9 Estimating GHG impacts of the policy ex-post

Ex-post impact assessment is a backward-looking assessment of the GHG impacts achieved by a policy to date. The GHG impacts can be assessed during the policy implementation period or in the years after implementation. Ex-post assessment involves estimating achieved RE addition and the consequential GHG impacts. In contrast to ex-ante estimates of GHG emissions, which are based on assumptions about future RE deployment, ex-post estimates of emissions are based on observed (monitored) data collected during the policy implementation period. Users who are estimating ex-ante GHG impacts only can skip this chapter.

Checklist of key recommendations

- Estimate achieved RE addition using monitored values for the parameters described in the monitoring plan
- Estimate the GHG impacts of the policy over the assessment period, for each GHG source included in the GHG assessment boundary

9.1 Introduction to estimating GHG impacts ex-post

Estimating GHG impacts ex-post has three main objectives. These are described below, with an indication of the sections of this chapter that are relevant to each.

9.1.1 Objective 1: Compare achieved renewable energy addition with a policy cap or a renewable energy target, or achieved GHG emissions level with a sectoral emissions target

Users may want to compare achieved RE addition with a policy cap. A policy cap generally reflects the ambition or the expected amount of RE addition that policymakers are aiming to achieve. Users might also want to assess the extent to which a policy has contributed to a separate target, such as a national RE target. Lastly, users may want to compare the ex-post estimated policy scenario emissions with a sectoral target for emissions in the energy sector.

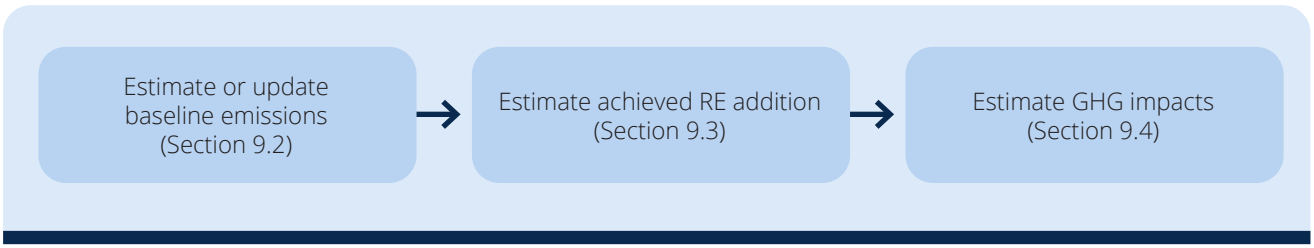
For objective 1, it is not necessary to develop a baseline scenario, and users follow the method in Section 9.3.

9.1.2 Objective 2: Compare achieved renewable energy addition or GHG emissions reductions with a baseline scenario

Users may want to compare the achieved RE addition with what would have happened in the absence of the policy. This requires determining a baseline scenario, which also serves as the basis for calculating baseline emissions and GHG emissions reductions.

FIGURE **9.1**

Overview of steps in the chapter



Users develop a baseline scenario under which an equivalent amount of electricity is generated as in the policy scenario, but from business-as-usual sources rather than via the RE addition that results from the policy. All other variables (such as economic trends) are kept the same as in the policy scenario. The baseline scenario is used to estimate either the GHG emissions trajectory or the GHG emissions reductions.

To achieve objective 2, users follow the methods in Sections 9.2, 9.3 and 9.4.

9.1.3 Objective 3: Compare achieved renewable energy addition or GHG emissions reductions with an ex-ante assessment

Users may want to compare an ex-ante (expected) RE addition with achieved RE addition, to ascertain whether a policy is performing in line with expectations. Likewise, they may want to compare the GHG emissions reductions achieved by a policy with the reductions estimated in an ex-ante assessment.

This can provide an indication of the impact of policy design characteristics and other factors on the RE addition (i.e. the factors set out in Chapter 7). For example, if the achieved RE addition is greater than the expected RE addition, this could indicate that other policies are interacting with, or adding further incentive to, the policy (e.g. where a renewable portfolio standard is achieved using a feed-in tariff policy). Alternatively, if the achieved RE addition is lower than the expected RE addition, it could be that other policies have counteracted the policy's intended impact or that the policy is not as effective as originally predicted.

This exercise can help users avoid double counting through the aggregation of emissions reductions from interacting policies. It can also be used to check whether all the assumptions that were made during the ex-ante assessment were correct. Lastly, comparisons between ex-ante and ex-post assessments can inform subsequent improvements of ex-ante assessments. These comparisons may become part of an ongoing process to refine future assessments.

To achieve objective 3, users follow the method in Sections 9.3 and 9.4.

9.1.4 Considerations for the desired level of accuracy

When selecting methods to estimate ex-post GHG impacts, users should consider the objectives, the level of accuracy needed to meet the stated objectives, the availability and quality of relevant data, the accessibility of methods, and capacity and resources for the assessment.

Users can follow a low-accuracy approach for their assessment, which may entail collecting aggregate data on energy generation from government agencies and/or using auxiliary electricity consumption emission factors based on the most common source of auxiliary generation for the country. An intermediate-accuracy approach may involve using clustered data on energy generation from electricity purchasers or distribution companies, and/or using auxiliary electricity consumption emission factors based on the most common source of auxiliary generation within the regions where the clusters are located. A high-accuracy approach can involve using disaggregated metered data on electricity imports and exports, and disaggregated fuel consumption data for auxiliary generation.

9.2 Estimate or update baseline emissions (if relevant)

To estimate the GHG emissions reductions achieved by the policy, baseline emissions need to be estimated. Baseline emissions should be recalculated each time an ex-post assessment is undertaken. If using the emissions trajectory method, users should update the baseline emissions by following the steps in Section 8.2.3. If using the grid emission factor method, users should skip this step (emissions reductions are estimated based on the RE addition and updated grid emission factor, in Section 9.4).

9.3 Estimate achieved renewable energy addition

It is a *key recommendation* to estimate achieved RE addition using monitored values for the parameters described in the monitoring plan. This achieved RE addition can be estimated in terms of RE capacity addition or RE electricity generation addition. Two main parameters to monitor are installed RE capacity and net electricity supplied to the electricity grid from

RE. Further guidance on indicators, parameters and monitoring plans is provided in Chapter 10.

Where users have no, or limited, monitored data for the policy, the achieved RE addition may have to be estimated using the best data available. See the considerations for the desired level of accuracy in Section 9.1.4 for further guidance on choosing an approach.

9.4 Estimate GHG impacts

The achieved RE addition should be translated into GHG impacts by following the method set out in Chapter 8, using monitored (rather than projected) data for the ex-post policy scenario. Chapter 10 lists all the relevant indicators and parameters for which data should be gathered to translate achieved RE addition into ex-post GHG impacts.

It is a *key recommendation* to estimate the GHG impacts of the policy over the assessment period, for each GHG source included in the GHG assessment boundary. For the emissions trajectory method, users should calculate the GHG impacts of the policy by subtracting baseline emissions (estimated in Section 9.2) from the ex-post policy scenario emissions for each source category included in the GHG assessment boundary.

For the grid emission factor method, users should calculate the GHG impacts of the policy by multiplying the updated grid emission factor by the RE addition (expressed in GWh).