their contributions are clearly defined, allowing for robust accounting of imported mitigation outcomes. South Africa's peak, plateau and decline target range, in contrast, is more problematic in terms of accounting, since it lacks a clearly defined target level and a target year. This makes South Africa's participation in these transfers highly problematic. However, since Mexico and Chile adopted

single-year targets, their participation is also restricted to certain conditions. The carbon taxes' design and their ability to link to other carbon pricing instruments also vary significantly between the countries analysed. In this regard, Mexico's carbon tax is problematic: Since carbon is not taxed equally across all fossil fuels covered by the tax, linking cannot be based on a common and uniform price per tonne which obstructs directly linking the carbon tax to other carbon pricing instruments. A soon harmonization of the tax rates seems highly unlikely because political opposition can be expected to continue being strong and President Peña Nieto has declared not to further raise taxes during his current term of office. Furthermore, with the national energy reform, the focus of the political attention seems to be put on alternative policy instruments and the Ministry of Environment is embarking on a process to establish a national ETS in 2018. South Africa and Chile, in contrast, both apply a uniform price per tonne CO_2, making linking much easier. Since in all three countries the sectors covered by the carbon tax are also included in their INDCs, accounting for imported mitigation outcomes is possible.

Technical and institutional readiness is medium in all three countries. MRV provisions are in place (Mexico, Chile) or its establishment is envisaged (South Africa). Mandatory unit registries which would ensure that double counting of emission reductions is avoided, however, are lacking. In this regard, Mexico can be expected to soon be able to build on its voluntary registry, which is currently being established.

Table 3: Comparison of the Potential for Implementing Cross-national Transfers of Units with Use of Carbon Tax in Chile, Mexico and South Africa

	Mexico	Chile	South Africa
INDC compatibility	Medium (single year target problematic)	Medium (single year target problematic)	Low (INDC highly problematic in terms of accounting)
Carbon tax design	Medium (no uniform price on CO_2 + carbon tax' coverage compatible with INDC)	High (uniform price on CO_2 + carbon tax coverage compatible with INDC)	High (uniform price on CO_2 + carbon tax coverage compatible with INDC)
Technical and institutional readiness	Medium (MRV provisions in place, other provisions and institutions to be established)	Medium (MRV provisions in place, other provisions and institutions to be established)	Medium (MRV provisions envisaged, other provisions and institutions to be established)

Source: Own compilation.

Sub-chapter 4.4 addresses the question in how far **international climate finance** can usefully complement and support the carbon pricing policies of the three focus countries. After a general discussion of the role of international climate finance in the context of carbon pricing, introducing the Partnership for Market Readiness (PMR) as a major initiative in this field and outlining the focus of PMR activity in the three partner countries, potential entry points for additional international climate finance are discussed on a theoretical level. Building on this, country-specific challenges and resulting support requirements are analysed. Key points of relevance to the question whether and where additional international climate finance can support carbon pricing policies, with a particular view to the introduction of carbon taxes including offset components, are summarised at the end of this chapter.

Even though the PMR is active in all three countries to different degrees, its support has not been a decisive factor with regard to the three countries' initial decision to introduce a carbon tax. Remaining issues in all three countries, in particular with regard to refining the design of a carbon tax system and introducing the option of offsetting, suggest that there are aspects that are not (fully) covered by the mandate of the PMR, encounter difficulties in their execution or need additional flanking measures to become fully operative.

Thus, the analysis conducted in this sub-chapter revealed that the implementation and operationalization of a carbon tax system has been and still is rather a political than a financial challenge. Additional support requirements may therefore not be financial but rather in the form of enhanced political dialogue in order to accelerate the process on the ground and move on to the next stage. An intervention of the PMR or other international climate finance initiatives at an earlier stage of the process, for example to strengthen preliminary policy analysis and stakeholder involvement, might have had a positive impact on the precise design and implementation of the carbon tax and might have enhanced the alignment of the political and technical processes from the beginning. With regards to the post-preparation stage, once the tax has been successfully operationalized, additional financial and technical support may be fundamental for a gradual improvement of the carbon tax system, including specific design features that allow for links with other carbon pricing instruments or with an offset programme.

With regard to the origin of additional international climate finance resources, on the one hand, funds from the PMR can be made available under different programmes or (re)directed to specifically support activities related to the introduction of a carbon tax with an offsetting component. The Chilean case shows that this is even possible if the focus of the original MRP has been placed on another issue. Apart from that, financial and technical support may be solicited under additional programmes, such as the PMR Technical Work Programme or its Policy Work Programme. Specific technical support with regard to offsetting may be sought from the PMR Offset Working Group. On the other hand, other international climate finance sources beyond the PMR may be accessed, such as the Green Climate Fund or the Transformative Carbon Asset Facility under the World Bank.

Design Recommendations for National Offset Policies

Chapter 5 of this report focuses on selected design aspects of national offset policies and derives recommendations for policy makers that are implementing or planning to implement carbon pricing instruments, in particular carbon taxes and ETSs, at the national level.

Carbon tax systems and ETSs are increasingly employed together at the national level. The introduction of an offset component to a carbon tax can play several roles in this context: on the one hand, the parallel use of offsets in two different target systems, a tax and an ETS, can establish an indirect link between the tax and the ETS. On the other hand, the use of offsets in a carbon tax can provide a basis for carbon trading and prepare for the transition into an ETS. A national ETS can subsequently be linked to other national, regional or international ETSs, enabling international cooperation on carbon pricing and fostering a connected carbon market in the future.

While the concrete motivation for the introduction of different carbon pricing instruments at the national level may differ depending on country-specific circumstances, the implications and recommendations that result for the design of a domestic offset policy are relatively straightforward.

Considering the two cases of interest in this section – indirect linking of a carbon tax and an ETS via an offset mechanism as well as the transition of a carbon tax into an ETS –, particular attention must be given to design features that allow for the use of offsets in terms of their transfer into different target systems. Fundamental for this transfer process is the consistency and compatibility of the involved systems in order to safeguard environmental integrity. This can be ensured through the specific design of key administrative processes, in particular project design and approval processes, MRV procedures and registration practices. It is important to align these administrative processes with those of potential target systems and ensure consistency and compatibility across systems before linking or combining them.

In this context, it must be taken into account that carbon taxation and emissions trading differ significantly with regard to their institutional and administrative set-up as well as with regard to their final objectives. An ETS has a fixed emissions reduction target and is based on stringent rules for MRV and registration procedures. A carbon tax, on the other hand, does not have a fixed emission reduction target and often requires less stringent MRV procedures. For this reason, an offset component that is in the first place designed for a

carbon tax may involve lower standards for safeguarding environmental integrity. An offset component that generates offsets for the use in an ETS, on the other hand, needs to fulfil higher environmental integrity standards in order not to undermine the emissions reduction target. As in both cases of interest, offsets are in the long-term generated for use in an ETS, we recommend to follow the standards established for ETSs when designing a domestic offset policy, which are in general higher than those established for a carbon tax. If the ETS is planned to be linked to (an)other ETS(s) at the international level, the highest available standards for key administrative processes should be chosen for the domestic offset programme in order to ensure consistency and compatibility across systems.

With particular regard to the three key administrative processes, central recommendations include:

- Take already approved and well-established methodologies and standards as a reference for **project design** in order to decrease subjectivity in the approval process and increase acceptability in the target system.
- Align methodologies and standards to a country-specific context in order to support domestic policy objectives.
- Take the highest available standards for **MRV** as a reference and establish a comprehensive national MRV framework in order to increase synergies between different MRV activities and provide a basis for linking.
- Consider **registry and registration** in view of potential links with an ETS and ensure the harmonisation of registration rules in order to facilitate transparent tracking.

In addition to key administrative processes, there are further issues that may arise with regard to the use of offsets in different target systems that deserve attention. Firstly, potential alternatives to the use of offset credits can be considered, in particular when designing an offset component for a carbon tax. In this case, tax reductions on the basis of verified monitoring reports may offer a cost-effective solution, making issuance procedures and the operation of a registry obsolete. However, this option is not feasible when the objective is to link the carbon tax to an ETS. Furthermore, the point of regulation of a target system has to be taken into account. Up- and downstream regulation becomes an issue for the use of offsets in particular in the case of linking: if two systems with different regulation points are linked, there is an increased risk for multiple carbon pricing and double counting. Therefore, offsets accepted under a certain carbon pricing instrument should not originate from sources or sectors which are covered by the instrument itself in order to ensure environmental integrity. The complexity of this issue increases when up- and downstream approaches are indirectly linked through the same offsetting mechanism. Therefore, this option requires careful consideration to be able to avoid adverse effects.

Given that in the long-term, different emerging national initiatives are envisaged to form a globally connected carbon market, attention must be paid to the international level. The Paris Agreement includes provisions for the creation of a new international cooperation mechanism, which is expected to replace the CDM and JI. Yet, it is still unclear how the transition will take place and what form the new mechanism will take, as rules and regulations have yet to be developed. In this situation of uncertainty, countries increasingly engage in the development of their own domestic market mechanisms. In order to ensure the consistency and compatibility of these domestic schemes in the future, countries can build on existing international experiences and infrastructure, for example from the CDM. Three potential scenarios in this context include (1) the full reliance of a domestic offset programme on existing CDM infrastructure; (2) the conversion of CDM institutions into a nationally adapted structure; and (3) the disbanding of CDM infrastructure and full independence of domestic offset programmes. Against this background, it can be argued that there is indeed a role for the CDM (and potentially also for other established, international mechanisms) in the development of new domestic offset programmes. However, in the long run, full reliance on an international mechanism can bring along substantial difficulties, as new regulations after 2020 might make it necessary to start from scratch. A feasible and realistic option can therefore be to take the components, tools and institutions of the CDM as guidance in the establishment of a national approach and align them with national policy objectives. Furthermore, the creation of an international guidance body could offer support and enhance the credibility,

consistency and compatibility of emerging domestic market mechanisms and ultimately steer developments in the direction of a global carbon market.

Zusammenfassung

Übergeordnetes Ziel dieses Berichts ist die Analyse der Einführung von CO_2-Preissystemen, insbesondere von Verbrauchsteuern auf Kohlenstoffemissionen (CO_2-Steuern), und Wechselwirkungen einer nationalen Offsetting-Politik mit anderen Politikfeldern. Diesbezüglich werden im Bericht Empfehlungen erarbeitet. Die Einführung von CO_2-Steuern in Chile, Mexiko und Südafrika steht hierbei im Zentrum der Analyse. Alle drei Länder planen derzeit die Einführung einer CO_2-Steuer oder haben diese bereits eingeführt. Mit der Möglichkeit, Offsets im Rahmen der Steuer zuzulassen, verfolgen Südafrika und Mexiko hierbei einen neuen Ansatz. Auch Chile untersucht diese Option. Die politischen Diskussionen zum Thema befinden sich in den drei Ländern in unterschiedlichen Stadien.

Das Übereinkommen von Paris, nationale Minderungsbeiträge, die Bepreisung von Kohlenstoffemissionen und die Nutzung von Offsets

Kapitel 2 stellt den Hintergrund von Instrumenten zur Bepreisung von Kohlenstoffemissionen dar. Mit dem Übereinkommen von Paris wurde eine neue Struktur für das internationale Klimaregime etabliert. Dieses neue Regime unterscheidet sich grundsätzlich vom Kyoto-Protokoll, indem alle Vertragsparteien dazu aufgefordert sind, einen Beitrag zur Begrenzung des Klimawandels zu leisten. Diese tatsächlich globale Beteiligung forderte jedoch einen doppelten Preis: dem Fehlen von Rechtsverbindlichkeit *und* einer höhere Komplexität, denn alle Vertragsparteien können ihre nationalen Minderungsbeiträge (Nationally Determined Contributions (NDCs)) unter ihren eigenen Bedingungen festlegen und sind hierbei nicht an die Verwendung einer allgemeingültigen Formel gebunden.

Weltweit wächst der Anteil der Länder, die zur Reduktion von Kohlenstoffemissionen auf Marktinstrumente setzen. Bei der Einführung eines Emissionshandelssystems (EHS) oder einer CO_2-Steuer können Emittenten selbst entscheiden, wie sie kosteneffizient Emissionen reduzieren. Da jede Tonne an ausgestoßenen Treibhausgasen (THG) zur finanziellen Belastung für Emittenten wird, werden Emissionsreduktionen zu einem Wirtschaftsgut. Dies führt zu Investitionen in emissionsarme Technologien und befördert technologische und soziale Innovation.

Diese Effekte können durch eine grenzüberschreitende Verknüpfung von Systemen zur Bepreisung von Kohlenstoffemissionen verstärkt werden. EHS und CO_2-Steuersysteme können entweder direkt (bilateral oder multilateral) oder indirekt über einen internationalen Marktmechanismus (multilateral) verlinkt werden. Mit Artikel 6 des Übereinkommens von Paris wurde die Grundlage für jedwedes Zusammenspiel nationaler Systeme zur Bepreisung von Kohlenstoffemissionen ab 2020 geschaffen. Details müssen jedoch noch ausgearbeitet werden.

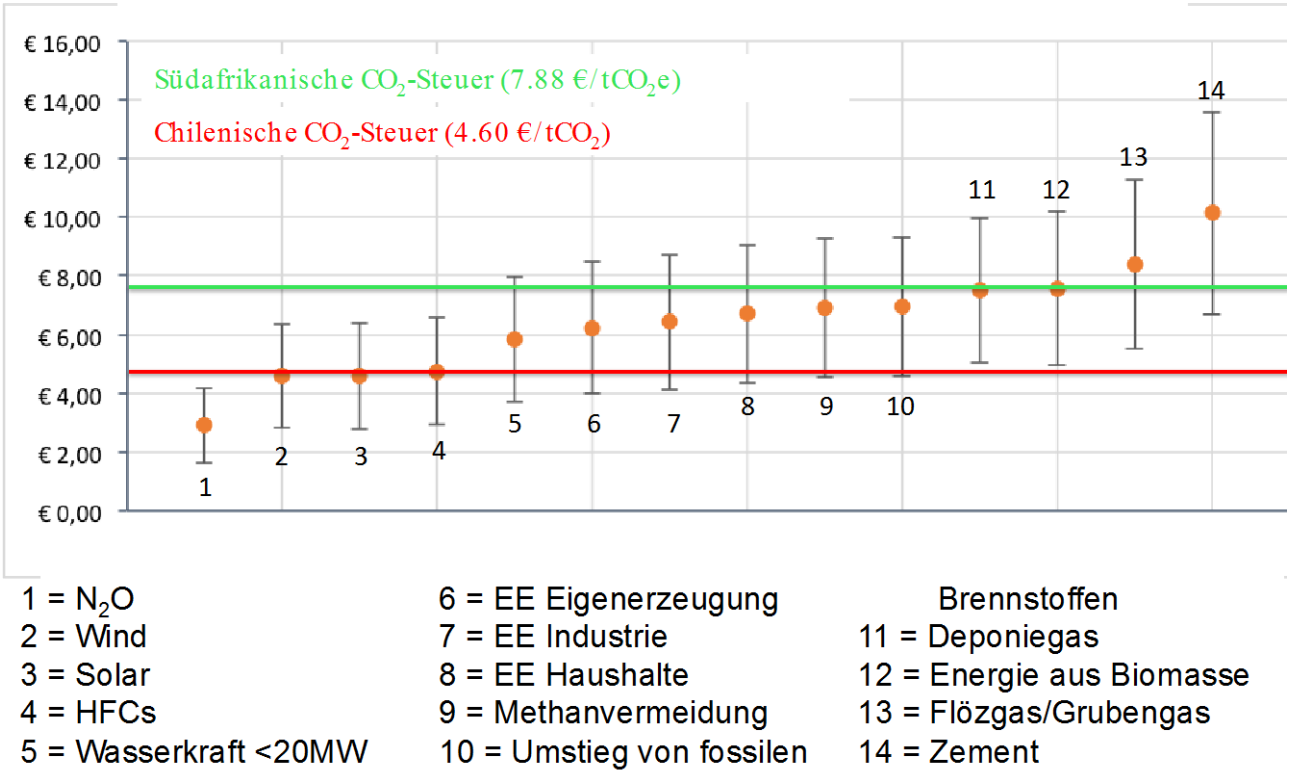
Das Linking von EHS oder CO_2-Steuersystemen mit einer Offset-Komponente bringt zahlreiche Vorteile. So können unter anderem zusätzliche kosteneffiziente Potenziale eröffnet, eine höhere Flexibilität ermöglicht und potentiell zusätzliche positive Nebeneffekte (Co-Benefits) erzielt werden. Allerdings ist die Einführung einer nationalen Offset-Komponente nur möglich, wenn inländische Instrumente zur Bepreisung von Kohlenstoffemissionen nicht die gesamte Wirtschaft abdecken.

Welchen Effekt das Offsetting von Emissionen in einem CO_2-Steuersystem hat, hängt stark vom Steuersatz ab. Insgesamt profitieren CO_2-Steuersysteme mit niedrigem Steuersatz und entsprechend niedrigen Minderungsergebnissen von der indirekten Emissionsminderung durch Offsets in Sektoren, die nicht von der CO_2-Steuer abgedeckt werden. Während die Regierung selbst entscheiden kann, ob sie Gelder, die sie durch die CO_2-Steuer einnimmt, zur Reduktion von Emissionen einsetzt, fließen Gelder für den Kauf von Offsets nachgewiesenermaßen in Minderungsaktivitäten. Bei einer Anhebung des Steuersatzes steigt der Anreiz für Steuerpflichtige, eigene Emissionsreduktionpotenziale zu heben, anstatt lediglich die Steuerlast durch finanzielle Mittel zu begleichen. Zum anderen sind höhere Steuersätze auch erforderlich, um die Generierung von Offsets durch Projekttypen anzuregen, welche mittlere oder höhere Kosten pro Tonne CO_2 haben.

Die Wirtschaftlichkeit verschiedener Projekttypen für die Generierung von Offsets

Der Einsatz von Offsets zur Erfüllung von (Teilen der) steuerlichen Pflichten ist für Steuerzahler nur attraktiv, wenn diese Option mit niedrigeren Kosten als die tatsächliche Steuerrate verbunden ist. Um sich der Frage der Wirtschaftlichkeit verschiedener Projekttypen für die Generierung von Offsets zu nähern, werden in Abbildung 1 die Spannweiten der Kosten für die Fortführung laufender Clean Development Mechanism (CDM)-Projekte nach Projekttyp in Relation zu den (geplanten) Steuersätzen der CO_2-Steuern in Chile und Südafrika dargestellt. Mexikos CO_2-Steuersatz ist in dieser Abbildung nicht enthalten, da Steuerzahler in Mexiko einen Teil ihrer Steuer mit Certified Emission Reductions (CERs) mexikanischer CDM-Projekte bezahlen können, wobei der Wert der CERs auf Grundlagen des globalen CER-Preises zum Zeitpunkt der Entrichtung der Steuer festgelegt wird. Im Falle Mexikos hat das Verhältnis von Steuerrate und den Kosten einzelner Minderungsprojekte daher keine Relevanz. Von Bedeutung sind lediglich die CER-Preise.

Abbildung 1: Spannweiten der Kosten für die Fortführung laufender CDM-Projekte nach Projekttyp



Quelle: Eigene Abbildung mit Datenmaterial aus Warnecke, Day & Klein, 2015.

Länderanalyse: Chile, Mexiko und Südafrika

Überblick zu zentralen Ergebnissen

Aufbauend auf den Hintergrundinformationen wird in Kapitel 3 der Stand der Einführung der CO_2-Steuern in Chile, Mexiko und Südafrika analysiert. Jedes Länderkapitel

- gibt einen Überblick über den allgemeinen Kontext, in dem die CO_2-Steuer eingeführt wird,
- beschreibt die Hauptmerkmale der (geplanten) CO_2-Steuer

- einschließlich der Offsetkomponente, sofern vorhanden, und
- untersucht den politischen Prozess sowie Stakeholder-Positionen in Bezug auf die Einführung der CO_2-Steuer und die Nutzung von Offsets.

Die Analyse zeigt, dass sich die Einführung der CO_2-Steuern in den drei Ländern in unterschiedlichen Stadien befindet. Währen in Mexiko die CO_2-Steuer im Januar 2014 in Kraft getreten ist, wird sie in Chile im Januar 2017 rechtswirksam. Der Gesetzgebungsprozess zur CO_2-Steuer in Südafrika steht hingegen noch ganz am Anfang und sein Ausgang ist derzeit ungewiss: Während ein Interviewpartner angab, dass 2016 ein politischer Prozess zu einer Entscheidung über die Zukunft der CO_2-Steuer geführt werden soll, äußerte ein anderer Interviewpartner ernsthafte Zweifel darüber, ob die Steuer aktuellen Plänen entsprechen oder aber überhaupt umgesetzt werden würde.

Auch in Bezug auf die Möglichkeit, Offsets für die Erfüllung (eines Teils) der CO_2-Steuern zu nutzen, sind nach wie vor zahlreiche Fragen offen. So konzentriert sich Chile derzeit auf die Umsetzung der CO_2-Steuer und sieht vorerst die Nutzung von Offsets in der CO_2-Steuer nicht vor, wenngleich Studien zu diesem Thema durchgeführt werden. In Südafrika hingegen wird die Einführung einer Offsetting-Komponente als Teil der CO_2-Steuer bereits diskutiert und das Finanzministerium überarbeitet derzeit seinen diesbezüglichen Vorschlag. Dieser verweist bisher auf den CDM, den Verified Carbon Standard (VCS), den Gold Standard (GS) und die Climate, Community and Biodiversity (CCB) Standards als mögliche Zertifizierungsstandards für Offsets. Die angekündigte Überarbeitung des Regierungsvorschlags, des Carbon Offsets Papers, lag zum Abschluss dieses Berichts Ende Mai noch nicht vor. Bisher fehlt in Südafrika die rechtliche Grundlage, sowohl für die CO_2-Steuer als auch für die Option, Offsets zu nutzen. Daher ist Mexiko bisher das einzige der drei untersuchten Länder, das tatsächlich die gesetzliche Grundlage geschaffen hat, um von der CO_2-Steuer betroffene Steuerpflichtigen die Möglichkeit zu bieten, einen Teil ihrer Steuerlast durch die Einreichung von Zertifikaten aus Minderungsprojekten zu begleichen. Das jedoch die hierfür erforderlichen untergeordneten Rechtsvorschriften auch zwei Jahre nach Einführung der CO_2-Steuer nicht veröffentlicht worden sind, könnte ein Hinweis auf die Schwierigkeiten sein, die mit Mexikos Ansatz verbunden sind: Die Möglichkeit, CERs einzureichen und dadurch die Steuerlast um den Marktwert der CERs zu reduzieren, bietet keinen Zusatznutzen für den Steuerzahler. Derzeit ist noch völlig offen, wie die gesetzliche Regelung zur Nutzung von CERs im Rahmen der CO_2-Steuer ausgestaltet wird. Eine baldige Verabschiedung dieser Regelung ist indes ungewiss, zumal sich Mexiko mittlerweile verstärkt auf die Umsetzung der nationalen Energiereform konzentriert. Darüber hinaus scheint das Finanzministerium nur ein geringes Interesse an der Offsetting-Komponente der CO_2-Steuer zu haben, während das Umweltministerium bereits den nächsten Schritt ins Auge gefasst hat: die Einführung eines EHS, möglicherweise schon im Jahr 2018.

Chile

Chile war im September 2014 das erste südamerikanische Land, das eine CO_2-Steuergesetzgebung (impuesto al carbono) als Teil einer breiteren Steuerreform verabschiedet hat. Am 1. Januar 2017 wird die CO_2-Steuer dort zwar in Kraft treten, doch 2017 werden zunächst lediglich Emissionen gemessen. Ab 2018 wird dann eine CO_2-Steuer von 5 US$ (4,60 EUR) für jede Tonne CO_2 fällig, die bei der Energieerzeugung in Anlagen ausgestoßen wird, welche aus Heizkessel und Turbinen bestehen und deren thermische Leistung einzeln oder im Verbund mindestens 50 MWt beträgt. Die Erzeugung unkonventioneller erneuerbarer Energie ist von der CO_2-Steuer ausgenommen. Hierunter wird Energie aus Biomasse gefasst, die direkt als Kraftstoff verwendet werden kann oder in andere Formen flüssiger, fester oder gasförmiger Biokraftstoffe umwandelbar ist. Auch der biologisch abbaubare Teil von privatem und gewerblichem Feststoffabfall zählen dazu. Insgesamt deckt die CO_2-Steuer etwa 55% von Chiles CO_2-Emissionen ab.

Studien der Päpstlichen Katholischen Universität Chile (Pontificia Universidad Católica de Chile - PUC) gehen davon aus, dass die CO_2-Steuer von Jahr zu Jahr mehr Emissionen reduzieren wird. Die Emissionsreduktionen sollen 2020 3 Millionen tCO_2 betragen (6% der Gesamtemissionen aus der Stromerzeugung) und 2030 6 Millionen tCO_2 (11% der Gesamtemissionen aus der Stromerzeugung). Akkumuliert sollen die Emis-

sionsreduktionen im Zeitraum 2017-2030 59 Millionen tCO_2 betragen. Die Studie nimmt an, dass die Emissionsreduktionen hauptsächlich dadurch erreicht werden, dass 3% der kohlebasierten Energieerzeugung mit Wind- und Wasserkraft ersetzt werden.

Der Einsatz von Offsets zur Erfüllung von (Teilen der) steuerlichen Pflichten ist in Chile zunächst nicht vorgesehen. Derzeit werden jedoch einige Studien hierzu durchgeführt. Darüber hinaus wurde in Interviews angegeben, dass dies eine Option für die Zukunft sein könnte.

Mexiko

Die Steuer auf fossile Brennstoffe (impuesto a los combustibles fósiles) wurde in Mexiko als Teil einer umfassenden Steuerreform eingeführt, die President Peña Nieto angestoßen hatte. Die Steuer trat im Januar 2014 in Kraft und deckt etwa 40% der mexikanischen Gesamtemissionen an THG ab. Die Steuer fällt bei Verkauf und Import fossiler Brennstoffe an. Das überarbeitete Gesetz über die spezielle Produktions- und Dienstleistungssteuer (Ley del Impuesto Especial sobre Producción y Servicios – LIEPS), das die Steuer begründet, beinhaltet eine Liste mit neun fossilen Brennstoffen. Diese Liste führt jedoch Erdgas nicht auf, das von der Steuer ausgenommen ist. Für jeden der anderen fossilen Brennstoffe wird eine Steuer auf Basis der zusätzlichen Menge CO_2 berechnet, welche erzeugt werden würde, wenn der entsprechende fossile Brennstoff anstelle von Erdgas verwendet würde. Die Steuerrate wird jährlich an den Index der Konsumentenpreise angepasst. Die Steuerraten, die seit dem 1. Januar 2016 in Kraft sind, reichen von 6,29 MXN Cents (0,0033 €) pro Liter Propan bis zu 38,93 MXN (2,05€) pro Tonne Naturkoks. Für fossile Brennstoffe, die nicht in der Liste enthalten sind, ist die Steuerrate auf 42,37 MXN (2,23 EUR) pro Tonne Kohlenstoff gelegt worden.

Zeitgleich mit der Verabschiedung der Steuer auf fossile Brennstoffe wurde die Option eingeführt, Zertifikate aus Klimaschutzprojekten zu verwenden. Hierbei sind nur CERs aus CDM-Projekten zugelassen, die von der Klimarahmenkonvention der Vereinten Nationen (United Nations Framework Convention on Climate Change - UNFCCC) genehmigt wurden und in Mexiko umgesetzt werden. Einschlägige Verfahren müssen noch vom Sekretariat für Finanz- und öffentliches Kreditwesen (Secretaría de Hacienda y Credito Publico - SHCP) ausgearbeitet werden. Es wird jedoch nicht möglich sein, CERs direkt einzusetzen, um die Gesamtmenge des zu besteuernden Kohlenstoffs zu reduzieren. Stattdessen kann ein Teil der Steuer mit CERs bezahlt werden. Laut Gesetz entspricht der Wert der CERs dem Marktwert zum Zeitpunkt der Zahlung der Steuer. Die Tatsache, dass die untergeordneten Rechtsvorschriften für die Nutzung von CERs auch zwei Jahre nach Inkrafttreten der CO_2-Steuer noch nicht veröffentlich wurden, könnte ein Hinweis auf die Schwierigkeiten sein, die mit diesem Ansatz verbunden sind.

Südafrika

Gemäß dem jüngsten Vorschlag, dem Entwurf zum CO_2-Steuergesetz (Draft Carbon Tax Bill), der am 2. November 2015 zur öffentlichen Kommentierung veröffentlicht worden ist, wird die CO_2-Steuer in Südafrika THGs aus allen Sektoren – unterteilt in insgesamt 88 Subsektoren – erhoben. Der Vorschlag sieht vor, dass die Steuer am 1. Januar 2017 in Kraft tritt. In der ersten Phase der Steuer bis 2020 soll sich die Steuerrate auf 120 R (7,88 EUR) pro tCO_2e belaufen. Die Regierung sieht jedoch eine Reihe von Möglichkeiten vor, um die Steuerlast zu reduzieren. Mit einem Grundfreibetrag von 100% fallen für den Wohnungssektor und Viehhaltung in der ersten Phase keine Steuerverpflichtungen an. In anderen Sektoren beläuft sich der Grundfreibetrag auf 75 bis 95%, womit der niedrigste effektive Steuersatz 6R (0,39 EUR) pro t CO_2e beträgt. Laut Finanzministerium könnte der Grundfreibetrag ab 2020 gesenkt und/oder in eine absolute Emissionsgrenze für die zweite Phase umgewandelt werden. Im Jahr 2014 hat das Finanzministerium sein „Carbon Offsets Paper“ veröffentlicht, das den Vorschlag enthält, den Einsatz von Offsets für bis zu 10% der Gesamtemissionen zuzulassen, die von der CO_2-Steuer betroffen sind. Der jüngste Vorschlag zur CO_2-Steuer nimmt diese Option auf und sieht vor, den Einsatz von Offsets je nach Sektor für 5 bis 10% der CO_2-Steuer zuzulassen. Der aktuelle Vorschlag sieht vor, dass nur inländische Projekte, die außerhalb der Reichweite von Aktivitäten, die von der CO_2-Steuer abgedeckt sind, zugelassen werden. Minderungsprojekte, die vor der Umsetzung der CO_2-Steuer registriert oder umgesetzt worden sind, sollen unter bestimmten Bedingungen und gemäß eines

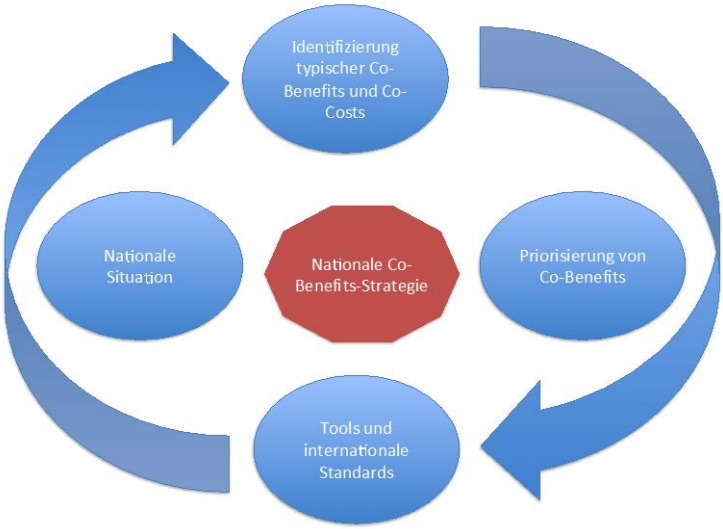
spezifischen Zeitplans zugelassen werden. Die genauen Bestimmungen müssen noch im Gesetzgebungsverfahren festgelegt werden. Projekte, die bereits von anderen staatlichen Anreizprogrammen wie dem Steueranreiz für Energieeffizienz (Energy Efficiency Tax Incentive) profitieren, sollen nicht zugelassen werden. Der CDM, der VCS, der Gold Standard und die CCB Standards werden derzeit für die Nutzung in der Offsetting-Komponente in Erwägung gezogen. Weitere Details hinsichtlich der Nutzung von Offsets in der südafrikanischen CO_2-Steuer werden voraussichtlich im neuen Vorschlag zu Offsets erarbeitet, dessen Veröffentlichung das Finanzministerium angekündigt hat.

Wechselwirkungen nationaler Offsets mit anderen Politikfeldern

Kapitel 4 analysiert die Wechselwirkungen einer nationalen Offset-Politik mit anderen Politikfeldern. Diese Politikfelder werden in vier Unterkapiteln untersucht, die sich auf die Erzielung von Co-benefits durch die Verwendung von Offsets (Kapitel 4.1), den Einfluss von Offsets auf langfristige Emissionsminderungspfade (Kapitel 4.2), prozedurale und institutionelle Vorkehrungen für die Zulassung eines Transfers von Minderungsergebnissen (Kapitel 4.3) und die Unterstützung durch internationale Klimafinanzierung (Kapitel 4.4) konzentrieren. Wo möglich, wird hierbei Bezug zu Chile, Mexiko und Südafrika genommen.

Unterkapitel 4.1 über die **Erzielung von Co-benefits** durch die Verwendung von Offsets untersucht, wie CO_2-Steuern mit einer Offsetting-Option ergänzt werden können, die die Regierung dabei unterstützt, Co-benefits zu erzielen und Co-costs zu vermeiden. Hierfür wurde ein Vorgehen erarbeitet, das die Entwicklung einer nationalen Co-benefits-Strategie für Offsetting im Kontext der CO_2-Steuer anleiten kann. Dieses Vorgehen kann als zyklischer Prozess verstanden werden, der aus vier zusammenhängenden Schritten besteht. Diese sind in Abbildung 2 dargestellt und werden in Unterkapitel 4.1 ausführlich erklärt.

Abbildung 2: Prozess für eine nationale Co-Benefits-Strategie



Quelle: Eigene Darstellung.

Analyseergebnisse aus Unterkapitel 4.1 weisen darauf hin, dass sich die Rolle, die Co-benefits in den drei untersuchten Ländern spielen, stark unterscheiden: Obwohl Mexiko das einzige Land ist, dessen CO_2-Steuer bereits in Kraft getreten ist und das zudem Vorkehrungen für Offsetting getroffen hat, gibt es in Mexiko derzeit keine Strategie für die Verwirklichung von Co-benefits durch Offsetting. Mexiko könnte jedoch auf seiner CDM-Infrastruktur aufbauen, um eine solche Strategie einzurichten: Da Mexikos Offsetting-System für die Zertifizierung von THGs auf dem CDM aufbaut, könnte die Verwendung freiwilliger CDM-Premium-Label wie dem Gold Standard und den CCB Standards aufbauen. In Südafrika waren Co-benefits von Anfang an ein wichtiger Bestandteil der Diskussion über die CO_2-Steuer. Regierungsdokumente betonen das

Potential, Co-benefits zu erreichen, und erörtern verschiedene Zertifizierungsstandards. Die Wahl des Standards wird voraussichtlich vom Offsetting-Sektor abhängen, da sich die meisten freiwilligen Zertifizierungsstandards auf bestimmte Sektoren konzentrieren. In Chile wird derzeit hingegen noch erwogen, ob zukünftig überhaupt Offsets zugelassen werden sollten. Da diese Erwägungen noch weit am Anfang stehen, sind derzeit noch keine Informationen über die mögliche Rolle von Co-benefits verfügbar. Co-Costs werden bisher von keinem der drei Länder adressiert.

Unterkapitel 4.2 zu **langfristigen Emissionsminderungspfaden** legt dar, dass unter der Voraussetzung, dass sowohl die Sektoren, die von einem Instrument zur Bepreisung von Kohlenstoffemissionen abgedeckt sind, als auch die Sektoren, die für die Erzeugung von inländischen Offsets zugelassen sind, im Emissionsminderungspfad enthalten sind, die Verwendung von Offsets statisch betrachtet keinen Einfluss auf den langfristigen Emissionsminderungspfad haben sollte. Demnach sollte die Verwendung inländischer Offsets keinen Einfluss auf die Emissionsminderungspfade der drei Fokusländern haben, die auf deren beabsichtigten national festgelegten Beiträgen (Intended Nationally Determined Contributions – INDCs) basieren. Jedoch kommt dieser Abschnitt auch zu dem Schluss, dass die Verwendung von Offsets durchaus die Effektivität anderer Politiken und Maßnahmen sowie den politischen Willen, Emissionen zu reduzieren, beeinflussen kann. Die folgende Tabelle gibt eine Übersicht über die Chancen und Risiken, die der Einsatz von Offsets für langfristige Emissionsminderungspfade haben kann und zeigt Möglichkeiten auf, diese zu vergrößern, bzw. zu verringern.

Tabelle 1: Chancen, die die Verwendung von Offsets bietet, und Möglichkeiten, diese zu vergrößern

Bereich	Chancen	Möglichkeiten, diese zu vergrößern
Umwelt	Reale Emissionsreduktionen im Offsetsektor anstelle zusätzlicher Einnahmen durch die CO_2-Steuer	Ausgestaltung der Regulierung Höhere Steuerraten
Wirtschaft	Kostenreduktion	Ausweitung der Offsetsektoren sowie der Offsetmenge, die eingesetzt werden darf
Umwelt	Positive spill-over-Effekte, Emissionen in Sektoren zu reduzieren, die nicht von der CO_2-Steuer abgedeckt sind	Diskontierung von Emissionsreduktionen in Offsetsektoren. Netto-Emissionsminderungen in den Offsetsektoren durch Verkürzung des Crediting-Zeitraums
Politik	Argument in politischen Verhandlungen, der die Einführung von Politiken und Maßnahmen und/oder höhere Reduktionsverpflichtungen ermöglicht	Beteiligung von Stakeholdern

Quelle: Eigene Zusammenstellung.

Tabelle 2: Risiken, die die Verwendung von Offsets birgt, und Möglichkeiten, diese zu verringern

Bereich	Risiken	Möglichkeiten, diese zu verringern
Umwelt	Gefährdung der Umweltintegrität	Ausgestaltung der Regulierung
Umwelt	Reduktion von Anreizen, Emissionen in Sektoren zu reduzieren, die von der CO_2-Steuer betroffen sind	Möglichkeit, Offsets zu verwenden, mit Ambitionsanstieg im zentralen System zur Bepreisung von Kohlenstoffemissionen verknüpfen
Technologie	Lock-in-Effekte in Sektoren, die vom System zur Bepreisung von Kohlenstoffemissionen abgedeckt sind	Möglichkeit, Offsets zu Verwenden, mit Ambitionsanstieg im zentralen System zur Bepreisung von Kohlenstoffemissionen verknüpfen

Bereich	Risiken	Möglichkeiten, diese zu verringern
Politik	Widerstand gegen weitere Klimaschutzpolitiken und –maßnahmen in Sektoren, die Offsets erzeugen, da diese potentielle Einnahmen durch Offsets in diesem Sektor reduzieren würden	Einbindung von Stakeholdern
Politik	Widerstand gegen Einführung von Offsets könnte Etablierung des Instruments zur Bepreisung von Kohlenstoffemissionen und/oder Offsets verhindern	Einbindung von Stakeholdern

Quelle: Eigene Zusammenstellung.

Unterkapitel 4.3 untersucht **prozedurale und institutionelle Vorkehrungen, die für die Zulassung eines Transfers von Minderungseinheiten** über Ländergrenzen hinweg in die (geplanten) CO_2-Steuersysteme in Chile, Mexiko und Südafrika benötigt werden. Nachdem grundlegende Fragen in Bezug auf die Umweltintegrität und relevante Vorgaben des Übereinkommens von Paris beleuchtet wurden, stellt das Unterkapitel weitere Readinesselemente vor, die ergänzend zur Erfüllung der Vorgaben des Übereinkommens von Paris benötigt werden. Abschließend werden Fragen zur Regulierung auf Ebene des CO_2-Steuersystems erörtert.

Das Unterkapitel schlussfolgert, dass die Fähigkeit, Minderungseinheiten zu importieren, in den drei Fokusländern sehr unterschiedlich ist. Was ihre INDCs angeht, sind Mexiko und Chile die Länder mit den besten Bedingungen, um an einem solchen Transfer teilzunehmen. Ihre Beiträge sind klar definiert, was ein robustes Accounting importierter Minderungseinheiten ermöglicht. Accounting bei Südafrikas Zielkorridor, in dem Emissionen gipfeln, stabil bleiben und dann abnehmen (peak, plateau and decline target range) ist hingegen weit problematischer, da weder ein klar definiertes Zielniveau noch ein Zieljahr besteht. Dies erschwert die Teilnahme an Transfers maßgeblich. Da Mexiko und Chile jedoch Ziele in Aussicht gestellt haben, die sich auf ein einzelnes Zieljahr beziehen, ist auch ihre Teilnahme an bestimmte Bedingungen gebunden.

Die Ausgestaltung der CO_2-Steuern und die Fähigkeit, diese mit anderen Instrumenten zur Bepreisung von Kohlenstoffemissionen zu verknüpfen, unterscheidet sich ebenfalls erheblich von Land zu Land. Diesbezüglich ist Mexikos CO_2-Steuer als problematisch zu betrachten: Da der Kohlenstoffgehalt nicht bei allen fossilen Brennstoffen gleich besteuert wird, kann eine Verknüpfung nicht auf einem gemeinsamen einheitlichen Preis pro Tonne erfolgen. Dies verhindert die direkte Verknüpfung der Steuer mit anderen Instrumenten zur Bepreisung von Kohlenstoffemissionen. Da nach wie vor politischer Widerstand zu erwarten ist und Präsident Peña Nieto verkündet hat, die Steuer während seiner aktuellen Amtszeit nicht weiter anzuheben, ist nicht davon auszugehen, dass die Steuerraten in naher Zukunft vereinheitlich werden. Darüber hinaus hat sich das Hauptaugenmerk in Mexiko mit der nationalen Energiereform hin zu alternativen Politikinstrumenten verschoben und das Umweltministerium hat jüngst einen Prozess initiiert, um 2018 ein nationales EHS einzurichten. Südafrika und Chile haben dagegen einen einheitlichen Preis pro tCO_2, was eine Verknüpfung sehr viel einfacher macht. Da die von der Steuer betroffenen Sektoren in allen drei Ländern auch in den INDCs enthalten sind, ist das Accounting der importierten Minderungseinheiten möglich.

Die technische und institutionelle Readiness ist in allen drei Ländern durchschnittlich. Vorkehrungen für das Messen, Berichten und Verifizieren (measurement, reporting and verification, MRV) von Emissionen sind eingerichtet (Mexiko, Chile) oder es ist deren Einrichtung vorgesehen (Südafrika). Verpflichtende Register für Minderungseinheiten, die gewährleisten würden, dass Doppelzählungen von Emissionsminderungen vermieden werden könnten, sind jedoch nicht vorhanden. Diesbezüglich ist zu erwarten, dass Mexiko bald auf seinem freiwilligen Register aufbauen kann, das derzeit eingerichtet wird.

Tabelle 3: Vergleich des Leistungsvermögens, einen grenzüberschreitenden Transfer von Minderungsleistungen zur Verwendung in den CO_2-Steuern in Chile, Mexiko und Südafrika umzusetzen

	Mexiko	Chile	Südafrika
Vereinbarkeit mit INDC	Mittel (Einzeljahrziel problematisch)	Mittel (Einzeljahrziel problematisch)	Niedrig (INDC hochproblematisch für Accounting)
Ausgestaltung der CO_2-Steuer	Mittel (kein einheitlicher CO_2-Preis + Geltungsbereich der CO_2-Steuer kompatibel mit INDC)	Hoch (einheitlicher CO_2-Preis + Geltungsbereich der CO_2-Steuer kompatibel mit INDC)	Hoch (einheitlicher CO_2-Preis + Geltungsbereich der CO_2-Steuer kompatibel mit INDC)
Technische und institutionelle Readiness	Mittel (Vorkehrungen für MRV vorhanden, sonstige Vorkehrungen und Institutionen ausstehend)	Mittel (Vorkehrungen für MRV vorhanden, sonstige Vorkehrungen und Institutionen ausstehend)	Mittel (Vorkehrungen für MRV vorgesehen, sonstige Vorkehrungen und Institutionen ausstehend)

Quelle: Eigene Zusammenstellung.

Unterkapitel 4.4 untersucht die Frage, inwieweit **internationale Klimafinanzierung** die Politikinstrumente zur Bepreisung von Kohlenstoffemissionen in den drei Fokusländern sinnvoll unterstützen und ergänzen kann. Zu Beginn wird die Rolle der internationalen Klimafinanzierung im Kontext der Bepreisung von Kohlenstoffemissionen allgemein diskutiert. Hierbei wird die Partnership for Market Readiness (PMR) als eine der wichtigsten Initiativen in diesem Feld sowie ihre Hauptaktivität in den drei Ländern vorgestellt. Zudem werden mögliche Eingangspunkte für zusätzliche internationale Klimafinanzierung theoretisch erörtert. Darauf aufbauend werden länderspezifische Herausforderungen und daraus resultierender Unterstützungsbedarf analysiert. Am Ende des Kapitels werden die wichtigsten Punkte im Bezug auf die Frage ob und an welcher Stelle zusätzliche Klimafinanzierung Politikinstrumente zur Bepreisung von Kohlenstoffemissionen unterstützen kann, zusammengefasst. Die Einführung eines CO_2-Steuersystems mit einer Offsetting-Komponente findet hierbei besondere Beachtung.

Obwohl die PMR in allen drei Ländern (unterschiedlich stark) aktiv ist, war ihre Unterstützung in keinem dieser Länder ausschlaggebend für die Entscheidung, eine CO_2-Steuer einzuführen. Nach wie vor bestehende Fragen in allen drei Ländern weisen darauf hin, dass es Bereiche gibt, die nicht (vollständig) unter das Mandat der PMR fallen, deren Umsetzung auf Schwierigkeiten stößt oder die zusätzliche flankierende Maßnahmen benötigen, um voll funktionsfähig zu werden. Hierzu zählen vor allem die Weiterentwicklung des CO_2-Steuer-Designs und die Einführung der Offsetting-Komponente.

So hat die Analyse in diesem Unterkapitel gezeigt, dass die Umsetzung und Operationalisierung eines CO_2-Steuer-Systems stets auch eine politische Herausforderung war und ist. Neben finanzieller Unterstützung besteht daher insbesondere Bedarf zur Verbesserung politischer Dialoge, die den Entwicklungsprozess vor Ort beschleunigen und das Erreichen des nächsten Stadiums ermöglichen kann. Es wird angenommen, dass der Eingriff der PMR oder einer anderen internationalen Finanzierungsinitiative in einer früheren Phase des Prozesses – beispielsweise um vorläufige Politikanalysen durchzuführen und die Beteiligung von Stakeholdern zu stärken – möglicherweise einen positiven Einfluss auf das konkrete Design sowie die Umsetzung der CO_2-Steuer gehabt und die Ausrichtung von politischen und technischen Prozessen aufeinander von Beginn an verbessert hätte. Wenn die CO_2-Steuer nach der Vorbereitungsphase erfolgreich operationalisiert worden ist, könnte zusätzliche finanzielle und technische Unterstützung dazu beitragen, das System allmählich zu verbessern. Dies ist auch im Bezug auf spezifische Ausgestaltungsmerkmale der Fall, die eine Verknüpfung der Steuer mit anderen Instrumenten zur Bepreisung von Kohlenstoffemissionen oder mit einem Offsetprogramm ermöglichen.

Internationale Klimafinanzierung zur Unterstützung der Einführung einer CO_2-Steuer mit einer Offsetting-Komponente könnte einerseits durch Mittel aus dem Country Programme der PMR selbst geschöpft oder (um)gelenkt werden. Der Fall Chile zeigt, dass dies selbst dann möglich ist, wenn sich das ursprüngliche Market Readiness Proposal (MRP) auf andere Themen konzentriert. Darüber hinaus besteht die Möglichkeit, finanzielle oder technische Unterstützung über zusätzliche Programme wie das Technical Work Programme oder das Policy Work Programme der PMR anzuwerben. Zum Beispiel kann die Offset Working Group der PMR spezifische technische Unterstützung für Offsetting zur Verfügung stellen. Andererseits kann auch auf internationale Klimafinanzierungsquellen jenseits der PMR, wie den Green Climate Fund (GCF) oder die Transformative Carbon Asset Facility (TCAF) der Welt Bank, zurückgegriffen werden.

Empfehlungen für die Ausgestaltung nationaler Offsetpolitik

Kapitel 5 dieses Berichts konzentriert sich auf ausgewählte Aspekte der Ausgestaltung nationaler Offsetpolitiken und leitet Empfehlungen für politische Entscheidungsträger ab, die nationale Instrumente zur Bepreisung von Kohlenstoffemissionen, im Besonderen CO_2-Steuern und EHS, einführen oder deren Einführung planen.

CO_2-Steuersysteme und EHS werden zunehmend als parallele Instrumente in einem Land eingesetzt. Die Einführung einer Offsetting-Komponente für eine CO_2-Steuer kann hierbei mehrere Rollen erfüllen: Einerseits kann die gleichzeitige Verwendung von Offsets in zwei Zielsystemen, also einer CO_2-Steuer und einem EHS, eine indirekte Verknüpfung zwischen der Steuer und dem EHS herstellen. Andererseits kann die Verwendung von Offsets in einer CO_2-Steuer die Grundlagen für Emissionshandel legen und den Übergang zu einem EHS vorbereiten. Ein nationales EHS kann später mit anderen nationalen, regionalen oder internationalen EHS verknüpft werden und so ein internationales Zusammenspiel bei der Bepreisung von Kohlenstoffemissionen ermöglichen und zukünftig die Entstehung eines globalen Kohlenstoffmarktes fördern.

Während sich die Beweggründe für die Einführung verschiedener Instrumente zur nationalen Bepreisung von Kohlenstoffemissionen von Land zu Land unterscheiden, sind die Empfehlungen für die Ausgestaltung nationaler Offsetpolitiken recht einheitlich.

Geht man von den zwei in diesem Kapitel betrachteten Fällen aus – der indirekten Verknüpfung einer CO_2-Steuer mit einem EHS durch einen Offsetmechanismus und die Überführung einer CO_2-Steuer in ein EHS –, muss solchen Ausgestaltungsmerkmalen besonderes Augenmerk geschenkt werden, welche die Übertragung von Offsets in andere Zielsysteme ermöglichen. Für diesen Übertragungsprozess ist die Kohärenz und Vereinbarkeit der beteiligten Systeme von grundlegender Bedeutung, um die Umweltintegrität zu gewährleisten. Beides kann durch die spezielle Ausgestaltung zentraler administrativer Prozesse sichergestellt werden, wie insbesondere der Projektprüfung, den MRV-Verfahren und der Registerführung. Es ist wichtig, diese administrativen Prozesse mit denen potentieller Zielsysteme in Einklang zu bringen und die Kohärenz und Vereinbarkeit über die Systeme hinweg sicherzustellen, bevor die Systeme miteinander verknüpft werden.

In diesem Zusammenhang muss beachtet werden, dass sich CO_2-Steuern und Emissionshandel im Bezug auf ihren institutionellen und administrativen Aufbau sowie auf ihr Hauptziel unterscheiden. Ein EHS hat ein festes Emissionsziel (cap) und beruht auf strengen Regeln bezüglich MRV und Registrierungsverfahren. Eine CO_2-Steuer dagegen hat kein festes Emissionsziel und benötigt häufig weniger strikte MRV-Verfahren. Daher kann eine Offsetting-Komponente, die zunächst für eine CO_2-Steuer entworfen wurde, niedrigere Standards im Bezug auf die Gewährleistung der Umweltintegrität haben. Eine Offsetting-Komponente, die Offsets für den Einsatz in einem EHS erzeugt, muss dagegen höhere Standards zur Gewährung der Umweltintegrität erfüllen, um das feste Emissionsreduktionsziel nicht zu untergraben. In beiden in diesem Kapitel betrachteten Fällen werden die Offsets langfristig für die Nutzung in einem EHS erzeugt. Daher empfehlen wir, die Ausgestaltung einer nationalen Offsetpolitik an den Standards eines EHS zu orientieren, da diese im Allgemeinen höher sind als die für eine CO_2-Steuer. Wenn geplant ist, das EHS international mit (einem) anderen EHS zu verknüpfen, sollten die höchsten verfügbaren Standards als Maßstab für die Ausgestaltung

der zentralen administrative Prozesse des nationalen Offsetprogramms gewählt werden, um Kohärenz und Vereinbarkeit über die Systeme hinweg auch langfristig sicherzustellen.

Bezüglich der drei zentralen administrativen Prozesse lauten die zentralen Empfehlungen:

- Anerkannte, gängige Methodologien und Standards sollten als Referenz für die **Projektgestaltung** genutzt werden, um die Subjektivität in der Projektprüfung zu verringern und die Akzeptanz im Zielsystem zu erhöhen.
- Methodologien und Standards sollten mit dem länderspezifischen Kontext in Einklang gebracht werden, um nationale Politikziele zu unterstützen.
- Die höchsten verfügbaren **MVR-Standards** sollten als Orientierung genutzt und ein umfassender nationaler Rahmen für MRV geschaffen werden, um Synergien zwischen verschiedenen MRV-Aktivitäten zu erhöhen und eine Grundlage für die Verknüpfungen von Systemen zu legen.
- Bezüglich der **Registerführung** sollten potenzielle Verknüpfungen mit einem EHS berücksichtigt und die Harmonisierung der Registrierungsregeln gewährleistet werden, um ein transparentes Tracking von Emissionsminderungen zu ermöglichen.

Neben diesen zentralen administrativen Prozessen gibt es weitere Aspekte, denen beim Einsatz von Offsets in verschiedenen Zielsystemen Aufmerksamkeit gebührt. Zunächst können potentielle Alternativen zum Einsatz von Offset-Zertifikaten in Erwägung gezogen werden, besonders bei der Ausgestaltung einer Offsetting-Komponente für eine CO_2-Steuer. In diesem Fall können Steuerreduktionen auf Basis verifizierter Monitoringberichte eine kosteneffiziente Lösung sein, wodurch das Verfahren zur Erstellung von Zertifikaten sowie die Führung eines Registers überflüssig gemacht werden. Diese Option ist jedoch nicht realisierbar, wenn langfristig eine Verknüpfung der CO_2-Steuer mit einem EHS anvisiert wird. Darüber hinaus muss der Ansatzpunkt der Regulierung des Zielsystems beachtet werden. Up- und Downstreamregulierung beim Einsatz von Offsets wird besonders bei der Verknüpfung von Systemen relevant: Werden zwei Systeme mit unterschiedlichen Regulierungspunkten verknüpft, entsteht ein erhöhtes Risiko der multiplen Bepreisung von Kohlenstoffemissionen und von Doppelzählungen. Daher sollten Offsets, die von einem bestimmten Instrument zur Bepreisung von Kohlenstoffemissionen akzeptiert werden, nicht aus Quellen oder Sektoren stammen, die bereits von dem Instrument selbst abgedeckt sind, um die Umweltintegrität gewährleisten zu können. Werden Up- und Downstreamansätze indirekt durch denselben Offsettingmechanismus verknüpft, erhöht sich die Komplexität dieser Problematik. Daher bedarf diese Option gründlicher Überlegungen, um negative Effekte zu vermeiden.

Da vorgesehen ist, dass entstehende nationale Initiativen langfristig einen global verknüpften Kohlenstoffmarkt bilden, muss der internationalen Ebene besondere Aufmerksamkeit gewährt werden. Das Übereinkommen von Paris beinhaltet Vorgaben für die Schaffung eines neuen internationalen Kooperationsmechanismus, der voraussichtlich die existierenden internationalen Mechanismen CDM und Joint Implementation (JI) ersetzen wird. Bisher steht jedoch noch nicht fest, wie dieser Übergang vonstatten gehen soll und welche Form der neue Mechanismus annehmen wird, da die Regeln und Bestimmungen erst noch entwickelt werden müssen. In dieser Zeit der Unsicherheit konzentrieren sich viele Länder zunehmend auf die Entwicklung ihrer eigenen nationalen Marktmechanismen. Um die Kohärenz und Vereinbarkeit dieser nationalen Systeme zukünftig zu gewährleisten, können Länder auf bestehende internationale Erfahrungen und Infrastrukturen – zum Beispiel aus dem CDM – aufbauen. In diesem Zusammenhang beinhalten mögliche Szenarien (1) den vollständigen Aufbau eines nationalen Offsetprogramms auf bestehende Infrastruktur aus dem CDM; (2) die Überführung der Institutionen des CDM in eine an nationale Gegebenheiten angepasste Struktur; und (3) die Auflösung der Infrastruktur des CDM und den Aufbau eines vollständig unabhängigen nationalen Offsetprogramms. Vor diesem Hintergrund wird angenommen, dass der CDM (und möglicherweise auch andere etablierte, internationale Mechanismen) tatsächlich eine Rolle bei der Entwicklung von nationalen Offsetprogrammen spielen kann. Langfristig kann die vollständige Abhängigkeit von einem internationalen Mechanis-

mus erhebliche Schwierigkeiten mit sich bringen, da neue Regeln für die Zeit nach 2020 dazu führen könnten, dass neue Institutionen aufgebaut werden müssen. Daher kann eine realistische Option darin bestehen, einzelne Komponenten, Instrumente und Institutionen des CDM als Leitfaden für die Schaffung eines nationalen Ansatzes zu verwenden und sie mit nationalen Politikzielen in Einklang zu bringen. Darüber hinaus könnte ein internationales Lenkungsorgan geschaffen werden, das Unterstützung anbieten, die Glaubwürdigkeit, Kohärenz und Vereinbarkeit entstehender nationaler Marktmechanismen steigern und letztendlich die Entwicklungen hin zu einem globalen Kohlenstoffmarkt steuern könnte.

1 Introduction

The overall objective of this report[1] is to explore the introduction of carbon emission pricing instruments, in particular carbon taxes and the interactions of national offset policies with other policy areas, and make recommendations on this topic. In this task, the study focuses on the carbon tax approaches Chile, Mexico and South Africa have chosen. All three countries have introduced or are planning to introduce national carbon taxes. Moreover, by allowing the use of offsets for compliance with the tax load to some extent, South Africa and Mexico are pioneering a novel approach. Chile, too, is assessing this option. Political discussions regarding the use of offsets are pending at different stages in the three countries.

Specific objectives of this report are to answer the following questions:

- Which objectives do the three countries pursue by introducing new systems and which requirements do they establish for the use of offsets?
- What impacts does the use of offsets have on other policy areas and vice versa, and how can positive impacts be maximised?
- Where do the three countries require advice or other forms of support and how could these needs be met through international climate finance?
- What potential do the new systems imply for the global carbon market and how should the three systems be designed to maximise this potential?

In doing so, the report starts by providing essential background information regarding international climate policy in chapter 2. The chapter comprises relevant aspects of the Paris Agreement and Intended Nationally Determined Contributions (INDCs), carbon pricing, reasons for allowing the use of offsets and discusses the economic feasibility of potential offset project types in the three countries.

On this basis, the country analysis is carried out in chapter 3. The current situation regarding carbon taxes and the use of offsets in Chile (chapter 3.1), Mexico (chapter 3.2) and South Africa (chapter 3.3) is structured as follows: After a short overview of the general context in which the carbon taxes are being introduced, the main characteristics of the taxes are laid out for each country. This includes options for offsets, if available. Furthermore, light is shed on the political process, the governments' goals as well as stakeholder positions regarding the carbon tax and the use of offsets.

Thereafter, interactions of national offset policies with other policy areas are analysed in chapter 4. Four topics are considered: the realisation of co-benefits and prevention of co-costs by using offsets (chapter 4.1), the impacts of the use of offsets on long-term emissions mitigation trajectories (chapter 4.2), procedural and institutional provisions to allow for transfer of mitigation outcomes (chapter 4.3) and support by international climate finance (chapter 4.4).

Based on the analysis conducted, chapter 5 of this report focuses on selected design aspects of national offset policies and derives recommendations for policy makers that are implementing or planning to implement carbon pricing instruments, in particular carbon taxes and ETSs, at the national level.

Conclusions for all parts of this report are compiled in the final chapter. While these conclusions pay special attention to the three focus counties, they also lead to recommendations with relevance for a broader spectrum of countries considering similar domestic policy approaches.

For this report, several data sources have been used. First of all, available literature has been analysed, including relevant legislative documents. Moreover, data on the economic feasibility of specific offset project

[1] This report is the final report of the research project "Potentials and Limitations of Different Requirements (Offsetting) in Bilateral and Global Carbon Pricing Systems" conducted by Wuppertal Institute and NewClimate Institute on behalf of the German Federal Environment Agency (UBA, Umweltbundesamt).

types available to the contractors was analysed. This information has been complemented with information gathered from expert interviews. Additional stakeholders were consulted by email to complete the information.

2 Background Information – Setting the Scene

2.1 The Paris Agreement and Nationally Determined Contributions (NDCs)

With the Paris Agreement, a new structure of the international climate regime has been created. This new regime is fundamentally different from the Kyoto Protocol: The Paris Agreement calls on all Parties to contribute to climate change mitigation. This truly global participation, however, comes at a double cost: lack of legal bindingness *and* increasing complexity.

In contrast to the Kyoto Protocol, where Parties committed to reducing greenhouse gas (GHG) emissions by adopting a legally binding mitigation target, under the Paris Agreement there is no legal obligation for Parties to achieve their nationally determined contributions (NDCs[2]). Instead of binding commitments, the Paris Agreement relies on the instruments of 'naming and shaming' to ensure implementation: creating a reputational risk through the establishment of mandatory transparency and review provisions (Obergassel et al., 2016).

Furthermore, under the Paris Agreement, Parties will be given the possibility to determine their contributions on their own terms, instead of using a uniform formula. The process in the run-up to the Paris conference, during which Parties have been invited to submit first "intended" nationally determined contributions (INDCs) already indicated how diverse Parties' contributions will be: while some Parties have submitted GHG emission targets, others have pledged non-GHG targets, combined their GHG emission target with non-GHG goals or pledged actions (policies and measures) to mitigate climate change. Diversity also exists among those countries that have submitted a GHG emission target: while some submitted continuous multi-year targets that describe a reduction of GHG emissions over a period of time, others submitted single-year targets, which only relate to a certain level of emissions in a specific year (for an overview see: WRI, 2016). As of January 26th 2016, 160 INDCs have been submitted, inter alia by Chile, Mexico and South Africa (UNFCCC (United Nations Framework Convention on Climate Change), 2016).

2.2 Carbon Pricing

The use of carbon pricing instruments as a means to reduce emissions is spreading worldwide. By 2015, almost 40 countries and more than 20 subnational jurisdictions had put a price on carbon (Carbon Pricing Leadership Website, 2015). While all carbon pricing instruments charge those who emit GHGs into the atmosphere, there are different carbon pricing instruments which a country can choose from in order to best suit its national circumstances. Direct carbon pricing, through carbon taxes or emissions trading systems (ETSs), is commonly assumed to be the most cost-effective instrument in comparison to indirect carbon pricing such as through regulatory policies (Haug, Frerk, & Santikarn, 2015). With the establishment of an ETS or a carbon tax, emitters can choose how to reduce their GHG emissions in the most cost-effective way. Since each tonne of GHG emitted represents a financial burden for the emitter, emission reductions are becoming an asset, triggering investments in low-carbon technologies and fostering technological and social innovation.

These effects can be further intensified by linking carbon pricing systems across national borders. Through linking, the risk of carbon leakage is reduced, while the number of GHG abatement options increases. Thus, linking carbon pricing systems can – at least in a short-term, static perspective – contribute to increased global cost efficiency in achieving GHG reductions and help implement existing mitigation targets. At best, linked carbon markets may also enable the adoption of more ambitious mitigation targets in the future.

[2] In the following we use the term INDC when referring to the contributions Parties to the UNFCCC have submitted in advance of the Paris conference, while the term NDC relates to the contributions the Parties to the Paris Agreement are to communicate to the UNFCCC every five years.

ETSs and carbon tax systems can either be linked directly (bilateral or multilateral link) or indirectly using international market mechanisms (multilateral link). With Art. 6 of the Paris Agreement, an international framework for both types of links has been established, allowing Parties to the Agreement to transfer GHG mitigation outcomes and use these transfers for achieving their climate change mitigation contributions. These regulations, which still have to be worked out in detail, constitute the basis for any future interactions among domestic carbon pricing systems from 2020 onwards.

2.3 Linking Carbon Pricing with Offsets

The linking of carbon taxation approaches with offsetting mechanisms is rather new, compared to the linking of other carbon pricing instruments. Countries considering offsetting as additional complementary instrument to their carbon tax can therefore build on only limited experiences worldwide. Since in general such innovative new approaches bear the risk that the initial objectives are not completely met during the implementing phase, it is important to have a good understanding about the correlation between design changes and their effects in practice. In order to lay out the foundations for the consideration in this research work, we recap in the following the fundamental differences between the link of offsets to an ETS and a carbon tax and highlight the main benefits of the additional offset component in each system.

The main difference between an ETS and a carbon tax is that variables and constants are reversed. In an ETS the mitigation goal is predefined through the overall cap that is set for the emissions covered by the scheme while the price for allowances in the scheme is variable according to demand and supply in the market. Stringent caps are more likely to lead to high allowance prices and vice versa. In a carbon tax system, the fixed value is the tax rate which is set by the regulator. The mitigation goal of the tax system can be defined during the design phase but it is uncertain to what extent this goal will be met. The emissions mitigation that is achieved by a carbon tax depends on the incentive set by the level of the tax rate to invest in mitigation opportunities in order to avoid the payment of the tax. If the tax level is too low, the tax payers will pay the tax but will shy away from the identification of mitigation opportunities and their subsequent implementation. The latter might require new knowledge and can involve risks that are additional and outside the core business of the taxable entity. On the other hand, relatively high tax rates could also lead to overachievement of the initial mitigation goal while overachievement in an ETS is excluded according to economic theory. Most business entities driven by investment certainty prefer carbon taxes due to the fixed carbon price. Regulators driven by mitigation certainty, however, tend to prefer an ETS.

Against this background, adding an offset component to either an ETS or a carbon taxation system can have different effects. Offsets allowed in an ETS – as long as they are real, permanent and additional – should in theory not increase or decrease the overall mitigation outcome. They might increase the cap which is globally compensated by emissions reductions outside the boundaries of the ETS. However, the effect of offsets on emissions in a carbon taxation system depends very much on the level of the carbon tax. Regarding the overall impact on emissions, taxation systems with low tax rates and consequently low direct mitigation outcomes benefit from the indirect mitigation achieved in sectors outside the carbon tax incentivised through the offset component. Funds spend for the purchase of offsets are invested in emission reduction activities while funds transferred to the government based on the tax bill will only be invested in mitigation actions if the government decides to do so. When tax rates are increased the incentives for taxable entities to identify and use own mitigation opportunities instead of just manage the financial aspect of the tax rise. On the other hand, increased tax rates are also required to incentivise the offset generation with project types that have medium or higher costs per tonne of CO_2 (see chapter 4.2).

Besides these differences, the linking of trading or taxation systems with an offset component has various advantages in common. These advantages include that the offsetting component will open up additional cost-effective potentials, create more flexibility and potentially have co-benefits. The offsetting component widens the range of mitigation options to sectors and industries not covered by the carbon pricing instrument and thus provides companies with more options to react to the price signal introduced by a carbon pricing instru-

ment. Politically, this can also allow for more ambitious domestic targets or higher tax rates. However, a national offsetting component is only possible for cases where domestic carbon pricing instruments are not applied to the overall economy (existence of non-carbon pricing sectors).

2.4 Economic Feasibility of Offset Project Types

The actual use of the offset component by the taxable entities strongly correlates to the incentive set by the level of the carbon tax, as explained in the previous section. Using offsets for complying with a carbon tax is only attractive for tax payers if this option results in costs that are lower than the actual tax rate. In this context, it is of interest to compare the costs for the generation of offsets with the tax level in the countries analysed. This comparison can give a first indication for whether the (envisaged) carbon taxes (potentially) include incentives for taxable entities to use offsets. Furthermore, it demonstrates whether the potential offset component of the carbon taxes leads to renewed economic feasibility for offset projects given that this is currently not ensured based on global price levels.

In general, countries may choose to allow the use of offsets from both Clean Development Mechanism (CDM) and non-CDM projects for complying with a carbon tax. Nevertheless, the following overview of the economic feasibility of offset project types is based on information regarding CDM projects, as data availability for non-CDM projects is limited and the CDM may also serve as a good indicator for relative costs of non-CDM project types. Since data collection for CDM projects is extremely difficult, only very few sources exist in this regard. A rough indication of the costs for new projects is provided in Table 4. The underlying study is based on literature as well as interviews with major project developers. Costs presented in the table reflect net costs taking into account benefits received from additional revenue streams. The cost ranges seem to be rather low compared to other sources and might only serve as an indication for the order in which project types reach their economic feasibility.

Table 4: Total Costs of New CDM Projects and Corresponding CER Price Band

Project Type	Total Costs (€/tCO_2)	CER Price Band (€)
N_20 adipic acid	Around 0.2	**Around 0**
N_20 nitric acid	Around 0.3	
Coal mine methane (CMM)	0.2 – 0.3	
EE own generation	0.3 – 0.4	
Biomass energy	0.5 – 4.7	**0 – 5**
EE households	0.6 – 5.2	
Hydro large-scale	0.3 – 4.3	
Hydro small-scale	0.5 – 4.8	
Landfill gas	0.3 – 4.3	
Methane avoidance	0.5 – 4.9	
Wind large-scale	4.2 – 8.3	**5 – 10**
Wind small-scale	4.8 – 9.4	
Solar	Above 8.1	**> 10**
Fossil fuel switch	Estimates vary	Estimates vary

Source: Own compilation with data from Warnecke, Klein, Perroy, & Tippmann, 2013.

Price ranges resulting from Warnecke, Day & Klein (2015) are used for the comparison presented in Figure 3 (Warnecke, Day, & Klein, 2015). The data from this second source is based on a comprehensive survey of more than 1,300 CDM projects conducted in 2014. Information was mainly gathered from project owners in

contrast to project developers in the previous source. This data is considered to be more reliable since it was collected more recently from a broader base of origin and since project owners are considered to be closer to the real situation of projects. Since this source was studying the required price level for the continuation of existing projects, it can also be assumed that the actual costs required to incentivise the start of new project developments are higher than shown in this overview. Additionally, for the interpretation of Figure 3, it needs to be considered that the price ranges are calculated based on global averages. The situation related to the countries analysed in this study seems to vary slightly for some project types. These country specific deviations are not included in Figure 3 since country specific data is only available for some project types and often does not include a sample large enough to allow for graphical representations with acceptable error margins. Therefore, deviations are mentioned in the text and should be treated as indications.

The most recent information about the (envisaged) tax rates of the carbon taxes in Chile and South Africa are included in Figure 3. Mexico's carbon tax was not included in this figure because of the particularities of its offsetting provisions: Instead of allowing for offsetting the CO_2 emissions taxed, tax payers are given the option to pay part of their tax bill with CERs from Mexican CDM projects, with the value of CERs being determined on the basis of global CER prices at the moment of paying the tax (see chapter 3.2 for details). Therefore, the relation between the tax rate and the costs of individual mitigation projects is not relevant in the case of Mexico, but only CER prices.

Figure 3 shows that, from the global perspective on CDM projects, there are project types that would clearly benefit from the new demand potentially created by an offsetting component of the (proposed) carbon taxes in South Africa as well as in Chile. Thus, many projects from all of the project types displayed in Figure 3 would be economically feasible in South Africa, in particular N_20 abatement, wind, solar and HFCs projects, but also most of all hydro (<20 MW), energy efficiency (EE) own generation, EE industry, EE households, methane avoidance and fossil fuel switch projects. Furthermore, about half of all landfill gas and biomass energy projects and some of the low-cost coal bed/mine methane and cement projects could be economically feasible in South Africa.

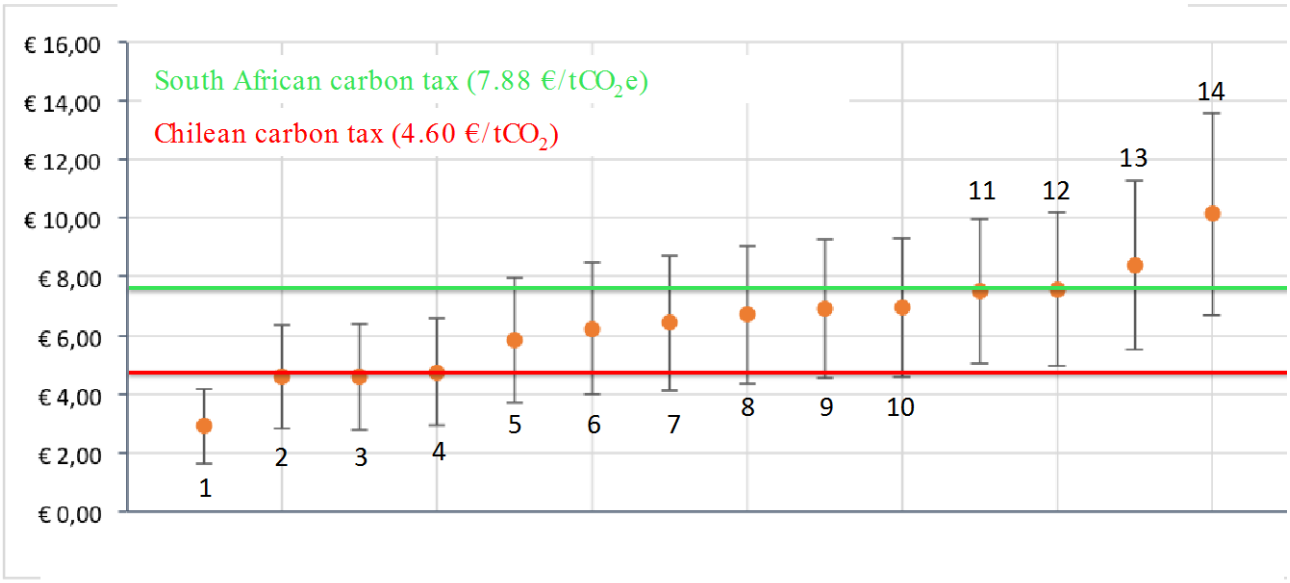
Country specific data for South Africa not included in Figure 3 shows, that compared to the global average, price ranges are lower in South Africa for energy efficiency households projects putting all of the projects of this project type into the range of economically feasible projects. However, price ranges for small hydro and EE own generation, on the other hand, are higher in South Africa than the global average, with the price required for about half of all small hydro projects below but for all EE own generation projects above the envisaged tax rate of South Africa's carbon tax. For South Africa, the study's data shows that about 50% of the projects are expected to be able to continue with CER prices below 5 € per tCO_2. This figure rises to 81% with CER prices below 10 € per tCO_2 and to 84% with CER prices below 20 €.

As the tax rate in Chile is considerably lower than the one planned in South Africa, only N_2O abatement projects as well as about half of all wind, solar and HFC projects would also be feasible in Chile, from a global perspective on CDM projects. Of the hydro (<20 MW), EE own generation, EE industry and EE households projects, only some at the lower end of the price range could be economically feasible in Chile while the lowest end of the price ranges for methane avoidance and fossil fuel switch projects are just below the tax rate of the carbon tax in Chile. Therefore, from the global perspective, there would be hardly any projects in methane avoidance and fossil fuel switch and none of the other project types with higher price ranges that could be economically feasible in Chile, should Chile decide to allow for the use of offsets in the future.

However, some country specific data not shown in this figure indicates lower price requirements compared to the global average for N_2O, solar and methane avoidance projects in Chile. This brings not only N_20, but also all solar and nearly half of all methane avoidance projects into the economic feasibility range in Chile. The average prices required for wind, small hydro, landfill gas and biomass energy projects in Chile seem to be higher than global average, however, leading to a loss of economic viability of all of these project types in Chile. Data from the study shows that in total, about 39% of all CDM projects in Chile are expected to be

able to continue with CER prices below 5 € per tCO_2 and are therefore close to the range of the envisaged carbon tax level.

Figure 3: Costs Ranges for the Continuation of Existing CDM Projects by Project Type[3]



1 = N_2O
2 = Wind
3 = Solar
4 = HFCs
5 = Hydro <20MW
6 = EE own generation
7 = EE industry
8 = EE households
9 = Methane avoidance
10 = Fossil fuel switch
11 = Landfill gas
12 = Biomass energy
13 = Coal bed/mine methane
14 = Cement

Source: Own illustration with data from Warnecke, Day & Klein, 2015.

[3] Amounts in Euro are calculated on the basis of the exchange rate of 2 November 2015 for South Africa (date of release of current proposal "Draft Carbon Tax Bill") and on the basis of the exchange rate from 01.01.2016 for Chile.

3 The Current Status of the Introduction of a Carbon Tax

After setting the scene with background information in chapter 2, chapter 3 analyses the current status of introducing a carbon tax in Chile, Mexico and South Africa. Each country section

- sheds light on the general context in which the carbon taxes are being introduced,
- describes the main characteristics of the (proposed) carbon taxes
- including options for offsets, if available, and
- examines the political process and stakeholder positions regarding the introduction of a carbon tax and the use of offsets.

3.1 Chile

General Context

Chile's Intended Nationally Determined Contribution (INDC) includes the unconditional goal to reduce carbon intensity per unit of GDP by 30% compared to levels of 2007, and by 35 to 45% with international support (Gobierno de Chile, 2015; Trading Economics / Banco Central de Chile, 2015). Chile's Climate Change Office (Oficina de Cambio Climático, OCC) in the Ministry of the Environment (Ministerio del Medio Ambiente, MMA) pushes the development of corresponding legislation. Thus, in September 2014, Chile was the first country in South America to pass legislation on a carbon tax (impuesto al carbono) as part of a broader tax reform (República de Chile, 2014).

Characteristics of the Tax on Fossil Fuels

While the tax enters into force on January 1st 2017, the first year of tax liability is 2018 with 2017 being limited to measuring of emissions. Starting in 2018, a carbon tax of 5 US$ (4.60 EUR)[4] has to be paid for every ton of CO_2 emitted in energy generation from installations that are composed of boilers or turbines and have an individual or combined thermal power equal to or above 50 MWt. Unconventional renewable energy generation is exempted from the carbon tax (República de Chile, 2014). This refers to biomass energy which can be used directly as a fuel or which can be converted into other liquid, solid or gaseous biofuels. Furthermore, it includes the biodegradable fraction of residential and non-residential solid waste (República de Chile, 2007). In total, about 55% of Chile's CO_2 emissions will be covered by the tax (Montero, 2014).

The carbon tax functions as a pilot scheme for the further development of market-based instruments in Chile. An interviewee stated that the level of the carbon tax in Chile was relatively low and generally designed that way to have an impact and be politically viable at the same time. While the tax was low, it provided the government with the opportunity to learn how to implement a carbon pricing system, including MRV, he stated. While there was no course of action in the current government to change the tax rate, the interviewee pointed to an evaluation of the carbon tax after the next elections after which further actions would be decided upon. These could involve raising the tax rate, moving to an ETS type of system or having something in between. The interviewee stressed that the last of these options would probably make a lot of sense for Chile as well as for a lot of other middle-income countries. However, he did not further specify what such a mixed approach could look like (División de Información y Economía Ambiental, Ministerio del Medio Ambiental, Chile, 2016).

[4] Amounts in Euro are calculated on the basis of the exchange rate from 01.01.2016 for Chile.

Political Process and Stakeholder Positions

The Chilean carbon tax was introduced as part of a comprehensive taxation reform passed by the National Congress of Chile with Law 20780 (Ley 20780) in September 2014. The law is expected to raise additional government income of 8 billion US$ per year (3% of GDP), of which 425 million US$ per year are expected to be generated by the carbon tax (Montero, 2014). The entire comprehensive taxation reform aims at tapping an extended, permanent source of income for funding educational reform, better health and other social programmes (Gobierno de Chile, n.d.). Two of the interviewees even stated that the main purpose of the carbon tax was to raise revenues (Juan-Pablo Montero, Profesor Titular, Instituto de Economía, Pontificia Universidad Católica de Chile, Chile, 2016; Oficina de Cambio Climático, Ministerio de Energía, Chile, 2015). However, interviewees pointed out that according to existing law, resources in Chile could not be earmarked and, therefore, the revenues of the carbon tax went directly to the general treasury (División de Información y Economía Ambiental, Ministerio del Medio Ambiental, Chile, 2016; Juan-Pablo Montero, Profesor Titular, Instituto de Economía, Pontificia Universidad Católica de Chile, Chile, 2016). Besides raising additional income, the Government of Chile pursues a number of goals with the introduction of the carbon tax.

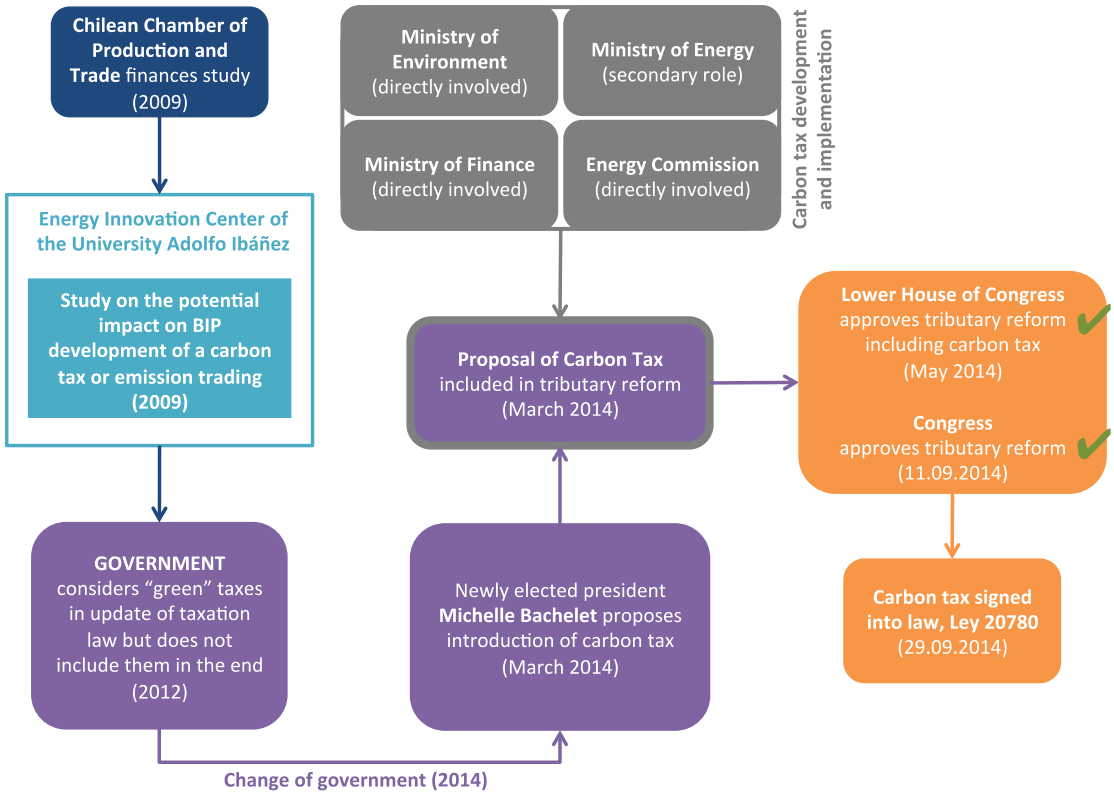
First of all, the tax is expected to curb the growth in Chile's energy-related CO_2 emissions. The Chilean economy is growing rapidly with a constant need for more energy. Electricity consumption in Chile is projected to increase by 6-7% per year between 2012 and 2030 (Gobierno de Chile, 2012). Carbon pricing is meant to support Chile in achieving its emissions mitigation goal of 20% until 2020 compared to a business-as-usual (BAU) scenario (Gobierno de Chile, 2011). Studies by the Pontifical Catholic University of Chile (Pontificia Universidad Católica de Chile - PUC) estimate the carbon tax to increasingly reduce more and more emissions over the years with emissions reductions of 3 million tCO_2 (equalling 6% of total emissions from electricity generation) in 2020 and 6 million tCO_2 (equalling 11% of total emissions from electricity generation) in 2030. Accumulated emissions reductions in the period 2017-2030 are expected to amount to 59 million tCO_2. According to the study, the emission reductions mainly result from the replacement of 3% of energy production from coal with wind and hydropower (Montero et al., n.d.; Pizarro, 2014).

Furthermore, the carbon tax is expected to help illustrating the polluter pays principle to the public and to acknowledge carbon emissions' health impact as well as its social cost and damage to the environment. While correcting existing perverse incentives, the carbon tax is to incentivise desired technology innovation and investment in abatement technologies. In doing so, it will provide flexibility for emitters to decide whether they just pay the carbon tax or reduce emissions and pay less taxes (Gobierno de Chile, 2014). Moreover, interviewees stress that the carbon tax had a lot of advantages for Chile compared to an ETS as it was much easier to implement and less complex. As middle-income country, Chile was familiar with taxes and was confident that it could develop the institutional structure required for a carbon tax in the next couple of years, the interviewee stated. Setting up the institutional structure for an ETS was perceived to be much harder. In general, an ETS was perceived to entail a lot of very specific problems that were really hard to solve but that could be solved with a carbon tax, as the interviewee explained. These were also the main reasons given for why the Chilean government switched from pursuing an ETS for many years to a carbon tax. It was stated that over-expectations with respect to the CDM and ETS had retained or delayed the introduction of a carbon pricing system in Chile (División de Información y Economía Ambiental, Ministerio del Medio Ambiental, Chile, 2016).

While carbon pricing and green taxes, including a carbon tax, have been topics in the political arena before, it had not been possible to reach consensus on their introduction before the change of government in 2014. While the previous administration was very keen on introducing an ETS and comprehensive reports on ETS in Chile were prepared, this did not materialize in the end. Difficulties regarding environmental law which includes an article requiring specific legislation in order to implement a cap-and-trade system were among the reasons why ETS has not come through yet, one of the interviewees pointed out. Such legislation had been in the Congress for many years pending approval (Juan-Pablo Montero, Profesor Titular, Instituto de Economía, Pontificia Universidad Católica de Chile, Chile, 2016). The plans for the carbon tax had been

there for years and with the change of government, they could be developed further and implemented quickly (Gobierno de Chile, Ministerio del Medio Ambiente, 2015). When newly elected President Michelle Bachelet proposed the carbon tax in March 2014, she did so with the carbon tax as part of a comprehensive taxation reform. In debates on the reform, the carbon tax did not stand out as a topic and the reform was approved by the Lower House of Congress in May 2014 and by the Chilean Congress in September the same year, after which it was signed into law (Reforma Tributaria, Ley 20.780) (República de Chile, 2014). While the Ministry of the Environment, the Ministry of Finance and the energy commission were directly involved in tax development and implementation, the Ministry of Energy played a secondary role because the carbon tax is affecting thermal energy generation in his sector of interest (Oficina de Cambio Climático, Ministerio de Energía, Chile, 2015). An overview of the political process relating to the introduction of the carbon tax in Chile including involved actors is presented in Figure 4 below.

Figure 4: Political Process Relating to the Introduction of Carbon Pricing in Chile Including Involved Actors



Source: Own Illustration.

In support of the carbon tax, Jimena Jara from the Subsecretary of Energy (Partido Por la Democracia (PPD), part of the coalition in government) as well as Juan-Pablo Montero (Department of Economics and Center for Global Change, Pontifical Catholic University of Chile (Pontificia Universidad Católica de Chile - PUC) emphasized issues closely linked to the goals put forward by the government such as the carbon tax incentivising investment in energy markets, contributing to economic growth, generating extra revenue and allowing Chile to fulfil its climate change mitigation goals (Gobierno de Chile, Ministerio del Medio Ambiente, 2015; Montero, 2014). Moreover, they stressed that the introduction of the carbon tax helped building the institutions required for more ambitious mitigation efforts over the next decade, inter alia, regarding monitoring and compliance. Furthermore, they pointed out that setting up a tax was not expensive and therefore easy to undo in case this would become an issue in the future (Montero, 2014). While the tax is perceived not to have had any major impact so far, it was stated in an interview that firms and companies started rethinking

investment strategies and expectations already (Gobierno de Chile, Ministerio del Medio Ambiente, 2015). Moreover, another interviewee pointed out that the carbon tax would not have a short-term effect as it was not indexed to marginal costs but that its effect would rather be medium and long-term by making other energy sources more competitive (Oficina de Cambio Climático, Ministerio de Energía, Chile, 2015).

Because the carbon tax was embedded in a larger tax reform and decisions were taken so quickly after the change of government, there was no real opposition from the economy or else, an interviewee stated. Neither was there hardly any involvement in the development and introduction of the carbon tax from civil society or business (División de Información y Economía Ambiental, Ministerio del Medio Ambiental, Chile, 2016; Juan-Pablo Montero, Profesor Titular, Instituto de Economía, Pontificia Universidad Católica de Chile, Chile, 2016; Oficina de Cambio Climático, Ministerio de Energía, Chile, 2015). Nevertheless, criticism on Chile's carbon tax arose on different issues. On the one hand, Montero points out advantages of a cap-and-trade system as compared to a carbon tax, stressing that linking of carbon markets was easier between two cap-and-trade systems compared to linking ETS with carbon taxes (Montero, 2014). To link ETS and carbon taxes, the design of both measures has to be harmonised and a price band has to be agreed on (Haug et al., 2015).

On the other hand, large electric utility companies Endesa (Empresa Nacional de Electricidad Sociedad Anónima), AES Gener, Colbún and E-CL criticise the exemption of specific industrial sectors from the carbon tax and complain about having to pay the lion's share of the carbon tax (Lopez, 2014). The carbon tax is expected to further increase the already relatively high electricity costs and prices in Chile (Berardesca, 2014; Susana Jiménez, 2014). Furthermore, Susana Jiménez from the think tank Liberty and Development (Libertad y Desarrollo, LyD) stresses that Chile was responsible for only 0.2% of global emissions of CO_2 and that therefore, the impact Chile's carbon tax could have globally was marginal at best while the economic costs for Chile regarding the competitiveness of its industry due to an increase in costs of production were considerable (Susana Jiménez, 2014). While up to date, opposition was perceived to be relatively low, one interviewee stated that criticism of the carbon tax was likely to increase in the first year of tax liabilities in 2018 (División de Información y Economía Ambiental, Ministerio del Medio Ambiental, Chile, 2016).

No Option for Offsets Envisaged So Far

Initially, the use of carbon offsets as a way of complying with the carbon tax is not allowed in Chile. However, currently, there are a couple of on-going studies regarding this issue. Furthermore, interviewees said that this may be an option for the future. However, one of the interviewees stated that this would only have to be decided after the evaluation of the carbon tax after the next elections (see above) and that all details would have to be worked out then (División de Información y Economía Ambiental, Ministerio del Medio Ambiental, Chile, 2016). While, according to one of the interviewees, there was opposition to allowing the use of offsets in parts of the government because with offsetting, revenue would be reduced (Juan-Pablo Montero, Profesor Titular, Instituto de Economía, Pontificia Universidad Católica de Chile, Chile, 2016), some private companies had lobbied for the inclusion of offsets, another interviewee said (Oficina de Cambio Climático, Ministerio de Energía, Chile, 2015). Furthermore, one of the interviewees stated that, together with the PMR, Chile aimed to look into the future, including regarding options to expand the carbon tax horizontally or vertically, i.e. at the sectoral and tax level (Oficina de Cambio Climático, Ministerio de Energía, Chile, 2015).

3.2 Mexico

General Context

Mexico can be considered an active proponent of climate action. As the first developing country, Mexico presented its Intended Nationally Determined Contribution (INDC) in March 2015, which, inter alia, contains a commitment to an unconditional reduction of GHGs by 22% below business-as-usual (BAU) for the year 2030 (Gobierno de Mexico, 2015). In reaching this target, Mexico can build upon a dedicated legislative framework, the General Law on Climate Change (Ley General de Cambio Climático - LGCC) adopted

in 2012, as well as on specific planning instruments, such as the Special Programme on Climate Change 2014-2018 (Programa Especial de Cambio Cambio Climático 2014-2018 – PECC). Strategy 5.3 of the PECC envisages the establishment of economic, financial and fiscal instruments to facilitate the implementation of national policies on climate change, with the introduction of a tax on fossil fuels being listed as the first specific measure to be taken (Diario Oficial de la Federación, 2014).

Characteristics of the Tax on Fossil Fuels

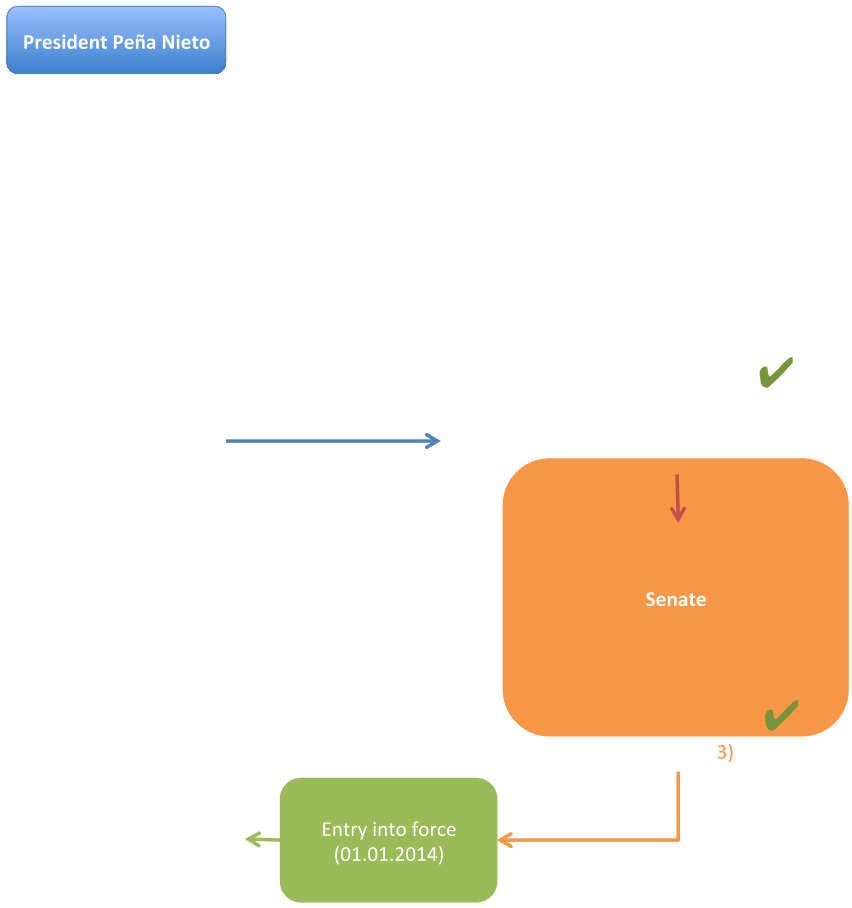
The tax on fossil fuels (impuesto a los combustibles fósiles) is imposed on the sale and import of fossil fuels. The tax entered into force in January 2014 and covers around 40% of Mexico's total GHG emissions (Spears et al., 2014). The reformed Law on the Special Tax on Production and Services (Ley del Impuesto Especial sobre Producción y Servicios – LIEPS), which establishes the tax, contains a list of nine fossil fuels. This list does, however, not specify natural gas, which is exempted from the tax. For each of the other fossil fuels, a tax rate is calculated based on the additional amount of CO_2 that would be generated if the respective fossil fuel were used instead of natural gas (CHCP, 2013). The tax rates are adjusted annually to the consumer price index. The tax rates in force since 1 January 2016 range between 6.29 MXN cents (0.0033 €[5]) per litre of propane and 38.93 MXN (2.05€) per ton of coal coke. For fossil fuels not listed the tax rate was set at 42.37 MXN (2.23 EUR) per tonne of carbon (SHCP, 2015).

Political Process and Stakeholder Positions

The tax was introduced as part of a larger fiscal reform initiated by President Peña Nieto. Peña Nieto outlined the tax's objectives in the draft decree presented to Congress in September 2013. Besides contributing to climate change mitigation and revenue generation, the tax is to provide co-benefits such as environmental protection, health benefits and increased competitiveness. Furthermore, it is to reaffirm Mexico's commitment to meet its internationally proclaimed emission target for the year 2020. The instrument of a carbon tax is considered superior to emissions trading because of its easy and broad applicability (Presidencia de la República, 2013). An overview of the political process relating to the introduction of the carbon tax in Mexico including involved actors is presented in Figure 5.

[5] Amounts in Euro are calculated on the basis of the exchange rate from 1 January 2016, date of entry into force of the adjusted rates.

Figure 5: Political Process Relating to the Introduction of Carbon Pricing in Mexico Including Involved Actors



Source: Own Illustration.

The unveiling of the plan to introduce a tax on fossil fuels provoked heavy criticism from business and industry (Interview with SEMARNAT, 2016a). In particular, the iron and mining industrial groups opposed the introduction of the tax, stating, inter alia, that it would put at risk a large number of jobs and reduce national competitiveness. While these concerns were shared by some scientists, other scientific institutions, together with non-governmental organisations (NGOs), supported the introduction of the tax. However, the proposed tax was significantly modified during its discussions in Congress: The originally proposed average quota of 5,41 € per tCO_2e was adjusted downwards to an average level of 2,20 € per tCO_2e, an upper limit to the quotas at 3% of the price for each fuel was established and the possibility to use Certified Emission Reductions (CERs) from CDM projects based in Mexico was introduced. With this modification contained in the verdict of the Commission of Finance and Public Credit (CHCP), the tax passed the Chamber of Deputies and the Senate and entered into force in January 2014.

Offsetting: Using CERs to Pay the Tax on Fossil Fuels

With the adoption of the tax on fossil fuels, the option to use credits from climate change mitigation projects was introduced. Eligibility is restricted to CERs from CDM projects approved by the UNFCCC and hosted in Mexico. Relevant procedures are still to be elaborated by the Secretariat of Finance and Public Credit (Secretaría de Hacienda y Credito Publico - SHCP). Notably, however, it will not be possible to use CERs directly to reduce the overall volume of taxed tCO_2. Instead, the taxpayer can pay part of the tax amount using CERs. The value of the CERs will be defined by SHCP, with the exact price formula to be elaborated by the Ministry.

The fact that the secondary regulation for the use of CERs has not yet been published two years after entry into force of the carbon tax may be an indication for the difficulties associated with this approach. According to one of our interviewees, the delay was due to the fact that the Ministry was reluctant to issue the secondary regulation since it would lead to an additional reduction of its revenues. With oil prices having fallen drastically, revenues have already been reduced significantly (MEXICO2, 2016).

Another interviewee, however, stated that the delay was caused by the lack of interest from the tax payers to make use of the offsetting option. This significantly limited pressure to issue the respective regulation (Interview with WWF Mexico, 2016). On the one hand, the lack of awareness regarding the tax on fossil fuels could be among the reasons for this lack of interest. On the other hand, this may also be caused by the design of the offsetting component. According to the law, the value of the CERs is to correspond to the market value at the moment of paying the tax (Congreso de los Estados Unidos Mexicanos, 2013, Art. 5). Hence, tax payers can submit CERs and have their tax bill reduced accordingly. However, as tax payers will continue to have the possibility to sell CERs at international market prices, there is no additional incentive to use them for paying the tax instead. Furthermore, as has been highlighted by one interviewee (Interview with WWF Mexico, 2016), tax payers who are willing to use this option but have no certificates would have to acquire them. With the value of CERs being set at market price levels, those taxpayers will not even be able to cover the additional transaction costs accruing from this acquisition.

It remains to be seen whether and how SHCP will take into account these circumstances when elaborating the procedures for using CERs as a way of paying the carbon tax.

3.3 South Africa

General Context

In the run-up to the 21st Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris, South Africa committed itself in its Intended Nationally Determined Contribution (INDC) to a peak, plateau and decline (PPD) of its national GHG emissions trajectory range. 2020 year-end is set as the starting point for PPD with peak emissions between 2020 and 2025, plateau for approximately a decade and decline in absolute terms thereafter. Premised on the adoption of a comprehensive, ambitious, fair, effective and binding multilateral rules-based agreement under the UNFCCC, emissions are to range between 398 and 614 Mt CO_2e by 2025 and 2030. To fulfil its mitigation commitments, South Africa is currently developing policy instruments such as company-level carbon budgets, desired emission reduction outcomes (DEROs) for sectors, and a carbon tax as well as regulatory standards and controls for specifically identified GHG pollutants and emitters (Government of South Africa, 2015). South Africa has decided to pursue a carbon tax instead of an ETS given the limited number of emitters that would fall under an ETS. Moreover, the tax can build on existing taxation infrastructure (Cecil Morden, Chief Director, Economic Tax Analysis, National Treasury, South Africa, 2016; World Bank, 2015b).

Characteristics of the Carbon Tax

On 2 November 2015, a new Draft Carbon Tax Bill was released for public comments. According to this latest proposal, sectors covered by the carbon tax will be divided into a total of 88 sub-sectors under the following headings:

1. Fuel combustion in energy industries, transport, other sectors[6] and other non-specified sources
2. Fugitive emissions from fuels in solid fuels, oil, and other fugitive emissions from energy production

[6] This category is divided into the sub-categories “commercial; institutional”, “residential” and “agriculture; forestry; fishing/fish farms”.

3. Industrial processes and product: mineral industry, chemical industry, metal industry
4. Agriculture, forestry and land use: livestock
5. Others[7] (Republic of South Africa, 2015).

However, not all sub-categories included in these categories are envisaged to pay the (full) carbon tax in the first phase (see below). The carbon tax is to cover emissions from all of the most important greenhouse gases: CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (Repulic of South Africa, 2015).

The latest proposal for the carbon tax envisages the tax to enter into force on 1 January 2017. In the first phase of the tax up until 2020, the tax rate is envisaged to amount to 120 R (7.88 EUR[8]) per tCO_2e. However, the government has planned a number of options to reduce the tax liability. Thus, the current draft includes a 60% basic tax-free allowance[9] for every sector covered, which reduces the effective carbon tax to 48 R (3.15 EUR) per t CO_2e. With a basic tax-free allowance of 100%, no tax liabilities are envisaged for the residential sector and livestock in the first phase. Additionally, the current plans include further free allowances for fugitive emissions, trade exposure, carbon budget and offsets as well as for a Z-factor. While the Z-factor accounts for GHG emissions intensity benchmark set for some (sub-) sectors, the carbon budget refers to an instrument setting a cap on emissions for selected companies and entities, see section below. In total, maximum free allowances amount to between 75 and 95% for the different sectors, setting the minimum of the effective carbon tax rate at 6R (0.39 EUR) per t CO_2e (Repulic of South Africa, 2015). According to the National Treasury, the percentage for tax-free thresholds might be lowered starting 2020 and/or may be converted to absolute emission thresholds for the second phase (National Treasury, 2015).

The current proposal envisages that during the first five years, the carbon tax will be revenue-neutral. Thus, revenues will be recycled by reducing the current electricity levy, the credit rebate for the renewable energy premium, a tax incentive for energy efficiency savings, increased allocations for free basic electricity/alternative energy, funding for public transport and initiatives to move freight from road to rail (Republic of South Africa, 2015).

Offsetting and Eligibility criteria

In 2014, National Treasury published a document called the "Carbon Offsets Paper". So far, this paper is the only official government document regarding the potential use of offsets for the carbon tax, as an interviewee from the National Treasury stressed (Cecil Morden, Chief Director, Economic Tax Analysis, National Treasury, South Africa, 2016). The Carbon Offsets Paper includes the proposal to allow for the use of offsets to cover up to 10% of total emissions affected by the carbon tax. The paper had been introduced after stakeholder consultations as a mechanism to further reduce tax liability and to provide more flexibility, one interviewee said (Cecil Morden, Chief Director, Economic Tax Analysis, National Treasury, South Africa, 2016). The latest proposal on the carbon tax, the Draft Carbon Tax Bill, takes up this option and envisages allowing for the use of offsets for 5 or 10% of the carbon tax depending on the sector. The current proposal envisages that only domestic projects that generate offsets outside the scope of activities subject to the carbon tax may be eligible. However, carbon offset projects registered or implemented before carbon tax implementation are to be accepted depending on certain conditions and within a specific timeframe that are still to be determined in the legislative process (Morden, 2015).

[7] This category covers any entity that perceives that it does not fall under any of the other categories.

[8] Amounts in Euro are calculated on the basis of the exchange rate of 2 November 2015 (date of release of current proposal "Draft Carbon Tax Bill").

[9] The term „allowance" in the context of South Africa's carbon tax is used to refer to a percentage of GHG emissions by which the total amount of emissions an entity has to pay the carbon tax for is reduced.

Furthermore, projects that already receive benefits from other government incentives, such as projects that benefit from the Energy Efficiency Tax Incentive, are to be put on the ineligible projects list (National Treasury, 2014). The Clean Development Mechanism (CDM), Verified Carbon Standard (VCS), the Gold Standard (GS) and the Climate, Community and Biodiversity (CCB) Standards are currently being discussed for use in the carbon offset scheme (National Treasury, 2014). Further aspects concerning the use of offsets in the South African carbon tax are likely to be clarified in the new proposal on carbon offsets announced by the National Treasury. As of end of May 2016, an update of the proposal has not been published yet.

Political Process and Stakeholder Positions

In South Africa, the main proponents of the carbon tax were National Treasury and the Department of Environmental Affairs (DEA) (Cecil Morden, Chief Director, Economic Tax Analysis, National Treasury, South Africa, 2016). In 2010, the South African National Treasury released the "Carbon Tax Discussion Paper" which includes three options for a carbon tax (National Treasury, 2010). National Treasury received a lot of comments from businesses, NGOs and academics regarding this paper (Cecil Morden, Chief Director, Economic Tax Analysis, National Treasury, South Africa, 2016). Among other issues, design features in the paper were criticised for being expressed so broadly that it was very difficult to determine what the potential impact of the carbon tax might be, as one of the interviewees pointed out (Environmental Economics, Climate Change & Sustainable Development Department, Group Sustainability, Eskom, South Africa, 2016). The year after, the National Treasury presented the "National Climate-Change Response Policy-White Paper" (NCCR-WP) as an intermediate step, which envisaged the development of a carbon tax policy. Comments received in response to the Carbon Tax Discussion Paper were considered in the development of the "Updated Carbon Tax Policy Paper" of 2013 (Cecil Morden, Chief Director, Economic Tax Analysis, National Treasury, South Africa, 2016). This paper envisaged to use a fossil fuel input tax. DEA has been working out the appropriate taxation rates for coal, crude oil and gasoline based on their carbon content (National Treasury, 2013b).

The National Treasury started another stakeholder consultation process regarding this paper in August 2013 (Partnership for Market Readiness (PMR), 2015). The comments received informed about the changes of the initial carbon tax proposal. The big issue was that the carbon tax should not be rushed, an interviewee said. Therefore, in the end, it was agreed to have a very low effective rate at the beginning through a couple of concessions, in particular tax free allowances. This softened existing resistance to the carbon tax, as the interviewee pointed out (Cecil Morden, Chief Director, Economic Tax Analysis, National Treasury, South Africa, 2016).

Based on the comments received, the "Carbon Offsets Paper" was published in April 2014. The paper makes proposals for definitions, principles, methodologies, standards, eligibilities as well as for MRV (National Treasury, 2014). In December 2014, the National Treasury's stakeholder consultation process ended, highlighting a number of issues that influenced the further design of the tax, e.g. ensuring technical and administrative aspects of the system, the ideal price, the requirements for a smooth transition to reduce impacts on industrial competitiveness as well as on consumers, revenue recycling requirements, and alignment of the tax with other policies such as Desired Emission Reduction Outcomes (DEROs) (Partnership for Market Readiness (PMR), 2015, p. 35). DEROs are intended limits on future emission for the long-, medium- and short-term. Those limits are to ensure that national emissions remain within the performance benchmark of the National GHG Emissions Trajectory Range specified in the National Climate Change Response-White Paper of 2010. The government suggests a possibility to translate DEROs into carbon budgets for selected companies as well as entities (Partnership for Market Readiness (PMR), 2015, p. 13).

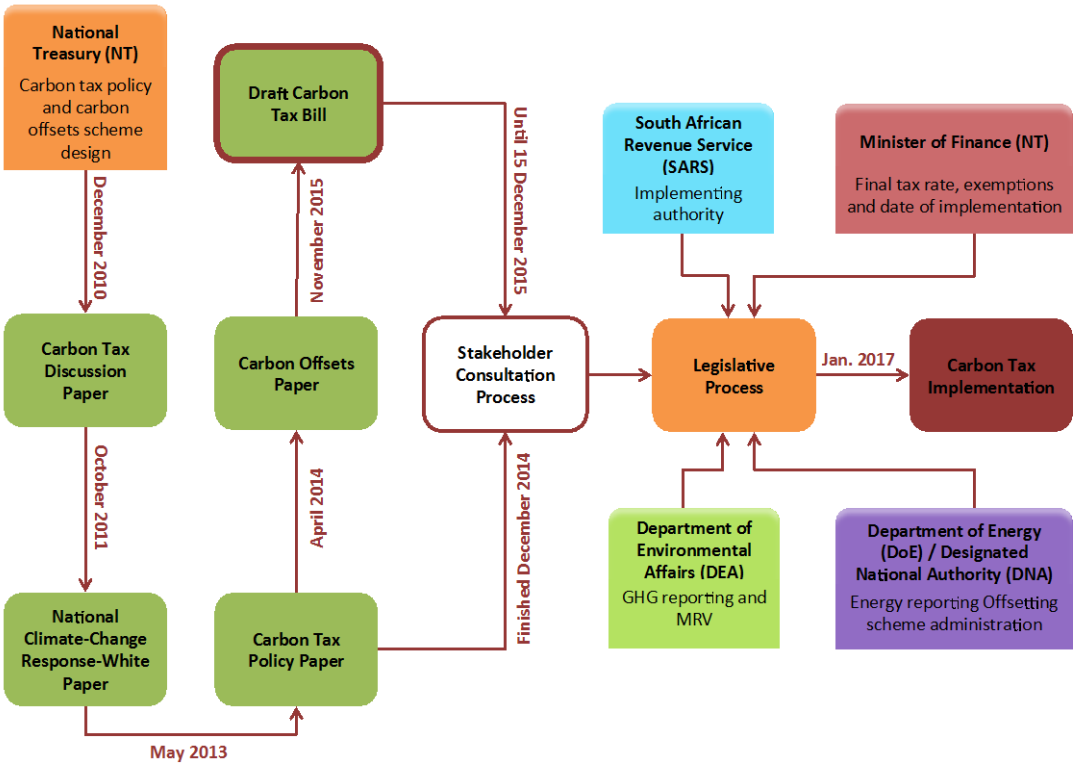
On 2 November 2015, South Africa's National Treasury published a new "Draft Carbon Tax Bill" which takes into account comments on the former Carbon Tax Policy Paper (2013) received from stakeholders and provides the current tax design as well as technical details and calculations. Nearly 100 public comments on,

inter alia, environmental and socio-economic impacts of the carbon tax as well as the design and legal wording of the proposed Bill have been submitted for this Bill. These comments will be used to revise the Draft Carbon Tax Bill.

After consideration of the outcome of the stakeholder consultation process, the legislative process is expected to start in order to create the basis for tax implementation in 2017. A revised Bill incorporating comments received is expected to be submitted to Cabinet for approval for tabling in Parliament. However, according to National Treasury, the final tax rate, exemptions, and the actual date of implementation will be determined by the Minister of Finance through the annual Budget process (National Treasury 2015: 1). Against all expectations, the Minister's budget speech, which took place on 24 February 2016, failed to deliver more details on related decisions (Andrew Gilder, Mansoor Parker, & Olivia Rumble, 2016; Szabo, 2016).

An overview of the political process relating to the introduction of the carbon tax in South Africa including involved actors is presented in Figure 6. Events after the stakeholder consultation process at the end of 2015 are depicted according to current plans and may still be modified.

Figure 6: Political Process Relating to the Introduction of Carbon Pricing in South Africa Including Involved Actors



Source: Own Illustration.

The introduction of the carbon tax has been delayed several times because design, technical analysis and stakeholder consultation process are taking longer than expected. Thus, one interviewee stated that the Department of Environmental Affairs (DEA) had some issues working on the MRV system for the carbon tax but got support from the PMR to solve these issues. At the time of the interview, on 22 January 2016, the DEA were still working on the MRV system. When asked, the interviewee from National Treasury pointed out that it was difficult to say whether the tax would be postponed again as the introduction of a carbon tax was always a political issue. While officials had done a lot of background work, policy work and extensive consultation, in the end, it was up to the legislator to pass the bill, he said. The interviewee stressed, however, that South Africa was not at that point yet and that there was going to be a political process to decide

whether the tax would proceed or not this year (2016) (Cecil Morden, Chief Director, Economic Tax Analysis, National Treasury, South Africa, 2016).

Another interviewee from the World Institute for Development Economics Research of the United Nations University (UNU-WIDER), referring to an earlier proposal, stated that National Treasury's proposal had become "widely complex" and "difficult to understand" (Senior Research Fellow, World Institute for Development Economics Research, United Nations University (UNU-WIDER), 2016) to the point that he even thought it was too complicated to be implemented. Further reasons provided by the interviewee for the slow progress of the carbon tax were, on the one hand, strong opposition from industry against having a carbon tax. On the other hand, he argued that due to South Africa's economic crisis – which was now in its eighth year – talking about "anything that smells like a burden for the economy" was "political suicide" (Senior Research Fellow, World Institute for Development Economics Research, United Nations University (UNU-WIDER), 2016). Furthermore, he pointed to plans inside the government and industry to reduce emissions by switching to nuclear power instead of by introducing other policies and measures. As there are blackouts in South Africa and cheap coal mines are getting to an end, he argued, South Africa had to restructure the power sector anyway. The only question remaining was how this would be done. The interviewee expected decisions to be taken once the economy started to grow again (Senior Research Fellow, World Institute for Development Economics Research, United Nations University (UNU-WIDER), 2016).

Another interviewee from Eskom, the largest energy generation, transmission and distribution company in South Africa, stated that the introduction of the carbon tax was further complicated by a lack of coordination between National Treasury's plans regarding the carbon tax and the Department of Environmental Affairs' plans for a carbon budget for selected companies and entities, which came out the same year. This issue was not entirely resolved up to today although studies are ongoing to address it. Furthermore, industry would have preferred other ways of integrating the two mechanisms than the ones included in the current proposal of the carbon tax via free allowances for entities affected by the carbon budget (see section above) (Environmental Economics, Climate Change & Sustainable Development Department, Group Sustainability, Eskom, South Africa, 2016).

The National Treasury states a number of goals to be achieved with the introduction of carbon pricing in South Africa that go beyond the reduction of GHGs. The essential objective of tax implementation is to change future behaviour and long-term emissions rather than to raise revenue, one interviewee pointed out (Cecil Morden, Chief Director, Economic Tax Analysis, National Treasury, South Africa, 2016). Therefore, on the one hand, the carbon tax is to enable the transition towards a low-carbon economy by minimising future needs for economic retrofitting and ensuring that the right price signals are in place for investors and consumers. Additionally, the carbon tax is to protect national producers and consumers from higher costs over the long term in the possible event of, e.g., border carbon adjustments (BCAs). On the other hand, the carbon tax is to support revenue recycling and sustainability. Tax revenue will be recycled into measures that aim to incentivise the uptake of renewable energy and enhancement of energy efficiency in the economy and thereby also improve the economic competitiveness of the domestic economy (National Treasury, 2013a).

While the government as well as NGOs support the implementation of the South African carbon tax and the objectives mentioned above, the national business and industry sectors express harsh criticism. Business associations such as the South African Chamber of Commerce and Industry (SACCI) state that the carbon tax would cause job losses in heavy industry (Rau, 2014). National industries such as SASOL are also convinced that the tax will worsen the already negative impact of the sharp rise in electricity costs (SASOL (former Suid-Afrikaanse Steenkool-, Olie- en Gasmaatskappy), 2015). Furthermore, Eskom argued that the models the Department of Energy use for future electricity supply already included an emissions' cap and that therefore, as a result of these long-term plans, there was already some kind of a carbon price in the energy sector (Environmental Economics, Climate Change & Sustainable Development Department, Group Sustainability, Eskom, South Africa, 2016). After the great recession of 2008/2009, the economy has not recovered yet. Thus, businesses also put forward a lot of socio-economic factors as reasons why the carbon tax should not

be introduced, one interviewee stated. However, he pointed out that there were also a few businesses that supported the carbon tax because it provided opportunities to modernize the economy (Cecil Morden, Chief Director, Economic Tax Analysis, National Treasury, South Africa, 2016).

4 Interactions of National Offsets with Other Policy Areas

After the analyses of the current situation regarding carbon taxes and the use of offsets in Chile, Mexico and South Africa conducted in chapter 3, this chapter examines interactions of national offset policies with other policy areas. While the first sub-chapter sheds light on aspects regarding the realisation of co-benefits and the prevention of co-costs by use of offsets, the impacts of the use of offsets on long-term emissions mitigation trajectories are outlined in the second sub-chapter. The subsequent chapter provides an analysis of procedural and institutional provisions to allow for the transfer of mitigation outcomes. Finally, support for carbon tax development by international climate finance is examined.

4.1 Use of Offsets and Related Co-Benefits and Co-Costs

Carbon pricing instruments, such as carbon taxes, can be complemented by an offsetting option. First and foremost, offsetting is to reduce the mitigation costs for those entities covered by the tax. If designed properly, however, the offsetting activities can have additional positive environmental, social and economic effects, so-called co-benefits. By establishing specific provisions for offset use from activities outside the sectors covered by the carbon tax, governments can make use of these synergies with climate change mitigation. At the same time, governments will also have to ensure that adverse impacts, so-called co-costs, are avoided, reduced or compensated for by requiring offsetting activities to be properly designed and implemented.

Governments in all three countries have highlighted benefits that go beyond the mere climate change mitigation impact of the policy instrument. As will be shown, some of these arguments were made with regard to the introduction of an offsetting option. Against this backdrop, this section explores how carbon taxes can be complemented by an offsetting option which supports governments in achieving co-benefits as well as in avoiding co-costs. For this purpose, a procedure was developed that can guide the development of a national co-benefits strategy for offsetting in the context of the carbon tax. This procedure can be perceived as a cyclic process consisting of four interrelated steps that are depicted in Figure 7.

Figure 7: National Co-Benefits Strategy Process

Source: Own Illustration.

The four steps are as follows:

1. **Identification of typical co-benefits and co-costs:** The starting point of the process is the identification of typical co-benefits and co-costs associated to a specific mitigation activity.
2. **Prioritisation of co-benefits:** The prioritisation of co-benefits is the stage at which a government defines the social, environmental and economic goals it strives to achieve by allowing the use of offsets in carbon tax systems. The definition of desired co-benefits can assist the identification of the mitigation activities to be prioritised in the context of offsetting.
3. **Tools and International Standards:** The achievement of specific co-benefits can be supported making use of tools and provisions. In this step, an overview of the tools that are to support the achievement of co-benefits and avoidance of co-cost will be provided. Furthermore, different international standards using some of these tools will be presented briefly.
4. **National Situation:** After having identified the tools that are to support the achievement of co-benefits, a choice on institutional design is to be made: should the tools be introduced at the national level or by building on international standards? In order to answer this question, the national situation in the three key countries will be analysed: guiding questions relate to the experience made with international standards and the relationship between these standards and national regulations. This allows the development of the national co-benefit strategy by, inter alia, deciding which national and/or international standards will be used and what additional provisions and institutions must be developed at the national level.

In the following, initial information on all of these steps will be provided: first, a categorization of project types and their typical co-benefits and co-costs is presented. In a second step we look at the co-benefits which the countries studied here are striving to achieve in the context of introducing the carbon tax and the offsetting option. In the next step, provisions and tools that support countries in achieving co-benefits and avoiding co-costs will be considered. Subsequently, international standards and national circumstances will be briefly looked at to arrive at general recommendations.

4.1.1 Categorisation of Mitigation Activities and Typically Associated Co-Benefits and Co-Costs

For the identification of typical co-benefits and co-costs associated to a specific mitigation activity, first, a list of most relevant example project types was generated based on the project type classification of the UNEP DTU pipeline. In doing so, typical co-benefits and co-costs were gathered via desk research and literature review. A detailed overview of typical co-benefits and co-costs by project type is provided in Table A-1 in Annex 3 of this report. The results are summarised in Table 5.

Table 5: Summary of Typical Potential Co-benefits and Co-costs by Project Type

Project types	Potential Impact														
	Social Dimension							Economic Dimension		Ecological Dimension					
	Health	Employment/Wealth	Welfare	Safety (e.g. working conditions)	Food supply	Energy Access (off-grid)	Technology Transfer	Energy Security	Economic competitiveness	Water consumption	Land consumption/displacement	Carbon leakage	Pollution/Waste (Water, Land, Air)	Ecosystem/Biodiversity	Preservation of natural resources
Biomass energy		+			-			+		-	-	-	-		+
Coal mine/bed methane	+			+											
EE households	+/-	+	+/-					+					+/-		+
EE industry	+		+	+				+	+/-				+	+	
EE own generation		+						+							
EE supply side	+/-			-				+	-				+/-	+	+
Forests	+	+									-	-	+	+/-	+
Fossil fuel switch	+/-			+					+				+/-		
Fugitive															+
Geothermal	+	+				+		+		-	-		+	+/-	+
HFCs		+	+												
Hydro	+	+	+			+					-		+/-	+/-	+
Landfill gas	+		+										+	+	
Methane avoidance	+							+					+	+	
N_2O: Adipic acid	+	+					+					-	+		
N_2O: Nitric acid	+	+					+						+		
PFCs + SF_6	+			+									+		
Solar	+	+/-				+		+		+	-		+	+	+
Wind	+	+	-			+		+		+	-		+	+/-	+

Potential Negative Impact, + Potential Positive Impact

Source: Own compilation. See Table A-1 in Annex 3 for details.

4.1.2 Prioritization of Key Co-Benefits

Circumstances for the implementation of climate change mitigation activities vary from country to country. And so do the national priorities in terms of what additional benefits these activities are desired to achieve. Therefore, this section will look at the co-benefits the countries analysed in this study are striving to achieve in the context of introducing the carbon tax and – in the cases of Mexico and South Africa – the offsetting option. To gain political support for the introduction of the carbon tax, governments in all three countries have brought forward arguments pointing at benefits that go beyond the climate change mitigation impact of the policy instrument. In the following, we will identify co-benefits that are particularly relevant for the individual countries. In addition, we will look at the criteria countries have established to evaluate CDM projects regarding their contributions to sustainable development (SD). These SD criteria can serve as an indication of the awareness and prioritisation of specific co-benefits in the countries.

In **Mexico,** main arguments for the introduction of the tax on fossil fuels are contained in the government's draft decree (Presidencia de la República, 2013). Key co-benefits to be achieved, besides revenue generation, include reduced air pollution, health benefits and a reduction of public health expenditures, and increased competitiveness. The offsetting option, which was introduced by the Chamber of Deputies, was underpinned by highlighting the need to soften potential adverse economic effects of the carbon tax. No reference to other co-benefits of the mitigation activities has been made. This shows that in the context of the carbon tax, there is no co-benefits strategy in Mexico. Mexico did, however, apply environmental, social, economic and technological criteria to evaluate CDM project proposals. An overview of these criteria is provided in table A-2 in Annex 4.

In **South Africa**, the policy papers published by the National Treasury provide a good insight into the government's rationale underpinning the introduction of the carbon tax and its offsetting provisions. Besides the overarching goals of reducing GHG emissions and enabling a transition towards a low-carbon economy, the documents also highlight non-climate related goals that are to be achieved with the introduction of the carbon tax: reducing negative impacts on society's poorest and improving the competitiveness of the economy. The carbon offsets paper (National Treasury, 2014), which served as a starting point for the public debate, highlights sustainable development (SD) benefits of offset projects as a key argument for the introduction of the offsetting provisions, which should be given due attention. The co-benefits mentioned include: fostering rural development, job creation, restoring landscapes, reducing land degradation, protecting biodiversity, increasing energy efficiency and low carbon growth (National Treasury, 2014). No further details on how these positive impacts could be achieved in the context of the carbon tax are provided. Their key relevance was, however, highlighted in the interview with National Treasury, which stated in that there will likely be some kind of recognition of co-benefits of offset projects (Cecil Morden, Chief Director, Economic Tax Analysis, National Treasury, South Africa, 2016). Hence, South Africa seems to be interested in developing a strategy on how to achieve co-benefits by using offsets in the carbon tax context. The indicators used by the South African DNA for the evaluation of CDM project proposals could be used as a starting point for the development of a national co-benefits strategy. In this regard, the website of South Africa's DNA provides a detailed document on the SD criteria used (Department of Minerals and Energy, 2004). For a schematic overview of the criteria used see Table A-3 in Annex 4.

In **Chile**, main arguments for the introduction of the carbon tax were climate change mitigation, income generation and investments in abatement technologies. However, other issues such as social costs, damage to the environment and health impacts were also acknowledged (Gobierno de Chile, 2014). Furthermore, an interviewee stated that co-benefits were a major issue for Chile (División de Información y Economía Ambiental, Ministerio del Medio Ambiental, Chile, 2016).

While Chile is planning to conduct studies on the introduction of offsetting in the context of the PMR, no political decision on this matter has been taken yet. Therefore, no statement can be made regarding the role of co-benefits of this type of activities. Similarly, information of the SD criteria applied to CDM projects is not available: while Chile was also among the countries analysed by Tewari (2012), no information on the

criteria used could be found. However, one interviewee noted that there is general awareness regarding the potential to achieve co-benefits through offsetting.

4.1.3 Tools and International Standards to Support the Achievement of Co-Benefits and Avoid Co-Costs

The fact that climate change mitigation actions can provide important non-climate benefits while also potentially leading to adverse effects has been widely acknowledged. Therefore, a wide range of tools and methodologies has been developed. Some of these tools and procedures can be used in the carbon tax context for establishing offsetting regulations that support the achievement of co-benefits prioritised by the government while addressing undesired effects.

Positive list/exclusion list: One of the possibilities to narrow down the scope of activities that can be used for offsetting is the application of a positive list or an exclusion list. With a positive list, the focus can be put on those activities associated with large co-benefits while a negative list allows to exclude projects prone to negative impacts. Criteria to be applied could be project category/sectoral scope and project size. Positive lists are particularly well suited to reduce the number of eligible projects to those types of interventions that are associated with the co-benefits prioritised by the government.

Project risk categorization: In order to better address the risks of individual eligible activities, countries can introduce a risk categorization process. Project proposals would then be categorized according to key characteristics. Such a process allows to better identify key risks and provide a basis for the establishment of risk type specific procedures. For instance, land-use projects undertaken in ecologically sensitive areas could be required to establish additional safeguard procedures to reduce the risk of adverse impacts.

Incentivising high quality offset activities: Regulations that provide an additional incentive for the use of certain offsets above others can support the achievement of co-benefits while minimizing risks. The choice of the type of incentive depends on the design of the offsetting option. If the offsetting option builds on the ton-is-a-ton principle, tax payers can opt to pay (part of) the tax for a certain amount of taxed tCO_2e by submitting the equivalent amount of CO_2e credits. Here, offsets from activities with higher risks could be discounted at a higher rate than those from activities with large co-benefits. If the offsetting option does not build on the ton-is-a-ton principle and tax payers can pay (part of) their financial debt with offsets, credits from high quality projects could be accounted at a higher price.

Monitoring of non-climate impacts: Before project or programme approval, proponents of the mitigation activity could be required to assess the co-benefits their activity is expected to deliver while also disclosing potential adverse effects (co-costs). Project and programme proponents could be asked to update their impact assessment at different stages of implementation. In the course of the implementation of the activity, monitoring of key variables could be required. Stakeholders can play a key role in the monitoring of environmental and social impacts of projects, as they are familiar with the project setting. Monitoring results could then be reported to the regulator and be verified by an independent third party.

Stakeholder involvement: The active involvement of those who are most directly affected by climate change mitigation activities is key for achieving co-benefits and ensuring the long-term sustainability of the interventions. There are different degrees of involving stakeholders: a minimum type of stakeholder involvement consists in making project design documents, monitoring reports and other project documents available to the public and inform stakeholders about the activity. However, stakeholders could also be consulted and engaged in physical meetings with the project proponent and/or representatives of the regulatory body. Such a process can be designed to allow for different levels of involvement for instance by requiring a high frequency of physical meetings with stakeholders.

Grievance mechanism: A grievance mechanism allows local communities and individuals to raise their concerns regarding project activities. It is an element of the stakeholder involvement process that helps to address adverse effects of climate change mitigation activities while also highlighting the underachievement

of expected co-benefits. If introduced, grievance mechanisms should be designed in a way that allows stakeholders easy access and use with financial, cultural and other barriers being reduced to a minimum.

International standards: Sustainability standards developed by voluntary certification schemes, international development banks and other institutions can be key sources for dealing with non-climate impacts of mitigation activities. However, there are important differences among these standards and not all elements briefly described above are included in all international standards and mechanisms. While some standards are strong in assessing risks and benefits, others provide for a good involvement of stakeholders during project implementation. A detailed comparison of different standards, mechanisms and approaches has been provided already by (Arens et al., 2014; Kreibich, Wang-Helmreich, & Beuermann, 2014). Based on these previous studies, an overview of the general characteristics is provided in Table 6. One important difference among these standards is their scope of assessment. Certification standards are mainly focused on the specific interventions (mainly projects) and assess impacts occurring within the geographic area and project lifetime. Multilateral development banks, in contrast, apply a broader approach, also assessing impacts beyond the scope of the assessed intervention by focusing on adverse impacts. Other key differences and common elements are contained in Table 6 below. This overview can assist countries in identifying the standard best suited for developing an own strategy to achieve key co-benefits through offsetting in the context of the carbon tax.

Table 6: Comparison of Standards for Sustainable Development

	CDM SD Tool	CCB Standards	The Gold Standard	IFC Sustainability Policy
Boundary of Assessment	Project limits	Project and impacts beyond boundaries	Project limits	Wide, inclusion of transboundary effects
Positive list/ exclusion list	No	Positive list	Positive list	Exclusion list
Risk categorization	No	No	No	Yes
Stakeholder Involvement	No	Yes	Yes	Yes
Monitoring of co-benefits	Yes (not mandatory)	Yes	Yes	No
Monitoring of co-costs	No	Yes	Yes	Yes
Grievance Mechanism	No	Yes	Yes	Yes

Source: Own compilation based on Arens et al. (2014) and Kreibich, Wang-Helmreich, & Beuermann (2014).

4.1.4 National Situation

Countries willing to achieve co-benefits by allowing the use of offsets in carbon tax systems have several possibilities to assess non-climate impacts of mitigation activities: they can **build on international standards** or they can **develop national provisions.** In general terms, developing national provisions can be expected to involve higher costs than using an internationally established infrastructure. A national system, in contrast, might better fit national circumstances and preferences. If it is harmonised with existing national regulations, it can provide further advantages in terms of applicability and ownership, while transaction costs are reduced. Hence, the decisions whether to develop a national system, build on existing international standards or combine elements of both to support the achievement of co-benefits and address potential co-costs will depend on various country-specific factors, including:

- GHG certification standard/methodology used,
- experience with international sustainability standards,

- sectors and activities that can be used for offsetting,
- national prioritisation of co-benefits, and
- existing national structures and regulations (such as Environmental Impact Assessment).

In the following, the national situation in Mexico, South Africa and Chile will be briefly analysed regarding the procedures in place, their experience with the application of international standards and the sector activities that can be used for offsetting.

Mexico

The design of Mexico's carbon tax theoretically gives taxpayers the possibility to pay part of the tax with CERs from Mexican CDM projects. However, as described above, secondary legislation has not yet been issued. The Mexican government therefore has the possibility to establish additional sustainability related requirements for projects that are to generate offsets for the carbon tax system.

Having chosen to build on the CDM for the certification of GHG emission reductions, Mexico could require projects to meet existing voluntary standards that are tailored to CDM projects. However, Mexican project proponents seem to lack experience with the application of voluntary certification standards. For instance, none of the registered CDM projects hosted by Mexico is certified by the Gold Standard or the CCB Standards (UNEP DTU, 2016). Nevertheless, certification by such standards could be made a requirement for offset projects. For projects in the energy sector, the Gold Standard could be used, while for projects from land-based activities, the CCB Standards could be applied. In addition, a sectoral focus could be placed on projects that are typically associated with large social co-benefits, such as energy efficiency projects at the household level. Such a sectoral focus could be achieved easiest by using a positive list.

In terms of institutional structure and procedures for supporting co-benefits in its offsetting strategy for the carbon tax, Mexico could build on its Designated National Authority (DNA). As outlined above, Mexico's DNA has in the past approved project proposals by putting an emphasis on social co-benefits. These structures could be revived in current times of low demand for CERs and used for assessing domestic offsetting projects against pre-established sustainability criteria. Meeting these criteria could be made a requirement for offset certification, or alternatively, result in a premium certificate price when used for domestic offsetting in the carbon tax system.

South Africa

In South Africa, the use of offsets is still under discussion and different certification standards are being considered in the latest official government document on offsets, the Carbon Offset Paper of 2014: the Clean Development Mechanism (CDM), Verified Carbon Standard (VCS), Gold Standard (GS) and the Climate, Community and Biodiversity (CCB) Standards (National Treasury, 2014).

Since the CDM and the VCS are exclusively devoted to the certification of GHG emission reductions, they would have to be complemented by other sustainability standards if achievement of co-benefits of potential offsets is to be ensured. The Gold Standard, in contrast, also addresses social and environmental impacts of mitigation activities. This more comprehensive standard, however, only covers particular activities. These are specific project types within the energy sector (energy efficiency, renewable energy, waste handling and disposal and short lived climate pollutants) as well as land use and forestry (afforestation, reforestation, agriculture) activities. Therefore, the decision whether to use an international standard for fostering co-benefits and addressing adverse impacts or use own national provisions will highly depend on the final choice made in terms of the offsetting sector(s) and the GHG certification standard. With South Africa having vast experience in using the CDM, building on this GHG certification infrastructure and complementing it with an additional voluntary standard also seems a viable option.

Chile

So far, Chile does not envisage the use of offsets for compliance with its carbon tax and there is no information on the prioritisation of specific co-benefits by Chile. Therefore, establishing provisions that foster the achievement of specific co-benefits is not possible. Furthermore, use of existing standards for the certification of non-carbon impacts may depend on the GHG certification standard used. With Chile having a lot of experience with the CDM (more than 100 registered activities (UNEP DTU, 2016), building on the CDM for GHG certification could be a viable option. However, such a decision should be made by taking into consideration the functionality of the national CDM infrastructure. In this regard, further analysis would be needed.

4.2 The Impacts of Offsets on Long-term Emissions Mitigation Trajectories

After framing the issue of co-benefits and co-costs when using offsets in sub-chapter 4.1, the following sub-chapter provides an overview of potential impacts of offsets on long-term emissions mitigation trajectories. For this purpose, it first provides information regarding relevant aspects of long-term emissions mitigation trajectories in general. Then it points to the relationship between long-term mitigation trajectories and (potential) offset sector(s) for the carbon taxes in Chile, Mexico and South Africa. The second section of this sub-chapter provides an overview of potential opportunities as well as risks which the use of offsets can have regarding long-term emissions mitigation. Furthermore, it discusses options that may be employed to increase the opportunities that arise with the use of offsets regarding emissions mitigation and to reduce related risks.

4.2.1 Long-term Emissions Mitigation Trajectories and Offsets

Long-term emissions mitigation trajectories define the path countries take to achieve their mitigation goals. Different mitigation trajectories have been developed for many countries. After COP21, the Intended Nationally Determined Contributions (INDCs) set a benchmark for countries' emissions trajectories. However, INDCs vary considerably in their type and scope. While a majority of INDCs includes a GHG emission reduction target, less than half cover the entire economy but only a selection of sectors or one sector only. Few countries also include non-GHG emissions targets, and some countries just base their INDC on policies and measures. This diversity makes the assessment of envisaged emissions trajectories difficult.

Determining the impacts of offsets on long-term emissions mitigation trajectories is complex and requires consideration of, inter alia,

- the scope of considered emissions trajectories,
- the scope of the carbon pricing instrument,
- the sectors eligible for the generation of offsets and
- the relationship between these three aspects.

The impact of offsets on mitigation trajectories varies significantly depending on whether the sectors covered by the carbon pricing instrument and the sectors eligible for the generation of offsets are included in the trajectory. In case both are included and accounting is done correctly, in a static perspective, the use of domestic offsets should have no net impact on long-term emissions mitigation trajectories. It can, however, influence the effectiveness of other policies and measures as well as the political will to reduce emissions. While the latter aspect will be discussed in the next sub-chapter, the following provides an analysis of the relationship between the scope of considered emissions trajectories, the carbon tax and potential sectors for the generation of offsets in Chile, Mexico and South Africa.

Chile

Chile's INDC includes separate targets for (1) land use, land use change and forestry (LULUCF) and (2) all other sectors quantified in the National Greenhouse Gas Inventory (1990-2010). This inventory covers the

entire national territory and includes the vast majority of sources and sinks in virtually all categories and subcategories pertinent to each sector, i.e. energy, industrial processes, use of solvents and other products, agriculture and waste (Gobierno de Chile, 2014).[10] In its INDC, Chile states that LULUCF is treated separately due to the high annual variability of the sector's sequestrations and emissions, and because it is less dependent on the path of economic growth. Regarding all sectors except LULUCF, the INDC's unconditional goal is to reduce carbon intensity per unit of GDP by 30% compared to levels of 2007 by 2030. A reduction by 35 to 45% in the same time frame is envisaged as conditional goal with the granting of international monetary funds.[11] Thus, while carbon intensity per GDP stood at 1.02 t CO_2e per million CLP$ in 2007 it is envisaged to fall to 0.71 CO_2e per million CLP$ (subject to economic growth) and respectively to 0.56 to 0.66 CO_2e per million CLP$ by 2030 with international monetary grants (and subject to economic growth) (Gobierno de Chile, 2015).

For LULUCF, a separate target expressed in CO_2e was set in Chile's INDC. Depending on the approval of the Native Forest Recovery and Forestry Promotion Law, Chile has committed to the sustainable development and recovery of at least 100,000 hectares of forest land, which will account for sequestrations and reductions of an annual equivalent of around 600,000 t CO_2e as of 2030. Furthermore, conditioned on the extension of Decree Law 701 and the approval of a new Forestry Promotion Law, Chile has agreed to reforest 100,000 hectares, which shall represent sequestrations of about 900,000 and 1,200,000 t CO_2e annually as of 2030 (Gobierno de Chile, 2015).

All in all, an emissions trajectory based on Chile's INDC broadly covers Chile's total country emissions. Chile's carbon tax, in contrast, covers part of its energy sector, namely energy generation from installations with boilers and turbines with an individual or combined thermal power equal to or above 50 MWt. Unconventional renewable energy generation from biomass is exempted from the carbon tax (República de Chile, 2014). Thus, all sectors covered by the carbon tax are included in Chile's emissions trajectory based on its INDC. So are virtually all sectors which might generate offsets in the future, should Chile decide to allow for the use of offsets at a later point in time. As the entire scope of the carbon tax as well as potential offset sectors are included in an emissions trajectory based on Chile's INDC, from a static perspective, the use of offsets would have no net impact on Chile's long-term emissions mitigation trajectory.

Mexico

Mexico's INDC contains a commitment to an unconditional nation-wide reduction of greenhouse gases (GHGs) by 22% below business as usual (BAU) for the year 2030. This commitment implies a net emission peak starting from 2026 and decoupling GHG emissions from economic growth. Thus, the commitment entails the goal to reduce Mexico's emissions intensity per unit of GDP by around 40% from 2013 to 2030. Furthermore, Mexico has made commitments conditional on a global agreement addressing important topics including international carbon price, carbon border adjustments, technical cooperation, access to low-cost financial resources and technology transfer, all at a scale commensurate to the challenge of global climate change. In particular, Mexico's conditional goal requires fully functional bilateral, regional and international

[10] The following categories were not estimated owing to a lack of activity data: Non-ferrous metals, Limestone and dolomite use, Soda ash use, Asphalt roofing production, Road paving with asphalt, Secondary HFC and PFC emissions, Fugitive emissions, Solvents, Paint application, Degreasing and dry cleaning, Cultivation of histosols, Other, Wetlands, Settlements remaining settlements, Other land remaining other land, Other (Harvested wood products). Categories not estimated due to the lack of a pertinent methodology are as follows: Pulp and paper industries, Food and drink. Category Mobile has been declared confidential (C), as the Energy sector team was not able to access the confidential military information required. The category Biological Nitrogen Fixation has been removed as a direct source of N2O because of the lack of evidence of significant emissions arising from the fixation process itself (Gobierno de Chile, 2014).

[11] This commitment assumes a growth rate for the economy similar to the growth path the country has experienced in the last decade, except for the most critical years of the international financial crisis (2008-2009). An international monetary grant is deemed any grants which allow to implement actions having direct effects on greenhouse gas emissions within adequate time frames (Gobierno de Chile, 2015).

market mechanisms. The conditional goal includes an increase of GHG reductions of up to 36% in 2030 (Gobierno de Mexico, 2015).

While Mexico's INDC covers total country emissions, Mexico's carbon tax covers part of the energy sector, namely the sale and import of fossil fuels except for natural gas. Thus, an emissions trajectory for Mexico based on its INDC would include all sectors covered by the carbon tax as well as all sectors that may be eligible for the generation of offsets. This means that from a static perspective, the use of offsets for compliance with the carbon tax would have no net impact on Mexico's long-term emissions mitigation trajectory.

South Africa

South Africa's INDC is economy-wide and takes the form of a peak, plateau and decline (PPD) GHG emissions trajectory. 2020 is set as the starting point for PPD with peak emissions between 2020 and 2025, plateau for approximately a decade and decline in absolute terms thereafter. Premised on the adoption of a comprehensive, ambitious, fair, effective and binding multilateral rules-based agreement under the UNFCCC, South Africa commits itself to emissions by 2025 and 2030 in the range between 398 and 614 Mt CO_2e (Government of South Africa, 2015).

South Africa plans to impose its carbon tax on

1. Fuel combustion in energy industries, transport, and other non-specified sources
2. Fugitive emissions from fuels in solid fuels, oil, and other fugitive emissions from energy production
3. Industrial processes and product: mineral industry, chemical industry, metal industry
4. Agriculture, forestry and land use: livestock and
5. Another category that covers any entity that perceives that it does not fall under any of the other categories (Repulic of South Africa, 2015).

Thus, an emissions trajectory based on South Africa's INDC covers total country emissions and includes all sectors South Africa's carbon tax is envisaged to be imposed upon as well as all potential sectors that may be eligible for the generation of offsets. This, again, means that from a static perspective, the use of offsets would have no net impact on South Africa's long-term emissions mitigation trajectory.

4.2.2 Potential Impacts of the Use of Offsets on Long-term Emissions Mitigation

While the use of offsets may have no net impact on INDC-based long-term emissions mitigation trajectories, it may well influence the effectiveness of other policies and measures as well as the political will to reduce emissions. This sub-chapter first provides an overview of potential opportunities which the use of offsets can have regarding long-term emissions mitigation and options to increase them. Thereafter, it sheds light on related risks as well as options that may be employed to reduce these risks to be able to make the most of the introduction of offsets.

Opportunities Arising from the Use of Offsets Regarding Long-term Emissions Mitigation and Options to Increase Them

Allowing the use of offsets to cover (part of) a carbon tax liability opens up substantial opportunities regarding emissions mitigation. The impact of offsets on emissions depends to a large extent on the **design of the offset regulation.** Basically, offsets can link to the sector(s) covered by a carbon tax in two ways: indirectly via the price for carbon or directly by reducing the amount of tons of CO_2e a carbon tax has to be paid for. Indirect linking via the price for carbon is, for example, planned in Mexico: as described above, Mexico envisages to allow the use of CERs from CDM projects to pay part of the tax amount according to the market value of the CERs. As it is unlikely that this option may be attractive for tax payers (see chapter 3.2 on Mexico for details), allowing the use of offsets has no impact on emissions in this case from a static point of view. When emissions reductions of a ton of CO_2e in an offset project may be used to offset a ton of CO_2e

covered by the carbon tax, however, an exactly determined amount of emissions is reduced in the offset sector while the tax to be paid is being reduced accordingly in the sector covered by the carbon tax. Such a design for an offset regulation indeed entails additional emission reductions, which are traded in for additional revenue. This consideration should be at the heart of any introduction of offsets for a carbon tax as in this case, an additional contribution to a mitigation goal set for the sector(s) covered by the carbon tax can be achieved in the offset sector(s).

In the second case described, the **tax rate of the carbon tax** may also influence the impact the introduction of offsets may have. Thus, low tax rates may not be able to incentivise substantial emission reductions – neither in the sector(s) covered by the carbon tax nor in the (potential) offset sector(s) – as emitters may prefer to just pay the tax instead of investing in low-carbon alternatives or buying offsets. In this case, the potential impact of offsets on emissions mitigation could be marginal. Higher tax rates, on the other hand, not only incentivise taxable entities to identify and use own mitigation options but also encourage the use of offsets and the corresponding reduction of emissions in offset sectors (see chapter 2.3).

One of the key reasons for the introduction of offsets is that they provide for greater flexibility in the location of emissions reduction interventions and hold the potential to **reduce the overall costs** of GHG abatement, depending on the design of the option to use offsets. Thus, for example, current provisions regarding the use of offsets do not entail cost reductions for the taxpayer: Submitting CERs and having the tax bill reduced according to the CERs' market value at the moment of paying the tax involves the same costs for the taxpayer (see chapter 3.2 for details). An option to increase the opportunity to reduce costs by allowing offsets is to **expand the scope of the sector(s)** eligible for the generation of offsets and to **raise the amount to which offsets may be used.**

Furthermore, offsets may entail **positive spill-over effects** from the sector(s) covered by a carbon pricing instrument to sectors included in an offset mechanism and tap emission reduction potentials that may otherwise have been neglected. This may lead to emission reductions well beyond those used for offsetting emissions in the main carbon pricing system. The extent of this spill-over effect depends highly on the amount to which offsets are used.

Without additional rules, offsets are at best a zero-sum-game and provide no net benefit for the climate as for every unit of emission reductions used, the same amount of emissions can increase inside the scope of the carbon pricing scheme. A net climate benefit can, however, be reached through the introduction of additional rules such as the discounting of emission reductions from the offset sector(s) and limited crediting periods beyond which emission reductions continue.

Discounting of emission reductions in offset sectors means that only part of the emission reductions that have actually taken place are able to generate offsets. This can be done in several ways: discounting could take place by setting discount factors that may vary according to specific (sub)sectors and/or project types. This option would provide countries with the opportunity to give preference to specific offsets that are particularly favourable (see chapter 4.1 above): offsets from such (sub)sectors and/or project types could be discounted to a lesser extent than offsets that are less desirable in the eyes of the government of a country. Apart from that, discount factors can either be set directly at the point of supply or at the demand side of the offsets (Castro, Duwe, Köhler, & Zelljadt, n.d.).

Moreover, emissions may be reduced **beyond the crediting period** of an emissions reduction activity leading to a positive net impact on the atmosphere. With fewer years an activity can generate offsets, surplus reductions would be yielded to the level to which mitigation activities do not depend on continued revenues from offsets, for example, when other benefits or revenues already exceed the operating costs of a mitigation activity, e.g. in the case of renewable energy projects which entail no fuel costs. This option is, however, not viable for mitigation activities which require continued revenue from offsets to operate such as N_2O abatement in nitric acid plants where N_2O abatement entails costs but no revenues other than those from offsets for plant operators (Lazarus, Erickson, & Schneider, 2013).

Opportunities to increase the benefit to the atmosphere via the use of offsets also entail **additional momentum** for increased climate action gained by allowing the use of offsets. Thus, offsets may be used as a bargaining chip in political discussions, inter alia, with opponents of the introduction of a carbon pricing instrument inside as well as outside of the government – even more so, with comprehensive stakeholder involvement. This has been the case both in Mexico and South Africa, where opposition against the introduction of the carbon taxes has been reduced significantly with the option to allow for the use of offsets. Also, allowing offsets may increase the willingness as well as the ability of a government to enhance its climate commitments. This would indeed have a positive impact on a countries' emissions reduction trajectory and entails the potential to further reduce country emissions.

Risks Arising from the Use of Offsets Regarding Long-term Emissions Mitigation and Options to Reduce Them

On the other hand, allowing offsets also entails a couple of risks. For example, offsetting regulations have to be designed in a way to ensure the **environmental integrity** of the overall carbon pricing system. The environmental integrity of a carbon pricing instrument may be threatened by non-permanence, non-additionality, double counting (double issuance, double claiming, double coverage, double use) and overselling of mitigation actions generating offsets. Suitable regulation is necessary to preserve environmental integrity. In this regard, chapter 4.3 below provides detailed information on these issues.

Another risk of allowing the use of offsets in a carbon pricing system is that offsets shift efforts to reduce emissions to (an)other sector(s). Thus, **emission reductions do not occur in the sector(s) the carbon pricing instrument was originally designed for.** Remedy can be offered by **tying the option to use offsets to increased levels of ambition** in the main carbon pricing system. Depending on the scale to which offsets are allowed and the increase of ambition, this could have a significant positive impact on the mitigation trajectory of a country. The larger the increase of ambition in the carbon pricing system relative to the scale to which offsets may be used, the bigger the net benefit for the atmosphere. Increasing the level of ambition should be a prerequisite for the introduction of an offsetting component in order to reach a carbon tax's full potential regarding the redirection of investment towards low-carbon options.

Moreover, the shifting of mitigation efforts to (an)other sector(s) through offsets may lead to **lock-in effects** in the sector(s) covered by the carbon pricing instrument: without additional measures, incentives for mitigation policies and measures in the sector(s) covered by a carbon pricing system which are provided by the carbon pricing instrument's price signal are reduced. Depending on the scale to which offsets are allowed, this reduction may be significant and divert investors from shifting long-term investment in the sector(s) covered by the carbon pricing instrument to low-carbon alternatives. Regarding this risk, **making offsets conditional on additional ambition** in the central carbon pricing system could, again, be a solution.

Furthermore, allowing the use of offsets entails the risk to **reduce incentives for mitigation policies and measures in the offset sector(s)** other than those that can be sold as an offset. With the perspective loss of additional income in the offset sector(s), opposition to further climate policies in a (potential) offset sector may increase significantly. An option to reduce this risk is the strong involvement of all stakeholders in these sectors.

All of these issues are among the reasons why there may be substantial **opposition** to allowing the use of offsets in a carbon pricing system. This opposition may further complicate the introduction and/or use of offsets or even carbon pricing mechanisms in general. In this case, as well, comprehensive stakeholder involvement can reduce opposition.

The following tables provide an overview of the aspects discussed in this sub-chapter.

Table 7: Opportunities Arising from the Use of Offsets and Options to Increase Them

Area	Opportunities	Options to Increase Opportunities
Environment	Real emissions reductions in offset sector replaces additional revenue from carbon tax	Design of regulation Higher tax rates
Economy	Reduction of costs	Increasing the scope of offset sector(s) and the amount to which offsets may be used
Environment	Positive spill-over effect of efforts to reduce emissions from sector covered by carbon tax to other sectors of the economy	Discounting of emissions reductions of offset sector(s) Net emission reductions in offset sector(s) beyond crediting period
Politics	Bargaining chip in political negotiations facilitating the introduction of policies and measures and/or stronger mitigation commitments	Stakeholder involvement

Source: Own compilation.

Table 8: Risks Arising from the Use of Offsets and Options to Reduce Them

Area	Risks	Options to Reduce Risks
Environment	Compromising environmental integrity	Design of regulation
Environment	Reduction of incentives to reduce emissions in main carbon pricing system	Tying option to use offsets to increased levels of ambition in main carbon pricing system
Technology	Lock-in effects in sectors covered by the carbon pricing system	Tying option to use offsets to increased levels of ambition in main carbon pricing system
Politics	Opposition to further climate policies and measures in sectors generating offsets as these would reduce potential income via offsets in this sector	Stakeholder involvement
Politics	Opposition to introduction of offsets may hinder introduction of carbon pricing instruments and/or offsets	Stakeholder involvement

Source: Own compilation.

4.3 Procedural and Institutional Provisions to Allow for International Transfers of Mitigation Outcomes

This section explores the procedural and institutional provisions needed to allow for the transfer of mitigation outcomes across borders by importing[12] mitigation outcomes into the (proposed) carbon tax systems of Chile, Mexico and South Africa. To this end, the section first provides essential background information regarding contributions under the Paris Agreement to lay out existing challenges regarding emissions account-

[12] In the context of linking carbon taxes with other carbon pricing instruments (ETSs and carbon taxes), some authors (Metcalf & Weisbach 2010) have proposed that firms that are subject to a carbon tax could be allowed to pay taxes at a higher level than their tax liability, in order to receive so called "Emission Tax Payment Credits (ETPCs)" which could then be exported. However, we consider this to be a rather theoretical option. Therefore, exports from the carbon tax will not be considered here.

ing, in particular in the case of international transfer of climate change mitigation results. Thereafter, it explores the procedural and institutional provisions needed to allow for the transfer of mitigation outcomes across borders by import in the (proposed) carbon tax systems of Chile, Mexico and South Africa. As stated in chapter 2 above, under the Paris Agreement there is no legal, but rather a political obligation for Parties to achieve their individual contributions. Furthermore, Parties willing to participate in the Paris Agreement have been given the possibility to determine the type and scope of their contributions on their own terms. The INDCs that have been submitted by Parties in advance of the Paris conference and which can be considered a basis for future NDCs include:

- GHG emission targets (either economy-wide or including one/more priority sectors),
- non-GHG emission targets,
- GHG emission targets with non-GHG goals as well as
- policies and measures to mitigate climate change.

Diversity also exists among GHG emission targets submitted. They range from continuous multi-year targets that describe a reduction of GHG emissions over a period of time to single-year targets which only relate to a certain level of emissions in a specific year. Both the lack of legal bindingness of individual contributions as well as their large diversity pose significant challenges in terms of GHG emissions accounting, in particular if the international transfer of mitigation outcomes is to be allowed.

The transfer of mitigation outcomes across borders by import and use in the carbon tax systems of Chile, Mexico and South Africa should not compromise environmental integrity. Usually, environmental integrity is considered to be ensured when the transfer of mitigation outcomes across national borders does not result in an increase of the overall GHG emissions compared to a situation without such transfers. The concept generally refers to the principle that a carbon offset mechanism can only be an effective climate mitigation policy tool if the resulting carbon offset credits represent actual emission reductions achieved by a project. In case of the CDM, for example, environmental integrity requires emission reductions generated by the CDM to be real, measurable, long term and additional to any that would have occurred in the absence of the project activity (Michaelowa, 2015).

In the particular context of the subject of this study – the transfer of offsets into carbon tax systems – we apply the concept of environmental integrity, however, in a broader sense. While the transfer of offsets into an ETS may undermine the "climate integrity" of the scheme, i.e. reduce its net mitigation effect (for example, if offsets are non-additional), the direct impact of offsets on a carbon tax system is different. Strictly speaking, the environmental integrity of the tax cannot be directly affected as it does not set a fixed emissions reduction cap. Still, the use of offsets can impact the overarching policy goal of a carbon tax, which can be considered to be mitigating emissions. The transfer of offsets that are not real, measureable, long term and additional into a carbon tax could therefore threaten the tax's "policy integrity". Keeping this conceptual differentiation in mind, we suggest to stick to the term "environmental integrity" in the remainder of this study, as it is widely used in the scientific debate in the context of emissions mitigation policies and actions.

To answer the question of whether environmental integrity is preserved or not, we will first look at the **international level**, since it provides the basis for all transfers of mitigation outcomes across national borders, and ask:

- Which issues may arise with transfers in terms of environmental integrity?
- Which provisions are already contained in the Paris Agreement for transfers?

At the national level and with respect to our focus countries we address the following questions:

- In how far do the countries analysed meet the general requirements to participate in transfers of mitigation outcomes?
- Which provisions are needed at the national level to allow for transfers of mitigation outcomes?

4.3.1 Key Issues

If not regulated adequately, all transfers have the potential to undermine environmental integrity. A transfer can undermine environmental integrity at different stages[13] of the process. This process can be broadly divided into three phases:

1. Implementation of the mitigation activity
2. Transfer of the mitigation outcome (including potential issuance of units)
3. Use of the transferred mitigation outcome

Analysis of the experience made with ETS and carbon markets has highlighted the fact that environmental integrity can be undermined in all three phases of the process. Non-permanence and non-additionality are risks to environmental integrity that are closely linked to the first phase of the transfer process described above: the implementation of the mitigation activity. Also, if mitigation outcomes result in the issuance of transferrable mitigation units, double issuance of such units as one of the types of double counting may threaten environmental integrity in the second phase of the process. Furthermore, there are different risks related to the phase of use of mitigation outcomes. Three of them can be subsumed under the term of double counting: double claiming, double coverage and double use. In addition, overselling can be a specific risk. It should be highlighted, however, that the relevance of the environmental integrity risks in this last phase of the transfer process depend on how the transferred mitigation results are to be used: In this stage of the process, environmental integrity will only be affected if the importing party decides to count the imported mitigation results against its national climate change mitigation target (NDC).

a) ***Non-Additionality***: Non-additionality of mitigation actions is a key threat to environmental integrity in the context of crediting, in particular if the credited activity occurs outside the scope of the contribution. Considering a mitigation activity that is not covered by the contribution of Party A and which would have happened anyways (=non-additional) is used for the generation of credits. Credits generated are then transferred to Party B, who uses these units for pledge attainment. In this scenario, Party B would have been allowed to reduce less GHG emissions domestically without an equivalent activity by Party A compensating for the additional GHGs that can be emitted.

b) ***Non-Permanence***: Non-permanence occurs when one emission reduction or the sequestration of emissions from the atmosphere is only achieved over a limited period of time. Non-permanence is an issue particularly relevant in the context of forestry, since the carbon sequestered by trees is reemitted to the atmosphere after the end of the lifetime. Without the necessary provisions, non-permanence can be a significant threat to environmental integrity: Assume Party A implements an afforestation project that generates mitigation results which are then used by Party B for pledge attainment. If there are no provisions in place to deal with non-permanence, the afforested area could be cleared after the mitigation outcome has been transferred and stored carbon would be released into the atmosphere, resulting in a net plus of emissions.

c) ***Double counting***: There are different forms of double counting, most of which are directly threatening environmental integrity:

   - ***Double issuance***: Double issuance refers to the situation when one emission reduction results in the issuance of two (or more) mitigation units that can be used for pledge attainment. Note that not all transfers of mitigation outcomes require the issuance of mitigation units.

[13] Note that in practice, stages might not necessarily be consecutive. Under the CDM, for instance, project implementation usually continues (in the next crediting period) after CERs have been issued for the emission reductions achieved.

- ***Double claiming***: Double claiming is the most well known form of double counting. It refers to a situation when the same emission reduction is accounted twice against two mitigation contributions: i.e. by the Party where the emission reduction occurred and by another Party using the unit that resulted from the emission reduction.
- ***Double coverage***: Double coverage can be considered a sub-form of double claiming. It refers to the situation when an emission reduction is used for meeting a GHG emissions target in one country and a non-GHG target in another.
- ***Double use***: Double use is when one mitigation outcome is used twice for mitigation pledge attainment, for instance if a mitigation unit is duplicated in a registry.

d) ***Overselling***: Overselling is a risk closely related to the question of legal bindingness of climate change contributions: Assume, country A has adopted a non-legally binding mitigation goal and transfers mitigation outcomes that are higher than the surplus the country actually achieved in the respective time period. Without further provisions, the country could simply refrain from meeting its contribution and walk away with the revenues stemming from the sale of units.

4.3.2 The International Level: From Kyoto to Paris

In order to deal with these risks described above, any international framework under which transfers are to be allowed must establish procedural as well as institutional provisions that regulate the participation in these transfers.

This section will address in particular two key questions: What are the conditions under which accounting for net flow of mitigation outcomes is possible? What institutional capacities do countries need to have and how should their contributions be designed to properly account for transfers of mitigation outcomes?

As outlined above, the Paris Agreement is fundamentally different from the Kyoto Protocol. Under the Kyoto Protocol, Annex B (developed country) Parties adopted legally binding emission reduction targets using a uniform formula. On that basis, Parties are allocated a certain amount of emission units (assigned amount units - AAUs) according to their national target. Parties can modify their assigned amount by generating Emission Reduction Units (ERUs) under the Joint Implementation (JI) mechanism or they may purchase Certified Emission Reductions (CERs) from projects implemented under the Clean Development Mechanism (CDM). Further, Parties can generate Removal Units (RMUs) resulting from human-induced land use, land-use change and forestry (LULUCF) activities on their territories.

The Kyoto Protocol sets a clear basic framework to allow for these units to be transferred and established provisions as well as institutions to maintain oversight of transactions:

1. National registries: To manage and track unit transfers, Annex B Parties are required to maintain national registries according to common standards.
2. An international transaction log (ITL): The ITL manages and oversees the transfers of units between countries, allowing to ensure that each national registry is in line with the ITL.
3. Reporting provisions: Furthermore, developed Parties and Parties with economies in transition who have adopted mitigation commitments under the Kyoto Protocol and are therefore listed in Annex B of the protocol need to report annually on the movements, additions and subtraction of units.

The new regime established with the Paris Agreement will differ significantly from the Kyoto regime as, for instance, there will be no Assigned Amounts for Parties, and the Paris Agreement will presumably not limit the transfer and use of mitigation outcomes for pledge attainment under the UNFCCC but allow for a wide array of (nationally and internationally governed) mitigation outcomes to be used.

Even though Parties to the UNFCCC agreed on several provisions that are relevant for transfers of mitigation outcomes, these are rather generic and will still have to be fleshed out in detail.

Transfers of Mitigation Outcomes Under the Paris Agreement

Article 6 of the Paris Agreement provides the basis for the voluntary cooperation among Parties in the implementation of their NDCs. There are two possible ways for transferring mitigation outcomes under the Paris Agreement: Cooperative Approaches and the Sustainable Development Mechanism (SDM).

The first possibility to transfer mitigation outcomes is contained in **Art. 6.2.**, which allows Parties to engage in so called "cooperative approaches" and exchange "internationally transferred mitigation outcomes" (ITMOs). It must be noted that these co-operations can be market-based as well as non-market based. Under Art. 6.2, Parties will have the option to use mechanisms that were developed outside the UNFCCC. Participation in these transfers must be authorized by Parties, guaranteeing that subnational jurisdictions do not exchange mitigation outcomes without consent from the national government. One key aspect, however, is that these transfers will not be governed by the UNFCCC and there will be no UN oversight. While a guidance is to be developed in order to ensure environmental integrity, transparency and robust accounting, the UNFCCC will neither establish obligatory rules nor a governance framework.

A second possibility to transfer mitigation outcomes is contained in **Art. 6.4** of the Paris Agreement, which establishes a "mechanism to contribute to the mitigation of greenhouse gas emissions and support sustainable development". While similar to the CDM in that it is to foster sustainable development while allowing for the participation of private and public entities, voluntary co-operations under Art. 6.4 are to deliver an overall mitigation effect, thereby going beyond pure offsetting. Remarkably and different to the cooperative approaches contained in Art. 6.2., activities under Art. 6.4 will be supervised by an international body. The Paris Agreement contains a provision that addresses the risk of double counting by requiring host Parties not to use emission reductions resulting from transfers under Art. 6.4 to demonstrate achievement of their NDC if they are used by another Party (Art. 6.5).

There are no further requirements or eligibility criteria that guide the participation of Parties in the here discussed transfers. These can be expected to be covered under the guidance for Art. 6.2 as well as under the rules, modalities and procedures of the new mechanism under Art. 6.4, which are to be adopted by the Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement (CMA) at its first session (Art. 6.7).

Contributions under the Paris Agreement

Contributions of Parties are the basis of any transfer of mitigation outcomes. These contributions can have different characteristics and Parties under the post-2020 climate regime have different possibilities when defining their individual contributions.

Legal Bindingness: The Paris Agreement requires Parties to "prepare, communicate and maintain successive nationally determined contributions" (Paris Agreement, Art. 4.1). While Parties are required to pursue domestic actions (Art. 4.2), they are not legally obliged to achieve their contribution. Hence, Parties' contributions as such are not legally binding and there are no sanctions in case of Parties falling short of achieving them.

As a consequence, there is a significant risk for overselling of mitigation outcomes. As long as there is no agreement among Parties to make individual contributions legally binding in the future, the risk of overselling should be dealt with by establishing respective eligibility criteria which require Parties willing to export mitigation results internationally to adopt legally binding contributions. Alternatively, a liability for buyer countries could be established. With such provisions in place, mitigation outcomes from sellers who sold more than what they would have been allowed (overselling) would no longer be valid and the buyer would be unable to use these mitigation results for meeting its contributions. Hence, buyers can be expected to seek for respective guarantees from the seller.

Sectoral Coverage: The Paris Agreement does not prescribe the type of contribution Parties are to adopt. In terms of sectoral coverage, the agreement states that developed countries "should" undertake "economy-

wide absolute emission reduction targets", while developing countries are "encouraged" to move towards economy-wide emission reduction or limitation targets over time (Paris Agreement, Art. 4.4). The sectoral coverage can be a key aspect when the transfer of mitigation outcomes is allowed, as the following example illustrates: Assume, a country with an NDC expressed as an emission reduction target for the industrial sector wants to engage in transfers. If mitigation outcomes from the sector covered by the NDC are to be exported, there is a built-in incentive for the country to ensure that emission reductions are additional, since the Party's contribution will be made stricter by the mitigation outcome transferred. If mitigation outcomes are transferred from sectors not covered by the contributions, there is no such incentive, making it imperative to have international oversight that ensures additionality.

Reference Levels: Similarly, the agreement does not prescribe whether contributions are to be expressed in absolute or in relative terms. Hence, Parties can adopt a contribution with a GHG reduction target expressed in percentages of a certain historic emissions level or an emissions level linked to another factor, such as GDP. If Parties with contributions linked to dynamic factors are to participate in the transfer of mitigation outcomes, specific provisions will be needed to deal with the increased uncertainty due to the unclear development of the factor. One possibility would be a reserve similar to the commitment period reserve under the Kyoto Protocol.

Timeframe: With regard to the timeframe of the contribution, the Paris Agreement states that the CMA "shall consider common time frames" at its first session. It therefore still remains to be seen what the outcome of these considerations will be.

Use of common timeframes by all Parties leads to a better comparability of the contributions and makes it easier to determine the aggregate climate change mitigation impact ex-ante. Use of common timeframes is particularly relevant if mitigation outcomes are to be transferred. The timeframe of a contribution can be either single year or multiple year and relate to one or several target years. Combinations of different timeframes are associated with considerable risks: For instance, if countries with a single-year target use mitigation outcomes that have been achieved by Parties with a multi-year target in a year preceding the single-target year, the overall cumulative emissions could be higher than without such transfers. Furthermore, Parties with single-year targets would probably be able to achieve their contributions largely by the use of imported mitigation outcomes (Kreibich & Obergassel, 2016).

Metric: The Paris Agreement does not prescribe a specific metric to be used by Parties when determining their contribution. Therefore, GHG-based contributions as well as non-GHG contributions or different combinations thereof are possible. This open structure can be expected to result in a large diversity of contributions, as the *intended* NDCs Parties submitted to the UNFCCC in advance of the Paris conference already have shown.

Reporting and Accounting Provisions under the Paris Agreement

In the context of reporting, the Paris Agreement establishes a "transparency framework for action and support" with "built-in flexibility" that takes into account Parties' different capacities (Art. 13.1). Hence, while allowing for flexibility in the implementation for developing countries, the transparency framework also includes some uniform requirements:

- Parties must regularly provide a national inventory report
- Parties are to provide information to track progress made in the implementation of the NDC
- Information provided must undergo a technical expert review

These general **reporting provisions** must however be further spelled out in detail and modalities, procedures and guidelines will be developed and are to be adopted at the first session of the governing body of the Paris Agreement, the CMA (Art. 13.13).

Parties further agreed on common **accounting principles** that require Parties to account for emissions and removals corresponding to their NDC and to promote environmental integrity, transparency, accuracy, completeness, comparability and consistency and ensure the avoidance of double counting (Art. 4.13). As laid out in the accompanying COP Decision (Para 31), a guidance for accounting will be developed and is to be adopted by the CMA at its first session.

Eligibility Criteria: Additional Readiness Elements

As shown, most provisions at the international level still need to be worked out in detail. Therefore, complementary requirements to those of the Paris Agreement are needed, requiring Parties willing to participate in the transfer of mitigation outcomes to have certain technical and institutional readiness elements in place.

Mitigation Outcome Registry and Transaction Log: In order to allow for the tracking of mitigation outcomes all Parties willing to participate in such transfers should be required to install national registries. These electronic standardised registries contain all information (quantity, status, ownership, location and origin) on the internationally transferrable mitigation outcomes held by a Party (Levin, Finnegan, Rich, & Bhatia, 2014). Another element needed to properly track transferrable mitigation outcomes is a transaction log, also based on IT database technology. If linking of carbon pricing systems is supervised internationally, the transaction log could also be established at the international level.

Reporting System: Parties that do use or generate internationally transferrable mitigation outcomes will have to regularly report on the generation, transfer and retirement of mitigation outcomes. This reporting complements inventory reporting on GHG emissions. In order to reduce ex-ante uncertainty, Parties should further provide information on the estimated use and generation of mitigation outcomes. This would allow the international community to assess whether it is on track in meeting global climate change mitigation goals.

Approval System: Parties will also have to install institutions responsible for approving activities that generate mitigation outcomes. For these institutions to function responsibly, Parties will need to develop national guidelines and procedures for approving activities.

4.3.3 Carbon Tax Level

Linking a Carbon Tax with Other Carbon Pricing Systems

As outlined above, the Paris Agreement provides two possible ways for transferring mitigation outcomes: Art 6.2 and Art. 6.4. Both options can be used for linking carbon tax systems internationally with ETSs abroad, allowing for the use of internationally transferred mitigation outcomes.

Art. 6.4 of the Paris Agreement provides the basis for **indirect linking** of ETSs and carbon tax systems. If Art. 6.4 is used in a carbon tax system, tax payers would be allowed to pay part of their tax amount by using mitigation outcomes generated under Art. 6.4. Art. 6.2, in contrast, allows for carbon pricing instruments to be linked directly. When applied by a carbon tax, such a **direct link** could be established by accepting allowances from ETSs to be used for compliance in the carbon tax system.

There is a vast amount of literature on linking of ETSs, while linking of carbon tax systems has been explored to a much more limited extend. However, some of the issues that arise with the linking of ETSs are also relevant in the context of linking carbon tax systems. Furthermore, there are additional issues that are specific to the linking of carbon taxes. In the following we will provide an overview of potential issues and highlight where procedural or institutional provisions at the carbon tax level are needed to address these issues.

Addressing Linking Risks by Establishing Domestic Provisions

Linking of systems (ETSs and carbon tax systems) can provide multiple economic and also political benefits: By linking different systems, ETS participants and carbon tax payers are provided with more abatement options while the risk of carbon leakage is reduced. In addition, political cooperation among countries might increase momentum to act on climate change and rise ambition among linked countries or jurisdictions

(Haug, Frerk, & Santikarn, 2015). However, linking can also lead to undesired outcomes, some of which can be addressed by establishing respective procedural and institutional provisions at the carbon tax level.

Ensuring Overall Mitigation Impact: Linking can lead to a reduction of the overall climate change mitigation effect if one (or several) of the linked ETSs is over-allocated with surplus allowances that would otherwise be retired from the system. Assume an ETS has business as usual emissions of 100 while allowances allocated are 120. Without linking, the surplus of 20 would not be used and the system would only emit the business as usual emissions. If the ETS is however linked to a second ETS with a demand for allowances due to an ambitious cap, the surplus would be absorbed by the second system (Carbon Market Watch, 2015).

A similar effect can be expected for the case where a carbon tax system allows for the use of allowances to be used for the payment of the tax. If allowances from a linked ETS with over-allocation can be used for tax compliance, the ecologic impact of the tax will be reduced, since inflow of cheap allowances will reduce the incentive established with the carbon tax to reduce carbon emissions. The overall mitigation effect might also be reduced if the system to which the carbon tax is linked has low levels of environmental integrity due to insufficient provisions in terms of measurement, reporting and verification (MRV) of emission reductions (Bodansky, Hoedl, Metcalf, & Stavins, 2014) .

Therefore, provisions must be established at the carbon tax level to effectively reduce these effects. Countries willing to link will have to ensure environmental integrity of their system by establishing robust MRV provisions, a registry for participants as well as a system to track the transfers. If tax payers of a carbon tax are to be allowed to use allowances from other ETSs, Parties will have to assess whether the system with which they are willing to link does provide sufficient levels of environmental integrity in order to make sure the environmental integrity of the own system is not undermined.

Safeguarding Tax Revenues: If prices of allowances of linked ETSs or of international credits are below the tax rate of the carbon tax system, there is an incentive for tax payers to use ETS permits to pay the carbon tax. This may however reduce tax revenues. In order to reduce this effect, an upper limit on the use of allowances might be established (Metcalf & Weisbach, 2010).

Preventing Tax Level Distortions: By linking the carbon tax system to other systems, the effective tax level will most likely be altered, theoretically leading to a full harmonisation of price levels of all linked systems. The effective price level for the tax-payer will therefore depend on the price levels of those systems to which it is linked. If the tax level lies above the price for the allowances of linked ETSs and if these allowances can be used in the carbon tax system, the effective amount the tax-payer is to pay in order to comply with its tax burden is reduced.

Dealing with the Risk of Multiple Carbon Pricing: The point of regulation is another relevant issue to consider since it can lead to increased burdens for the end consumer. Assume in country A fossil fuel emissions are taxed at the moment of the extraction of the fossil fuel (upstream), while in country B emissions are covered during consumption of fossil fuel (downstream). If these two systems link and the fossil fuels extracted in country A are transferred to country B for final consumption, the GHG content of the end product will be regulated twice, potentially leading to undesired impacts (higher prices) for the end consumer (Carbon Market Watch, 2015).

Safeguarding Non-Carbon Benefits: Reduction of GHG emissions is often associated with other non-climate related benefits, such as health benefits, biodiversity preservation and long-term cost savings (see chapter 4.1). If, through linking, tax-payers use allowances or credits from linked systems to pay their tax instead of reducing the use of fossil fuels, the co-benefits associated to the foregone emission reductions will get lost (Bodansky, Hoedl, Metcalf, & Stavins, 2014). One possibility would be to only link to systems with provisions intended to lead to similar co-benefits. However, in any case, benefits will not be local.

4.3.4 Mexico, Chile and South Africa and Linking of Their Carbon Tax Systems

The possibilities for countries to import mitigation outcomes into their carbon tax systems mainly depend on three key elements: the characteristics of Parties' contributions, the basic design of the carbon tax systems, and the technical and institutional readiness of the country.

Therefore, we will in the following begin by analysing Parties' INDCs and ask whether they meet the **general requirements** to participate in international transfers and what additional provisions are needed to ensure their participation does not undermine environmental integrity.

In a second step, we will look more closely at the **carbon tax systems** of Mexico, Chile and South Africa and assess their general suitability for linking with other carbon pricing instruments. In a third step, the technical and institutional readiness of the three countries will be analysed.

Parties' INDCs and Their Abilities to Participate in International Transfer of Mitigation Outcomes

Parties' contributions provide the basis for any transfers under the Paris Agreement. In the following, we analyse the INDCs of Mexico, Chile and South Africa and discuss the countries' ability to participate in transfers of mitigation outcomes. A comparison of countries' INDCs is provided in table A-4 in Annex 5.

None of the three countries adopted an INDC with an economy-wide multi-year target. Single year targets, as adopted by Chile and Mexico, are problematic when used as a basis for the transfer of mitigation results. More generally, single-year targets provide less certainty than multi-year targets with regard to the GHGs emitted. This is related to the functioning of climate change as such, which is caused by the built-up of GHG concentrations in the atmosphere over-time (Kreibich & Obergassel, 2016).

With the **use of mitigation outcomes**, the associated costs could be significantly reduced and Parties with single-year targets may rely largely on imported units generated abroad. Lazarus, Kollmuss, and Schneider (2014) show that if Parties with single year-targets were allowed to use mitigation results from vintages other than the target year, the cumulative emission reductions in the target year would be lower than without these transfers (Lazarus, Kollmuss, & Schneider, 2014). A restriction on the use of mitigation outcomes to the target year vintage is therefore not an adequate solution to the problem if Parties with multi-year targets do also participate in these transfers (Kreibich & Obergassel, 2016).

With transfers under Art. 6.4 presumably also involving Parties with timeframes other than 2030, the use of mitigation outcomes achieved under Art. 6.4 is problematic for Mexico and Chile. Hence, translating the single-year target into a multi-year target would be necessary. For South Africa, whose trajectory target is largely incompatible with other Parties' contributions in terms of accounting, participation in transfers under Art. 6.4 is even more problematic.

For Chile and Mexico, the use of mitigation outcomes under Art. 6.2 could however be possible with an additional requirement, which limits the participation in these transfers to Parties with single-year targets that use the same target year. For South Africa, in contrast, the use of mitigation outcomes will be problematic since its INDC is expressed as a trajectory target, which lacks both, a clear target year and a target level, both necessary to ensure clear accountability.

Therefore, the modalities and procedures for transfers under Art. 6.4 to be agreed on must ensure that the activities for which units are issued are not providing a basis or pathway for Parties to achieve their contributions. Table 9 provides an overview of Parties' abilities to participate in transfers under Art. 6.2, while Source: Own compilation.

Table 10 shows Parties' abilities to participate in and use the mechanism under Art. 6.4 based on their INDCs.

Table 9: Parties' Abilities to Participate in Cooperative Approaches Based on their INDCs

	Mexico	Chile	South Africa
Import	Mexico can import and use ITMOs from other Parties with the same timeframe (single-year target with 2030 as target-year).	Chile can import and use ITMOs from other Parties with the same timeframe (single-year target with 2030 as target-year).	Import and use of ITMOs problematic since robust accounting is not possible due to design of INDC.

Source: Own compilation.

Table 10: Parties' Abilities to Participate in and Use the SDM Based on their INDCs

	Mexico	Chile	South Africa
Participation possible?	Participation only possible if all countries use single year 2030 target or if single year-target is translated into multi-year target.	Participation only possible if all countries use single year 2030 target or if single year-target is translated into multi-year target.	Participation problematic due to design of INDC.
Import	Import and use of SDM units not possible if Parties with a contribution other than a single-year target for 2030 are involved.	Import and use of SDM units is not possible if Parties with a contribution other than a single-year target for 2030 participate in the SDM.	

Source: Own compilation.

The Suitability of Countries' Carbon Tax Systems for Linking

The design of carbon taxes can significantly influence their suitability for linking with other carbon pricing instruments. Two aspects are of crucial relevance in this regard: price per tonne of CO_2 and the sectoral coverage of the carbon tax vis-à-vis the INDC.

One aspect that is of crucial relevance for linking is the **price per tonne of CO_2** used in the carbon tax. South Africa and Chile both apply a uniform price per tonne of CO_2, allowing linking with other carbon pricing systems. The design of Mexico's tax of fossil fuels, in contrast, is much more problematic in this regard, since carbon emissions are not taxed equally across all fossil fuels covered. Without a uniform price level for carbon, the ton-is-a-ton principle cannot be applied across all fossil fuels taxed, making linking difficult. The already existing, though not yet operational, possibility for Mexican taxpayers to submit CERs from Mexican CDM projects in order to reduce their tax bill, does not represent an actual link between the carbon tax and the CDM, since CERs are not accepted on the basis of their climate mitigation value (one CER reduces one ton of carbon) but on the basis of their monetary value (current market value): One CER cannot be used directly to reduce the tax that would have to be paid for one tonne of carbon. Instead, the (market) value of the CERs submitted by the taxpayer will be estimated and then used to diminish the sum still to be paid.

Therefore, alternative ways to make the Mexican carbon tax compatible with carbon pricing instruments abroad should be considered. The most straight forward option consists in changing the tax rate in a way that it reflects a common price on carbon. This, however, can be expected to be politically difficult due to resistance from industrial groups, as the introduction of the carbon tax has already shown. Another possibility would be to introduce fossil fuel specific provisions for the use of external mitigation outcomes. Under this

option, taxpayers would be given the possibility to exclude a certain quantity of a fossil fuel from being taxed if they submit a certain amount of external mitigation outcomes. The ratio (exchange rate) could be determined based on political and economic preferences. By setting the exchange rate accordingly issues such as reduced tax revenues and distributional effects among participants could also be addressed. Mexico might further introduce specific provisions to circumvent potential double payments through linking.

Another key aspect is the **coverage of the carbon tax vis-à-vis the INDC**. If the carbon tax covers sectors not covered by the INDC, import of mitigation outcomes becomes challenging in terms of accounting. In all three countries coverage is not an issue, since the carbon tax is covered by the INDC.

Technical and Institutional Readiness of the Carbon Tax for Linking

A prerequisite for linking the carbon tax to other systems (ETSs and carbon taxes) is that there are **technical elements** in place that ensure the environmental integrity of the overall system.

One of the key aspects is a robust system for the **measurement, reporting and verification (MRV)** of emissions. In Mexico, the introduction of the carbon tax was accompanied by the establishment of provisions that require all tax payers to regularly report on their activities related to fossil fuels. This allows to monitor the transfers and use of fossil fuels. Similarly, in Chile, the law which introduces the carbon tax (Ley 20780) already includes first provisions regarding reporting and verification. Thus, the law determines that the Superintendency for the Environment, which is responsible for the supervision of monitoring, registration and reporting of emissions, will determine the monitoring system as well as the requirements for certification. Furthermore, the law provides a schedule for MRV (for details see country sheet) and determines sanctions for taxpayers who fail to fulfil their reporting obligations (República de Chile, 2014). As highlighted by one interviewee, these definitions and MRV rules still have to be worked out in detail (División de Información y Economía Ambiental, Ministerio del Medio Ambiental, Chile, 2016). In South Africa, current plans envisage tax paying entities to self-report their carbon emissions and tax liability to the South African Revenue Service (SARS). The audit is expected to be assisted by the Department of Environmental Affairs (DEA), which is to lead the MRV process (Repulic of South Africa, 2015).

A **mitigation outcome registry** is a key tool to avoid double counting. Here, Mexico can be expected to build on its National Emissions Registry (Registro Nacional de Emisiones – RENE). In addition to the registry on emissions, this registry features a second part where the private sector can voluntarily provide information on its emission reduction projects. Information required inter alia relates to emissions trading transactions, date of verification, revenues received and source of financing (Cámara de Diputados, 2012). Once this system is applied more broadly and made mandatory, it can be expected to work as a registry allowing for imports into the carbon tax system. According to one interviewee, Mexico is already analysing how the registry can be linked to other elements already in place, such as the voluntary carbon market platform $MEXICO_2$ (Interview with SEMARNAT, 2016b). Similar elements have not been found in other countries. Table 11 provides an overview of key elements for technical readiness in the three countries.

Table 11: Technical Readiness: Key Elements

	Mexico	Chile	South Africa
MRV system	MRV provisions for tax on fossil fuels in place. Link to GHG monitoring system and registry to be strengthened.	General provisions and schedule regarding MRV in place. Monitoring system and requirements for certification to be elaborated.	Current plans include general provisions regarding the division of responsibilities on MRV.
Mitigation Outcome Registry	To be elaborated (possibly building on RENE and $MEXICO_2$)	To be elaborated	To be elaborated

Source: Own compilation.

Technical and institutional readiness can be assessed to be medium in all three countries. MRV provisions are in place (Mexico, Chile) or their establishment is envisaged (South Africa). Mandatory unit registries which would ensure that double counting of emission reductions is avoided, are, however, lacking.

4.4 Support by International Climate Finance

After a thorough analysis of the current status of carbon pricing in the three partner countries Chile, Mexico and South Africa, including their provisions for offsetting, as well as a detailed discussion of the interactions of carbon pricing instruments with selected policy fields, this chapter addresses the question in how far international climate finance can usefully complement and support the carbon pricing policies of these countries. In order to approach this question, the chapter starts with a general discussion of the role of international climate finance in the context of carbon pricing, introducing the Partnership for Market Readiness (PMR) as a major initiative in this field and outlining the focus of PMR activity in the three partner countries. In a following section, potential entry points for additional international climate finance are discussed on a theoretical level. Building on this, country-specific challenges and resulting support requirements are analysed. Key points of relevance to the question whether and where additional international climate finance can support carbon pricing policies, with a particular view to the introduction of carbon taxes including offset components, are summarised at the end of this chapter.

4.4.1 The Case for International Climate Finance

In accordance with the principle of common but differentiated responsibility and respective capabilities set out in the Convention, developed country Parties shall provide financial resources to assist developing country Parties in implementing the objectives of the UNFCCC (UNFCCC Art. 4). In 2009, industrialised countries pledged in the Copenhagen Accord to scale up international climate finance to USD 100 billion annually by 2020 and beyond. While this pledge had initially been interpreted as a ceiling, the decision text accompanying the Paris Agreement transforms this figure to a floor of financial contributions, intending to ramp them up before 2025 (Obergassel et al., 2016).

With specific regard to carbon markets and carbon pricing, international climate finance supports the design and implementation of market-based instruments for cost-efficient emission reductions particularly in the scope of the Partnership for Market Readiness (PMR) which has been launched in 2011. The PMR has currently 17 implementing countries participants, including Chile, Mexico and South Africa.

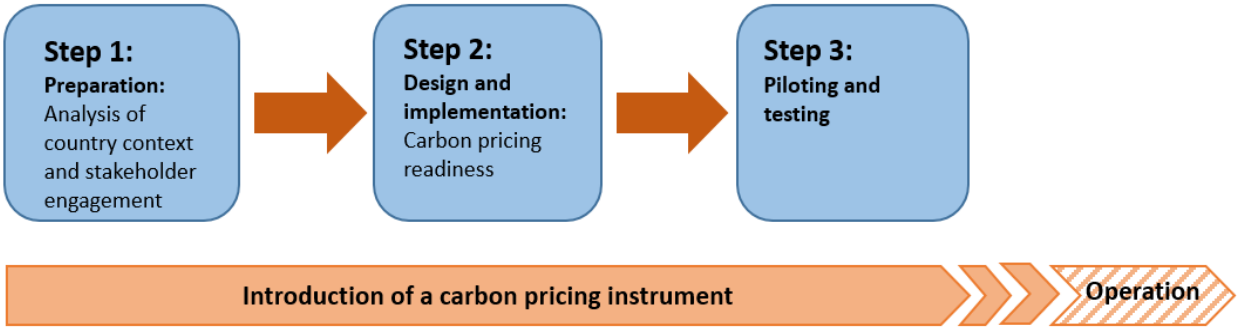
Once fully operational, carbon pricing instruments such as carbon taxes and ETS potentially raise substantial revenues and hence are effective tools to support the public budget at the national, sub-national or regional level. However, their introduction may require substantial upfront resources at different stages of the process, depending on countries' readiness. International climate finance[14] can, in general, support and essentially accelerate the introduction of carbon pricing systems and ensure their effective operation by providing these necessary upfront funds.

The process of introducing an explicit carbon pricing instrument, such as a carbon tax, can be broadly divided into three steps (see Figure 8). The **first step** is a preparatory phase, which includes careful examination of the actual political constellation as well as the socio-economic and legal circumstances in a given country. Preliminary studies (e.g. in the form of policy mappings, impact assessments etc.) help to evaluate the feasibility and viability of different carbon pricing instruments and may include a recommendation for a

[14] Broadly defined, climate finance refers to the sum of capital flows that target low-carbon development with direct or indirect greenhouse gas mitigation and/or adaptation objectives or outcomes. In the context of international negotiations, the term 'international climate finance' is often used to describe particularly the financial flows from developed to developing countries. An even more stringent definition incorporates the notions of 'incrementalism' and 'additionality', recognising that tackling climate change requires 'new and additional' funding (WRI, 2013).

particular design. In parallel, stakeholders need to be engaged and political commitment and ownership ensured to drive the process forward. The **second step** involves readiness building in a wider sense, setting the foundation for the successful realisation of a carbon pricing instrument. Carbon pricing readiness may thereby include different activities such as designing and implementing a carbon pricing policy, a GHG data management system for MRV, and/ or other necessary legal and institutional arrangements. In a more advanced stage it may also involve the determination of sector benchmarks or the design of an offset programme. In a **third step**, the carbon pricing instrument needs to be tested for its functionality and effectiveness under real-life conditions. For this purpose, a pilot may be implemented, potentially followed by a full-scale installation of the mechanism in case it proves effective. Depending on the specific circumstances of an individual country, international climate finance can interfere in each of these three steps and offer support in order to take the process to the next level.

Figure 8: Three Steps of Introducing a Carbon Pricing Instrument



Source: Own Illustration.

A few years ago, discussions on carbon markets and carbon pricing have been extended to consider not only the introduction of one carbon pricing instrument as a principal market mechanism in a country, but the linking of different carbon pricing instruments at a sub-national, national and global level, examining how carbon pricing instruments could lead to globally converging carbon prices in the medium to long term (Haug et al., 2015). This bottom-up approach of linking countries' climate policies has also found its way into the Paris Agreement, marking a significant change from the top-down structure of the Kyoto Protocol. More recently, the debate was taken a step further, considering not only linking across different carbon markets and carbon pricing instruments but specifically the introduction of an offsetting component into a carbon tax or ETS. Both the linking across explicit carbon pricing instruments as well as the introduction of offsetting in such systems bring along a number of supplementary functional and institutional prerequisites that are discussed in more detail in sub-chapter 4.3.3.

In order to adequately address these new requirements, considerations on connecting a carbon pricing instrument with an offsetting mechanism ideally forms part of the entire process of introducing a carbon pricing policy – from preparation to design and implementation to successful piloting and finally operation. The here described broadening of the discussion potentially expands the target area for international climate finance.

Over the last years, several initiatives have been launched to promote the development and implementation of carbon pricing instruments by offering financial and technical support in particular to developing economies. One of the most recognised among these is the Partnership for Market Readiness (PMR) which will be presented in detail in the next sub-chapter.

4.4.2 The Partnership for Market Readiness

The Partnership for Market Readiness (PMR) is a global platform for technical assistance and discussions on carbon pricing policies that was officially launched in Barcelona in 2011. The initiative consists of Contrib-

uting Participants, which provide financial support to the PMR Trust Fund, and Implementing Country Participants, which receive funding and technical support. Together, contributing and implementing countries form the Partnership Assembly, which is the PMR's decision making body.

With its particular focus on carbon pricing, the PMR filled an important niche and was unique in terms of its resources, scope and the highly participatory governance approach at the time of its launching. It still promotes a broad agenda of market based instruments in several developing and emerging economies and provides long-term and large-scale support in the form of grant funding and technical assistance.

The PMR's core objectives, at the time of its launching, included 1) to provide grant funding for building market readiness components; 2) to pilot and test new market-based concepts, both for domestic and new international mechanisms; 3) to provide a platform for technical discussions, exchange and collective innovation; and 4) to create and share lessons learned and best practices.

The PMR's objectives and activities are not rigid but have considerably evolved since its inception in 2011. Today, the PMR has a stronger focus on carbon pricing through taxes and emission trading instead of general market readiness, and constantly includes new, emerging topics (Redwood, Eerikainen, & Trexler, 2015).

One of the PMR's flagship activities is its support of the emergence of "credible, consistent, and potentially compatible" carbon pricing frameworks across countries (3Cs). Financial and technical support is granted in the scope of three programmes: a **Country Work Programme** which has at its heart the elaboration and implementation of a Market Readiness Proposal (MRP), focusing on country-level readiness and building up the foundations for carbon pricing policies. In the framework of the **Technical Work Programme,** these readiness activities are complemented in the form of programmatic support on those elements that are common across countries, including MRV, registries, baseline setting, and offsets. In 2014, the Partnership Assembly additionally launched a **Policy Work Programme,** which aims at assessing policy options and identifying effective and cost-efficient instruments for post-2020 mitigation scenarios. Within these three programmes, the PMR covers grants for the preparation and implementation of MRPs, technical support for core components of carbon pricing policies, and exchange of information and knowledge management between participating and implementing countries (PMR Secretariat, 2015b).

In terms of financial endowment, the PMR has a clear focus on the elaboration and implementation of MRPs. The standard process for allocation of funds includes an initial expression of interest, followed by a preparation phase in which countries formulate their MRP. The elaboration of the MRP is supported by PMR funds in the amount of USD 350,000 per country. After the presentation of a final MRP to the Partnership Assembly, countries enter the implementation phase in which proposed activities are implemented. For MRP implementation, countries can apply for a funding grant of USD 3 million, USD 5 million, or USD 8 million, depending on compliance with specific criteria (PMR Secretariat, 2015a).

Under the Policy Work Programme, the PMR released USD 5 million for financial year 2015 in order to support country-level and cross-country analytical policy work outside the scope of the MRP.

With a particular regard to offsetting mechanisms in carbon pricing systems, the PMR established the **PMR Offset Working Group** as part of the PMR Technical Work Programme in 2013. The objective of this working group is to develop a knowledge and information exchange platform for PMR Implementing Country Participants that is focused on enhancing common understanding of the key components for offset programme design, development and implementation. The PMR secretariat, with support from external experts, collaborates with the Offset Working Group to develop knowledge products, webinars, trainings, and e-learning modules that meet the needs of the Implementing Country Participants (PMR, 2016a).

All three countries analysed in this study have presented MRPs to the Partnership Assembly and have signed (in the case of Chile) or are about to sign (in the cases of Mexico and South Africa) respective grant agreements for the implementation of proposed MRP activities. To different degrees, the countries have also bene-

fitted from the other PMR programmes. The following sections give a brief overview on actual PMR activities in Chile, Mexico and South Africa. As information on country-specific activities under the Technical Work Programme and the Policy Work Programme is scarce, a focus is laid on the countries' MRPs.

Chile sought support from the PMR in 2011 and presented its final MRP to the Partnership Assembly in March 2013, focusing, at the time, on the design of a pilot ETS for the Chilean energy sector. In this context, PMR funding was planned 1) to promote general understanding and technical and institutional capacities across all stakeholders for the design and implementation of market mechanisms and their MRV systems with a particular focus on an ETS; 2) to design and implement an MRV framework and registry system for the ETS; 3) to prepare the necessary regulation to implement the ETS as well as the MRV framework and the registry; and 4) to study complementary instruments (e.g. innovative finance, offsetting) to fit with the proposed ETS and to enhance its effectiveness (PMR, 2013a). Chile was the first (and to date only) country to sign a grant agreement with the World Bank as delivery partner in September 2014, equipping the Government of Chile with a grant of USD 5 million. When the government passed the tax reform in 2014, which included the provisions for Chile's carbon tax (see chapter 3.1), the scope of the MRP was broadened in order to encompass not only emissions trading but carbon pricing instruments in a wider sense. However, the MRP was not formally adjusted as no respective procedures are in place yet at the level of the PMR secretariat to do so. Chile justified the political decision to focus on a carbon tax instead of an ETS to the Partnership Assembly by the rationale that an initial carbon tax approach may be easier and quicker to implement and may facilitate the readiness for the subsequent introduction of an ETS. As a result of these changes, PMR activity is currently planned to focus on the development of necessary regulations and infrastructure for Chile's carbon tax system (with a focus on the establishment of an MRV system and a registry), as well as on the provision of inputs for the potential link with other carbon pricing components, such as an offset mechanism or an ETS. PMR funding is being redirected accordingly. The carbon tax is set to enter into force on 1st January 2017, with tax liability starting in 2018. Apart from that, Chile receives support under the Technical Work Programme with regard to the technical implementation of its carbon tax. Expert consultants have been engaged to work on the detailed definition of which plants will be subject to the tax (PMR, 2015e). Furthermore, Chile will use the Policy Work Stream to analyse future effects of its new carbon tax on thermal power generation and map the interactions of energy policies and regulations (PMR, 2016b).

Mexico presented its final MRP to the Partnership Assembly in March 2013. It focuses on the introduction of credited NAMAs in three sectors: urban communities, urban transport, and refrigeration. PMR funds are planned to advance, among others, an MRV framework and institutional arrangements for the three credited NAMAs, as well as the development of a NAMA tracking tool to record transactions and emission reductions. The generated credits are envisaged to be used for compliance with a future national carbon tax or an ETS (PMR, 2013b). With regard to the grant agreement, final decisions on institutional arrangements pend confirmation from the Government of Mexico. Upon governmental confirmation, the World Bank expects to promptly finalise project appraisal and the signature of the grant agreement (PMR, 2015d). Apart from the elaboration and implementation of the MRP, Mexico can be expected to benefit from input provided under the PMR Offset Working Group with particular regard to the design and technical core components of its domestic offset programme. There is no information available on particular support for Mexico under the Policy Work Programme.

South Africa sought support from the PMR in 2012 and presented its final MRP to the Partnership Assembly in March 2015. Of the three analysed countries, South Africa is the only one in which the MRP explicitly focuses on the preparation, design and implementation of a carbon tax, including an offsetting component. More specifically, the MRP covers the modelling of the carbon tax policy package, the set-up of an MRV system and a structure for the carbon tax, as well as the design and development of a carbon tax offset scheme (PMR, 2015c). With regard to the grant agreement, the World Bank project appraisal process in collaboration with the South African Government is ongoing and the grant of USD 5 million is expected to become effective in April 2016 (PMR, 2015d). The latest proposal envisages the carbon tax to enter into force

on 1st January 2017. Apart from that, South Africa received specific support under the Technical Work Programme on the technical implementation of its MRV system as well as on benchmarking options (PMR, 2015e). Moreover, as is the case in Mexico, South Africa can be expected to make use of the technical assistance offered under the Offset Working Group.

While the PMR's desired long-term impact is to contribute to the reduction of GHG emissions through the implementation of carbon pricing, its medium-term impact is to establish core technical components for carbon pricing on the ground. It is important to note that both impacts strongly depend on certain external factors. Those include an appropriate enabling carbon price and policy environment at both the national and international levels, in order to support the establishment and effective operation of domestic and global carbon markets. Furthermore, additional financial resources, a favourable business climate and technology diffusion may complement the full implementation of carbon pricing instruments and the development of the required technical infrastructure which the PMR supports (Redwood et al., 2015).

4.4.3 Potential Entry Points for Additional International Climate Finance

Against the background of the above collected information on the PMR and its work in Chile, Mexico and South Africa, the following section further analyses core activities of the initiative as well as potential points of improvement. On that basis, entry points for additional financial resources in order to support the overall PMR objectives will be identified.

The First Independent Evaluation Report on the relevance, effectiveness and efficiency of the PMR, conducted in early 2015, concludes that the PMR has been very successful with regard to two of its main objectives: 1) establishing a platform for technical discussions that enables policy makers and other stakeholders to share experience and information on market readiness; and 2) providing important technical inputs and guidance, particularly for the MRP preparation process. The objective to implement the MRPs on the ground and to pilot and test new concepts for market instruments, on the other hand, has not yet been achieved to a full scale. Two of the main reasons for that are that first of all, while resource mobilisation under the PMR has been commendable, the actual outflow of these resources has been limited and has mainly taken place to finance MRP preparation. Implementation grants have also been approved, but in many cases, necessary grant agreements have not yet been

finalised.[15] Secondly, many of the so far completed MRPs focus on the design and development of technical core components and infrastructure like MRV and registry systems rather than on the introduction and operation of a carbon pricing instrument per se. It has therefore not yet been possible to pursue detailed implementation and operation of a designed mechanism at the country level (Redwood et al., 2015).

A closer analysis of PMR activity against the above presented process of introducing a carbon pricing instrument suggests that the PMR is particularly strong with regard to the second step (design and implementation), while placing less emphasis on the first (preparation) and the last step (piloting and testing). Funding for upstream analytical policy work outside the scope of the MRP has only recently been introduced. In its first round, support was solely provided to five countries[16] and activities started considerably later than the

[15] Currently, Chile is the only country where a grant agreement has been signed (between the World Bank and the Government of Chile, in September 2014). PMR activities have started, a first Project Implementation Status Report was presented in May 2015. In Mexico, final decisions on institutional arrangements pend confirmation from the Government of Mexico. Upon confirmation of the institutional arrangements, the World Bank expects to promptly finalise project appraisal and the signature of the grant agreement. In South Africa, the World Bank project appraisal process in collaboration with the South African Government is ongoing and the grant is expected to become effective in April 2016 (PMR, 2015d).

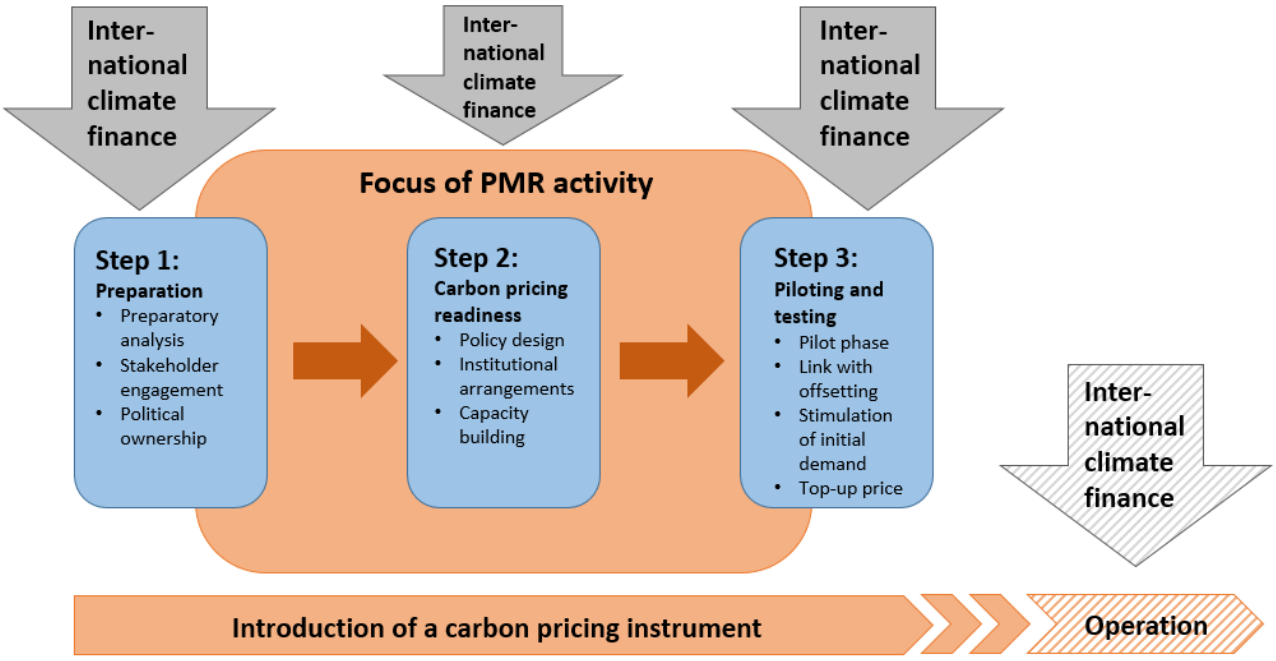
[16] In the first phase, policy analysis support was granted to Brazil, China, Colombia, Costa Rica and Peru. Chile also expressed interest in obtaining targeted support for financial year 2016 for the design and implementation of its carbon tax (PMR Secretariat, 2015b).

MRP preparation process. It follows that in many countries that receive support from the PMR for the introduction of a market mechanism, the first step – involving preliminary analysis of a country context – was skipped, proceeding straight to the second step of MRP preparation and implementation.

With particular view to the introduction of an offset programme in a carbon tax system, which is of special interest in this study, a closer analysis of PMR activity can be equally indicative. In general terms, the PMR supports under its Technical Work Programme all of the carbon pricing instruments that the Implementing Country Participants are pursuing, including ETSs, carbon taxes, and crediting mechanisms. The introduction of specific technical components (such as MRV, data management and registries, stakeholder engagement and preparedness) can provide an important starting point for connecting a carbon pricing instrument with an offsetting mechanism, which has, however, not yet been an objective in itself under the PMR. Three PMR countries are currently planning to create or are creating domestic credit markets as a compliance option for a carbon tax or an ETS: China (China Certified Emission Reduction scheme – CCER), South Africa, and Mexico (both developing an offset component for their carbon tax) (World Bank, 2015a). In these three cases, the PMR offers support in the form of technical notes and workshops. Only in South Africa, however, the offset component of the carbon tax is included in the countries' MRP.

The analysis conducted in this sub-chapter has particular implications for the question of whether and where additional international climate finance can accompany PMR activities. As is shown in Figure 9, additional funds may have a flanking role at all three stages of the introduction of a carbon pricing instrument.

Figure 9: Potential Entry Points for Additional Climate Finance



Source: Own Illustration.

Step 1 – Preparation

For the ultimate choice of a carbon pricing instrument it is important that the instrument's policy objectives are aligned with the broader national economic priorities and institutional capacities in order to ensure a viable and practicable implementation. Moreover, the preparation of a country includes considerations in how far carbon pricing may be complemented by other components, such as, for example, an offset programme (World Bank, 2015b).

Even though recently funding under the PMR is granted to countries for upstream policy work analysis, activities in this field have been limited to date. The fact that in several countries, a change of focus has taken place after finalisation of the MRP (as has been the case in Chile) may imply that preliminary analysis has not been considered sufficiently. Without the careful evaluation of the framework conditions that may be either supportive or obstructive to the introduction of a carbon pricing instrument, however, a change of plans may become necessary at an advanced stage of the process. This questions the efficiency of funds disbursed for the elaboration of an MRP in the first place and may lead to delays in its implementation.

Against this background, additional international climate finance may accompany PMR activities in the first step of the introduction process. It may support the preparation of the political and socio-economic environment by enabling policy analysis that informs decision makers and stakeholders on different carbon pricing options – including components such as offsetting – and strengthens political buy-in for a recommended choice. In this sense, additional international climate finance may complement and extend, in particular, the PMR's Policy Work Programme. These measures may be further flanked by a reinforced, high-level political cooperation that enhances a better understanding of the short-, medium- and long-term planning for carbon pricing policies within and across countries.

Step 2 – Carbon Pricing Readiness

The provision of country-level readiness for the introduction of carbon pricing instruments is currently in the focus of PMR activity. Yet, there might still be demand for additional funds to further strengthen institutional and technical readiness in order to guarantee MRP implementation and finally operation of the mechanism on the ground.

One major challenge for MRP implementation lies in the two appraisal and approval processes countries have to pass: one by the PMR itself and one by the Delivery Partner[17]. The PMR raises particular technical quality requirements that need to be met in the final MRPs in order for resource disbursement to take place. On the other hand, the Delivery Partner prescribes operational and legal requirements regarding procurement, financial management, safeguards, monitoring and evaluation, and project presentation, that are additional to those required for a final MRP by the PMR (Redwood et al., 2015). In this context, additional international climate finance may assume a complementary role to increase the readiness for these appraisal and approval processes, for instance, through providing necessary training and capacity building to executing agencies. Furthermore, additional funds may help to ensure that all legal, institutional, financial, and operational mechanisms that are needed for a project to start implementation once it has been appraised and approved are themselves fully in place on the ground.

Beyond readiness for MRP implementation, additional international climate finance may also support specific readiness activities with a view to (new) procedural and institutional requirements for the transfer of mitigation outcomes, as laid out in more detail in chapter 4.3. Given that the introduction of an offsetting component in a carbon pricing system represents a relatively new policy area that is not yet reflected in (most) countries' MRPs, additional international climate finance may assume a relevant role in building up respective readiness features in order to prepare countries for this option.

Step 3 – Piloting and Testing

Once preparation has been completed, a policy has been designed and core components for the implementation of one or more mechanisms have been set up, further financing may be needed to fully implement the instrument and make it operational on the ground. This may include the implementation of pilots and the consideration of incentivising tools to facilitate operation.

[17] Delivery Partners of the PMR supervise grant implementation and provide technical support. They are responsible for the use of funds transferred under the PMR. Principal Delivery Partner under the PMR is the World Bank.

Given that piloting and testing of newly designed carbon pricing instruments has not yet been achieved to a full scale under the PMR, this can represent a further entry point for additional international climate finance: first of all, additional funds may promote the realisation of **pilot projects** that facilitate the smooth transition from the formulation of a carbon pricing policy to its implementation, offering feedback on the effectiveness of initial design features and leaving space for corrections. Regarding the subject of this study, pilots may be of particular importance to demonstrate challenges and opportunities that arise from introducing an offsetting component in a carbon tax system, as country-level experiences in this area have been limited up to date. Second, in cases where a new approach to carbon pricing, like offsetting components, proves not to be viable in the initial phase, additional international climate finance can help to **stimulate initial demand.** This may, for example, take the form of results-based financing[18], where offsets are bought but (partly) retired. Thirdly, international climate finance may support the offset component of a carbon tax through paying a **top-up price** in case the market price for offsets is below a certain level. Through these targeted interventions at an advanced stage of the introduction process, additional international climate finance may effectively complement and support the PMR's Country Work Programme with a particular view to the implementation and subsequent operation of a carbon pricing instrument on the ground.

Post-introduction

Once the **introduction** of a carbon pricing instrument can be considered complete, the successful **operation** of the mechanism may also require support through international climate finance. This, however, is not discussed in the scope of this study.

The analysis above shows that international climate finance, in the form of support under the PMR and beyond, has indeed the potential to support the introduction of carbon pricing policies through several targeted activities. Although the PMR is unique in terms of funds and scope, there are still fields in which additional sources may leverage the effectiveness of the PMR and facilitate the full achievement of its objectives.

The origin of these additional sources may be manifold. Currently, the landscape of international climate finance counts a plenitude of international climate finance mechanisms, funds and initiatives that hold diverse financial assets and have different tools at their disposal. It can be assumed that the Green Climate Fund (GCF) – as one of the largest international climate funds in terms of resources, and the primary financing mechanism under the UNFCCC – will have a significant role to play in building country level readiness for carbon pricing and other mitigation measures. As a relatively new initiative, also the Transformative Carbon Asset Facility (TCAF) that was launched at COP21 and has a particular focus on supporting infrastructure for carbon pricing may be key for the further spread of carbon pricing policies around the world. Apart from that, several medium-sized funds and initiatives may provide punctual technical or financial support to specific needs. In light of this vast offer of existing and emerging financing sources it is important to make sure that synergies are used (and duplications prevented) once different funds engage in the same country. Specific coordination may become necessary in this context in order to guarantee complementarity and coherence of actions at the operational level, allowing for maximum effectiveness of international climate finance.

4.4.4 Country-specific Support Requirements

The following section applies the above derived insights to the three focus countries of this study, highlighting challenges and potential support requirements in the introduction of a carbon tax system with an offset component.

[18] Results-based financing (RBF) approaches are characterised as a modality under which finance is dispersed upon achievement of predefined results. RBF application in the context of current and future carbon market initiatives is particularly interesting due to its potential benefits in catalysing effective climate action (Warnecke, Röser, Hänsel, & Höhne, 2015).

In the three investigated countries Chile, Mexico and South Africa, the current carbon pricing policy focuses on the design and implementation of a carbon tax. Furthermore, there are ongoing discussions on the potential transfer of the carbon tax into an ETS or the additional introduction of an ETS complementing the carbon tax. The three countries are at different stages of development in this regard and nothing concrete has been decided yet.

Apart from that, all three countries consider, to varying degrees, the introduction of a domestic offsetting programme that can potentially be linked to the respective carbon pricing instruments on the ground: in Mexico, there has been a political decision on the possibility to use offsets to comply with the carbon tax. However, the operation is pending the development and adoption of a regulatory framework. In South Africa, the National Treasury has published a Carbon Offsets Paper in 2014, considering the use of offsets in the planned carbon tax system. The carbon tax itself, however, has not yet passed the legislative process. In Chile, plans regarding the introduction of a domestic offsetting programme are being considered under the PMR, but there have been no concrete consultations at a political level so far.

The concrete design of the carbon tax, including an offset component, varies considerably across the three analysed countries. In their current state, all of them still have to deal with different issues, which are discussed in more detail in chapter 3 of this report. This suggests that in all three countries, there is still considerable room for refining and improving the carbon tax design as well as for enhancing concrete plans with a view to domestic offsetting programmes. In the following, country-specific challenges with regard to the introduction of a carbon tax will be briefly outlined and potential additional financial support requirements presented. This analysis is principally based on evidence provided in the scope of expert interviews that were carried out with governmental and non-governmental stakeholders in the three countries (see Annexes 2 for details).

Chile

The introduction of the Chilean carbon tax was set in the context of the domestic tax reform of September 2014. With regards to major challenges met in the preparation and implementation of the carbon tax, in particular measurement difficulties were reported. The system that is in place to measure CO_2 and other local pollutants needs to be improved to allow for the creation of an effective MRV system and a registry, as is planned under current PMR activity. In general, however, the experts interviewed agree that the process of developing and implementing the carbon tax has been smooth and it is expected that preparations for operation will be completed in due time for the entry into force of the carbon tax.

Further challenges, however, may arise at a later stage, once the carbon tax has taken effect. In this context, some interviewees mentioned the option to introduce offsets in the carbon tax system at a later point in time. Currently, there are no provisions in place that allow for the use of offsets. Yet, potential linking of the carbon tax with either an ETS or an offsetting mechanism, at a later stage of the process, is being considered under PMR activity in the country.

Additional Support Requirements

Experts interviewed on the Chilean case broadly agree that there are currently no major financial support requirements with regard to the carbon tax as such. Expectations are that tax revenues will more than cover future costs of the system. Technical support, on the other hand, is always needed, as one of the interviewees pointed out. This may relate to an improvement of measuring methodologies or to a gradual increase of the scope and rate of the tax.

Apart from that, considerations by two interviewees on the introduction of an ETS (or a hybrid between an ETS and a tax) or an offset mechanism in the medium-term suggest that additional financial resources may be required for the further development of carbon pricing instruments in Chile. While activities under the PMR help to build up a solid fundament for carbon pricing policies, including an effective MRV system and a registry, the precise design of additional instruments as well as their implementation and operationalisation may require supplementary financial and technical attention. This may include support of preliminary policy

analysis, stakeholder engagement as well as the implementation of pilot phases. However, given the very early stage of discussions on carbon pricing instruments other than the currently developed carbon tax, it is difficult, at this point in time, to assess concrete amounts of financing needs and potential additional finance sources. Yet, several experts interviewed indicated that they were aware of funding opportunities under the GCF or TCAF and consider to apply for funding in the future.

Mexico

PMR activities represent only one part of Mexico's climate policies. Among the countries studied in this report, Mexico is the only one where a carbon tax has already been approved and entered into force in 2014, without involvement of the PMR. Apart from the carbon tax, the implementation of a domestic ETS is currently under consideration (World Bank, 2015a).

Even though the carbon tax is already operational in Mexico, it is subject to several challenges. Two major challenges include the fact that tax revenues are comparatively low (due to low tax rates and a low oil price) and the fact that even though the option to use offsets for compliance was introduced together with the adoption of the tax law, a secondary regulation for the use of offsets is still pending. Offsetting is thus not yet operational in the Mexican tax system.

With regard to this last challenge, opinions vary among the experts interviewed on whether the delay of the secondary regulation on offsetting is caused by the unwillingness of the Ministry of Finance to issue the regulation (since this would lead to an additional reduction of revenues), or by the lack of interest on the part of the tax payers to make use of the offsetting option.

Additional Support Requirements

In Mexico, decisions on the introduction of a carbon tax and an offsetting mechanism on a political level have already been taken. At this point in time, and in view of the above mentioned major challenges, additional financial resources may step in specifically at two points: on the one hand, to help refine the design of the existing carbon tax system and substantially enhance its effectiveness in environmental, social and economic terms, and on the other hand, to effectively promote the development process of a domestic offsetting mechanism. Particular analysis is needed to identify key barriers for the implementation of offsetting, as well as for the careful design of specific provisions and local standards that ensure both the economic viability and environmental integrity of an offsetting programme. Once regulations for the offsetting mechanism have been drafted, additional finance could support a pilot phase.

Given that currently, the focus of the debate seems to shift from the carbon tax to increasingly materialising plans on the introduction of a domestic ETS (planned for the end of 2018), it can be expected that additional financial resources will be required to support respective processes. In addition to that, current PMR activities may be redirected (in a similar way as has occurred in Chile) to focus specifically on readiness activities that prepare Mexico for the implementation and operationalisation of an ETS, including the establishment of a national trading registry.

South Africa

Even though the PMR is currently involved in the design and development of the carbon tax and an offsetting mechanism in South Africa, the process has been initiated several years before PMR support was sought, with a first discussion paper on the carbon tax being published in 2010. In line with this, interviewees highlight that most of the preparatory work has been conducted without foreign support. Particular challenges met include difficulties to develop a coherent proposal that would be technically and politically feasible, as well as strong and persistent opposition from the industry. These two challenges may have contributed to a considerable slowdown of the processes and to the postponement of the introduction of the tax.

Additional Support Requirements

South Africa finds itself in a specific situation, facing its 8th year of economic crisis. It is highlighted in the interviews that in this context, no major announcements with regard to climate change mitigation can be expected. Yet, in view of the recent decisions of COP21 and South Africa's INDC submission, substantial progress with regard to emission reductions is urgently needed.

This situation has particular implications with regard to the question of whether and where additional international climate finance resources may support domestic carbon pricing policies. A clear priority must be given to an acceleration of processes with regard to the implementation of the carbon tax. Accordingly, additional funds may be used to support further analysis of the factors that currently prevent the tax from being implemented and to develop effective solutions. This may include, on the one hand, central work on the synchronisation of political and technical processes. The technical process must be translated into political action, which requires the existence of specific institutional structures. Currently, the draft text legislation relies on the establishment of an effective MRV system. Both processes need to go hand in hand in order for the legislation to be passed. On the other hand, with regard to the current economic stagnation, additional international climate finance may come in to advance the broad analysis of (economic) co-benefits of carbon pricing instruments in order to increase attractiveness of such policies.

With respect to the offsetting component of the carbon tax system, many elements seem to be covered under the MRP. Thus, once the grant agreement has been signed, progress can be expected on that regard. However, while in current provisions the offsetting mechanism is envisaged to accept projects under international rules (international rules and standards are taken as a reference), additional international climate finance sources may provide further support with a particular view to the design of a domestic offsetting programme, based on local standards. As is the case in Mexico and Chile, a further entry point for additional international climate finance may lie in the implementation of a pilot. Also, considering the relatively low carbon price that could currently be offsetted, tools such as initial demand stimulation or financing a top-up price might have a positive effect.

Apart from the carbon tax, additional support requirements may emerge in the long-term with regard to the establishment of an ETS along with the carbon tax, or else the further development and transfer of the carbon tax into an ETS. Even though opinions vary on the state of political discussions on that regard, there is agreement among the interviewees that an ETS in South Africa would have to be linked internationally (at least across regional borders) as the number of domestic entities in South Africa that would fall under an ETS is limited. Additional finance could be used to ensure that the ETS is designed in a way that allows for linking across both systems and borders.

Finally, there is also agreement that additional finance must not necessarily have a focus on carbon pricing policies. Another important issue in the South African climate change debate is the diversification of the energy sector. Additional funds may support the restructuring of the sector, for example through the development of skills and capacity, promoting a shift away from coal (and considerations regarding nuclear) to renewable sources. Major finance gaps are also expected to arise with regard to other areas, in particular adaptation.

Key Message

A close analysis of the country-specific political processes with regard to the introduction of a carbon tax reveals that in all three cases, these processes have been triggered by a fiscal reform process. Thus, PMR support has not been a decisive factor neither in Chile, nor Mexico, nor South Africa with regard to the initial decision to introduce a carbon tax. Still, the PMR is involved, to different degrees, in the concrete design and implementation of the carbon tax systems and potential offset components. While explicit support of the carbon tax with an offsetting programme under the PMR is only present in South Africa, PMR funds in Chile are being redirected from a proposal to design and implement an ETS to a carbon tax. In Mexico, the PMR mainly supports the introduction of credited NAMAs but is also involved, in the form of technical support, in the offset component of the Mexican carbon tax. Remaining issues in all three countries, in particular with regard to refining the design of a carbon tax system and introducing the option of offsetting, suggest that

there may be aspects that are not (fully) covered by the mandate of the PMR, encounter difficulties in their execution or need additional flanking measures to become fully operative. These could be potential entry points for additional sources of international climate finance that go beyond the scope of the PMR or that could effectively accompany PMR activities in order to additionally support and advance the diffusion of carbon pricing policies around the world.

5 Design Recommendations for National Offset Policies

This section discusses selected design aspects of national offset policies and derives recommendations for policy makers who are implementing or planning to implement carbon pricing instruments at the national level. It builds on the information presented in the previous sections, taking into account discussions on interactions of national offsets with other policy areas and establishing links to the implementation status of carbon taxes and their offset components in the three partner countries, Chile, Mexico and South Africa, where appropriate.

More precisely, this section addresses the question of how a domestic offset policy must be designed in order to allow for the parallel use of offsets in different carbon pricing instruments. Particular attention will be paid to two cases: in the first case, a country decides to introduce both a carbon tax and an ETS at the domestic level, aiming, for example, to target emission reductions in different sectors. In the second case, a country that has already introduced a carbon tax considers using this tax as a transitional instrument to an ETS. In both cases, existing or envisaged offset components can be introduced to a carbon tax and an ETS, either simultaneously or sequentially. Additionally, consideration is given to the question of how a domestic offset policy must be designed to foster a global carbon market and counteract fragmentation of standards through the emergence of various national offset policies.

The relevance of these questions is reflected in the Paris Agreement which provides a framework for a decentralised, bottom-up approach to climate action, while highlighting the importance of connecting policies at the national and international level in order to ratchet up climate ambition. Consistency and compatibility of emerging market-based mechanisms and their components, such as MRV or offsetting, are important to allow for interactions between different systems and instruments, in particular the transfer of mitigation outcomes.

The starting point for this section is a brief discussion of the motivation behind the introduction of an ETS at the national level, either in parallel to a carbon tax or building upon a carbon tax, and the role of offsets therein (5.1). Subsequently, concrete design options for a domestic offset policy are explored, focussing on the use of offsets in terms of their transfer into different domestic target systems such as carbon taxes or ETSs (5.2). The foundation is laid by fundamental considerations that are central to the design of all offset programmes (5.2.1). On that basis, key administrative processes that support the transfer of offsets into their targets systems are discussed (5.2.2). In addition, the requirements of an offset policy to also ensure international compatibility are briefly considered (5.2.3). The section ends with a summary of the general results (5.3), leading to the derivation of concrete recommendations for the design of national offset policies.

Where appropriate, this section reflects experiences made in the three focus countries of this study, Chile, Mexico and South Africa. Practical experience regarding the design of an offset component for a carbon tax, the potential link of this carbon tax with an ETS, or its transition into an ETS, however, is limited in these countries and beyond. As outlined in previous sections, the carbon tax in Chile does not include an offset component and considerations on transforming the carbon tax into an ETS remain a distant prospect. South Africa, on the other hand, is currently developing an offset component for its envisaged carbon tax but is not yet considering the introduction of an ETS nor the transition of the tax into an ETS. While Mexico may be a potential candidate for the combined introduction of a carbon tax and an ETS, the currently pursued offset approach offers little prospects for wider application.

Given the very early stage in the process of setting up a structure in which offsets are used in different carbon pricing instruments at the national and international level and the lack of practical experience regarding its operation, the recommendations developed in this section will be largely theory-based.

5.1 Offsets in a Carbon Tax and an ETS

ETSs and carbon taxes are the most popular market instruments that can deliver an explicit price on carbon. While both instruments can achieve cost-effective and efficient emission reductions, a key difference is the

level of uncertainty associated with the carbon price and emission reductions that will be achieved. In an ETS, the government sets the quantity of emissions through a cap and allows the market to determine the price, whereas in a carbon tax, the government sets the price and allows the market to determine the quantity of emissions (PMR & ICAP 2016).

Increasingly, governments also explore a combination of features of carbon taxation and emissions trading to form hybrid approaches, or they employ ETSs and carbon taxes together at the national level (World Bank, 2015b). Hybrid approaches exist in different forms, for example, an ETS combined with a price floor and ceiling in order to influence the price level to a certain extent, or tax schemes that accept offsets to lower tax liabilities and introduce a trading element.

For a country that has implemented a domestic carbon tax, different options for the introduction of an ETS exist. A country may introduce an ETS and a carbon tax in parallel, for example to target emission reductions in different sectors. This is the case, among others, in France, Ireland, Portugal and Sweden, where carbon taxes are applicable to selected non-EU ETS sectors. However, an ETS and a carbon tax may also significantly overlap. This is the case in Norway, where some installations, in particular offshore petroleum installations, are covered by both the Norwegian ETS and a carbon tax. The tax rate for theses installations had been lowered in 2008 with the introduction of the ETS. In 2013, however, the government increased the tax rate again. The idea is to reduce it once allowance prices in the ETS rise compared to the levels when the tax increase was implemented (EDF & IETA, 2013). In a different setting, a country may consider to use the carbon tax as a transitional instrument to an ETS. This was, for instance, mentioned by some stakeholders as a rationale for the carbon tax introduction in Chile (cf. chapter 3.1) and had also been envisaged by the previous Australian government. In both situations, the introduction of an offset component to a domestic carbon tax can play an important role with a view to the complementary or subsequent implementation of an ETS.

The Role of Offsets for the Combined Introduction of a Carbon Tax and an ETS

As highlighted in previous sections, the use of offsets has multiple objectives. Formally, offsets are expected to reduce the overall cost of mitigation action by disclosing the most cost-effective reduction options and by opening up more options for subjects liable to a tax or ETS. In combination with an explicit carbon pricing instrument, such as a carbon tax or an ETS, they may extend the price signal of the system to other sectors and/or regions and drive mitigation in sectors and/or entities that are not part of the regulatory system. In the political debate on carbon pricing, offsetting options may reduce opposition against the introduction of explicit instruments, in particular on the part of the private sector, as offsets potentially soften adverse economic effects of carbon pricing. Informally, the use of offsets may also be motivated by the intention to support existing offset projects through safeguarding demand for credits, as was reported for Mexico and South Africa (cf. chapters 3.2 and 3.3).

With a particular regard to a setting in which a carbon tax and an ETS are implemented or planned to be implemented at the national level, the reasons for introducing an offset mechanism may go beyond the above mentioned. The focus is placed on two specific cases:

In a **first case**, a carbon tax and an ETS are being implemented at the national level, resulting in co-existence of the two instruments. While theoretically, different carbon pricing instruments may overlap within a particular sector, we assume in this case that emissions trading and carbon taxation are introduced to different sectors. Without any kind of linking, each system establishes its own independent carbon price and prices do not converge by the means of markets alone. If links are established at the national level, for example to promote a certain degree of price harmonisation, this can take the form of a uni-directional direct link through acceptance of ETS allowances for carbon tax obligations, or of an indirect link via a crediting mechanism, such as an offset programme. In case of indirect linking, the carbon tax and the ETS compete for credits in the same third system. If the price for offsets is lower than the price level or tax rate in the indirectly linked systems, this can (but does not have to) lead to price convergence among all three systems: if, at the time of linking, the price for ETS allowances is higher than the carbon tax rate, offsets flow into the ETS. As a result, and depending on the quantitative limitation for the use of offsets, prices for ETS allowances converge

towards the level of the carbon tax rate. On the other hand, if the price for ETS allowances is lower than the carbon tax rate, offsets flow into the carbon tax system. Consequently, the effective tax burden for the regulated entities is reduced but there is no price convergence, as the carbon tax rate remains fixed.

The indirect linking of a carbon tax with an ETS via an offset mechanism brings along certain benefits of direct linking – such as cost efficiency gains and potential price harmonisation – while requiring less standardisation. This can increase the political and technical feasibility of linking approaches, in particular in countries with limited institutional and technical capacities.

In a **second case**, a carbon tax is being implemented at the national level and planned to serve as a transitional instrument to the introduction of an ETS. In general, the realisation of a carbon tax can be expected to provide a solid basis for the implementation of an ETS. Both instruments rely on common core components, such as an effective MRV system (even though MRV requirements may differ in the respective systems, as explained below). One central difference in the technical set-up of both instruments, however, is that an ETS establishes tradable units in order to allow emissions trading while a carbon tax does not.

With a particular view to the potential transition of a tax into an ETS, the introduction of an offset component can offer specific benefits. First of all, offsetting allows to involve the private sector in the search for cost-effective mitigation options outside the regulated sectors. Sectors that turn out to be particularly attractive for private investment can be incorporated, at a later point in time, into an ETS. While broadening the feasible scope of an ETS, this can help to reduce the financial burden that is related to the establishment of an ETS in terms of upfront costs and thus enhance political feasibility. Furthermore, offsetting introduces a 'trade' component into the system. Some sources refer to this setting as a hybrid solution or 'tax and trade' system, in particular in the South African context.[19] On that regard, offsetting can familiarise regulated entities with a trading element and encourage them to develop respective capacities. This can reduce general concerns regarding emissions trading and enhance the technical feasibility of the introduction of an ETS, in particular on the part of the regulated entities.

The brief discussion of the two cases shows that the introduction of an offset component into a carbon tax is indeed useful when considering the introduction of an ETS at the national level, either complementary to the carbon tax or building upon it. While the motivation behind the choice of a specific setting for carbon pricing may differ depending on country-specific circumstances and related policy objectives, the implications for the design of a national offset policy are relatively straightforward and show high consistency across the two cases illustrated above.

5.2 Design Options for a National Offset Policy

There are various options for the design of an offset component. The final approach chosen by national regulators largely depends on the main objectives behind the introduction of such an instrument, the specific set-up of the target system(s) (carbon taxes or ETSs), and the technical and institutional capacities of a country.

Already, there are general guiding frameworks for policy makers that plan to design and implement a domestic offset programme (PMR, 2015a, 2015b). These frameworks include a step-by-step approach that leads through the development and implementation of several key design features, such as governance structure, project cycle, and MRV and registry institutions. They do not, however, consider the various options that exist for the use of offsets and their implications for the design of key administrative processes that support the transfer of offsets into different target systems.

[19] It must be pointed out that the term 'tax and trade' is primarily used in literature to describe a setting in which the combination of features of a carbon tax and a cap-and-trade system results in an ETS with a price ceiling and a price floor (PWC 2009). However, the term has also been used in the context of South Africa's plans to introduce an offset component into its carbon tax regime (Gonzalez, 2013).

This section takes existing international experiences as a starting point and outlines how domestic offset programmes can, in general, make use of them. On that basis, the relevance of key administrative processes for the transfer of offsets into a carbon tax and/or an ETS is discussed, focussing, in particular, on project approval processes, MRV procedures and registration practices. Attention must be given to the design of these processes in order to ensure the environmental integrity of offset programmes and their target systems, irrespective of the final setting in which they are used.

5.2.1 Fundamental Considerations

Benefitting from International Experiences

Instead of developing a national offset standard from scratch, countries can make use of internationally available institutional frameworks and administrative processes that have been established, for example, in the context of the CDM. The degree to which a domestic offset programme relies on this existing international infrastructure can vary. The consideration of whether and how this international experience can be leveraged to develop domestic offset arrangements is a central design choice for domestic policy makers. It determines in how far institutions and processes are designed and run by the domestic government or by an international offset programme body. Moving along the spectrum from a fully reliant domestic offset programme (that accepts only offsets from established standards, e.g. the CDM or voluntary standards) to an independent one, the regulatory role of the domestic government increases and the authority of the international programme body decreases. In a fully independent domestic offset programme, a country can create its own institutions and administrative processes but still build on established international standards and methodologies as a basis for customisation to the domestic context. The most well known reference programme at a global level is the CDM, which has served as an important model and inspiration for most other offset programmes. The decision of policy makers regarding the role that international programmes can play in the design of a domestic offset policy depends on multiple factors, the most important being:

- Short- and long-term objectives of the offset programme,
- Current situation with regard to domestic capacity and desire to develop these capacities,
- Alignment of international offset programmes with domestic priorities,
- Preferred level of control with regard to the approval of projects and issuance of credits,
- Targeted delivery periods, and
- Available financial resources for planning, designing and implementing an offset programme (PMR & ICAP 2016).

With a particular view to the use of offsets in terms of their transfer to different target systems, a focus must be placed on key administrative processes that support this transfer. These key administrative processes can also be based on international experiences, to the extent stated above. Their ultimate objective should thereby always be to safeguard the environmental integrity of the offset programme and its target systems.

Ensuring Credibility, Consistency and Compatibility

The concept of environmental integrity, which has been introduced in chapter 4.3, can be considered central to the environmental performance of any carbon pricing instrument that allows for the use of offsets. The concept of environmental integrity is also at the core of the “3Cs” approach (Credibility, Consistency, Compatibility) that has been coined by the PMR in the framework of global carbon market development. The basic idea of the “3Cs” approach is to provide an opportunity for countries to work together to build common frameworks, including MRV, registry and data management systems, which are

- Credible: effective and trusted,
- Consistent: internally consistent, consistent over time, consistent with domestic as well as international norms and standards, and

- Compatible: with other mechanisms domestically and internationally, to minimise duplication of effects and costs, support credibility, address competitiveness concerns and retain the option for future linking (PMR Secretariat 2014).

The ”3Cs” approach has gained particular attention in the debate on linking different carbon market mechanisms. Compatibility and consistency of the design features of the systems to be linked are key to protect their environmental integrity (PMR 2014). While linking is generally associated with cross-border transfers of mitigation outcomes (cf. chapter 4.3.3), the “3Cs” approach may also be relevant for the indirect linking of a carbon tax and an ETS through an offset mechanism or the transition of a carbon tax with an offset component into an ETS. Both can be considered cases of linking in the broader sense, with offset transfers limited to the domestic level.

5.2.2 Key Administrative Processes

Environmental integrity of an offset programme can be operationalised through the eligibility of project types, methodology development, additionality and baseline rules, as well as through particular MRV requirements (PMR, 2015b). As mentioned above, key administrative processes that ensure that these issues are addressed effectively include (1) project design (including methodology development) and approval processes; (2) monitoring, reporting and verification (MRV) procedures; and (3) registry and registration practices. These processes are also reflected in the readiness elements that ensure environmental integrity in the broader international context (cf. chapter 4.3.2).

When designing a domestic offset policy, it is important to align these administrative processes with those of potential target carbon pricing instruments and ensure consistency and compatibility across systems before linking or combining them. The following section briefly outlines the relevance of each administrative process for the environmental integrity of a domestic offset programme and discusses implications for the use of offsets in a carbon tax and an ETS, either simultaneously or subsequently.

Project Design and Approval Processes

Project design and approval processes can directly affect the environmental integrity of the domestic offset programme by determining which project types and activities are eligible for generating offsets, and by defining the stringency of the underlying methodologies. Thus, the starting point for the project cycle of all offset programmes is the development of a project concept, including the design and development of baseline and monitoring methodologies to credit offset activities. Baseline methodologies define how to establish a baseline and determine additionality, while monitoring methodologies specify how (stringent) the actual emission reductions are quantified. With regard to methodology development, policy makers can decide whether to take a bottom-up approach, in which project developers propose specific methodologies for their projects, or a top-down approach, in which methodologies are developed by the programme itself. Furthermore, a combination of both may be feasible. In either case, already approved methodologies from existing international programmes provide a valuable starting point. Furthermore, standardisation of methodologies can make the approval process for projects easier, more transparent and streamlined, for example through the use of default parameters to calculate project emissions, sector-wide performance standards for additionality assessment and baseline setting, or positive lists (PMR, 2015b).

With particular regard to the two cases in which offsets are planned to be used either simultaneously or subsequently both in a carbon tax and an ETS, it can be expected that the methodological approach (whether bottom-up or top-down) is less relevant for the environmental integrity of the programme. More important from an efficiency and integrity point of view is the question of whether to base methodology development on existing methodologies, as well as the degree of standardisation. If offset credits are to be accepted in two different domestic systems (and, in the long-term, at the international level), it is useful to take already approved and well-established methodologies and standards as a reference. This decreases subjectivity in the approval process and increases the probability that a methodology is accepted in different systems. In the past, many domestic offset programmes have taken advantage of the wealth of CDM methodologies and

standards that already exist. Country-specific adjustments, such as qualitative limitations on the accepted standards and project types, may help to align the domestic offset policy with the respective carbon pricing system and specific national policy objectives. In South Africa, for example, currently, the use of offsets that are generated domestically and outside the scope of the carbon tax under the CDM, VCS, Gold Standard or CCB Standards are being discussed for use in the carbon tax (cf. chapter 3.3). The methodologies that underlie these programmes and standards may provide a good starting point when considering the design of an own, domestic South African standard at a later point in time. With regard to the two cases of interest, it can be concluded that considerations on methodology development and approval processes are similar, irrespective of whether offsets are used simultaneously in an ETS and a carbon tax, or in a carbon tax which is transferred into an ETS.

Monitoring, Reporting, Verification (MRV)

A robust framework for MRV of emission reductions within an offset programme is essential to ensure the environmental integrity throughout the offset origination process. A prerequisite for the issuance of offsets is that the project operator monitors (i.e., measures and quantifies) the emission reductions that have actually occurred as a result of a registered project activity. Monitoring occurs based on a monitoring plan that has been developed and approved during the project design and approval process. The monitoring results are reported periodically. Based on the operator's monitoring report, a verification body – which can be either an accredited, independent entity or a public authority – verifies and confirms or rejects the claimed emission reductions.

A robust MRV system is not only a core component of all offset programmes but also central to other carbon pricing instruments, including carbon taxes and ETSs. The specific design of this component, however, varies considerably from one system to another. In order to ensure the consistency and compatibility of offset use in multiple target schemes, these differences in MRV rules must be taken into account when designing an offset policy which is (to be) integrated into other carbon pricing instruments.

With regard to the potential target systems considered, it can be assumed that robustness and complexity of MRV approaches in ETSs are usually higher than in carbon taxation approaches. Carbon tax related MRV schemes are often inspired by long-established financial reporting procedures since a carbon tax is usually integrated in the wider tax scheme of a country. Verification is integrated in other financial audits which are required for further tax obligations, although the reported data is different. Under a carbon tax, the regulated entities monitor and report, on a regular basis, the purchasing and sale of fuel and other input materials (in an upstream system) or their emissions (in a downstream system). In an ETS, the covered installations implement monitoring and reporting procedures according to a detailed monitoring plan which has been developed and approved in accordance with ETS legislation. The regular emissions report must be verified by a verification body and accepted by the authorities. After verification, the operator must surrender an amount of emission allowances equivalent to the verified emissions. The main reason why ETSs tend to have more complex MRV requirements (and consequently higher transaction costs) is the fixed emission reduction target which requires stringent MRV of all mitigation outcomes (internal ones as well as those imported through offsets) in order not to compromise the environmental integrity of the system. Since a pure carbon tax does not have a fixed mitigation target, such as a cap, less stringent MRV rules for mitigation outcomes may not directly undermine the environmental integrity of the system in terms of a climate target (see explanation above). However, when offsets are generated based on less stringent MRV rules, these offsets might come along with lower transaction costs and provide less certainty that the emission reductions claimed actually happened. Such inflow of potentially cheaper offsets can have two effects: on the one hand, cheap offsets may reduce revenues raised through the tax, affecting the economic efficiency of the tax system (from a regulator's point of view) and undermining policy goals that are linked to these revenues (such as, in the case of Chile, educational reform, better health and other social programmes (cf. chapter 3.1)). On the other hand, cheap offsets may reduce the financial incentives for entities covered by the tax to reduce emissions in their

own installations. This may also undermine the policy goals of a carbon tax, provided that emissions reductions are part of these policy goals. Thus, the environmental integrity of a carbon tax – if interpreted more broadly – may also be affected through the use of offsets, even though in a more indirect way than this is the case in an ETS.

With regard to the design of an offset policy, this implies that an offset component generating offsets for a carbon tax may require less stringent MRV rules than an offset component designed for an ETS: an offset component that is designed to only serve a carbon tax has to fulfil similarly stringent requirements compared to the MRV requirements of the tax system itself, in order to not undermine the integrity of the tax system. As offsets are used to reduce tax liability, they represent an economic benefit and, again, stringent requirements appear appropriate to demonstrate reliability. However, when planning to also use the generated offsets in an ETS, either simultaneously through indirect linking or after the transition of a tax into an ETS, it is often not sufficient to meet the standards set for MRV in a carbon tax regime (unless these standards are themselves inspired by international standards or best practices). Instead, the highest available standards for MRV at the national level (and, if linking across borders is envisaged, at the international level) should be taken as a reference for MRV procedures in the offset programme. This ensures consistency and compatibility of the programme with different target systems and facilitates the use of offsets therein without compromising environmental integrity. From an overall domestic policy perspective, the creation of a comprehensive national policy framework that integrates separate MRV approaches into a broader climate change policy context can help to centralise and harmonise different MRV activities, providing a sound foundation for several linking options.

Only minor differences arise from the two specific cases of interest in which offsets are planned to be used either simultaneously or subsequently both in a carbon tax and an ETS. In both settings, the offset policy design must meet MRV requirements of a carbon tax in the short-term while already anticipating potentially more stringent MRV requirements that will have to be met in the long-term. Thus, in both cases, the ETS, whether already implemented or planned to be implemented, sets the standard for the design of MRV procedures in an offset programme. If less stringent MRV rules are chosen, this has different implications: in a setting in which offsets are used in two different systems at the same time, low MRV requirements imply that offset demand will be limited to the carbon tax regime (as offsets are not acceptable under the ETS), undermining the objectives of indirect linking. If, on the other hand, the carbon tax is used as a transitional instrument to an ETS, less stringent MRV rules imply that once the transition has been completed and the only target system for offsets is the ETS, demand for offsets will dry up due to low rates of acceptance in the ETS. Against this background and in view of the various countries that implement MRV procedures as ‘no-regret’ option for the future use of carbon pricing instruments or for the immediate introduction of a carbon tax with transition plans into an ETS, it is highly recommended to focus on stringent MRV rules from the beginning. Benefits from such a ‘no-regret’ approach might be limited if regulated entities are used to lenient rules in a transitional period and must be trained to follow stricter rules later on.

Registries and Registration Procedures

Registries and registration procedures are equally important components for safeguarding environmental integrity of offset programmes as they track information on the mitigation activities and generated offsets. Central elements of registries and registration procedures include a project database, containing information on mitigation activities at various stages of the project cycle, and a registry system, tracking transfers and the use of offsets from issuance until retirement or cancellation. A registry, serving as transaction log, first comes into play when a project has successfully completed the project approval process and is registered under an offset programme. The verification and certification of emission reductions lead to the issuance of offset credits, which are then listed in a project’s account in this registry. From there they can be transferred among participants, and retired or cancelled. While the project database is often operated by the institution administering the offset scheme, policy makers that design an offset programme can choose whether to outsource registry system functions to third party registry providers, with varying degrees of involvement in its

set-up and operation, or to create an own registry system. Major registry service providers include Markit (Markit, 2016) and APX (APX, 2016), who maintain a software platform with interface details and operational requirements to be specified by the offset programme.

While a registry, serving as transaction log, is also a central component of an ETS, a carbon tax can forgo a registry since no units are issued. The transfer of offsets into these two different target systems therefore involves different administrative procedures with regard to registration: offsets that are planned to be used in an ETS must be transferred from the offset programme's registry to the registry of the ETS, according to specific transfer rules outlined in ETS legislation. Offsets that are generated for use in a carbon tax, on the other hand, do not need to be transferred. Thus, administrative procedures can be limited to the cancellation of the offsets in the offset programme's registry. This may still require an effective and efficient oversight mechanism to ensure the environmental integrity of the offset programme as well as the economic integrity of the tax system. Minor differences can be expected to arise with regard to the two cases of interest. When a carbon tax is planned to be indirectly linked with an ETS, registration procedures to be provided by the offset programme involve two different processes: cancellation of offsets in the programme's registry upon request of the tax authority, and transfer of offsets to the ETS registry in line with specific transfer rules (including retirement in the programme's registry). In case a tax is transferred into an ETS, registration procedures involve only one process at a time: cancellation of offsets under the carbon tax and transfer of offsets once the transition to an ETS is completed. At an advanced stage, it may be useful to harmonise registration rules of the offset programme with those applying to the ETS in order to facilitate tracking of all traded units and ensure the integrity of the systems. Even more advanced, and with a particular view to international linking, registries can also be connected. An example is the connection of the European Union's Community Independent Transaction Log (CITL) and individual Member State registries with the United Nations' International Transaction Log (ITL), which means that carbon credits issued under the CDM can be transferred to registries of EU Member States (cf. chapter 4.3).

Reflection on Alternatives to Crediting

With particular regard to the introduction of an offset component to a carbon tax, thought must be given to potential alternatives to the use of offset credits. In theory, it is possible to allow deductions to the tax bill based on the amounts of reduced emissions stated in verified monitoring reports. The actual emission reductions achieved by offsetting activities for a certain time period are quantified and verified already before an issuance procedure starts. This approach might offer the least cost intensive option for the inclusion of offsetting activities into a carbon tax scheme since the creation of units is not required. Costs for issuance procedures and the operation of a registry to log unit transaction are avoided. Although the environmental integrity is not per se at risk, double counting issues still need to be addressed: similar to units, it needs to be ensured that monitoring reports are used and "cancelled" only once. This could be tracked as part of the project database, where additionally, monitoring reports would need to be included. This is, for example, already implemented through the CDM project database which transparently provides all relevant project documentation including monitoring reports. It also needs to be ensured that mitigation activities which have provided their monitoring reports to entities covered under the carbon tax do not apply for issuance of units in any other mechanism.

Apart from these theoretical considerations, it does not seem to be advisable to follow this route in either of the two cases discussed in this section. This approach, although cost efficient within isolated structures, does not provide any future options to link either simultaneous or subsequently to an ETS, neither domestically nor internationally. Given that tradable units present a systemic core component of all ETSs, a carbon tax system including an offset component in which actual emissions are calculated based on monitoring reports clearly lacks the fundament for transferring this system into an ETS or indirectly linking it to an ETS. Yet, international linking might still be possible to result-based financing schemes where monitoring reports are potentially accepted as a proof that certain results have been met. This, however, goes beyond the scope of this study.

Reflection on Up- and Downstream Approaches

When introducing a carbon pricing instrument at the national level, such as a carbon tax or an ETS, policy makers have to define the point of regulation: in an upstream approach, the fuel supplier must pay the tax or surrender allowances when fossil fuels are brought into the system, while in a downstream approach, taxes are paid and allowances surrendered by the final emitter.

The choice of whether a carbon tax or an ETS takes an upstream or downstream approach, or a combination of both, depends on country-specific circumstances and underlying policy objectives. In general, an offset component follows the design choice of the target system: depending on whether the carbon pricing instrument is planned to be applied upstream or downstream, either producers and importers (upstream) or end users (downstream) can make use of offsets to comply with their obligations.

As has already been discussed in the context of direct linking between an ETS and a carbon tax, up- or downstream regulation becomes an issue for the use of offsets in the case of linking: if two systems with different approaches are linked, there is an increased risk for multiple carbon pricing and double counting (cf. chapter 4.3.3). Especially the additional risk of double counting extends also to the use of offsets. Offsets allowed in ETSs should not originate from sources or sectors which are covered by the ETS itself in order to avoid undermining the environmental integrity. A similar recommendation may apply to a situation where offsets are generated in an installation covered by a carbon tax scheme. At first glance, it could still be argued that this would not affect the environmental integrity since the carbon tax has no mitigation objective similar to a cap in an ETS. However, if an installation that is covered under a tax scheme also generates offsets, this may imply that, on the one hand, the taxable amount of emissions is reduced through the implementation of mitigation measures on-site, thus reducing the carbon tax bill of the installation, while on the other hand, this installation can sell certificates for the generated emission reductions to other entities covered by the carbon tax. This could present a case of double use, i.e. compensating twice for the generated emission reductions, which would not only undermine the economic efficiency of the carbon tax in terms of reduced revenues but also its environmental integrity in terms of mitigation incentives that are directly set through the carbon tax, potentially undermining its political objectives (see discussion on environmental integrity in chapter 4.3). However, at the same time, it could also be argued that offset projects that have higher costs per tonne of CO_2 might still be financially additional if tax reductions alone would not suffice to achieve economic feasibility for these mitigating activities. In this case, the rules for the offset component must ensure that the financial additionality under these conditions is tested during project approval. In order to avoid these type of risks, we tend to recommend not to allow offsetting activities in carbon tax regulated entities or sectors in both cases of interest in which offsets are planned to be used either simultaneously or subsequently in a carbon tax and an ETS. In general, the complexity of these issues increases when up- and downstream approaches are indirectly linked through the same offsetting system. Therefore, this option requires careful consideration of boundary setting to be able to avoid adverse effects.

5.2.3 Implications from the International Perspective

The cross-border connection of emerging national market-based mechanisms around the world can be considered key to a successful and cost-effective global climate policy in the long-term. In recent years, a loss of confidence in international market mechanisms, due to a lack of demand, has been accompanied by a growing interest in domestic carbon pricing instruments, in particular carbon taxes and ETSs. There is a need to combine and link these national-level initiatives in order to counteract a further fragmentation of the carbon market and give a global response to climate change. Offset mechanisms may play an important role in this context as they can represent a linking element between different carbon pricing instruments at the national and international level. A central prerequisite for that is the consistency and compatibility of the offset programme with the systems to link.

The Future Role of International Mechanisms

In the past, the most straightforward approach to ensure consistency and compatibility in the use of offsets in different systems has been the full reliance on international offset programmes, allowing only offsets from established standards to enter a system. The most widely known international offset programmes are the two flexible mechanisms established under the Kyoto Protocol: the Clean Development Mechanism (CDM) which generates Certified Emission Reductions (CERs), and Joint Implementation (JI) which generates Emission Reduction Units (ERUs). However, while the Paris Agreement includes provisions for the creation of new international cooperation mechanisms which are expected to replace the CDM and JI, it is still not clear how exactly the transition from the existing Kyoto mechanisms to a new international carbon market after 2020 will be managed. The Paris Agreement does not include, for example, any details about a potential carry-over of Kyoto units after 2020 or regulations regarding their cancelation. This increases the uncertainty on the future role of existing international mechanisms and their tradable units (in particular CERs and ERUs) and increasingly encourages countries to establish their own domestic schemes. While the Paris Agreement sends a clear message that the (international) consistency and compatibility of these emerging domestic carbon pricing schemes is important and desirable, the absence of rules and regulations for the post-2020 period makes it difficult for countries to align with future provisions, for example based on Article 6.4. Even though it is expected that a mechanism resulting from Article 6.4 constitutes a similar structuring element in a future global carbon market as the CDM did in the past, this still needs to be proven. In the meantime, in order to ensure international consistency and compatibility, it seems recommendable to build on the existing established approaches and structures while preparing for new elements such as "net mitigation" or "own contributions". In this context, it is useful to be aware of the different roles the CDM can play for national offset policies in the current situation, and their implications for the design of a national offset programme.

The Role of the CDM for National Offset Policies

The CDM, along with other international market mechanisms, currently finds itself in a relatively quiet period. This slowdown has been triggered by the end of the first commitment period of the Kyoto Protocol, combined with a weakened demand for international offset credits in general due to the global financial crisis and its extended legacy. While there still is trading through the CDM and new projects are registered, credits from projects registered after 2012 in non-LDCs are not eligible for the EU ETS – which has been the main source of credit demand in the last decade. As a consequence, the volume of issuance and trading has declined significantly since 2012 to approximately a third of its peak value (UNFCCC 2016).

The CDM is unlikely to re-emerge as the major international market mechanism of a future climate regime, at least not in the same form and function in which it exists to date. However, central components, tools and institutions that have been established in the context of the CDM may play an important role in the support of the development of domestic and regional offset programmes. Three – not necessarily mutually exclusive – scenarios can be envisaged:

(1) Reliance on CDM Functions for Operation of Domestic Offset Programmes

Several domestic offset programmes have developed that strongly rely on existing CDM infrastructure. In the most extreme of all cases, a domestic offset programme can fully rely on the CDM, by allowing only CERs issued by the CDM as offset credits. Such an approach entails minimum additional transaction costs, a high level of security regarding environmental integrity and international acceptance of credit accounting, and the opportunity for immediate implementation, without the need to establish an infrastructure in the host country. For example, South Korea's ETS allows the use of credits from domestic CDM projects (ICAP 2016). However, the sustainability of the full reliance approach is uncertain, given that it is not clear what will happen to existing CDM projects, or to existing structures such as the CDM Executive Board after 2020. This prospect presents a serious risk of discontinuation or disruption to the carbon taxes or ETSs that are attached to the offset programmes, unless measures are put in place for a transition to a decentralised programme.

(2) Conversion of CDM Institutions to Provide International Support for Decentralised Approaches

Other domestic and regional offsetting programmes have developed in a more decentralised manner. For example, China's CCER programme has made use of CDM methodologies (complemented by some new non-CDM methodologies) and has implemented a programme with an institutional setup that mirrors the CDM in many ways, but with national institutions for project approval and credit issuance. Such decentralised approaches can learn from the structures of the CDM in the design of their mechanisms. Other offset programmes that have developed national institutions that largely reflect CDM structures include Japan's Bilateral Offset Crediting Mechanism (BOCM) and Thailand's Voluntary Emission Reduction Program (T-VER).

However, a significant role for international institutions remains in this regard for two reasons. Firstly, decentralising all functions to the level of national institutions is likely to result in increased transaction costs, since processes will be replicated in all individual mechanisms. Processes such as the maintenance of a registry, for example, would entail fewer transaction costs if operated at the international level simultaneously for multiple offset programmes. Secondly, and closely related, international guidance and review of all offset mechanisms is essential to ensure the potential compatibility of different programmes, the integrity of emission reductions, and the international acceptance of accounting methods.

In this regard, it can be argued that there is a major role for an international review facility. Whilst offset programme processes such as project approval procedures and even credit issuance could feasibly take place at the level of decentralised national institutions, an international review facility could assume responsibility for international review and acceptance of regulations and procedures for decentralised MRV and credit issuance, and for occasional international audits. Such an international body may also act as a central administrative facility to compile information on market activity from the authorities of various decentralised programmes, and may provide a platform for experience sharing and cooperation. The development of such an international body is overdue, since several decentralised offset programmes are already being designed and implemented without concrete international guidelines, presenting a risk for lock-in to fragmented approaches. An international review facility could provide recommended guidelines for new decentralised offset programmes to develop their regulations and processes in a way that will ensure they can be internationally recognised, consistent and compatible.

While such an international body could be constructed by a working group of participating countries, the conversion or transition of existing CDM institutions may be the most efficient solution.

(3) Disbanding of CDM and Complete Decentralisation of Offset Programmes

The possibility that CDM institutions are disbanded in the period after 2020 remains feasible. In this case, all institutions and processes for decentralised offsetting programmes would have to be implemented at the national level. Unless this transition occurs in parallel with the assumption of some of the roles by a new international body (as described in the previous scenario) this will involve major transaction costs at the national level, which may negatively affect the feasibility of domestic offset programmes altogether.

A review of the envisaged scenarios indicates that there is a major role for the CDM in the development of new (domestic) offset programmes, but that it would be unwise for countries with a long-term perspective to develop complete reliance on the mechanism. Realistically, a mixture of these scenarios is feasible. Domestic offset programmes could be implemented immediately with the use of CERs, and the programmes could be developed gradually, with an international guidance body providing support for the development of decentralised systems. The role of existing CDM institutions and capacities could also evolve to fulfil such an international function.

5.3 Recommendations

While the concrete motivation for the introduction of different carbon pricing instruments at the national level may differ depending on country-specific circumstances, the implications and recommendations that result for the design of a domestic offset policy are relatively straightforward.

Define objectives: Starting point for the development of any national policy in general and an offset policy in particular is the definition of objectives. In this context, it is important that countries become aware of their own objectives at an early stage in the process of policy development. This requires full knowledge about the existing policy options and their impacts. Careful consideration of the short- and long-term impacts of a policy must be given in order to ensure that short- and long-term goals can be met with the chosen approach. An early stakeholder involvement and a good understanding of domestic options and needs are required to ensure general acceptance and protect the instrument against the influence of lobbying. A sudden change of strategy due to unclear objectives, on the other hand, can hinder the development and implementation of a policy (as has been revealed in chapter 4.4). Hence, the definition of clear objectives for a domestic offset policy is key and provides a sound basis for the generation and use of offsets in the future.

Make use of international experience: An important decision about countries' objectives is linked to the question to what extent countries choose to rely on international experience and infrastructure or on plans to develop an independent domestic approach. Full reliance on international mechanisms, such as the CDM, has certain advantages but also includes the risk that the infrastructure has to be replaced by national institutions and procedures, for example post-2020. This may be less relevant for a country with short-term goals only, aiming at providing short-term support to existing national mitigation activities. When choosing an independent domestic approach, on the other hand, countries need to have a realistic view about their own capabilities and persistence of political support for a domestic approach, for example in a case in which high costs for the operation of a system reduce the net revenues from the introduction of a carbon tax. In the end, a realistic and feasible way forward can be to take existing international components, tools and institutions as guidance in the establishment of a domestic approach and align them with national (short- and long-term) policy objectives.

These considerations may be of particular relevance with regard to countries that have already defined the ultimate long-term objective to implement a countrywide ETS, with a carbon tax and an offset component serving only as provisional steps. In such a case, there will be no or only a limited future role for domestic offsets since quantifiable emission sources which are feasible for offsetting will be integrated in the ETS, and the remaining non-feasible sources (mostly those difficult to MRV) would be covered by other policy instruments. In these cases, countries may want to avoid establishing an independent domestic offset scheme and rather build on existing infrastructure for an interim period.

Support harmonised and complementary regulation: Considering the two cases of interest in this chapter – indirect linking of a carbon tax and an ETS via an offset mechanism as well as the transition of a carbon tax into an ETS – particular attention must be given to design features that allow for the use of offsets in terms of their transfer into different target systems. Consistency and compatibility of the involved systems are key for this transfer process in order to safeguard environmental integrity. They can be ensured through the specific design of key administrative processes, in particular project design and approval processes, MRV procedures and registration practices. It is important to align these administrative processes with those of potential target systems and ensure consistency and compatibility across systems before linking or combining them.

In this context, it must be taken into account that carbon taxation and emissions trading differ significantly with regard to their institutional and administrative set-up as well as with regard to their final objectives. An ETS has a fixed emissions reduction target and is based on stringent rules for MRV and registration procedures. A carbon tax, on the other hand, does not have a fixed emission reduction target and often requires less stringent MRV procedures. For this reason, an offset component that is in the first place designed for a carbon tax may involve lower standards for safeguarding environmental integrity. An offset component that generates offsets for the use in an ETS, on the other hand, needs to fulfil higher standards concerning environmental integrity in order not to undermine the emissions reduction target. As in both cases of interest, offsets are in the long-term generated for use in an ETS, we recommend to follow the standards established for

ETSs when designing a domestic offset policy, as these are in general higher than those established for a carbon tax. If the ETS is planned to be linked to (an)other ETS(s) at the international level, the highest available standards for key administrative processes should be chosen for the domestic offset programme in order to ensure consistency and compatibility across systems.

With particular regard to the three key administrative processes, central recommendations include:

- Take already approved and well-established methodologies and standards as a reference for **project design** in order to decrease subjectivity in the approval process and increase acceptability in the target system.
- Align methodologies and standards to a country-specific context in order to support domestic policy objectives.
- Take the highest available standards for **MRV** as a reference and establish a comprehensive national MRV framework in order to increase synergies between different MRV activities and provide a basis for linking.
- Consider **registry and registration** in view of potential links with an ETS and ensure the harmonisation of registration rules in order to facilitate transparent tracking.

Reflect on related issues: In addition to key administrative processes, other issues that may arise with regard to the use of offsets in different target systems include potential alternatives to offset credits. In particular when designing an offset component for a carbon tax, tax reductions on the basis of verified monitoring reports may offer a cost-effective solution, making issuance procedures and the operation of a registry obsolete. Yet, this option is not feasible when the ultimate objective is to transfer the carbon tax to an ETS. Furthermore, the point of regulation of a target system has to be taken into account. Up- and downstream regulation becomes an issue for the use of offsets in particular in the case of linking: if two systems with different points of regulation are linked, there is an increased risk for multiple carbon pricing and double counting. The complexity of this issue is increased when up- and downstream approaches are indirectly linked through the same offsetting mechanism, which requires careful consideration to avoid adverse effects.

Consider long-term development: Given that in the long-term, different emerging national initiatives are envisaged to form a globally connected carbon market, attention must be given to current developments at the international level. The Paris Agreement includes provisions for the creation of a new international cooperation mechanism, which is expected to replace the CDM and JI. Yet, it is still unclear how the transition will take place and what form the new mechanism will take, as rules and regulations are yet to be developed. In this situation of uncertainty, countries increasingly engage in the development of their own domestic market mechanisms. In order to ensure the consistency and compatibility of these domestic schemes in the future, the CDM may still play an important role. Three potential scenarios in this context include (1) the full reliance of a domestic offset programme on existing CDM infrastructure; (2) the conversion of CDM institutions into a nationally adapted structure; and (3) the disbanding of CDM infrastructure and full independence of domestic offset programmes. Hence, it can be argued that there is indeed a role for the CDM (and potentially also for other established, international mechanisms) which can be considered in the development of new domestic offset programmes. Furthermore, at the international level, the creation of an international guidance body could offer support and enhance the credibility, consistency and compatibility of emerging domestic market mechanisms and ultimately steer developments in the direction of a global carbon market.

Implications for the focus countries: Looking back at the focus countries in this study, we conclude that Chile is still in a position to consider and define its own objectives, capabilities as well as political feasibility for the development of an offset strategy. South Africa is very advanced in developing its strategy to allow for the use of offsets in its envisaged carbon tax and has invested time and effort to consider its objectives although the actual acceptance of certain offset standards is still part of the final negotiations. This example, however, shows that complex political processes and diverse positions can still delay or hinder the implementation of the initial strategy. In Mexico, the opportunity to introduce an offset component to the carbon

tax was included rather quickly and subject to lobbing later on. The current approach does not offer incentives for the actual use of offsets and hinders the connection to an ETS in the future. This issue is not related to the fact that Mexico has chosen to impose the tax on the sale and import of fossil fuels. The difficulties result from the fact that no uniform carbon price is defined for the carbon content of the different fuels. Especially if a tax and an ETS are to operate in parallel, Mexico should reconsider the rules for the offsetting component taking into account the above highlighted recommendations.

6 Conclusions

In this study the introduction of carbon taxes in Chile, Mexico and South Africa and respective approaches for the potential complementary introduction of offsetting components were analysed and discussed. In the first analytical part of this study, the current situation within the three focus countries was reviewed and assessed. The second part focussed on potential interactions of national offsets with other policy areas including related co-benefits and co-costs, their impacts on long-term emission mitigation trajectories, procedural and institutional provisions to allow for international transfers of mitigation outcomes and potential for further support by international climate finance. The third part reviewed and discussed design opportunities as well as their implications and derived recommendations for policy makers on the national level. Relevant conclusions were drawn from all three parts of this study with particular relevance for the three focus countries but also leading to recommendations with relevance for a broader spectrum of countries considering similar domestic policy approaches.

Although political discussions regarding the use of offsets are pending at different stages in the three countries, the analysis conducted in the first part has shown valuable insights pointing to **significant variation of the status in the countries**. Thus, while the carbon tax in Mexico has entered into force in January 2014 and the carbon tax in Chile will become operative in January 2017, the legislative process regarding the carbon tax in South Africa is still to start and its outcome unclear. While there was going to be a political process in 2016 to decide whether the tax would proceed or not, as one of the interviewees explained, another interviewee seriously doubted that the carbon tax would enter into force as envisaged in current plans or maybe even not at all.

Huge uncertainties also exist regarding the option to use offsets for compliance with (part of) the tax load. Thus, **Chile** is currently focusing on the implementation of the carbon tax and has so far no concrete plans of allowing offsets for the tax. Nevertheless, it engages in research on this topic. In **South Africa**, there are ongoing discussions and National Treasury has developed a proposal on offsetting. This proposal points to the CDM, VCS, Gold Standard and CCB Standards as potential certification standards for offsets. As of end of May 2016, the announced update of this proposal has not been published yet. So far, there is no legislative basis neither for the carbon tax nor for the potential use of offsets. Therefore, **Mexico** is the only one of these three countries who has actually introduced legislation including the option to use credits from climate change mitigation projects to cover part of its tax on fossil fuels. The fact that the secondary regulation for the use of CERs has not yet been published two years after entry into force of the carbon tax may be an indication for the difficulties associated with the chosen approach: Submitting CERs and having the tax bill reduced according to the CERs' market value at the moment of paying the tax provides little additional benefits for the taxpayer. It remains to be seen how final procedures for using CERs as a way of paying the carbon tax in Mexico will be elaborated. However, an early issuance of the detailed offsetting regulation seems questionable, as the general focus has shifted away from the carbon tax and is now put on the national energy reform. In addition, there seems to be little interest from the Ministry of Finance to issue the regulation, while the Ministry for Environment is al-ready focusing on the next step: the introduction of an ETS, possibly by 2018.

Findings from sub-chapter 4.1 indicate that **the role of co-benefits varies significantly across the three countries** analysed: Despite the fact that Mexico is the only country with an operational carbon tax and offsetting provisions in place, there is currently no strategy for the realisation of co-benefits through offsetting. However, Mexico could build on its CDM infrastructure to establish a dedicated co-benefits strategy. With the offsetting scheme building on the CDM scheme for GHG certification, the use of voluntary CDM premium labels (such as the Gold Standard and CCB Standards) seems the most promising strategy. In South Africa, co-benefits of offsets were a crucial part of the discussion on the carbon tax from the very beginning. Official government documents highlight the potential to achieve co-benefits and different certification standards are being discussed. The choice of the standards to be applicable can be expected to depend on the

offsetting sectors, since most voluntary certification standards only focus on certain sectors. Chile, in contrast, is still in the process of assessing whether to introduce an offsetting option or not. Given this early stage of the discussion, no information on the potential role for co-benefits in the context of offsetting was available. However, there seems to be a general awareness regarding the potential to achieve co-benefits through offsetting. The tools and international standards to be used for the achievement of co-benefits in the three countries will depend on factors such as the prioritisation of co-benefits, offsetting sectors and GHG certification standard. At the time of writing, all these factors were characterised by a large uncertainty, requiring further analysis at a later point in time. Neither one of the three countries addresses co-cost in any way.

There are different explanations for the varying relevance of co-benefits in the three countries. In Chile, the minor role of co-benefits from offsetting activities can be attributed to the fact that the offsetting options as such is still in its infancy, while in the other two countries, the dynamics of the political process seems to have had a major influence: In Mexico, the lack of consideration of co-benefits seems to stem from the fact that the offsetting option was introduced only weeks before adoption of the carbon tax, after business groups had lobbied for its inclusion as a cost containment tool. In South Africa, the offsetting option is being proposed by the government well in advance of the scheduled adoption of the carbon tax. Highlighting social, economic and environmental co-benefits can be expected to result in additional political support for the introduction of the offsetting option as well as for the carbon tax as such.

In Sub-chapter 4.2 which discusses the impacts on long-term emissions mitigation trajectories we have shown that in case both the sectors covered by the carbon pricing instrument and the sectors eligible for the generation of offsets are included in the trajectory, the use of offsets should have no net impact on long-term emissions mitigation trajectories. Thus, **allowing for the use of offsets should have no net impact on INDC-based emissions trajectories** in neither one of the three countries analysed in this study.

However, the section also concluded that the use of offsets may well influence the effectiveness of other policies and measures as well as the political will to reduce emissions. Regarding opportunities, it demonstrated that additional revenue from the carbon tax could be traded in for real emissions reductions in the offset sector when a ton of CO_2e covered by the carbon tax can be offsetted with the reduction of a ton of CO_2e in the offset sector, rather than linking via the price for carbon. This opportunity can be increased with higher tax rates which encourage the further use of offsets and hereby cause additional reductions of emissions in (the) offset sector(s). Furthermore, the introduction of offsets reduces the costs of emissions mitigation – even more so with an increased scope of eligible offset sector(s) and the amount to which offsets may be used. Relating to the positive spill-over effect of efforts to reduce emissions from the sector covered by the carbon tax to other sectors of the economy, increased benefits regarding emissions mitigation can be achieved by discounting emission reductions of the offset sector(s) or by achieving net emission reductions in the offset sector(s) beyond the crediting period. Furthermore, the introduction of offsets can be used as a bargaining chip in political negotiations and thus facilitate the introduction of mitigation policies and measures (including carbon pricing) and/or even stronger mitigation commitments. This opportunity can be further increased with comprehensive stakeholder involvement.

Regarding the risk regarding long-term emission reductions caused by the introduction of offsets, the risk to compromise the environmental integrity of a carbon pricing system can be reduced by choices regarding the design of offset regulation (see chapter 4.3). Moreover, the risk to diminish incentives to reduce emissions in the main carbon pricing system as well as the risk of lock-in effects in sectors covered by the carbon pricing system can be reduced by tying the option to use offsets to increased levels of ambition in the main carbon pricing system. Last but not least, opposition to further climate policies and measures in sectors generating offsets can arise as this may reduce the potential income via offsets in this sector, and general opposition to the introduction of offsets from different stakeholders may hinder the introduction of carbon pricing instruments and/or offsets. These risks, however, can be reduced by comprehensive stakeholder involvement.

Based on the analysis presented in Sub-chapter 4.3 on procedural and institutional provisions needed to allow the carbon tax systems of Mexico, Chile and South Africa to participate in transfers of mitigation outcomes across national borders, this study concludes that **the ability to import mitigation outcomes varies significantly among the three countries analysed**. An overview of the results of the analysis is provided in Table 12. In terms of Parties' INDCs, Mexico and Chile are the countries with the best conditions for participating in such transfers. Their contributions are clearly defined, allowing for robust accounting of imported mitigation outcomes. South Africa's peak, plateau and decline target range, in contrast, is more problematic in terms of accounting, since it lacks a clearly defined target level and a target year. This makes South Africa's participation in these transfers highly problematic. However, since Mexico and Chile adopted single-year targets, their participation is also restricted to certain conditions.

The carbon taxes' design and their ability to link to other carbon pricing instruments also vary significantly. In this regard, Mexico's carbon tax is problematic: Since carbon is not taxed equally across all fossil fuels covered by the tax, linking cannot be based on a common and uniform price per tonne which obstructs directly linking the carbon tax to other carbon pricing instruments. A soon harmonization of the tax rates seems highly unlikely because political opposition can be expected to continue being strong and President Peña Nieto has declared not to further raise taxes during his current term of office. Furthermore, the focus of the political attention seems to be put on other issues, such as the national energy reform and considerations to establish a national ETS in 2018. South Africa and Chile, in contrast, both apply a uniform price per tonne CO_2, making linking much easier. Since in all three countries the sectors covered by the carbon tax are also included in their INDCs, accounting for imported mitigation outcomes is possible. Technical and institutional readiness is medium in all three countries. MRV provisions are in place (Mexico, Chile) or its establishment is envisaged (South Africa). Mandatory unit registries which would ensure that double counting of emission reductions is avoided, however, are lacking. In this regard, Mexico can be expected to soon be able to build on its voluntary registry, which is currently being established.

Table 12: Comparison of the Potential for Implementing Cross-national Transfers of Mitigation Outcomes with Use of Carbon Tax in Chile, Mexico and South Africa

	Mexico	Chile	South Africa
INDC compatibility	Medium (single year target problematic)	Medium (single year target problematic)	Low (INDC highly problematic in terms of accounting)
Carbon tax design	Medium (no uniform price on CO_2 + carbon tax' coverage compatible with INDC)	High (uniform price on CO_2 + carbon tax coverage compatible with INDC)	High (uniform price on CO_2 + carbon tax coverage compatible with INDC)
Technical and institutional readiness	Medium (MRV provisions in place, other provisions and institutions to be established)	Medium (MRV provisions in place, other provisions and institutions to be established)	Medium (MRV provisions envisaged, other provisions and institutions to be established)

Source: Own compilation.

With a particular view to the effective operationalisation of a carbon tax with an offset component, sub-chapter 4.4 shows a relatively consistent picture across the countries analysed regarding the question whether and where additional financial support could usefully complement carbon pricing policies in Chile, Mexico and South Africa. **Even though the PMR is active in all three countries to different degrees, its support has not been a decisive factor with regard to the three countries' initial decision to introduce a carbon tax**. However, remaining issues in all three countries, in particular with regard to refining the design of a carbon tax system and introducing the option of offsetting, suggest that there are aspects that are not (fully) covered

by the mandate of the PMR, encounter difficulties in their execution or need additional flanking measures to become fully operative.

Thus, the analysis conducted in this sub-chapter revealed that the implementation and operationalisation of a carbon tax system has been and still is rather a political than a financial challenge in Chile, Mexico and South Africa. Additional support requirements may therefore not be financial but rather in the form of enhanced political dialogue in order to accelerate the process on the ground and move on to the next stage. The interviews confirmed that additional finance at this point in time would not necessarily speed up the development and implementation of a carbon tax. Yet, it can be presumed that an intervention of the PMR or other international climate finance initiatives at an earlier stage of the process, for example to strengthen preliminary policy analysis and stakeholder involvement, might have had a positive impact on the precise design and implementation of the carbon tax and might have enhanced the alignment of the political and technical processes from the beginning.

With regards to the post-preparation stage, once the tax has been successfully operationalised, additional financial and technical support may be fundamental for a gradual improvement of the carbon tax system, including specific design features that allow for links with other carbon pricing instruments or with an offset programme. In this context, provisions that allow for linking and trading across both systems and borders including the development of consistent, coherent and comparable standards which ensure that offsets can be used in different systems are key (see chapter 4.3). International climate finance can substantially advance these developments through the support of research and analysis in this field, but also through specific capacity development.

With regard to the origin of additional international climate finance resources, on the one hand, funds from the PMR can be made available under different programmes or (re)directed to specifically support activities related to the introduction of a carbon tax with an offsetting component. The Chilean case shows that this is even possible if the focus of the original MRP has been placed on another issue. Apart from that, financial and technical support may be solicited under additional programmes, such as the PMR Technical Work Programme or its Policy Work Programme. Specific technical support with regard to offsetting may be sought from the PMR Offset Working Group. On the other hand, other international climate finance sources beyond the PMR may be accessed, such as the Green Climate Fund or the Transformative Carbon Asset Facility under the World Bank.

The third analytical part focused on the national perspective and derived recommendations to be considered during the design of national offset policies. The considerations are with relevance for the three focus countries as well as with broader relevance for countries that consider implementing similar approaches. The discussion in this section concluded that specific **design recommendations for countries mostly rely on a good understanding of the policy options, the objectives and capabilities of the countries themselves**. The section is based on the definition of two specific cases where countries aim to introduce a carbon tax and an ETS in parallel or subsequently with combination of an offset component. The main findings are mostly theory-based since only very limited practical experiences exist so far from implementing countries.

We found that it is of utmost importance that countries initially go through a process to make themselves aware of their objectives and to ensure that the impacts of the available policy options in this context are known. The effect of countries' choices influences, for example, whether future options to build on the instrument are limited or broad. Furthermore, it is important to be aware of the effects that reliance on existing international instruments can have on long-term objectives. We demonstrated that given the broad international experiences that are available, countries should in any case aim for already approved and well-established methodologies and standards as a reference for project design in order to decrease subjectivity in the approval process and increase acceptability in the target system. Methodologies and standards can be further aligned to a country-specific context in order to support domestic policy objectives. Also for other key administrative processes, it seems recommendable to take the highest available standards as a reference. Especially for MRV provisions, we showed that the establishment of a comprehensive national MRV framework

increases synergies between different MRV activities and provides a basis for future linking. In view of potential links with an ETS, registry and registration provisions should consider and ensure the harmonisation of registration rules in order to facilitate transparent tracking.

7 References

Andrew Gilder, Mansoor Parker, & Olivia Rumble. (2016, February 3). What does the 2016 Budget mean for implementation of the carbon tax? SA. Retrieved from https://www.ensafrica.com/news/What-does-the-2016-Budget-mean-for-implementation-of-the-carbon-tax?Id=2126&STitle=carbon%20tax%20ENSight

APX. (2016). APX - Energy. Environment. Market Integrity. Retrieved April 20, 2016, from http://www.apx.com/

Arens, C., Mersmann, F., Beurmann, C., Rudolph, F., Holm-Olsen, K., & Fenhan, J. (2014). *Mapping the Indicators: An Analysis of Sustainable Development Requirements of Selected Market Mechanisms and Multilateral Institutions*. German Emissions Trading Authority (DEHSt). Retrieved from http://www.carbon-mechanisms.de/fileadmin/media/dokumente/publikationen/Mapping_the_Indicators_-_An_Analysis_of_Sustainable_Development_Requirements_of_Selected_Market_Mechanisms_and_Multilateral_Institutions.pdf

Berardesca, P. (2014, June 10). Chile cobrará un impuesto a las emisiones de carbono. *Aguilero*.

Bodansky, D., Hoedl, S. A., Metcalf, G. E., & Stavins, R. N. (2014). Facilitating Linkage of Heterogeneous Regional, National, and Sub-National Climate Policies through a Future International Agreement. *National, and Sub-National Climate Policies Through a Future International Agreement (November 1, 2014)*. Retrieved from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2554732

Cámara de Diputados. (2012). *Ley General de Cambio Climático*.

Carbon Market Watch. (2015). *Towards a Global Carbon Market - Prospects for Linking the EU ETS to Other Carbon Markets* (Carbon Market Watch Report).

Carbon Pricing Leadership Website. (2015). *Who is using it?* Retrieved from http://www.carbonpricingleadership.org/who/

Castro, P., Duwe, M., Köhler, M., & Zelljadt, E. (n.d.). *Market-based mechanisms in a post 2012 climate change regime*. Hamburg, Berlin, Zurich: Perspectives, Ecologic, University of Zurich.

Cecil Morden, Chief Director, Economic Tax Analysis, National Treasury, South Africa. (2016, January 22). Interview on South African carbon tax.

CHCP. (2013). Dictamen de la Comisión de Hacienda y Crédito Público, con proyecto de decreto que reforma, adiciona y deroga diversas disposicio- nes de la Ley del Impuesto al Valor Agregado, de la Ley del Impuesto Especial sobre Producción y Servicios, de la Ley Fe- deral de Derechos y se expide la Ley del Impuesto sobre la Renta. In *Gaceta Parlamentaria*. Palacio Legislativo de San Lázaro: Comisión de Hacienda y Crédito Público.

Congreso de los Estados Unidos Mexicanos. (2013). *Ley del Impuesto Especial sobre Producción y Servicios - Última Reforma DOF 11-12-2013*. Retrieved from http://gaceta.diputados.gob.mx/Gaceta/62/2014/oct/20141028-I.html

Department of Minerals and Energy. (2004). *Sustainable Development Criteria for Approval of Clean Development Mechanism Projects by the Designated National Authority of the CDM*.

Diario Oficial de la Federación. Programa Especial de Cambio Climatico 2014 – 2018 (PECC). (2014).

División de Información y Economía Ambiental, Ministerio del Medio Ambiental, Chile. (2016, January 13). Interview on Chilean carbon tax.

EDF, & IETA. (2013, May). Norway. The World's Carbon Markets: A Case Study Guide to Emissions Trading. Retrieved from https://www.edf.org/sites/default/files/EDF_IETA_Norway_Case_Study_May_2013.pdf

Environmental Economics, Climate Change & Sustainable Development Department, Group Sustainability, Eskom, South Africa. (2016, February 4). Interview on South African carbon tax.

Gobierno de Chile. (2011). *2a Comunicación Nacional de Chile ante la Convención Marco de las Naciones Unidas sobre Cambio Climático*. Santiago de Chile.

Gobierno de Chile. (2012). *National Energy Strategy 2012-2030*. Retrieved from http://www.centralenergia.cl/uploads/2012/06/National-Energy-Strategy-Chile.pdf

Gobierno de Chile. (2014). *Chile's National Greenhouse Gas Inventory, 1990-2010*. Santiago de Chile: Gobierno de Chile, Ministerio del Medio Ambiente.

Gobierno de Chile. (2015). *Contribución nacional tentativa de Chile (INDC) para el Acuerdo Climático París 2015*. Retrieved from http://www4.unfccc.int/submissions/INDC/Published%20Documents/Chile/1/Chile%20INDC%20FINAL.pdf

Gobierno de Chile. (n.d.). *Mapa de la reforma tributaria. La reforma que Chile necesity para más y mejor educación, salud y protección social*. Retrieved from http://www.reformatributaria.gob.cl/

Gobierno de Chile, Ministerio del Medio Ambiente. (2015). *Ministerios de Medio Ambiente y Energía lanzan proyecto de cooperación para preparar mercado de carbono*. Santiago de Chile. Retrieved from http://portal.mma.gob.cl/ministerios-de-medio-ambiente-y-energia-lanzan-proyecto-de-cooperacion-para-preparar-mercado-de-carbono/

Gobierno de Mexico. (2015). *Intended Nationally Determined Contribution*. Retrieved from http://www4.unfccc.int/submissions/INDC/Published%20Documents/Mexico/1/MEXICO%20INDC%2003.30.2015.pdf

Gonzalez, G. (2013, September). South Africa Aims to Blend Carbon Tax with Offsets [News Articles]. Retrieved from http://www.ecosystemmarketplace.com/articles/south-africa-aims-to-blend-br-carbon-tax-with-offsets/

Government of South Africa. (2015). *South Africa's Intended Nationally Determined Contribution (INDC)*. Retrieved from http://www4.unfccc.int/submissions/INDC/Published%20Documents/South%20Africa/1/South%20Africa.pdf

Haug, C., Frerk, M., & Santikarn, M. (2015). *Towards a global price on carbon: Pathways for linking carbon pricing instruments - background report to inform the G7 process*. adelphi, on behalf of the German Federal Environment Agency Umweltbundesamt.

ICAP. (2016, March 30). Korea Emissions Trading Scheme. Retrieved from https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems%5B%5D=47

Interview with SEMARNAT. (2016a). *Interview with former staff member*.

Interview with SEMARNAT. (2016b). *Interview with staff member*.

Interview with WWF Mexico. (2016). *Interview with staff member*.

Juan-Pablo Montero, Profesor Titular, Instituto de Economía, Pontificia Universidad Católica de Chile, Chile. (2016, January 15). Interview on Chilean carbon tax.

Kreibich, N., & Obergassel, W. (2016). *Carbon Markets After Paris - How to Account for the Transfer of Mitigation Results?* (JIKO Policy Paper No. 01/2016). Wuppertal Institute for Climate, Environment, Energy. Retrieved from http://www.carbon-mechanisms.de/fileadmin/media/dokumente/publikationen/PP_Accounting.pdf

Kreibich, N., Wang-Helmreich, H., & Beuermann, C. (2014). *Social and environmental effects of climate financing: Avoiding negative impacts* (Paper for the International Workshop"Green and social: managing synergies and trade-offs", 12.03.- 13.03.2014 . Bonn: DIE - German Development Institute, (unpublished)).

Lazarus, M., Erickson, P., & Schneider, L. (2013). *Potential for International Offsets to Provide a Net Decrease of GHG Emissions* (Working Paper No. 2013-06). Stockholm: Stockholm Environment Institute.

Lazarus, M., Kollmuss, A., & Schneider, L. (2014). *Single-year mitigation targets: Uncharted territory for emissions trading and unit transfers* (Working Paper No. 2014-1). Stockholm Environment Institute. Retrieved from http://www.sei-international.org/mediamanager/documents/Publications/Climate/SEI-WP-2014-01-Single-year-pledges.pdf

Levin, K., Finnegan, J., Rich, D., & Bhatia, P. (2014). *GHG Protocol – Mitigation Goal Standard: An accounting and reporting standard for national and subnational GHG reduction goals*. Washington, DC: World Resources Institute. Retrieved from http://www.wri.org/publication/mitigation-goal-standard

Lopez, D. (2014, September 30). Chile anuncia el primer impuesto al carbono en América Latina. *Latinoamérica Renovable*. Retrieved from http://latinoamericarenovable.com/2014/09/30/chile-anuncia-el-primer-impuesto-al-carbono-en-america-latina/

Markit. (2016). Registry. Retrieved April 22, 2016, from http://www.markit.com/product/registry

Metcalf, G. E., & Weisbach, D. (2010). *Linking Policies When Tastes Differ: Global Climate Policy in a Heterogeneous World* (Discussion Paper No. 10/38). The Harvard Project on International Climate Agreements.

MEXICO2. (2016). *Interview with staff member*.

Michaelowa, A. (2015). *Strengths and weaknesses of the CDM in comparison with new and emerging market mechanisms*. Paper No. 2 for the CDM Policy Dialogue, June 2015. Retrieved from http://www.cdmpolicydialogue.org/research/1030_strengths.pdf

Montero, J.-P. (2014). *Pricing carbon in an emerging economy: The case of Chile* (Economics for Energy's Workshop). Madrid.

Montero, J.-P., Pica, A., Sauma, E., & Vicuña, S. (n.d.). *Reforma tributaria: Un avance hacia una economía más baja en carbono*.

Morden, C. (2015). *Carbon Tax Proposals. Portfolio Committee on Environmental Affairs*. Retrieved from http://pmg-assets.s3-website-eu-west-1.amazonaws.com/150526carbon.pdf

National Treasury. (2010). *Discussion Paper for Public Comment. Reducing Greenhouse Gas Emissions: The Carbon Tax Option.* Retrieved from http://www.treasury.gov.za/public%20comments/Discussion%20Paper%20Carbon%20Taxes%2081210.pdf

National Treasury. (2013a). *Carbon Tax Policy Paper. Reducing greenhouse gas emissions and facilitating the transition to a green economy*. South Africa. Retrieved from http://www.treasury.gov.za/public%20comments/Carbon%20Tax%20Policy%20Paper%202013.pdf

National Treasury. (2014). *Carbon Offsets Paper. Published for Public Comment. April 2014*. South Africa. Retrieved from http://www.treasury.gov.za/public%20comments/CarbonOffsets/2014042901%20-%20Carbon%20Offsets%20Paper.pdf

National Treasury. (2015, November). Media Statement: Publication of the Draft Carbon Tax Bill for public comment. Retrieved from http://www.treasury.gov.za/comm_media/press/2015/2015110201%20-%20Media%20Statement%20Carbon%20Tax%20Bill.pdf

National Treasury, R. of S. A. (2013b). *Updated Carbon Tax Policy Paper: Request for Public Comments*. Retrieved from http://www.treasury.gov.za/public%20comments/Press%20Release%20-%20Carbon%20Tax%20Policy%20Paper%202013.pdf

Obergassel, W., Arens, C., Hermwille, L., Kreibich, N., Mersmann, F., Ott, H. E., & Wang-Helmreich, H. (2016). *Phoenix from the Ashes — An Analysis of the Paris Agreement to the United Nations Framework Convention on Climate Change*. Wuppertal: Wuppertal Institute for Climate, Environment and Energy. Retrieved from http://wupperinst.org/en/info/details/wi/a/s/ad/3362/

Oficina de Cambio Climático, Ministerio de Energía, Chile. (2015, December 8). Interview on Chilean carbon tax.

Partnership for Market Readiness (PMR). (2015). *Market Readiness Proposal (MRP) for the Republic of South Africa. South Africa: The Carbon Tax Policy Package*. Retrieved from https://www.thepmr.org/system/files/documents/South%20Africa%20Final%20MRP_16%20Feb%202015.pdf

Pizarro, R. (2014). *Impuestos verdes*. Gobierno de Chile.

PMR. (2013a, February). Market Readiness Proposal for Chile. Partnership for Market Readiness. Retrieved from https://www.thepmr.org/system/files/documents/Chile_MRP_Final_20-02-2013.pdf

PMR. (2013b, February). Market Readiness Proposal for Mexico. Partnership for Market Readiness. Retrieved from https://www.thepmr.org/system/files/documents/Mexico_MRP_Final_19-02-2013_0.pdf

PMR. (2014). *Lessons Learned from Linking Emissions Trading Systems: General Principles and Applications.* (Technical Note No. 7). Partnership for Market Readiness. Retrieved from https://www.thepmr.org/system/files/documents/PMR%20Technical%20Note%207.pdf

PMR. (2015a). *Options to Use Existing International Offset Programs in a Domestic Context* (Technical Note). Partnership for Market Readiness. Retrieved from http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2015/08/27/090224b08309d7dd/1_0/Rendered/PDF/Options0to0use0n0a0domestic0context.pdf

PMR. (2015b). *Overview of Carbon Offset Programs: Similarities and Differences* (Technical Note). Partnership for Market Readiness. Retrieved from https://www.thepmr.org/system/files/documents/PMR%20Technical%20Note%206_Offsets_0.pdf

PMR. (2015c, February). Market Readiness Proposal for South Africa. Partnership for Market Readiness. Retrieved from https://www.thepmr.org/system/files/documents/South%20Africa%20Final%20MRP_16%20Feb%202015.pdf

PMR. (2015d, October). PMR Dashboard Project Implementation Milestones By Country. Retrieved from https://www.thepmr.org/system/files/documents/PMR%20Dashboard_10-14-2015.pdf

PMR. (2015e, October). Status Update on Activities of the Technical Work Program. Partnership for Market Readiness. Retrieved from https://www.thepmr.org/system/files/documents/151014%20PMR%20Note_TWP%20FY16%20update.pdf

PMR. (2016a, February). Offsets Working Group. Retrieved from https://www.thepmr.org/content/offsets-working-group

PMR. (2016b, February). Policy Work. Retrieved from https://www.thepmr.org/content/policy-work

PMR, & ICAP. (2016). *Emissions Trading in Practice: A Handbook on Design and Implementation*. Washington, D.C.: World Bank Group.

PMR Secretariat. (2014, November). *Emerging carbon markets: different approaches being adopted.* Santiago, Chile. Retrieved from https://www.thepmr.org/system/files/documents/Emerging%20Carbon%20Markets%20-%20Different%20Approaches%20Being%20Adopted.pdf

PMR Secretariat. (2015a). *PMR Annual Report FY2015*. World Bank Group. Retrieved from https://www.thepmr.org/system/files/documents/PMR%20Annual%20Report%20FY15.pdf

PMR Secretariat. (2015b, October). *PMR's Policy Analysis Support: Status Update. Presentation for the Thirteenth Meeting of the Partnership Assembly.* Sweimeh, Jordan. Retrieved from https://www.thepmr.org/system/files/documents/PA13_PMR%20Policy%20Analysis%20Work%20Program_October%2029.pdf

Presidencia de la República. (2013). *Iniciativa de Decreto por el que se reforman, adicionan y derogan diversas disposiciones de la Ley del Impuesto al Valor Agregado, de la Ley del Impuesto Especial sobre Producción y Servicios y del Código Fiscal de la Federación*.

PWC. (2009). *Carbon Taxes vs Carbon Trading. Pros, cons and the case for a hybrid approach.* PricewaterhouseCoopers LLP. Retrieved from http://pwc.blogs.com/files/carbon-taxes-and-trading---final---march-2009.pdf

Rau, N. (2014, February). SACCI comments on the 2014 Budget - Press Release. Retrieved from http://www.sacci.org.za/index.php?option=com_content&view=article&id=650:sacci-commetns-on-2014-budget-press-release&catid=9:press-office&Itemid=40

Redwood, J., Eerikainen, J., & Trexler, M. (2015). *Partnership for Market Readiness (PMR): First Independent Evaluation Report*. Development Portfolio Management Group University of Southern California. Retrieved from https://www.thepmr.org/content/pmr-first-independent-evaluation-final-report

República de Chile. (2007). *Fija texto refundido, coordinado y sistematizado del decreto con fuerza de ley No 1, de minería, de 1982, ley general de servicios eléctricos, en materia de energía eléctrica* (Decreto con Fuerza de Ley No. 4/20018). Santiago de Chile. Retrieved from http://www.leychile.cl/Navegar/?idNorma=258171&idVersion=201 0-02-01&idParte

República de Chile. (2014). *Ley 20780. Reforma tributaria que modifica el sistema de tributacción de la rente e introduce diversos ajustes en el sistema tributario*. Santiago de Chile. Retrieved from http://www.ley-chile.cl/N?i=1067194&f=2014-10-01&p=

Republic of South Africa. (2015). *Draft Explanatory Memorandum for the Carbon Tax Bill, 2015*. Retrieved from http://www.treasury.gov.za/public%20comments/CarbonTaxBill2015/EM%20-%20Carbon%20Tax%20Draft%20Bill.pdf

Repulic of South Africa. (2015). *Draft Carbon Tax Bill*. Retrieved from http://www.treasury.gov.za/public%20comments/CarbonTaxBill2015/Carbon%20Tax%20Bill%20final%20for%20release%20for%20comment.pdf

SASOL (former Suid-Afrikaanse Steenkool-, Olie- en Gasmaatskappy). (2015, May). *SASOL Group's Submission in Respect of Carbon Tax. In response to the Davis Tax Committee's call for public comments*. Retrieved from http://www.taxcom.org.za/docs/New_Folder2/Sasol%20carbon%20tax%20presentation%20to%20DTC.pdf

Schneider, Lambert, Anja Kollmuss and Michael Lazarus (2014): *Addressing the risk of double counting emission reductions under the UNFCCC* (No. 2014–2): Working Paper. Stockholm Environment Institute. Available at: http://www.sei-international.org/mediamanager/documents/Publications/Climate/SEI-WP-2014-02-Double-counting-risks-UNFCCC.pdf [Accessed 8 November 2015].

Senior Research Fellow, World Institute for Development Economics Research, United Nations University (UNU-WIDER). (2016, January 8). Interview on South African carbon tax.

SHCP. (2015). *ACUERDO 26/2015 por el que se actualizan las cuotas del Impuesto Especial sobre Producción y Servicios aplicables a los combustibles fósiles.* Retrieved from http://www.dof.gob.mx/nota_detalle.php?codigo=5421292&fecha=24/12/2015

Spears, E., Valle, J., & Arderiu, E. (2014). *Case Study: Moving from Tax to Trade in Mexico*. International Emissions Trading Association. Retrieved from https://ieta.memberclicks.net/assets/GHG-Market-Report/2014/ieta%202014%20ghg%20report%20-%20case%20study-moving%20from%20tax%20to%20trade%20in%20mexico%20-%20spears%20valle%20arderiu.pdf

Susana Jiménez. (2014, August 21). Susana Jiménez: "Impuesto al carbono e ineficiencia." *Libertad Y Desarrollo*. Santiago de Chile. Retrieved from http://lyd.org/centro-de-prensa/noticias/2014/08/susana-jimenez-impuesto-al-carbono-e-ineficiencia/

Szabo, M. (2016, February 22). South African government to revise carbon tax bill following consultation. *Carbon Pulse*. Retrieved from carbon-pulse.com/16167/?utm_source=CP+Daily&utm_campaign=dc20a39ea5-CPdaily26022016&utm_medium=email&utm_term=0_a9d8834f72-dc20a39ea5-42676397

Trading Economics / Banco Central de Chile. (2015). *Chile GDP Annual Growth Rate*. Retrieved from http://www.tradingeconomics.com/chile/gdp-growth-annual

UNEP DTU. (2016). *CDM/JI Pipeline Analysis and Database, February 1st 2016*.

UNFCCC. (2016, March 31). CERs issued and issuing. Retrieved from https://cdm.unfccc.int/Statistics/Public/files/201603/cersnum.pdf

UNFCCC (United Nations Framework Convention on Climate Change. (2016). INDCs as communicated by Parties. Retrieved January 26, 2016, from http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx

Warnecke, C., Day, T., & Klein, N. (2015). *Analysing the status quo of CDM projects. Status and prospects*. Cologne: NewClimate Institute, Ecofys.

Warnecke, C., Klein, N., Perroy, L., & Tippmann, R. (2013). *CDM Market Support Study*. Frankfurt / Main: Ecofys / Climatekos.

Warnecke, C., Röser, F., Hänsel, G., & Höhne, N. (2015). *Connecting the dots - Results-based financing in climate policy*. NewClimate Institute. Retrieved from https://newclimateinstitute.files.wordpress.com/2015/08/newclimate-finalreport_rbfandcarbonmarkets14011.pdf

World Bank. (2015a). *Crediting-Related Activities under the PMR: Status and Support for Implementation*. World Bank Group. Retrieved from http://www.ecofys.com/files/files/world-bank-2015-crediting-related-activities-under-the-pmr.pdf

World Bank. (2015b). *State and Trends of Carbon Pricing*. Retrieved from http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2015/09/21/090224b0830f0f31/2_0/Rendered/PDF/State0and0trends0of0carbon0pricing02015.pdf

WRI. (2013, April). Why Is Climate Finance So Hard To Define? Retrieved from http://www.wri.org/blog/2013/04/why-climate-finance-so-hard-define

WRI. (2016). *CAIT Climate Data Explorer*. World Resources Institute. Retrieved from http://cait.wri.org/indc/

8 Annexes

Annex 1: Country Sheets

Annex 1.1: Country Sheet Chile

Table 1: Status Quo of Carbon Pricing in Chile

	Characteristics
Name of instrument	Impuesto al carbono (Carbon tax)
Date of entry into force	Entry into force on January 1st 2017, first year of tax liability 2018
Scope	
- Sectors covered	Energy generation from installations that are composed of boilers or turbines and have an individual or combined thermal power equal to or above 50 MWt. Unconventional renewable energy generation from biomass is exempted from the carbon tax (República de Chile, 2014). Unconventional renewable energy refers to biomass energy which can be used directly as fuel or which can be converted into other liquid, solid or gaseous biofuels. Furthermore, the biodegradable fraction of residential and non-residential solid waste is included in unconventional renewable energy (República de Chile, 2007).
- Gases covered	CO_2
- Point of regulation	Downstream: Carbon tax is imposed on emissions from fixed sources of installations that are composed of boilers or turbines which, individually or combined, have a thermal power equal to or above 50 MWt, see above.
- Treatment of imports and exports	n.a.
Price / cap level	5 US$ (4.60 EUR)[20] per tCO_2 (República de Chile, 2014)
Cost containment mechanisms	
- Offsets	Use of carbon offsets as a way of complying with carbon tax not allowed initially, but option not ruled out for the future (Szabo, 2015). Pontifica Universidad Católica de Chile (Pontifical Catholic University of Chile - PUC) mentions option to bring reductions from transportation and forestry sectors with offsets (Montero, 2014).
Reporting and verification	• The monitoring system as well as the requirements for certification are determined by the Superintendency for the Environment which is responsible for the supervision of monitoring, registration and reporting of emissions. • Every taxpayer has to present a monitoring report to the Superintendency of the Environment in January/February. Instructions for the report are provided by the Superintendency of the Environment. • In March, the Superintendency for the Environment will certify the emissions caused by every taxpayer the previous year.

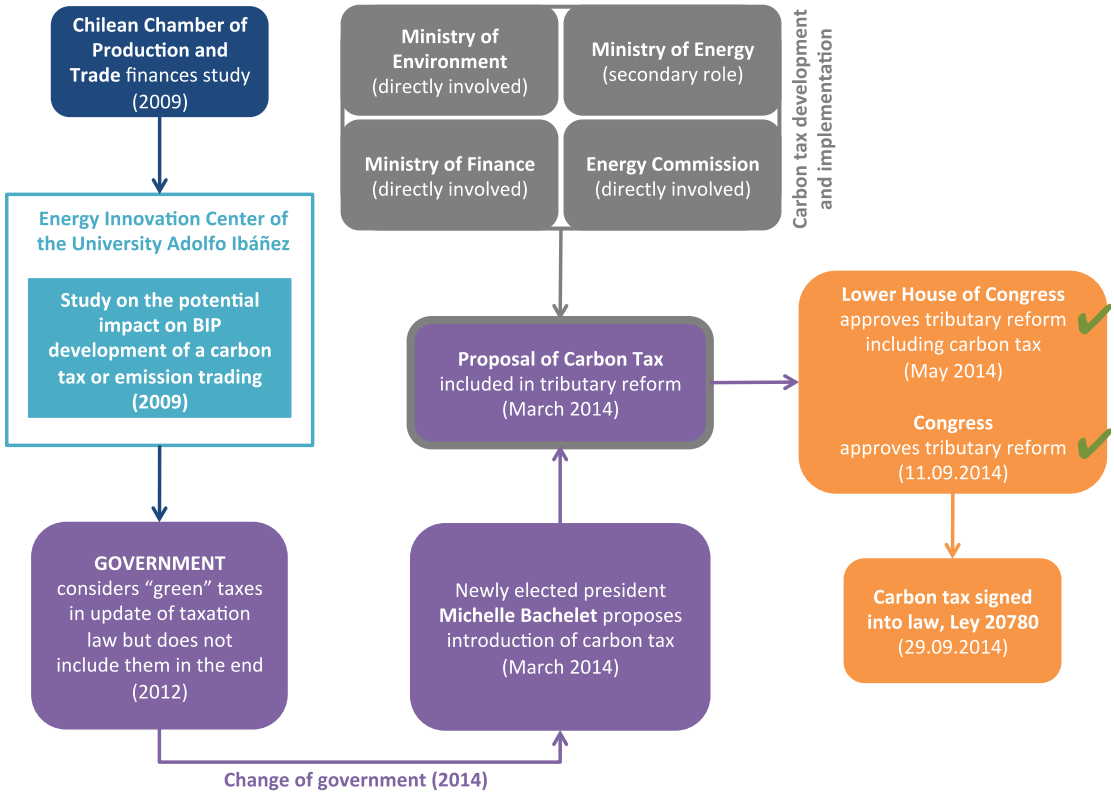
[20] Amounts in Euro are calculated on the basis of the exchange rate from 01.01.2016.

	• In April, the Internal Tax Service will send a report containing tax calculations for every emissions source to the corresponding Economic Load Dispatch Center (Centro de Despacho Económico de Carga - CDEC) and the National Energy Commission. • There are sanctions for taxpayers who fail to fulfil their obligations (República de Chile, 2014).

Table 2: Details of Offsetting Regulation in Carbon Tax in Chile

Eligibility	tbd
- Eligibility criteria	tbd
- Standards	tbd
- Quantity limits	tbd
- Sectoral limits	tbd
Price	tbd

Figure 1: Political Process Relating to the Introduction of Carbon Pricing in Chile Including Involved Actors



Source: Own illustration.

References

Montero, J.-P. (2014). *Pricing carbon in an emerging economy: The case of Chile* (Economics for Energy's Workshop). Madrid.

República de Chile. (2007). *Fija texto refundido, coordinado y sistematizado del decreto con fuerza de ley*

No 1, de minería, de 1982, ley general de servicios eléctricos, en materia de energía eléctrica (Decreto con Fuerza de Ley No. 4/20018). Santiago de Chile. Retrieved from http://www.leychile.cl/Navegar/?id-Norma=258171&idVersion=201 0-02-01&idParte

República de Chile. (2014). *Ley 20780. Reforma tributaria que modifica el sistema de tributacción de la rente e introduce diversos ajustes en el sistema tributario*. Santiago de Chile. Retrieved from http://www.leychile.cl/N?i=1067194&f=2014-10-01&p=

Szabo, M. (2015, May 27). Chile considering eventual shift to ETS as it readies carbon tax. *Carbon Pulse*. Retrieved from http://carbon-pulse.com/chile-considering-eventual-shift-to-ets-as-it-readies-carbon-tax/

Annex 1.2: Country Sheet Mexico

Table 1: Status Quo of Carbon Pricing in Mexico

	Characteristics
Name of instrument	Tax on fossil fuels (Impuesto a los combustibles fósiles – part of the reformed Law on the Special Tax on Production and Services (Ley del Impuesto Especial sobre Producción y Servicios – LIEPS))
Date of entry into force	1 January 2014
Scope	
- Sectors covered	Fossil fuel energy sector
- Gases covered	CO_2
- Point of regulation	Upstream: The carbon tax is imposed on the sale and import of fossil fuels (natural gas is exempted).
- Treatment of imports and exports	Imports are covered. The carbon tax is not imposed on the export of fossil fuels (Congreso de los Estados Unidos Mexicanos, 2013, Art. 8 II).
Price / cap level	The carbon tax sets individual tax rates for each fossil fuel. For propane, for instance, the tax is 6.92 MXN cents (0,0033 €)[21] per litre while for mineral carbon it is 29.31 MXN (1.53 €) per ton. For fossil fuels not listed the price was set at 42,37 MXN (2.23 €) per tonne of carbon (SHCP, 2015). The implicit price per tonne of CO_2 varies across the fuels taxed, ranging from more than 46 MXN for diesel to less than 6 MXN for petroleum coke.[22] As natural gas is exempted, its implicit price per tonne of CO_2 is zero (Montes de Oca, Muñoz Piña, & Belausteguigoitia, 2014).
Cost containment mechanisms	
- Offsets	The possibility to use CERs was introduced as a cost containment instrument together with the tax.
Reporting and verification	• Importers (and exporters) of fossil fuels must be listed in the "padrón de importadores y exportadores" (Register of imports and exports) controlled by the Secretariat of Finance and Public Credit (Secretaría de Hacienda y Credito Publico - SHCP) (Congreso de los Estados Unidos Mexicanos, 2013, Art. 19 XI). • Taxpayers have to identify those activities that are related to fossil fuels (Congreso de los Estados Unidos Mexicanos, 2013, Art. 19 I). • Four times a year (in April, July, October, January), taxpayers have to provide information to the Tax Administration Service (Servicio de Administración Tributaria) on their 50 main clients and providers of these fuels of the trimester before (Congreso de los Estados Unidos Mexicanos, 2013, Art 19 VIII).

[21] Amounts in Euro are calculated on the basis of the exchange rate of 01.01.2016 (date of the entry into force of adjusted tax rates).

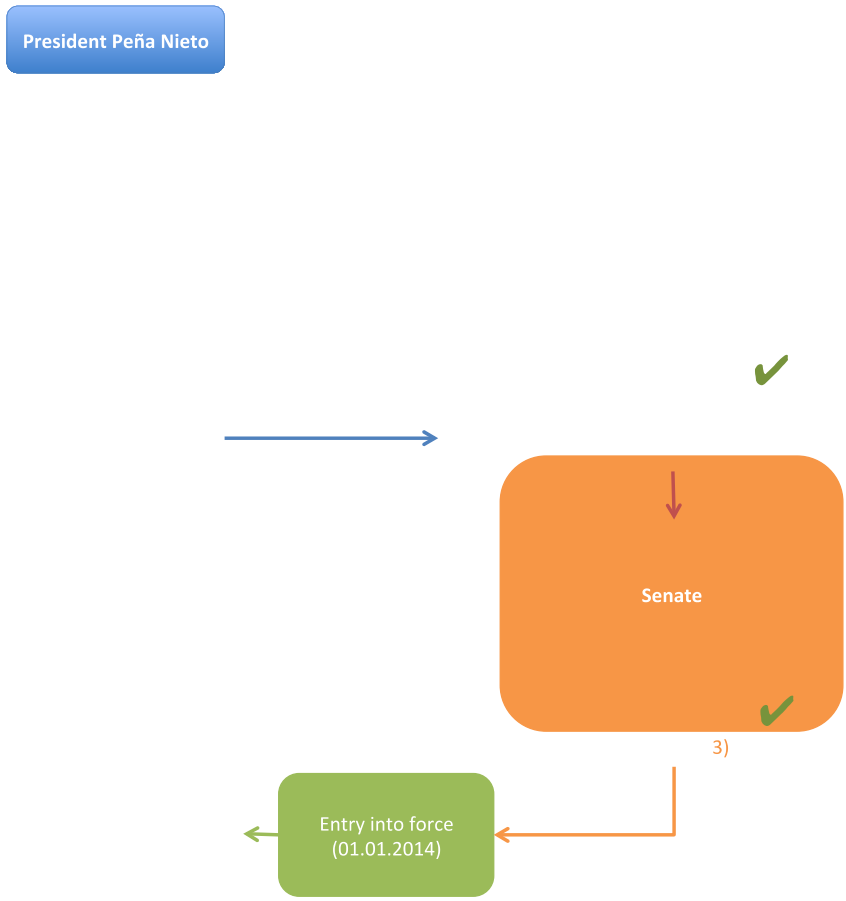
[22] The implicit prices per tonne of CO_2 are taken from Montes de Oca, Muñoz Piña, & Belausteguigoitia (2014). They have been calculated on the basis of the original tax rates established with the adoption of the carbon tax in 2013 (see Congreso de los Estados Unidos Mexicanos, 2013).

	• Taxpayers must implement physical controls of fabricated or produced volumes and provide a trimestral report on the monthly reading of the registries of each device used for the control (Congreso de los Estados Unidos Mexicanos, 2013, Art. 19 X). • Taxpayers must provide to the Tax Administration Service (Servicio de Administracion Tributaria) a trimestral report on price of disposal of each product as well as their value and volume of the trimester before (Congreso de los Estados Unidos Mexicanos, 2013, Art. 19, XIII). • Carbon tax monitoring system not yet integrated into mechanism for reporting on emissions (Montes de Oca et al., 2014).

Table 2: Details of Offsetting Regulation in Carbon Tax in Mexico

Eligibility	
- Eligibility criteria	CDM projects must be hosted in Mexico and approved by the UNFCCC (Congreso de los Estados Unidos Mexicanos, 2013, Cap. 1, Art. 5).
- Standards	CDM standard is used.
- Quantity limits	Tbd
- Sectoral limits	Tbd
Price	Taxpayers can submit CERs to reduce their overall tax amount to be paid by an amount equivalent to the value of the CERs. The value of the CERs will be determined according to rules to be established by the Secretariat of Finance and Public Credit (Secretaría de Hacienda y Credito Publico - SHCP) and are to reflect market prices at the moment of paying the carbon tax (Congreso de los Estados Unidos Mexicanos, 2013, Cap. 1, Art. 5).

Figure 1: Political Process Relating to the Introduction of Carbon Pricing in Mexico Including Involved Actors



Source: Own illustration.

References

Congreso de los Estados Unidos Mexicanos. (2013). *Ley del Impuesto Especial sobre Producción y Servicios - Última Reforma DOF 11-12-2013*.

Montes de Oca, M., Muñoz Piña, C., & Belausteguigoitia, J. C. (2014). *MRV and Linking: A Perspective from Mexico*.

SHCP. (2015). *ACUERDO 26/2015 por el que se actualizan las cuotas del Impuesto Especial sobre Producción y Servicios aplicables a los combustibles fósiles.* Retrieved from http://www.dof.gob.mx/nota_detalle.php?codigo=5421292&fecha=24/12/2015

Annex 1.3: Country Sheet South Africa

Table 1: Status Quo of Carbon Pricing in South Africa (According to Current Proposal "Draft Carbon Tax Bill")

	Characteristics
Name of instrument	Carbon Tax
Date of entry into force	Envisaged for 1st January 2017 (according to current proposal; legislation has not been adopted yet)
Scope	
- Sectors covered	Envisaged sectors to be covered: 1. Fuel combustion in energy industries, transport, and other non-specified sources 2. Fugitive emissions from fuels in solid fuels, oil, and other fugitive emissions from energy production 3. Industrial processes and product: mineral industry, chemical industry, metal industry 4. Agriculture, forestry and land use: livestock 5. Others (this category covers any entity that perceives that it does not fall under any of the other categories) (Repulic of South Africa, 2015).
- Gases covered	CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (Repulic of South Africa, 2015).
- Point of regulation	Envisaged downstream for stationary direct and processes, upstream for non-stationary emission sources through integration into the current fuel tax regime (Morden, 2015).
- Treatment of imports and exports	n.a.
Price / cap level	R120 (7,88 EUR[23]) per tCO_2e, according to current plans for the first phase up until 2020. Including tax-free allowances, the effective carbon tax ranges between R6 (0,39 EUR) and R48 (3,15 EUR) per tCO_2e for different sectors and is nullified for residential and livestock (Repulic of South Africa, 2015).
Cost containment mechanisms	
- Offsets	Option to use offsets is envisaged as a cost containment instrument.
Reporting and verification	According to current plans: • Tax paying entities are to self-report their carbon emissions and tax liability to South African Revenue Service (SARS). • The DEA is to lead the MRV process, collecting the GHG process emissions information. In the following, the Department of Environment (DoE), which is developing the Central Energy Database, is to supply energy combustion data to the National Atmospheric Emissions Inventory System (NAEIS – part of the South African Air Quality Information System, SAAQIS).

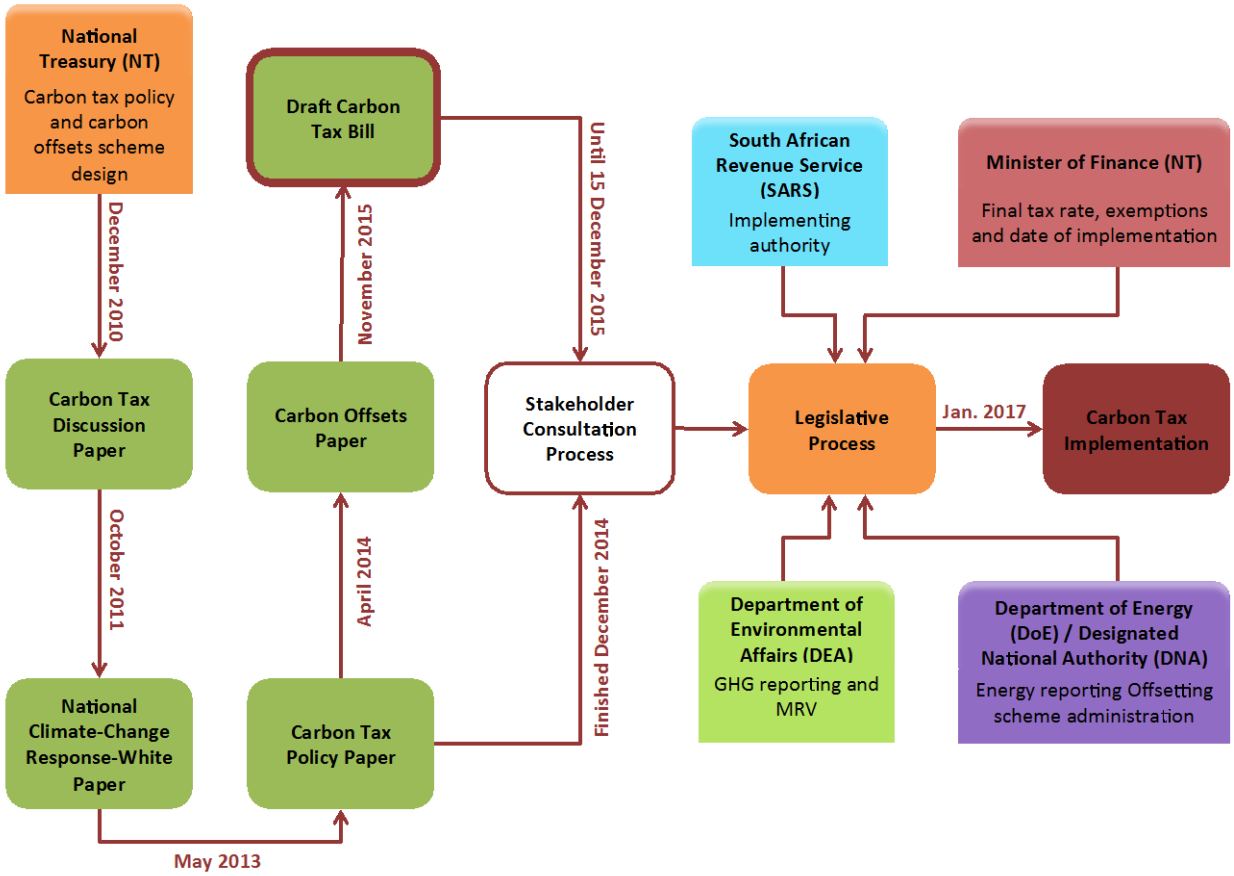
[23] Amounts in Euro are calculated on the basis of the exchange rate of 2 November 2015 (date of release of current proposal "Draft Carbon Tax Bill").

	• The DoE currently hosts the Designated National Authority (DNA) who is expected to be responsible for administering the carbon offsets (Republic of South Africa, 2015).

Table 2: Details of Offsetting Regulation in Carbon Tax in South Africa (According to Carbon Offsets Paper Published for Public Comment April 2014) (National Treasury, 2014)

Eligibility	
- Eligibility criteria	Proposed list of eligible project types: • Energy and energy efficiency • Transport • Agriculture, forestry and other land uses (AFOLU) • Waste Proposed eligibility criteria: • Projects that generate carbon offset credits must occur outside the scope of activities subject to the carbon tax. • Only South African based credits are eligible for use within the carbon offset scheme. Carbon offset projects registered and / or implemented before the introduction of the carbon tax regime to be accepted subject to certain conditions and within a specific timeframe to be elaborated. • Lists of both eligible and ineligible projects to be introduced. • Development of a South African specific carbon offsets standard/scheme could occur in the medium term to facilitate certain project types. Proposed negative list for projects: • Projects that receive benefits from other government incentives, such as projects that benefit from the Energy Efficiency Tax Incentive or the Renewable Energy Independent Power Producers Purchase Programme (REIPPPP) • Energy efficiency, cogeneration of renewable energy, and fuel switch projects implemented on activities owned/controlled by companies covered by the tax.
- Standards	Clean Development Mechanism (CDM), Verified Carbon Standard (VCS), Gold Standard (GS) and Climate Community and Biodiversity Standard (CCBS) are being considered for use in the carbon offset scheme.
- Quantity limits	Reduction of carbon tax liability by up to 5-10%.
- Sectoral limits	tbd
Price	tbd

Figure 1: Political Process Relating to the Introduction of Carbon Pricing in South Africa Including Involved Actors (Legislative Process as Envisaged in Current Proposal "Draft Carbon Tax Bill")



Source: Own illustration.

References

Morden, C. (2015). *Carbon Tax Proposals. Portfolio Committee on Environmental Affairs*. Retrieved from http://pmg-assets.s3-website-eu-west-1.amazonaws.com/150526carbon.pdf

National Treasury. (2014). *Carbon Offsets Paper. Published for Public Comment. April 2014*. South Africa. Retrieved from http://www.treasury.gov.za/public%20comments/CarbonOffsets/2014042901%20-%20Carbon%20Offsets%20Paper.pdf

Republic of South Africa. (2015). *Draft Explanatory Memorandum for the Carbon Tax Bill, 2015*. Retrieved from http://www.treasury.gov.za/public%20comments/CarbonTaxBill2015/EM%20-%20Carbon%20Tax%20Draft%20Bill.pdf

Repulic of South Africa. (2015). *Draft Carbon Tax Bill*. Retrieved from http://www.treasury.gov.za/public%20comments/CarbonTaxBill2015/Carbon%20Tax%20Bill%20final%20for%20release%20for%20comment.pdf

Annex 2: Detailed Information Regarding the Interviews Conducted

Ten expert interviews with relevant stakeholders from Chile, Mexico and South Africa have been conducted in person at the 21st Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) in Paris and via telephone or video conferences. One of the interviews was provided by an expert in written form. The names of the interviewees were only included in the report in case

this was explicitly agreed. Otherwise, it was agreed to only include a reference to the interviewee's affiliation.

Annex 3: Typical Potential Co-benefits and Co-costs of Project Types

Table A-1: Typical Potential Co-benefits and Co-Costs of Project Types

Project type	Potential Co-Benefits	Potential Co-Costs	Sources
Biomass energy Use of biomass based fuels, such as agricultural and forestry residues, biogas and biodiesel, for energy generation	• Cost-efficiency of the GHG abatement • Benefits and development support for poorer parts of society via employment • Preservation of natural resources via usage and promotion of RE • Contribution to energy security	• Higher water use (e.g. growing biomass) • Biofuel displaces food production • Sacrificing natural areas to managed monocultures • Contaminating waterways with agricultural pollutants • Threatening food supplies or farm lifestyles via competition for land • Increasing net emissions of carbon to the atmosphere, as a consequence of increased deforestation or energy-demanding manufacturing technologies • Project-specific public acceptance concerns	UNFCCC (2012): 29 Field, C. B. et al (2007): 65 Alexeew et al. (2010): 241 IPCC (2014): 72
Coal mine / bed methane Treatment and/or utilisation of methane from coal mines, including ventilation air methane	• Health benefits → Avoided accidents such as gas explosions or fires from mines		UNFCCC (2012): 29 Olsen & Fenhann (2006): 11
EE households Lighting, stoves and appliances	• Energy savings → reduced energy bills → ability to acquire better living conditions → wealth benefit • Better air quality by avoiding harmful smoke production of e.g. indoor open fire → health benefit • Benefits to beneficiaries by providing more efficient and less cost intensive lighting bulbs e.g. LEDs • Promotion of reliable and renewable energy	• Disposal of EE technologies e.g. bulbs, stoves, etc. • Negative health impacts via incorrectly implemented EE measures (e.g. reduced air exchange via sealing without ventilation systems) • Negative well-being impact via noise of implemented EE measures (e.g. heat pumps, ventilation systems)	UNFCCC (2012): 29 Olsen & Fenhann (2006): 11 IEA (2014): 34ff., 109

Project type	Potential Co-Benefits	Potential Co-Costs	Sources
	• Contribution to energy security via reduced demand • Less pressure on scarce natural resources via reduced demand • Less waste and associated pollution of land and water via reduced demand		
EE industry Efficiency of industrial plant processes	• Raise of competitiveness and productivity via emissions reduction and reduced demand • Health impact via reduced local air pollution and better work conditions • Ecosystem impact via reduced local air and water pollution • New business opportunities via new EE processes and technologies • Safety, working conditions and job satisfaction • Contribution to energy security via lower energy intensity • Enhanced production and capacity utilisation • Reduced operation and maintenance costs	• Negative trade effects (increased costs and decreased competiveness) via cost-ineffective investments in EE measures	Alexeew et al. (2010): 241 IPCC (2014): 86 IEA (2014): 34ff., 48, 130ff.
EE own generation Efficiency in the use of process wastes for heat or energy	• Improved local quality of live via lower electricity bills → wealth benefit • Contribution to energy security		Spalding-Fecher (2015): 46
EE supply side Efficiency of existing energy generation facilities inc. fossil fuel plants, cogeneration and combined cycle projects	• Contribution to energy security via reduced exposure to fuel price volatility (resource sufficiency) • Health and ecosystem impact via lower air pollution • Contribution to (off-grid) energy access	• Safety and waste concerns • Negative health impact via upstream supply-chain activities • Negative trade effects on exporting/importing countries via increased competiveness	UNFCCC (2012): 29 IPCC (2014): 72 IEA (2014): 36, 51, 154ff.

Project type	Potential Co-Benefits	Potential Co-Costs	Sources
Forests Afforestation, reforestation, mangroves and agroforestry	• Employment impact via entrepreneurship development • Diversification of income sources and access to markets • Additional income to (sustainable) forest management • Innovative financing mechanisms for sustainable resource management • Establishment of new protected forest area • Positive effects on biodiversity • Ecosystem resilience • Linkage between adaptation and mitigation • Positive impact on Air quality → Carbon stocks under management → via photosynthesis	• Adverse effects on vulnerable communities (displacement) • Carbon leakage to non-forest areas • Negative effect on biodiversity → Risk of introducing non local species → Maladaption via large scale monocultures	Harmeling et al. (2014): 84 UNFCCC (2012): 29 IPCC (2014): 89
Fossil fuel switch New natural gas plants and switch from oil to natural gas	• Positive Health impacts via better air quality • Less diseases via particulate matter • Less road traffic injuries → less smog leads to a better vision • Cost-effectiveness • Promotion of reliable and renewable energy • Stimulation of local economy	• Different kind of air pollution → climate impact	WHO (2010):45ff. UNFCCC (2012): 29
Fugitive Treatment of fugitive gases from fossil fuel production	• Promotion of reliable and renewable energy • Preservation of natural resources		
Geothermal	• Local employment impact • Less waste water • Health and ecosystem impact via avoidance of air pollution • Contribution to (off-grid) energy access • Preservation of natural resources via usage and promotion of RE • Contribution to energy security	• Negative air quality effect • Higher water use • Land consumption • Project-specific public acceptance concerns	Elizabeth et al (2013): 109 UNFCCC (2012): 29 IPCC (2014): 72

Project type	Potential Co-Benefits	Potential Co-Costs	Sources
		• Production of geofluids from a hydrothermal reservoir for use in power or thermal energy generation can lower the water table, adversely affect nearby geothermal-natural features (e.g., geysers, springs, and spas), create hydrothermal (phreatic) eruptions, increase the steam zone, allow saline intrusions, or cause subsidence → negative impact on biodiversity	
HFCs Treatment of HFC23 and HFC134a inc. thermal oxidisation	• Poverty alleviation via job creation • Improvement to infrastructure • Impact on life quality		UNFCCC (2012): 29 Alexeew et al. (2010): 241
Hydro	• Job creation • Welfare • Contribution to (off-grid) energy access • Promotion of renewable energy • Contribution to energy security • Irrigation, flood control, navigation, water availability (for multipurpose use of reservoirs and regulated rivers) • Health and ecosystem impact via avoidance of air pollution	• Threat of displacement for large hydro → Adverse effects on vulnerable communities → Negative effects on biodiversity • Project-specific public acceptance concerns • Higher water use	Alexeew et al. (2010): 241 Olsen & Fenhann (2006): 12 IPCC (2014): 72
Landfill gas Treatment of landfill gas and municipal solid waste including flaring and power generation activities	• Air, land and water benefits • Health benefits • Social benefits • Learning benefits • Welfare benefits → tax benefits used for public service purposes • Revenue generation		UNFCCC (2012): 18 Olsen & Fenhann (2006): 11
Methane avoidance	• Contribution to energy security (potential to se gas in some cases) • Health and ecosystem impact via avoidance of air pollution		IPCC (2014): 72

Project type	Potential Co-Benefits	Potential Co-Costs	Sources
Avoidance, treatment and utilisation of methane from manure, waste water, palm oil waste and composting			
N_2O: Adipic acid Thermal decomposition of adipic acid	• Employment via job creation • Economic and technical benefits via employment and technology transfer • Health benefits via better air quality	• Carbon leakage	UNFCCC (2012): 29 Spalding-Fecher (2015): 46 Olsen & Fenhann (2006): 19 Schneider et al. (2010): 17ff.
N_2O: Nitric acid Catalytic decomposition of nitric acid	• Employment via job creation • Economic and technical benefits via employment and technology transfer • Health benefits via better air quality		UNFCCC (2012): 29 Spalding-Fecher (2015): 46 Olsen & Fenhann (2006): 19
PFCs + SF_6 Avoidance, treatment or recycling PFC and SF_6 gases	• Improvement of infrastructure • Improvement of Health and Safety		UNFCCC (2012): 29
Solar Solar PV, solar thermal and solar water heating	• Local employment impact • Preservation of natural resources via usage and promotion of RE • Contribution to (off-grid) energy access • Less water use • Contribution to energy security • Health and ecosystem impact via avoidance of air pollution	• Storage of solar energy is expensive • Land consumption • Project-specific public acceptance concerns	UNFCCC (2012): 29 IPCC (2014): 72
Wind	• Local employment impact • Health and ecosystem impact via avoidance of air pollution • Contribution to (off-grid) energy access	• Extra measures to match demand • Land consumption • Noise • Biodiversity (e.g. animals which are scared by noises or wounded by wind blades)	UNFCCC (2012): 29 Alexeew et al. (2010): 241 Olsen & Fenhann (2006): 12 IPCC (2014): 72

Project type	Potential Co-Benefits	Potential Co-Costs	Sources
	• Preservation of natural resources via usage and promotion of RE • Contribution to energy security • Less water use	• Project-specific public acceptance concerns (e.g. visibility of wind)	

Annex 4: Indicators Used for the Evaluation of CDM Project Proposals in Mexico and South Africa

Table A-2: Indicators Used for the Evaluation of CDM Project Proposals in Mexico

Category	Indicator
Economic	Additional investment
Economic	Employment generation
Economic	Contribution to sustainability of balance of payments
Technological	Technology transfer
Environmental	Impact on air, water and land resources
Environmental	Impact on solid waste generation or disposal
Environmental	Impact on conservation/promotion of biodiversity
Social	Consistency with national, provincial and local development and sectoral priorities
Social	Quality of life of locals
Social	Poverty reduction
Social	Inclusion of developmental activities to support society (healthcare, infrastructure, etc.)
Social	Accessibility of local public services
Social	Contribution to regional integration and linkages with other sectors (within the country)

Source: Tewari, 2012.

Table A-3: Indicators Used for the Evaluation of CDM Project Proposals in South Africa

Category	Indicator
Economic	Additional investment
Economic	Employment generation
Economic	Contribution to sustainability of balance of payments
Economic	Clean Energy Development
Technological	(Implications of) Technology transfer on South Africa
Environmental	Impact on air, water and land resources
Environmental	Impact on solid waste generation or disposal
Environmental	Impact on conservation/promotion of biodiversity
Environmental	Contribution to resource sustainability
Environmental	Other Impacts

Category	Indicator
Social	Consistency with national, provincial and local development and sectoral priorities
Social	Quality of life of locals
Social	Poverty reduction
Social	Inclusion of developmental activities to support society (healthcare, infrastructure, etc.)
Social	Accessibility of local public services
Social	Contribution to regional integration and linkages with other sectors (within the country)
Social	Capacity/skill/knowledge development
Social	Removal of social disparities
Social	Preservation of local culture/heritage
Social	Relocation of communities

Source: Tewari, 2012.

Annex 5: Countries' INDCs: Comparison of Key Characteristics

Table A-4: Countries' INDCs: Comparison of Key Characteristics

	Mexico	Chile	South Africa
Type	Absolute target	GHG Intensity target + absolute target for the LULUCF specific target	GHG emissions trajectory range (Peak, plateau and decline - PPD)
Metric	GHG	GHG for the GHG target, ha of forest area for the LULUCF target	GHG
Timeframe	Single year	Single year	Single year
Sectoral Scope	Economy wide	Energy, Industrial processes, Use of disolventes and other products, agriculture and waste. LULUCF sector covered by a specific contribution.	Economy wide
Coverage of GHG's	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6.	CO_2, CH_4, N_2O, HFCs, PFCs. (SF_6 not covered)	CO_2, CH_4, N_2O, HFCs, PFCs, SF_6.
Reference Level	Business as Usual Baseline	Historic emissions	Absolute target

	Mexico	Chile	South Africa
Geographic Area	Nation-wide	Nation-wide	Nation-wide

Source: Own compilation.