

# **CREDITING EMISSION REDUCTIONS IN NEW MARKET BASED MECHANISMS – PART II: ADDITIONALITY ASSESSMENT & BASELINE SETTING UNDER PLEDGES**

The logo for INFRAS, featuring the word "INFRAS" in white lowercase letters on a black rectangular background, which is part of a larger graphic element consisting of a black and a yellow rectangle.

## *Final Report*

Commissioned by the Ministry of Infrastructure and the Environment (I&M) of the Netherlands and the Federal Office of the Environment (FOEN) of Switzerland

Zurich, January 2014

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Zurich, January 2014

## **Jointly commissioned by:**

- The Dutch Ministry of Infrastructure and the Environment (I&M), Directorate of International Affairs, 2500 EX The Hague, and
- The Swiss Federal Office for the Environment (FOEN), Climate Division, CH 3003 Bern. The FOEN is an agency of the Federal Department of the Environment, Transport, Energy and Communications (DETEC).

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## GLOSSARY

Additionality:	Refers to the question of whether the emission reductions occur as a result of the policy intervention (the market mechanism)
Additionality assessment:	Assessment of whether agreed criteria for additionality are fulfilled
Allowance:	A tradable unit issued under a trading mechanism
BAU emissions:	Most likely level of business-as-usual emissions
Baseline:	Emissions level used as reference level for the issuance of units
Baseline setting:	Determination of the baseline
Crediting mechanism:	A market mechanism in which credits are issued for actions that deliver emission reductions. The amount of credits is based on an ex-post comparison of monitored emissions against a baseline, possibly adjusted for leakage emissions. The credits can be traded.
Credits:	A tradable unit issued from a crediting mechanism
Leakage emissions:	Indirect emission effects that occur as a result of the market mechanism in sources that are not covered under the mechanism
Market mechanism:	All types of market mechanisms, including trading mechanism and crediting mechanisms
Trading mechanism:	A market mechanism in which an emissions cap is set for the entire economy or sectors of the economy. Emission allowances corresponding to the cap are issued and allocated to the entities included in the mechanism. The entities must surrender an emission allowance for each ton of CO <sub>2</sub> e they emit. The emission allowances can be traded between the entities included in the mechanism.
Units:	Tradable units which entitle the owner to emit one ton of CO <sub>2</sub> e. Units include credits (from a crediting mechanism) or allowances (from a trading mechanism)

## ABBREVIATIONS

BAU	Business as Usual
CDM	Clean Development Mechanism
FVA	Framework for Various Approaches
GDP	Gross Domestic Product
LDC	Least Developed Country
MRV	Measurable, Reportable, Verifiable
MWh	Megawatt hours (energy unit)
NMA	Non-Market-Based Approaches
NMM	The New Market Mechanism
NAMAS	Nationally Appropriate Mitigation Actions
t	One metric tonne (of carbon dioxide)
QELRO	Quantified Emission Limitation and Reduction Objective
UNFCCC	United Nations Framework Convention on Climate Change

## 1. INTRODUCTION

While the first part of the study presents insights on how to define crediting baselines and determine additionality in new Market based Mechanisms in general, the present Part II looks closer into the question on how the emerging mitigation pledges from host countries may inform baseline setting and additionality in crediting mechanisms.

The study focusses on new market based mechanisms such as the Frameworks for various approaches (FVA) and the New Market Mechanism (NMM), but the analysis and its findings are equally relevant for other international crediting schemes, be in the context of Nationally Appropriate Mitigation Actions (the proposed “crediting NAMAs”) and, more importantly, in the context of the existing crediting under the Clean Development Mechanism (CDM) and Joint Implementation (JI). As current pledges for 2020 seem not very ambitious and NMM and FVA may be expected to start on a larger scale only after 2020, the relevance of the current study may be most prominent for the post 2020 phase. However, we think that the interaction between crediting and pledges should already be considered in existing and piloted crediting mechanisms in the run-up to 2020.

Chapter 2 provides an overview on characteristics of different Cancun pledges. Chapter 3 elaborates on the role of robust international carbon accounting rules to enable the operationalization of crediting mechanisms, helps to prevent double-counting of crediting units and describes the role of host country strategies and programs in meeting pledges. Our analysis suggests that the latter may be an important element that allows host countries to define baselines and additionality for crediting mechanisms in such a way that the crediting does not endanger their meeting the pledge, as discussed in chapter 4. The concept is further elaborated in different cases and examples in chapter 5 and preliminary findings are provided in chapter 6.

In this study the term “pledge” refers to emission reduction statements that countries have made under the Convention for 2020 and also to emission commitments for a timeframe beyond 2020. As international negotiations on a future climate scheme are on-going, and commitment requirements have not been discussed or defined yet, we use existing 2020 pledges made under the Convention as examples to explore ways on how future pledges may inform baseline setting and additionality determination.

## 2. CHARACTERISTICS AND CLASSIFICATION OF PLEDGES

Baseline and additionality criteria for market mechanisms may depend to a large extent on the type of emission reduction commitment a country has made. In this chapter we examine the types of emission reductions commitments (“pledges”) countries have made and classify them in order to analyse their impacts on setting the baseline and assessing additionality for market mechanisms (see chapters 4 and 5).

At COP16 in Cancun in 2010, many developed and developing Parties stated their national mitigation targets and actions for the year 2020.<sup>1</sup> The pledges are quite diverse in terms of ambition, scope, applicability, coverage and use of units from market mechanisms. Countries that took on an emissions reduction commitment under the second commitment period of the Kyoto Protocol (KP) have to follow KP rules on how they will account for their emissions and how they have to meet their commitments. It is less clear how countries have to meet the emission reduction pledges that they made under the Convention, e.g. how emissions are accounted for and which units can be used for compliance.

### 2.1. EXISTING PLEDGE TYPES

The pledges are diverse in terms of scope, applicability, coverage and use of units from market mechanisms. Table 1 summarizes different characteristics that countries have chosen for their pledges. We do not discuss the level of ambition, i.e. to what extent the pledges are in line with the 2 degree target and equity considerations (see box 1).

<sup>1</sup> [COP-16 Cancún agreements](#) from 2010 include voluntary mitigation pledges made by developed and developing countries to control their emissions of greenhouse gases.

Characteristics	Comments
<b>Reduction target</b>	<ul style="list-style-type: none"> <li>- Absolute (t CO<sub>2</sub>e)</li> <li>- Intensity-based (t CO<sub>2</sub>e per intensity indicator, such as GDP)</li> </ul>
<b>Reference year</b>	<ul style="list-style-type: none"> <li>- Historical base year</li> <li>- Projected future BAU emissions in target year</li> <li>- No reference year, fixed reduction amount for the target year</li> </ul>
<b>GHG gases</b>	<ul style="list-style-type: none"> <li>- All Kyoto gases: A1 countries account for the following gases covered by UNFCCC: carbon dioxide (CO<sub>2</sub>); methane (CH<sub>4</sub>); nitrous oxide (N<sub>2</sub>O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulphur hexafluoride (SF<sub>6</sub>); and nitrogen trifluoride (NF<sub>3</sub>).</li> <li>- CO<sub>2</sub> only: Pledges from NA1 countries do not necessarily include all those gases e.g. China's target is expressed in CO<sub>2</sub> only.</li> </ul>
<b>Sectors</b>	<ul style="list-style-type: none"> <li>- Economy-wide (comprehensive)</li> <li>- Sector specific policy- and project level actions: Not all countries have economy-wide targets. Some countries have subnational targets that only cover certain regions (e.g. China's regional ETs, California, Quebec), see tables in Appendix 1.</li> </ul>
<b>Conditionality</b>	<ul style="list-style-type: none"> <li>- Unconditional (unilateral action)</li> <li>- Conditional (requiring financial support from donor country, or other political prerequisites)</li> </ul>
<b>Time frame</b>	<ul style="list-style-type: none"> <li>- Multi-year (all countries with a reduction commitment in CP2)</li> <li>- Single year (pledges made under the Convention)</li> </ul>
<b>Indirect Emissions</b>	<ul style="list-style-type: none"> <li>- Included: The direct and indirect emissions included within the target/goal boundary (can include assessment and disclosure of significant sources of leakage – either outside goal boundary or to another jurisdiction)</li> <li>- Excluded</li> </ul>
<b>Inclusion of market based mechanisms</b>	<ul style="list-style-type: none"> <li>- Pledge explicitly include the use of international market units for pledge attainment.</li> <li>- Pledge do not specify the use of international market units</li> </ul>

**Table 1:** Features of existing pledge types and available options.



The introduction of mitigation pledges under the Convention creates eight broad groups for the period of 2013-2020. Table 1 shows the eight pledges types in terms of share of global CO<sub>2</sub> emissions of the countries with that respective pledge type (the eight pledge types and Figure 1 have been taken from the chapter “Typology of Current Mitigation Pledges” from a forthcoming report on the Common Accounting Framework, FOEN forthcoming).

1. **Absolute reductions relative to historic base year emissions, continuous multi-year targets:** The 37 countries<sup>2</sup> with a QELRO in the second commitment period of the Kyoto Protocol have absolute reduction targets for 2020 relative to historic base year emissions. The targets are translated into quantified emissions budgets over the commitment period from 2013-2020. Assigned amount units (AAUs) are issued once for the entire period of the continuous multi-year target.
2. **Absolute reductions relative to historic base year emissions , single year targets for 2020:** Under the Convention, some countries made absolute emission reduction pledges for 2020, yet these are not translated into multi-year targets. Such targets are measured in tonnes of CO<sub>2</sub>e reduced below the historic base year emissions. Five A1 countries and four NA1 countries have made this type of pledge.<sup>3</sup>
3. **Absolute reductions relative to BAU emissions in target year, single year targets:** Nine countries have set absolute reduction targets relative to a projected business-as-usual (BAU) emissions level in the target year. Such targets are measured in tonnes of CO<sub>2</sub>e reduced below the BAU emissions. When countries specify their BAU emissions ex-ante for the target year it is possible to establish the absolute target ex-ante. If the target was a multi-year target then it could be translated ex-ante into a quantified emissions budget over the target period. If countries did not specify their BAU emissions ex-ante BAU emissions would have to be monitored and established ex-post. Seven of the eight countries in this category (Indonesia, Israel, Mexico, Papua New Guinea, Singapore, South Africa, South Korea) have set their BAU emissions. Chile is in the process of doing so. All these countries have single year targets.
4. **Absolute reduction to a specified emissions level in target year, single year targets:** Costa Rica and Maldives aim to have zero net emissions by 2020, while Papua New

<sup>2</sup> Australia, Belarus, Croatia, EU27, Iceland, Kazakhstan, Monaco, Norway, Switzerland, Ukraine

<sup>3</sup> A1: Canada, Japan, New Zealand, Russia, USA; NA1: Antigua and Barbuda, Marshall Islands, Moldova, Montenegro

Guinea has such a target for 2050 (following an intermediate 2030 target). These targets would be measured in terms of absolute emissions.

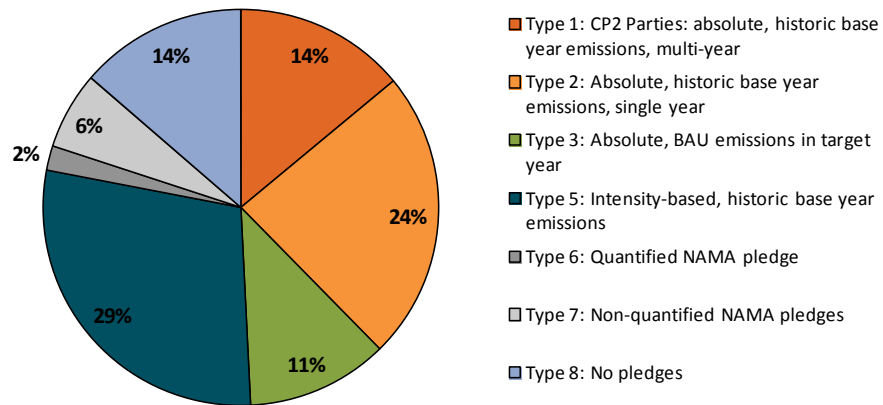
5. **Intensity-based reductions relative to historic base year emissions, single year targets:** China and India have set targets based on relative reductions to be achieved per economic output compared to a historic base year. Such targets are usually measured in terms of tonnes of CO<sub>2</sub>e reduced per GDP.
6. **GHG-quantified nationally appropriate mitigation actions (NAMAs):** Eight countries<sup>4</sup> have made pledges which can be classified as “GHG-quantified” either because they: a) have specific quantified targets which could be translated into GHG terms with additional information, such as share of forest cover to be increased, rate of deforestation to be decreased, or share of renewable energy sources to be reached in the energy mix, by a given year, or; b) directly quantify the GHG reduced or avoided by the NAMAs they have pledged to undertake. These are distinguished from the NAMAs classified below because progress with the pledged NAMAs can be measured and verified.
7. **Non-quantified policy-, sectoral-, and project- level nationally appropriate mitigation actions (NAMAs):** 32 countries<sup>5</sup> have made pledges that are based on implementing certain activities without quantifying the expected impact of such activities in GHG terms or in any other terms which could help determine their GHG impact. These NAMAs also do not specify how implementation of activities will be measured, and take the form of statements expressing non-quantified objectives, such as to increase renewable energy generation or to improve energy efficiency, often without specification of timeframes.
8. **No pledges:** 34 countries<sup>6</sup> with emissions representing more than 0.1% of global emissions (in 2010) have no reduction pledges.

<sup>4</sup> Burkina Faso, Central African Republic, Colombia, Cook Islands, Ethiopia, Gabon, Morocco, Peru

<sup>5</sup> Afghanistan, Algeria, Argentina, Armenia, Benin, Bhutan, Botswana, Cambodia, Cameroon, Chad, Congo, Côte d'Ivoire, Dominica, Egypt, Eritrea, Gambia, Georgia, Ghana, Guinea, Jordan, Macedonia, Madagascar, Malawi, Mauritania, Mauritius, Mongolia, San Marino, Sierra Leone, Swaziland, Tajikistan, Togo, Tunisia

<sup>6</sup> Bangladesh, Bolivia, Cuba, Ecuador, Iraq, Iran, Kenya, Kuwait, Lao, Libya, Malaysia, Mali, Myanmar, Nigeria, North Korea, Oman, Pakistan, Philippines, Qatar, Saudi Arabia, Serbia and Montenegro, Sudan, Syria, Thailand, Trinidad and Tobago, Turkey, Turkmenistan, Uganda, United Arab Emirates, Tanzania, Uzbekistan, Venezuela, Vietnam, Zambia

Existing pledge types and their share of global CO<sub>2</sub> emissions (in 2010)



**Figure 1** Existing Pledge Types and their share of total global CO<sub>2</sub> emissions (2010). (Source FOEN, forthcoming)

Most countries with significant GHG emissions have made emission reduction pledges. Almost 80% of global GHG emissions are from countries with economy-wide targets. Noteworthy is that countries that have made continuous multi-year emissions commitments account for only approximately 14 % of global CO<sub>2</sub> emissions.

### Box 1: Science and Equity

#### Pledges compared to the 2 degree goal

Already in the period up to 2020 deep emission cuts are necessary in order to stay within the 2 degree target countries agreed to in Cancun. According to UNEP, the current pledges are insufficient to meet this goal. An estimated additional 8-16 Gigatons of emissions reductions are necessary by 2020 to make the 2 degree goal “likely.” Current unconditional pledges are about 1 Gt below projected BAU emissions ([UNEP Gap report 2012](#)). Because it is the cumulative GHG emissions that shape the response in atmospheric temperature rise, the low level of ambition of current 2020 pledges will result in much more radical emission reduction requirements in later decades ([INFRAS-ETHZ 2012](#)).

#### Equity Principles

Equity, the fair sharing of mitigation and adaptation costs, is a core issue and influence what pledges countries take and what accounting framework they will agree to under a new climate agreement.

The importance of equity is reflected in the overarching principle of the UNFCCC that Parties act “on the basis of equity” (Article 3.1). Common but differentiated responsibilities and respective capabilities (CBDR/RC) is a key principle of the Convention.

Under the Kyoto Protocol the issue of equity was addressed to a certain extent by dividing countries into developed nations (Annex 1) and developing nations (Non-Annex 1). Yet this dichotomy is increasingly questioned. Many of the NA1 countries have per capita emissions on par or above the emissions of many Annex 1 countries. For example, China’s per capita CO<sub>2</sub> emissions in 2010 were almost on par with those of the EU. Also, per capita GDP of some non-Annex 1 countries are higher or on par with some countries classified as Annex 1.

Parties are currently trying to find common ground on how equity should be operationalized under a new climate treaty. Parties have differing views on what a fair sharing of mitigation and adaptation costs actually means (see e.g. INFRAS 2012). Different equity principles and frameworks have been discussed.<sup>7</sup> Countries are concerned that they will be asked to do more than what they evaluate to be their fair share, and conversely that other countries will ‘free ride’ off their efforts.

Equity will likely be one of the fundamental issues that will determine the success of the ADP to deliver a global agreement that ensures the 2 degree target.

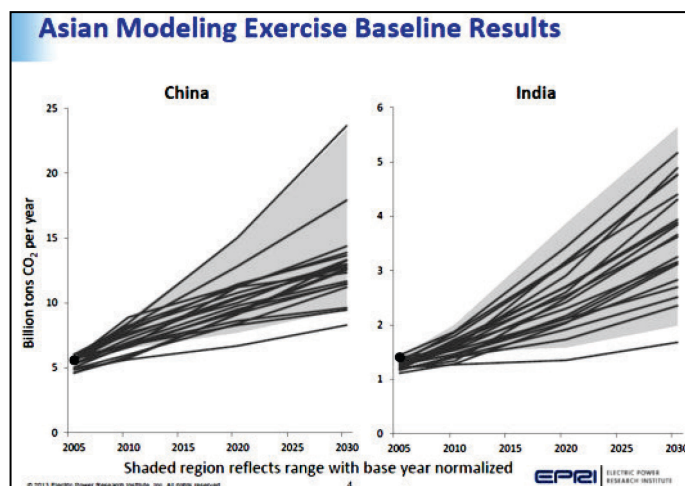
Comparability of mitigation efforts is difficult with varying types of pledges. Accounting for tradable GHG units is possible and can be addressed, as long as there is a quantifiable reduction target. E.g. once GDP is known, an intensity based target can be quantified. The same holds true for a reduction target relative to BAU emissions level: once the BAU emissions level is set, the reduction target is quantifiable. Yet quantifiability does not necessarily lead to environmental integrity, see box 2.

<sup>7</sup> For an overview on equity principles, see: CAN Fair Effort Sharing Discussion Paper at <http://www.climatenetwork.org/publication/can-discussion-paper-fair-effort-sharing-jul-2011>

## Box 2: Setting BAU emissions trajectory for determining mitigation targets

Many of the pledges are based on reductions below a projected BAU emission scenario. But the uncertainties of BAU emission scenarios are very large. Projecting BAU emission scenarios is technically complicated, politically challenging and subject to large uncertainties. Normative parameters have to be set to design a model to run BAU scenarios. These exogenous factors can have a large influence on the projected BAU emissions:

It is for example challenging to represent impacts and interactions of policies in a model. Establishing which policies should be included in the scenario is non-trivial.



Per capita income and energy intensity assumptions have the largest impact on emissions scenarios. As shown in the graph above, these factors can be tremendously dynamic, as for example in many Asian countries and are therefore difficult to project in the future (graph by: Geoff Blanford, Electric Power Research Institute ([PPT](#))).

Many factors that can have a large impact on emissions are unknown ex ante. E.g. the exponential growth in shale gas extraction in the US.

### Economic output measures for the determining of intensity-based mitigation targets

For intensity-based pledges it is necessary to know the economic output. There are different measures used:

- Nominal Gross Domestic Product (GDP): determines the value of all final goods and services produced in a country in a particular year.
- Real, or constant GDP
- Gross National Product (GNP) determines the market value of all goods and services produced in one year by labour and property supplied by the residents of a country.
- Purchase Power Parity (PPP): determines the costs that would be needed to purchase the same goods and services in different countries, and uses the values to calculate an implicit foreign exchange rate.

Measuring economic activity requires the collection of large amount of data and making decisions about how to deal with currency fluctuations and other external factors. GDP growth can be over-estimated by governments because of political pressures that lead to overly-optimistic assumptions related to economic growth.

Transparent assumptions, data sources and methodologies that are used for BAU determinations may help to clarify how emissions projections were made but they will not necessarily lead to more comparable pledges or more ambitious targets. Transparency also does not necessarily increase accuracy of BAU emission scenarios since conditions may change unexpectedly and uncertainty is inherent to modelling.

Setting baselines for a country's mitigation target poses slightly different issues than setting baselines for offsetting mechanisms. Please see chapter 4, for a more in-depth discussion on baseline setting in offsetting mechanisms.

## 2.2. TIME FRAME OF THE PLEDGES

All pledges made under the Convention share in common that their pledge is for a single target year, 2020 in most cases.<sup>8</sup> It is only the countries that have a reduction commitment under CP2 that have multi-year reduction commitment with quantified carbon budgets.

The single year pledges under the Convention neither specify nor necessarily imply targets for the years preceding or following this single year. This has implications for comparability and integrity of efforts and also for the use of carbon market units.

The remaining atmospheric “carbon budget” is limited if we are to achieve the 2 degree target. In other words, because of the longevity of CO<sub>2</sub> (and other GHGs) it is the cumulative emissions reductions that are relevant.

Under multi-year pledges, such as the CP2 pledges, cumulative emission reductions over all years are accounted against the emissions trajectory a country chooses. This ensures that the actual effort over time is considered. A country with a single year target on the other hand, does not have to account for its emissions pathway. Only emissions in the pledge year 2020 are accounted for. Meeting a single year target through purchasing international units would be much easier for the single-year target than for the multi-year one, as the number of required international units would be far less. This is because under the single-year target, total cumulative emission reductions, would be far less than under a multi-year target.

Single year pledges also present issues in terms of accounting for international transfer or crediting units. The issues arise in particular, if a country with a single year pledge is allowed to sell internationally traded GHG units that have a vintage other than the single pledge year, say before 2020. These units could then be used for compliance by the buyer country but this would not be reflected in the seller country pledge.

In summary, single year pledges cannot necessarily ensure a reduction of cumulative emissions and lack the same level of comparability, either with multiple-year targets or with similar

<sup>8</sup> The exceptions are Costa Rica with a carbon neutrality pledge for the year 2021 and Papua New Guinea with a target for 2030.

single-year targets. The comparability and ambition issue that arise for single-year targets are examined in more detail by forthcoming SEI working paper (Lazarus, Kollmuss, Schneider)

Setting a crediting baseline for a country with a single year target is best done if the single-year target is translated into a multi-year target, as is done for example for countries under the Kyoto Protocol where a linear trajectory is used between base year and target year (UNFCCC 2011).

### 2.3. CONDITIONAL VERSUS NON-CONDITIONAL PLEDGES

Many NA1 countries have made their pledges conditional on receiving financial support. This raises the question of how such financial contributions and the resulting emissions reductions are accounted for. Ideally there should be no double counting of financial contributions or emissions reductions (see discussion on double counting). Some NA1 countries have made their pledges conditional on being able to use international credits (e.g. CERs) for compliance with their own target. One study estimated that global mitigation in 2020 could be weakened by up to 1.6bn tCO<sub>2</sub> if credits issued in NA1 countries were counted towards both buyer and seller country pledges (Erickson and Lazarus, 2011).

### 2.4. CLARIFICATION OF PLEDGES

Parties are aware that current pledges are not comparable with each other because of the varying ambition, scope, applicability, coverage and use of units from market mechanisms.

At the UNFCCC negotiations countries are discussing the nature of existing pledges under several tracks. Parties have established a work programme under the Subsidiary Body for Scientific and Technological Advice (SBSTA) to clarify reduction targets of developed country Parties ([1/CP.18 para 8](#)). In addition, a work programme to further understand the diversity of NAMAs under the Subsidiary Body for Implementation (SBI) was also established in Doha (1/CP.18, para. 19). A UNFCCC technical paper from October 2013 gives an overview of the developed country pledges and their assumptions (UNFCCC 2013). Parties furthermore are discussing enhancing pre-2020 mitigation ambition for countries under work stream 2 of ADP (2/CP.18, para. 5). UNFCCC workshops were held in 2012 with the aim to clarify the assumptions and the conditions of developing country NAMAs. (1/CP.16, paragraph 38).

Despite these efforts, the differences in the characteristics of pledges remain. For the purpose of baseline setting for crediting mechanisms, many of these issues need to be clarified first,

if the approaches discussed in this paper are to be applicable. In the next chapter we discuss how pledges are met and how they can inform crediting baseline setting.

### **3. HOW TO MEET PLEDGES**

This chapter describes the important role of robust carbon accounting rules and of national strategies, programmes and plans for the implementation of country pledges. This prepares for the chapters below, where these elements are then used in baseline setting and additionality demonstration.

#### **3.1. NEED FOR ROBUST INTERNATIONAL ACCOUNTING RULES**

All Parties under the UNFCCC have some reporting requirements, including information on emissions, emissions objectives and trends. The reporting requirements differ for developed and developing countries and although they are more extensive for developed countries, they do not constitute an emissions accounting framework. Currently only Parties with mitigation commitments under the KP are subject to a rules-based accounting framework.

A common accounting framework (CAF) that is robust, rigorous, transparent, and comprehensive would be necessary to ensure comparability and enable the assessment of countries performance in meeting their pledges. Such a CAF would also facilitate the environmental integrity of crediting mechanisms and carbon markets in general, for example by addressing different forms of double counting (see Lazarus et al. 2013). However, such a CAF would not be sufficient to address all issues, e.g. the environmental integrity of the baselines, which would require additional requirements/rules.

Until a CAF has been established, it may make sense to support host countries in establishing best practice in approaches in meeting the pledges and defining baselines/additionality consistent with meeting the pledge, as laid out in this report.

#### **3.2. ROLE OF NATIONAL STRATEGIES AND PROGRAMMES FOR MEETING PLEDGES**

In the Framework Convention, Parties commit themselves to “formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures



to mitigate climate change [...]” (UNFCCC 1992, Art. 4.1b). In addition, the Convention builds on the principle that “Policies and measures to protect the climate system against human-induced change should be appropriate for the specific conditions of each Party and should be integrated with national development programmes [...]” (Art 3.4). The convention already acknowledges that any national mitigation action should be appropriate for the country and planned and implemented in the framework of national policies and programmes.

It is not clear how pledges or targets will be defined in an international scheme for 2020 or beyond. However, once the commitment to a pledge is made, it may be assumed that national governments will formulate programs and policies in order to meet their national, sectorial or regional emissions pledges and to make meeting the pledges consistent with the Party’s other policies and development goals. Parties will probably use a range of approaches to this aim, depending on their national circumstances including economic and development characteristics, policy framework, information availability and/or planning capabilities.

Such strategy plans and programs for implementation can be the fundament for achieving consistency between the pledge, crediting mechanisms and additionality. In general they should clearly define whether crediting is included in the respective approach or not. If it is included, concerns about consistency exist and there is a need for further provisions in the plans (e.g. that pledges must be met first before crediting might take place). Furthermore in these plans and programs existing mitigation potentials, approaches where cost-effectiveness is suitable or synergies with other national policies and strategies could be analysed. Finally a national framework could be part of the program that facilitates the means for emission reductions measures (including mechanisms). This framework encompasses the governance of the mitigation measures and specifies processes and technical inputs needed to implement them. The framework further needs to specify how baselines are determined, how envisaged mechanisms are to be planned and developed and finally how accounting of emission reductions should be managed. In order to facilitate international crediting, the framework should be in line with international framework for crediting mechanisms.

### 3.3. PROGRAMS AND PLANS DIRECTLY OR INDIRECTLY RELATED TO CLIMATE CHANGE MITIGATION

Most countries with an international pledge under the UNFCCC have set up some kind of program, action plan or framework on climate change mitigation that elaborates on how to achieve the pledge. Usually reference to the countries’ overall climate policy, legislation and regulation

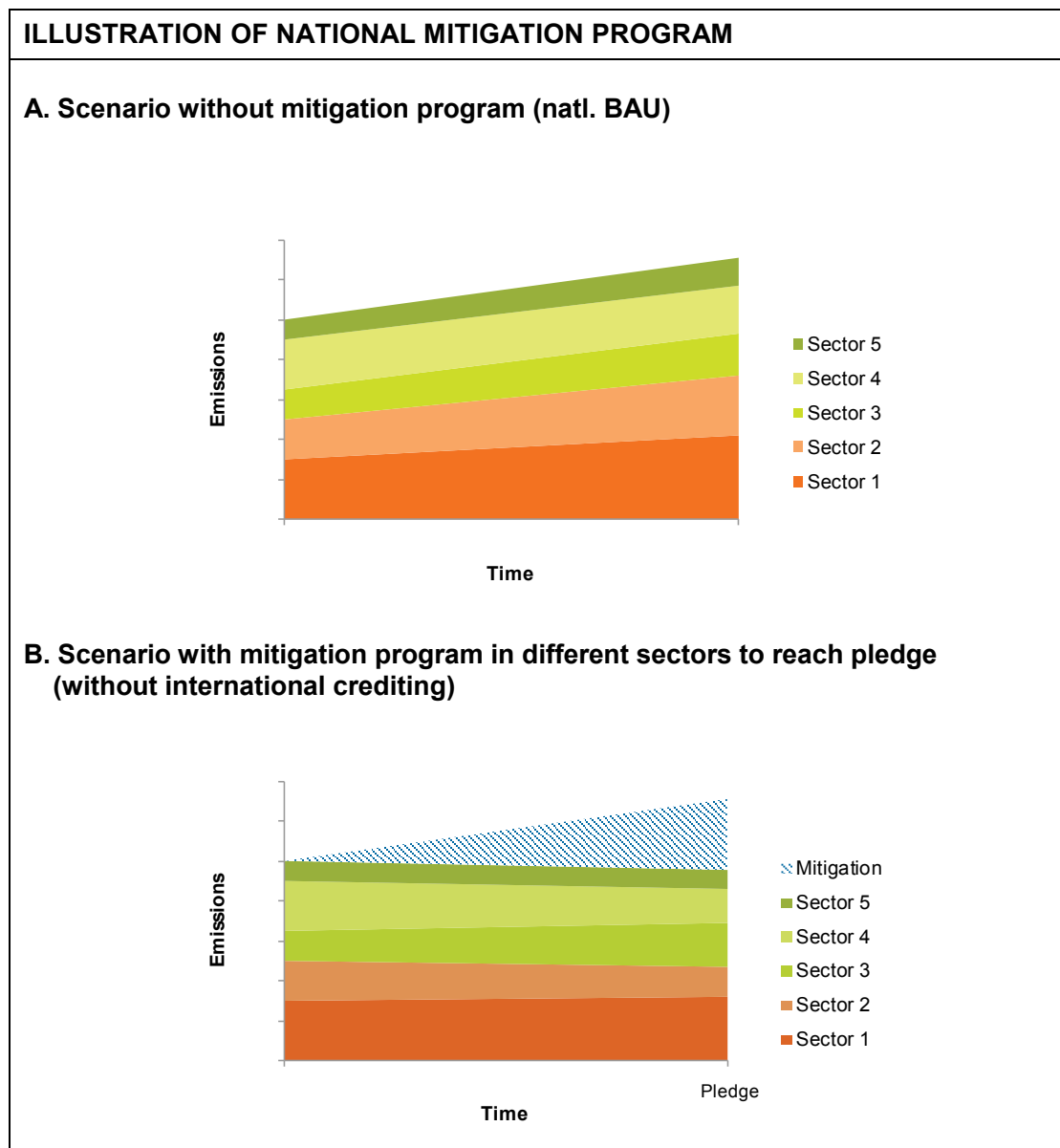
is highlighted. Indonesia for example has formulated a National Mitigation Action Plan on greenhouse gas emission reduction (RAN-GRK) that identifies its national emission reduction potential and provides the framework for mitigation actions. Similar actions plans and programs exist among others in Korea (Framework Act on Low Carbon as part of the Green Growth agenda), Mexico (Special Climate Change Program) or China (climate white paper, embedded in 5 year plans), etc. Furthermore, a wealth of programs and plans that are indirectly related to greenhouse gas mitigation exists. Those might range from energy efficiency plans (e.g. Energy Efficiency Strategy Paper for Turkey) to national programmes for shifts in economic (low carbon) development.

A recent survey of national legislation and strategies to mitigate climate change (Navroz K. D. et al. 2013) found that in 2012 already about two thirds of global GHG emissions are under some sort of national climate legislation or strategies (not to be confused with *international* pledges). Also, about 71% of global GHG emissions are covered by an international pledge (see chapter 2). With this, there seems to be a growing role of pledges, strategies and programs in many countries that underlines their potential importance in informing baseline setting and additionality for international crediting.

In general these plans and programs provide a blue print for implementation of mitigation actions. This includes primarily specifications about the pledge such as pledge type, explanations about BAU scenarios and whether crediting is included or not in the pledge, but defines also relevant responsibilities by stakeholders. In the action plan by Indonesia for example specifications of governance are elaborated and the strong ownership by the government is highlighted. It further proposes national integrators and national coordinators facilitating the functioning of the mechanism and coordination among stakeholders. It also foresees the alignment of mitigation actions with other policies and strategies.

The degree of detail of information varies amongst mitigation programs, action plans or frameworks. Some elaborate detailed frameworks for technical questions, e.g. on how to establish BAU scenarios, set sectoral caps and respective processes required while others come up with rather general guidelines on the approach envisaged.

In this perspective the climate programs and plans play an important role by providing information about how pledges inform crediting baselines and additionality.



**Figure 2** Illustration of how countries may use national mitigation programs to modify GHG emissions in targeted sectors from a national BAU scenario (A) to reach a national pledge (B).

## 4. HOW PLEDGES INFORM CREDITING BASELINE SETTING AND ADDITIONALITY

This chapter explains why pledges need to be taken into account when setting baselines or determining additionality in new market based mechanisms. Based on existing instruments for national policy planning mentioned above such as national strategies and plans that may guide host countries on their path to reaching their pledges, several basic approaches are presented on how to design baselines/additionality that are in line with the national pledges.

### 4.1. CONNECTION BETWEEN PLEDGES AND BASELINES/ADDITIONALITY

In evaluating the relationship between pledges and additionality and baseline setting we build on the definition of these terms that have been established in the framework of the CDM, as this is the most developed and comprehensive regulatory body for baseline and additionality.

**Additionality:** Under the CDM, a “CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (3/CMP.1, Annex, paragraph 43).” We are also assuming that host country pledges are defined in a way that rules out double counting, i.e. where mitigation actions are only counted once, either for (i) compliance with the host country pledge or (ii) for international crediting, transfer and compliance with the buying country pledge (see chapter 2). Under these assumptions, the scenario in the absence of the market mechanism includes all mitigation policies and (level of) actions that the host country is undertaking to meet the pledge. In this context, mitigation policies and actions are only additional if they are not already part of the country’s national strategies and programmes for meeting the pledge (section 3).

**Baselines:** Similarly, under the CDM, the baseline is defined as “the scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity” (3/CMP.1, Annex, paragraph 44). This counterfactual reference scenario is affected by numerous technical, regulatory, and economic factors and a wealth of approaches has been developed to determining baseline and additionality for market based mechanisms (see Part I of the study).

If a host country agrees to implement an emission pledge, this will generally impact the level and coverage of domestic mitigation actions. With this, pledges are one of the relevant regulatory and economic factors that may influence baseline setting and additionality.

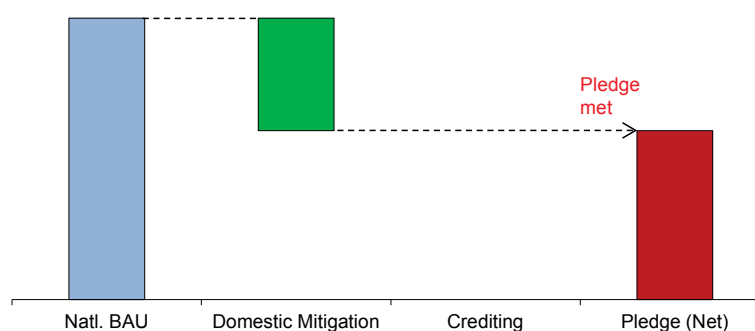
#### 4.1.1. RELATIONSHIP BETWEEN HOST COUNTRY PLEDGE AND CREDITING BASELINE

This is illustrated in the following example:

We assume the case of a host country that pledges to reduce national GHG emissions from a national business as usual (BAU) level (blue bar in Figure 3) to the pledged level by domestic mitigation action (red). (We assume that the pledge is defined net of international crediting.)

##### *A) Situation without international crediting*

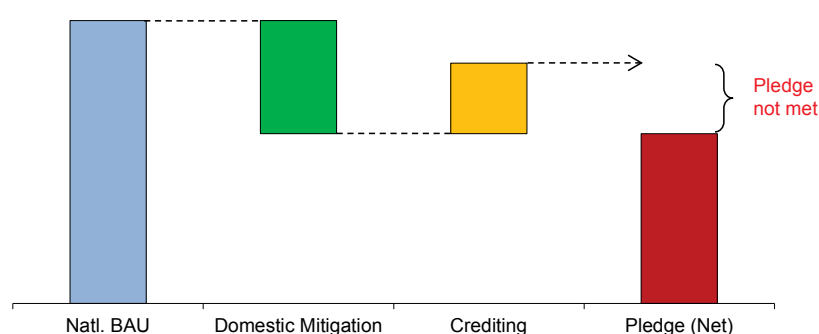
In absence of international crediting, domestic mitigation action that is the “own contribution” of the host country (and may be financed both by host country and internationally; green bar) results in a reduction of national GHG emissions from BAU level in order to reach the pledge.



**Figure 3** Situation without international crediting (NMM/FVA)

*B) Situation with international crediting (NMM/FVA)*

This is the same situation as above but the host country intends to enter into international crediting with new market based mechanisms and part of the results from mitigation action is credited and transferred for compliance to another country (yellow bar). (We assume that the pledge is defined net of international crediting.)

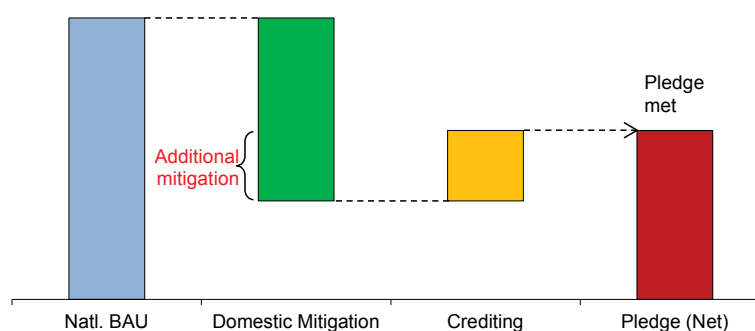


**Figure 4** Situation with international crediting with new market based mechanisms

If the baseline determination for international crediting does not take into account that also in absence of the crediting activity the host country would implement some mitigation action to meet its pledge (see Figure 4), then setting the baseline without taking into account the pledge may lead to the transfer of mitigation action outcomes that should support the host country pledge abroad (yellow bar in Figure 4) and result in the host country not meeting its pledge (as illustrated in Figure 4). In essence, not considering the pledge in crediting baseline setting leads to an inconsistency between domestic and international carbon accounting in that the credited mitigation action is double counted or it leads to a situation where the host country does not meet its pledge (crediting through markets at the expense of the pledge of the host country), if the avoidance of double-counting is ensured.

*C) Situation with international crediting for additional mitigation action*

If however the baseline setting (and additionality determination) takes into account the host country pledge and the related mitigation programmes and policies that the host country would also implement in absence of the crediting activities, then only crediting units are transferred that are based on additional mitigation, going over and above of what the unilateral and supported mitigation action provides and international crediting does not endanger meeting the host country pledge (Figure 5).



**Figure 5** Situation with international crediting for additional mitigation action

In order to make the national accounting consistent with international carbon accounting, approaches to crediting baseline determination should aim at separating own mitigation action of the host country from mitigation action for international crediting to assure that only those mitigation units are transferred abroad that are additional to the host country's own contribution to meeting its pledge.

#### 4.1.2. PLEDGES TO INFORM BASELINE AND ADDITIONALITY

From this it follows that in general crediting baselines have to be *consistent* with host country pledges and host country mitigation policy. In other words, a crediting baseline and additionality needs to be defined in such a way, that only mitigation action that go above and beyond the national activities to meet the pledge are credited.

**Principle:**

How do pledges inform baseline setting and additionality determination in market based mechanisms in order to achieve consistency?

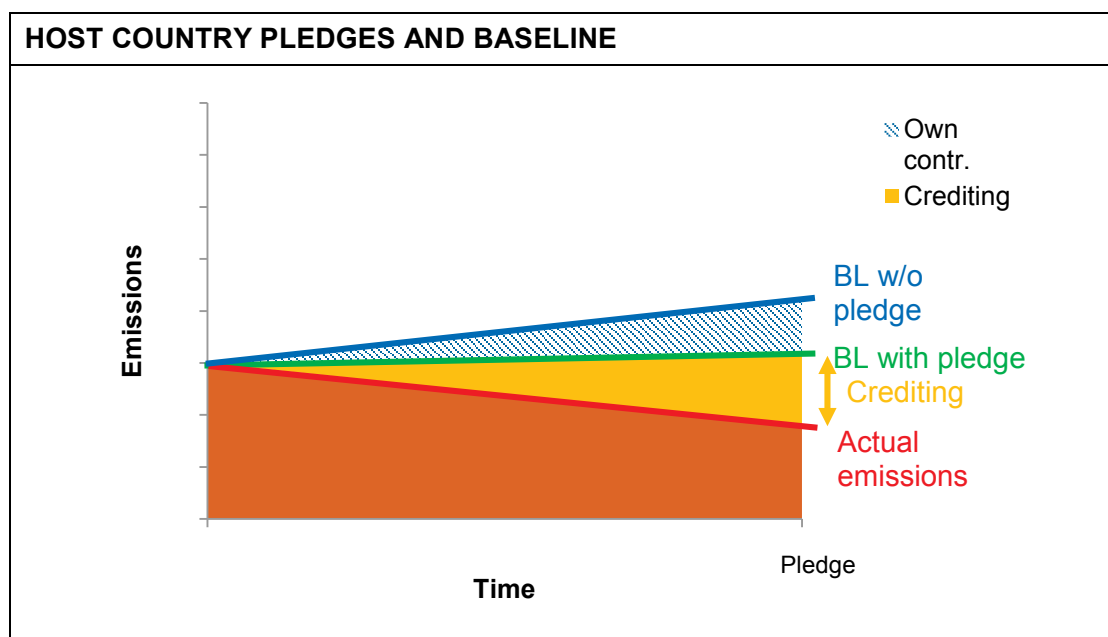
- i. The **baseline** for a crediting mechanism is set in such a way that if emissions would follow the baseline scenario, the host country pledge could still be reached, and
- ii. **additionality**<sup>9</sup> of crediting activities is determined in such a way that if all activities deemed additional<sup>10</sup> would not be implemented the host country pledge could still be reached.

In the context of a specific crediting activity, this requirement leads to a baseline that is not defined by a BAU scenario that is not taking into account the pledge (blue emissions trajectory in Figure 6), but by a scenario that is consistent with the pledge (green). A specific mitigation activity may generate units for international crediting (light yellow area in Figure 6) and may at the same time contribute to reaching the host country pledge (light blue area).

<sup>9</sup> Please note that separate additionality determination may not be relevant for all types of crediting schemes; in particular for sectoral approaches, additionality may be covered by suitable crediting baseline setting.

<sup>10</sup> Clarification of the term “additional” in this context: In above paragraph, the term „additional“ refers to mitigation activities for *international crediting*. These are activities that would not be implemented in absence of the crediting instrument. The term “additional” is also used in the context of national “*own contribution*” of host countries: here, measures are “additional” if they would not have been implemented in absence of a host country climate policy and/or national pledge. With this, a measure that a host country takes may be an additional own contribution (that a country implements to reach its pledge), but at the same time this measure is a non-additional crediting action (because it would also be implemented in absence of the crediting instrument).





**Figure 6** Approach to baseline setting without (blue line) and with (green line) host country pledges taking into account own mitigation contribution.

In essence, no crediting should take place at the expense of reaching the pledged targets. The above principle may support host countries in keeping track of their pledges while using the benefits of market based mechanisms contributing to best practice governance. In addition, the principle may assure buying countries that their use of market based mechanisms is not at the expense of the ability of host countries meeting their pledges.

### 4.1.3. PLEDGES, PERVERSE INCENTIVES AND LEVEL PLAYING FIELD BETWEEN MARKET PARTICIPANTS

If baseline setting and additionality determination in market based mechanisms is to be informed by host country pledges, a perverse incentive for host countries may arise not to accept stringent pledges in order benefit from higher baseline scenarios leading to a higher number of crediting units from a given mitigation activity. This issue has already surfaced under the CDM where domestic policies may influence baseline setting and additionality and has since long been discussed in the “E+/E-“-discussion; without resolution (see Section 4.6 in Part I of this study).

However, pledges under the UNFCCC (in whatever form they may take) should be consistent with market based mechanisms under the UNFCCC. Therefore, host country pledges are on a structurally different level from the point of view of the international climate policy than mere host country policies. The existing “E+/E-“-guidance by the CDM Executive board for

integrating host country policies with baseline setting and additionality determination has led to a lot of ambiguity and uncertainty in its interpretation. Following the above principle may help to reduce these uncertainties in the context of new market based mechanisms.

Acknowledging that the level of ambition of a host country's pledge under the UNFCCC (for 2020 or beyond) will influence the country's potential for international crediting should already be taken into account when defining country pledges or when deciding on which host countries to rely on for supply of crediting units. While the topic of burden sharing and definition of the level of ambition of pledges goes beyond the scope of the present study (see e.g. UNEP-GAP 2012, INFRAS 2011), there may be a need to define eligibility criteria for host country participation on a suitable international level in order to establish level playing field between supplying host countries. It may be only on the basis of such criteria that a "race to the bottom" in ambition level of host countries that are in competition for market based mechanisms may be contained. (Similarly, there may be the need for eligibility criteria for buying countries, e.g. supplementarity rules).

## 4.2. APPROACHES ON HOW PLEDGES CAN INFORM BASELINE SETTING AND ADDITIONALITY

Different approaches may be explored by host countries seeking to achieve consistency in crediting baseline setting and additionality determination with meeting their pledges. Besides the need for a consistent MRV- and accounting framework in the host country, any approach to informing baseline setting by pledges will have to build on the existing policy planning approaches that countries regularly use in formulating their climate, energy, economic and other development policies (see section 3.2).

<b>APPROACHES FOR PLEDGES INFORMING BASELINES AND ADDITIONALITY</b>		
<b>Approach</b>	<b>Description</b>	<b>Host country requirement</b>
1. Sector-by-sector	Host country specifies (i) sectors that are reserved for domestic mitigation action and (ii) sectors for international crediting	Consistent ex-ante division of sectors/activity types
2. Top-down projection	Crediting baseline based on projected emissions for national strategy/plan and sector modelling	Comprehensive framework for projection/modelling of emissions from sources in relevant sectors
3. Credit sharing	Host country defines % sharing of emission reductions between contribution to domestic pledge and crediting (e.g. for each sector/activity type)	Framework for projection of emissions to determining the necessary domestic share to assure reaching of host country pledge
4. "LDC pledge"	Crediting baseline builds on BAU scenario, because LDC pledge is reached anyhow with high probability	Pledge (or pledged actions) are met with high probability in BAU case (this may be relevant for LDC countries or other countries with very low carbon economies)

**Table 2** Potential approaches on how baseline setting and additionality determination can build on host country pledges. Note: There may be more approaches.

The approaches are briefly described in the following and further analysed in the context of examples of their potential implementation in countries in chapter 5.

### **1. Sector-by-sector**

A simple approach to drawing the line between (i) domestic mitigation action for reaching the host country pledge and (ii) mitigation for international crediting is that the host country restricts domestic action to reach its pledge on a pre-defined set of sectors or activity types. Here, a certain level of assessment of the contribution to mitigation by the different activities and policies (with or without models) is needed so that the host country is assured that it will with high confidence be reaching the pledge with mitigation actions confined to the pre-defined sectors/activity types. In this case, baseline setting as well as additionality determination in sectors/activity types outside of the government's focus areas follows generic rules (see part 1 of the study) and does not need to take the pledges into account. This approach is further discussed in section 5.1.

### **2. Top-down projection**

In order to use this approach, countries need to gain access to the relevant data, resources and models to project sectorial energy and emissions characteristics into the future and to assess the role of mitigation actions and policies in different sectors/activity types in reaching the host country pledge (section 3.2). In this case, the crediting baseline is defined by the emissions tra-

jectory leading to reaching the pledge. Mitigation activities that are (i) not BAU and (ii) not part of the host country's program for reaching the pledge are deemed additional. This approach is further discussed in section 5.2.

### **3. Credit sharing**

In this approach, the emissions reductions from each of the considered mitigation activities are shared between (i) the host country (for meeting its pledge) and (ii) by a crediting investor (for international crediting). In this case, baseline setting and additionality determination follows generic rules (see part 1 of the study) and does not need to take the pledges into account. Once crediting units are issued based on these additionality and baseline rules, they are shared between host country and crediting investor, e.g at a pre-defined percentage rate, depending on factors such as activity type, financial contribution of host country versus investor, etc. The host country needs to make sure that its share in the issued credits is high enough to assure the meeting of its pledge and that its share in the units is actually used for compliance (and cancelled) and not transferred abroad. No double counting of emission reductions may occur.

In essence, this approach of credit sharing is similar to one interpretation of “net benefits” of market based mechanisms that is found in the literature, although it does not lead to “net atmospheric benefits”. For an in-depth discussion see Lazarus et al. 2013.

This approach is further discussed in section 5.3.

### **4. Case of “LDC pledge”**

A burden sharing approach that is based on the Convention's principles of “common but differentiated responsibilities and respective capabilities” may result in pledges of countries with low carbon economies such as least developed countries (LDC) with higher allocation levels compared to the actual very low level of emissions. In addition, pledges might also be made in the form of pledged actions rather than QELROs<sup>11</sup>. In such cases, the host country is likely to reach its quantitative pledge (if any) and baseline setting and additionality demonstration can follow generic rules (see part 1 of the study) and does not need to take the pledges into account. This approach is further discussed in section 5.4.

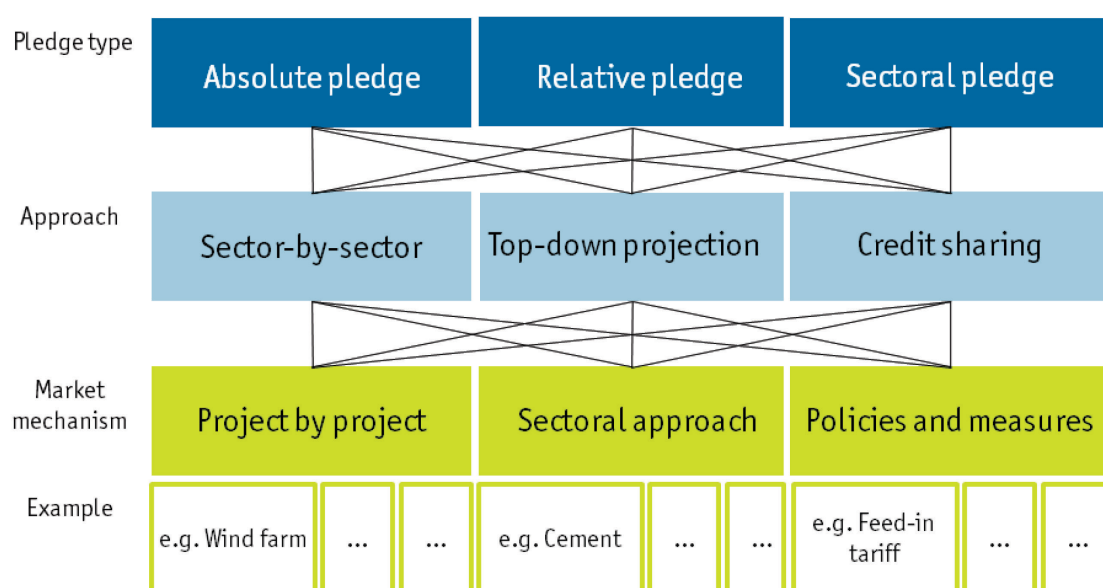
These different approaches to aligning baselines and additionality with pledges are further elaborated in examples in the next chapter.

<sup>11</sup> Quantified Emissions Limitation and Reduction Objective.

## 5. OPTIONS AND EXAMPLES FOR BASELINE SETTING UNDER PLEDGES

On the basis of a number of cases and examples, this chapter looks into options on how to achieve consistency between pledges and baselines/additionality in various settings of approaches as sketched in 4.2 and referring to example country's activities. The cases look first into the simpler case of absolute pledges and then consider also the impact of relative pledges on baselines and additionality (section 5.5). For each option a short description of the case is provided including the pledge type, the national planning approach to meeting the pledges and the considered market mechanism(s). Finally a discussion of the options presented here will highlight opportunities and challenges as well as further issues for consideration.

Each example represents a specific combination of pledge type (section 2), national planning approach (section 3) and market mechanism type (Part I, section 3).



**Figure 7** Considered examples illustrate how baselines/additionality could be treated in a given combination of pledge type, host country approach to reaching pledge and market mechanism.

The following table provides example of pledge types and their intended implementation forms amongst various countries (table not exhaustive):

	<b>Unilateral Mitigation Actions</b>	<b>Supported Mitigation Actions <sup>3</sup></b>
<b>Climate neutrality</b>	Maldives	Costa Rica, Papua New Guinea
<b>Below business as usual</b>	Indonesia <sup>1,2</sup> , Republic of Korea <sup>1</sup> , Singapore <sup>1</sup>	Brazil, Chile, Mexico, Papua New Guinea, South Africa
<b>Below base year</b>	Republic of Moldova	Antigua and Barbuda, Marshall Islands
<b>Emissions per GDP</b>	China <sup>1</sup> , India	

**Table 3** Example types of emission targets as pledged by countries. 1) Top down approach with projections and respective reduction targets in specific sectors; 2) Differentiation of sector reductions for own pledges vs. for crediting; 3) Upfront funding of host and buyer country of a fund for mitigation actions.

## 5.1. CASE 1: CREDITING BASELINE BASED ON SECTOR-BY-SECTOR APPROACH

### 5.1.1. DESCRIPTION

In this example case it is assumed that a country has an absolute emissions limitation or reduction pledge under the UNFCCC. Also, we assume that in order to meet its pledge, the host country has broken down its national pledge into different sector targets in the framework of national mitigation strategies/programmes. We are looking at the case where in this context the country has pre-defined a set of focus sectors/activity types for domestic mitigation action, while other sectors/activity types may be used for crediting activities that do not count towards meeting the pledge.

	<b>Case setting</b>
<b>Pledge type</b>	Absolute pledge
<b>Approach to meet pledge</b>	Sector-by-sector: Top down definition of focus sectors for domestic action
<b>Market mechanism</b>	Project-by-project crediting mechanism

**Table 4** Overview of case setting for case 1.

### 5.1.2. COUNTRY EXAMPLE: KOREA

Korea with its pledge type and approach can be used here as an example country. Its act on Low Carbon Green Growth has set a 30% reduction target by 2020 compared to BAU with sectoral, year-by-year GHG emission reduction targets. The target is part of Korea's national policy and pledged under the UNFCCC as NAMA. The BAU baseline is already defined (776 Mt in 2020) and can be adapted to new evidence regularly. The bulk of the targeted reduction of 233 Mt in 2020 should be reached by specific actions (fuel switch, depletion of abatement potential in

specific sectors) and by an ETS with respective allocation of sectoral caps. Quantitative reduction targets in the ETS are set for Industry, Transport, Building, Agriculture, Waste and Public sectors. The ETS is assumed to cover 70% of total emissions. There is also a restriction to use emission reductions from domestic offset projects to meet up to 10% of individual compliance obligations. International crediting is only allowed from 2020 onwards. However credited emissions for domestic offset purposes must be additional to the reduction potentials identified in certain sectors (i.e. steel, cement and petrochem). This could mean that domestic crediting could mainly take place in sectors that are not covered by the ETS and the sectors with abatement potential as specified in the act.

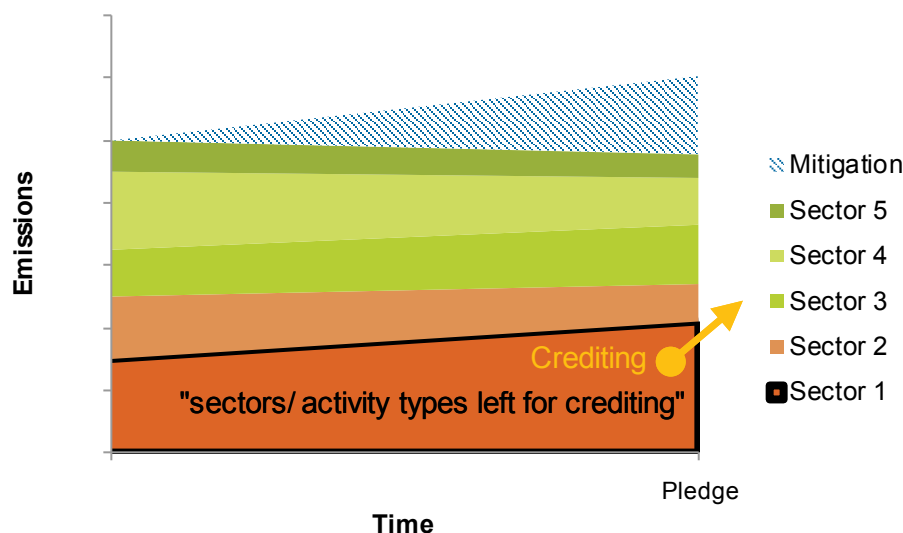
### 5.1.3. DERIVING BASELINE/ADDITIONALITY

In a sector-by-sector approach, if crediting activities are to take place in sectors/activity types that have not been designated by the government for reaching its pledge, then crediting baseline and additionality are derived based on the rules laid out in part I of this study.

In a simple solution, the government clearly distinguishes:

- i. sectors/activity types for domestic actions from
- ii. sectors/activity types for international crediting.

If crediting activities should be implemented in sectors/activity types that are already defined as sectors for domestic mitigation then an approach as described in sections 5.2 (top-down projection) or 5.3 (fixed sharing) could be followed to assure reaching of the pledge while at the same time crediting from a given sector/activity type.



**Figure 8** Illustration of crediting in a sector-by-sector approach in a sector/activity type that outside of the sectors/activities that are pre-defined by the host country for domestic action to reach its pledge. In the example of the figure, the country would plan to reach its mitigation pledge based on domestic activities (including supported activities but excluding international crediting) in sectors 2 to 5, but would not plan to use sector 1 for domestic action. Sector 1 could then be used for crediting with additionality/baseline rules that do not take the pledge into account.

### Example: Implementing REDD+ in a project-by-project crediting mechanism

For example, we assume a host country in its mitigation programme has defined a set of domestic mitigation sectors and activities to reach its pledge, including a given set of REDD+ projects in the forestry sector. For REDD+ projects that are not part of this set of domestic actions, the crediting baseline and additionality are derived based on the rules laid out in part I of this study. This would mean e.g. that the REDD+ activity would have to prove its lack in economic attractiveness to assure additionality and the baseline scenario would need to be in line with regulatory requirements (as enforced in practice), but because the project is not part of the pre-defined domestic mitigation programme for meeting the pledge it could be ruled out that the baseline would be impacted by the pledge.



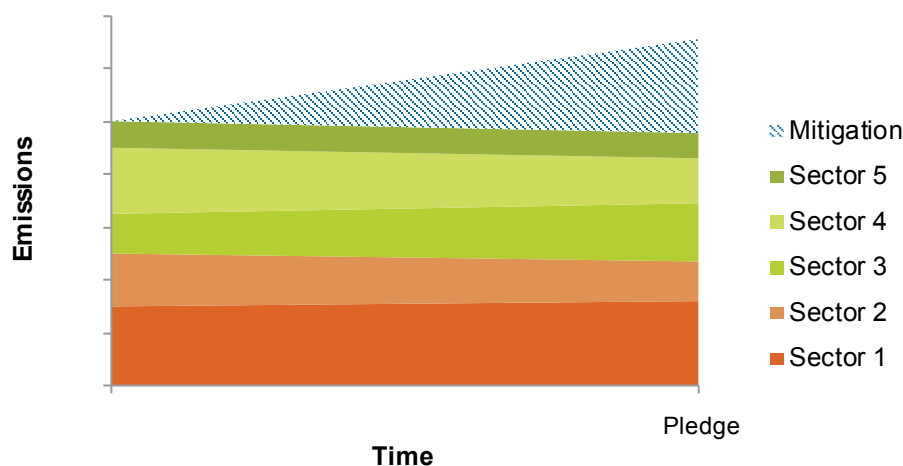
## 5.2. CASE 2: CREDITING BASELINE BASED ON TOP-DOWN PROJECTION

### 5.2.1. DESCRIPTION

We again assume an absolute pledge and that the host country went through an emission projection exercise as a basis for its mitigation policy to reach this pledge. The projections would define for the sectors and/or emission sources in the country the expected BAU emissions, as well as a set of mitigation activities that are in line with reaching the pledge. The results of these emission projections for the different (sub-) sectors are then used as a boundary condition for determining baselines/additionality.

	Example Setting	Example country: Indonesia
<b>Pledge type</b>	Absolute pledge	26% - 41% reduction from BAU baseline in 2020 – may be translated at some point to absolute target
<b>Approach to meet pledge</b>	Top-down projection: Crediting baseline based on projected emissions for national strategy/plan and sector modelling	National Action Plan (RAN-GRK), clearly defines a set of domestic or internationally supported mitigation activities (NAMAs) that are not eligible for crediting
<b>Market mechanism</b>	A) Sectoral crediting mechanism B) Policies & measures based crediting C) Project-by-project crediting mechanism	Crediting mechanisms (“Crediting NAMAs”)

**Table 5:** Overview of case setting for case 2.



**Figure 9:** Illustration of a top-down projection approach to mitigation policy (see also chapter 3). The host country derives sectoral and/or sub-sectoral targets based on an emissions projection exercise for mitigation scenarios. These (sub-) sectoral scenarios may serve as a basis to define baselines/additionality for crediting mechanisms.

### 5.2.2. COUNTRY EXAMPLE: INDONESIA

This example may be illustrated by the current 2020 pledge and mitigation policies and plans of Indonesia. However they are not fully in line with the example since Indonesia's pledge is not absolute but relative to a not yet quantified BAU scenario. The national action plan foresees that a 26% reduction from BAU baseline in 2020 pledged internationally should be achieved by implementing unilateral mitigation actions. Furthermore to achieve further reduction up to the 46% reductions pledged, implementation of mitigation actions with international support is envisaged. Finally, credited mitigation actions are foreseen as well but only in addition to the unilateral mitigation actions envisaged.

In this perspective the Indonesian government ensures consistency between mechanisms used (for credited mitigation) and the reductions pledged (unilateral mitigation action). There is a set of focus sectors and measures specified that the international pledge could be met with. This includes sustainable peat land management, reduction in deforestation rate, the sector of agriculture in general, promotion of energy efficiency and development of alternative and renewable energy sources amongst others. Overall Indonesia faces the following challenges with its approach: the construction of a BAU baseline scenario is challenging and requires detailed sectoral data. It further needs to be consistent with national development priorities. In addition translation of the national target into sectoral ambitions is yet missing. Finally there is neither specification how it is ensured that the unilateral projects needed for meeting the pledge will

actually be implemented nor by what measures (e.g. policies, standards, information or research and development). This requires an in depth analysis of respective costs and potentials for mitigation as well as a respective MRV system to monitor and review the measures.

### 5.2.3. DERIVING BASELINE/ADDITIONALITY

When implementing market mechanisms in a country that builds its mitigation policy on top-down projection of emission trajectories in different (sub-) sectors, the baseline for a crediting mechanism should be set in such a way that if emissions would follow the baseline scenario, the host country pledge could still be reached with high confidence, i.e. the baseline emissions need to be consistent with the trajectory of the relevant (sub-) sector. Similarly, additionality of crediting activities needs to be determined in such a way that all mitigation activities that are defined as being part of the domestic mitigation action and that are necessary to maintain an emissions trajectory consistent with meeting the pledge, are deemed non-additional (see also 4.1.2). This is because their implementation would also take place in absence of the crediting mechanism. Only project activities that go beyond the domestic emissions reduction outcomes may potentially be additional.

#### **Example A: Building wind power plants in sectoral crediting mechanism**

Assuming a country that defines based on a top-down projection exercise an absolute sector target for the power sector as part of their policy mix to reaching the host country pledge. The national utility or other players would implement mitigation action such as building renewable wind power plants, implementing demand side measures, etc. to reach the target. The crediting baseline for the sector would be defined by the projected emission trajectory to meeting the sector target. All emission reductions beyond this trajectory would be eligible for international crediting (and would not be counted towards meeting the host country pledge).

In this sectoral mechanism, there would be no need for defining baselines on the assumption that a given wind power plant would replace a *built and operating margin* in the grid and no (difficult) additionality determination for grid additions is needed.

Some countries have also power sector targets in terms of percentage shares in renewable power generation. Such multi-dimensional targets for the same sector somewhat complicate baseline setting, but are common. Different solutions to baseline setting could be considered in this case, inter alia that crediting for power sector can only start once both the target emissions trajectory *and* the required percentage of renewable power is reached.

### **Example B: Building wind power plants in a policy & measures based crediting mechanism**

In this example, the market based instrument builds on policies and measures implemented by the host country. Similarly to example A, crediting would take place on a sectoral level; mitigation action however would be explicitly based on host country policies and measures.

For instance, the host country government could implement a feed in tariff to promote renewable energy generating in the grid. The government would allocate a certain budget for the feed in tariff that is sufficient for a level of feed-in tariff for meeting the sector target. The government can then open a second budget for e.g. increasing the feed in tariff or increasing the number of plants that can benefit from preferential tariffs, thus increasing mitigation outcomes. As in the sectoral approach in example A, the baseline would be defined by the emissions trajectory of the sector that is in line with meeting the sector target, and crediting starts with sector level emissions reductions that go beyond.

Again, there may be perverse incentives for countries not to go for stringent emission pledges (section 4.1.3).

### **Example C1: Building wind power plants in a project-by-project crediting mechanism**

In the CDM or other project-by-project mechanisms, baselines for power sector projects are usually derived from the carbon intensity of the existing plants in the grid (“grid tool”). However, with the existence of host country pledges, the crediting could only be made for emission reductions that go beyond the sector trajectory that is in line with meeting the pledge. Also, in the project-by-project approach, one would need to differentiate “crediting” plants (that generate units for crediting) from “regular” plants (without crediting) in the grid.

A necessary condition for crediting would be that for each year the sum of power sector emissions (from both crediting and regular plants) and credited units would be lower than the emission trajectory in line with the pledge.

$$\sum_{Grid} power\ plant\ emissions\ [t] + \sum_{Crediting\ plants} credited\ units\ [t] \leq power\ sector\ target\ [t]$$

Several approaches to baseline setting may be considered. For instance, the grid baseline emission factor (in tCO<sub>2</sub>/MWh) may be defined as average emissions in the grid that are in line with the sector target. From this, the (maximum) baseline grid emission factor for crediting can be derived:

$$EF_{Grid} \left[ \frac{t}{MWh} \right] = \frac{(\text{power sector target [t]} - \sum_{\text{crediting plants}} \text{credited units [t]})}{\sum_{\text{Grid}} \text{power plant generation [MWh]}}$$

With this, the grid emission factor does not have to directly depend on the carbon intensity of the plants in the grid (as is the case e.g. with the CDM *grid tool*). However, the determination of the sector target and the related emissions project exercise will heavily build on data of existing and planned power generation capacities in the grid.

Such an approach would be new to crediting and the following aspects might merit further consideration:

- One issue to consider further in developing such approaches will be data vintage, as  $EF_{Grid}$  in year  $x$  may be dependent on the number of units credited for year  $x-1$  or  $x-2$ . The DNA would need to coordinate  $EF_{Grid}$  calculation, as is the case in CDM today.
- Assuming an open power market with several market players producing power for one grid, the government would need to provide subsidies/feed in tariffs for “regular” plants, while “crediting” plants would build their economic viability on the additional income from crediting. The approach allows for a clear separation of host country mitigation activities and crediting activities. With this, additionality determination may be much simpler than in existing crediting systems such as the CDM, where the treatment of host country policies and subsidy schemes in additionality determination has never been adequately solved.
- In case of several power producers, this approach establishes a link between different plant types: if the “regular” plants do not perform and do not limit their emissions trajectory in line with their share of the power sector target, the crediting plants may receive less credits. This liability needs to be adequately taken care of in order to make the instrument attractive to crediting investor – the issue of linking is also typical in sector based approaches.

#### **Example C2: Energy efficiency in industry in project-by-project crediting mechanism**

Keeping project-by-project crediting consistent with reaching the domestic sector target becomes more challenging in other sectors. For example, if energy efficiency in industry as a fuel would be used for international crediting, then host countries might face challenges in meeting their industry sector target, as their sector emissions projection may already include an autonomous increase in efficiency over time. In this situation, for instance two approaches to crediting baselines might be considered:

- a) **Discounting:** One approach would be to have baselines designed not taking into account the sector target required for the pledge (as described in Part I), and then reducing the baseline by a fixed percentage that takes reaching the sector target into account. For instance, the DNA might publish for each year this percentage, which is derived from the requirement that for each year the sum of the industry sector emissions (from both “crediting” and “regular” plants) and credited units from the sector would be lower than the emission trajectory in line with the pledge.

$$\sum_{\text{Industry}} \text{plant emissions [t]} + \sum_{\substack{\text{Crediting} \\ \text{plants}}} \text{credited units [t]} \leq \text{industry sector target [t]}$$

The regular update of this discount factor might provide some level of uncertainty to crediting project proponents, as the future level of crediting units becomes less certain.

- b) **Standardized product benchmark baseline:** In sub-sectors that produce homogenous, well defined products such as EAF steel, cement clinker, pulp & paper, and where data availability is sufficient, a benchmark could be defined in terms of emissions per ton of product produced, similar to the benchmarks e.g. used in allocation in the EU-ETS. The benchmark level would be derived from the sector target in such a way that above equation would be met.

A standardized product benchmark approach (b) might be considered to be more “fair” in that all crediting plants mitigation action is measured with the same benchmark. With conventional baseline setting and discounting (a) the incentives for mitigation action from crediting become also available for less efficient plants, on the other hand the approach tends to place “early movers” at a disadvantage.

## 5.3. CASE 3: PERCENTAGE SHARING OF EMISSIONS REDUCTIONS

### 5.3.1. DESCRIPTION

We again assume an absolute pledge and that the host country went through an emission projection exercise as a basis for its mitigation policy to reach this pledge. The projections would define for the sectors and/or emission sources in the country the expected BAU emissions, as well as a set of mitigation activities that are in line with reaching the pledge (see section 3.2).

As in section 5.2, the results of these emission projections for the different (sub-) sectors are then used as a boundary condition for determining baselines/additionality. In this case however,

the approach assesses the mitigation outcome of domestic and crediting action with the same metric, using a percentage sharing.

	<b>Case setting</b>
<b>Pledge type</b>	Absolute pledge
<b>Approach to meet pledge</b>	Host country defines % sharing of emission reductions between contribution to domestic pledge and crediting (e.g. for each sector/activity type)
<b>Market mechanism</b>	A) Sectoral crediting mechanism or Policies & measures based crediting B) Project-by-project crediting mechanism

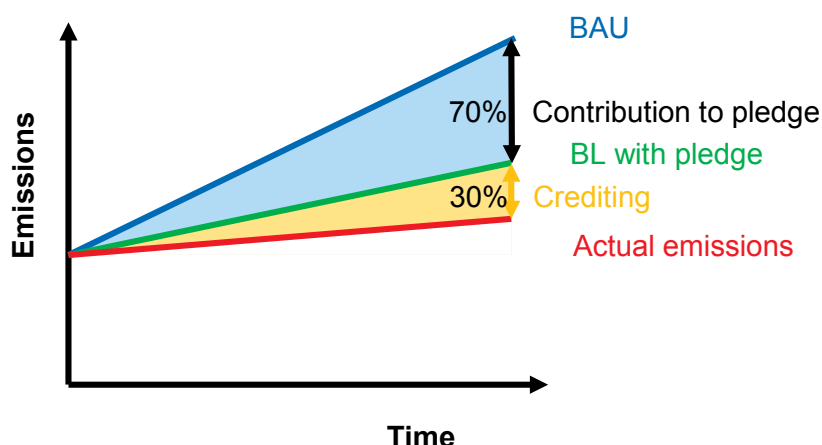
**Table 6** Overview of case setting for case 3.

### 5.3.2. COUNTRY EXAMPLE: CHINA

Currently, it appears that no country has of yet proposed a percentage sharing approach for meeting its pledge (other than in the context of the discussion of “net benefits”). However, the application of a special levy on special CDM project types by the government of China may be seen as a predecessor of “credit sharing” (levy of 65% for HFC-23, 30% for N<sub>2</sub>O and 2% for other CDM project types). Although this is not entirely in line with the setting of this case, the revenues from the levy may be used for climate related activities as defined by the Ministry of Finance, and might eventually contribute to meeting China’s pledge. In this example however the buyer has no opportunity to negotiate upon the fixed shares with the government.

### 5.3.3. DERIVING BASELINE/ADDITIONALITY

In this case, the first level of “BAU” baseline (without domestic mitigation to meet the pledge) would basically follow the rules laid out in Part I of this study (blue line in Figure 10). The difference between actual emissions (red line) and the “BAU” baseline would then be shared between host country domestic mitigation and crediting.



**Figure 10** Illustration of a percentage sharing approach. Mitigation outcomes are shared in a (fixed) percentage between host country's contribution to meeting its pledge and crediting (in the example 70% to 30%). The percentage is to be defined in such a way as to assure meeting of the pledge and being attractive to buyers.

#### **Example A: Building renewable power plants in sectoral crediting mechanism**

As in the case of example A in section 5.2.3, it is assumed that the country defines an absolute sector target for the power sector based on a top-down projection exercise as part of their policy mix to reaching the host country pledge. The country could then develop a power sector renewal and extension plan that defines a portfolio of investments in renewable or low carbon power plants and the retirement of old inefficient plants from the grid. This plan would be designed in such a way that the projected mitigation impact of the plan (based on modelling) would reduce power sector emissions by more than what would be necessary for meeting the sector target (e.g. mitigation is 150% of mitigation necessary for the sector target).

For the financing of the investment, the host country may seek support from investors. In a credit sharing arrangement, some of the investors may accept a share in the generated credits as part of the revenue stream.

The determination of the adequate percentage share depends on several factors:

- a) The sharing of the mitigation outcome needs to be in line with meeting the sector target. For instance, if the expansion plan is expected to deliver a reduction in power sector emissions of 150% of the reduction that would be necessary to meeting the host country pledge, then the share for crediting shall be below  $\frac{1}{150\%} = \frac{1}{3}$ .
- b) On the other hand, investing in the portfolio and crediting should also be financially sufficiently attractive to the investor. If the share of credits is too low, the investor may not be interested in investing in the portfolio.



This example presents one potential arrangements for a sharing of emission reductions, other approaches are also possible.

In countries that would choose to use such a sharing approach for meeting (part of) their pledge, the inherent tying together of domestic and crediting action might lead to a situation where the host country cannot meet its domestic pledge because of a lack in demand for crediting from these mitigation activities. Such an approach would therefore require a long term commitment of investors/buyers to assure the long term robustness of the portfolio of low carbon investments.

## 5.4. CASE 4: “LDC PLEDGE”

### 5.4.1. DESCRIPTION

In this case we look at example pledges and crediting activities of Least Developed Countries (LDC) or other countries with low emission economies. So far only few LDC have pledged voluntary quantified emission reductions under the Copenhagen Accord, most of them aiming for carbon sequestration in forestry. The Maldives<sup>12</sup> and Buthan even strive for carbon neutrality. Going forward, more LDCs pledging quantified emission limitation targets and actions might be expected in the future. Their targets will follow the principle of common but differentiated responsibilities and will, compared to current emission levels allow for sustainable growth. Having growth targets would lower the bar for LDCs to conduct crediting projects that still are very rare in LDCs, since baselines for crediting would also allow for development and growth in emissions. In this context, the crediting baselines and additionality issues would be handled under the rules as laid out in part I of this study.

	<b>Case setting</b>
<b>Pledge type</b>	Any type if LDC has a pledge
<b>Approach to meet pledge</b>	Individual project-based activities in LDC countries or other countries with very low carbon economies
<b>Market mechanism</b>	A) Project-by-project crediting mechanism

**Table 7** Overview of case setting for case 4.

<sup>12</sup> Also, the Maldives have left LDC status in 2011.

### 5.4.2. COUNTRY EXAMPLE: EAST AFRICA AND THE MALDIVES

Providing clean cooking stoves for households in East Africa is a typical example for a crediting approach in LDCs according to the rules as laid out in part I of this study. The programme of activities aims at disseminating improved cook stoves that are more efficient under the CDM framework (UNFCCC 2012). Accordingly fuel consumption and emissions from the use of non-renewable biomass are reduced. Further benefits are the reduction of deforestation and improvement of the user's life quality, in particular indoor air quality. The baseline scenario would be the use of fossil fuels or non-renewable biomass for meeting similar thermal energy needs. As any potential pledge of an LDC country will allow for growth, the baseline setting does most probably not need to consider a pledge (which would be on a level that would be met anyhow) but would follow the rules laid out in part I.

One example of low carbon economy with an international pledge is the Maldives. This is an exceptional case amongst low carbon economies, since the country has voluntarily pledged to become climate neutral by 2020 (net zero carbon emissions unconditional to foreign support). The approach chosen by the Maldives is to play a role model for other countries. A concrete climate plan that unveils what mitigation actions are needed to meet this pledge is yet under development. However a climate vision exists for energy targets, namely the 100% generation of electricity from renewable energy sources. If this vision would be transferred into a pledge to be reached by domestic action (domestically or internationally financed), for instance a crediting project in the renewable power sector with a baseline might not be consistent with the pledge if carbon neutrality should be achieved domestically. Or the host country would need to compensate for crediting in the power sector with increased sequestration activity in the AFOLU sector. This special example illustrates that also in low carbon economies there may be instances where the definition of the host country pledge may impact the adequacy of sectors for crediting. Also here, it may be beneficial if national pledges are based on comprehensive strategies and programs that consider also the potential for crediting mechanisms.

### 5.4.3. DERIVING BASELINE/ADDITIONALITY

For crediting projects on a project-by-project level the crediting baselines and additionality issues would be handled in the “conventional” way as laid out under the rules in part I of this study.

## 5.5. CASE 5: BASELINES UNDER RELATIVE PLEDGES

### 5.5.1. DESCRIPTION

In this case we assume that the host country has committed to a relative pledge that refers to another indicator such as national GDP and a respective base year. Reduction efforts are then considered as the relative change in emissions projection per development of that indicator between the base year and the pledge year. Accordingly the two projections would define for the emission sources in the country the expected BAU emissions. Based on this a set of mitigation activities need to be developed that are in line with reaching the pledge. The results of these relative emission projections are then used as a boundary condition for determining baselines/additionality if crediting mechanisms are to be a mitigation option.

	Case setting
<b>Pledge type</b>	Relative pledge (e.g. pledge depending on GDP)
<b>Approach to meet pledge</b>	Top-down projection: Crediting baseline based on projected emissions for national strategy/plan for e.g. economic development and emissions
<b>Market mechanism</b>	A) Sectoral crediting mechanism B) Policies & measures based crediting C) Project-by-project crediting mechanism

**Table 8** Overview of case setting for case 5.

Defining relative pledges may provide benefits compared to pledges defined in absolute terms: In a situation where emissions correlate strongly (and linearly) with GDP, relative pledges may allow for more growth in emissions in growing economies and adjust the caps towards more stringent targets in case of reduced economic activity. However, there are a number of challenges for the host country with relative pledges:

- While GDP and emissions may be correlated to a certain extent in certain situations such as the current low economic growth in the Euro-zone leading to low EU-ETS emissions, in general the correlation over time is less obvious and may also include significant time lags. For instance Grubb *et al.* (2006) observe in the considered time span 1980 – 2000 countries where CO<sub>2</sub> emissions per GDP follow clear linear trends over time (e.g. China) while in other countries carbon intensity of GDP behaves rather stochastically (e.g. Malaysia), concluding “It is difficult to draw any conclusions regarding GDP-CO<sub>2</sub> relationships.”

- Economic growth is one key factor amongst others that influence an economy's emissions (see example of Japan's increase in fossil power generation following the Fukushima nuclear power plant event).
- In general, the emission intensity of GDP appears to be much more influenced by structural changes and shifts in the economic patterns (e.g. increasing share of lower emitting service sector) than through improvements in technologies and production efficiency.
- There is a range of definitions for national GDP, different countries have different definitions; GDP may be defined nominal or real, etc., which poses additional issues when determining and projecting GDP for country pledges.

This may in some countries lead to situations where in a growing economy a relative pledge based on emissions per GDP can be met with very low mitigation efforts, while stagnating economies or economies in recession with a relative pledge may be hit by rather stringent targets (because of low GDP) and are faced with the need for high mitigation efforts (on top of the economic challenges). The impact of such relative pledges on baseline setting is discussed below.

### 5.5.2. COUNTRY EXAMPLE: CHINA

China's voluntary international pledge is a 40-45% decrease in carbon dioxide emissions per unit of GDP by 2020 in relation to the 2005 level (17% reduction by 2015). The pledge further mentions that the actions envisaged will be autonomous and domestic. China has published a number of plans that contain targets and actions to reduce its GHG emissions e.g. China's 12<sup>th</sup> 5-year plan, a Work Plan for Controlling Greenhouse Gas Emissions, China's Policies and Actions for Addressing Climate Change and the China's 2050 Energy and Climate Scenario. However there is no specification how the relative pledge was determined e.g. based on modelling of GDP and projected emissions trajectories. In the past 10 years China has seen a volatile annual GDP development (as many countries do) that is strongly linked to the government's economic development strategies and the development of the global economy. Thus projection of this indicator faces significant challenges. Available literature analysing the interpretation of the pledge diverges, since the actual mitigation target is sensitive e.g. to assumptions on economic growth and accordingly the projected target either coincides with a mere BAU scenario or reveal significant emission reductions from BAU (Höhne et al., 2011; DEA, OECD, UNEP, 2013). Furthermore China aims at a share of 15% non-fossil energy in total energy consumption (11.4% in 2015) which equals about 540 million tons of coal equivalents. Primarily China plans to in-

crease capacity of wind power (200 GW) and small scale hydro (100 GW). Targets for each renewable energy source and envisaged mitigation actions are described in the Development Plan for Renewable Energy. Finally China pledged to increase its forest coverage by 40 million hectares and forest stock volume by 1.3 billion cubic meters by 2020 from the 2005 levels.

### 5.5.3. DERIVING BASELINE/ADDITIONALITY

Deriving baseline levels from relative pledges, or from any pledge that is not defined in absolute terms or includes other factors that are not known sufficiently early ex-ante to be able to inform baseline setting and additionality is challenging, as e.g. relative pledges on a national level cannot be simply broken down on a sector level, because the relative contribution of sectors to national GDP changes over time (see also discussion above).

#### **Example A1: A sectoral crediting mechanism for cement sector with relative sector target**

We assume a country with a relative pledge to reduce emissions intensity per GDP by 40% by the pledge year. Through projection of economic development and emissions, the national pledge would be broken down to relative targets for each sector. E.g. the cement sector would need to reduce cement sector emissions per cement sector GDP by 50%, Iron and steel sector by 30% etc.

Assuming that a robust cement sector GDP can be determined, a government implementing a sectoral crediting mechanism would e.g. use a top-down projection and GDP modelling exercise to prescribe a time series of (fixed) cement sector baseline emission intensity  $I_{cement,yr}$  in tCO<sub>2</sub>/\$ that is in line with meeting the sector relative target in the pledge year. The crediting baseline for the sector would be defined by the projected emissions intensity of sector GDP times actual sector  $GDP_{cement,yr}$  for a given year:

$$E_{BL,cement,yr} = I_{cement,yr} \cdot GDP_{cement,yr}$$

while the sector's emissions intensity  $I_{cement,yr}$  would be kept fixed and  $GDP_{cement,yr}$  would follow its (exogenous) annual variations. In analogy to the case of the absolute pledge in Example A of section 5.2.3, all emission reductions beyond this crediting baseline would be eligible for international crediting (and would not be counted towards meeting the host country pledge).

However, as the share in contribution from different sectors to national GDP varies over time, being at or below this cement sector baseline emission intensity  $I_{cement,yr}$  is no guarantee for meeting the national relative pledge. Also, the sector will only know its (absolute) sector target *ex-post* after the official GDP values for the specific sector have been made available. This makes planning, investing and hedging for meeting the sector target rather difficult.

**Example A2: Multiple targets – cement sector with relative emissions sector target and a sector renewables target.**

Here we assume the same situation as in example A1, but the host country would not only have a relative sector target but also a target for the share of renewable energy in total energy consumption (similar to the example of target in non-fossil share China). The host country would translate the national renewable share pledge to a sector target of x% renewable share.

A solution to crediting baseline setting in this situation might be that the sector can only transfer credits abroad if both (i) the relative emissions sector target is met and (ii) the sector renewable target is met. As the two targets are on a different level, a certain level of ambiguity arises, and if e.g. the two targets are rather close, then there may be a range of baselines that is consistent with both (i) and (ii). In most cases however, the target that requires the higher level of mitigation effort will be the decisive element in determining the crediting baseline.

## 5.6. DISCUSSION OF CASES

Many countries have a framework for policy planning in order to operationalize meeting the targets of their pledge. However, from the considered cases a couple of findings and requirements are emerging:

- Formulating and planning a domestic mitigation policy requires a minimum level of data availability and top-down modelling of projections of emission trajectories, for which host countries require relevant resources.
- Variance in approaches and uncertainties in projections for BAU may be very high (see e.g. Clapp and Prag 2012). With this, uncertainty issues may emerge that are similar to the uncertainty issues with crediting baseline setting described in Part I of the study. However, this seems less a problem in host countries with pledges, as the important new element is that host countries draw a clear line between own mitigation action and action for crediting and that its own bookkeeping of mitigation units is overall consistent and free of double counting.
- The challenges of projecting dynamic emission trajectories should not be underestimated. If e.g. the planned domestic mitigation activities do underperform or the host country runs out of resources for their implementation and the host country is in danger of not reaching its target, turning to additional sectors that are “reserved” for crediting may

not be possible for the host country government. And in some instances, the mitigation potential left for domestic action may be more costly. However this is the case with all crediting. As a simple solution, countries running in danger of not meeting their pledge because of crediting “low hanging fruits” may turn to buying (back) crediting units from the international market.

- On a practical level, it turns out that several host countries define multiple targets for the same sector, e.g. if there are quantitative targets in terms of emission levels and at the same time on the share of renewable energy sources. With this, several boundary conditions need to be combined in baseline setting. This is feasible, but may add additional levels of complexity to baseline setting.

Based on the considered cases, the following hypothesis may be formulated: Taking pledges into account in setting crediting baselines may solve many issues related to the interaction between host country policies and crediting mechanisms that has e.g. lead to the epic “E+/E-“ discussion in the CDM. Informing baselines/additionality by pledges provides, at least in theory, an elegant solution to the E+/E- issue, as host countries clearly draw the line between own mitigation action and action for crediting.

However, as with E+/E-, the concept suffers from perverse incentives: Host country Parties are incentivised to agree on less ambitious pledges in order to maximize their potential for crediting (see discussion above). This cannot be solved at level of the individual mitigation action (as e.g. E+/E- tried) but is an inherent issue of burden sharing that has to be solved on the (seemingly more appropriate) national level. Internationally, a process might be established in which each country explains to the others why it thinks that its pledge is “fair” in terms of CBDR/RC and equity.

Also, the following more outcomes may require further analysis:

- Will stringent international carbon accounting framework (CAF) together with related processes that ensures environmental integrity and compliance solve everything?  
It should in theory, because such processes would rule out double counting and would provide adequate compliance incentives for host countries to make sure international crediting would not be at the expense of meeting their pledges. However, in practice, the stringency of CAF, environmental integrity and compliance regimes emerging from international negotiations may be somewhere in between. Also, the principle of con-

sistency of crediting baselines with pledges may be a useful tool for host countries to stay within their pledge in the sense of a good practice guidance.

- National strategies and programmes building on projections of national emission trajectories into the future are an important tool for countries to meeting their pledges. Projections allow for breaking down national mitigation pledges into (sub-) sectoral emission targets. In cases where countries plan to implement crediting mechanisms in (sub-) sectors that are also a focus of the domestic mitigation action for meeting the pledge, an emerging boundary condition is that crediting baselines/additionality have to be defined in such a way that the sum of total sector emissions plus the number of units that are credited abroad is smaller than or equal to the domestic target for the considered sector. From this condition more detailed rules for crediting under different circumstances can be derived.
- Existing national mitigation strategies and programmes are often too general and do not provide for sufficient details and graininess to directly use them as a basis for defining crediting baselines/additionality. A suitable national entity would need to further break down national strategies and programmes to sector, sub-sector and finally to the level of the individual crediting activity. In general, breaking down pledges to baselines for sectoral crediting may be simpler than for project-by-project crediting, because a higher level of aggregation of targets is sufficient.
- Project-by-project approaches for crediting under pledges are challenging (though feasible) to implement. On the one hand, there is a need for a coordinating entity (such as a DNA) that manages crediting baseline determination, so that crediting of units does not endanger the meeting of the domestic pledge. On the other hand the clear separation of mitigation outcomes between domestic host country action and crediting seems to solve the long standing issues around the treatment of host country mitigation policies in crediting baselines (“E+/E-“ issues).
- Also, project-by-project approaches under a pledge have the drawback that the amounts of crediting units for entities implementing crediting activities may depend on the performance of “regular” plants in the sector that are not under a crediting scheme but would need to contribute to meeting the domestic pledge. If regular plants underperform in terms of emissions reductions for meeting the domestic sector target, then crediting plants may get less crediting units. From this, it may derived that project-by-project crediting under a host country pledge requires additional domestic rules in order to assure that crediting plants receive their crediting units. The rules should prevent a situa-



tion in which project participants implementing crediting action would be “held hostage” by the rest of the sector to complying with the sector’s national mitigation obligation. This is an issue which is also typical for sectoral approaches as shown e.g. by Aasrud et al. (2009).

## 6. POLICY PROCESSES

Chapters 4 and 5 sketch technical approaches on how host country pledges can inform baseline setting and additionality determination for crediting mechanisms. These approaches need to be embedded into national strategies and programs to meeting the pledges as described in Sections 3.2 and 3.3. Besides the more technical or methodological issues discussed in chapters 4 and 5, it is important to highlight that such approaches require adequate political and institutional processes within the host country that allow for target setting and decision taking in line with the circumstances and capabilities in different sectors of the host country and the principles of national sovereignty.

On the national level (left hand side in Figure 11) one can distinguish the process of defining an overall national mitigation pledge and the processes of developing national mitigation strategies and programmes that include deriving national, sector and sub-sector level mitigation targets in a kind of sub-national “effort sharing exercise” and defining national mitigation actions to support the reaching of the specific targets. Such programs are often developed in a political process including shareholder consultations etc. Lessons learnt from earlier experience in similar processes, e.g. in the earlier EU burden sharing discussions, could be helpful in the set-up of such processes.

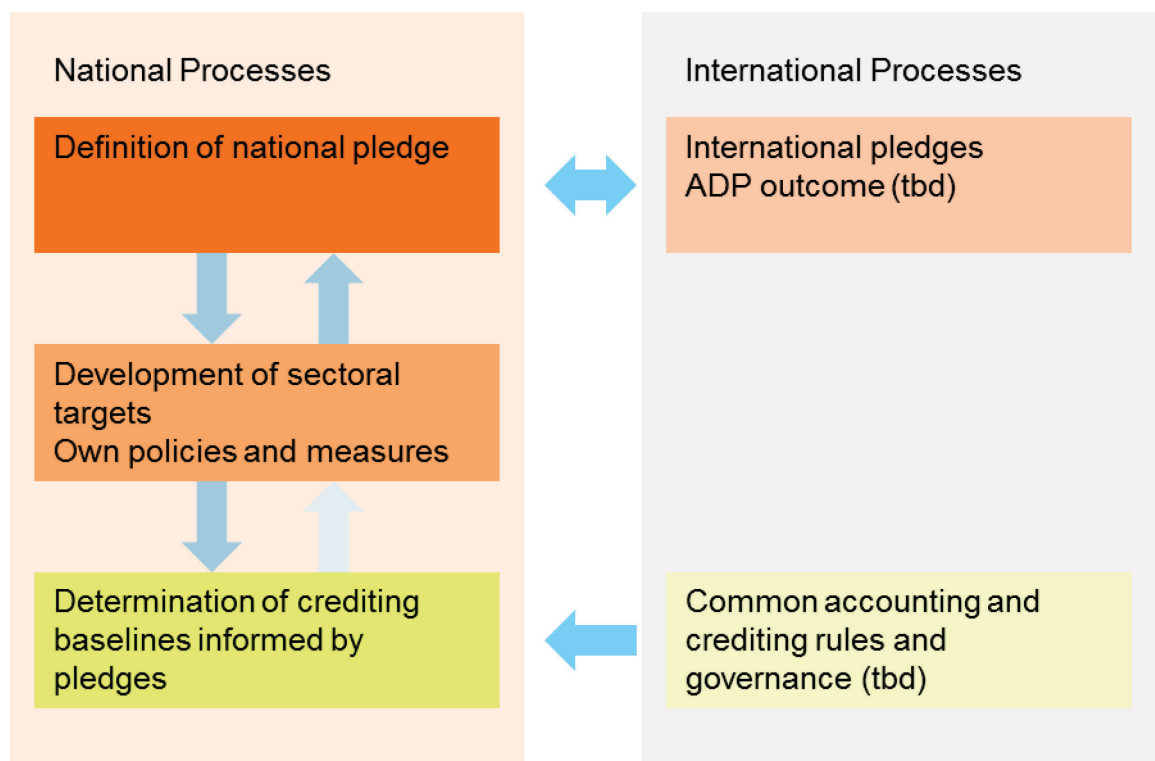
Such a national process may build *inter alia* on the following elements:

- National system of GHG emission inventories
- National system of GHG emission projections
- Identification and analysis of mitigation potentials in all relevant sectors
- Processes of developing national mitigation strategies and programmes
  - Definition of national pledge
  - Development of sectoral targets (“national burden sharing”) and timetables
  - Identification of policies and measures, selection of most suitable instruments for their implementation (regulations & standards, carbon tax, ETS, Feed in tariffs etc.)

- Development of crediting system
  - Establishing Carbon Accounting Framework in line with international bookkeeping rules
  - Definition of role of crediting in national mitigation potential
  - Determination of most suitable mechanism or offsetting program to be used
  - Development of methodologies and approaches for MRV
  - Collection of necessary data for baseline setting and additionality determination on project/technology/sector level
  - Determination of crediting baselines informed by pledges

Please note that above processes should ideally be embedded in existing processes and institutions for the development of national strategies and policies. The above elements are by no means exhaustive and their relative importance may vary under different country circumstances and capacities.

Establishing such elements and a functional mitigation policy process takes usually several years. It may therefore be useful to build on existing elements and standards, learn from other countries' experiences and gain own experiences in pilot schemes (assuming that adequate ambition levels will emerge on an international level).



**Figure 11** Key processes for the setting of crediting baselines on a national and international level.

On an international level, depending on the outcome of the ADP process, the pledge may also be impacted by the results of international climate negotiations. Also, potential future common accounting and crediting rules under the Convention may impact how crediting baselines will need to be set under pledges.

The role of international governance and oversight is currently much debated in international negotiations. If one aims for environmental integrity and efficiency of market based mechanisms (e.g. with a high acceptance and fungibility of the related crediting units) the international oversight (and therefore comparability) of the following elements should be sought:

- Process to assure ambition level and comparability of international pledges (in line with the principles of CBDR/RC)
- National inventory processes and national communications
- Carbon Accounting Framework, natl. and intl. tracking and bookkeeping
- Methodologies for baseline setting under pledges
- MRV of mitigation activities

In sum, building national processes for the definition and implementation of pledges and defining how pledges “trickle down” through a policy process in the host country of national sub-

targets and mitigation strategies and programs to impact crediting baseline setting is a political and methodological challenge for which further work and experiences are needed. However, many developed and developing countries have already gone through such exercises or are currently in the middle of these policy processes. Even though each country is different, there is a lot to learn from past and ongoing experience.

## 7. FINDINGS FROM PART II OF THE STUDY

While the first part of the study presents insights on how to define crediting baselines and determine additionality in new Market based Mechanisms in general, the present second part of the study looks closer into the question on how the emerging mitigation pledges from host countries may inform baseline setting and additionality. Although the study focusses on new market based mechanisms such as the Framework for various approaches and the New Market Mechanism, the analysis and its findings are equally relevant for other international crediting schemes, be in the context of Nationally Appropriate Mitigation Actions (the proposed “crediting NAMAs”) and, more importantly, in the context of the existing crediting under the Clean Development Mechanism (CDM) and Joint Implementation (JI). In the following, we list some of the main findings from the analysis:

Pledges need to inform baseline setting and additionality. If not, host countries may face difficulties of meeting the pledge at the expense of international crediting. Buyer countries may not want to buy units from crediting mechanisms if this may lead to host countries losing their ability of meeting the pledge.

The type of pledge and the stringency of its definition may impact the ability to derive baselines and additionality. E.g. our preliminary analysis suggests that defining crediting baselines under relative pledges face considerable challenges in their operationalization, compared to absolute pledges. Similarly, pledges that are not clearly defined and are ambiguous (e.g. in their inclusion of crediting units) seem less suitable and may pose substantial difficulties in developing crediting baselines and additionality approaches that are consistent with the host country’s pledge.

Pledges are an opportunity to solving the “E+/E- issue”, the question of how host country policies and regulations that impact emissions should be treated in baseline setting. Based on the pledge, the host country can develop a program of mitigation activities that are necessary to meet its pledge, and differentiate these domestic actions from mitigation actions for international crediting that go beyond these mitigation actions. With this, the host country can draw the line between domestic mitigation activities that aim at meeting the pledge and activities that can be used for international crediting.

Defining how pledges “trickle down” through a policy process in the host country of national sub-targets and mitigation strategies and programs to impact crediting baseline setting is a political and methodological challenge for which further work and experiences are needed. However, many developed and developing countries have already gone through such exercises

or are currently in the middle of mitigation policy processes, e.g. establishing national QELROs, considering different instruments including carbon taxes, efficiency standards, ETS, crediting, etc.

An important topic are perverse incentives: Pledges that can inform baseline setting should require a comparable level of effort from host countries, taking into account the principle of common but differentiated responsibilities and respective capabilities, and lead to a level playing field between host countries.

It appears that baseline setting (and additionality) under a host country pledge is simpler to operationalize in the context of top-down sectoral approaches to mechanisms. Project-by-project approaches that are by their very nature bottom-up, appear to face more challenges, but are still feasible.

The present preliminary analysis touches only on a limited and simplified set of pledge types, frameworks for the projection and planning of mitigation activities and crediting mechanisms. It shows the close relationship of host country pledges, approaches to meeting the pledge and scope for crediting mechanisms. Further analysis may promote the understanding of these interactions and may help countries in defining pledges, policies and measures while allowing for international crediting.

## APPENDIX : EMISSIONS REDUCTION PLEDGES PRE-2020

Source [UNEP Gap report 2012](#)

Country	Unconditional pledge	Conditional pledge	Current emissions (MtCO <sub>2</sub> e 2010)	Share of global emissions (in 2010)
Antigua and Barbuda	Reduce emissions by 25% below 1990 level by 2020	none	1	0.001
Australia	Reduce emissions by 5% below 2000 level by 2020	Reduce emissions by 25% below 2000 level by 2020	629	1.3
Belarus	Reduce emissions by 8% below 1990 level by 2020	none	150	0.3
Brazil	Reduce emissions by 36.1% to 38.9% below BaU by 2020	none	1621	3.2
Canada	No unconditional pledge: BaU emissions growth assumed	Reduce emissions by 17% below 2005 level by 2020	728	1.5
Chile	20% reduction below the BaU in 2020 as projected from 2007	none	107	0.21
China	Lower CO <sub>2</sub> emissions per unit of GDP by 40-45% by 2020 compared to the 2005 level; increase share of non-fossil fuels in primary energy consumption to around 15% by 2020; increase forest coverage by 40 million hectares and forest stock volume by 1.3 billion cubic meters by 2020 from 2005 levels	none	11182	22
Costa Rica	None: assumed to follow BaU trajectory	Carbon neutrality by 2021	11	0.022
Croatia	Reduce emissions by 5% below 1990 level by 2020	none	31	0.062
EU27	Reduce emissions by 20% below 1990 level by 2020	Reduce emissions by 30% below 1990 level by 2020	4999	10
Iceland	Reduce emissions by 15% below 1990 level by 2020	Reduce emissions by 30% below 1990 level by 2020	23	0.046
India	Reduce emission intensity of GDP by 20 to 25% by 2020 in comparison to the 2005 level	none	2692	5.4

Country	Unconditional pledge	Conditional pledge	Current emissions (MtCO <sub>2</sub> e 2010)	Share of global emissions (in 2010)
Indonesia	Reduce emissions by 26% on BaU by 2020	Reduce emissions by 41% on BaU by 2020 (government announcement not an official pledge)	1946	3.9
Israel	Reduce emissions by 20% on BaU by 2020	none	79	0.16
Israel	Reduce emissions by 20% on BaU by 2020	none	79	0.16
Japan	No unconditional pledge: BaU emissions growth assumed	Reduce emissions by 3.8% below 2005 level by 2020	1379	2.8
Kazakhstan	Reduce emissions by 15% below 1990 level by 2020	none	318	0.63
Maldives	None: assumed to follow BaU trajectory	Reduce net emissions to zero by 2020	1	0.0015
Marshall Islands	Reduce emissions by 40% below 2009 levels by 2020	none	NA	NA
Mexico	Reductions through to 2012 in line with Special Climate Change Programme. Estimated to deliver 51MtCO <sub>2</sub> e reduction on BaU in 2020	Reduce emissions by 30% below BAU in 2020	661	1.3
Moldova	Reduce emissions by 25% below 1990 by 2020	none	11	0.023
Monaco	Reduce emissions by 30% below 1990 level by 2020	none	NA	NA
Montenegro	Reduce emissions by 20% below 1990 by 2020	none	NA	NA
New Zealand	Reduce emissions by 10% below 1990 level by 2020	Reduce emissions by 20% below 1990 level by 2020	80	0.16
Norway	Reduce emissions by 30% below 1990 level by 2020	Reduce emissions by 40% below 1990 level by 2020	67	0.13
Papua New Guinea	Reduce emissions by at least 50% below BaU by 2030	none	43	0.085
Russian Federation	Reduce emissions by 15% below 1990 level by 2020	Reduce emissions by 25% below 1990 level by 2020	2510	5
Singapore	None: assumed to follow BaU trajectory	Reduce emissions by 16% below BaU by 2020	50	0.1



Country	Unconditional pledge	Conditional pledge	Current emissions (MtCO <sub>2</sub> e 2010)	Share of global emissions (in 2010)
South Africa	None: assumed to follow BaU trajectory	Reduce emissions by 34% below BaU by 2020	422	0.84
South Korea	Reduce emissions by 30% below BaU by 2020	none	647	1.3
Switzerland	Reduce emissions by 20% below 1990 level by 2020	Reduce emissions by 30% below 1990 level by 2020	57	0.12
Ukraine	Reduce emissions by 20% below 1990 level by 2020	none	397	0.79
United States of America	No unconditional pledge: BAU emissions growth assumed	Reduce emissions by 17% below 2005 level by 2020	6715	13
<b>Total</b>			<b>37636</b>	<b>74.5405</b>

**Table 9:** Pledges (unconditional and conditional) as interpreted for UNEP report of countries that formulated pledges in terms of GHG emissions.

Country	Current emissions (2010)	Share of global emissions (2010)
Afghanistan	18	0.035
Algeria	169	0.34
Argentina	315	0.63
Armenia	11	0.023
Benin	47	0.093
Bhutan	9	0.019
Botswana	12	0.023
Cambodia	192	0.38
Cameroon	82	0.16
Central African Republic	512	1
Chad	33	0.065
Colombia	187	0.37
Congo	1113	2.2
Côte d'Ivoire	165	0.33
Egypt	276	0.55
Eritrea	5	0.01
Ethiopia	110	0.22

Country	Current emissions (2010)	Share of global emissions (2010)
Gabon	22	0.043
Georgia	13	0.026
Ghana	86	0.17
Jordan	25	0.049
Macedonia	12	0.024
Madagascar	43	0.086
Mauritania	12	0.023
Mauritius	3	0.0067
Mongolia	70	0.14
Morocco	78	0.16
Peru	76	0.15
Sierra Leone	10	0.02
Tajikistan	15	0.029
Togo	23	0.047
Tunisia	38	0.08
<b>Total emissions</b>	<b>3782</b>	<b>7.5017</b>

**Table 10:** Countries that have submitted policy-, sectoral-, and project- level actions (not formulated in terms of GHG emissions).

Country	Current emissions (2010)	Share of global emissions (2010)
Azerbaijan	50	0.1
Bangladesh	184	0.37
Bolivia	144	0.29
Cuba	58	0.12
Ecuador	54	0.11
Guinea	230	0.46
Iraq	191	0.38
Iran	528	1.1
Kenya	56	0.11
Kuwait	101	0.2
Lao	100	0.2
Libya	79	0.16
Malaysia	330	0.66
Mali	50	0.1

Country	Current emissions (2010)	Share of global emissions (2010)
Myanmar	362	0.72
Nigeria	215	0.43
North Korea	96	0.19
Oman	82	0.16
Pakistan	340	0.68
Philippines	159	0.32
Qatar	112	0.22
Saudi Arabia	495	0.99
Serbia and Montenegro	82	0.16
Sudan	195	0.39
Syria	68	0.14
Thailand	413	0.82
Trinidad and Tobago	57	0.11
Turkey	420	0.84
Turkmenistan	87	0.17
Uganda	58	0.11
United Arab Emirates	207	0.41
Tanzania	70	0.14
Uzbekistan	174	0.35
Venezuela	310	0.62
Vietnam	306	0.61
Zambia	77	0.15
<b>Total emissions</b>	<b>6540</b>	<b>13.09</b>

**Table 11:** Countries with no pledges with shares of global emissions larger than 0.1%

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