Buildings Efficiency Guidance

Guidance for assessing the greenhouse gas impacts of buildings policies

May 2018

Overview of the methodology

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3. Overview of Buildings Sector Policies

This guidance approaches the buildings sector with a systemic view by addressing a range of policies, including regulatory and financial support policies. These policies can be introduced as standalone measures or they can be integrated into policy packages. This chapter provides an overview of main types of policies covered by the guidance.

3.1 Types of policies in the buildings sector

This guidance can be used to assess the GHG impacts of regulatory and financial support policies in the buildings sector. Mandatory labelling, certification and energy audits are sometimes considered as information policies. However, for the purposes of this guidance, they are considered regulatory policies, because mandatory labelling, certification and energy audits have a decisive regulatory character. Voluntary labelling, certification and energy audits, however, mainly focus on information dispersion and thus are not within the scope of the guidance. Table 3.1: Types of policy instruments and example policies in the buildings sector lists common policy instruments and policies in the buildings sector.

Most energy efficiency policies for buildings generate cost savings. The most important determinants for success are that the policy is well-designed, enforced and implemented. For this reason, policy instruments should always be tailored to local contexts.[1]

Evidence to date shows that building codes and labels, appliance standards and labels, supplier obligations, public procurement, and leadership programmes have been among the most cost-effective policy instruments.[2] Evidence regarding the success of other policies, particularly information policies, is more limited.

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[1] Schwarz, 2009; Boza-Kiss, Moles-Grueso and Urge-Vorsatz, 2013; Lucon, Ürge-Vorsatz et al. 2014.

[2] Lucon, Ürge-Vorsatz et al. 2014.

Table 3.1: Types of policy instruments and example policies in the buildings sector

Type of policy instrument	**Example policies** *(Policies in **bold** are those covered by the guidance)*
Regulatory policies	• **Building codes (mandatory and voluntary)** • **Minimum energy performance standards for appliances** • **Mandatory labelling, certification and energy audits** • Construction material standards • Efficiency standards for HFCs and fluorinated gases (F-gases) used for refrigeration, cooling, insulation, fire-retardant and sound-insulation • Public procurement requirements

Support policies	• **Financial support policies**
	  ○ **Financial incentives**
	  ○ **Fiscal measures**
	• Non-financial support policies
	  ○ Inhabitant behaviour change incentives
	  ○ Building permit waiver programmes

Information policies	• Awareness-raising and information campaigns • Energy labelling for end-user appliances • Energy performance certificates • Voluntary agreements • Contractor training • Smart metering • Benchmarking programmes • Building energy management systems programme • Sustainability disclosure
Taxes, charges and market mechanisms	• Carbon and energy taxes • Public goods charge • Energy efficiency penalty • Carbon markets with allocation and trading of emissions allowances
Demand-side management	• Financial and incentive-based measures (e.g., time-varying pricing tariffs) • Normative and/or informative regulatory and control measures • Voluntary agreements and partnerships
Tradable permits	• Energy-efficiency obligations and tradable energy-efficiency (white) certificates

Voluntary and negotiated agreements	• Tailored contracts between an authority and another entity, aimed at meeting a predefined level of energy savings
Research and development (R&D)	• Research grants for technology, building standards and materials
Public procurement policies	• Efficient products and equipment procurement • Sustainable or energy efficiency standards for construction and repair • Public leadership programmes
Infrastructure programmes	• Electrical grid/energy supply policies and improvements • Smart grid • Cogeneration and tri-generation programmes

* Indicates policy to which this guidance document is applicable

Source: Adapted from WRI 2015 and Lucon et al. 2014.

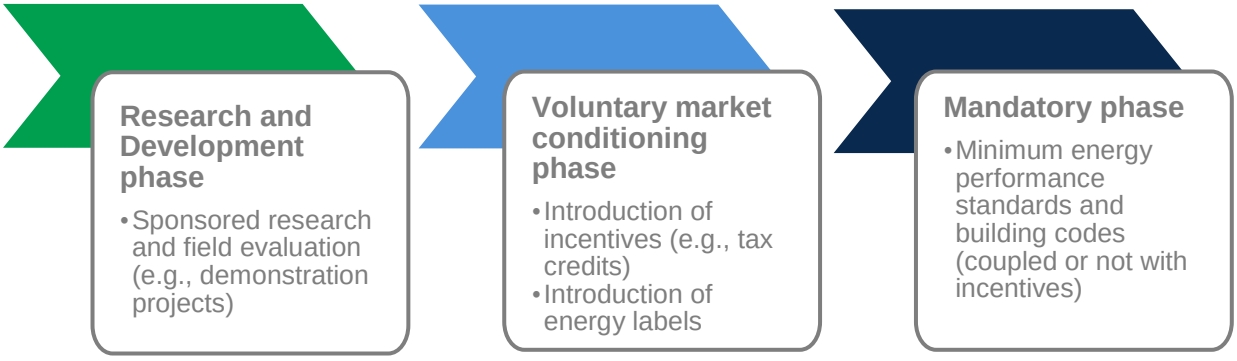
3.2 Regulatory policies

Overview of regulatory policies

Regulatory policies are instruments that mandate energy efficiency through imposed requirements. They are used in most countries that have legislation in place for energy efficiency in buildings. Regulatory policies are most effective when combined in a policy package with information policies and support policies, as these can help to ensure higher compliance rates.[3]

Due to difficulties in enforcing mandatory standards, countries have also chosen to introduce voluntary standards before making them mandatory to allow the markets time to adapt. A typical phasing of policy instruments in a policy package is depicted in Figure 3.1 below. The phasing can be circular, with products and building systems being further improved through research and development and voluntary standards, before the higher efficiency is encoded in ever-ambitious mandatory standards.

Figure 3.1: Typical commercialisation path of innovative products, building systems and associated policies



Source: Adapted from IEA, 2013b.

[3] Schwarz 2009; Lucon, Ürge-Vorsatz et al. 2014.

Building codes

Building codes are sets of standards that specify minimum requirements of energy performance for new or existing buildings. They are among the most common and effective regulatory policies for energy efficiency in new buildings. The widespread implementation of stringent building codes for all new buildings is determined to be a key policy priority for achieving a 1.5-2°C scenario.[4]

Although several countries have recently started to introduce mandatory building codes for retrofits in existing buildings, their prevalence has not been as common as governments have tended to be reluctant to enforce standards on owners of existing buildings. Adequate compliance remains a major barrier, even in countries with advanced buildings policies.

Building codes can be grouped into two main categories depending on the compliance approach:

- **Prescriptive building codes** set minimum energy performance requirements for each building component (e.g., permissible levels of heat loss for windows, roofs and walls, and/or efficiency levels for heating, cooling and lighting equipment)[5]
- **Performance-based building codes** require the overall building to be considered as one single system and comply with maximum energy standards.[6] This gives builders flexibility, allowing them to use the most cost-effective measures to meet the code.

The success of building codes in achieving expected energy savings depends on effective enforcement and a regular revision schedule to strengthen the standards. Figure 3.2 illustrates the typology of building codes depending on the building type and the compliance specifications.

Figure 3.2: Typology of building codes by building type and compliance specifications

[4] Lucon, Ürge-Vorsatz et al. 2014.

[5] IEA 2013a.

[6] IEA 2013a.

Building codes often refer to the building envelope, which is the physical shell separating the interior and exterior of a building. Components of the building envelope include the walls, floors, roofs, ceilings, windows and doors. The building envelope can affect energy use and GHG emissions. Decreasing heat transfer through the building envelope is crucial for reducing the need for heating and cooling.

The guidance refers to retrofit and deep retrofit activities implemented under policies for existing buildings. Retrofit, also known as called conventional retrofit or shallow retrofit, refers to the modifications made to existing buildings to improve energy efficiency and decrease energy demand. Deep retrofit refers to the building assessment and construction process that uses a more integrative approach to achieve larger energy savings than conventional retrofits. Deep retrofits address nearly all energy loads, including space heating and cooling, hot water, lighting, appliances and plug loads. Often conventional or shallow retrofits focus on simple and isolated system upgrades, while deep retrofits use a systems approach to assess the whole building for overall energy efficiency. The guidance is applicable to both types of retrofit, though the lower impact of conventional or shallow retrofits may mean it is not a worthwhile undertaking to assess the impacts of such policies that promote such retrofits.

Minimum energy performance standards for appliances

Minimum energy performance standards for appliances are rules or guidelines for a particular product class that set a minimum efficiency level, and usually prohibit the sale of underperforming products.[7] Most developed countries and an increasing number of developing countries have put forward MEPS for appliances.[8]

MEPS for appliances tend to be easier to enforce than building codes, as compliance can be monitored at the level of producers and distributors instead of buildings. They can therefore be a good first step in countries that have yet to implement comprehensive policies for energy efficiency in buildings.[9] MEPS for appliances should act to complement rather than substitute for building codes. MEPS for appliances for cooling equipment alone do not ease pressure on the electricity grid in low-income countries, due to growing demand for cooling.[10]

Mandatory labelling, certification and energy audits

Labelling and certification programmes rate the energy performance of buildings or appliances for users and buyers, and validate that buildings or appliances meet certain standards. Labelling and certification programmes can be either voluntary or mandatory. Only mandatory labelling and certification programmes are considered regulatory policies and are included in the scope of the guidance. Voluntary labelling and certification mainly focus on information dispersion, and are considered information policies which do not fall within the scope of the guidance. Similar to standards, building and appliance labels are most successful when technical specifications are regularly updated to reflect the best products or buildings on the market. Equipment and appliance labels are often used to enhance the impact of standards.

[7] Lucon, Ürge-Vorsatz et al. 2014.

[8] Koeppel and Ürge-Vorsatz 2007.

[9] Schwarz 2009.

[10] Liu, Meyer and Hogan 2010.

Energy audits are typically used to identify cost-effective energy efficiency measures after assessing the energy performance of existing buildings and are most prevalent for commercial buildings. They are most successful when they are mandatory and combined with incentives to implement the identified measures to enhance energy efficiency.

3.3 Support policies

Support policies include both financial support policies and non-financial support policies aimed at encouraging different actors to increase energy efficiency. Evidence from European countries shows that financial support policies to support energy efficiency in the buildings sector are relatively common, but the understanding of their overall effectiveness remains unclear. There is some evidence that financial support policies directly targeting upfront costs tend to be more effective than other support policies such as energy or carbon taxes (that target running costs), provided the level of support is sufficient.[11]

Support policies typically work in one of the three following ways:

- By encouraging actors to comply with existing regulatory and voluntary standards
- By encouraging actors to exceed the requirements of regulatory standards
- By encouraging energy efficiency measures where no policies exist (standalone instrument)

Common financial support policies include:

- **Financial incentives** to meet certain efficiency standards when constructing or renovating buildings. These are among the most frequently used instruments to advance building energy efficiency in developing countries and for building retrofits.[12] Examples include grants, subsidies or preferential loans for energy efficiency investments, renewable rebates, or utility rebates.
- **Fiscal measures** to encourage a further uptake of energy-efficient materials and equipment. Examples include reduced VAT or tax incentives or credits for energy efficiency investments.

Energy savings companies (ESCOs) are often established as a result of, or in response to, these financial support policies. ESCOs offer energy savings performance contracts that provide financial incentives and financing options for energy efficiency investments. They assess efficiency opportunities, purchase the equipment necessary to improve performance and install the equipment. Most ESCOs provide financing options for these services as well, but the building owner may be required to seek outside financing.

Common non-financial support policies include instruments such as building permit waiver programmes or increased floor area ratio incentives to enhance compliance with regulatory policies or to increase the impact of other policies.

In addition, non-financial incentives include access to training and/or capacity building (especially for builders, designers or building owners) or free access to market materials and globally recognised logos or brands (e.g., the ENERGY STAR programme in the US). Similarly, obtaining access to networks (e.g., service providers and bulk purchases) and access to tools or data can all be offered as an incentive for participation in energy efficiency programmes, rather than just a free or paid resource.

[11] Schwarz 2009.

[12] Lucon, Ürge-Vorsatz et al. 2014.

3.4 Information policies

Information policies complement regulatory policies or financial support policies to inform the targeted audience about the existence and eligibility of such policies. Two main information policies that are addressed in this guidance:

- **Capacity building and training policies** aim to educate designers, builders, building code officials and other key stakeholders about requirements in new buildings policies. They are important in both the development and implementation phases of policies and can help ensure a higher rate of compliance for regulatory policies.
- **Advice and information campaigns** build awareness about buildings policies and are central to the implementation phase of policies.[13] Targeted information and technical advice is particularly important to ensure a higher uptake of financial instruments.[14]

Due to the difficulty in assessing the impact of information policies, they are not a focus of this guidance. These policies are considered in the barriers section of the ex-ante assessment guidance. In general, the lack of adequate information policies is considered to be a barrier since it tends to hinder the effectiveness of regulatory policies and support policies.

[13] Deringer, Iyer and Huang 2004; Lucon, Ürge-Vorsatz et al. 2014.

[14] Novikova et al. 2011.

4. USING THE GUIDANCE

This chapter provides an overview of the steps involved in assessing GHG impacts of buildings policies, and outlines assessment principles to help guide the assessment.

Checklist of key recommendations

- Base the assessment on the principles of relevance, completeness, consistency, transparency and accuracy

4.1 Overview of steps

This guidance is organised according to the steps a user follows in assessing the GHG impacts of a buildings policy (see Figure 4.1). Depending on when the guidance is applied, certain chapters are skipped. For example, if the user is assessing GHG impact ex-ante, but not ex-post, Chapter 9 can be skipped.

Figure 4.1: Overview of steps

Part I: Introduction, objectives, steps and overview of building sector policies

Understand purpose and applicability of the guidance (Chapter 1)
Determine the objectives of the assessment (Chapter 2)
Understand buildings policies (Chapter 3)
Understand assessment steps and principles (Chapter 4)

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Part II: Defining the assessment

Clearly describe the policy to be assessed (Chapter 5)
Identify the GHG impacts, define the GHG assessment boundary and assessment period (Chapter 6)

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Part III: Assessing impacts

Define the most likely baseline scenario, estimate baseline values for each parameter, estimate baseline emissions (Chapter 7)
Estimate GHG impacts ex-ante (Chapter 8)
Estimate GHG impacts ex-post (Chapter 9)

↓

Part IV: Monitoring and reporting

Identify key performance indicators and parameters to monitor and develop a monitoring plan (Chapter 10)
Report the results and methodology used (Chapter 11)

4.2 Planning the assessment

Users should review this guidance, the *Introductory Guide* and other relevant guidance documents, and plan in advance the steps, responsibilities and resources needed to meet their objectives for the assessment. Identify in advance the expertise and data needed for each step, plan the roles and responsibilities of different actors, and secure the budget and other resources needed. Any interdependencies between steps should be identified, for example where outputs from one step feed into another, and timing should be planned accordingly.

The time and human resources required to implement the guidance and carry out an impact assessment depend on a variety of factors, such as the complexity of the policy being assessed, the extent of data collection needed and whether relevant data has already been collected, whether analysis related to the policy has previously been done, and the desired level of accuracy and completeness needed to meet the stated objectives of the assessment.

4.2.1 Choosing a desired level of accuracy based on objectives

There are a range of options for assessing GHG impacts that allow users to manage trade-offs between the accuracy of the results and the resources, time, and data needed to complete the assessment, based on objectives. Some objectives require more detailed assessments that yield more accurate results (to demonstrate that a specific reduction in GHG emissions is attributed to a specific policy, with a higher level of certainty), while other objectives may be achieved with simplified assessments that yield less accurate results (to show that a policy contributes to reducing GHG impacts, but with less certainty around the magnitude of the impact).

Users should choose approaches and methods that are sufficient to accurately meet the stated objectives of the assessment and ensure that the resulting claims are appropriate. For example, whether a policy contributes to achieving GHG emission reductions or whether emission reductions can be attributed to the policy. Users should also consider the resources needed to obtain the data needed to meet the stated objectives of the assessment.

4.2.2 Approaches for estimating GHG emissions

Users should choose whether they want to estimate a *GHG emission level* or *GHG emission reductions* achieved by the policy. The choice is guided by the user's objectives in undertaking the impact assessment.

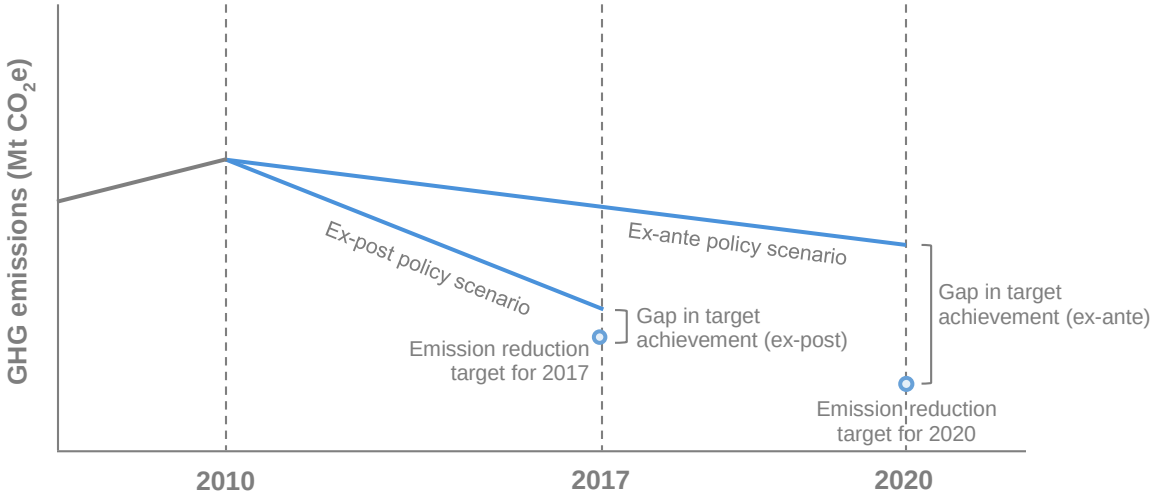
Estimating GHG emission level

Estimating an emission level is relevant for determining whether policies are on track to meet goals such as NDCs or sectoral targets, and to inform goal setting. Where NDCs set out economy-wide emission targets, estimated sectoral emissions can be aggregated to obtain an estimated economy-wide emission level. This approach does not quantify the GHG emission reductions impact of a policy, but helps users understand expected future emissions with the policy in place.

Estimating an emission level, either ex-ante or ex-post, allows comparison against a target, as shown in Figure 4.2. Here, an ex-ante estimate of emission levels out to 2020 shows that there is a gap and expected emission reductions in the sector are not on track to be met. The figure also shows an ex-post estimate of emission levels, estimated in 2017. Here, the emission level is higher than the target – in

other words, the anticipated emission reductions have not been achieved. In both of these ex-ante and ex-post assessments a baseline is not used, nor needed.

Figure 4.2: Use of GHG emission level in ex-ante and ex-post impact assessment



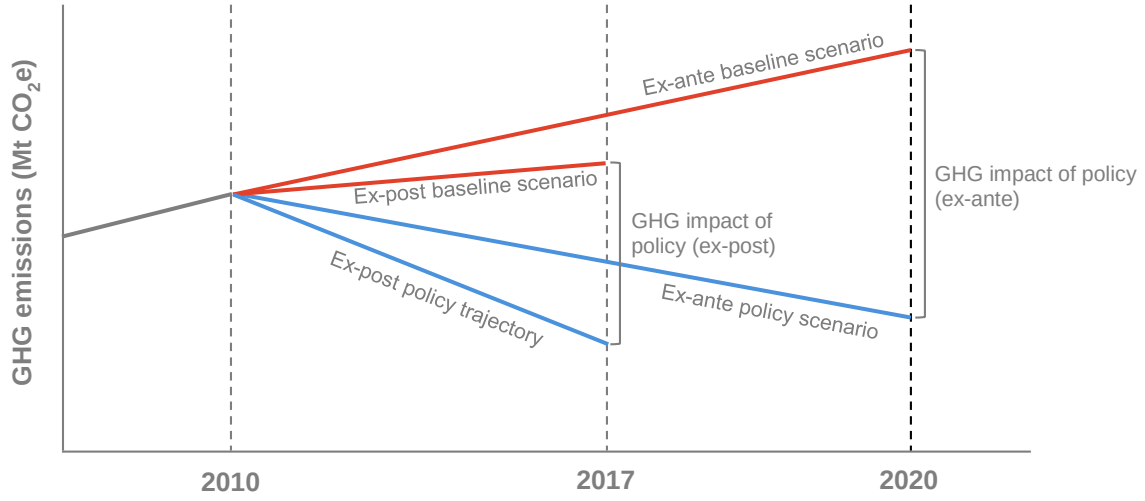
Estimating GHG emission reductions

Estimating emission reductions is relevant where the objective is to evaluate the performance and effectiveness of a specific policy. This requires comparing emissions under the policy scenario with emissions under a baseline scenario.

Figure 4.3 illustrates the estimation of GHG emission reductions ex-ante and ex-post. The reductions are calculated by subtracting the ex-ante (or ex-post) policy scenario emissions from the ex-ante (or ex-post) baseline emissions. To estimate the ex-ante emission reductions, both the policy scenario emissions and baseline emissions are forecasted. For example, a user would like to know what impact a building code that was implemented in 2010 might have on building sector emissions through to 2020. The upper red line ‘Ex-ante baseline scenario’ would represent an ex-ante business-as-usual scenario without the building code being implemented, and the upper blue line ‘Ex-ante policy scenario’ represents the ex-ante estimation of sectoral emissions with the policy’s implementation. The difference between the lines in 2017 and 2020 is the ex-ante estimation of GHG impact of the policy.

To estimate the ex-post emission reductions, only the baseline emissions have to be estimated, while the policy scenario emissions are based on observed data. For example, a user would estimate the emissions pathway after implementation of the building code (i.e., ‘Ex-post policy trajectory’) compared to a hypothetical baseline (i.e. ‘Ex-post baseline scenario’). The figure highlights that the ex-ante emission reductions estimate and the ex-post estimate may differ.

Figure 4.3: Estimating GHG impacts with baseline approach



4.2.3 Methods for obtaining or estimating data

It is recommended that users use country-specific data. Potential data sources include the ministry of energy, national energy statistics, and international agencies such as IEA. Chapter 7 discusses potential sources for common data needs and provides guidance for remote data collection where building sector data is limited.

4.2.4 Expert judgment

It is likely that expert judgment and assumptions will be needed in order to complete an assessment where information is not available or requires interpretation. Expert judgment is defined by the IPCC as a carefully considered, well-documented qualitative or quantitative judgment made in the absence of unequivocal observational evidence by a person or persons who have a demonstrable expertise in the given field.[15] The goal is to be as representative as possible in order to reduce bias and increase accuracy. The user can apply their own expert judgment or consult experts.

When relying on expert judgment, information can be obtained through methods that help to avoid bias known as expert elicitation. The 2006 IPCC Guidelines for National Greenhouse Gas Inventories provides a procedure for expert elicitation including a process for helping experts understand the elicitation process, avoiding biases, and producing independent and reliable judgments.[16]

Expert judgment can be associated with a high level of uncertainty. As such, experts can be consulted to provide a range of possible values and the related uncertainty range or they can be consulted to help select suitable values from a range of values. Expert judgment can be informed or supported through broader consultations with stakeholders. It is important to document the reason that no data sources are available and the rationale for the value chosen.

Assumptions or expert judgment will likely be required in order to complete the assessment where information is not available to make a reasonable assumption about the value of a parameter. When

[15] IPCC 2000. Available at: http://www.ipcc-nggip.iges.or.jp/public/gp/english

[16] IPCC 2006. Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

doing so, it is important to document the reason that no data sources are available and the rationale for the value chosen.

4.2.5 Planning stakeholder participation

Stakeholder participation is recommended in many steps throughout the guidance. It can strengthen the impact assessment and the contribution of policies to GHG emission reduction goals in many ways, including by:

- Establishing a mechanism through which people who may be affected by or can influence a policy have an opportunity to raise issues and have these issues considered before, during and after policy implementation
- Raising awareness and enabling better understanding of complex issues for all parties involved, building their capacity to contribute effectively
- Building trust, collaboration, shared ownership and support for policies among stakeholder groups, leading to less conflict and easier implementation
- Addressing stakeholder perceptions of risks and impacts and helping to develop measures to reduce negative impacts and enhance benefits for all stakeholder groups, including the most vulnerable
- Enhancing the credibility, accuracy and comprehensiveness of the assessment, drawing on diverse expert, local and traditional knowledge and practices, for example, to provide inputs on data sources, methods and assumptions
- Enhancing transparency, accountability, legitimacy and respect for stakeholders' rights
- Enabling enhanced ambition and financing by strengthening the effectiveness of policies and credibility of reporting

Various sections throughout this guidance explain where stakeholder participation is recommended — for example, in identifying impacts (Chapter 6), identifying barriers (Chapter 8), monitoring performance over time (Chapter 10), and reporting (Chapter 11).

Before beginning the assessment process, consider how stakeholder participation can support identified objectives and include relevant activities and associated resources in assessment plans. It may be helpful to combine stakeholder participation for impact assessment with other participatory processes involving similar stakeholders for the same or related policies, such as those being conducted for assessment of sustainable development and transformational impacts, and for technical review.

It is important to ensure conformity with national legal requirements and norms for stakeholder participation in public policies, as well as the requirements of specific donors and of international treaties, conventions and other instruments to which the country is party. These are likely to include requirements for disclosure, impact assessments and consultations, and may include specific requirements for certain stakeholder groups (e.g., UN Declaration of the Rights of Indigenous Peoples, International Labour Organisation Convention 169).

During the planning phase, it is recommended to identify stakeholder groups that may be affected by or may influence the policy. Appropriate approaches should be identified to engage with the identified stakeholder groups, including through their legitimate representatives. To facilitate effective stakeholder

participation, consider establishing a multi-stakeholder working group or advisory body consisting of stakeholders and experts with relevant and diverse knowledge and experience. Such a group may advise and potentially contribute to decision making to ensure that stakeholder interests are reflected in design, implementation and assessment of policies.

Refer to the ICAT *Stakeholder Participation Guidance* for more information, such as how to plan effective stakeholder participation (Chapter 4), identify and analyse different stakeholder groups (Chapter 5), establish multi-stakeholder bodies (Chapter 6), provide information (Chapter 7), design and conduct consultations (Chapter 8) and establish grievance redress mechanisms (Chapter 9). Appendix A summarises the steps in this guidance where stakeholder participation is recommended along with specific references to relevant guidance in the *Stakeholder Participation Guidance.*

4.2.6 Planning technical review (if relevant)

Before beginning the assessment process, consider whether technical review of the assessment report will be pursued. The technical review process emphasises learning and continual improvement and can help users identify areas for improving future impact assessments. Technical review can also provide confidence that the impacts of policies have been estimated and reported according to ICAT key recommendations. Refer to the ICAT *Technical Review Guidance* for more information on the technical review process.

4.3 Assessment principles

Assessment principles are intended to underpin and guide the impact assessment process, especially where the guidance provides flexibility. It is *a key recommendation* to base the assessment on the principles of relevance, completeness, consistency, transparency and accuracy, as follows:[17]

- **Relevance**: Ensure the assessment appropriately reflects the GHG impacts of the policy and serves the decision-making needs of users and stakeholders, both internal and external to the reporting entity. Applying the principle of relevance depends on the objectives of the assessment, broader policy objectives, national circumstances, and stakeholder priorities.
- **Completeness**: Include all significant impacts in the GHG assessment boundary, including both positive and negative impacts. Disclose and justify any specific exclusions.
- **Consistency**: Use consistent assessment approaches, data collection methods, and calculation methods to allow for meaningful performance tracking over time. Document any changes to the data sources, GHG assessment boundary, methods, or any other relevant factors in the time series.
- **Transparency**: Provide clear and complete information for stakeholders to assess the credibility and reliability of the results. Disclose and document all relevant methods, data sources, calculations, assumptions, and uncertainties. Disclose the processes, procedures, and limitations of the assessment in a clear, factual, neutral, and understandable manner with clear documentation. The information should be sufficient to enable a party external to the assessment

[17] Adapted from WRI 2014

process to derive the same results if provided with the same source data. Chapter 11 provides a list of recommended information to report to ensure transparency.

- **Accuracy**: Ensure that the estimated impacts are systematically neither over nor under actual values, as far as can be judged, and that uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users and stakeholders to make appropriate and informed decisions with reasonable confidence as to the integrity of the reported information. If accurate data for a given impact category is not currently available, users should strive to improve accuracy over time as better data becomes available. Accuracy should be pursued as far as possible, but once uncertainty can no longer be practically reduced, conservative estimates should be used. Box 4.1 provides guidance on conservativeness.

In addition to the principles above, users should follow the principle of comparability if it is relevant to the assessment objectives, for example if the objective is to compare multiple policies based on their GHG impacts or to aggregate the results of multiple impact assessments and compare the collective impacts to national goals (discussed further in Box 4.2).

- **Comparability**: Ensure common methodologies, data sources, assumptions and reporting formats such that the estimated impacts of multiple policies can be compared.

Box 4.1: Conservativeness

Conservative values and assumptions are those more likely to overestimate negative impacts or underestimate positive impacts resulting from a policy. Users should consider conservativeness in addition to accuracy when uncertainty can no longer be practically reduced, when a range of possible values or probabilities exists (for example, when developing baseline scenarios), or when uncertainty is high.

Whether to use conservative estimates and how conservative to be depends on the objectives and the intended use of the results. For some objectives, accuracy should be prioritised over conservativeness in order to obtain unbiased results. The principle of relevance can help guide what approach to use and how conservative to be.

Box 4.2: Applying the principle of comparability when comparing or aggregating results

Users may want to compare the estimated impacts of multiple policies, for example to determine which has the greatest positive impacts. Valid comparisons require that assessments have followed a consistent methodology, for example regarding the assessment period, the types of impact categories, impacts, and indicators included in the GHG assessment boundary, baseline assumptions, calculation methods, and data sources. Users should exercise caution when comparing the results of multiple assessments, since differences in reported impacts may be a result of differences in methodology rather than real-world differences. To understand whether comparisons are valid, all methods, assumptions and data sources used should be transparently reported. Comparability can be more easily achieved if a single person or organisation assesses and compares multiple policies using the same methodology.

Users may also want to aggregate the impacts of multiple policies, for example to compare the collective impact of multiple policies in relation to a national goal. Users should likewise exercise

caution when aggregating the results if different methods have been used and if there are potential overlaps or interactions between the policies being aggregated. In such a case, the sum would either over or underestimate the impacts resulting from the combination of policies. For example, the combined impact of a local energy efficiency policy and a national energy efficiency policy in the same country is likely less than the sum of the impacts had they been implemented separately, since they affect the same activities. Chapter 4 provides more information on policy interactions.

In practice, users may encounter trade-offs between principles when developing an assessment. For example, a user may find that achieving the most complete assessment requires using less accurate data for a portion of the assessment, which could compromise overall accuracy. Users should balance trade-offs between principles depending on their objectives. Over time, as the accuracy and completeness of data increases, the trade-off between these principles will likely diminish.