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# 1 Introduction

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*Energy use is responsible for almost 75% of global greenhouse gas (GHG) emissions. More than 40% of these emissions come from electricity and heat production.<sup>1</sup> A fundamental transformation of the energy system is required to achieve net zero global emissions in the second half of the 21st century.*

*Renewable energy (RE) policies will play a significant role in this transition. Governments around the world are implementing increasingly ambitious policies to accelerate the move away from fossil fuel sources of energy to renewable sources. The declining cost of RE technologies and their potential to support sustainable development objectives are helping to accelerate the change.*

*In this context, there is an increasing need to assess and communicate the impacts of RE policies to ensure that they are effective in mitigating GHG emissions, advancing development objectives, and helping countries meet their sectoral targets and national commitments. The Initiative for Climate Action Transparency (ICAT) Renewable Energy Methodology helps policymakers assess the impacts of RE policies and improve the effectiveness of policies. It can play a critical role in providing the information needed for preparing reports under the Paris Agreement's enhanced transparency framework and for the United Nations Sustainable Development Goals (SDGs).*

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## 1.1 Purpose of the methodology

This document provides methodological guidance for assessing the GHG impacts of RE policies. The methodology provides a stepwise approach for estimating the effects of policy design characteristics, economic and financial factors, and other barriers on the potential for RE policies to achieve their technical potential for the assessment period. Methods are provided to convert this impact (expressed in terms of newly installed RE capacity or generated electricity) into GHG emissions reductions.

This methodology is part of the series of ICAT guides for assessing the impacts of policies and actions. It is intended to be used in combination with any other ICAT documents that users choose to apply. The series of assessment guides is intended to enable users who choose to assess GHG, sustainable development and transformational impacts of a policy to do so in an integrated and consistent way within a single impact assessment process. Refer to the *Introduction to the ICAT Assessment Guides*<sup>2</sup> for more information about the ICAT assessment guides and how to apply them in combination.<sup>3</sup>

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## 1.2 Relationship to other guidance and resources

This methodology uses and builds on existing resources mentioned throughout the document. These include the Clean Development Mechanism (CDM) large-scale consolidated methodology *ACM0002: Grid-Connected Electricity Generation from Renewable Sources*,<sup>4</sup> and the CDM Tool to Calculate the Emission Factor for an Electricity System.<sup>5</sup>

The methodology builds on the Greenhouse Gas Protocol *Policy and Action Standard* (© WRI 2014; all rights reserved)<sup>6</sup> and the draft *Policy and Action Standard – Energy Supply Sector Guidance*<sup>7</sup> (both of which provide guidance on estimating the GHG impacts of policies and actions, and discussion on many of the accounting concepts in this document, such as baseline and policy scenarios), to provide a detailed method for specific RE policies. The

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<sup>2</sup> <https://climateactiontransparency.org/wp-content/uploads/2020/01/Introduction-to-the-ICAT-Assessment-Guides.pdf>

<sup>3</sup> <https://climateactiontransparency.org/wp-content/uploads/2020/01/Renewable-Energy-Methodology-Executive-summary.pdf>

<sup>4</sup> Available at: <https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJJWWO4PVN>.

<sup>5</sup> Available at: [https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v2.pdf/history\\_view](https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v2.pdf/history_view).

<sup>6</sup> Available at: [www.ghgprotocol.org/policy-and-action-standard](http://www.ghgprotocol.org/policy-and-action-standard).

<sup>7</sup> Available at: [www.ghgprotocol.org/sites/default/files/ghgp/standards\\_supporting/Energy%20Supply%20-%20Additional%20Guidance.pdf](http://www.ghgprotocol.org/sites/default/files/ghgp/standards_supporting/Energy%20Supply%20-%20Additional%20Guidance.pdf).

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<sup>1</sup> WRI (2017).

methodology adapts the structure, and some of the tables, figures and text from the *Policy and Action Standard*, where relevant. Chapters 1, 2, 4, 5, 6, 10 and 11, and the glossary include elements drawn from the *Policy and Action Standard*. Figures and tables adapted from the *Policy and Action Standard* are cited, but for readability not all text taken directly or adapted from the standard is cited.

A full list of references is provided at the end of this document.

### 1.3 Intended users

This methodology is intended for use by policymakers and practitioners seeking to estimate GHG mitigation impacts of domestic policies and actions in the context of development and implementation of nationally determined contributions (NDCs), national low emission development strategies, nationally appropriate mitigation actions (NAMAs) and other mechanisms. The primary intended users are developing country governments at any level (national, subnational or municipal), and relevant stakeholders who are implementing and assessing RE policies. Throughout the document, the term “user” refers to the entity implementing the methodology.

The main emphasis of the methodology is the assessment of GHG impacts. Impact assessment can also inform and improve the design and implementation of policies. Thus, intended users also include any stakeholders involved in the design and implementation of national RE policies, RE targets, NDCs, low emission development strategies and NAMAs, including research institutions, businesses and non-governmental organizations.

### 1.4 Scope and applicability of the methodology

This document provides general principles and concepts, and a stepwise method for estimating the GHG impacts of three types of RE policies:<sup>8</sup>

- **feed-in tariff policies (including feed-in premiums)** – policies that aim to promote RE deployment by offering long-term purchase

<sup>8</sup> Throughout this document, where the word “policy” is used without “action”, it is used as shorthand to refer to both policies and actions. See [Glossary](#) for definition of “policy or action”.

agreements with power producers at a specified price per kilowatt-hour (kWh)

- **auction policies (including tender policies)** – competitive bidding procurement processes for renewable electricity in the form of either capacity (megawatt – MW) or electricity generated (megawatt-hour – MWh)
- **tax incentive policies** – policies under which authorities at the national, subnational or municipal level offer tax incentives for the installation and operation of RE installations.

These types of RE policies form the core of many policy packages that countries are using to promote RE and are further discussed in [Chapter 3](#). RE can also be promoted via economic instruments (such as emissions trading programmes or carbon taxes), actions to change the regulatory environment (such as grid access), priority dispatch and wheeling, and capacity-building programmes (such as development initiatives by energy service companies). However, the focus of this methodology is on policies that specifically target RE deployment for grid-connected electricity generation, and these other types of instruments and actions are only discussed peripherally in this methodology. There is also scope for important RE policies to incentivize off-grid RE, and renewables-based heating and cooling (in particular, solar water heaters and geothermal technologies). [Appendix F](#) lists the full criteria used to choose the scope of the methodology.

This document is organized into four parts (see [Figure 1.1](#)). It details a process for users to follow when conducting a GHG assessment of RE policies. It provides guidance on defining the assessment, an approach to GHG assessment that includes ex-ante (forward-looking) assessments and ex-post (backward-looking) assessments, and monitoring and reporting. Throughout the document, examples are provided to illustrate how to apply the methodology.

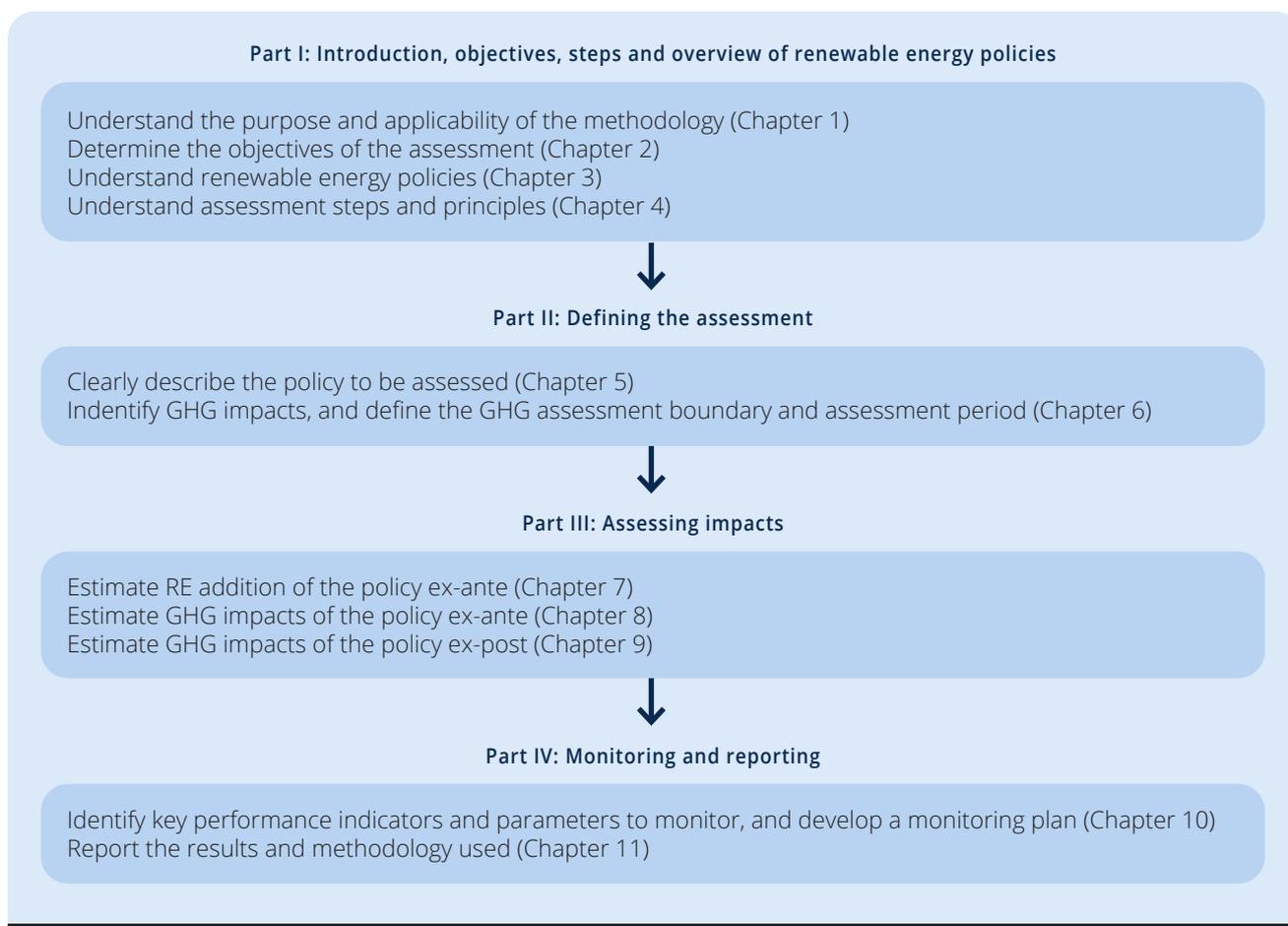
The methodology is applicable to policies:

- at any level of government (national, subnational, municipal) in all countries and regions
- that are planned, adopted or implemented
- that are new policies or actions; or extensions, modifications or eliminations of existing policies or actions.

The methodology does not provide exhaustive accounting methods for all RE technologies. For

FIGURE 1.1

## Overview of the methodology



example, the GHG impact of electricity generation from biomass depends on the emissions associated with growing the biomass and any land-use change. In such cases, the methodology highlights technology-specific considerations and provides references to other resources, where possible, but does not provide detailed accounting methods.

### 1.5 When to use the methodology

The methodology can be used at multiple points throughout the policy design and implementation process, including:

- **before policy implementation** – to assess the expected future impacts of a policy (through ex-ante assessment)

- **during policy implementation** – to assess the impacts achieved to date, ongoing performance of key performance indicators, and expected future impacts of a policy
- **after policy implementation** – to assess what impacts have occurred as a result of a policy (through ex-post assessment).

Depending on individual objectives and when the methodology is applied, users can implement the steps for ex-ante assessment, ex-post assessment or both. The most comprehensive approach is to apply the methodology before implementation, regularly during policy implementation and again after implementation. Users carrying out an ex-post assessment only can skip [Chapters 7](#) and [8](#). Users carrying out an ex-ante assessment only can skip [Chapter 9](#).

## 1.6 Key recommendations

The methodology includes key recommendations that are recommended steps to follow when assessing and reporting impacts. These recommendations are intended to help users to produce credible and high-quality impact assessments that are based on the principles of relevance, completeness, consistency, transparency and accuracy.

Key recommendations are indicated in subsequent chapters by the phrase “It is a *key recommendation* to ...”. All key recommendations are also compiled in a check list at the beginning of each chapter.

Users who want to follow a more flexible approach can use the methodology without adhering to the key recommendations. The *Introduction to the ICAT Assessment Guides* provides more information on how and why key recommendations are used within the ICAT assessment guides, and on following either the “flexible approach” or the “key recommendations approach” when using the documents. Refer to the *Introduction to the ICAT Assessment Guides* before deciding which approach to follow.

## 1.7 Alignment with the enhanced transparency framework of the Paris Agreement

This methodology can help countries to fulfil their accounting and reporting requirements under the enhanced transparency framework of the Paris Agreement. Specifically, the methodology can help countries understand the impacts of RE policies, estimate baseline emissions and GHG impacts, conduct projections, and monitor progress over time using indicators and parameters. This enables countries to account for their contributions and track progress towards implementation and achievement of their NDCs. Alignment of indicators and parameters (i.e. using the same indicators and parameters to assess the impacts of an RE policy and to meet reporting requirements of the transparency framework) is recommended for the following:

- Estimating baseline emissions and GHG impacts. Align input parameters used to estimate baseline emissions and GHG impacts of RE policies with the input parameters used for GHG accounting of NDCs ([Chapter 8](#)).
- Projections and assessment period. Align the parameters and assessment period used to develop projections for RE policies with the

parameters and time frame used to meet reporting requirements of the transparency framework ([Chapters 6](#) and [8](#)).

- Monitoring and tracking progress towards NDCs. Indicators and parameters used in this methodology to monitor RE policy implementation can also be used to track progress towards implementation and achievement of an NDC ([Chapter 10](#)). Some indicators suggested in this methodology can be used to track sustainable development and transformational impacts ([Chapter 6](#)).

## 1.8 Process for developing the methodology

This methodology has been developed through an inclusive, multi-stakeholder process convened by ICAT. The development is led by the NewClimate Institute (technical lead) and Verra (co-lead), who serve as the secretariat and guide the development process. The first draft was developed by drafting teams, consisting of a subset of a broader Technical Working Group (TWG) and the secretariat. The TWG consists of experts and stakeholders from a range of countries identified through a public call for expressions of interest. The TWG contributed to the development of the technical content of the methodology through participation in regular meetings and written comments. The energy sector TWG contributed to both the *ICAT Renewable Energy Methodology* and the *Buildings Efficiency Methodology*. A Review Group provided written feedback on the first draft of the methodology. ICAT’s Advisory Committee, which provides strategic advice to ICAT, reviewed the second draft.

The second draft was applied by ICAT participating countries and other non-state actors to ensure that it can be practically implemented. The current version of the methodology was informed by the feedback gathered from that experience.

More information about the methodology development process, including governance of the initiative and the participating countries, is available on the ICAT website.<sup>9</sup>

All contributors are listed in the [Contributors section](#).

<sup>9</sup> <https://climateactiontransparency.org>

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## 2 Objectives of assessing the GHG impacts of renewable energy policies

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*This chapter provides an overview of objectives users may have in assessing the GHG impacts of RE policies. Determining the assessment objectives is an important first step, since decisions made in later chapters are often guided by the stated objectives.*

### Checklist of key recommendations

- Determine the objectives of the assessment at the beginning of the impact assessment process

Assessing the GHG impacts of RE policies is a key step towards identifying opportunities and gaps in effective GHG mitigation strategies. Impact assessment supports evidence-based decision-making by enabling policymakers and stakeholders to understand the relationship between policies and expected GHG impacts. It is a *key recommendation* to determine the objectives of the assessment at the beginning of the impact assessment process.

Examples of objectives for assessing the GHG impacts of a policy are listed below. The ICAT *Sustainable Development Methodology* and *Transformational Change Methodology* can be used to assess the broader sustainable development and transformational impacts of RE policies, and users should refer to that methodology for objectives for assessing such impacts.

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### 2.1 General objectives

- **Estimate the GHG impacts of policies to determine whether they are on track to help meet goals** such as NDCs or other emissions targets.
- **Maximize positive impacts** of policies, such as increased GHG emissions reductions, RE capacity addition and RE electricity generation.
- **Ensure that policies are cost-effective** and that limited resources are invested efficiently.

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### 2.2 Objectives of assessing impacts before policy implementation

- **Improve policy design and implementation** by understanding the impacts of different design and implementation choices.
- **Inform goal setting** by assessing the potential contribution of policies to national goals and targets, such as NDCs.
- **Access financing** for policies by estimating potential GHG emissions reductions, or by estimating the RE capacity addition and RE electricity generation, together with a well-designed policy framework that fosters the development of bankable projects and businesses.

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### 2.3 Objectives of assessing impacts during or after policy implementation

- **Assess policy effectiveness** by determining whether RE policies are delivering the intended results.
- **Improve policy implementation** by determining whether RE policies are being implemented as planned.
- **Learn from experience and share best practices** about policy impacts.
- **Track progress toward national goals and targets** such as NDCs, the SDGs of the 2030 Agenda for Sustainable Development and national RE targets/action plans, and understand the contribution of RE policies towards achieving them.
- **Inform future policy design**, including reformulation of NDCs towards enhanced ambition, and decide whether to continue current actions, enhance current actions or implement additional actions.

- **Report**, domestically or internationally, including under the Paris Agreement's enhanced transparency framework, on the impacts of policies achieved to date.
- **Meet funder requirements** to report on GHG emissions reductions, RE capacity addition or RE electricity generation.

Users should identify the intended audience(s) of the assessment report. Possible audiences include policymakers, the general public, non-governmental organizations, companies, funders, financial institutions, analysts, research institutions, or other stakeholders affected by (or who can influence) the policy or action. For more information on identifying stakeholders, refer to the ICAT *Stakeholder Participation Guide* (Chapter 5).

Subsequent chapters provide flexibility to enable users to choose how best to assess the impacts of policies and actions in the context of their objectives, including which impacts to include in the GHG assessment boundary, and which methods and data sources to use. The appropriate level of accuracy and completeness is likely to vary by objective. Users should assess the impacts of their policies with a sufficient level of accuracy and completeness to meet the stated objectives of the assessment.