



WORLD  
RESOURCES  
INSTITUTE

# REPORTING RESULTS FOR SUCCESS

## Agenda

1. Background
2. Assessing Uncertainty
3. Verification
4. Reporting Principles and Requirements



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## Purpose of this webinar

- Series: Tools for Sustainability Webinar
- Objective: Learn process of conducting an impact analysis of BEA policies and projects
- Today's webinar: "Reporting Results for Success" is 4 of 4 in series
- Objective: Learn why and how to report assessment results

## Impact Estimation for BEA

- Impact estimation analyses for 7 cities
- Important to assess the potential effects of policies and projects in a relevant, consistent, and accurate way
- Process for cities:



- Potentially more guidance/resources for all cities with progress

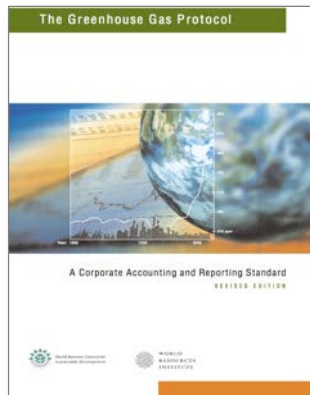
## The Greenhouse Gas Protocol

- The GHG Protocol sets the global standard for how to measure, manage, and report greenhouse gas emissions
- Convened in 1998 by WRI and WBCSD
- Provides:
  - Greenhouse gas accounting and reporting standards
  - Sector guidance
  - Calculation tools
  - Trainings (webinar, e-learning and in-person training)
- Standards and tools available free of charge at [www.ghgprotocol.org](http://www.ghgprotocol.org)



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# Greenhouse Gas Protocol standards



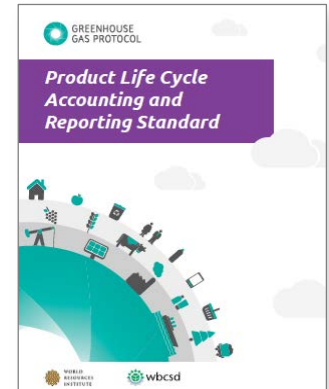
Corporate Standard



Project Protocol



Corporate Value Chain  
(Scope 3) Standard



Product Standard



Policy and Action  
Standard



Mitigation Goal  
Standard



Global Protocol for  
Cities (GPC)

# Policy and Action Standard



## *Policy and Action Standard*

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

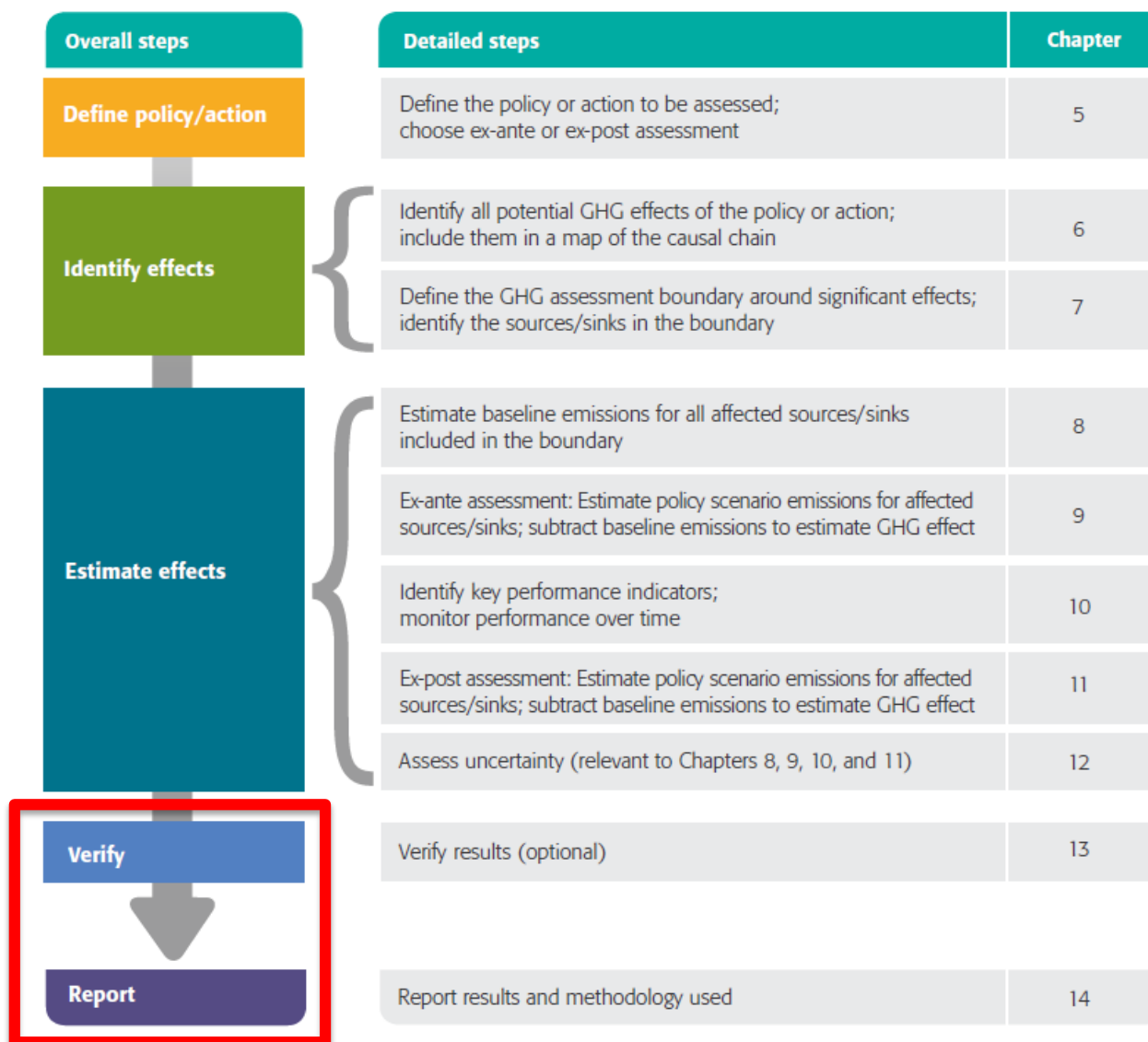


The standard helps to answer the following questions:

- ❖ What effect is a given policy or action likely to have on GHG emissions in the future?
- ❖ Is a given policy or action on track and delivering expected results?
- ❖ What effect has a given policy or action had on GHG emissions?



# Steps in policy/action assessment



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## Assessing Uncertainty

- Uncertainty assessment: a systematic procedure to quantify and/or qualify the sources of uncertainty in a GHG assessment
  - Improves assessment quality
  - Increases confidence in results
  - Crucial for properly interpreting GHG assessment results




## Uncertainty Assessment Process



## 2. Types of Uncertainty

Types of uncertainty	Description	Possible sources of uncertainty
<b>Parameter uncertainty</b>	Uncertainty regarding whether a parameter value used in the assessment accurately represents the true value of a parameter	<ul style="list-style-type: none"> <li>• Activity data</li> <li>• Emission factors</li> <li>• Global warming potential (GWP) values</li> </ul>
<b>Scenario uncertainty</b>	Variation in calculated emissions due to methodological choices	<ul style="list-style-type: none"> <li>• Methodological choices</li> <li>• Selection of baseline scenario and estimation of baseline emissions</li> <li>• Selection of policy scenario and estimation of policy scenario emission</li> </ul>
<b>Model uncertainty</b>	Limitations in the ability of modeling approaches, equations, or algorithms to reflect the real world	<ul style="list-style-type: none"> <li>• Model limitations</li> </ul>

### 3. Range of Approaches

Level of rigor	Extent of sensitivity analysis	Method of assessing uncertainty	Parameters and assumptions assessed for uncertainty
<b>Lower</b>    <b>Higher</b>	Few key parameters and assumptions analyzed	Qualitative	Few key parameters and assumptions assessed
	Many key parameters and assumptions analyzed	Quantitative: Single parameter uncertainty	Many key parameters and assumptions assessed
	All key parameters and assumptions analyzed	Quantitative: Propagated parameter uncertainty	All key parameters and assumptions assessed

## 4. Sensitivity Analysis

- Identify highly variable parameters or parameters expected to significantly impact the assessment results
- Adjust the value of parameters to determine the impact of variance on overall results

## Sensitivity Analysis example

**Table 12.3** Estimated values for replacement rate used for policy scenario estimation

2014	2015	2016	2017	2018	2019	2020
0%	37%	64%	74%	84%	94%	95%

-Key parameter identified for analysis



## Sensitivity Analysis example

**Table 12.4** Sensitivity analysis for ex ante results over GHG assessment period (2014–20):  
Activity data variation considered

Sensitivity scenarios	Activity data variation assessed			
	Replacement rate	Housing units	Hours of lamp use	Grid emission factor
Primary scenario	0%	0%	0%	0%
Alternative scenario 1	+50%	+20%	+50%	+15%
Alternative scenario 2	-50%	-20%	-50%	-15%

- Additional parameters identified
- Parameter values adjusted to create scenarios for comparison of variance

## Sensitivity Analysis example

**Table 12.5** Sensitivity analysis for ex ante results over the period of assessment (2014–20): Cumulative results for different scenarios

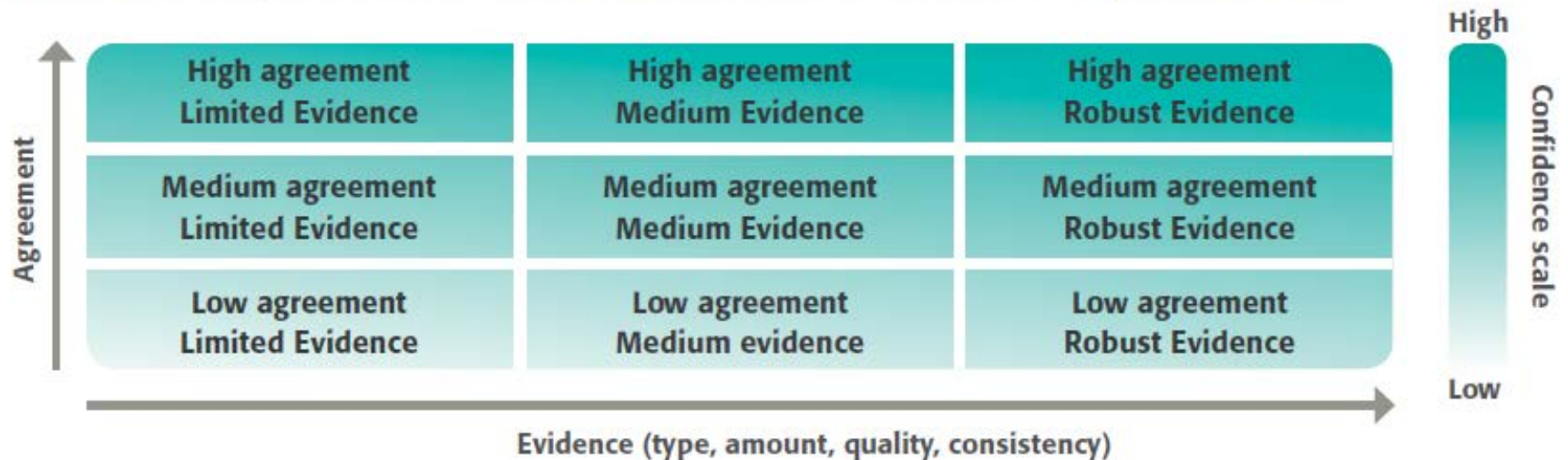
Sensitivity scenarios	GHG emission variation (t CO <sub>2</sub> e)			
	Replacement rate	Housing units	Hours of lamp use	Grid emission factor
Primary scenario	-1,730,000	-1,730,000	-1,730,000	-1,730,000
Alternative scenario 1	-2,037,000	-1,823,000	-2,595,000	-1,989,000
Alternative scenario 2	-1,080,000	-1,553,000	-865,000	-1,470,000

-Variance calculated in terms of GHG emissions

## 5. Qualitative Uncertainty Analysis

- Characterization of the level of confidence of the results based on:
  - The quantity and quality of evidence (robust, medium, or limited)
  - The degree of agreement of the evidence (high, medium, or low)

**Figure 12.2** Summary statements for evidence and agreement and their relationship with confidence



Source: Adapted from IPCC 2010.

## 6. Quantitative Uncertainty Analysis

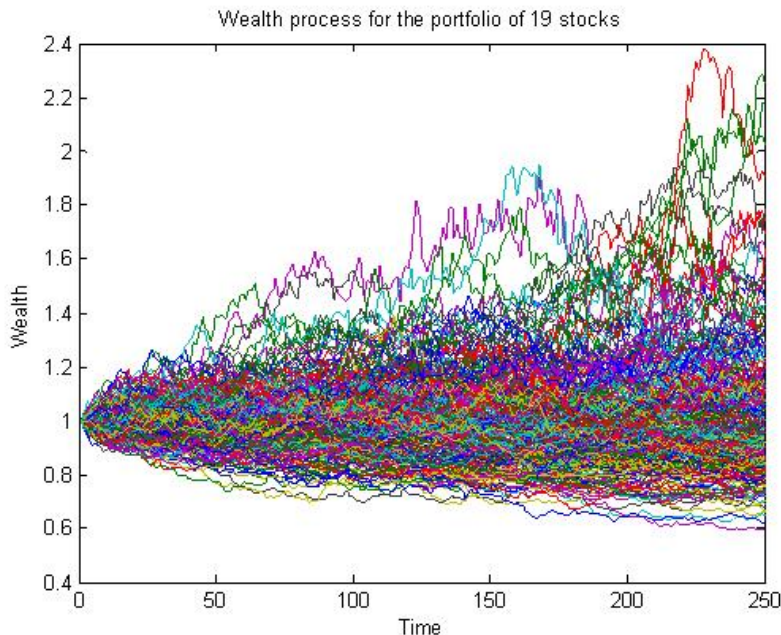
- Collect appropriate information to estimate overall uncertainty and source-/sink-specific estimates of uncertainty at a specified confidence level (preferably 95%)
- Estimates of uncertainty should be made for individual parameters and then aggregated to source and sink categories
- Quantitative uncertainty analysis should be undertaken where feasible

## Single Parameter Uncertainty Assessments

- Measured uncertainty approach (represented by standard deviations)
- Default uncertainty estimates for specific activities or parameters (from IPCC 2006 guidelines or other literature)
- Probability distributions from commercial databases
- Uncertainty factors for parameters reported in literature
- Pedigree matrix approach (based on qualitative data quality indicators)
- Survey of experts to generate upper- and lower- bound estimates
- Expert judgement (based on as much data as available)
- Other approaches

## Propagated Parameter Uncertainty Assessments

- **Error propagation equations:** combines uncertainty associated with individual parameters to form a single scenario involving estimates of the mean and standard deviation of each input



- **Monte Carlo simulation:** Random sampling technique that shows the range of likely results based on the range of values for each parameter and probabilities associated with each value  
(left example: Cornell Engineering, 2013)

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## Quality Assurance

- Assurance is the level of confidence that the information reported is:
  - Relevant
  - Complete
  - Accurate
  - Consistent
  - Transparent
  - without material misstatements





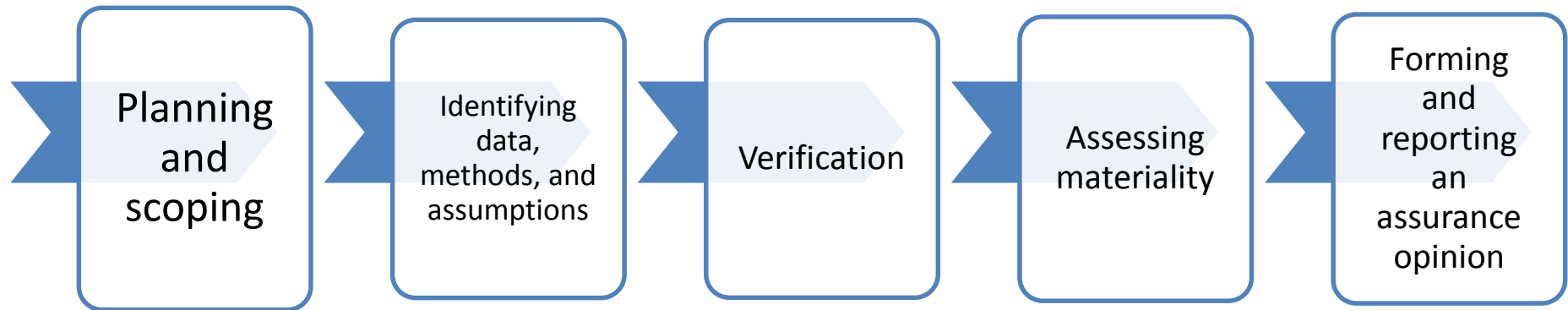
## Verification

- Validation: Provides assurance of ex-ante Estimates before or during the implementation of a policy or action
- Verification: Provides assurance of ex-post estimates during or after the implementation of a policy or action

## Why verify?

- Increased confidence in outcomes before implementing policy/project
- Increased confidence in reported progress of policy/project
- Enhanced facilitation of learning and knowledge transfer
- Improved efficiency in expanding implementation of efficiency projects/policies
- Greater stakeholder trust in reported results

## Verification process



## Types of Verification

Type of verification	Description
<b>First-party verification</b>	Internal verification performed by independent person(s) from within the reporting entity. <ul style="list-style-type: none"><li>• Example: person(s) from a different department in an organization not involved in the process of planning, implementing and reporting on a policy or action.</li></ul>
<b>Third-party verification</b>	Assurance performed by person(s) from an independent entity. <ul style="list-style-type: none"><li>• Examples: independent accounting, engineering or policy analysis organization; accredited third-party verification body</li></ul>

## Levels of Assurance

Assurance opinion	Nature of opinion
Limited assurance	<p><b>Negative opinion</b></p> <ul style="list-style-type: none"><li>Example: "Based on our verification, we are not aware of any material modifications that should be made to the entity's assertion that the policy's change in GHG emissions from the baseline scenario is a reduction of 2 million tonnes of CO<sub>2</sub>e and is in conformity with the <i>GHG Protocol Policy and Action Standard</i>."</li></ul>
Reasonable assurance	<p><b>Positive opinion</b></p> <ul style="list-style-type: none"><li>Example: "In our opinion the reporting entity's assertion that the policy's change in GHG emissions from the baseline scenario is a reduction of 2 million tonnes CO<sub>2</sub>e is fairly stated, in all material respects, and is in conformity with the <i>GHG Protocol Policy and Action Standard</i>."</li></ul>

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## Reporting

- Reporting Principles:

- Relevance
- Completeness
- Consistency
- Transparency
- Accuracy



## Reporting requirements

- Five parts to the reporting requirements and template:
  1. GHG assessment information
  2. Description of the policy or action
  3. Estimated change in GHG emissions and removals
  4. Methodology
  5. Optional reporting information



# Sample reporting template

## Part 1: GHG assessment information

Reporting requirement	Response
The title of the policy or action (or package of policies/actions) assessed (Reference: Section 5.2)	
The objective(s) and intended audience of the GHG assessment (Reference: Chapter 2)	
The year the assessment was developed	
Whether the reported assessment is an update of a previous assessment, and if so, links to any previous assessments	
The GHG assessment period (Reference: Section 7.3)	
Whether the GHG assessment is an ex-ante assessment, an ex-post assessment, or a combined ex-ante and ex-post assessment (Reference: Section 5.4)	
Whether the assessment applies to an individual policy/action or a package of policies/actions, and if a package, which individual policies and actions are included in the package (Reference: Section 5.3)	

# Sample reporting template

## Part 2: Description of the policy or action assessed

(Reference: Section 5.2)

Information	Response
The status of the policy or action (planned, adopted, or implemented)	
The date of implementation	
The date of completion (if applicable)	
The implementing entity or entities	
The objective(s) of the policy or action	
The type of policy or action	
A description of the specific interventions included in the policy or action	
The geographic coverage	
The primary sectors, sub-sectors, and emission source/sink categories targeted	
The greenhouse gases targeted (if applicable)	
Other related policies or actions	
Key performance indicators (if applicable)	
Intended level of mitigation to be achieved and/or target level of key indicators (if applicable)	
Title of establishing legislation, regulations, or other founding documents (if applicable)	
Monitoring, reporting, and verification procedures (if applicable)	
Enforcement mechanisms (if applicable)	
Reference to relevant guidance documents (if applicable)	
The broader context/significance of the policy/action (if applicable)	
Outline of non-GHG effects or co-benefits of the policy or action (if applicable)	
Other relevant information (if applicable)	



## Sample reporting template

### Part 3: Estimated change in GHG emissions and removals resulting from the policy or action (Reference: Chapters 8, 9, 11)

Estimated change in GHG emissions and removals over the GHG assessment period (in metric tons of carbon dioxide equivalent)

Year	Total net change in emissions and removals	Uncertainty range (quantitative estimate or qualitative description)
Year 1		
Year 2		
Year 3		
Year 4		
Year ...		
<b>Total cumulative emissions and removals</b>		

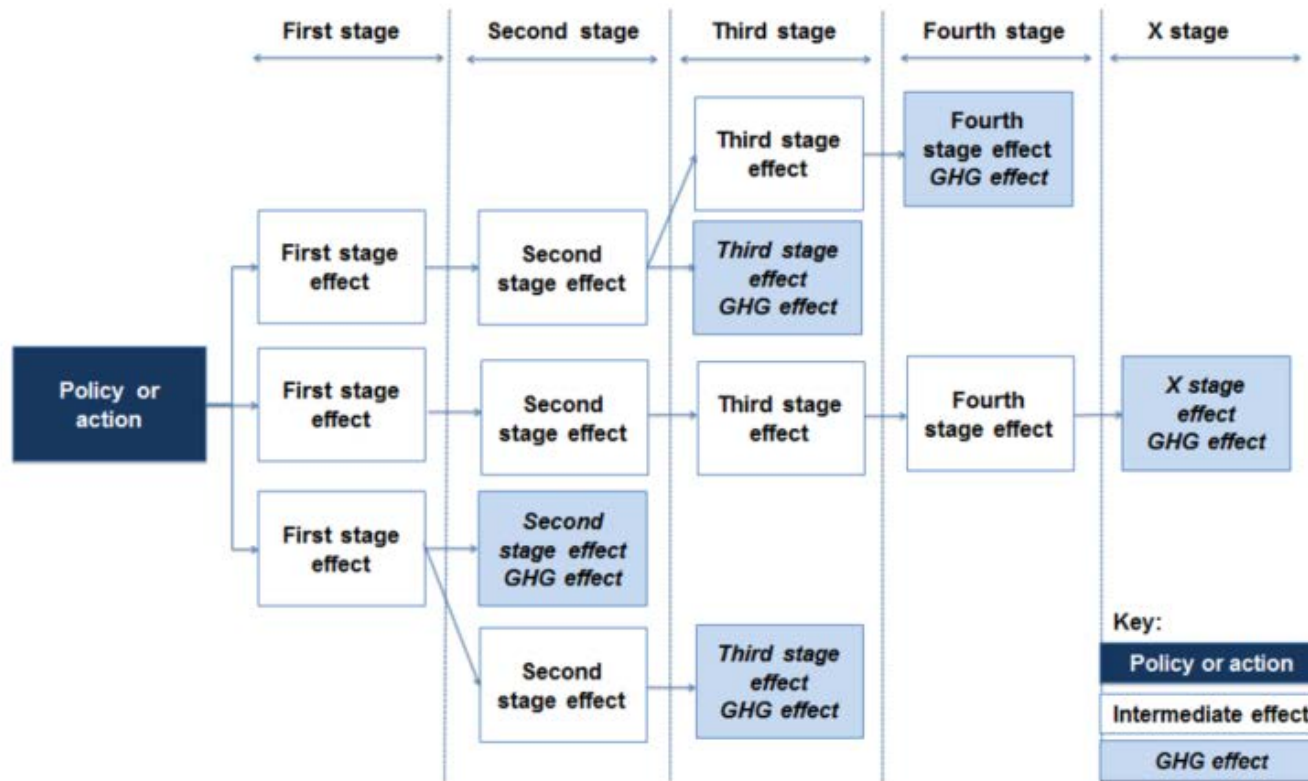
# Sample reporting template

## Part 4: Methodology

### Causal chain

(Reference: Chapter 6)

Example:



# Sample reporting template

## GHG assessment boundary

(Reference: Chapter 7)

Potential greenhouse gas effects of the policy or action	Source/sink categories affected	Greenhouse gases affected	Positive or negative emissions effect	Included or excluded in the assessment (effects, sources/sinks, and gases)	Justification for exclusions (if applicable)

Reporting requirement	Response
The approach used to determine the significance of GHG effects	

# Sample reporting template

## Baseline methodology

(Reference: Chapter 8)

Reporting requirement	Response
Description of the baseline scenario (i.e., a description of the events or conditions most likely to occur in the absence of the policy or action)	
Justification for why it is considered the most likely scenario	
The methodology and assumptions used to estimate baseline emissions, including the emissions estimation method(s) (including any models) used	
Justification for the choice of whether to develop new baseline assumptions and data or to use published baseline assumptions and data	
A list of policies, actions, and projects included in the baseline scenario	
Any implemented or adopted policies, actions, or projects with a potentially significant effect on GHG emissions excluded from the baseline scenario, with justification for their exclusion	
Whether the baseline scenario includes planned policies and if so, which planned policies are included	

## Sample reporting template

**Key parameters used to estimate baseline emissions (including activity data, emission factors, and GWP values)**

(Reference: Chapter 8)

Parameter	Baseline value(s) applied over the GHG assessment period	Methodology and assumptions to estimate value(s)	Data source(s)
<i>Parameter 1</i>			
<i>Parameter 2</i>			
<i>Parameter 3</i>			
<i>Parameter...</i>			

# Sample reporting template

## Ex-ante methodology (if applicable)

(Reference: Chapter 9)

Reporting requirement	Response
Description of the policy scenario (i.e., a description of the events or conditions most likely to occur in the presence of the policy or action)	
The methodology and assumptions used to estimate policy scenario emissions, including the emissions estimation method(s) (including any models) used	
Any potential interactions with other policies and actions, and whether and how policy interactions were estimated	
Any sources, sinks, greenhouse gases, or GHG effects in the GHG assessment boundary that have not been estimated in the policy scenario, with justification, and a qualitative description of the change to those sources, sinks, or gases	
Additional references or sources (if applicable)	



## Sample reporting template

**Key parameters used to estimate ex-ante policy scenario emissions (including activity data, emission factors, and GWP values) (if applicable)**

(Reference: Chapter 9)

Parameter	Policy scenario value(s) applied over the GHG assessment period	Methodology and assumptions to estimate value(s)	Data source(s)
<i>Parameter 1</i>			
<i>Parameter 2</i>			
<i>Parameter 3</i>			
<i>Parameter...</i>			

# Sample reporting template

## Monitoring performance over time (if applicable)

(Reference: Chapter 10)

Key performance indicators/parameters	Rationale for their selection	Data source(s)	Monitoring methods/frequency	The performance of the policy or action over time, as measured by key performance indicators
<i>Indicator/parameter 1</i>				
<i>Indicator/parameter 2</i>				
<i>Indicator/parameter...</i>				

Reporting requirement	Response
Whether the performance of the policy or action is on track relative to expectations	
Whether the assumptions on key parameters within the ex-ante assessment remain valid	

# Sample reporting template

## Uncertainty

(Reference: Chapter 12)

Reporting requirement	Response
The range of results from sensitivity analysis for key parameters and assumptions	
The method or approach used to assess uncertainty	
Additional references or sources (if applicable)	

## Verification

(Reference: Chapter 13)

Reporting requirement	Response
Whether the GHG assessment results were verified	
Type of verification (first party or third party), if applicable	
Relevant competencies of the verifier(s), if applicable	
The opinion issued by the verifier, if applicable	



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**Thank You**

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