New Greenhouse Gas Protocol standards for quantifying GHG effects of policies and tracking progress toward mitigation goals

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Abstract

The World Resources Institute is developing two Greenhouse Gas Protocol[1] standards to help countries and sub-national governments better design, track, and evaluate climate change mitigation policies, actions, and goals. The standards intend to create more international consistency and transparency in the way GHG assessments are carried out, since no international standards currently exist in these areas. The two standards are:

- *Policy and Action Standard*: how to estimate GHG reductions and track and report progress from policies and actions
- *Mitigation Goals Standard*: how to assess and report progress toward national, subnational, and sectoral GHG reduction goals

The standards are expected to be adopted by governments, donor agencies and financial institutions, and researchers to:

- Inform mitigation strategies based on estimated GHG effects
- Track performance of mitigation actions and track progress toward mitigation goals
- Report on GHG reductions from policies and progress toward mitigation goals
- Facilitate financial support for mitigation actions

This paper presents the basic principles from the *Policy and Action Standard* and experiences gained from pilot testing. Pilot tests of 26 policies/actions in 18 countries and cities confirmed the usefulness of the standard and led to further improvements in the methodology. Even if not all steps of the standard are useful in a given context, individual elements can support decision making processes at all levels. The requirements regarding reporting also enhance transparency.

Apart from the usefulness to national actors, the standard can help capacity building, increase options for peer learning and facilitates south-south cooperation by providing a consistent, but flexible tool for mitigation assessment.

[1] The GHG Protocol is a multi-stakeholder partnership convened by WRI and the World Business Council for Sustainable Development (WBCSD). Launched in 1998, the mission of the GHG Protocol is to develop internationally accepted GHG accounting and reporting standards and tools through global multi-stakeholder standard development processes, and to promote their adoption in order to achieve a low emissions economy worldwide. The final standards will be published in August 2014. The draft standards are available at www.ghgprotocol.org/mitigation-accounting.

The case for international standards

Greenhouse gas mitigation activities around the globe have been steadily increasing over the last several years and are expected to be further enhanced in the coming decades. The UNFCCC negotiations are encouraging more developing countries to take on commitments and engage in 'Nationally Appropriate Mitigation Actions' (NAMAs). Additionally, many countries engage in mitigation activities as part of their sustainable development agenda, which may be linked but not necessarily directly related to the international climate regime.

Resulting from this enhanced activity is an increased need for understanding the consequences of commitments and actions, especially regarding their GHG effect. Decision makers want to understand the impacts of commitments, policies and actions both before they adopt them, as well as retrospectively to understand whether intended effects were in fact achieved – and if not, to understand why in order to improve future activities. A wide range of other stakeholders also strive for a better understanding of the GHG effects of commitments, policies and actions – at the international as well as the national level. Current approaches to assessing the impacts of policies and goals are often not fully transparent, consistent, or comprehensive.

In this context, the World Resources Institute convened an international multi-stakeholder process to develop two new Greenhouse Gas Protocol standards to help countries and sub-national governments better design, track, and evaluate climate change mitigation policies, actions, and goals. The two standards are:

- *Policy and Action Standard*: how to estimate GHG reductions and track and report progress from policies and actions applicable to a range of sectors
- *Mitigation Goals Standard*: how to calculate GHG reductions and track and report progress toward national and sub-national GHG reduction goals

The standards are designed to create more international consistency and transparency in the way the assessment of GHG effectiveness of policies and goals are carried out and reported, since no international cross-sectoral standards currently exist in these areas. The *Policy and Action Standard* builds on established sector-specific standards and protocols (e.g., for evaluating energy savings) to help users assess the GHG effects of specific policies and actions in any sector in an accurate, consistent, transparent, complete, and relevant way, to support more effective decision making. It aims to help policymakers and other decision-makers develop effective strategies for managing and reducing GHG emissions. Apart from informing mitigation strategies, the *Mitigation Goals Standard* also supports users in understanding the level of ambition of a mitigation goal, assessing progress towards a goal, and finally evaluating the achievement of goals.

Non-GHG effects of policies, for example economic, social, and other environmental effects, are often just as or even more important to policymakers than GHG effects. The *Policy and Action Standard* can support the assessment of non-GHG effects, but does not provide comprehensive guidance in this area. In many cases specific and more detailed evaluation methods and data sources will be required to assess these effects.

In the following sections we concentrate on the *Policy and Action Standard*. In the next section, we discuss the applicability of the standard to different target groups and outline the scope of the standard. In the third section, we provide an overview of some of the key concepts and steps in the standard. The fourth section provides insights of the pilot testing phase that was carried out during the second half of 2013. The conclusions then provide an outlook on further planned activities.

The Policy and Action Standard - Applicability

The standard is intended for a wide range of organizations and institutions, including governments (municipal, subnational, national), donor agencies and financial institutions, businesses, research institutions, and NGOs.

It is designed to be globally applicable. It can be used in developing countries as well as in industrialized countries or emerging economies. The individual steps of the standard can be applied to policies and actions in any sector, and works for cross-sector policy instruments, for example emissions trading programs or carbon taxes.

While there are large differences in how easy the standard is to apply for different policy instruments, it is designed to cover all types of policies and actions. This includes, but is not limited to: regulations and standards, emissions trading programs, taxes and charges, subsidies and incentives, information instruments, research and development policies, voluntary agreements, infrastructure programs, financing and investment, and implementation of new technologies, processes, or practices.

The standard also explicitly intends to serve for evaluation of policies and actions that are not necessarily intended to achieve GHG emission reductions, but that have objectives unrelated to GHG emissions and that potentially increase or decrease GHG emissions or removals.

Given this broad scope the *Policy and Action Standard* provides a unique tool to enhance transparency and comparability across a wide range of applications.

The Policy and Action Standard - Key concepts and steps

Given the wide range of objectives that are potentially covered by the standard and the wide-ranging applicability, the standard necessarily remains broad. The level of detail of the analysis, data sources and methodologies are not prescribed and are for the user to select depending on the stated objectives. The standard provides a process to guide the user while providing a large amount of flexibility. At the same time it includes extensive and rigorous reporting requirement to ensure robustness and transparency of the analysis. Within this section we provide an introduction to some of the key concepts that form important elements of the standard.

Policies and actions. The standard defines policies and actions as interventions taken or mandated by a government, institution, or other entity. This includes a wide range of potential applications, such as laws and directives, regulations and standards, taxes and subsidies, information instruments, and implementation of new technologies, practices, or processes, among others. It aims at activities that go beyond the project or individual site,[2] and covers any type of policy or action, not only those explicitly intended to reduce GHG emissions. The standard also applies to packages of related policies/actions.

Attributing changes in emissions to policies and actions. The standard supports users in attributing changes in GHG emissions and removals to a specific policy or action, to help understand policy effectiveness. Attributing changes in emissions to specific policies and actions is difficult since GHG emissions in a given jurisdiction or region can change due to a variety of factors, including: the policy or action being assessed; other policies or actions that affect the same emissions sources; and various external drivers that affect emissions, such as changes in economic activity, population, energy prices, weather, autonomous technological improvements, and structural shifts in the economy. The attribution generally becomes more difficult the more indirect the policy or action is and the more complex the policy landscape.

[2] For project-based activities the GHG Protocol for Project Accounting is available at: http://www.ghgprotocol.org/standards/project-protocol

Baseline scenario and policy scenario. To estimate the change in GHG emissions resulting from a given policy or action, it is necessary to establish a reference case, or baseline scenario, against which the change is estimated. The baseline scenario represents the events or conditions most likely to occur in the absence of the policy or action being assessed. The baseline scenario is not a historical reference point, but is instead an assumption about conditions that would exist over the policy implementation period if the policy or action assessed were not implemented.

In contrast to the baseline scenario, the policy scenario represents the events or conditions most likely to occur in the presence of the policy or action being assessed. The policy scenario is the same as the baseline scenario in all respects except that it includes the policy or action (or package of policies/actions) assessed. The difference between the policy scenario and the baseline scenario represents the change resulting from the policy or action.

The scope of the baseline and policy scenario can range from the complete economy to a small subsector, depending on the breadth of sources and sinks affected by the policy or action.

Ex-ante and ex-post assessment. Ex-ante assessments are prospective (forward-looking), while ex-post assessments are retrospective (backward-looking). Ex-ante assessment can be carried out before or during policy implementation, while ex-post assessment can be carried out during or after policy implementation. Both may also be carried out in combination, also known as 'rolling monitoring'. The standard provides specific guidance on both types of assessment. In general, effective GHG management involves both ex-ante assessment and ex-post assessment. Figure 1 illustrates the relationship between ex-ante and ex-post assessment.

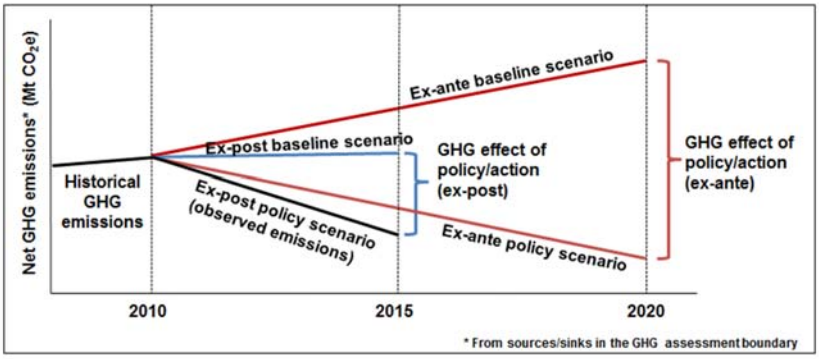

Figure 1. Ex-ante and ex-post assessment

Key steps

The standard is organized according to the steps a user follows in accounting for and reporting changes in GHG emissions from a policy or action. Figure 2 provides an overview of steps in the standard, organized by chapter. The main objective of the process is to ensure consistency, completeness, robustness and transparency across all steps of the quantification. It also aims to ensure consistency across time for longer-term evaluation processes that ideally would include ex-ante assessment prior to implementation, progress monitoring during implementation, and ex-post evaluation after implementation. Additional steps are involved for monitoring progress, where key performance indicators are defined and then tracked over the implementation period. Depending on what stage a policy is during the implementation process, users may skip Chapter 9, Chapter 10, or Chapter 11.

Figure 2. Overview of steps

In the following sections we provide a brief description of each step and its significance in the process.

Define objectives and the policy or action to be assessed. Explicitly defining and reporting the objectives or purpose of the assessment helps understand the level of accuracy and completeness required. Additionally, basic information about the assessment is required, which includes a detailed description of the policy or action that will be assessed. Information on the type of policy or action, implementation status, time frame, responsible entities, coverage, and scope are essential to understand potential effects. Depending on the degree of interaction with other implemented or adopted policies or actions it may also be desirable to assess a package of related policies or actions. The standard provides guidance on how to decide on this.

Identify GHG effects of the policy or action and define the GHG assessment boundary. The next step is to identify potential effects of the policy or action, before those effects can be quantitatively estimated. Many effects of the policy or action may not be immediately apparent, and many GHG effects (whether GHG increasing or GHG decreasing) may be far removed from the direct or immediate effects of the policy or action. The effects are then visualized in a 'causal chain' (see figure 3).

For a given objective not all effects will need to be quantified nor will this be possible given available data and resources. The standard therefore provides guidance on how to determine which of the effects are significant and should be included in the GHG assessment boundary and estimated. To

ensure a complete assessment, the standard encourages that all conceivable effects are taken into consideration, including:

- **In-jurisdiction and out-of-jurisdiction effects:** Effects that occur both inside and outside of the geopolitical boundary over which the implementing entity has authority, such as a city boundary or national boundary. To identify such effects, users should first define the relevant jurisdictional boundary. Out-of-jurisdiction effects are called spillover effects if they reduce emissions outside the jurisdictional boundary and leakage if they increase emissions outside the jurisdictional boundary.
- **Short-term and long-term effects:** Effects that are both nearer and more distant in time, based on the amount of time between implementation of the policy and the effect. The standard encourages assessing both short-term and long-term effects, to the extent they are significant for the individual assessment.
- **Intended and unintended effects**: Unintended effects may include a variety of effects, such as rebound effects, e.g. increases in energy-using activities or behavior resulting from energy efficiency improvements; effects in sectors other than the targeted sector; effects on members of society not targeted by the policy or action;[3] effects on behavior once a policy is announced but before it is implemented; lack of compliance or enforcement; etc. Unintended effects can be either GHG increasing or GHG decreasing.
- **Likely, possible, and unlikely effects:** All potential effects, regardless of their likelihood of occurring.
- **GHG emissions/removal increasing and decreasing effects:** Effects that both increase and decrease emissions released from sources and sinks.

The causal chain is a conceptual diagram tracing the process by which the policy or action leads to GHG effects through a series of interlinked logical and sequential stages of cause-and-effect relationships. Developing a visual map of the causal chain can help identify additional effects not previously identified. It can also serve as a useful communication tool in addition to serving as a key step in the GHG assessment process. Figure 3 provides an example of a causal chain diagram. Non-GHG effects, such as economic, social, and other environmental effects, can also be identified at the same time and included in the causal chain.

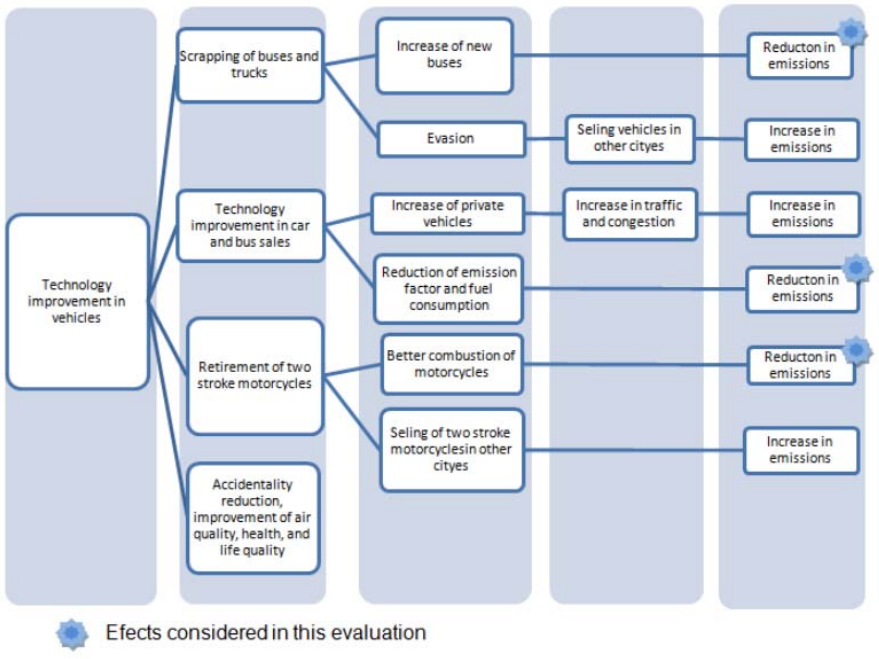

Figure 3. Causal chain example from the pilot testing in Medellin, Colombia

[3] This is sometimes referred to as a non-participant spillover effect.

Estimate GHG effects of the policy or action. There is flexibility in the sequencing and application of individual steps, but in principle the standard expects users to follow the steps in a way that allow to estimate the GHG effects of a policy or action according to the following equation (in Mt CO_2e):

> *Total net change in GHG emissions and removals resulting from the policy or action =*
>
> *Total net policy scenario emissions – Total net baseline scenario emissions*

To allow this, both baseline and policy scenario need to follow the same methodology, using the same parameters. The standard does not prescribe specific methods or tools. Instead a variety of equations, algorithms, and models can be used, including: bottom-up methods (e.g., engineering models); top-down methods (e.g., econometric models, regression analysis, computable general equilibrium (CGE) models); simple equations (e.g., simple extrapolation); complex models (e.g., simulation models, integrated assessment models); or a combination of methods.

When estimating the GHG effects of a policy or action ex-post, the comparison group method can be used, where one group or region affected by the policy or action is compared with an equivalent group or region that is not affected by the policy or action.

The standard requires at the minimum a qualitative description of the uncertainties involved in the analysis and provides guidance on various methodologies for qualitative and quantitative uncertainty analysis. It also requires a sensitivity analysis for the key parameters and assumptions in the assessment to understand differences in results due to methodological choices and assumptions and explore model sensitivities to inputs.

Lessons from pilot testing for the Policy and Action Standard

As part of the standard development process, the Policy and Action Standard was pilot tested on 26 policies/actions in 18 countries and cities in 2013 to test how the standard works in practice. Pilot countries included Bangladesh, Belgium, Chile, China, Colombia, Costa Rica, Germany, Indonesia, Israel, Japan, Mexico, South Africa, South Korea, Tunisia, the United Kingdom, and the United States.

Overview of pilots

The standard was piloted on a range of policy/action types (see figure 5) and across all sectors (see figure 6). The standard was also used to estimate the mitigation impact of four NAMAs: the Costa Rica Coffee NAMA, the Tunisian Buildings NAMA, part of the Tunisian Solar Plan NAMA, and the South Africa Passenger mode shift from road to rail NAMA.

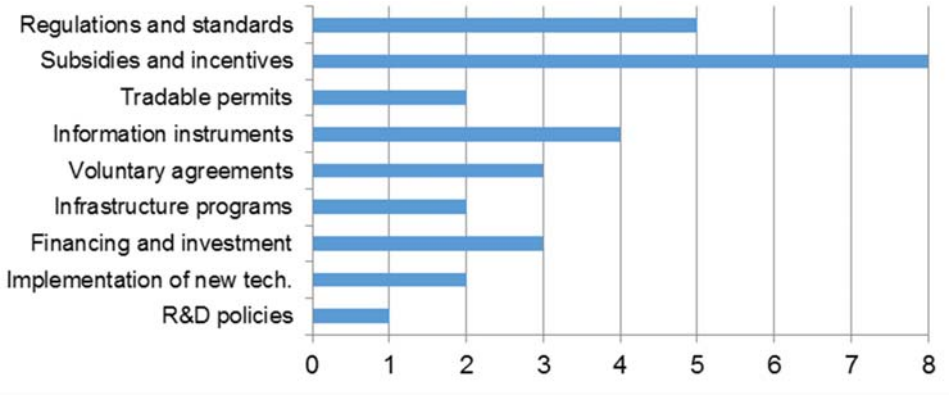

Figure 4. Types of policies and actions piloted

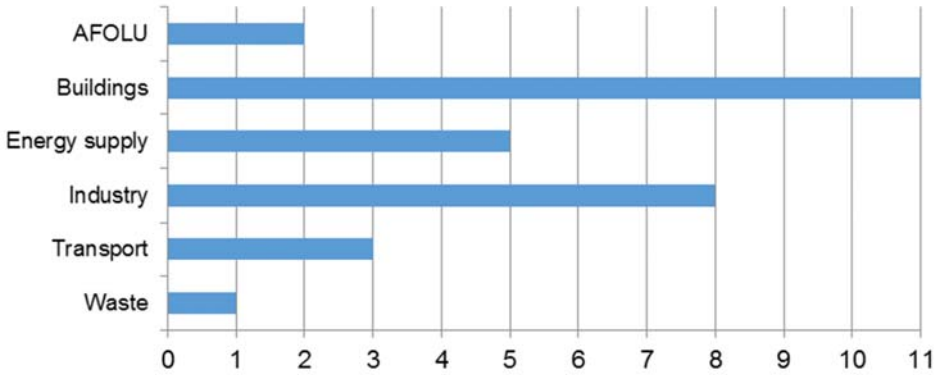

Figure 5. Sectors piloted

The pilot testing process demonstrated the standard to be applicable to all policy/action types and sectors, across eight developed countries and 18 developing countries, at both the national and subnational levels.

The following sections briefly highlight three case studies from the pilot testing process to provide some more in-depth examples of the variety of assessments that the standard can support.

Case 1 – Evaluating a transportation plan in Colombia

The Clean Air Institute (CAI) used the standard to assess the Air Quality Management Plan of Area Metropolitana del Valle de Aburra (AMVA) in Antioquia, Colombia. The objectives of the assessment were to evaluate the GHG impact of the transportation measures in the plan and inform the development of a future integrated environmental strategy for sustainable urban mobility in the AMVA. The assessment was performed with the energy model LEAP (Long-range Energy Alternatives Planning System) using information from the latest emissions inventory developed locally.

The plan consists of two transportation policies: 1) regulations to improve vehicle technologies; and 2) incentives to reduce trips from private transportation in cars and motorcycles and increase trips by bicycle, walking, and public transportation. Both policies affect emissions from urban transport – the first by improving vehicle technology and the second by shifting toward less emitting modes of transport. As a result, interactions between the two policies were considered likely.

The metropolitan authority (AMVA) was interested in the individual emissions impact of each policy in order to understand whether each policy was effective and should continue to be supported and implemented. The authority was also interested in the total emissions impact of both policies when implemented together to understand how effective they would be when implemented together. CAI

used the standard to assess the policies both individually and together as a package to understand the emissions implications of implementing them as a package versus implementing only one or the other policy on its own. To do so, CAI estimated the interactions between the policies following the guidance in the standard. The total estimated GHG reductions from both policies was 3,490,000 metric tons of CO_2e cumulatively over the period 2014-2023, or annual reductions of 10,000 to 600,000 tons per year from 2014 to 2023.

Main challenges in applying the standard. The analysis team found that selecting the appropriate model for the assessment and developing the causal chain were challenging steps. The team decided to use the LEAP (Long-range Energy Alternatives Planning System) model developed by SEI, and they developed the causal chain (see figure 3) through expert consultations. Another key challenge encountered during the pilot was finding high-quality data in Colombia for all sources needed to estimate emissions. Where there were data gaps, CAI relied on assumptions from previous studies to fill the gaps. To improve future assessments, CAI identified areas where uncertainty was highest in order to prioritize ongoing efforts to reduce uncertainty (such as emission factors and fuel consumption data for different vehicle categories, which were estimated based on national or regional data, rather than local data).

Main lessons learned. Despite the challenges posed by defining the causal chain, the exercise was seen as extremely useful and important to clearly identify all possible, not only intended effects. The determination of significance of effects was seen as highly useful, although overly complicated, with practical considerations such as data availability playing a more important role than the recommended approach of identifying significant effects based on how large they are expected to be and how likely they are to occur. The required uncertainty assessment was also seen as useful. It led to the identification of next steps to reduce the uncertainty for future analyses. Despite some practical challenges, CAI found the standard to be "an excellent way to guide the process for estimating impacts of policies."

Case 2 – Evaluating a renewable energy program in Tunisia

The National Agency for Energy Conservation of Tunisia (ANME) together with GIZ and ALCOR Consulting, used the standard to carry out a combined ex-post and ex-ante assessment of the PROSOL Elec program in Tunisia. PROSOL Elec is a renewable energy support program, launched by ANME in 2010, that aims to promote and support the installation of photovoltaic (PV) systems in residential and commercial buildings with low voltage grid connection. The objectives of the assessment were to assess progress of the program to date and to estimate the future contribution of the program to mitigation at the national level.

ANME used the standard to define the GHG assessment boundary by identifying all significant effects of the program that needed to be estimated, which included: 1) reduction of GHG emissions due to reduced combustion in conventional power plants; 2) reduction of fugitive GHG emissions due to reduced gas transport and storage; and 3) increased GHG emissions due to increased production of PV systems (an out-of-jurisdiction effect).

ANME calculated baseline emissions for each effect, then calculated policy scenario emissions both ex-ante and ex-post to estimate the total effect of the program. The standard helped ANME arrive at an accurate and complete estimate of the program's effect by including all significant effects of the policy (both emissions increasing and decreasing), not only the intended (emissions reducing) effects of the program. The calculations found that the program is expected to reduce GHG emissions by 4,090,050 t CO_2e cumulatively over the period 2014-2030, or 194,764 t CO_2e per year (on average).

In addition to calculating reductions in GHG emissions, the results were also used to calculate the amount of money the government is expected to save through reduced energy subsidies.

Main challenges in applying the standard. The analysis team in Tunisia, like in Colombia, also found it challenging to select the best method for carrying out the assessment. Evaluating the likelihood of effects in the causal chain were also seen as difficult and were more inclined to include even apparently insignificant effects in the assessment.

Main lessons learned. One lesson learned from the process was the value in combining different data sources that already exist to account for both GHG impacts and co-benefits in an efficient and comprehensive manner. The standard was found to be well-structured, detailed and user-friendly, but focusing too strongly on individual actions, with too little guidance on the evaluation of packages of policies and actions. The team identified the need for more concrete exigencies on monitoring and verification.

Case 3 – Evaluating an oil pipeline between Canada and the United States

The Stockholm Environment Institute used the standard to carry out an ex-ante assessment of the proposed Keystone XL pipeline that would deliver oil from Canada's oil sands to the Gulf of Mexico. The US Government has made its approval of the pipeline contingent in part on whether the pipeline would have a net increasing effect on greenhouse gas emissions. The objective of the assessment was to inform that decision by estimating the net global GHG effect of the pipeline (including both in-jurisdiction effects and out-of-jurisdiction effects).

The most critical step in the assessment was the determination of the most likely baseline scenario – i.e., what would most likely happen to the oil from the Canadian oil sands if the pipeline were not built? SEI defined three illustrative baseline scenarios to represent the range of possibilities if the pipeline were not built: 1) none of the oil to be carried by Keystone XL would otherwise make it to market and be consumed; 2) all of the oil would otherwise make it to market and be consumed; and 3) a middle ground option in which half of the oil would go to market and be consumed. Given lack of better information and the different perspectives in the literature, each was considered to be equally likely.

The assessment found that based on the choice of baseline scenario, at the extreme ends of the assumptions, the pipeline could either increase global emissions by 93 $MMTCO_2e$, or decrease global emissions by 0.3 $MMTCO_2e$. The assessment shows the limitations of ex-ante assessment if there is no way to identify the most likely baseline scenario, since the results of the assessment hinge on the selection of the most likely baseline scenario. It also shows the importance of defining and reporting alternative baseline scenarios when uncertainty is high, and conducting sensitivity analyses to understand the range of possible results given the uncertainties. Further analysis to quantify uncertainty, including Monte Carlo analysis, can also be helpful in such cases.

As part of the assessment, SEI developed a simple supply-demand model of global oil markets model to estimate price effects on impacts on global oil consumption. The model revealed that the choice of whether to include the effects of the pipeline on global oil prices had very significant impact on the results: including price effects increased GHG impact by a factor of 4. Differentiating between where impacts were expected to occur—in Canada, in the U.S., or in other countries—required crude assumptions, due to the complexities of the global oil market. More attention was given to estimating the total global GHG effect of the pipeline.

Main challenges in applying the standard. Like a number of other pilot testers, the team struggled with the concept of tiers as implemented in the draft standard. Based on this and other experiences the tiers were removed from the standard. The estimation of in-jurisdiction and of global effects was in this case particularly challenging and only possible by making crude assumptions. The

team also found it difficult to judge if its analysis actually adheres to the standard, given the length and complexity of the document.

Main lessons learned. The pilot demonstrated the value in using the standard to assess not only policies that are intended to mitigate climate change, but also on policies that are expected to increase emissions, in order to understand the GHG effects of any policy, whether positive or negative.

Summary of pilot testing findings

Pilot testers found specific steps in the standard particularly helpful. The steps were found to support the analysis team in providing guidance on steps to take and critical issues to watch out for. This overall improved assessment quality and comprehensiveness compared to many current practices. These most helpful guidance included:

- Mapping of the causal chain to understand the cause-and-effect relationships that lead from policy implementation to changes in GHG emissions;
- Providing of a framework to identify all significant effects of the policy, not only the direct or intended effects; and
- Requiring that users define a baseline scenario that represents what would most likely happen in the absence of the policy or action.

The pilot process also resulted in revisions to the draft, such as the decision to remove a tiered framework (similar to the tiers in the IPCC *Guidelines for National Greenhouse Gas Inventories*), due to the difficulty in objectively specifying the cut-off between discrete tiers. Instead, the standard now presents a range of methodological options for each step without tiers.

Pilot testers agreed on the need for sector-specific guidance, which at the time of the pilot testing was still under development and not yet available.

The amount of time required to assess policies and actions ranged from 5 days to 40 days, with an average of 19 days. The amount of time varied depending on: whether data had already been collected; whether any previous analysis had been done that could be built on; the complexity of the policy/action; and the level of accuracy and completeness required to meet the objectives. Pilot testers highlighted the need to put systems in place to collect data and apply the methodologies, if not already in place – ideally before the policy or action is implemented. Once systems are in place, assessments require less time and resources, making each subsequent assessment easier to carry out.

All pilot testers who responded said they would use the standard to assess policies and actions again in the future – to meet objectives such as assessing policy effectiveness, informing policy design, reporting to the UNFCCC, and attracting finance for mitigation actions.

Conclusions and way forward

The *Policy and Action Standard* is expected to fill a gap in creating a more transparent and consistent approach to estimating the impacts of policies. It aims to help national and subnational governments meet a variety of objectives, including: improving domestic monitoring and evaluation processes, attracting financial support for mitigation actions (e.g., NAMAs), and fulfilling reporting obligations under the UNFCCC (e.g., related to national communications, biennial reports, and biennial update reports).

Pilot tests of 26 policies/actions in 18 countries and cities have confirmed the usefulness of the standard and have helped to improve user-friendliness. Even if not all steps of the standard are useful in a given context, individual elements can support decision making processes at all levels. Specific elements of the standard have been identified as being particularly useful. These include:

- The mapping of effects, which was found to be a useful exercise for policy makers to think through the different options for action available to them.
- The identification of different types of effects, including unintended, out-of-jurisdiction and long-term effects make the assessment more comprehensive.
- The requirements regarding reporting enhance transparency.

Apart from the usefulness to national actors, the standard can help capacity building, increase options for peer learning and facilitates south-south cooperation by providing a consistent, but flexible tool for mitigation assessment.

The pilot tests also confirmed that many of the individual steps of the standard, while extremely useful, remain a challenge to apply in practice. Data availability and quality and the selection of the most appropriate methods and tools remain issues that can only partly be solved within the standard.

Some of the challenges identified in the pilot testing, such as problems in applying the tier concept, led to revisions in the standard in the effort to increase user-friendliness. Overall, the pilot cases were used to provide real-world examples within the standard. Feedback on the difficulty to select the methods for the assessment led to the provision of a list of available methods and tools, which aims to support this, while acknowledging that analysis situations will vary widely and additional guidance may be required. The length and complexity of the document led to a number of comments from pilot testers and was addressed by providing an executive summary.

After the standard is published in September 2014, WRI plans to develop additional resources to help users implement the standard, including an online and in-person training curriculum, sector-specific guidance documents, and a list of relevant calculation methods and tools, which will be made available online at www.ghgprotocol.org. This will further enhance the usefulness of the standard as a tool to increase the capacity around the globe to evaluate GHG effects of policies and actions before, during and after implementation.

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