Sustainable Development Methodology

PART III : QUALITATIVE APPROACH TO IMPACT ASSESSMENT

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Overview of ICAT

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Introductory Guide

Impact Assessment Methodologies

Greenhouse gas impacts

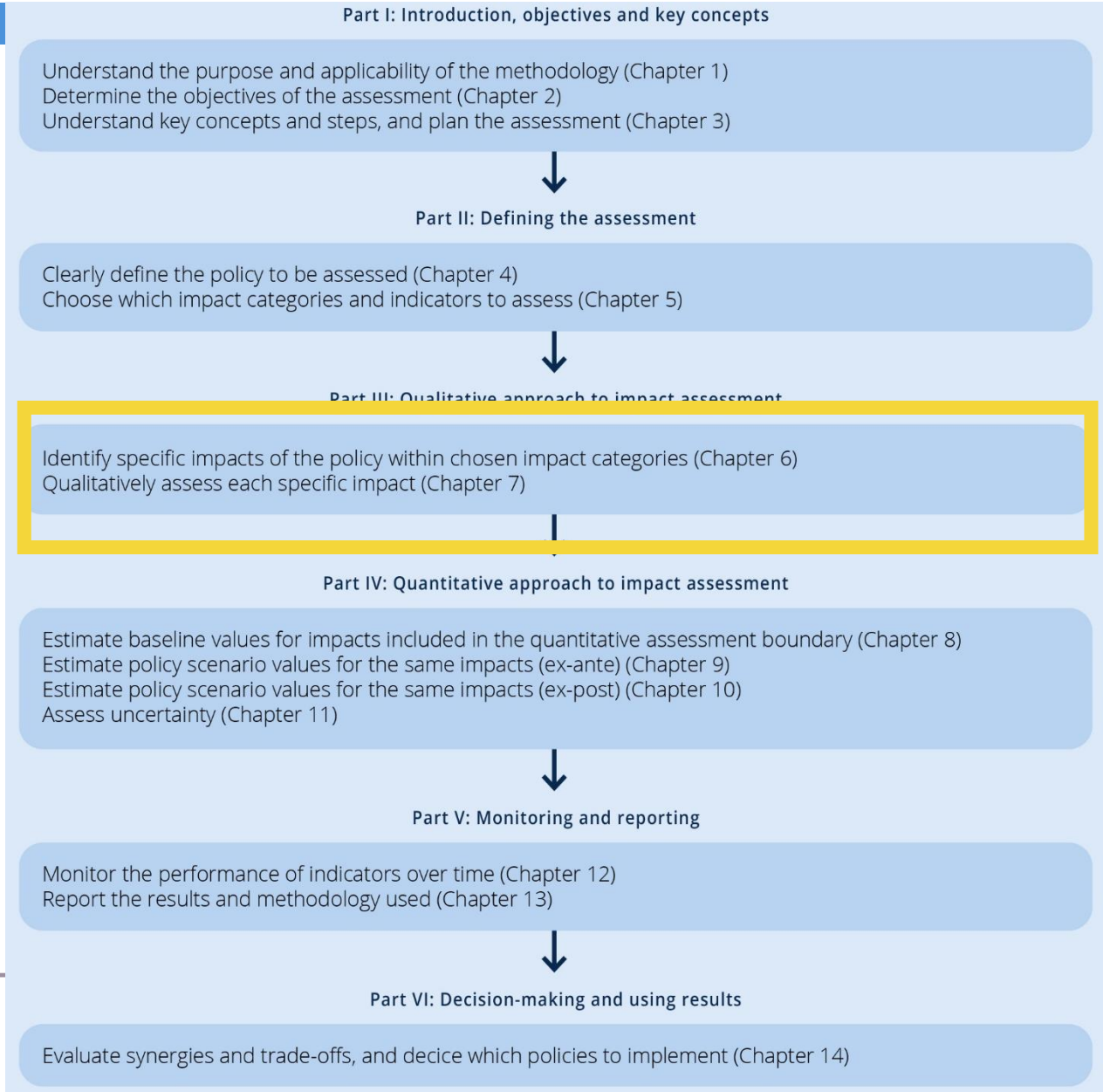
- Renewable Energy
- Buildings Efficiency
- Transport Pricing
- Agriculture
- Forestry

- Sustainable Development
- Transformational Change
- Non-State and Subnational Action

Process Guidance Documents

- Stakeholder Participation
- Technical Review

Overview of the SD methodology



Part II: Overview

Part III: Qualitative approach to impact assessment

Identify specific impacts of the policy within chosen impact categories (Chapter 6)

Qualitatively assess each specific impact (Chapter 7)

This button indicates a key recommendation

This is an interactive panel: navigate by clicking on a particular step

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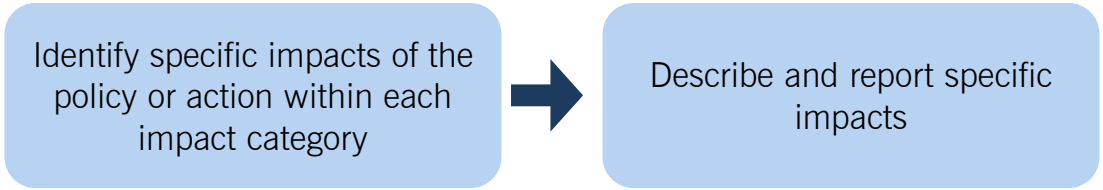
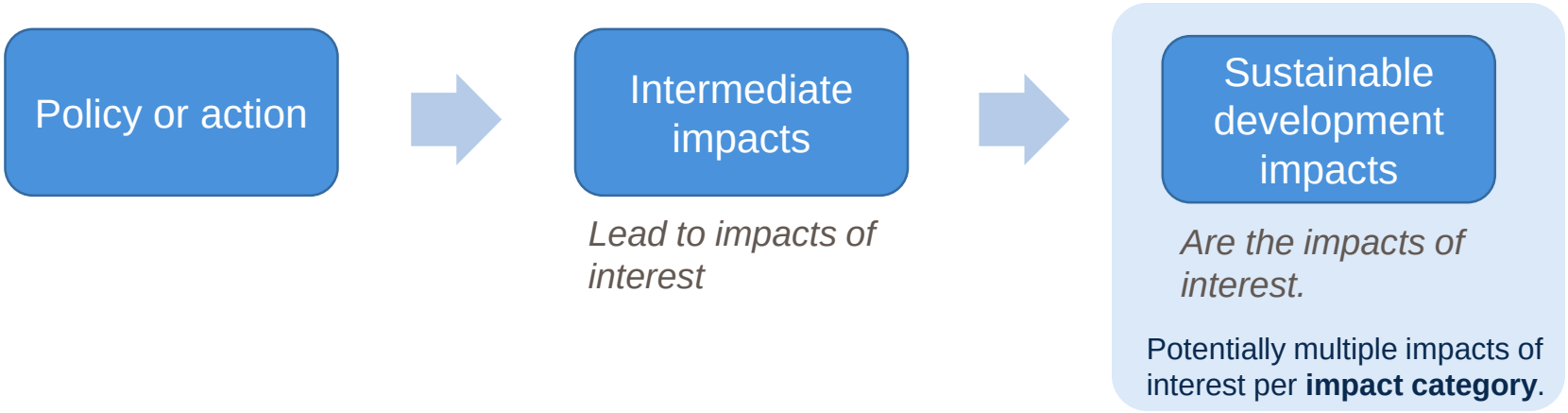
Chapter 6. Identify specific impacts of the policy within chosen impact categories

How to identify all potential impacts of the policy or action within each sustainable development impact category included in the assessment boundary.



6.1 Types of specific impacts

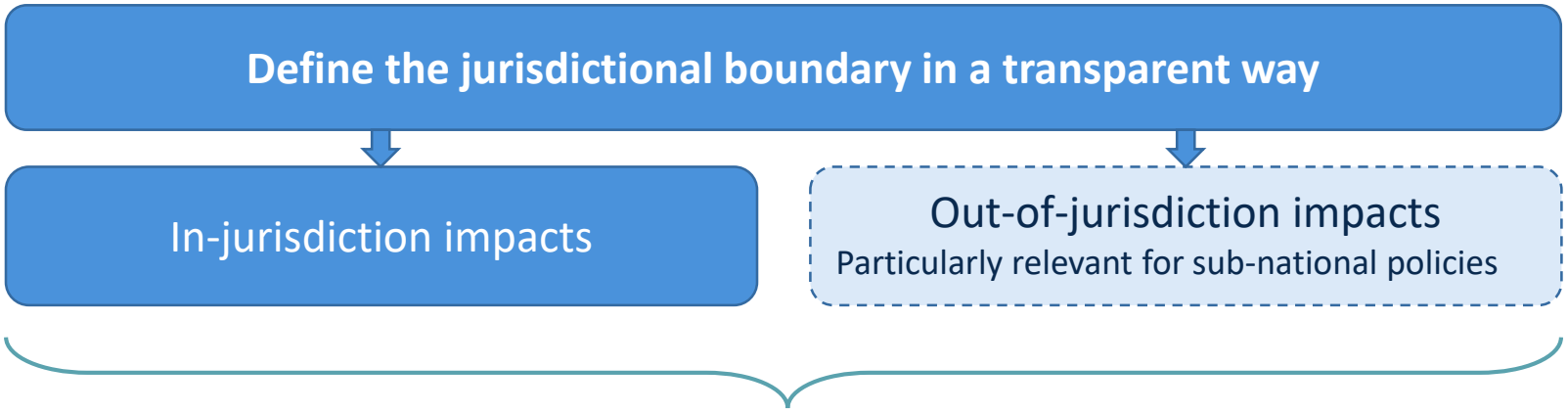
Identify **all potential sustainable development impacts** of the policy or action **within each impact category** included in the assessment (*Chapter 5*).



To ensure **comprehensiveness**, identified impacts should be:
Positive and negative, Intended and unintended, In- and out-of-jurisdiction, Short term and long term

Identify all potential sustainable development impacts of the policy or action within each impact category included in the assessment, using a causal chain and table format if relevant and feasible, and in consultation with stakeholders.

6.1 In- and out-of-jurisdiction impacts



Separate tracking of impacts when feasible can:

- Help link the policy or action to the implementing jurisdiction's sustainable development goals
- Address potential double counting of out-of-jurisdiction impacts

Separately identify and categorize in- and out-of-jurisdiction sustainable development impacts, if relevant and feasible.

6.1 Causal chains for identifying and organizing specific impacts

- What is a causal chain:

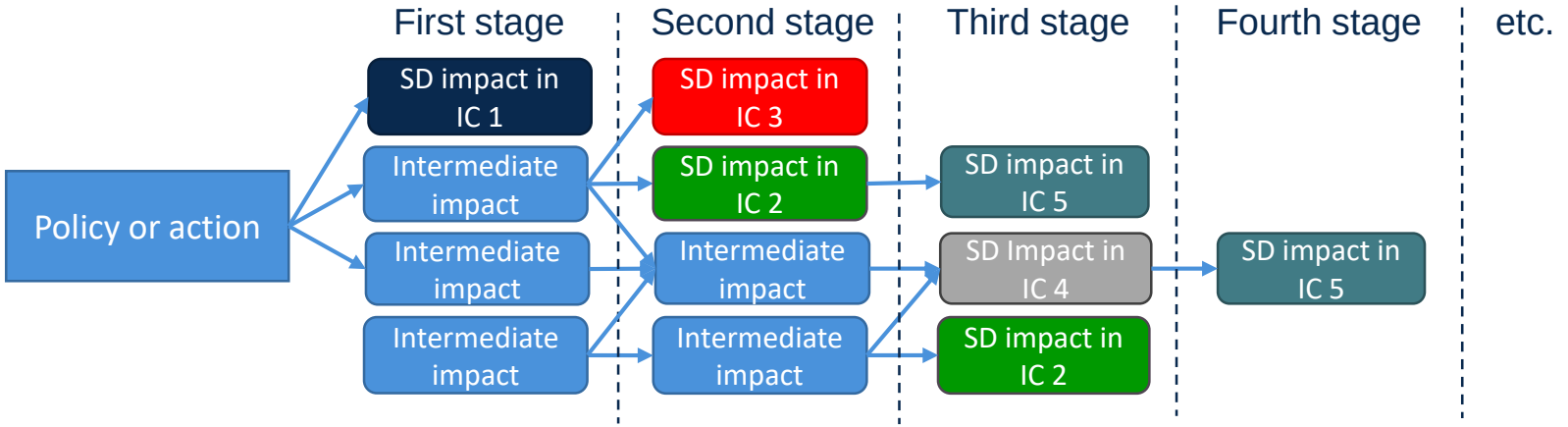
Conceptual diagram articulating the process by which the policy or action leads to various sustainable development (SD) impacts through a series of **interlinked logical** and **sequential stages** of **cause-effect relationships**.

- Purpose: identifying, organizing and communicating all potential sustainable development impacts of a policy or action in all identified impact categories.
- Why using it: Tool to enhance policy design, improve understanding of policy effectiveness, communicate the impacts of the policy to stakeholders.

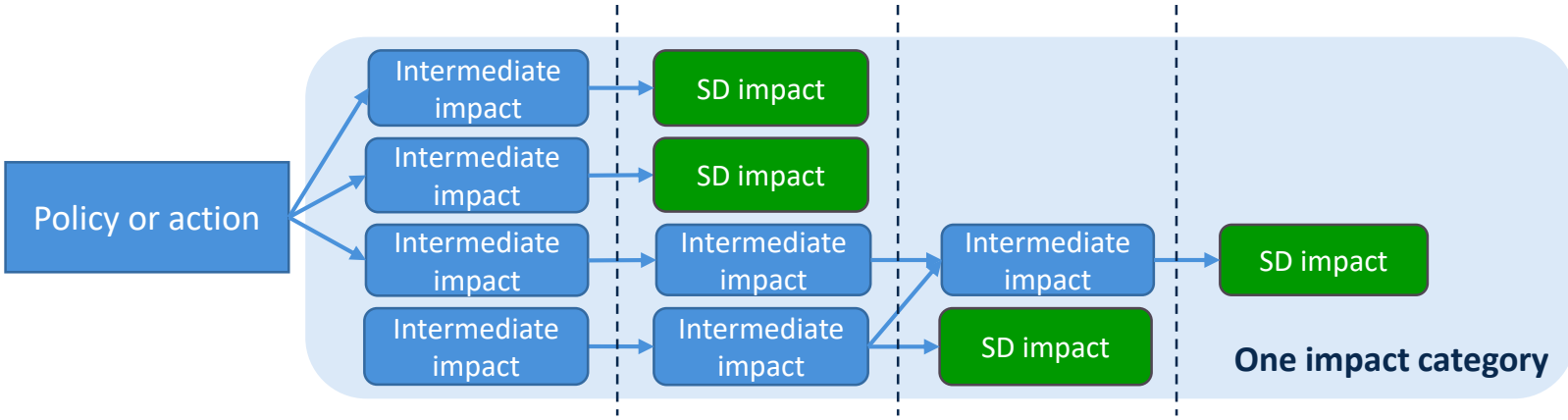
Option 1: Single causal chain with all SD impact categories	Option 2: Separate causal chains for each impact category
Limited specific impacts and interrelated impact categories	Relatively unrelated impact categories with no intermediate impacts in common
Might not include all specific impacts since too complex	Does not illustrate the relationships between impact categories

6.1 Causal chains for identifying and organizing specific impacts

Option 1: Single causal chain



Option 2: Separate causal chains for each impact categories



6.1 Literature review, stakeholder consultations and expert judgement

Users should:

- review literature (prior assessments or case studies of similar policies and impact categories)

- consult relevant stakeholders for different perspectives

→reference to the ICAT Stakeholder Participation Guide

- complement with expert judgment

6.2 Describe and report specific impacts

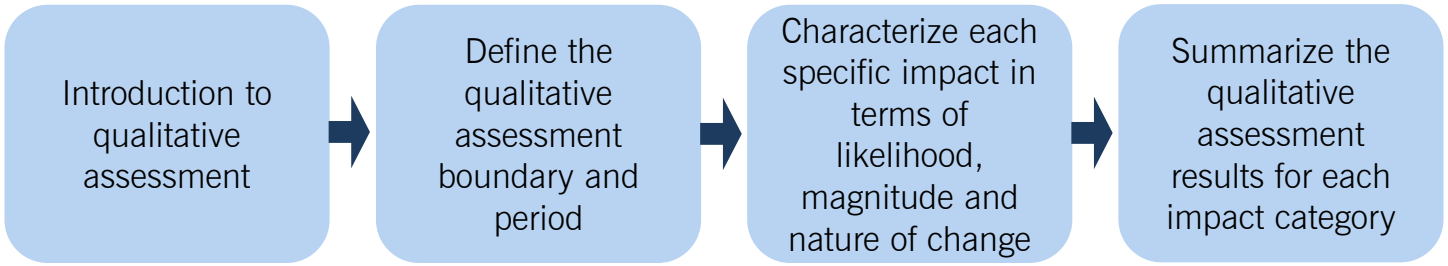
Communicating all identified impacts helps stakeholders and decision-makers **understand the various impacts of the policy** or action and helps users determine the most relevant impacts to assess in a **transparent** and **consistent** manner.

Reporting of all identified impacts should be made with a causal chain and a table format.

Impact categories included in the assessment	Specific impacts identified (only SD impacts)	In- or out-of-jurisdiction	Type of impacts (optional)	Methods/references used to identify impacts (optional)
	Each impact should be described, including the direction of change (increase or decrease) and the underlying logic and causal relationship of how the impact is expected to occur. The level of details depends on users' objectives and context.	In, out or both		

Chapter 7. Qualitatively assess each specific impact

For both qualitative or quantitative approaches and either ex-ante or ex-post assessments, how to qualitatively assess specific impacts and summarize the assessment results.



7.1 Introduction to qualitative assessment

	QUALITATIVE ASSESSMENT	QUANTITATIVE ASSESSMENT
WHAT	Describes the impacts of a policy or action on selected impact categories **in qualitative terms**	Estimates the impacts of a policy or action on selected impact categories **in quantitative terms**
PROS	• Simpler, requires less resources • Sometimes sufficient to meet the objectives of the assessment • Can use both quantitative and qualitative data (stakeholders engagement) with additional insights	• Produces more reliable and robust results • Can meet a wider range of assessment objectives
CONS	• Does not enable an accurate or quantified estimate of the impacts of a policy or action to meet a wider set of objectives. • Can be subjective and uncertain → less reliable results • Can be limited in coverage and thus non-representative of broader conditions or impacts	• Only use of quantitative data is possible → restrictive • Requires more time and resources • Data intensive

Helpful to use a combination of qualitative and quantitative data and approaches

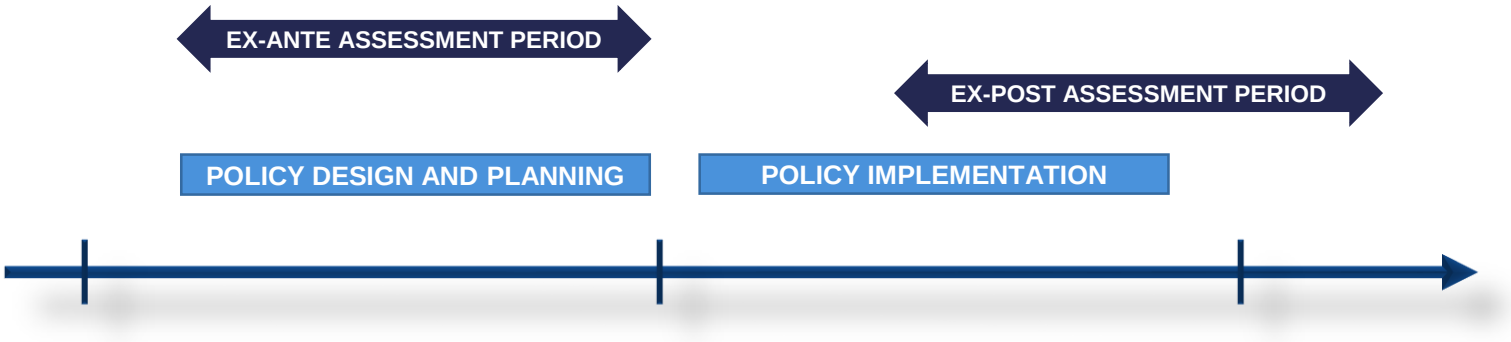
7.2 Define the qualitative assessment boundary and period

SCOPE

RANGE OF DIMENSIONS

IMPACT CATEGORIES

Specific impact | Specific impact | Specific impact



Possible to align the ex-ante assessment period with the SDGs or NDC implementation periods, or longer-term planning.

- Include all impact categories included in Chapter 5 and all specific impacts identified in Chapter 6.
- Define the assessment period based in.

Chapter 6 | Chapter 7

Rule of thumb for ex-ante assessment periods

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7.3 Characterize each specific impact: Step 1

STEP 1
STEP 2
STEP 3
STEP 4
STEP 5

- Assessment of the **likelihood** the impact will occur

Likelihood	Description
Very likely	Reason to believe the impact will happen (or did happen) as a result of the policy or action.
Likely	Reason to believe the impact will probably happen (or probably happened) as a result of the policy or action.
Possibly	Reason to believe the impact may or may not happen (or may or may not have happened) as a result of the policy or action. About as likely as not. Cases where the likelihood is unknown or cannot be determined should be considered possible.
Unlikely	Reason to believe the impact probably will not happen (or probably did not happen) as a result of the policy or action.
Very unlikely	Reason to believe the impact will not happen (or did not happen) as a result of the policy or action.

- Likelihood classification
  - be based on **evidence**
  - solicit **multiple viewpoints** and consult stakeholders with reference to the *ICAT Stakeholder Participation Guide*

Characterize each identified impact based on the likelihood that each impact will occur, the magnitude of each impact, and the nature of the change (positive or negative)

7.3 Characterize each specific impact: Step 2

STEP 1
STEP 2
STEP 3
STEP 4
STEP 5

- Assessment of the **magnitude** of the impact based on evidence

Likelihood	Description
Major	The change in the impact category is (or is expected to be) substantial in size (either positive or negative).* The impact significantly influences the effectiveness of the policy or action 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).* The impact somewhat influences the effectiveness of the policy or action 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).* The impact is inconsequential to the effectiveness of the policy or action with respect to that impact category.

- Useful to consider:
  - Extent of the area affected (single site, local, regional, national or international impacts)
  - Duration of the change (short-, medium- or long-term)
  - Size of the groups affected

Characterize each identified impact based on the likelihood that each impact will occur, the magnitude of each impact, and the nature of the change (positive or negative).

7.3 Characterize each specific impact: Step 3

STEP 1
STEP 2
STEP 3
STEP 4
STEP 5

- Combination of likelihood and magnitude to **determine significance**

Likelihood	Magnitude		
	Minor	Moderate	Major
Very likely	INSIGNIFICANT	SIGNIFICANT	
Likely			
Possible			
Unlikely		INSIGNIFICANT	
Very unlikely			

Based on the assessment of likelihood and magnitude, determine which identified impacts are significant, in consultation with stakeholders.

7.3 Characterize each specific impact

- Step 4: Determine the nature of change
  - Impacts are either positive, neutral or negative.
- Step 5: Report the results
  - Use of the reporting template
- Refining the assessment

Summarize the qualitative assessment results for each impact category, taking into account all significant impacts.

Case Studies using this Methodology

- Sustainable Development Impact of the Cities Footprint Project on the Sustainable Development Goals in Five Cities of Bolivia

- An Assessment of the Sustainable Development Impact of Biodiversity Policy in South Africa through the ICAT SD Guidance

Thank You

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Checklist of key recommendations

Chapter	Key recommendation
Chapter 6. Identifying specific impact categories within each impact category	Identify all potential sustainable development impacts of the policy or action within each impact category included in the assessment, using a causal chain and table format if relevant and feasible, and in consultation with stakeholders.
	Separately identify and categorize in- and out-of-jurisdiction sustainable development impacts, if relevant and feasible.
Chapter 7. Qualitatively assessing impacts	Include all impact categories included in Chapter 5 and all specific impacts identified in Chapter 6 in the qualitative assessment boundary. Separately assess the impacts of the policy or action on different groups in society where relevant
	Define the assessment period.
	Characterize each identified impact 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 or action on different groups in society where relevant.

Insights from Bolivia

- Active participation and involvement of stakeholders in the assessment was essential, as they are the main source of information for the identification of impacts.
- Stakeholder participation was planned according to ICAT‘s own Stakeholder Participation Guidance methodology, and provided multiple opportunities for stakeholders to participate.

See Section 1.3 in: Sustainable Development Impact of the Cities Footprint Project on the Sustainable Development Goals in Five Cities of Bolivia (Arteaga Valdivia 2019)

6.1 Types of impacts and definitions

Types of impacts (non prescriptive and non exhaustive list)	Definitions
Positive and negative impacts	Impacts that are perceived as favourable or unfavourable from the perspectives of different stakeholder groups.
Intended and unintended impacts	Impacts that are intentional or unintentional, based on the original objectives of the policy or action and from the perspective of policymakers and stakeholders. (In some contexts, intentional impacts are called primary impacts and unintended impacts are called secondary impacts.)
Short-term and long-term impacts	Impacts that are nearer or more distant in time, based on the amount of time between implementation of the policy and the impact.
In-jurisdiction and out-of-jurisdiction impacts	Impacts that occur inside the geopolitical boundary over which the implementing entity has authority, such as a city boundary or national boundary, as well as impacts that occur outside of the geopolitical boundary.
Technology impacts	Changes in technology such as design or deployment of new technologies.
Business and consumer impacts	Changes of business practices or behaviour (such as manufacturing decisions) or consumer practices or behaviour (such as purchasing decisions).
Infrastructure Impacts	Changes in existing infrastructure or development of new infrastructure.
Market impacts	Changes in supply and demand, prices, market structure or market share.
Life-cycle impacts	Changes in upstream and downstream activities, such as extraction and production of energy and materials, or impacts in sectors not targeted by the policy or action.
Macroeconomic impacts	Changes in macroeconomic conditions, such as GDP, income, employment, or structural changes in economic sectors.
Trade impacts	Changes in imports and exports.
Institutional impacts	Changes in institutional arrangements.
Distributional impacts	Changes in how income, resources or costs are distributed among a population, or changes among different demographic groups, such as gender or income groups.

6.1 Solar PV example: types of impacts

Types of impacts (non prescriptive and non exhaustive list)	Solar PV incentive policy
Positive and negative impacts	**Positive:** Reduced air pollution from distributed fossil fuel generation. **Negative:** Increased air pollution from solar production, transportation and installation.
Intended and unintended impacts	**Intended:** Reduced air pollution from distributed fossil fuel generation. **Unintended:** Increased air pollution from solar production, transportation and installation.
Short-term and long-term impacts	**Short-term:** Increased renewable energy generation from more solar generation. **Long-term:** Increased energy independence from reduced imports of fossil fuel.
In-jurisdiction and out-of-jurisdiction impacts	**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 impacts	Replacement of diesel generators with solar PV technology
Business and consumer impacts	**Business:** Increased business opportunities for solar manufacturing, mining, transportation, solar power plants and grid associated technologies. **Consumer:** Increased household/business income due to reduction in energy costs.
Infrastructure Impacts	Reduced GHG emissions associated with decreased manufacturing of new fossil fuel generation plants.
Market impacts	Increased business opportunities for solar installation, operations, and maintenance.
Life-cycle impacts	Increased air pollution from solar PV production, transportation and installation.
Macroeconomic impacts	Increased household and business income and spending due to reduction in energy costs.
Trade impacts	Increased energy independence from reduced imports of fossil fuel.
Institutional impacts	Establishment of a new government unit to implement the solar incentive policy.
Distributional impacts	Increased income for households, institutions and other organizations that install solar PV systems.

6.1 Impact matrix table for identifying and organizing specific impacts

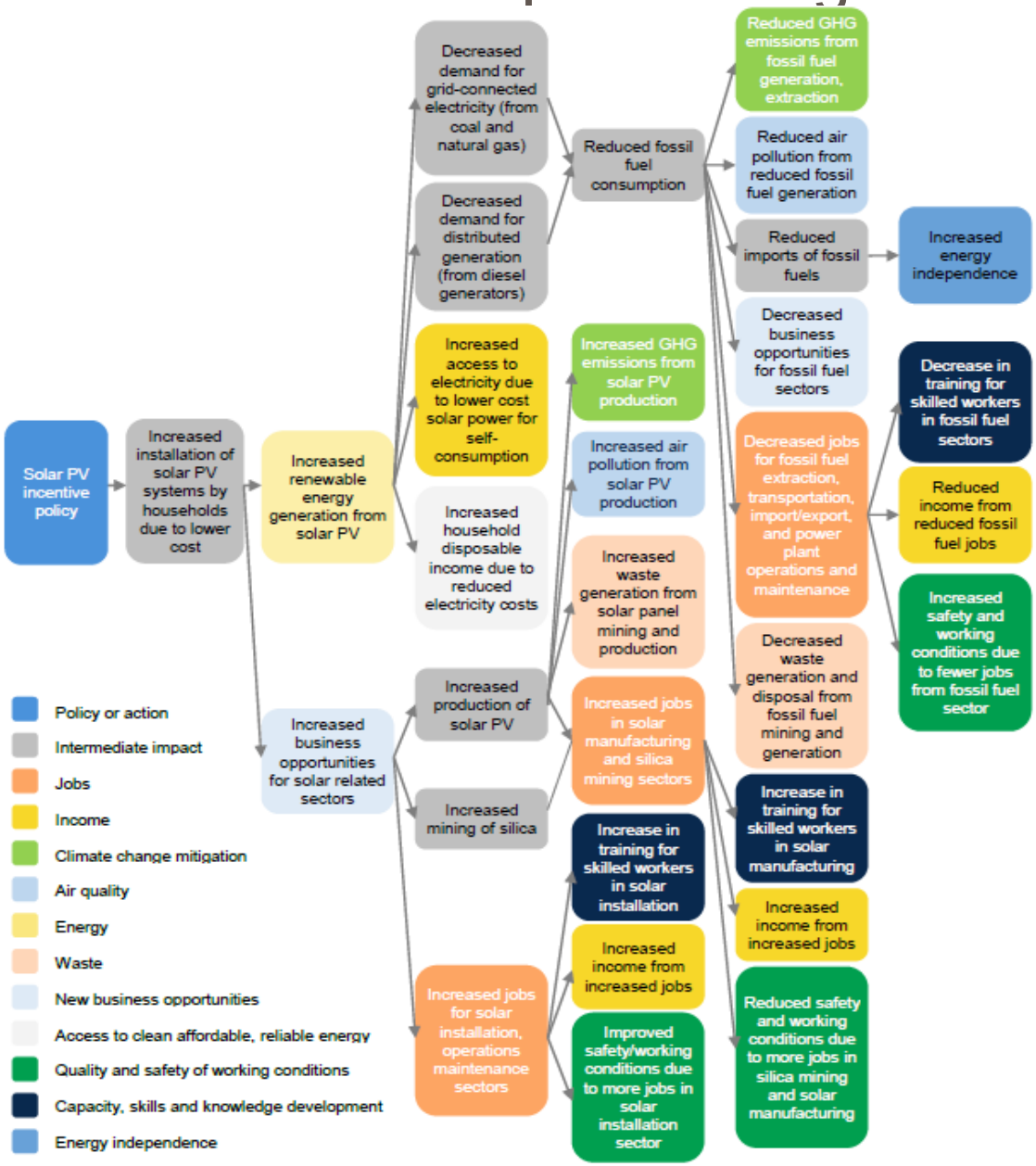
- Purpose: Help identify all potential impacts

- Identification of impacts for all combinations of impact types

Headers : impact types

Types of impacts	Short-term	Long-term
Intended impacts	Increased jobs in domestic solar PV installation, operations and maintenance sectors	Increased jobs in domestic solar PV manufacturing sector
Unintended impacts	Reduced jobs in domestic fossil fuel sector	

6.1 Solar PV example: example of a single causal chain for all impact categories



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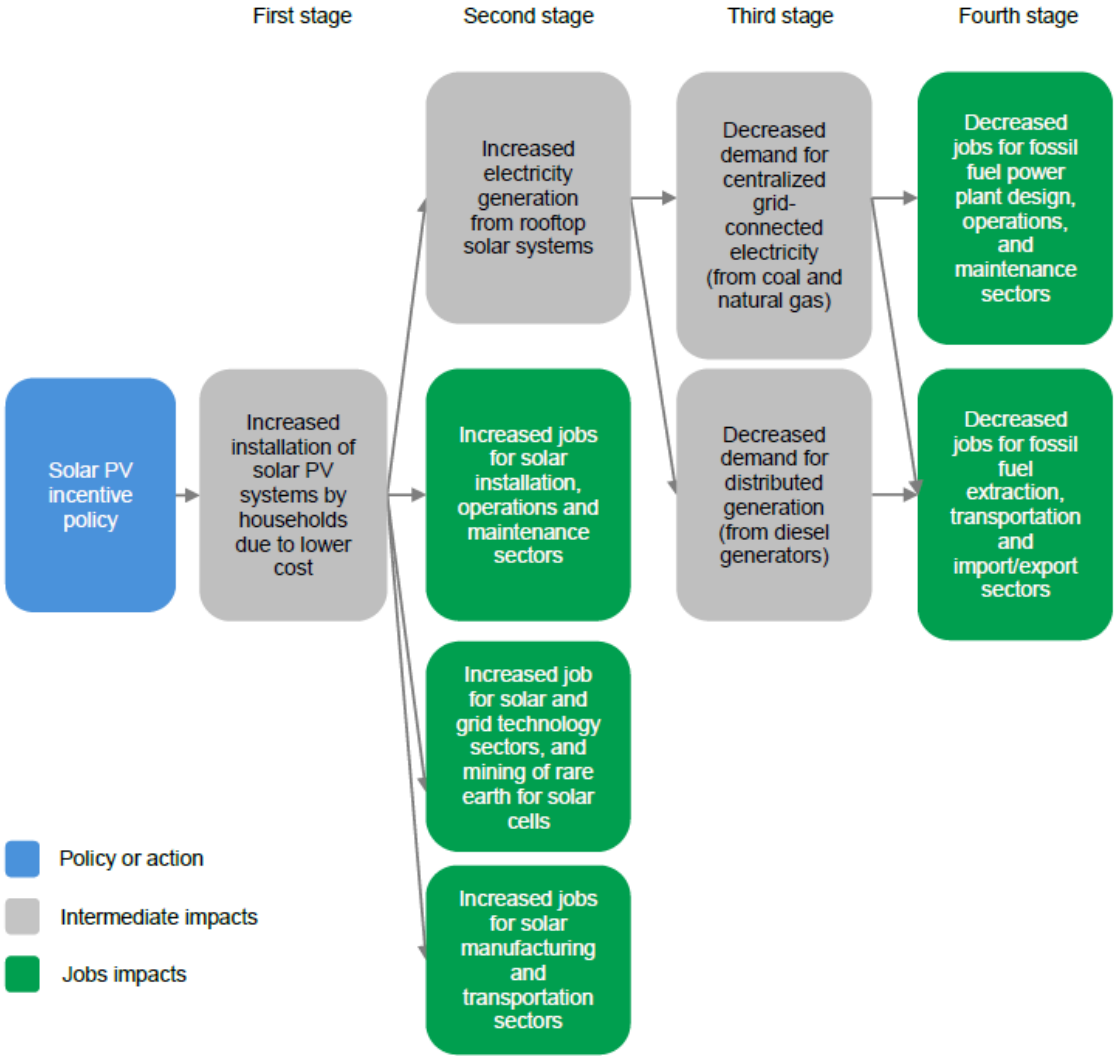
6.1 Solar PV example: example of a causal chain for one impact category



6.2 Solar PV example: reporting specific impacts

Impact categories included in the assessment (from Chapter 5)	Specific impacts identified (within each impact category)	In- or out-of-jurisdiction
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 manufacturing of new fossil fuel generation plants	In
	Reduced GHG emissions from fossil fuel extraction and transportation	Both
	Increased GHG emissions from solar power production	Both
	Increased GHG emissions from solar power transportation and installation	In
	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 power production	Both
	Increased air pollution from solar power transportation and installation	
	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 for 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
Quality and safety of working conditions	Increased safety and working conditions due to more jobs from the solar installation sector, where workers have better working conditions	In
	Increased safety and working conditions due to fewer jobs in coal sector where workers have worse working condition	Both
	Decreased safety and working conditions due to more jobs from 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 maintenance sectors	In
	Increased jobs in the solar panel manufacturing sector	Both
	Increased jobs for solar and grid technology sectors, and mining of rare earth 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 for fossil fuel generation technology sectors (e.g., super critical and ultra-super critical 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 (e.g., oil and gas)	In
	Decreased energy independence from foreign control over scarce resources needed to manufacture solar panels	In

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7.2 Rule of thumb for different ex-ante assessment periods

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.

Assessment period	Approximate assessment period (rule of thumb)
Short-term	< 5 years
Medium-term	≥ 5 years and < 15 years
Long-term	≥ 15 years

7.3 Evidence

Evidence can be comprised of (non-exhaustive list) :

- published studies on similar policies and impacts 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
- expert judgment

Qualitative studies :

- longitudinal impact assessment
- Sampling
- Interviews
- Ethnography

7.3 Rule of thumb for likelihood classification

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 or action.	**≥ 90 %**
Likely	Reason to believe the impact will probably happen (or probably happened) as a result of the policy or action.	**< 90 % and ≥ 66 %**
Possibly	Reason to believe the impact may or may not happen (or may or may not have happened) as a result of the policy or action. 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 or action.	**< 33 % and ≥ 10 %**
Very unlikely	Reason to believe the impact will not happen (or did not happen) as a result of the policy or action.	**< 10 %**

7.3 Using stakeholder consultation to qualitatively assess impacts in Malawi

- 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.
- Due to 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.
- 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

Dimension	Summary of stakeholder responses
Environmental impacts	• Water, land, and waste impacts were considered likely, major magnitude, positive, and significant. • The possibility for water acidification was considered to be very likely, major magnitude, significant, and negative.
Social impacts	• Health and wellbeing, education and culture, and welfare and equality indicators were considered to be likely, major magnitude, positive impact, and significant. • Institutions and laws, indicators of public participation in policy making, and access to administrative and judicial remedies were agreed as likely and positive but of only moderate impact. • Labour rights and youth labour conditions were considered 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 agreed as very likely, major magnitude, positive impact, and significant.

Stakeholders:

1) District government officials
2) Non-governmental/civil society organization representatives
3) Community stakeholders

7.3 Reporting template

Chapter 5	Chapter 6			Chapter 7						Chapter 8		
Impact categories	Specific impacts	In- or out-of-jurisdiction	Types of impacts	Likelihood	Magnitude	Positive or negative	Significant ?	Summary of qualitative assessment	Methods	Feasible to quantify ?	Included in the assessment boundary ?	Justification for exclusions
IC 1	Impact 1	In	Long-term	Likely	Major	Positive	Significant					
	Impact 2	Both										

7.3 Example: Reporting for the solar PV incentive policy example (1/3)

Chapter 5	Chapter 6 (Identify specific impacts)			Chapter 7 (Qualitatively assessing impacts)						Chapter 8 (Defining the quantitative assessment boundary)		
Impact categories included in the assessment	Specific impacts identified	In- or out-of-jurisdiction	Type of impacts (optional)	Likelihood	Magnitude	Positive or negative impact	Significant?	Summary of qualitative assessment results for each impact category	Methods/sources used	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	In		Very Likely	Major	Positive	Yes	Major positive impact from displacing fossil fuel electricity with solar electricity. While negative impacts do exist, they are insignificant.	Stakeholder consultation	Yes	Yes	Included
	Reduced GHG emissions from distributed fossil fuel generation	In		Unlikely	Moderate	Positive	No		https://india.blogs.nytimes.com/2012/07/31/the-diesel-generator-indias-trusty-power-source/)	No	No	Impact is not significant
	Reduced GHG emissions associated manufacturing of new fossil fuel generation plants	In		Unlikely	Minor	Positive	No		Stakeholder consultation	N/A	No	Impact is not significant
	Reduced GHG emissions from fossil fuel extraction and transportation	Both		Possible	Moderate	Positive	Yes		http://www.catf.us/resources/publications/files/Cradle_to_Grave.pdf	No	No	No reliable data/methods available
	Increased GHG emissions from solar production, transportation and installation	Both		Likely	Minor	Negative	No		http://spectrum.ieee.org/green-tech/solar/solar-energy-isnt-always-as-green-as-you-think	N/A	No	Impact is not significant
	Increased GHG emissions from increased production of goods and services due to increased income	In		Likely	Minor	Negative	No		Household energy consumption in the UK: a highly geographically and socioeconomically disaggregated model." Energy Policy 36(8): 3167– 3182.	N/A	No	Impact is not significant
Air quality / health impacts of air pollution	Reduced air pollution from grid-connected fossil fuel-based power plants	In		Very Likely	Major	Positive	Yes	Major positive impact from displacing fossil fuel electricity with solar electricity. While negative impacts do exist, they are insignificant.	Stakeholder consultation	Yes	Yes	Included
	Reduced air pollution from distributed fossil fuel generation	In		Unlikely	Major	Positive	No		Stakeholder consultation	No	No	Impact is not significant
	Reduced indoor air pollution from traditional use of biomass	In		Very Likely	Major	Positive	Yes		https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2568866/	No	No	No reliable data/methods available
	Reduced air pollution from manufacturing of new fossil fuel generation plants	In		Likely	Minor	Positive	No		Expert judgment	No	No	Impact is not significant
	Reduced air pollution from fossil fuel extraction and transportation	Both		Possible	Moderate	Positive	Yes		http://www.catf.us/resources/publications/files/Cradle_to_Grave.pdf	No	No	No reliable data/methods available
	Increased air pollution from solar production, transportation and installation	Both		Likely	Minor	Negative	No		http://spectrum.ieee.org/green-tech/solar/solar-energy-isnt-always-as-green-as-you-think	N/A	No	Impact is not significant

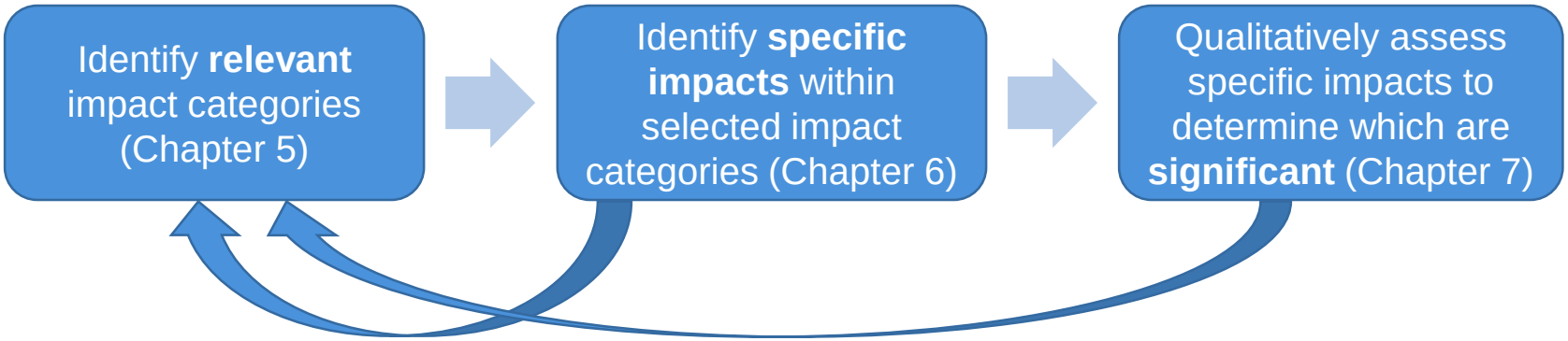
7.3 Example: Reporting for the solar PV incentive policy example (2/3)

	Increased air pollution from increased production of goods and services due to increased income	In		Likely	Minor	Negative	No		Household energy consumption in the UK: a highly geographically and socioeconomically disaggregated model." Energy Policy 36(8): 3167– 3182.	N/A	No	Impact is not significant
Waste generation and disposal	Decreased waste generation and disposal from less fossil fuel generation (e.g., coal ash)	In		Very likely	Moderate	Positive	Yes	Major positive impacts from reducing fossil fuel extraction, transportation and consumption outweigh moderate or insignificant negative impacts from solar related mining and solar panel disposal.	http://www.catf.us/resources/publications/files/Cradle_to_Grave.pdf	No	No	No reliable data/methods available
	Decreased waste generation and disposal from less fossil fuel production and transportation	Both		Very likely	Major	Positive	Yes		http://www.catf.us/resources/publications/files/Cradle_to_Grave.pdf	No	No	No reliable data/methods available
	Increased waste generation and disposal from more solar production (e.g., silicon tetrachloride waste)	Both		Likely	Moderate	Negative	Yes		http://spectrum.ieee.org/green-tech/solar/solar-energy-isnt-always-as-green-as-you-think	No	No	No reliable data/methods available
	Increased waste generation and disposal from discarded solar panels (e.g., cadmium and tellurium)	In		Possible	Minor	Positive	No		http://spectrum.ieee.org/green-tech/solar/solar-energy-isnt-always-as-green-as-you-think	No	No	Impact is not significant
Energy	Increased renewable energy generation from more solar generation	In		Very likely	Major	Positive	Yes	Major positive impact from increase solar electricity	Stakeholder consultation	Yes	Yes	Included
Access to clean, affordable, and reliable energy	Increased access to clean, affordable and reliable electricity	In		Very likely	Major	Positive	Yes	Major positive impact from increased solar electricity outweighs unlikely, insignificant negative impact.	Stakeholder consultation	Yes	Yes	Included
	Decreased access to electricity due to fewer new coal power plants	In		Unlikely	Minor	Negative	No		Stakeholder consultation	N/A	No	Impact is not significant
Capacity, skills, and knowledge development	Increase in training for skilled workers in solar relevant sectors	Both		Likely	Major	Positive	Yes	Major positive impact from solar sectors. While a negative impact exists, it is insignificant.	Stakeholder consultation	Yes	Yes	Included
	Decrease in training for skilled workers in fossil fuel sectors	Both		Possible	Minor	Negative	No		Stakeholder consultation	N/A	No	Impact is not significant
Quality and safety of working conditions	Increased safety and working conditions due to more jobs from the solar installation sector, where workers have better working conditions	Both		Very Likely	Major	Positive	Yes	Major positive impact from solar sectors. While negative impacts exist, they are insignificant.	Stakeholder consultation	No	No	No reliable data/methods available
	Increased safety and working conditions due to fewer jobs in coal sector, where workers have worse working condition	Both		Likely	Moderate	Positive	Yes		http://www.catf.us/resources/publications/files/Cradle_to_Grave.pdf	No	No	No reliable data/methods available
	Decreased safety and working conditions due to more jobs from silica mining and solar cell manufacturing, where workers have worse working condition (e.g., the lung disease silicosis,	Both		Unlikely	Moderate	Negative	No		Reference: https://qz.com/760079/indias-solar-dreams-too-are-made-in-china/	N/A	No	Impact is not significant

7.3 Example: Reporting for the solar PV incentive policy example (3/3)

	exposure to Hydrofluoric acid and cadmium)											
Jobs	Increased jobs in the solar installation, operations maintenance sectors	In		Very likely	Major	Positive	Yes	Major positive impacts from solar power plants and solar panel sectors outweigh moderate negative impact on coal extraction, transportation and import/export sectors.	http://www.thesolarfoundation.org/wp-content/uploads/2016/10/TSF-2015-National-Solar-Jobs-Census.pdf	Yes	Yes	Included
	Increased jobs in the solar panel manufacturing sector	Both		Very likely	Major	Positive	Yes		http://www.thesolarfoundation.org/wp-content/uploads/2016/10/TSF-2015-National-Solar-Jobs-Census.pdf	Yes	Yes	Included
	Increased jobs for solar and grid technology sectors, and mining of rare earth for solar cells	Both		Possible	Minor	Positive	No		Stakeholders consultation	N/A	No	Impact is not significant
	Decreased jobs in the fossil fuel power operations and maintenance sectors	In		Likely	Minor	Negative	No		Stakeholder consultation	N/A	No	Impact is not significant
	Decreased jobs in fossil fuel sectors	Both		Likely	Moderate	Negative	Yes		Stakeholder consultation	Yes	Yes	Included
	Decreased jobs in the fossil fuel generation technology sectors (e.g., super critical and ultra-super critical generation)	Both		Unlikely	Moderate	Negative	No		Stakeholder consultation	N/A	No	Impact is not significant
Income	Increased income for households, institutions and other organizations due to reduction in energy costs	In		Very likely	Major	Positive	Yes	Major positive impact from saving from energy spending.	Stakeholder consultation	Yes	Yes	Included
New business opportunities	Increased business opportunities for solar manufacturing, mining, transportation, solar power plants and grid associated technologies	Both		Very likely	Major	Positive	Yes	Major positive impact from solar sectors. While a negative impact exists, it is insignificant.	https://connectamericas.com/content/opportunities-renewable-energy-value-chain	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	Both		Likely	Minor	Negative	No		Stakeholder consultation	No	No	Impact is not significant
Energy Independence	Increased energy independence from reduced imports of fossil fuels	In		Very likely	Major	Positive	Yes	Major positive impact from decrease fossil fuel import. While a negative impact exists, it is insignificant.	Stakeholder consultation	Yes	Yes	Included
	Decreased energy independence from foreign control over scarce resources needed to manufacture solar panels	In		Possible	Minor	Negative	No		Reference: http://foreignpolicy.com/2016/07/12/decoder-rare-earth-market-tech-defense-clean-energy-china-trade/	N/A	No	Impact is not significant

Refining the assessment



Users may find in Chapter 6 or 7 that certain impact categories not deemed significant in Chapter 5 are in fact significant and should be included in the assessment. Users should revisit Chapter 5 after going through the steps in Chapter 6 and 7 to make sure that all potentially significant and relevant impact categories are included in the assessment.