6 Identifying specific impacts within each impact category

After choosing which impact categories to assess in Chapter 5, the next step is to identify the specific impacts within each selected impact category. This chapter explains how to identify all potential impacts of a policy within each sustainable development impact category that has been included in the assessment boundary.

This step is relevant for all users – both those following qualitative and those following quantitative approaches – and for either ex-ante or ex-post assessment. For all users, the set of impacts identified in this chapter will be included in the qualitative assessment boundary and qualitatively assessed in Chapter 7. For users following a quantitative approach, it is not necessary to estimate all the impacts identified in this chapter. Instead, the qualitative assessment step in Chapter 7 will be used to determine which impacts are significant, and therefore recommended to be included in the quantitative assessment boundary and estimated (in Chapter 8). It is important to comprehensively consider all potential impacts in this chapter before setting the quantitative assessment boundary.

Checklist of key recommendations

- Identify all potential sustainable development impacts of the policy within each impact category included in the assessment, using a causal chain and table format, if relevant and feasible, in consultation with stakeholders
- Separately identify and categorize in- and out-of-jurisdiction sustainable development impacts, if relevant and feasible

6.1 Identify specific impacts of the policy within each impact category

A comprehensive understanding of impacts is crucial to the completeness and accuracy of the assessment. For each impact category included in the assessment boundary in Chapter 5, it is a *key recommendation* to identify all potential sustainable development impacts of the policy within each impact category included in the assessment, using a causal chain and table format, if relevant and feasible, in consultation with stakeholders.

If significant sustainable development impacts are identified during this step that were not considered in Chapter 5, users should consider revising the list of impact categories included in the assessment.

6.1.1 Types of specific impacts

To identify sustainable development impacts, it can be useful to first identify the intermediate impacts resulting from the policy that lead to sustainable development impacts. "Intermediate impacts" are changes in behaviour, technology, processes or practices that result from the policy and lead to sustainable development impacts. "Sustainable development impacts" are changes in specific sustainable development impact categories, such as changes in air quality, jobs or health, among others outlined in Chapter 5. Figure 6.2 illustrates the relationship between intermediate impacts and sustainable development impacts.

FIGURE **6.1**

Overview of steps in the chapter

Identify specific impacts of the policy within each impact category (Section 6.1) → Describe and report specific impacts (Section 6.2)

Sustainable development impacts are the impacts of interest (such as increased jobs in the solar manufacturing sector), whereas intermediate impacts lead to an impact of interest (such as increased demand for solar PV systems, which leads to increased solar PV manufacturing). Both intermediate and sustainable development impacts can be short term or long term.

An intermediate impact in one context may be a sustainable development impact in another context, depending on the policy objectives and circumstances. For example, cost savings may be a sustainable development impact in one context and, in another context, an intermediate impact towards using the savings to achieve improved nutrition, health care, education or quality of life.

Each impact category included in the assessment may have multiple distinct impacts. For example, a solar PV incentive policy may have five distinct sustainable development impacts within a single impact category of jobs: an increase in jobs in the solar installation, operations and maintenance sectors; an increase in jobs in the solar manufacturing sector; an increase in jobs in the solar and grid technology sectors, including mining of rare earth minerals for solar cells; a decrease in jobs in the fossil fuel power plant design, operations and maintenance sectors; and a decrease in jobs in fossil fuel sectors.

To ensure a complete assessment, users should consider a wide range of potential impacts, as outlined in Table 6.1. It is important to identify not only positive and intended impacts, but also potential negative and unintended impacts, to comprehensively assess the total net impact of the policy on the impact categories included in the assessment. In Chapter 7, each impact will be qualitatively assessed to determine whether it is significant. Insignificant impacts will be excluded from the quantitative assessment boundary (for users following a quantitative approach).

FIGURE **6.2**

Intermediate impacts and sustainable development impacts

TABLE **6.1**

Types of impacts, definitions and examples

Type of impact	Definition	Examples for a solar PV incentive policy
Positive and negative	Impacts that are perceived as favourable or unfavourable from the perspectives of different stakeholder groups	Positive: Reduced air pollution from distributed fossil fuel generation Negative: Increased air pollution from solar production, transportation and installation
Intended and unintended	Impacts that are intentional or unintentional, based on the original objectives of the policy, and from the perspective of policymakers and stakeholders (In some contexts, intentional impacts are called primary impacts and unintended impacts are called secondary impacts.)	Intended: Reduced air pollution from distributed fossil fuel generation Unintended: Increased air pollution from solar production, transportation and installation

TABLE **6.1,** continued

Types of impacts, definitions and examples

Type of impact	Definition	Examples for a solar PV incentive policy
Short term and long term	Impacts that are nearer or more distant in time, based on the amount of time between implementation of the policy and the impact	Short term: Increased renewable energy generation from more solar generation Long term: Increased energy independence from reduced imports of fossil fuels
In-jurisdiction and out-of-jurisdiction	Impacts that occur inside the geopolitical boundary over which the implementing entity has authority, such as a city boundary or national boundary, and impacts that occur outside the geopolitical boundary	In-jurisdiction: Increased domestic jobs for solar installation, operations and maintenance Out-of-jurisdiction: Increased jobs in other countries for solar manufacturing, since solar PV is imported
Technology	Changes in technology such as design or deployment of new technologies	Replacement of diesel generators with solar PV technology
Business and consumer	Changes in business practices or behaviour (such as manufacturing decisions), and consumer practices or behaviour (such as purchasing decisions)	Business: Increased business opportunities for solar manufacturing, mining, transportation, solar power plants and grid-associated technologies Consumer: increased disposable household income due to a reduction in energy costs.
Infrastructure	Changes in existing infrastructure or development of new infrastructure	Reduced GHG emissions associated with decreased manufacturing of new fossil fuel generation plants
Market	Changes in supply and demand, prices, market structure or market share	Increased business opportunities for solar installation, operations and maintenance
Life cycle	Changes in upstream and downstream activities, such as extraction and production of energy and materials, or impacts in sectors not targeted by the policy	Increased air pollution from solar PV production, transportation and installation
Macroeconomic	Changes in macroeconomic conditions, such as GDP, income or employment, or structural changes in economic sectors	Increased household and business income and spending due to reduction in energy costs
Trade	Changes in imports and exports	Reduced imports of fossil fuels
Institutional	Changes in institutional arrangements	Establishment of a new government unit to implement the solar PV incentive policy
Distributional	Changes in how income, resources or costs are distributed among a population, or changes among different demographic groups, such as gender or income groups	Increased income for households, institutions and other organizations that install solar PV systems

Source: Adapted from WRI (2014).

The types of impacts in Table 6.1 are intended to guide the development of a comprehensive list of potential impacts. The types of impacts are not mutually exclusive, so each impact will fit into multiple types. For example, a single impact may be positive, intended, in-jurisdiction and long term. Table 6.1 provides users with different lenses to view impacts in different ways, to help identify all potential impacts of the policy. However, the list is neither prescriptive nor exhaustive, and not all types of impacts listed may be relevant to the policy being assessed.

In-jurisdiction and out-of-jurisdiction impacts
It is a *key recommendation* to separately identify and categorize in- and out-of-jurisdiction sustainable development impacts, if relevant and feasible. Users should define the jurisdictional boundary based on what is most relevant, and be transparent about which jurisdictional boundary is used.

Separately tracking in- and out-of-jurisdiction impacts can help link the policy or action to the implementing jurisdiction's sustainable development goals by separating the impacts that affect the jurisdiction's goals from impacts that occur outside the jurisdiction. Separate tracking can also address potential double counting of out-of-jurisdiction impacts between jurisdictions.

Out-of-jurisdiction impacts may be especially relevant for subnational policies that have impacts in other subnational regions within the same country. Transnational impacts in neighbouring countries may also be relevant. Where collecting data from other jurisdictions is difficult, users may need to estimate impacts rather than using the more accurate data-collection methods that can be used within the implementing jurisdiction.

If a single impact is both in-jurisdiction and out-of-jurisdiction and separate tracking is not feasible, users can apportion the impact between in-jurisdiction and out-of- jurisdiction based on assumptions.

6.1.2 Methods for identifying and organizing specific impacts

A variety of methods may be used to identify specific impacts resulting from a policy, including developing a causal chain and using an impact matrix table. For either method, stakeholder consultation, literature review and expert judgment can be used to identify impacts. The methods are not mutually exclusive and should be used in combination to identify all potential impacts.

Each specific impact should be characterized relative to a baseline scenario – that is, the conditions most likely to occur in the absence of the policy. For example, in a country where coal production is increasing significantly over time, jobs in the coal-mining sector may continue to increase even with a new solar PV incentive policy. However, jobs in the coal-mining sector would have increased by a greater amount if the new solar policy did not exist, since the policy reduces demand for coal relative to the baseline scenario. Therefore, the user should identify the impact as a decrease in jobs in the coal-mining sector resulting from the solar PV incentive policy, even though there is no decrease in absolute terms. In Chapters 6 and 7, users should identify and characterize impacts relative to baseline scenarios in conceptual terms, even if baseline scenarios are not explicitly defined. Chapter 8 provides detailed guidance on estimating baseline values in a quantitative assessment and may also be useful when identifying impacts relative to baseline scenarios.

Causal chain
A causal chain is a conceptual diagram tracing the process by which a policy leads to various sustainable development impacts through a series of interlinked logical and sequential stages of cause-and-effect relationships. Developing a causal chain is a useful tool for identifying, organizing and communicating all potential sustainable development impacts of the policy. It helps users and stakeholders understand the logic and underlying assumptions of impacts by showing how the policy leads to changes through a series of intermediate impacts. To identify a comprehensive list of impacts, users should develop a causal chain that includes all potential impacts of the policy within each impact category included in the assessment, to the extent feasible.

To develop the causal chain, users should first identify the proximate (first-stage) intermediate impacts of the policy. It may be useful to first consider the inputs, resources and activities involved in implementing the policy to help identify the proximate impacts, or changes in behaviour, technology, processes or practices. Each first-stage impact represents a distinct "branch" of the causal chain. Each branch of the causal chain may lead to one or more intermediate impacts or sustainable development impacts. Users should extend each branch of the causal chain through a series of cause-and-effect relationships – that is, a series of intermediate effects – until the causal chain leads to all potential sustainable development impacts in the selected impact categories, to the extent feasible.

Figure 6.3 provides an example of a causal chain for a solar PV incentive policy that includes intermediate impacts and sustainable development impacts for one impact category: jobs. Users should identify all intermediate impacts that may lead to sustainable development impacts, and as many sustainable development impacts as possible, considering the types of impacts in Table 6.1.

It is possible that a sustainable development impact in one category may lead to another sustainable development impact in another category. For example, an increase in household income (a sustainable development impact relating to income) that results from a solar PV incentive policy may lead to increased demand for goods and services, which may lead to increased economic activity (a sustainable development impact relating to economic activity). Box 5.2 provides more information on interlinkages between related sustainable development impact categories.

In different situations, it may be more appropriate to develop either (1) a single causal chain that contains all sustainable development impact categories included in the assessment, or (2) separate causal chains for each impact category. Where the number of impact categories is relatively small and where impact categories are interrelated, users may find it useful to include all sustainable development impact categories in a single, integrated causal chain. A single causal chain can help stakeholders understand all impact categories in a single diagram and the relationships between impact categories. On the other hand, if the impact categories included in the assessment are less closely related and do not have many intermediate impacts in common, or if developing an integrated causal chain would be too complex, users can develop separate causal chains for each selected impact category.

Figure 6.4 provides an example of a causal chain that includes multiple impact categories. It can be difficult to include all impact categories and specific impacts within a single causal chain, depending on the number of impact categories and specific impacts identified. Figure 6.4 includes all impact categories included in the assessment, but does not include all specific impacts within each impact category. Figure 6.5 separately illustrates social and economic impacts, rather than combining them in a single diagram.

FIGURE **6.3**

Example of a causal chain for the jobs impact category

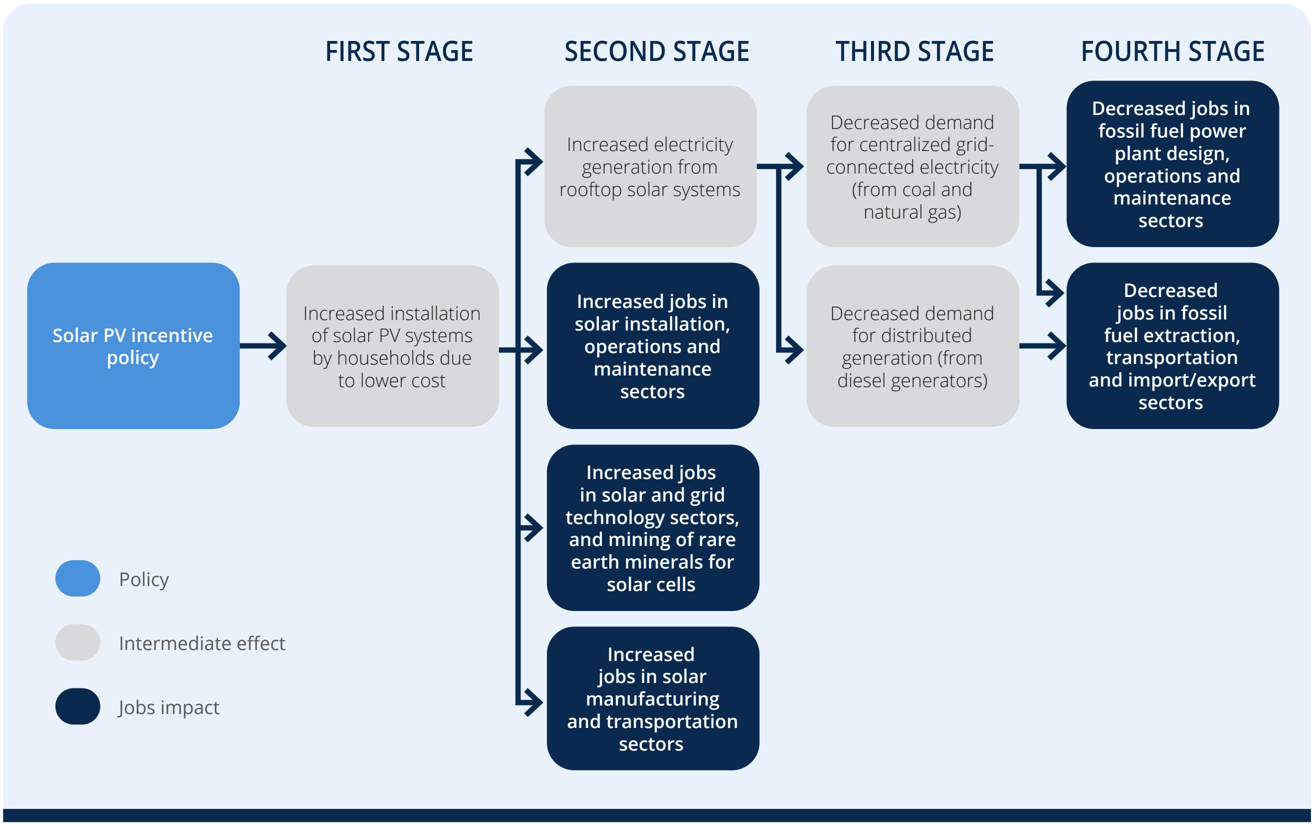


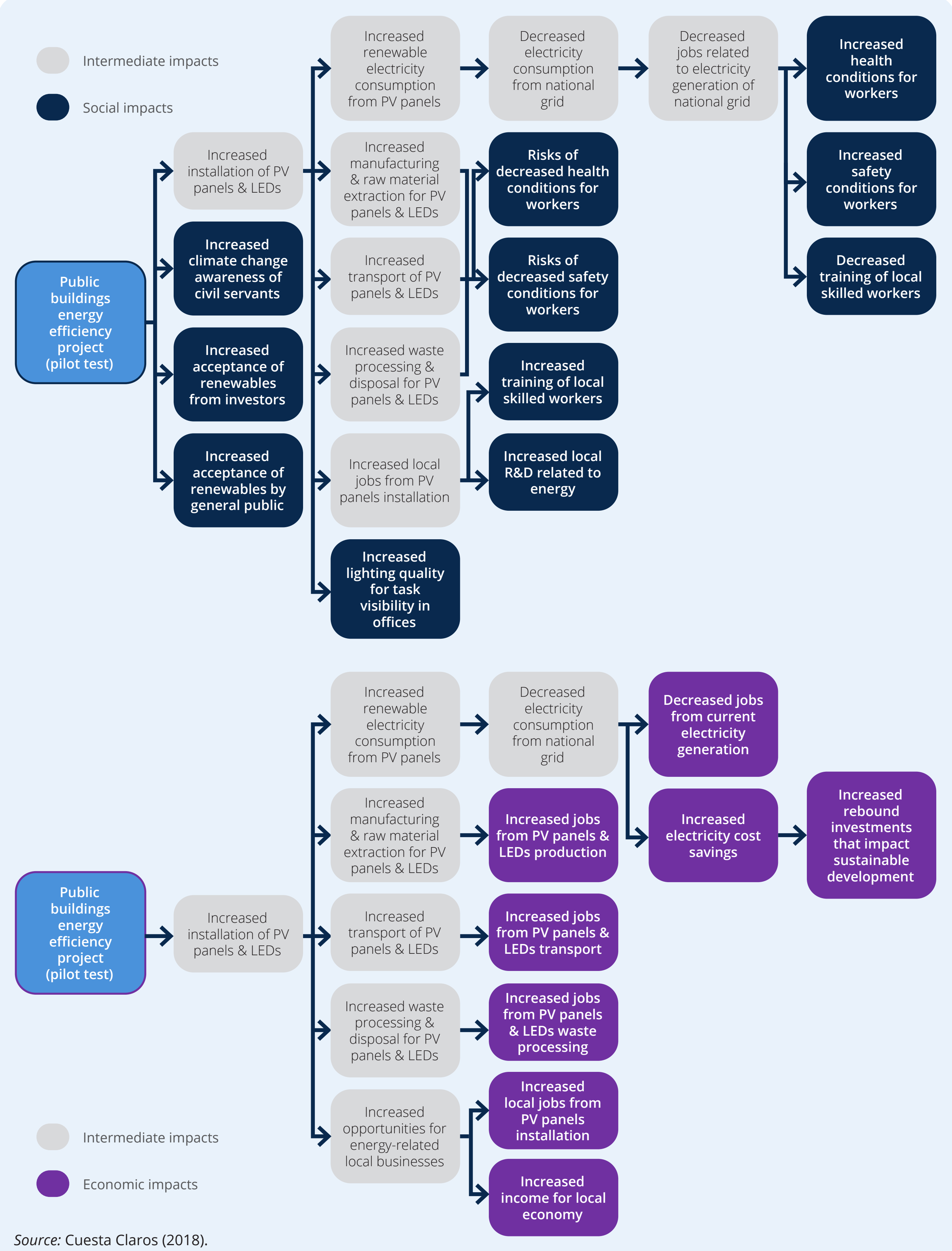
FIGURE **6.4**

Example of a causal chain that includes all impact categories included in the assessment

Note: This example includes all impact categories included in the assessment but does not include all identified specific impacts within each impact category.

FIGURE **6.5**

Example of causal chains that separately illustrate social and economic impacts



Source: Cuesta Claros (2018).

If useful, the causal chain can be colour-coded or include symbols to designate different impact categories or types of impacts, such as positive versus negative impacts or in-jurisdiction versus out-of-jurisdiction impacts.

The causal chain should be as comprehensive as possible, rather than limited by geographic or temporal boundaries. To make the process more practical, users should only include those branches of the causal chain that are reasonably expected to lead to sustainable development impacts in categories selected for assessment. If the causal chain becomes too complex, users can summarize the sustainable development impacts for each branch without mapping each intermediate impact for each stage separately.

Impact matrix table

Users may also find it helpful to develop an impact matrix table to identify specific impacts. To do so, users should select a set of impact types to put in the column headers and a different set of impact types in the row headers. Users then identify impacts for each combination of impact types. Table 6.2 provides an example. Users can develop multiple impact matrix tables for the policy to ensure that all impacts are identified. Note that the purpose of the table is to help identify all potential impacts; whether a specific impact is classified as one type of impact or another is less important than developing a comprehensive list of potential impacts.

6.1.3 Literature review, stakeholder consultations and expert judgment

Users should review literature and conduct stakeholder consultations when identifying impacts and developing a causal chain or impact matrix table. Users can also use expert judgment to supplement these efforts.

To the extent feasible, users should review prior assessments or case studies of similar policies and impact categories. Additional literature that may be useful includes regulations, development plans, regulatory impact analyses, environmental impact assessments, risk assessments and economic studies. It may also be useful to refer to guidance or methods that are sector-specific and/or impact-category-specific. The ICAT website provides references to methods and models for assessing specific impacts, which can help users identify impacts.[22]

Users should also consult relevant experts and stakeholders when identifying impacts and constructing the causal chain. Different stakeholder groups approach a policy from different perspectives. By conducting stakeholder consultations to identify impacts, users can enhance the completeness of the impacts identified, identify and address possible unintended or negative impacts early on, and increase acceptance of the final assessment results. Stakeholder consultation may include interviews, surveys or focus groups. Chapter 8 of the ICAT *Stakeholder Participation Guide* provides information on how to consult stakeholders.

TABLE **6.2**

Example of an impact matrix table for an illustrative solar PV incentive policy for the jobs impact category

Type of impact	Short term	Long term
Intended	**Increased** jobs in domestic solar PV installation, operations and maintenance sectors	**Increased** jobs in domestic solar PV manufacturing sector
Unintended	**Reduced** jobs in domestic fossil fuel sector	

Note: Increases in jobs are in green, and decreases in jobs are in red.

[22] https://climateactiontransparency.org/icat-toolbox/sustainable-development

6.2 Describe and report specific impacts

Communicating all identified impacts helps stakeholders understand the various impacts of the policy, and helps users determine the most relevant impacts to assess in a transparent and consistent manner. This is important to enable decision makers to take actions to address any negative impacts and enhance positive impacts.

Users should report all identified sustainable development impacts using a causal chain and a table format, if relevant and feasible. Reporting impacts using a causal chain helps users and decision makers understand in visual terms how the policy leads to changes across sustainable development impact categories. This can be useful for enhancing policy design, improving understanding of policy effectiveness and communicating the impacts of the policy to stakeholders. Reporting the impacts using a table format, such as the reporting template, helps users undertake the steps in the following chapters by using a single template.

To provide clarity for each identified impact, users should describe the direction of change (increase or decrease), and the underlying logic and causal relationship of how the impact is expected to occur. For example, impacts on jobs resulting from a solar PV incentive policy may include an "increase in jobs in solar manufacturing due to increased demand", an "increase in jobs in solar PV installation due to increased demand" and a "decrease in jobs in the coal-mining sector due to decreased demand". The level of detail will depend on the user's objectives and context.

When reporting impacts using a table format, users should report all identified sustainable development impacts but, to keep the report simple for readers, it is not necessary to include intermediate impacts. Users should specify the impact category for each impact and whether it is in-jurisdiction, out-of-jurisdiction or mixed. If it would be helpful, users can report the type of impact, such as intended or unintended, short term or long term, or positive or negative, and the methods or sources used to identify each impact. Table 6.3 provides a reporting template that can be used to report the identified impacts, using an illustrative example of a solar PV incentive policy.

TABLE **6.3**

Example of reporting impacts using reporting template for a solar PV incentive policy

Impact categories included in the assessment (from Chapter 5)	Specific impacts identified (within each impact category)	In- or out-of-jurisdiction	Type of impacts (optional)	Methods/ sources used to identify impacts (optional)
Climate change mitigation	Reduced GHG emissions from grid-connected fossil fuel–based power plants	In		
	Reduced GHG emissions from distributed fossil fuel generation	In		
	Reduced GHG emissions associated with manufacturing of new fossil fuel generation plants	In		
	Reduced GHG emissions from fossil fuel extraction and transportation	Both		
	Increased GHG emissions from solar PV production	Both		
	Increased GHG emissions from solar PV transportation and installation	In		
	Increased GHG emissions from increased production of goods and services due to increased income	In		

TABLE **6.3,** continued

Example of reporting impacts using reporting template for a solar PV incentive policy

Impact categories included in the assessment (from Chapter 5)	Specific impacts identified (within each impact category)	In- or out-of-jurisdiction	Type of impacts (optional)	Methods/ sources used to identify impacts (optional)
Air quality/ health impacts of air pollution	Reduced air pollution from grid-connected fossil fuel–based power plants	In		
	Reduced air pollution from distributed fossil fuel generation	In		
	Reduced indoor air pollution from traditional use of biomass	In		
	Reduced air pollution from manufacturing of new fossil fuel generation plants	In		
	Reduced air pollution from fossil fuel extraction and transportation	Both		
	Increased air pollution from solar PV production	Both		
	Increased air pollution from solar PV transportation and installation	Both		
	Increased air pollution from increased production of goods and services due to increased income	In		
Waste generation and disposal	Decreased waste generation and disposal from reduced fossil fuel generation (e.g. coal ash)	In		
	Decreased waste generation and disposal from reduced fossil fuel production and transportation	Both		
	Increased waste generation and disposal from increased solar mining and panel production (e.g. silicon tetrachloride waste)	Both		
	Increased waste generation and disposal from discarded solar panels (e.g. cadmium and tellurium)	In		
Renewable energy generation	Increased renewable energy generation from increased solar generation	In		
Access to clean, affordable and reliable energy	Increased access to clean, affordable and reliable electricity	In		
	Decreased access to electricity due to fewer new coal power plants	In		
Capacity, skills and knowledge development	Increase in training for skilled workers in solar-relevant sectors	Both		
	Decrease in training for skilled workers in fossil fuel sectors	Both		

TABLE **6.3**, continued

Example of reporting impacts using reporting template for a solar PV incentive policy

Impact categories included in the assessment (from Chapter 5)	Specific impacts identified (within each impact category)	In- or out-of-jurisdiction	Type of impacts (optional)	Methods/ sources used to identify impacts (optional)
Quality and safety of working conditions	Increased safety and working conditions due to more jobs in the solar installation sector, where workers have better working conditions	In		
	Increased safety and working conditions due to fewer jobs in the coal sector, where workers have worse working conditions	Both		
	Decreased safety and working conditions due to more jobs in silica mining and solar cell manufacturing, where workers have worse working condition (e.g. the lung disease silicosis, exposure to hydrofluoric acid and cadmium)	Both		
Jobs	Increased jobs in the solar installation, operations and maintenance sectors	In		
	Increased jobs in the solar panel manufacturing sector	Both		
	Increased jobs in the solar and grid technology sectors, and mining of rare earth minerals for solar cells	Both		
	Decreased jobs in the fossil fuel power operations and maintenance sectors	In		
	Decreased jobs in fossil fuel sectors	Both		
	Decreased job in fossil fuel generation technology sectors (e.g. supercritical and ultra-supercritical generation)	Both		
Income	Increased income for households, institutions and other organizations due to reduction in energy costs	In		
New business opportunities	Increased business opportunities for solar manufacturing, mining, transportation, solar power plants and grid-associated technologies	Both		
	Decreased business opportunities for fossil fuel extraction and transportation, fossil fuel power plants, and fossil fuel–generated associated technologies	Both		
Energy independence	Increased energy independence from reduced imports of fossil fuels (e.g. oil and gas)	In		
	Decreased energy independence from foreign control over scarce resources needed to manufacture solar panels	In		

7 Qualitatively assessing impacts

This chapter provides guidance on assessing sustainable development impacts qualitatively. This step is relevant for users who are following either a qualitative or a quantitative approach, and for either ex-ante or ex-post assessment. The chapter explains how to qualitatively assess each specific impact identified in Chapter 6 and summarize the qualitative assessment results for each impact category.

For users following a quantitative approach, this qualitative step is used to prioritize which specific impacts to quantify in later chapters. The quantitative assessment boundary (defined in Chapter 8) should include all impacts determined to be significant based on the qualitative assessment in this chapter, where feasible.

Checklist of key recommendations

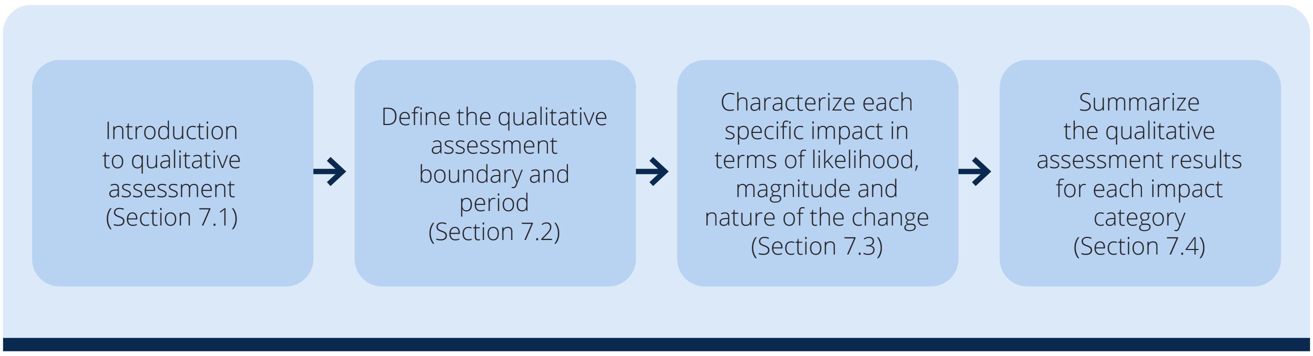
- Include all impact categories included in Chapter 5 and all specific impacts identified in Chapter 6 in the qualitative assessment boundary
- Define the assessment period
- Characterize each identified impact identified in Chapter 6 based on the likelihood that each impact will occur, the magnitude of each impact and the nature of the change (positive or negative)
- Based on the assessment of likelihood and magnitude, determine which identified impacts are significant, in consultation with stakeholders
- Summarize the qualitative assessment results for each impact category, taking into account all significant impacts
- Separately assess the impacts of the policy on different groups in society, where relevant

7.1 Introduction to qualitative assessment

Qualitative assessment is an impact assessment approach that involves describing the impacts of a policy on selected impact categories in qualitative terms. This is in contrast to quantitative assessment,

FIGURE **7.1**

Overview of steps in the chapter



which involves estimating the impacts of a policy on selected impact categories in quantitative terms.

Qualitative assessment is simpler and requires fewer resources than quantitative assessment (outlined in later chapters). In some cases, the qualitative approach to impact assessment may be sufficient to meet the stated objectives of the assessment. However, the qualitative approach does not enable an accurate or quantified estimate of the impacts of a policy, which limits its ability to meet a wider set of objectives relating to understanding policy impact with greater certainty.

A qualitative assessment can use both qualitative and quantitative data. Qualitative data can be used to describe concepts that are harder to measure, such as quality, behaviour or experiences. Quantitative data can be used to measure or estimate quantities such as cost, time, area and energy. Whereas quantitative data can show how a policy is progressing and whether it has led to a given impact, qualitative methods (e.g. stakeholder interviews, focus groups, case studies) can show a more nuanced story of change, such as how or why a change happened for specific stakeholders, who has benefited and why, and experiences or impacts for different stakeholder groups. This qualitative information can help policymakers improve the policy over time. It can provide additional insights into a policy's specific local context and impacts, from experiences and perspectives of affected stakeholders.

In certain cases, qualitative assessments can be more subjective and uncertain than quantitative assessments. They can therefore lead to inaccurate and misleading results if they are not combined with a quantitative assessment. Depending on the level of sampling of different stakeholder groups, qualitative assessments can also be limited in coverage and therefore not representative of broader conditions or impacts, which can produce less reliable results and less ability to generalize impacts. Therefore, it can be helpful to use a combination of qualitative and quantitative data and approaches. For more information on qualitative methods, see Appendix C.

7.2 Define the qualitative assessment boundary and period

The qualitative assessment boundary defines the scope of the qualitative assessment in terms of the range of dimensions, impact categories and specific impacts that are included in the qualitative assessment. It is a *key recommendation* to include all impact categories included in Chapter 5 and all specific impacts identified in Chapter 6 in the qualitative assessment boundary.

Both short-term and long-term impacts may result from a policy, as identified in Chapter 6. It is a *key recommendation* to define the assessment period. The assessment period is the time period over which impacts resulting from the policy are assessed. The assessment period can be shorter or longer than the policy implementation period (i.e. the period during which the policy is in effect).

For an ex-ante assessment, users should consider the assessment objectives and stakeholders' needs when determining the assessment period. For example, a five-year assessment period may be appropriate if the objective is to inform policymakers on sustainable development progress by the end of a five-year planning cycle. If the objective is to understand the expected contribution of the policy towards achieving a country's NDC, it may be most appropriate to align the assessment period with the NDC implementation period (e.g. ending in 2030). Similarly, to align the results with the achievement of SDGs under the 2030 Agenda for Sustainable Development, users may define an assessment period ending in 2030. To align with longer-term trends and planning, users should select an end date such as 2040 or 2050. If the objective is to have a comprehensive understanding of all impacts resulting from the policy, the assessment period should be based on when the full range of impacts are expected to occur.

For an ex-post assessment, the assessment period can be the period between the date the policy is implemented and the date of the assessment, or a shorter period between these two dates. The assessment period for a combined ex-ante and ex-post assessment should consist of both an ex-ante assessment period and an ex-post assessment period.

In addition, users can separately estimate and report impacts over any other time periods that are relevant. For example, if the assessment period is 2020–2040, a user may separately estimate and report impacts over the periods 2020–2030, 2030–2040 and 2020–2040.

If an appropriate assessment period cannot easily be determined, users can use short-term, medium-term or long-term classifications to define the assessment period. Table 7.1 provides rules of thumb for assessment period lengths. Users can also define the time periods differently; in this case, users should report the time periods used.

TABLE **7.1**

Rules of thumb for ex-ante assessment periods

Assessment period	Approximate assessment period
Short term	<5 years
Medium term	≥5 years and <15 years
Long term	≥15 years

Users who are assessing the GHG impacts and/or transformational impacts of the policy, following other ICAT methodologies, should align the assessment periods between the assessments to ensure a consistent and integrated assessment, or explain why there are differences in the assessment periods.

7.3 Characterize each specific impact in terms of likelihood, magnitude and nature of the change

It is a *key recommendation* to characterize each specific impact identified in Chapter 6 based on:

- the likelihood that each impact will occur
- the magnitude of each impact
- the nature of the change (positive or negative).

Based on the assessment of likelihood and magnitude, it is a *key recommendation* to determine which identified impacts are significant, in consultation with stakeholders. Assessing the significance of each specific impact is an important step for the qualitative assessment. It is also useful when identifying the specific impacts to be included in the quantitative assessment boundary, where significance is used to determine which impacts should be quantified (in Section 8.1).

The following steps can be used to characterize each specific impact:

- Step 1. Assess the likelihood that each sustainable development impact will occur.
- Step 2. Assess the expected magnitude of each sustainable development impact.
- Step 3. Determine which identified impacts are significant, based on their likelihood and expected magnitude.
- Step 4. Determine the nature of the change (positive or negative).
- Step 5. Report the results.

7.3.1 Step 1: Assess the likelihood that each sustainable development impact will occur

For each sustainable development impact identified in Chapter 6, users should assess the likelihood that it will occur by classifying each impact according to the options in Table 7.2. For ex-ante assessments, this involves predicting the likelihood of each impact occurring in the future as a result of the policy. For ex-post assessments, it involves assessing the likelihood that the impact occurred in the past as a result of the policy, since impacts may have occurred during the assessment period for reasons unrelated to the policy being assessed. If a given impact is unlikely to occur, the impacts that follow from that impact can also be considered unlikely to occur. If users cannot determine the likelihood of a specific impact, it should be classified as “possible”.

TABLE **7.2**

Assessing likelihood of sustainable development impacts

Likelihood	Description	Approximate likelihood (rule of thumb)
Very likely	Reason to believe the impact will happen (or did happen) as a result of the policy.	≥90%
Likely	Reason to believe the impact will probably happen (or probably happened) as a result of the policy.	<90% and ≥66%
Possible	Reason to believe the impact may or may not happen (or may or may not have happened) as a result of the policy. About as likely as not. Cases where the likelihood is unknown or cannot be determined should be considered possible.	<66% and ≥33%
Unlikely	Reason to believe the impact probably will not happen (or probably did not happen) as a result of the policy.	<33% and ≥10%
Very unlikely	Reason to believe the impact will not happen (or did not happen) as a result of the policy.	<10%

Source: Adapted from WRI (2014).

To the extent possible, the likelihood classification should be based on evidence, such as published studies on similar policies and impact categories in the same or other jurisdictions, prior experience, modelling results, risk management methods, life cycle assessment (LCA) databases and studies, relevant media reports, consultation with stakeholders, and expert judgment.

Users can conduct other types of qualitative studies, including longitudinal impact assessment, sampling, interviews and ethnography, to inform the assessment. Appendix C provides an overview of qualitative research methods.

Because the determination can be subjective, users should solicit multiple viewpoints and consult stakeholders when assessing the likelihood of impacts. The ICAT *Stakeholder Participation Guide* (Chapter 8) provides more information on how to consult with stakeholders.

7.3.2 Step 2: Assess the expected magnitude of each sustainable development impact

Next, users should classify the magnitude of each sustainable development impact as major, moderate or minor (see Table 7.3).

It is not necessary to accurately calculate the relative magnitude of sustainable development impacts at this stage, but the classification should be based on evidence, to the extent possible. Evidence may include published studies on similar policies and impact categories in the same or other jurisdictions, prior experience, modelling results, LCA databases and studies, relevant media reports, consultation with experts and stakeholders, and expert judgment. Appendix C provides an overview of qualitative research methods.

If no data or evidence exist to estimate relative magnitudes, expert judgment and stakeholder consultation should be used to classify impacts as major, moderate or minor. If this is not possible, users should classify a given impact as “uncertain” or “cannot be determined”.

Magnitude represents the degree of change resulting, or expected to result, from the policy. Conceptually, the degree of change should be characterized relative to a baseline scenario that represents the events or conditions that would most likely occur in the absence of the policy. Since this is a qualitative assessment, this step does not require a detailed baseline assessment.

TABLE **7.3**

Estimating relative magnitude of sustainable development impacts

Relative magnitude	Description
Major	The change in the impact category is (or is expected to be) substantial in size (either positive or negative).[a] The impact significantly influences the effectiveness of the policy with respect to that impact category.
Moderate	The change in the impact category is (or is expected to be) moderate in size (either positive or negative).[a] The impact somewhat influences the effectiveness of the policy with respect to that impact category.
Minor	The change in the impact category is (or is expected to be) insignificant in size (either positive or negative).[a] The impact is inconsequential to the effectiveness of the policy with respect to that impact category.

Source: Adapted from WRI (2014).

[a] The magnitude of the change should be considered relative to the broader conditions relating to the impact category or to the maximum potential impact from policy options considered feasible.

When determining the magnitude of the change, it may be useful to consider the extent of the area affected by the policy, such as:

- a single site (e.g. the impacts are restricted to areas within the boundaries of the site)
- local impacts (e.g. affecting the water supplies of a local community)
- regional impacts (e.g. affecting habitat areas that support species of regional significance)
- national impacts
- international impacts.

It may be useful to consider the duration of the change in terms of the length of time over which impacts may occur, such as short term (up to 5 years), medium term (5–15 years) and long term (greater than 15 years).

It may also be useful to consider the size of the groups (e.g. businesses or consumers) affected by the policy and the scale of change in the underlying activities (e.g. change in vehicle kilometres travelled or electricity consumption).

Determining whether an impact is major, moderate or minor requires comparing the expected impact with a reference point. Users should choose a reference point that produces the most meaningful results based on the specific context and circumstances.

In general, users should assess the magnitude of each impact relative to the broader conditions relating to a given impact category (e.g. total level of air pollution in a region or total number of jobs), rather than in comparison with other impacts resulting from the policy.

Users can also classify impacts as major, moderate or minor in relation to the maximum level of impact considered feasible from various policy options available in a jurisdiction (e.g. the maximum level of air quality improvement or job creation considered feasible and realistic). Users should report the approaches and reference points used to determine the magnitude of impacts.

For example, a solar PV incentive policy may have three impacts in the impact category of air quality. Each impact should be assessed relative to the broader conditions – absolute levels of air pollution in the region – to determine whether it is minor, moderate or major. The determination of magnitude can alternatively be in relation to the maximum level of air pollution reduction considered feasible from various policy options that are available. See Box 7.1 for an example. Note that impacts should be compared based on their absolute value, regardless of whether each impact is increasing or decreasing.

BOX **7.1**

Example of using estimates to assess relative magnitude of impact for a solar PV incentive policy

A solar PV incentive policy has multiple impacts on the impact category of air quality, as measured by the indicator of sulfur dioxide (SO_2) emissions. These include (1) reduced SO_2 emissions from fossil fuel combustion at power plants (assumed to be approximately 5,000 kg/year), (2) reduced SO_2 emissions from extraction and transportation of fossil fuels (assumed to be approximately 2,000 kg/year) and (3) increased SO_2 emissions from extraction and transportation of materials associated with solar panels (assumed to be approximately 200 kg/year).

Users should first decide the reference point to be used. In this case, the user decides to use the maximum potential impact from policy options considered feasible as the reference point, and estimates that quantity to be approximately 50,000 kg/year. Next, the user compares the approximate magnitude of each impact in relation to the reference point. The relative magnitude of "reduced SO_2 emissions from fossil fuel combustion" is 10% (5,000 divided by 50,000), the relative magnitude of "reduced SO_2 emissions from extraction and transportation of fossil fuels" is 4% (2,000 divided by 50,000), and the relative magnitude of "increased SO_2 emissions from extraction and transportation of materials associated with solar panels" is 0.4% (200 divided by 50,000). Based on this estimation, the first impact is considered major, the second impact is considered moderate and the third impact is considered minor.

7.3.3 Step 3: Determine which identified impacts are significant, based on their likelihood and expected magnitude

Once the likelihood and magnitude of each impact have been determined, users should combine the scores on likelihood and magnitude to determine whether each impact is significant. In general, users should consider impacts to be significant unless they are either minor in size, or unlikely or very unlikely to occur (see Figure 7.2). Depending on the context and assessment objectives, users can adopt other approaches to determining the significance of impacts, such as considering unlikely impacts that are major or moderate to be significant. Users should use a consistent approach to determining significance across all impacts. Both positive and negative impacts should be considered equally significant based on the same likelihood and magnitude criteria, to avoid a bias towards either positive or negative impacts. Users can separately assess positive impacts and negative impacts.

7.3.4 Step 4: Determine the nature of the change (positive or negative)

Users should characterize each sustainable development impact identified in Chapter 6 as positive, negative or neutral. For example, an increase in available habitat area for a key species would be classified as positive, whereas habitat loss would be considered negative. The determination should be based on the perspectives of the user, policymakers and affected stakeholders. If it is not possible to determine whether the net impact is positive or negative, users should classify the impact as "unknown" or "cannot be determined".

7.3.5 Step 5: Report the results

Users should report the outcomes of the qualitative assessment for each specific impact – that is, the likelihood, relative magnitude and nature of the change, and whether each impact is significant – and the methods and sources used. Table 7.5 provides a reporting template that can be used.

Box 7.2 provides a case study of consulting stakeholders during the qualitative assessment process.

FIGURE **7.2**

Recommended approach for determining significance, based on likelihood and magnitude

<table>
<tr><th rowspan="2">Relative magnitude</th><th colspan="3">Magnitude</th></tr>
<tr><th>Minor</th><th>Moderate</th><th>Major</th></tr>
<tr><td>Very likely</td><td rowspan="5">Insignificant</td><td colspan="2" rowspan="3">Significant</td></tr>
<tr><td>Likely</td></tr>
<tr><td>Possible</td></tr>
<tr><td>Unlikely</td><td colspan="2" rowspan="2"></td></tr>
<tr><td>Very unlikely</td></tr>
</table>

Source: Adapted from WRI (2014).

BOX **7.2**

Using stakeholder consultation to qualitatively assess impacts in Malawi

The Initiative for Climate Action and Development in Malawi applied the ICAT *Sustainable Development Methodology* to assess the impacts of the Farmer Field Schools Approach, an element of the Malawi National Climate Change Management Policy. The project was an ex-post assessment of the environmental, social and economic impacts of a group of initiatives addressing pesticide risk reduction, poverty alleviation, the mainstreaming of climate change impacts in the irrigation sector, agricultural productivity and diversification, value chain and business development, and governance.

The objective was to assess policy effectiveness by determining whether actions are being implemented as planned and delivering intended results across multiple impact categories and across different groups in society. The findings will be used to improve policy design and implementation.

The impact categories, specific impacts and indicators assessed were drawn from the National Climate Change Management Policy, the objectives of programme donors, and selected indicators from the SDGs. Because of a lack of quantitative data, the project team carried out a qualitative assessment, using a mixed methods approach of literature review, case studies and stakeholder consultation.

The project team developed assessment questionnaires that included all the identified impact categories, specific impacts and indicators. Respondents were asked to qualitatively assess the impacts for each indicator in terms of likelihood, magnitude, positive or negative impact, and whether the impact was significant. Interviews and focus groups with identified stakeholders were carried out by enumerators who had completed training specifically for this project.

Target groups of stakeholders for the interviews were district government officials, representatives from non-governmental/civil society organizations, and community stakeholders (mostly participants in the Farmer Field Schools). Care was taken to ensure that marginalized groups were included in the consultation process. To identify community stakeholders, the project leads consulted the National Youth Network on Climate Change, the Coalition of Women Farmers and the Federation of Disability Organizations in Malawi. In total, 401 people were engaged, of whom 203 responded; respondents were evenly distributed across regions and groups of stakeholders.

Table 7.4 provides examples of qualitative assessment results from the stakeholder respondents.

BOX **7.2,** continued

Using stakeholder consultation to qualitatively assess impacts in Malawi

TABLE **7.4**

Examples of stakeholder responses for one programme

Dimension	Summary of stakeholder responses
Environmental impacts	• Water, land and waste impacts were considered to be likely, of major magnitude, positive and significant. • Water acidification was considered to be very likely, of major magnitude, significant and negative.
Social impacts	• Health and well-being, education and culture, and welfare and equality indicators were considered to be likely, of major magnitude, positive and significant. • Institutions and laws, indicators of public participation in policymaking, and access to administrative and judicial remedies were considered to be likely, of only moderate impact and positive. • Labour rights and youth labour conditions were considered to be unlikely and not significant. • Quality of jobs and fairness of wages were considered not applicable by the respondents.
Economic impacts	• Jobs, wages and worker productivity indicators were marked as not applicable by respondents. • Business and technology, growth in new sustainable industries, and innovation were considered to be very likely, of major magnitude, positive and significant.

The results included a recommendation to introduce a quantitative aspect to performance measurement in the future, which can be used to define objectives, measure baseline data and track performance through a database.

7.4 Summarize the qualitative assessment results for each impact category

As the last step of the qualitative assessment, it is a *key recommendation* to summarize the qualitative assessment results for each impact category, taking into account all significant impacts. This involves summarizing the net impact of the policy on each impact category in descriptive terms, based on the qualitative assessment of specific impacts.

Users should comprehensively consider all significant impacts within each impact category, taking into account the magnitude and likelihood of both positive and negative impacts, and provide a succinct summary of the qualitative results for each impact category. Users should conclude that the policy has an overall positive or negative impact on a given impact category if the assessment of each significant impact is either positive or negative. If the results are mixed and the conclusion is not clear for a given impact category, users should provide a balanced summary that includes both positive and negative impacts. See Table 7.5 for an example of summarizing the qualitative assessment results.

It is a *key recommendation* to separately assess the impacts of the policy on different groups in society, where relevant. If relevant and feasible, users should separately summarize the conclusions for in-jurisdiction and out-of-jurisdiction impacts. Users should consult stakeholders when summarizing the assessment results to ensure that the qualitative summary properly characterizes the impact for each impact category. Stakeholders should be informed about the methods and sources used to determine the likelihood and magnitude of impacts. If insignificant impacts are deemed important by stakeholders, users should acknowledge the existence of such impacts in the summary.

TABLE **7.5**

Reporting the qualitative assessment results for a solar PV incentive policy

Chapter 5	Chapter 6 (identify specific impacts)		
Impact categories included in the assessment	Specific impacts identified	In- or out-of-jurisdiction	Type of impacts (optional)
Climate change mitigation	Reduced GHG emissions from grid-connected fossil fuel–based power plants	In	
	Reduced GHG emissions from distributed fossil fuel generation	In	
	Reduced GHG emissions associated with manufacturing of new fossil fuel generation plants	In	
	Reduced GHG emissions from fossil fuel extraction and transportation	Both	
	Increased GHG emissions from solar production, transportation and installation	Both	
	Increased GHG emissions from increased production of goods and services due to increased income	In	
Air quality/health impacts of air pollution	Reduced air pollution from grid-connected fossil fuel–based power plants	In	
	Reduced air pollution from distributed fossil fuel generation	In	
	Reduced indoor air pollution from traditional use of biomass	In	
	Reduced air pollution from manufacturing of new fossil fuel generation plants	In	
	Reduced air pollution from fossil fuel extraction and transportation	Both	
	Increased air pollution from solar PV production, transportation and installation	Both	
	Increased air pollution from increased production of goods and services due to increased income	In	
Waste generation and disposal	Decreased waste generation and disposal from reduced fossil fuel generation (e.g. coal ash)	In	
	Decreased waste generation and disposal from reduced fossil fuel production and transportation	Both	
	Increased waste generation and disposal from increased solar production (e.g. silicon tetrachloride waste)	Both	
	Increased waste generation and disposal from discarded solar panels (e.g. cadmium and tellurium)	In	
Energy	Increased renewable energy generation from increased solar generation	In	
Access to clean, affordable and reliable energy	Increased access to clean, affordable and reliable electricity	In	
	Decreased access to electricity due to fewer new coal power plants	In	

TABLE **7.5**, continued

Reporting the qualitative assessment results for a solar PV incentive policy

Chapter 5	Chapter 6 (identify specific impacts)		
Impact categories included in the assessment	**Specific impacts identified**	**In- or out-of-jurisdiction**	**Type of impacts (optional)**
Capacity, skills and knowledge development	Increase in training for skilled workers in solar-relevant sectors	Both	
	Decrease in training for skilled workers in fossil fuel sectors	Both	
Quality and safety of working conditions	Increased safety and working conditions due to more jobs in the solar installation sector, where workers have better working conditions	Both	
	Increased safety and working conditions due to fewer jobs in the coal sector, where workers have worse working conditions	Both	
	Decreased safety and working conditions due to more jobs in silica mining and solar cell manufacturing, where workers have worse working condition (e.g. the lung disease silicosis, exposure to hydrofluoric acid and cadmium)	Both	
Jobs	Increased jobs in the solar installation, operations and maintenance sectors	In	
	Increased jobs in the solar panel manufacturing sector	Both	
	Increased jobs in the solar and grid technology sectors, and mining of rare earth minerals for solar cells	Both	
	Decreased jobs in the fossil fuel power operations and maintenance sectors	In	
	Decreased jobs in fossil fuel sectors	Both	
	Decreased jobs in fossil fuel generation technology sectors (e.g. supercritical and ultra-supercritical generation)	Both	
Income	Increased income for households, institutions and other organizations due to reduction in energy costs	In	
New business opportunities	Increased business opportunities for solar manufacturing, mining, transportation, solar power plants and grid-associated technologies	Both	
	Decreased business opportunities for fossil fuel extraction, transportation, fossil fuel power plants, and fossil fuel–generated associated technologies	Both	
Energy independence	Increased energy independence from reduced imports of fossil fuels	In	
	Decreased energy independence from foreign control over scarce resources needed to manufacture solar panels	In	

TABLE **7.5,** part II

Reporting the qualitative assessment results for a solar PV incentive policy

Chapter 5	Chapter 7 (Qualitatively assess impacts)						
Impact categories included in the assessment	**Specific impacts identified**	**Likelihood**	**Magnitude**	**Positive or negative impact**	**Significant?**	**Summary of qualitative assessment results for each impact category**	**Methods/ sources used**
Climate change mitigation	Reduced GHG emissions from grid-connected fossil fuel–based power plants	Very likely	Major	Positive	Yes	Major positive impact from displacing fossil fuel electricity with solar electricity. Although negative impacts do exist, they are insignificant.	Stakeholder consultation
	Reduced GHG emissions from distributed fossil fuel generation	Unlikely	Moderate	Positive	No		Reference: Timmons (2012)
	Reduced GHG emissions associated with manufacturing of new fossil fuel generation plants	Unlikely	Minor	Positive	No		Stakeholder consultation
	Reduced GHG emissions from fossil fuel extraction and transportation	Possible	Moderate	Positive	Yes		Reference: Clear Air Task Force (2001)
	Increased GHG emissions from solar production, transportation and installation	Likely	Minor	Negative	No		Reference: Mulvaney (2014)
	Increased GHG emissions from increased production of goods and services due to increased income	Likely	Minor	Negative	No		Reference: Druckman and Jackson (2008)

TABLE **7.5,** part II – continued

Reporting the qualitative assessment results for a solar PV incentive policy

Chapter 5	Chapter 7 (Qualitatively assess impacts)						
Impact categories included in the assessment	**Specific impacts identified**	**Likelihood**	**Magnitude**	**Positive or negative impact**	**Significant?**	**Summary of qualitative assessment results for each impact category**	**Methods/ sources used**
Air quality/ health impacts of air pollution	Reduced air pollution from grid-connected fossil fuel–based power plants	Very likely	Major	Positive	Yes	Major positive impact from displacing fossil fuel electricity with solar electricity. Although negative impacts do exist, they are insignificant.	Stakeholder consultation
	Reduced air pollution from distributed fossil fuel generation	Unlikely	Major	Positive	No		Stakeholder consultation
	Reduced indoor air pollution from traditional use of biomass	Very likely	Major	Positive	Yes		Reference: Fullerton, Bruce and Gordon (2008)
	Reduced air pollution from manufacturing of new fossil fuel generation plants	Likely	Minor	Positive	No		Expert judgment
	Reduced air pollution from fossil fuel extraction and transportation	Possible	Moderate	Positive	Yes		Reference: Clear Air Task Force (2001)
	Increased air pollution from solar PV production, transportation and installation	Likely	Minor	Negative	No		Reference: Mulvaney (2014)
	Increased air pollution from increased production of goods and services due to increased income	Likely	Minor	Negative	No		Reference: Druckman and Jackson (2008)

TABLE **7.5,** part II – continued

Reporting the qualitative assessment results for a solar PV incentive policy

Chapter 5	Chapter 7 (Qualitatively assess impacts)						
Impact categories included in the assessment	**Specific impacts identified**	**Likelihood**	**Magnitude**	**Positive or negative impact**	**Significant?**	**Summary of qualitative assessment results for each impact category**	**Methods/ sources used**
Waste generation and disposal	Decreased waste generation and disposal from reduced fossil fuel generation (e.g. coal ash)	Very likely	Moderate	Positive	Yes	Major positive impacts from reducing fossil fuel extraction, transportation and consumption, which outweigh moderate or insignificant negative impacts from solar-related mining and solar panel disposal	Reference: Clear Air Task Force (2001)
	Decreased waste generation and disposal from reduced fossil fuel production and transportation	Very likely	Major	Positive	Yes		Reference: Clear Air Task Force (2001)
	Increased waste generation and disposal from increased solar production (e.g. silicon tetrachloride waste)	Likely	Moderate	Negative	Yes		Reference: Mulvaney (2014)
	Increased waste generation and disposal from discarded solar panels (e.g. cadmium and tellurium)	Possible	Minor	Positive	No		Reference: Mulvaney (2014)
Energy	Increased renewable energy generation from increased solar generation	Very likely	Major	Positive	Yes	Major positive impact from increase in solar electricity	Stakeholder consultation

TABLE **7.5,** part II – continued

Reporting the qualitative assessment results for a solar PV incentive policy

Chapter 5	Chapter 7 (Qualitatively assess impacts)						
Impact categories included in the assessment	**Specific impacts identified**	**Likelihood**	**Magnitude**	**Positive or negative impact**	**Significant?**	**Summary of qualitative assessment results for each impact category**	**Methods/ sources used**
Access to clean, affordable and reliable energy	Increased access to clean, affordable and reliable electricity	Very likely	Major	Positive	Yes	Major positive impact from increased solar electricity, which outweighs unlikely, insignificant negative impact	Stakeholder consultation
	Decreased access to electricity due to fewer new coal power plants	Unlikely	Minor	Negative	No		Stakeholder consultation
Capacity, skills and knowledge development	Increase in training for skilled workers in solar-relevant sectors	Likely	Major	Positive	Yes	Major positive impact from solar sectors. Although a negative impact exists, it is insignificant.	Stakeholder consultation
	Decrease in training for skilled workers in fossil fuel sectors	Possible	Minor	Negative	No		Stakeholder consultation
Quality and safety of working conditions	Increased safety and working conditions due to more jobs in the solar installation sector, where workers have better working conditions	Very likely	Major	Positive	Yes	Major positive impact from solar sectors. Although negative impacts exist, they are insignificant.	Stakeholder consultation
	Increased safety and working conditions due to fewer jobs in the coal sector, where workers have worse working conditions	Likely	Moderate	Positive	Yes		Reference: Clear Air Task Force (2001)

TABLE **7.5,** part II – continued

Reporting the qualitative assessment results for a solar PV incentive policy

Chapter 5	Chapter 7 (Qualitatively assess impacts)						
Impact categories included in the assessment	Specific impacts identified	Likelihood	Magnitude	Positive or negative impact	Significant?	Summary of qualitative assessment results for each impact category	Methods/ sources used
Quality and safety of working conditions, continued	Decreased safety and working conditions due to more jobs in silica mining and solar cell manufacturing, where workers have worse working condition (e.g. the lung disease silicosis, exposure to hydrofluoric acid and cadmium)	Unlikely	Moderate	Negative	No	Major positive impact from solar sectors. Although negative impacts exist, they are insignificant, continued	Reference: Sarkar (2016)
Jobs	Increased jobs in the solar installation, operations and maintenance sectors	Very likely	Major	Positive	Yes	Major positive impacts from solar power plants and solar panel sectors, which outweigh moderate negative impact on coal extraction, transportation and import/ export sectors	Reference: Solar Foundation (2016)
	Increased jobs in the solar panel manufacturing sector	Very likely	Major	Positive	Yes		Reference: Solar Foundation (2016)
	Increased jobs in the solar and grid technology sectors, and mining of rare earth minerals for solar cells	Possible	Minor	Positive	No		Stakeholder consultation

TABLE **7.5,** part II – continued

Reporting the qualitative assessment results for a solar PV incentive policy

Chapter 5	Chapter 7 (Qualitatively assess impacts)						
Impact categories included in the assessment	Specific impacts identified	Likelihood	Magnitude	Positive or negative impact	Significant?	Summary of qualitative assessment results for each impact category	Methods/ sources used
Jobs, continued	Decreased jobs in the fossil fuel power operations and maintenance sectors	Likely	Minor	Negative	No	Major positive impacts from solar power plants and solar panel sectors, which outweigh moderate negative impact on coal extraction, transportation and import/ export sectors, continued	Stakeholder consultation
	Decreased jobs in fossil fuel sectors	Likely	Moderate	Negative	Yes		Stakeholder consultation
	Decreased jobs in fossil fuel generation technology sectors (e.g. supercritical and ultra-supercritical generation)	Unlikely	Moderate	Negative	No		Stakeholder consultation
Income	Increased income for households, institutions and other organizations due to reduction in energy costs	Very likely	Major	Positive	Yes	Major positive impact from savings on energy spending	Stakeholder consultation
New business opportunities	Increased business opportunities for solar manufacturing, mining, transportation, solar power plants and grid-associated technologies	Very likely	Major	Positive	Yes	Major positive impact from solar sectors. Although a negative impact exists, it is insignificant.	Reference: ConnectAmericas (no date)

TABLE **7.5,** part II – continued

Reporting the qualitative assessment results for a solar PV incentive policy

Chapter 5	Chapter 7 (Qualitatively assess impacts)						
Impact categories included in the assessment	Specific impacts identified	Likelihood	Magnitude	Positive or negative impact	Significant?	Summary of qualitative assessment results for each impact category	Methods/ sources used
New business opportunities, continued	Decreased business opportunities for fossil fuel extraction, transportation, fossil fuel power plants, and fossil fuel–generated associated technologies	Likely	Minor	Negative	No	Major positive impact from solar sectors. Although a negative impact exists, it is insignificant, continued	Stakeholder consultation
Energy independence	Increased energy independence from reduced imports of fossil fuels	Very likely	Major	Positive	Yes	Major positive impact from decreased fossil fuel import. Although a negative impact exists, it is insignificant.	Stakeholder consultation
	Decreased energy independence from foreign control over scarce resources needed to manufacture solar panels	Possible	Minor	Negative	No		Reference: Simmons (2016)

TABLE **7.5,** part III

Reporting the qualitative assessment results for a solar PV incentive policy

Chapter 5	Chapter 8 (Define the quantitative assessment boundary)			
Impact categories included in the assessment	Specific impacts identified	Feasible to quantify?	Included in the quantitative assessment boundary?	Justification for exclusions or other comments
Climate change mitigation	Reduced GHG emissions from grid-connected fossil fuel–based power plants	Yes	Yes	Included
	Reduced GHG emissions from distributed fossil fuel generation	No	No	Impact not significant
	Reduced GHG emissions associated with manufacturing of new fossil fuel generation plants	-	No	Impact not significant
	Reduced GHG emissions from fossil fuel extraction and transportation	No	No	No reliable data/ methods available
	Increased GHG emissions from solar production, transportation and installation	-	No	Impact not significant
	Increased GHG emissions from increased production of goods and services due to increased income	-	No	Impact not significant
Air quality/ health impacts of air pollution	Reduced air pollution from grid-connected fossil fuel–based power plants	Yes	Yes	Included
	Reduced air pollution from distributed fossil fuel generation	No	No	Impact not significant
	Reduced indoor air pollution from traditional use of biomass	No	No	No reliable data/ methods available
	Reduced air pollution from manufacturing of new fossil fuel generation plants	No	No	Impact not significant
	Reduced air pollution from fossil fuel extraction and transportation	No	No	No reliable data/ methods available
	Increased air pollution from solar PV production, transportation and installation	-	No	Impact not significant
	Increased air pollution from increased production of goods and services due to increased income	-	No	Impact not significant

TABLE **7.5,** part III – continued

Reporting the qualitative assessment results for a solar PV incentive policy

Chapter 5	Chapter 8 (Define the quantitative assessment boundary)			
Impact categories included in the assessment	Specific impacts identified	Feasible to quantify?	Included in the quantitative assessment boundary?	Justification for exclusions or other comments
Waste generation and disposal	Decreased waste generation and disposal from reduced fossil fuel generation (e.g. coal ash)	No	No	No reliable data/ methods available
	Decreased waste generation and disposal from reduced fossil fuel production and transportation	No	No	No reliable data/ methods available
	Increased waste generation and disposal from increased solar production (e.g. silicon tetrachloride waste)	No	No	No reliable data/ methods available
	Increased waste generation and disposal from discarded solar panels (e.g. cadmium and tellurium)	No	No	Impact not significant
Energy	Increased renewable energy generation from increased solar generation	Yes	Yes	Included
Access to clean, affordable and reliable energy	Increased access to clean, affordable and reliable electricity	Yes	Yes	Included
	Decreased access to electricity due to fewer new coal power plants	-	No	Impact not significant
Capacity, skills and knowledge development	Increase in training for skilled workers in solar-relevant sectors	Yes	Yes	Included
	Decrease in training for skilled workers in fossil fuel sectors	-	No	Impact not significant
Quality and safety of working conditions	Increased safety and working conditions due to more jobs in the solar installation sector, where workers have better working conditions	No	No	No reliable data/ methods available
	Increased safety and working conditions due to fewer jobs in the coal sector, where workers have worse working conditions	No	No	No reliable data/ methods available
	Decreased safety and working conditions due to more jobs in silica mining and solar cell manufacturing, where workers have worse working condition (e.g. the lung disease silicosis, exposure to hydrofluoric acid and cadmium)	-	No	Impact not significant

TABLE **7.5,** part III – continued

Reporting the qualitative assessment results for a solar PV incentive policy

Chapter 5	Chapter 8 (Define the quantitative assessment boundary)			
Impact categories included in the assessment	**Specific impacts identified**	**Feasible to quantify?**	**Included in the quantitative assessment boundary?**	**Justification for exclusions or other comments**
Jobs	Increased jobs in the solar installation, operations and maintenance sectors	Yes	Yes	Included
	Increased jobs in the solar panel manufacturing sector	Yes	Yes	Included
	Increased jobs in the solar and grid technology sectors, and mining of rare earth minerals for solar cells	-	No	Impact not significant
	Decreased jobs in the fossil fuel power operations and maintenance sectors	-	No	Impact no significant
	Decreased jobs in fossil fuel sectors	Yes	Yes	Included
	Decreased jobs in fossil fuel generation technology sectors (e.g. supercritical and ultra-supercritical generation)	-	No	Impact no significant
Income	Increased income for households, institutions and other organizations due to reduction in energy costs	Yes	Yes	Included
New business opportunities	Increased business opportunities for solar manufacturing, mining, transportation, solar power plants and grid-associated technologies	No	No	No reliable data/ methods available
	Decreased business opportunities for fossil fuel extraction, transportation, fossil fuel power plants, and fossil fuel–generated associated technologies	No	No	Impact not significant
Energy independence	Increased energy independence from reduced imports of fossil fuels	Yes	Yes	Included
	Decreased energy independence from foreign control over scarce resources needed to manufacture solar panels	-	No	Impact not significant

Abbreviation: -, not applicable