GREENHOUSE GAS PROTOCOL

Policy and Action Standard

EXECUTIVE SUMMARY

An accounting and reporting standard for estimating the greenhouse gas effects of policies and actions

WORLD RESOURCES INSTITUTE

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1. Context

Greenhouse gas (GHG) emissions are driving climate change and its impacts around the world. Every degree increase in temperature will produce increasingly unpredictable and dangerous impacts for people and ecosystems. As a result, there is an urgent need to accelerate efforts to reduce GHG emissions. National and subnational governments, financial institutions, and private sector organizations around the world are planning and implementing policies and actions to reduce GHG emissions.

Policymakers and analysts are seeking to assess and communicate the effects of policies and actions on GHG emissions—both before adoption to inform the design of policies and actions and after implementation to understand whether the intended effects were achieved.

In this context, the World Resources Institute convened a global multistakeholder process to develop the GHG Protocol *Policy and Action Standard*—an international standard for estimating and reporting the change in GHG emissions and removals resulting from policies and actions. Box 1 explains the standard development process.

2. Why use the standard

The *Policy and Action Standard* helps users assess and report the GHG effects of policies and actions in an accurate, consistent, transparent, complete, and relevant way in order to support effective GHG reduction strategies.

Specific objectives for assessing the GHG effects of a policy or action include:

- Inform the design and selection of policies and actions
- Assess the effectiveness of policies and actions in delivering the intended results
- Learn from experience to improve policy implementation
- Assess the contribution of policies and actions toward broader GHG reduction goals
- Attract and facilitate financial support for mitigation actions
- Ensure that policies and actions are cost-effective
- Report on GHG effects of policies and actions for domestic or international purposes

In addition to assessing GHG effects, the standard provides a framework that can be used to assess the broader social, economic, and environmental impacts of a policy or action, such as air quality, public health, and job creation.

Box 1 How the standard was developed

The standard was developed by the Greenhouse Gas Protocol (GHG Protocol). The GHG Protocol is a multistakeholder partnership of businesses, NGOs, governments, academic institutions, and others convened by the World Resources Institute (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, and to promote their adoption in order to achieve a low emissions economy worldwide. All GHG Protocol standards and guidance are available at www.ghgprotocol.org.

In June 2012, WRI launched a two-year process to develop the *Policy and Action Standard*. A thirty-member Advisory Committee provided strategic direction throughout the process. The first draft of the *Policy and Action Standard* was developed in 2012 by two Technical Working Groups consisting of over fifty members, then reviewed by members of a Review Group, including during three stakeholder workshops. In 2013, the second draft was pilot tested on 27 policies and actions in 20 countries and cities across a range of sectors to determine how the standard worked in practice. Pilot countries included Bangladesh, Belgium, Chile, China, Colombia, Costa Rica, Germany, India, Indonesia, Israel, Japan, Mexico, South Africa, South Korea, Tunisia, the United Kingdom, and the United States. The standard was revised based on pilot testing feedback and circulated for public comment in July 2014.

In parallel, the GHG Protocol *Mitigation Goals Standard*—an international standard for assessing progress toward national and subnational GHG reduction goals—was developed through the same standard development process.

The standard can be most easily applied to non-GHG effects that are closely linked to GHG emissions in terms of data needs, such as energy use, waste generation, and local air pollution. Additional methods and data will be necessary when assessing impacts that are less related to GHG emissions, such as public health impacts or broader economic impacts such as changes in GDP or jobs.

To understand the cost-effectiveness of a policy, the GHG estimates obtained from applying the standard can be combined with information on costs associated with a policy. The results can also be used as part of a broader cost-benefit analysis. The standard provides guidance on using the results in a cost-effectiveness analysis, cost-benefit analysis, or multicriteria analysis in an appendix.

Relationship to other GHG accounting standards

Before choosing to use the *Policy and Action Standard,* users should consider the broader landscape of GHG accounting standards to determine the most appropriate standard to use.

GHG emissions can be accounted for at the country, city, company, or facility level using GHG inventories. GHG accounting can also be used to estimate GHG reductions from specific projects, policies, or actions, or to assess progress toward GHG reduction goals. Table 1 provides an overview of standards and guidelines available for measuring emissions, emissions reductions, and goal progress at multiple levels. Taken together, the methods provide a basis for comprehensive GHG management.

GHG inventories are a critical first step for managing emissions, since they are necessary for tracking changes in overall emissions and identifying and prioritizing mitigation opportunities. However, changes in GHG inventories over time do not explain why emissions have grown or declined over time or reveal the effects of individual policies or actions. Assessing the GHG effects of key policies and actions should be carried out as a complement to developing a GHG inventory. By attributing changes in emissions to specific policies and actions, use of the *Policy and Action Standard* can inform policy selection and design and enable an understanding of policy effectiveness.

The *Policy and Action Standard* and The *GHG Protocol for Project Accounting* both provide methods for estimating GHG reductions from interventions. The *Policy and Action Standard* applies to broader policies or actions (such as a renewable energy policy at the sector or jurisdiction level), rather than individual mitigation projects (such as an individual solar photovoltaic installation).

3. Who should use the standard

The standard is intended for a wide range of organizations and institutions. The primary intended users are analysts and policymakers assessing government policies and actions at the national, state, provincial, sector, or municipal level. Other potential users include donor agencies and financial institutions, research institutions, non-governmental organizations, and businesses.

The following examples show how different types of users can use the standard:

- **Governments**: Estimate the GHG effects of planned policies and actions to inform decision making; monitor progress of implemented policies and actions; and retrospectively evaluate GHG effects to learn from experience.
- **Donor agencies and financial institutions:** Estimate the GHG effects of finance provided, such as grants or loans to support GHG reductions and low emissions development strategies.
- **Businesses:** Estimate the GHG effects of private sector actions larger than individual projects, such as company-wide energy efficiency programs implemented by electric utilities; voluntary commitments; implementation of new technologies, processes, or practices; private sector financing and investment.
- **Research institutions and NGOs:** Estimate the GHG effects of any of the above types of policies or actions to assess performance or provide support to decision makers.

Table 1 Types of GHG measurement and associated standards or guidelines at multiple levels

Type of GHG measurement	Countries	Cities and subnational jurisdictions	Companies/ organizations
GHG emissions inventory	IPCC *Guidelines for National Greenhouse Gas Inventories*	WRI/C40/ICLEI *Global Protocol for Community-Scale Greenhouse Gas Emission Inventories*	GHG Protocol *Corporate Standard*
GHG reductions	GHG Protocol *Policy and Action Standard* (for policies and actions) *GHG Protocol for Project Accounting* (for projects)		
Goal progress	GHG Protocol *Mitigation Goals Standard*		GHG Protocol *Corporate Standard*

The standard is applicable to policies and actions:

- At any level of government (national, subnational, municipal) in all countries and regions
- In any sector (such as energy supply, industry, residential and commercial buildings, transportation, waste, and agriculture, forestry, and other land use [AFOLU]) as well as cross-sector policy instruments, such as emissions trading programs or carbon taxes
- Intended to mitigate GHG emissions or intended to achieve objectives unrelated to or contrary to climate change mitigation (but that have an effect, either positive or negative, on GHG emissions)
- That are planned, adopted, or implemented, or are extensions, modifications, or eliminations of existing policies or actions

The standard may be useful for estimating the GHG effects of NAMAs that are framed as policies or programs. It may also be useful for actions that comprise low emissions development strategies (LEDS) and other national development plans.

4. When to apply the standard

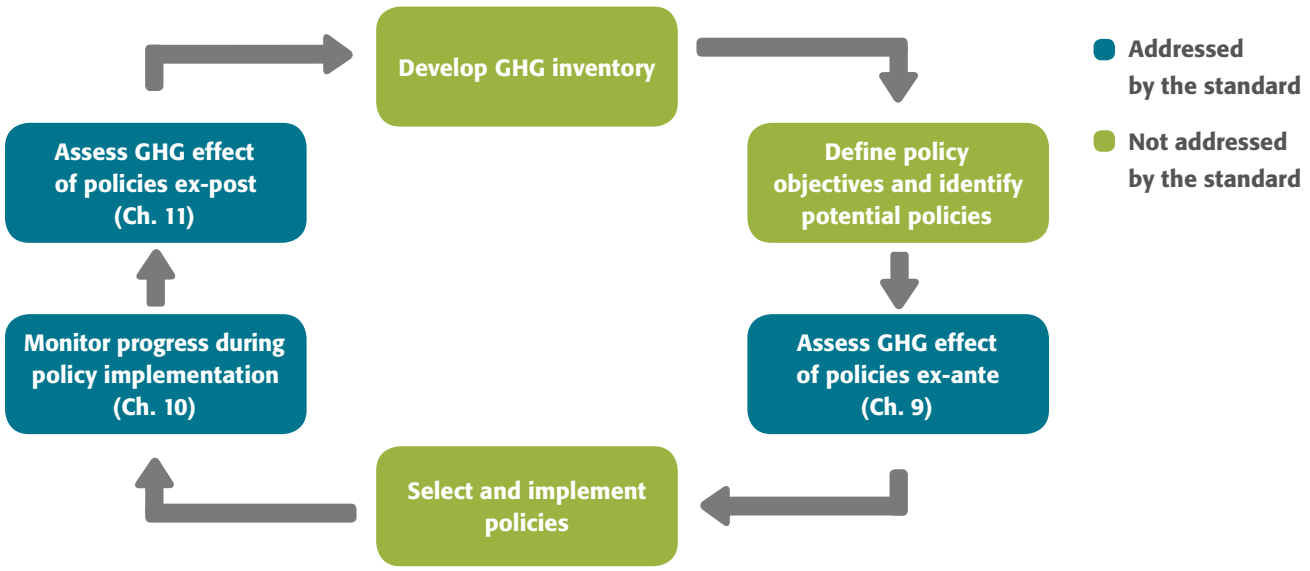
The standard may be used at multiple points in time:

- **Before policy implementation:** To estimate the expected future effects of a planned policy or action (through ex-ante assessment)
- **During policy implementation:** To estimate achieved effects to date, the ongoing performance of key performance indicators, and the expected future effects of a policy or action
- **After policy implementation:** To estimate what effects a policy or action has had on GHG emissions (through ex-post assessment)

The most comprehensive approach is to apply it before implementation, annually (or regularly) during policy implementation, and again after implementation. Figure 1 outlines a sequence of steps that may be used to monitor and assess GHG effects at multiple steps in a policy design and implementation process.

The time required to implement the standard depends on a variety of factors, including the complexity of the policy or action being assessed, the scope of the assessment, the extent of data collection needed and whether relevant data has already been collected, whether analysis related to the policy or action has previously been done, and the desired level of accuracy and completeness needed to meet the user's objectives.

Figure 1 Assessing GHG effects throughout a policy design and implementation process



5. Overview of steps

Figure 2 provides an overview of steps in the standard. For each step, the standard includes both requirements and guidance. The requirements represent the accounting and reporting steps that users must follow in order for the assessment to be in conformance with the standard.

5.1 Define the policy or action to be assessed

Users may assess either an individual policy/action or a package of related policies/actions. Types of policies or actions that may be assessed include laws, directives, and decrees; regulations and standards; taxes and charges; subsides and incentives; tradable permits; voluntary agreements or measures; information instruments;

Figure 2 Overview of steps

Overall steps	Detailed steps	Chapter
Define policy/action	Define the policy or action to be assessed; choose ex-ante or ex-post assessment	5
Identify effects	Identify all potential GHG effects of the policy or action; include them in a map of the causal chain	6
	Define the GHG assessment boundary around significant effects; identify the sources/sinks in the boundary	7
Estimate effects	Estimate baseline emissions for all affected sources/sinks included in the boundary	8
	Ex-ante assessment: Estimate policy scenario emissions for affected sources/sinks; subtract baseline emissions to estimate GHG effect	9
	Identify key performance indicators; monitor performance over time	10
	Ex-post assessment: Estimate policy scenario emissions for affected sources/sinks; subtract baseline emissions to estimate GHG effect	11
	Assess uncertainty (relevant to Chapters 8, 9, 10, and 11)	12
Verify	Verify results (optional)	13
Report	Report results and methodology used	14

research, development, and deployment (RD&D) policies; public procurement policies; infrastructure programs; implementation of new technologies, processes, or practices; and financing and investment.

Some types of policies and actions are more difficult to assess than others, since the causal relationship between implementation of the policy and its GHG effects may be less direct. For example, information instruments and research, development, and deployment (RD&D) policies may have less direct and measurable effects than regulations and standards. While the standard can be applied to any policy type, users may encounter data collection and estimation challenges that hinder a complete and credible assessment.

5.2 Identify potential GHG effects

In order to estimate GHG effects of a policy or action, users must first understand what the effects are. Effects are changes in behavior, technology, processes, or practices that result from a policy or action. Effects may be intended or unintended, may occur in the short term or the long term, and may occur inside or outside of the implementing jurisdiction's geopolitical boundary. See Table 2 for examples of the various types of effects using an illustrative policy.

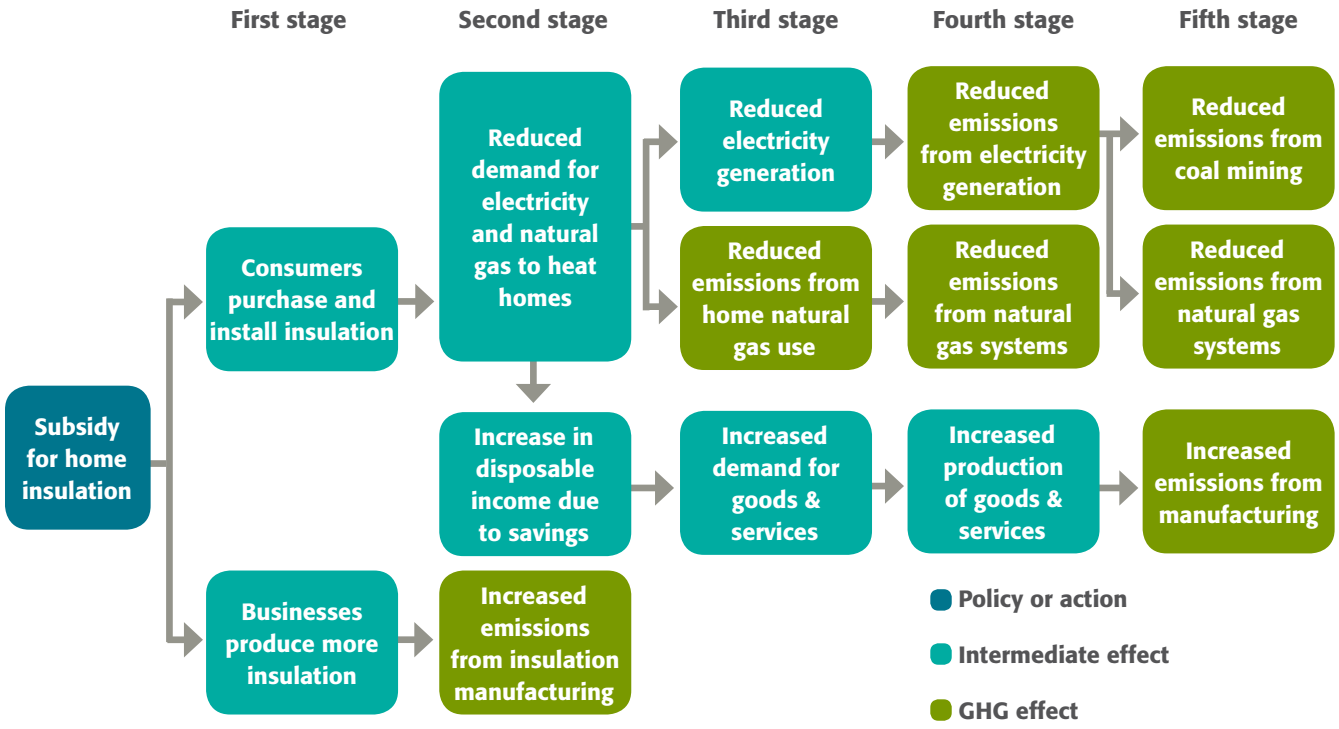
5.3 Map the causal chain

A 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. Mapping the causal chain is a key step in the assessment process, since it helps identify and organize potential effects. It also helps the user and decision makers understand in visual terms how the policy or action leads to changes in emissions, which can serve as a useful tool to enhance policy design, improve understanding of policy effectiveness, and communicate the effects of the policy to stakeholders. Figure 3 provides an example of a causal chain.

Table 2 Illustrative example of various effects for a United States vehicle fuel efficiency standard

Type of effect	Examples of effects
Intended effect	• Fuel consumption and tailpipe emissions per mile driven are reduced.
Unintended effect	• Some consumers drive further distances, since improved vehicle fuel efficiency decreases the cost of driving per kilometer, thereby reducing some of the emissions benefits. This is called a *rebound effect.* • Emissions from the U.S. electricity generation sector increase as a result of more electric vehicles being sold.
In-jurisdiction effect	• Automakers in the U.S. produce and sell more efficient cars, which reduces gasoline consumption in the United States.
Out-of-jurisdiction effect	• Because of the U.S. regulation, Canada adopts a similar vehicle fuel efficiency regulation, leading to reduced emissions from cars in Canada. This is a *spillover effect.* • U.S. automakers might sell old models to countries without similar standards, which could increase emissions in other countries *(leakage).*
Short-term effect	• U.S. automakers produce more efficient vehicles, using the same basic technology (cars fueled by gasoline and diesel).
Long-term effect	• U.S. automakers develop new vehicle technologies that reduce emissions even further, such as zero emissions vehicles.

Figure 3 **Example of a causal chain for an illustrative subsidy for home insulation**



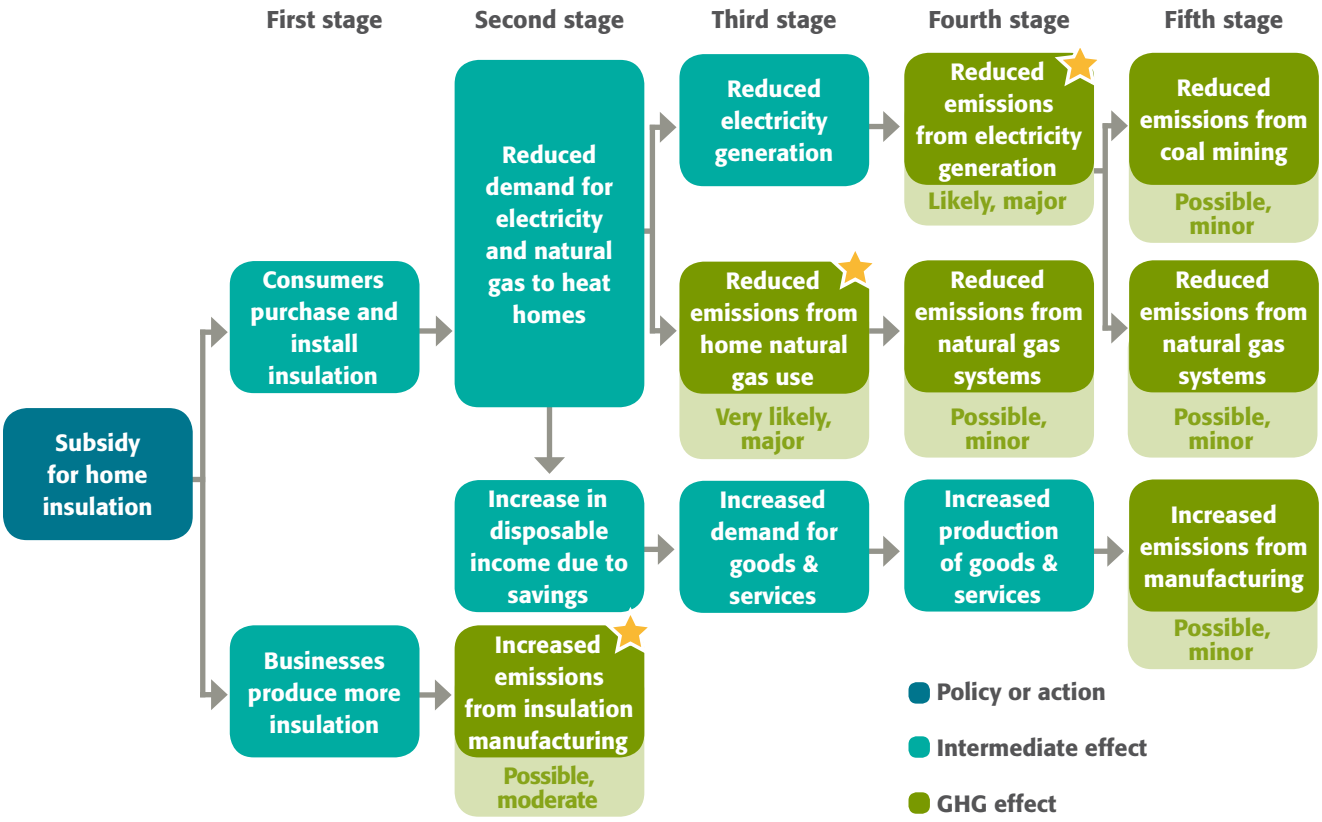
5.4 Define the GHG assessment boundary

The GHG assessment boundary defines the scope of the assessment in terms of the range of GHG effects (and non-GHG effects, if relevant) identified in the causal chain that are included in the GHG assessment and estimated. The standard encourages a comprehensive assessment that includes the full range of GHG effects that are considered significant.

The GHG assessment boundary also defines the assessment period—the time period over which GHG effects resulting from the policy or action are assessed. The assessment period should be comprehensive to capture the full range of effects based on when they are expected to occur.

Figure 4 provides an example of identifying which GHG effects are significant (and included in the assessment boundary) based on the relative magnitude and likelihood of potential GHG effects. In the figure, stars are used to indicate GHG effects included in the boundary.

Figure 4 Example of assessing each GHG effect to determine which effects to include in the GHG assessment boundary



Note: Stars indicate GHG effects included in the boundary.

5.5 Define the baseline scenario and policy scenario

Attributing changes in emissions to specific policies and actions can be difficult. GHG emissions can change as a result of various 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, and weather).

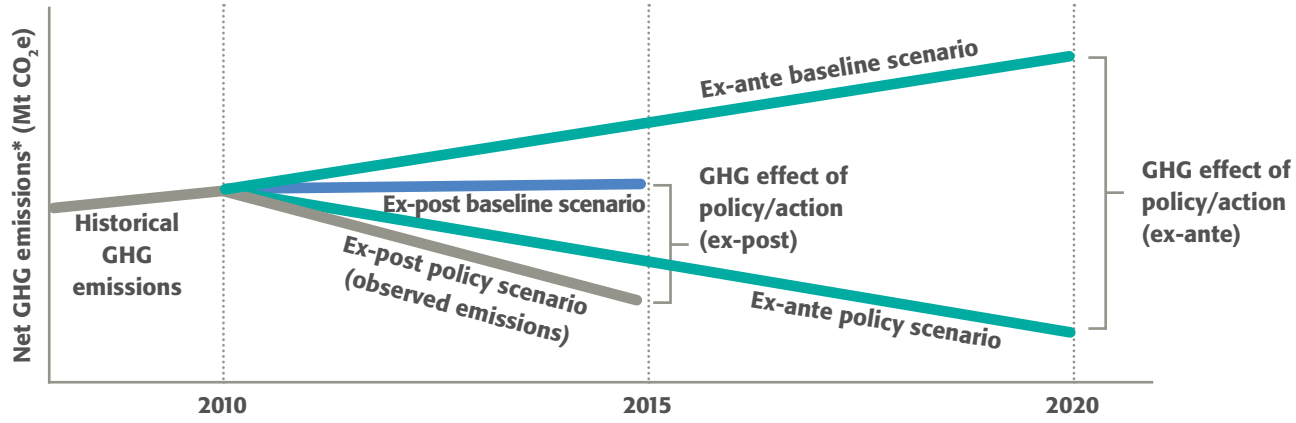
For example, a city may implement a GHG mitigation policy in the electricity sector and then observe that energy-related emissions in the following year have declined. However, emissions may have declined because an economic downturn reduced demand for electricity, rather than because the policy was effective. Further analysis is required to understand why emissions have changed.

To estimate the GHG effect of a policy or action, it is necessary to establish a 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. It 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 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.

Figure 5 illustrates baseline scenarios and policy scenarios, for both ex-ante and ex-post assessment. Box 2 provides an example of defining the baseline scenario for the Keystone XL pipeline.

Figure 5 **Ex-ante and ex-post assessment**



Note: * From sources and sinks in the GHG assessment boundary.

Box 2 **Evaluating the Keystone XL pipeline**

The Stockholm Environment Institute (SEI) used the *Policy and Action Standard* in 2013 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. In 2013, the U.S. government made its approval of the pipeline contingent in part on whether the pipeline would not result in a net increase in 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: 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 Mt CO_2e, or decrease global emissions by 0.3 Mt CO_2e. The assessment 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.

5.6 Estimate the GHG effect of the policy or action

The difference in emissions between the policy scenario and the baseline scenario represents the GHG effect of the policy or action. See Equation 1.

The standard does not prescribe specific methods or tools to estimate emissions but instead allows for a variety of equations, algorithms, and models to be used. The choice of methodology and data sources will depend on the objectives of the assessment and the level of accuracy needed to meet the objectives. The choice will also be influenced by available data, capacity, and resources. The standard encourages using the most accurate approach that is feasible and serves the stated objectives.

Table 3 provides an example of estimating the GHG effect for an illustrative policy.

5.7 Identify policy interactions

An individual policy or action may overlap or interact with other policies and actions to produce total effects that differ from the sum of the individual effects of each individual policy. Policies or actions may interact if they affect the same source(s) or sink(s). For example, national and subnational policies in the same sector are likely to interact. The standard provides guidance on identifying and estimating policy interactions at multiple steps in the assessment process.

Box 3 provides an example of evaluating a transportation plan in Colombia, taking into account policy interactions.

Equation 1 Estimating the GHG effect of a policy or action

Total net change in GHG emissions resulting from the policy or action (t CO_2e) =
Total net policy scenario emissions (t CO_2e) – Total net baseline scenario emissions (t CO_2e)

Notes: "Net" refers to the aggregation of emissions and removals. "Total" refers to the aggregation of emissions and removals across all sources and sinks included in the GHG assessment boundary.

Table 3 Example of estimating the GHG effect of a home insulation subsidy

GHG effect included in the GHG assessment boundary	Affected sources	Policy scenario emissions	Baseline emissions	Change in emissions
Reduced emissions from electricity use	Fossil fuel combustion in grid-connected power plants	48,000 t CO_2e	50,000 t CO_2e	**–2,000 t CO_2e**
Reduced emissions from home natural gas use	Residential natural gas combustion	16,000 t CO_2e	20,000 t CO_2e	**–4,000 t CO_2e**
Increased emissions from insulation production	Insulation manufacturing processes	6,000 t CO_2e	5,000 t CO_2e	**+1,000 t CO_2e**
Total emissions/ Total change in emissions		**70,000 t CO_2e**	**75,000 t CO_2e**	***–5,000 t CO_2e***

Box 3 Evaluating a transportation plan in Colombia

The Clean Air Institute (CAI) used the standard to assess the Air Quality Management Plan of the 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 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 to understand whether each policy was effective and should continue to be supported. The authority was also interested in the total emissions impact of both policies when implemented together to understand their combined effect. CAI used the standard to assess the policies both individually and as a package to understand the emissions implications of implementing them as a package versus implementing one or the other on its own. As part of the assessment, CAI estimated the interactions between the policies.

5.8 Monitor performance over time

Monitoring performance during the policy implementation period serves two related functions:

- Monitor trends in key performance indicators to understand whether the policy or action is on track and being implemented as planned
- Collect data needed to estimate the GHG effect of the policy or action ex-post

Key performance indicators should be used to track performance of the policy or action over time. Table 4 provides definitions and examples of various types of indicators. Inputs and activities are most relevant for monitoring policy or action implementation, while intermediate effects and non-GHG effects are most relevant for monitoring policy or action effects.

The types of data that need to be collected vary by type of policy or action and sector. For selected examples, see Table 5.

5.9 Verify results

After completing the assessment, users may choose to verify the results. While verification is not a requirement, it can help provide users and stakeholders with confidence in the assessment results.

5.10 Report results

Publicly reporting the results and the methodology used is the final step of the standard and is critical for ensuring transparency. The standard provides a list of information to include in the assessment report.

6. Additional guidance and tools to help implement the standard

To complement the general standard, the GHG Protocol website provides sector-specific guidance and examples for five sectors—agriculture, forestry, and other land use (AFOLU), energy supply, residential/commercial buildings, transportation, and waste.

Users may also apply a variety of models, calculation tools, spreadsheets, or other methods and tools to carry out calculations. To help users, the GHG Protocol website provides a list of available calculation tools and methods relevant to estimating the effects of policies and actions. The GHG Protocol website also provides several GHG calculation tools that allow users to calculate GHG emissions from specific sources.

To download sector guidance and the list of available tools and methods, visit: www.ghgprotocol.org/policy-and-action-standard.

Table 4 Types of indicators

Indicator types	Definitions	Examples for a home insulation subsidy program
Inputs	Resources that go into implementing a policy or action, such as financing	Money spent to implement the subsidy program
Activities	Administrative activities involved in implementing the policy or action (undertaken by the authority or entity that implements the policy or action), such as permitting, licensing, procurement, or compliance and enforcement	Number of energy audits carried out; total subsidies provided
Intermediate effects	Changes in behavior, technology, processes, or practices that result from the policy or action	Amount of insulation installed by consumers; fraction of homes that have insulation; amount of natural gas and electricity consumed
GHG effects	Changes in GHG emissions by sources or removals by sinks that result from the policy or action (Note: GHG effects are estimated, rather than monitored directly)	Reduced CO_2, CH_4, and N_2O emissions from reduced home natural gas use
Non-GHG effects	Changes in environmental, social, or economic conditions other than GHG emissions that result from the policy or action	Household disposable income from energy savings

Table 5 Examples of data to be monitored by policy/action type

Examples of policies/actions	Selected examples of data to be monitored
Energy efficiency program in the commercial buildings sector	• Electricity use (annual, direct metering) • Emission factor from grid electricity • Gross floor area of building units
Solar power incentives	• Solar panels produced each year • Capacity of solar power installed • Electricity generated from solar power
Electric vehicle subsidy	• Number of electric vehicles (quarterly) • Passenger figures (monthly) • Vehicle-kilometers traveled (monthly)
Emissions trading system	• Facility-level monitoring of emissions data from covered facilities
Information campaign to encourage energy savings in the residential sector	• Surveys of a representative sample of households to collect data such as awareness of the campaign, actions taken as a result of the campaign, household size, household income, and household energy use over time

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About the World Resources Institute

WRI is a global research organization that works closely with leaders to turn big ideas into action to sustain a healthy environment—the foundation of economic opportunity and human well-being.

Our Challenge

Natural resources are at the foundation of economic opportunity and human well-being. But today, we are depleting Earth's resources at rates that are not sustainable, endangering economies and people's lives. People depend on clean water, fertile land, healthy forests, and a stable climate. Livable cities and clean energy are essential for a sustainable planet. We must address these urgent, global challenges this decade.

Our Vision

We envision an equitable and prosperous planet driven by the wise management of natural resources. We aspire to create a world where the actions of government, business, and communities combine to eliminate poverty and sustain the natural environment for all people.

GREENHOUSE GAS PROTOCOL

The Greenhouse Gas Protocol provides the foundation for sustainable climate strategies. GHG Protocol standards are the most widely used accounting tools to measure, manage and report greenhouse gas emissions.