

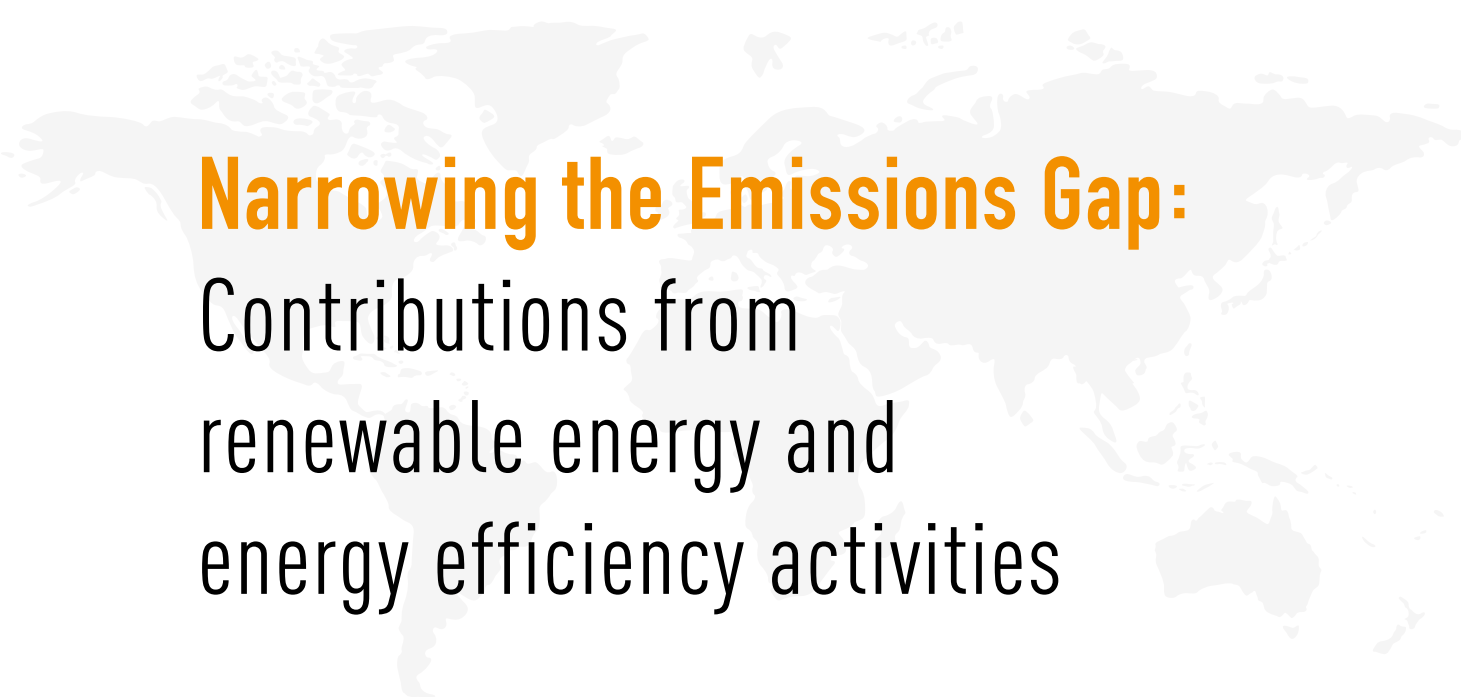


Narrowing the Emissions Gap:

Contributions from renewable energy and energy efficiency activities

First Report | 2015





Narrowing the Emissions Gap: Contributions from renewable energy and energy efficiency activities

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FOREWORD

Many countries have put in place renewable energy and energy efficiency initiatives, but most of them do not measure, report or receive acknowledgement for the resulting reductions in greenhouse gas emissions. Yet these reductions could add up to 1 gigaton per year by 2020, which would help close the emissions gap of 8 – 10 gigatons of carbon dioxide equivalents that must be filled if we are to stay below the politically agreed target of 2°C.

Initiated by the Government of Norway and coordinated by the United Nations Environment Programme, the 1 Gigaton Coalition aims to make these savings visible by measuring emissions reductions, reporting successes and strengthening the case for a global scaling up of energy efficiency policies and renewable energy technologies.

This first report comes in the critical window between the agreement of the 2030 Agenda for Sustainable Development and final negotiations on climate change at COP21. As well as examining the challenges of attributing reductions to individual actions, it provides an overview of energy efficiency and renewable energy activities in developing countries and uses case studies to illustrate their impact on current emission levels.

While this report clearly demonstrates significant benefits of renewable energy and energy efficiency in developing countries, it also highlights untapped potential gains, which the Coalition aims to describe more fully in future reports. For example, REN21's Global Status Report 2015 states that 164 countries have defined renewable energy targets in 2015, including 131 developing and emerging economies, meaning developing countries have a great capacity to contribute to emissions reductions. The extent to which this is being realized is of more than academic interest. Good examples and positive stories about renewable energy and energy efficiency are motivating more and more countries to take action.

Bilateral and multilateral initiatives are making a big impact on narrowing the emissions gap, so the 1 Gigaton Coalition will continue to work with its partners to improve data collection and develop a unified measurement and reporting methodology that is aligned with IPCC and UNFCCC requirements. It will also continue to publish annual reports for use within the UNFCCC and the SE4ALL frameworks, and to provide a respected platform for countries to promote their emission reduction efforts and achievements in the energy sector.

We are pleased at how fast the 1 Gigaton Coalition is growing. Since the official launch at COP20 in Lima, about 100 partners have joined or expressed their interest in joining. The success of the Coalition will clearly depend on the active involvement of its partners and the effective coordination with other initiatives and programmes. Our shared objective

is clear: to become a driving force in promoting enhanced action for a sustainable low-carbon and climate resilient future.

We would like to thank all those who have contributed to this first report. It is our hope that through such credible reporting, the Coalition will continue to motivate donors, initiatives and countries to scale up their efforts and help narrow the emissions gap.



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UN Under-Secretary-General
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KEY FINDINGS

ENERGY EFFICIENCY AND RENEWABLE ENERGY ACTIVITIES IN DEVELOPING COUNTRIES IN THE LAST 10 YEARS WILL SIGNIFICANTLY REDUCE CO₂ EMISSIONS FROM ENERGY USE BY 2020. This inaugural report of the 1 Gigaton Coalition is a first effort to assess how various renewable energy and energy efficiency initiatives contribute to narrowing the 2020 emissions gap. This report surveys a sample of these activities to establish a foundation of available information to measure and report greenhouse gas emission savings. It estimates, based on a sample of projects analyzed, that CO₂ emissions could be reduced by 1.7GtCO₂ a year by 2020.

ATTRIBUTING EMISSION REDUCTIONS TO SPECIFIC ACTORS IS CHALLENGING, AS MANY ACTORS OFTEN CONTRIBUTE TO THE SAME PROJECTS. Overlaps between national activities, and bilateral, multilateral and partner initiatives that collaborate to support renewable energy and energy efficiency projects in developing countries make it very difficult to disentangle which emissions reductions should be attributed to individual actors.

THERE IS INSUFFICIENT DATA AND NO COMMON METHODOLOGY TO QUANTIFY THE REDUCTIONS. This gap makes it challenging to aggregate or compare GHG mitigation contributions between different actors. This report outlines some suggestions on how to improve the reporting practices of renewable energy and energy efficiency projects to better quantify their emissions' savings.

THE 1.7 GIGATON IS AN INITIAL ESTIMATE OF WHAT COULD BE ACHIEVED. Emissions savings to be achieved in 2020 could be higher than this initial estimate if challenges related to data collection and methodology are addressed. These improvements would enable countries to quantify their achievements, motivating them to increase their ambitions to support further renewable energy and energy efficiency activities.

THE 1 GIGATON COALITION IS WORKING TO ADDRESS THESE CHALLENGES TO QUANTIFY THE FULL REDUCTIONS GENERATED BY ENERGY PROJECTS. The 1 Gigaton Coalition will collaborate with stakeholders to develop solutions for quantifying emission reductions from renewable energy and energy efficiency initiatives through the Coalition's work plan for 2016 and beyond.

EXECUTIVE SUMMARY

The 1 Gigaton Coalition supports efforts to measure and report reductions of greenhouse gas (GHG) emissions resulting from renewable energy (RE) and energy efficiency (EE) initiatives. Emissions from energy use comprise two-thirds of global GHG emissions,¹ and this sector is crucial for determining the future global climate trajectory. The 1 Gigaton Coalition's objective is to quantify RE and EE contributions to narrowing the emissions gap – the difference between 2020 emission levels consistent with staying within the 2°C climate limit, and the emissions levels expected in that year if country pledges and commitments are met.

This inaugural report of the 1 Gigaton Coalition is a first step to measuring and reporting how RE and EE programs contribute to narrowing the 2020 emissions gap. Decision 1 of COP19 (Decision 1/CP.19) called for all countries to enhance mitigation efforts to 2020, which is a central motivation for this report's focus on RE and EE efforts in developing countries, many of which have been conducted in collaboration with bilateral and multilateral partners. These efforts have not previously been quantified or assessed for their contribution to global climate mitigation. This report reveals data gaps, overlaps and challenges stemming from a lack of unified methodologies, all of which make it difficult to accurately estimate emissions reductions from a range of programs and initiatives.

Mitigation from RE and EE programs in developing countries is substantial. Developing countries are investing in RE generation, particularly solar, wind, and hydropower, and improving EE in many sectors, from lighting to industry. These investments have allowed developing countries to achieve substantial RE and EE expansion, as their economies grow and their energy demand increases.

This inaugural report provides an analysis of developing countries' overall RE and EE initiatives, as well as specific projects and case studies that detail their countries' implementation of EE and RE programs. The report is a first endeavor to understand: 1) how developing countries are undertaking RE and EE programs; 2) the targets and policies used to implement RE and EE projects; 3) the range of partner institutions supporting these efforts; 4) how different actors are measuring the GHG emissions mitigation resulting from these RE and EE initiatives; and 5) the contribution of countries' emissions reductions to global climate mitigation. RE and EE activities in developing countries are conducted in partnership with a range of bilateral, multilateral, and cooperative groups. This report surveys a sample of these activities to establish a foundation of available information to measure and report the individual and total contributions of these efforts to global climate mitigation.

ENERGY EFFICIENCY AND RENEWABLE ENERGY PROJECTS IN DEVELOPING COUNTRIES SUBSTANTIALLY REDUCE GREENHOUSE GAS EMISSIONS.

Reductions are significant. A rough scenario comparison reveals that the current level of EE and RE in developing countries im-

plemented by national governments and the business sector with international assistance lower CO₂ emissions from energy use on the order of 4 Gt CO₂ by 2020 compared to baseline scenarios. This presents the upper limit of the possible impact of implemented activities to reduce the emissions gap.

Various activities contribute to overall reductions – attribution to individual actors is complex and challenging. Several activities that sometimes overlap contribute to the overall reductions. Programs were analyzed in this report to provide an overview of the relative impact of different developing country RE and EE activities. Due to data and methodology challenges, this analysis is indicative rather than comprehensive.

Forty-two bilaterally-supported RE and EE projects, which received US \$2.6 billion in financial assistance between 2005 and 2012, will save 6 MtCO₂e in 2020. This modest estimate represents a fraction of the total number of RE and EE efforts that developing countries are undertaking. Accounting for all bilaterally supported projects, which received a total of US \$24 billion in financial support between 2005 and 2012, could potentially increase the estimated impact to 58 MtCO₂e in 2020. Given that US \$730 billion was invested in renewable power and fuels in developing countries from 2004 – 2014,² the 42 projects represent less than one percent of global financial investment, and the total impact could be as great as 1.7 GtCO₂/year.

In addition to assessing the emissions reductions achieved through bilaterally supported RE and EE activities, the report surveys other emissions impacts reported by other implementing actors. Four multilateral development banks report that their RE and EE activities could result in reductions of 1 Gt of CO₂ per year, but a comprehensive aggregation of their efforts is not possible at this time. National governments in developing countries implementing EE and RE policies and programs have not consistently quantified emission reduction impacts. A comprehensive analysis of all national efforts has not been performed – the total would make a substantial contribution to global emission mitigation figures. This report is a first endeavor to quantify the level of EE and RE projects in developing countries.

The aggregate emissions reductions resulting from EE and RE activities in developing countries make a substantial reduction in the 2020 greenhouse gas emissions gap. The gap between the "no new policy" baseline (i.e., assuming no additional efforts) in developing countries and what is compatible with a 2°C trajectory is significant (Figure 1)³. Note that this figure relates only to emissions from energy use in developing countries, not all sectors and gases. The 2°C trajectory is indicative as it depends on how reduction efforts are shared between sectors and countries. The 2°C range is an estimate based on scenarios that start emission reductions as of 2010, which were used to originally define the 2020 emissions gap.

EE and RE activities which developing countries have committed to implement by 2020, and which constitute current policy trajectory, could result in emission reductions in the order of 4GtCO₂ compared to the baseline scenario. However, there remains a significant gap between the current policy trajectory and what is needed to limit global temperature rise to 2°C (Figure 1). In addition, full implementation of developing countries' 2020 pledges going beyond the current policy trajectory would lower projected emissions by roughly another 1 GtCO₂ by 2020.

MITIGATION ACHIEVEMENTS REMAIN UNMEASURED AND UNREPORTED

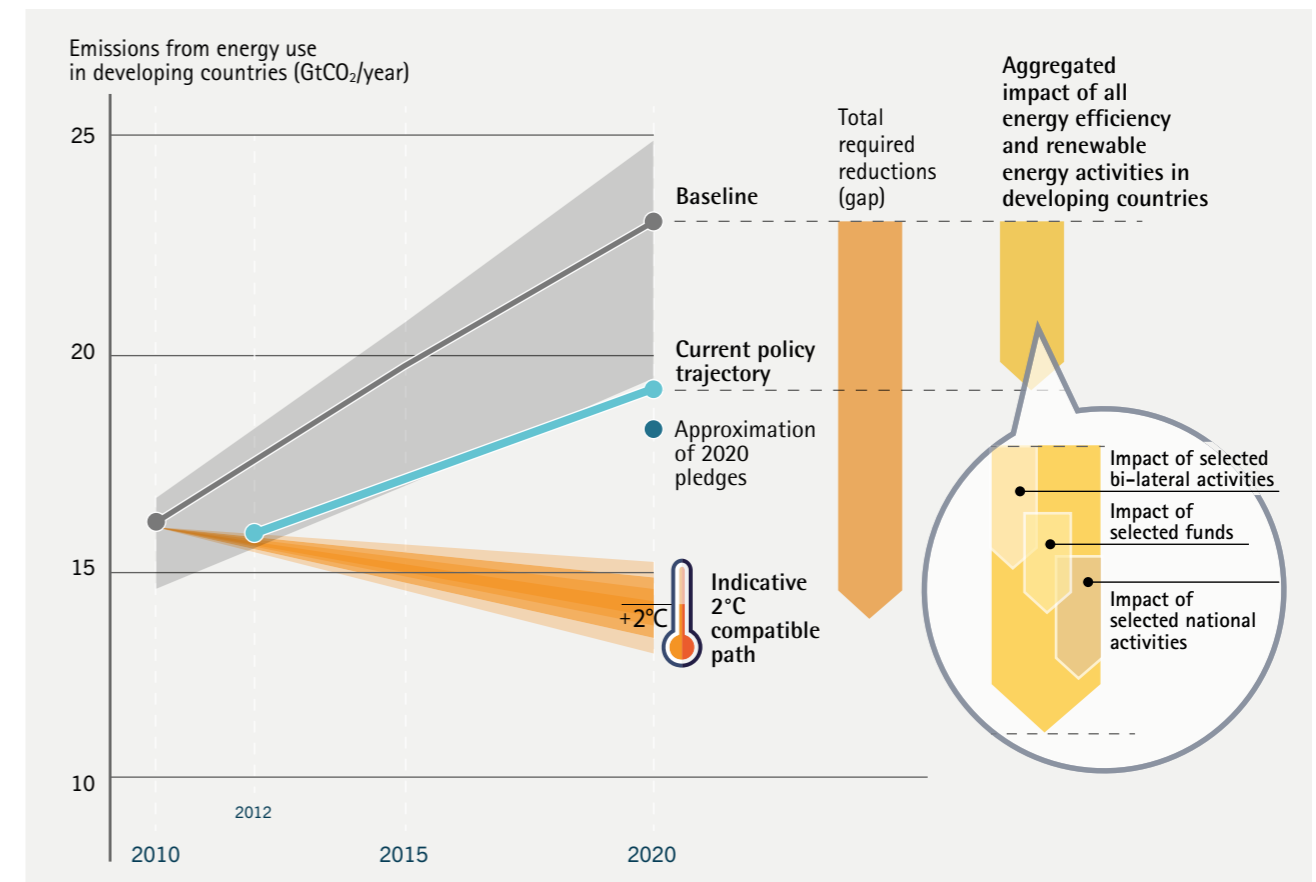
Collecting data on greenhouse gas mitigation in developing countries resulting from RE and EE projects is challenging. There are significant gaps in data on reduced GHG emissions from RE and EE initiatives. In many instances, impact estimates are not matched with details on project methodologies and assumptions used to make these estimates. Overlaps in data among bilateral, multilateral and partner initiatives that collaborate to support RE and EE projects in developing countries further complicate the picture. Bilateral aid agencies frequently contribute towards multilateral development banks, and partner initiatives are often collaborations between governments, private sector organizations, and civil society. Disentangling how emissions reductions should be attributed to specific actors is complex and problematic.

Where data is available, attributing mitigation contributions to individual actors is difficult. Many factors contribute to measurable GHG emission reductions, but these are not readily distilled in a single number that quantifies abatement in tons of carbon. An EE or RE program's successful implementation often depends on capacity-building efforts and on institutional, financing, and technological support. These efforts can all contribute to mitigation, but are often financed by separate partners. It is therefore difficult to attribute emission reductions to specific actors in a particular project, as many projects contribute to the same action.

WORK TO IMPROVE THE REPORTING PRACTICES OF RENEWABLE ENERGY AND ENERGY EFFICIENCY PROJECTS IS NEEDED.

The 1 Gigaton Coalition could be instrumental in addressing these reporting challenges. The findings in this report reveal common challenges in measuring and reporting emissions reductions, including insufficient data and lack of a unified methodology. The 1 Gigaton Coalition works to solve these problems, through its planned activities for 2016 and beyond (including reports, workshops, and meetings), and by assisting developing countries working to better quantify emissions reductions resulting from RE and EE programs.

Figure 1: CO₂ emissions from energy use in developing countries, under different scenarios.



Source: 1 Gigaton Coalition

INTRODUCTION

In the context of the COP21 in Paris, and the recently-approved Sustainable Development Goals, countries are in a unique position in history to combat climate mitigation. Current 2020 climate pledges made through the Cancun Agreement fall 8 – 10 gigatons short of the emission reductions needed to keep global temperature rise below 2°C. The United Nations Environment Programme's (UNEP) annual Emissions Gap assessments have emphasized the urgency needed to close the emissions gap⁴. The most recent Intergovernmental Panel on Climate Change (IPCC) report⁵ points to low-carbon energy sources, especially renewable energy generation and increased energy efficiency, as essential solutions for achieving emissions pathways that will keep global warming below the 2°C threshold. It is difficult to overstate the importance of renewable energy development and energy efficiency measures.

Renewable energy (RE) and energy efficiency (EE) programs in developing countries make significant contributions towards closing the GHG emissions gap. Many of these efforts occur in the energy sector, which accounts for roughly two-thirds of global GHG emissions.⁶ Developing countries are investing in renewable electricity generation, particularly through solar, wind, and hydropower, and tackling energy efficiency in a range of sectors, from lighting to industry. Insufficient data, however, has thwarted previous attempts to quantify these initiatives' contribution toward meeting global mitigation goals.

The 1 Gigaton Coalition supports platforms to measure and report GHG emission reductions resulting from renewable energy and energy efficiency programs so that these contributions are recognized and counted. The Coalition focuses on cooperation between countries and on bringing developing countries' impacts to light. This voluntary international framework focuses on programs that are not fully understood due to a lack of quantifiable information to assess their impact – these often overlooked activities will save an estimated 1 GtCO₂e by 2020.

This report strives to document: 1) how developing countries are undertaking RE and EE efforts; 2) the range of targets and policies used to implement RE and EE projects; 3) the range of partner institutions that support RE and EE efforts in developing countries; 4) how different actors are measuring GHG emissions mitigation impact resulting from these RE and EE initiatives; and 5) how these emissions reductions in developing countries contribute to global climate mitigation. This inaugural report answers these questions through a high-level analysis of developing countries' overall RE and EE efforts, as well as an analysis of specific projects and case studies that explore developing countries' implementation of EE and RE programs.

With the aim of narrowing the emissions gap through emissions reductions from the energy sector, the 1 Gigaton Coalition is a voluntary international framework, launched at COP-20 in Lima to build upon and intensify country efforts on climate mitigation to 2020, as specified in the COP19 decision (Decision/CP.19 Further Advancing the Durban Platform). While RE and EE programs' impact in developing countries has been documented anecdotally, most of their achievements either have not been quantified or have been assessed using inconsistent and incomparable methods. The 1 Gigaton Coalition supports countries'

work to fill this data gap by measuring and reporting GHG emission reductions resulting from RE and EE initiatives. The Coalition's mission is to comprehensively assess government, private sector, and multi-stakeholder emission reduction initiatives that align with national pledges.

As a first step, this inaugural report quantifies the reduced GHG emissions resulting from RE and EE initiatives and programs in developing countries. The analysis is a first step towards understanding RE and EE projects in developing countries' total impact and the role of bilateral, multilateral, and partner initiative aid in these efforts. Due to data scarcity (particularly on EE) and the wide variability in measuring and reporting mechanisms, this report limits its conclusions to the projects and initiatives included in the analysis and does not suggest that these examples can be ascribed for all partner-supported RE and EE efforts in developing countries. To accomplish this level of attribution the methodology introduced in this report will need to be further developed.

This report is comprised of three main parts. First, the report presents an overview of the methodological challenges to attributing reductions to individual actors, whose work often overlaps (Chapter 3). It then assesses the impact that developing countries' RE and EE efforts have had on these countries' GHG emissions (Chapter 4). This analysis is followed by an overview of developing countries' RE and EE activities, based on a survey of policies and targets from 62 countries (Chapter 5.1) and on five country case studies (Chapter 5.2). Finally, it analyzes the GHG reductions of selected partner-supported activities that promote RE and EE in developing countries (Chapter 6). The report ends with recommendations for refining data collection and analysis methods to assess these partnerships' impact on RE and EE efforts in developing countries.

METHODOLOGICAL OVERVIEW AND CHALLENGES

Attempts to estimate the emissions impact of renewable energy and energy efficiency measures in developing countries encounter a number of challenges, including: overlaps in project reporting; the difficulties of creating business-as-usual scenarios to measure policies against; a lack of publically-available information about renewable energy and energy efficiency projects; and un-harmonized data collection and reporting practices among different project supporters and participants.

Given these gaps, this report employs several strategies to assess renewable energy and energy efficiency measures' emissions impact. In Chapter 3, the report evaluates emissions reductions generated by all renewable energy and energy efficiency activities in developing countries. Chapter 4 reviews broad trends in developing country renewable energy and energy efficiency targets and policies. Five case studies of innovative renewable energy and energy efficiency policies in developing countries help illustrate the strategies countries use to meet these targets. Chapter 5 assesses the emissions mitigation reported by six country partners, the European Commission, nine development banks, and seven initiatives.

Attempts to estimate the effects of renewable energy (RE) and energy efficiency (EE) measures on GHG emissions face several challenges:

OVERLAPS IN PROJECT REPORTING

It is not feasible to accurately attribute mitigation outcomes to individual actors due to the cooperative and collective nature of many RE and EE efforts and the vast field of actors working to implement them. A wide range of actors supports RE and EE initiatives in developing countries, often working in collaboration with each other. Efforts to implement RE and EE projects often receive multilateral support from governments, development banks and funds, and from other organizations in public and private sectors.

Disaggregating multilateral contributions is very difficult. The Climate Investment Fund (CIF), for instance, works to mobilize co-financing and to build policy support for climate projects. CIF support is disbursed through multilateral development banks (MDBs), making the separation of bilateral and multilateral contributions to climate mitigation difficult to trace.⁷

These challenges are described in more detail in Chapter 6, Assumptions and Uncertainties.

COUNTERFACTUAL DEVELOPMENT

To calculate emissions reductions, it is necessary to estimate what would have happened in the absence of bilateral, multilateral or partner collaborations on RE and EE projects. Such counterfactual development (i.e., what would have happened in the absence of such efforts) cannot be accurately determined due to the various assumptions involved in the quantification process.

In most cases, partner countries face difficulties assessing the impact of their actions against the 'business as usual' scenario that would result had their activities not taken place (counterfactual assessments). The Japan Bank for International Cooperation's (JBIC) counterfactual evaluation of the Zafarana Wind Power Plant Project provides an example of best practices and a model for similar assessments.⁸

DATA GAPS AND INCONSISTENCY

Data on many projects is not publicly available. Where data is available, inconsistent reporting makes it hard to collect information in a comparable manner.

Some projects provide reductions in terms of reduced GHG emissions, while others provide intermediate data, such as kilowatt-hours (KWh) produced or saved or gigawatts (GW) of installed energy capacity. It requires further calculations to translate the intermediate data into GHG emissions mitigation and results may vary significantly based on assumptions (e.g., emissions or capacity factors) involved in the calculations.

Some bilateral, multilateral or partner initiatives provide an estimate for overall mitigation impact, but will not publish details on the calculation methodology employed, assumptions made, or implied uncertainties.

Analyses adopt distinct assumptions when assessing greenhouse gas reductions. And in many instances, impact estimates are not given with comprehensive details on project methodologies and assumptions.



This report employed several strategies to overcome these methodological challenges, all of which come with inherent advantages and disadvantages:

OVERVIEW

The report provides a broad picture of what GHG emission levels in developing countries would be without EE and RE initiatives driven by national governments with support from other countries, international funds and businesses (→ Chapter 3). This approach provides an overall estimate of RE and EE in developing countries' global impact without attempting to attribute the reductions to any individual actor or projects.

SURVEY ON NATIONAL ACTIVITIES

The report describes developing countries' EE and RE actions, based on a survey of targets and policies in over 120 countries (→ Chapter 4.1). This analysis shows where developing countries have adopted RE and EE policies, targets and programs, highlighting the strategies they are utilizing. Using data from the REN21 Renewables 2015 Global Status Report, as well as the REN21 survey conducted on EE for the 1 Gigaton Coalition. Chapter 4.1 provides a global picture of RE and EE activities in developing countries.

COUNTRY CASE STUDIES

Because data are still limited and incomplete, the report provides illustrative examples of EE and RE activities in five countries (→ Chapter 4.2). These case studies give a narrative of specific projects and innovations developing countries are undertaking to increase energy efficiency and renewable energy. They are quantified to the greatest feasible extent, but the report does not attempt to measure their contribution to national or global mitigation goals.

IMPACT OF SELECTED ACTIVITIES

The report concludes by illustrating the potential for quantifying RE and EE activities' GHG reductions (→ Chapter 5) in developing countries. This chapter includes a review of the methodology used to calculate GHG emissions reductions. It applies top-down assessments that draw from funder reports and self-reported estimates and bottom-up assessments that aggregate project-level data to understand RE and EE projects' mitigation impacts in developing countries. This analysis suggests that the bottom-up methods yield a greater quantity of data, as well as more reliable data, than top-down practices. Although more onerous and time consuming, only a project-by-project analysis produced information that filtered quantifiable projects from those with only qualitative results (e.g., capacity building). The bottom-up approach also provided details that enabled us to estimate an emissions impact if it was not directly reported (e.g., kWh of power generated from a renewable energy project).

REVIEW OF ACCOUNTING METHODS

In → Chapter 6 an overview is provided of the different approaches that some international financial institutions have used to measure their efforts' GHG emission reductions.

Chapter 3

DEVELOPING COUNTRIES' ENERGY EFFICIENCY AND RENEWABLE ENERGY CONTRIBUTION TO GLOBAL GREENHOUSE GAS EMISSION REDUCTIONS



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