

# U.S. EPA Toolkit for Building National GHG Inventory Systems

5. Key Category Analysis

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Template 5. Key Category Analysis Overview

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Abbreviations

CMA Conference of the Parties serving as the meeting of the Parties to the Paris Agreement

CO2 carbon dioxide

CO2 Eq. carbon dioxide equivalents

ETF enhanced transparency framework (under the Paris Agreement)

GHG greenhouse gas

IPCC Intergovernmental Panel on Climate Change

IPPU industrial processes and products use

KCA key category analysis

kt kilotonnes

“L” key category according to level-based assessment

LULUCF land use, land use change and forestry

MPGs modalities, procedures, and guidelines

“Q” key category according to qualitative criteria

QA quality assurance

QA/QC quality assurance and quality control

QC quality control

“T” key category according to trend-based assessment

TACCC transparency, accuracy, completeness, comparability, consistency

## Introduction to Template 5. Key Category Analysis

The EPA has developed the *Toolkit for Building National Greenhouse Gas Inventory Systems* (‘Toolkit’) to help developing countries build their institutional capacity to establish, maintain, and improve sustainable inventory management systems, which facilitate and support preparing complete, high-quality GHG inventories using the [*2006 Intergovernmental Panel on Climate Change Guidelines*](https://www.ipcc-nggip.iges.or.jp/public/2006gl/) (*2006 IPCC Guidelines*) and the [*2019 Refinement of the 2006 IPCC Guidelines*](https://www.ipcc.ch/site/assets/uploads/2019/12/19R_V0_01_Overview.pdf)(*2019 Refinement*) on a biennial basis.[[1]](#footnote-2)

In EPA’s Toolkit, this is Template 5. Its purpose is to help the National Inventory Coordinator, or Key Category Analysis (KCA) Lead identify and report sources and sinks that make the greatest contribution to national GHG emissions and removals. The findings from completing this template can help guide national GHG inventory teams in prioritizing improvements and associated allocation of resources to improve their national GHG inventory. You may use this template with the EPA’s [KCA Tool](https://www.epa.gov/system/files/documents/2024-12/kca-tool-version-3.0.xlsx), its [Data Entry Guide](https://www.epa.gov/system/files/documents/2024-12/kca-tool-version-3.0-data-entry-guide.pdf), and its optional [Data Entry Sheet](https://www.epa.gov/system/files/documents/2024-12/kca-tool-version-3.0-data-entry-sheet.xlsx), which are all included in the Toolkit.‎1 Alternatively, you may use this template with other software or by following the methods described in the *2006 IPCC Guidelines*.[[2]](#footnote-3) This template and the KCA Tool apply the guidance in the *2006 IPCC Guidelines*, Volume 1, Chapter 4 on Methodological Choice and Identification of Key Categories.[[3]](#footnote-4) As part of reporting requirements of the Enhanced Transparency Framework (ETF) under the Paris Agreement, all countries will be required to report national GHG inventories consistent with the *2006 IPCC Guidelines*, including findings from a KCA. Review the [Modalities, Procedures and Guidelines (MPGs)](https://unfccc.int/sites/default/files/resource/CMA2018_03a02E.pdf) for more information. Countries may also use the *2019 Refinement*, which includes some updates for implementing the KCA (i.e., the trend analysis).[[4]](#footnote-5) EPA notes that the ETF Reporting Tool and the IPCC Inventory Software also automate preparation of KCA based on your inventory data, but this template may still assist in ensuring your reporting and documentation is consistent with the MPGs and IPCC good practices.

The concept of identifying key categories was introduced by the IPCC as a way to help countries prioritize resources for improving national GHG inventories. Key categories are sources and sinks that are the most significant contributors to national emissions and removals. According to the *2006 IPCC Guidelines*, “a key category is one that is prioritized within the national inventory system because its [emission] estimate has a significant influence on a country’s total inventory of greenhouse gases in terms of the absolute level, the trend, or the uncertainty in emissions and removals.” In other words, a category may be identified as key if it is a large contributor to total emissions, has a high rate of change over time, or has high uncertainty.

Figure 5-1. Key Category Analysis Approaches, adapted from the United Nations Framework Convention on Climate Change’s (UNFCCC) GHG Inventory Review Training Course.[[5]](#footnote-6)

This template assists countries in identifying key categories using approaches consistent with the *2006 IPCC Guidelines* (Figure 5-1). While application of Approach 1 and Approach 2 are the focus here, compilers of a country’s GHG inventory may also qualitatively evaluate key categories if they determine that the results of Approaches 1 and 2 do not identify all categories that should be prioritized in the inventory system.

Approach 1 key category analysis assesses the relevance of each category compared to total national emissions levels in the Current Year (“level assessment”), and its influence on the overall trend when comparing the contribution to the trends in Current Year since the Base Year (“trend assessment”). Approach 1 key category assessment is completed without incorporating assessed uncertainties. Under MPG paragraphs 25, 41, and 42, countries are required to complete an Approach 1 analysis. Specifically, countries shall identify key categories for the starting year (e.g., 1990 or 2020) and latest reporting year (e.g., 2022), both including and excluding land use, land use change and forestry (LULUCF) categories, using Approach 1 for both the level and trend assessments, and also show the individual and cumulative percentage contributions from key categories, for both level and trend. Countries shall also describe the key categories, including information on the approach used for their identification, and information on the level of disaggregation used (e.g. default disaggregation from *2006 IPCC Guidelines* provided in Table 4.1 or default disaggregation in ETF Reporting Tool or additional country-specific disaggregation). The analysis is performed with and without the LULUCF sector to understand its influence on overall GHG levels and trends.

Approach 2 key category assessment also involves conducting both level and trend assessments, but in doing so incorporates information on uncertainty in the analysis. Approach 2 is not required under the MPGs, but countries are encouraged to apply this approach if they have quantified uncertainties.

Approaches 1 and 2 may not identify all key categories. It is considered good practice to use qualitative criteria to identify key categories in such instances (e.g., identifying categories not estimated but likely significant as key). Refer to the *2006 IPCC Guidelines*, Volume 1, Chapter 4, and the corresponding updates in the 2019 Refinement to the 2006 IPCC Guidelines for more information on qualitative criteria.

***Disaggregation approach***. The KCA can be more insightful if the analysis is conducted at a disaggregated level – for example, fossil fuel combustion should be assessed at the level of categories or subcategories at which the IPCC methods are applied in the inventory. For example, within the fossil fuel combustion sector, the transport sector should be disaggregated to the category level and types of transport and GHG (e.g. civil aviation (CO2, CH4, N2O), road transportation CO2, CH4, N2O, etc.). Review the *2006 IPCC Guidelines*, Volume 1, Chapter 4, Section 4.2 and Table 4.1 for guidance on the suggested levels of disaggregation of source and sink categories for organizing inventory information for data entry to conduct a KCA.

This guidance is particularly useful if preparing a KCA for the first time. The Special Considerations in Table 4.1 provide guidance for further disaggregation of key categories to refine the KCA and prioritize inventory improvements. Disaggregation is useful because it allows a country to better assess significant sources and sinks and more easily plan specific methodological improvements. However, as stated in section 4.2 of Chapter 4, "disaggregation to very low levels should be avoided since it may split an important aggregated category into many small subcategories that are no longer key." The *2019 Refinement* also includes minor updates to Table 4.1 that you may want to consider as well, including reflecting new categories introduced in the Refinement itself.

## Instructions

The tables in this template may be customized by adding, removing, or modifying rows to better reflect your country’s particular needs or circumstances.

|  |  |
| --- | --- |
| Complete the cells that are shaded this color: |  |

Enter new information about your inventory in black text.

The blue text throughout each template provides detailed instructions and example responses to help you complete the tables. Once the tables are complete, delete all the blue text throughout the template. The remaining text or tables in black text may be used for reporting or to contribute to a National GHG Inventory System Manual.

### Suggested Roles and Responsibilities

In this template, the Key Category Analysis Lead, National Inventory Coordinator, and Sector/Category Leads will carry out the steps defined below. The Key Category Analysis Lead role is documented in *Template 2. Institutional Arrangements*, and is often filled by someone already on the inventory team, like the National Inventory Coordinator or a Sector/Category Lead. The roles and responsibilities should be adapted to your inventory arrangements.

Role: National Inventory Coordinator

Responsibilities:

Distribute this template to Sector/Category Leads, according to national circumstances, and collect templates once completed

Role: Key Category Analysis Lead

Responsibilities:

Complete Table 5-1 through Table 5-15 in this template

Role: Sector/Category Leads

Responsibilities:

Support KCA Lead in completing this template

Note: If you use the IPCC Inventory Software or you plan to rely on the ETF Reporting Tools (CRT Table 7) for analysis of your latest inventory, you can still use this template to document the results of the KCA.

### Preparing Inventory Data to Perform KCA

Before documenting the KCA, prepare your country’s GHG inventory in a format compatible with the KCA Tool or other software, download the latest version of the KCA Tool, and enter the inventory data into the KCA Tool or other software.

|  |  |
| --- | --- |
| Organize GHG Inventory estimates, including level of data disaggregation for each sector/subsector | Organize inventory estimates for the Base Year and Current Year at appropriate disaggregation level, along with uncertainty assessment if available. Determine which level of aggregation that you will be reporting data in the KCA and ensure you are not double counting any emissions. The disaggregated inventory data should sum to national gross total emissions when excluding LULUCF, and net total emissions when including LULUCF. |
| Download the latest version of the KCA Tool. | If you are using the EPA KCA Tool, download the tool from the [Toolkit website](https://www.epa.gov/ghgemissions/toolkit-building-national-ghg-inventory-systems#kca) or contact [ghgi.transparency@epa.gov](mailto:ghgi.transparency@epa.gov). Once the Excel document is saved, double-click the file to open it and begin the KCA, following the instructions in the tool. The Data Entry Guide, also available on the [Toolkit website](https://www.epa.gov/ghgemissions/toolkit-building-national-ghg-inventory-systems#kca), contains detailed instructions for completing the KCA using the EPA KCA Tool. |
| Input data into KCA Tool | After consulting the KCA Tool Data Entry Guide, enter the data into the KCA Tool. |

### Overview of Steps

|  |  |
| --- | --- |
| Step | Purpose |
| 1. **Document the Approach 1 key category level assessment and trend assessment.** | Approach 1 key category assessment assesses the relevance of each category compared to total national emissions in the Current Year (“level assessment”), and its influence on the overall trend when comparing the Current Year and the Base Year (“trend assessment”).[[6]](#footnote-7) Approach 1 key category assessment is completed without incorporating information on uncertainty. |
| 1. **Document the (optional) Approach 2 key category level assessment and trend.** | Approach 2 key category assessment also performs the level and trend assessments, but in doing so incorporates information on uncertainty in the analysis. Approach 2 is not required under the MPGs, but countries are encouraged to apply this approach if they have quantified uncertainties. |
| 1. **Identify key categories using qualitative criteria.** | If quantitative key category analysis has not been carried out due to lack of completeness in the inventory or other reasons described in Step 3, it is good practice to use qualitative criteria to identify key categories. |
| 1. **Identify and apply improvements to the inventory report.** | As part of the overall GHG inventory improvement plan, aim to regularly review estimates of uncertainty, with attention to key categories and trends, technologies, or management practices that are changing. |
| 1. **Document key category identification methods.** | Keeping a record of the data sources used and analyses performed will improve inventory transparency in reporting and help institutionalize the KCA process. *Template 3. Methods and Data Documentation* can be used to document and report methodologies, datasets, and assumptions.5 |

### STEP 1: Document the Approach 1 Key Category Level Assessment and Trend Assessment.

Document the Approach 1 Key Category Level Assessments and Trend Assessment according to Steps 1.1 – 1.3 below.

#### STEP 1.1: Document the Current Year Level Assessment (Approach 1).

* If using the EPA KCA Tool, copy the results in sheets named tab “7a. Approach 1 KCA LULUCF” and “7b. Approach 1 KCA No LULUCF” and paste the tables under the corresponding table titles in black text below.
* When copying the tables from the KCA Tool, include as many rows as necessary to document each category up to the KCA threshold defined in the KCA parameters tab (e.g., 95%).
* If using other tools/software, at a minimum, document the following from the analysis for each category in your country’s Approach 1 Current Year level assessment up to the KCA threshold (e.g., 95%):
  + CRT code
  + Category title
  + GHG type (e.g., CO2)
  + Current Year estimate (in kt CO2 Eq.), including column for absolute value of current year estimate
  + Level assessment (or contribution to national emissions)
  + Cumulative percent of national emissions
  + Optional to include Approach 1 level assessment rank for current year (per 2019 Refinement, included if using EPA KCA Tool)

Table 5-1. Key Categories Based on Contribution to Total National Emissions in Current Year, including LULUCF

[If using the **KCA Tool**, copy and paste Table 7a-2 from tab “7a. Approach 1 KCA LULUCF” of the KCA Tool here. If using **other software,** create your own table that, at a minimum, contains the information in the bulleted list under Step 1.1.]

Table 5-2. Key Categories Based on Contribution to Total National Emissions in Current Year, excluding LULUCF

[If using the **KCA Tool**, copy and paste Table 7b-2 from tab “7b. Approach 1 KCA No LULUCF” of the KCA Tool here. If using **other software,** create your own table that, at a minimum, contains the information in the bulleted list under Step 1.1.]

#### STEP 1.2: Document the Base Year Level Assessment (Approach 1).

* If using the EPA KCA Tool, copy the results in sheets named tab “7a. Approach 1 KCA LULUCF” and “7b. Approach 1 KCA No LULUCF” and paste the tables under the corresponding table titles in black text below.
* When copying the tables from the KCA Tool, include as many rows as necessary to document each category up to the KCA threshold defined in the KCA parameters tab (e.g., 95%).
* If using other tools/software, at a minimum, document the following from the analysis for each category in your country’s Approach 1 Base Year level assessment up to the KCA threshold (e.g., 95%):
  + CRT code
  + Category title
  + GHG type (e.g., CO2)
  + Base Year estimate (in kt CO2 Eq.)
  + Level assessment (or contribution to national emissions)
  + Cumulative percent of national emissions
  + Optional to include Approach 1 level assessment rank for base year (per 2019 Refinement, included if using EPA KCA Tool)

Table 5-3. Key Categories Based on Contribution to Total National Emissions in Base Year, including LULUCF

[If using the **KCA Tool**, copy and paste Table 7a-1 from tab “7a. Approach 1 KCA LULUCF” of the KCA Tool here. If using **other software**, create your own table that, at a minimum, contains the information in the bulleted list under Step 1.2.]

Table 5-4. Key Categories Based on Contribution to Total National Emissions in Base Year, excluding LULUCF

[If using the **KCA Tool**, copy and paste Table 7b-1 from tab “7b. Approach 1 KCA No LULUCF” of the KCA Tool here. If using **other software**, create your own table that, at a minimum, contains the information in the bulleted list under Step 1.2.]

#### STEP 1.3: Document the Trend Assessment (Approach 1).

* The trend assessment uses both Base Year and Current Year estimates to identify categories whose trends differ significantly from the trend of the total inventory, regardless of whether the category’s trend is increasing or decreasing, or it is a sink or source.
* Categories with trends that diverge the most from the total trend should be identified as key when this difference is weighted by the level of emissions or removals of the category in the Base Year. The IPCC defines the “inventory category trend” as the percent change in a category’s net emissions from the Base Year to the Current Year. The “total trend” is the percent change in total inventory net emissions from the Base Year to the Current Year.
* If using the EPA KCA Tool, copy the results in sheets named tab “7a. Approach 1 KCA LULUCF” and “7b. Approach 1 KCA No LULUCF” and paste the tables under the corresponding table titles in black text below. These tables will be a record of the results of the IPCC Approach 1 key category trend assessment for the period from the Base to the Current Year, e.g., 2000-2022.
* If using other tools/software, at a minimum, document the following from the analysis for each category in your country’s Approach 1 trend assessment up to the KCA threshold (e.g., 95%):
  + CRT code
  + Category title
  + GHG type (e.g., CO2)
  + Base Year estimate (in kt CO2 Eq.)
  + Current Year estimate (in kt CO2 Eq.)
  + Trend Assessment
  + Contribution to the trend
  + Cumulative contribution to the trend
  + Optional to include approach 1 trend assessment rank (per 2019 Refinement, included if using EPA KCA Tool)

Table 5-5. Key Categories Based on Contribution to Overall Trend in National Emissions, including LULUCF

[If using the **KCA Tool**, copy and paste Table 7a-3 from tab “7a. Approach 1 KCA LULUCF” of the KCA Tool here. If using **other software**, create your own table that, at a minimum, contains the information in the bulleted list under Step 1.3.]

Table 5-6. Key Categories Based on Contribution to Overall Trend in National Emissions, excluding LULUCF

[If using the **KCA Tool**, copy and paste Table 7b-3 from tab “7b. Approach 1 KCA No LULUCF” of the KCA Tool here. If using **other software**, create your own table that, at a minimum, contains the information in the bulleted list under Step 1.3.]

### STEP 2: Document the Approach 2 Key Category Level Assessment and Trend Assessment with Uncertainty.

The Approach 2 key category assessment also performs the level and trend assessments, but in doing so accounts for uncertainty of national emissions and removals estimates. Country-specific uncertainty estimates can be entered into the KCA Tool’s data input tabs. Complete this step if your country has uncertainty data. If no country-specific uncertainty estimates exist, users can enter IPCC default uncertainties into the KCA Tool. Approach 2 is not required under the MPGs, but countries are encouraged to apply this approach if they have quantified uncertainties.

Document the Approach 2 Key Category Level Assessments and Trend Assessment according to Steps 2.1 – 2.3.

#### STEP 2.1: Document the Current Year Level Assessment with Uncertainty (Approach 2).

* If using the EPA **KCA Tool**, copy the results in sheets named tab “8a. Approach 2 KCA LULUCF” and “8b. Approach 2 KCA No LULUCF” and paste the tables under the corresponding table titles in black text below.
  + In these tables in the KCA Tool, key categories are shaded in light blue.
  + Continue to add the next inventory categories until all key categories are entered. The cumulative total of the level assessment amounts for these categories should account for at least 90% of national emissions.
* If using **other** tools/software, at a minimum, document the following from the analysis for each category in your country’s Approach 2 Current Year level assessment to account for at least 90% of national emissions:
  + CRT code
  + Category title
  + GHG type (e.g., CO2)
  + Current Year estimate (in kt CO2 Eq.)
  + Level assessment
  + Combined uncertainty
  + Relative level assessment with uncertainty
  + Cumulative percent of national emissions
  + Optional to include Approach 2 level assessment rank (per 2019 Refinement, included if using EPA KCA Tool)
* Note that in the ranking that Approach 2 produces, smaller but more uncertain sources will appear to contribute more to the national total than they would if using Approach 1. Some categories identified using Approach 2 will be the same as those identified using Approach 1 level assessment.

Table 5-7. Key Categories Based on Contribution to Total National Emissions in Current Year with Uncertainty, including LULUCF

[If using the **KCA Tool**, copy and paste Table 8a-2 from tab “8a. Approach 2 KCA LULUCF” of the KCA Tool here. If using **other software**, create your own table that, at a minimum, contains the information in the bulleted list under Step 2.1.]

Table 5-8. Key Categories Based on Contribution to Total National Emissions in Current Year with Uncertainty, excluding LULUCF

[If using the **KCA Tool**, copy and paste Table 8b-2 from tab “8b. Approach 2 KCA No LULUCF” of the KCA Tool here. If using **other software**, create your own table that, at a minimum, contains the information in the bulleted list under Step 2.1.]

#### STEP 2.2: Document the Base Year Level Assessment with Uncertainty (Approach 2).

* If using the EPA KCA Tool, copy the results in sheets named tab “8a. Approach 2 KCA LULUCF” and “8b. Approach 2 KCA No LULUCF” of the KCA Tool and paste the tables under the corresponding table titles in black text below.
  + Enter the first inventory category identified as a key category (shaded in light blue).
  + Continue to add the next inventory categories until all categories that are identified as key in the KCA Tool are entered. The cumulative total of the level assessment amounts for these categories should account for at least 90% of national emissions.
* If using other tools/software, at a minimum, document the following from the analysis for each category in your country’s Approach 2 Base Year level assessment to account for at least 90% of national emissions:
  + CRT code
  + Category title
  + GHG type (e.g., CO2)
  + Base Year estimate (in kt CO2 Eq.)
  + Level assessment
  + Combined uncertainty
  + Relative level assessment with uncertainty
  + Cumulative percent of national emissions
  + Optional to include Approach 2 level assessment rank (per 2019 Refinement, included if using EPA KCA Tool)
* Note that in the ranking that Approach 2 produces, smaller but more uncertain sources will appear to contribute more to the national total than they would if using Approach 1. Some categories identified using Approach 2 will be the same as those identified using Approach 1 level assessment.

Table 5-9. Key Categories Based on Contribution to Total National Emissions in Base Year with Uncertainty, including LULUCF

[If using the **KCA Tool**, copy and paste Table 8a-1 from tab “8a. Approach 2 KCA LULUCF” of the KCA Tool here. If using **other software**, create your own table that, at a minimum, contains the information in the bulleted list under Step 2.2.]

Table 5-10. Key Categories Based on Contribution to Total National Emissions in Base Year with Uncertainty, excluding LULUCF

[If using the **KCA Tool**, copy and paste Table 8b-1 from tab “8b. Approach 2 KCA No LULUCF” of the KCA Tool here. If using **other software**, create your own table that, at a minimum, contains the information in the bulleted list under Step 2.2.]

#### STEP 2.3: Document the Trend Assessment with Uncertainty (Approach 2).

* The Approach 2 trend assessment uses both Base Year and Current Year estimates and uncertainty information to identify categories whose trends differ significantly from the trend of the total inventory, regardless of whether the category’s trend is increasing or decreasing, or it is a sink or source.
* If using the EPA KCA Tool, copy the results in sheets named tab “8a. Approach 2 KCA LULUCF” and “8b. Approach 2 KCA No LULUCF” of the KCA Tool and paste the tables under the corresponding table titles in black text below. These tables will be a record of the results of the IPCC Approach 2 key category trend assessment for the period from the Base to the Current Year, e.g., 2000-2022.
  + Enter the first inventory category identified as a key category (shaded in light blue).
  + Continue to add the next inventory categories until all categories that are identified as key in the KCA Tool are entered. The cumulative total of the level assessment amounts for these categories should account for at least 90% of national emissions.
* If using other tools/software, at a minimum, document the following from the analysis for each category in your country’s Approach 2 trend assessment to account for at least 90% of national emissions:
  + CRT code
  + Category title
  + GHG type (e.g., CO2)
  + Current Year estimate (in kt CO2 Eq.)
  + Base Year estimate (in kt CO2 Eq.)
  + Trend assessment
  + Combined uncertainty
  + Relative level assessment with uncertainty
  + Cumulative percent of national emissions
  + Optional to include Approach 2 trend assessment rank (per 2019 Refinement, included if using EPA KCA Tool)

Table 5-11. Key Categories Based on Contribution to Overall Trend in National Emissions with Uncertainty, including LULUCF

[If using the **KCA Tool**, copy and paste Table 8a-3 from tab “8a. Approach 2 KCA LULUCF” of the KCA Tool here. If using **other software**, create your own table that, at a minimum, contains the information in the bulleted list under Step 2.3.]

Table 5-12. Key Categories Based on Contribution to Overall Trend in National Emissions with Uncertainty, excluding LULUCF

[If using the **KCA Tool**, copy and paste Table 8b-3 from tab “8b. Approach 2 KCA No LULUCF” of the KCA Tool here. If using **other software**, create your own table that, at a minimum, contains the information in the bulleted list under Step 2.3.]

### STEP 3: Identify Key Categories with Qualitative Criteria.

* Quantitative approaches may not identify all key categories. It is considered good practice to use qualitative criteria to identify key categories in such instances. The following examples are given by the *2006 IPCC Guidelines* as considerations for qualitatively determining key categories.

|  |  |
| --- | --- |
| Criteria | Consideration |
| **Use of mitigation technologies or policies led to a decrease in emissions or enhanced removals** | If emissions from a category have decreased or removals have increased through the use of climate change mitigation techniques, inventory compilers can ensure that such categories are prioritized within the inventory and that better quality estimates are prepared to reflect the mitigation effects as closely as possible. This will also ensure that the methods used are transparent with respect to mitigation which is important for assessing inventory quality. |
| **Expected growth** | Inventory compilers can use expert judgement to qualitatively assess which categories are likely to show a substantial increase of emissions or decrease of removals in the future, identifying such categories as key categories (e.g. categories that emit fluorinated gases). |
| **A quantitative assessment of uncertainty was not possible (e.g., capacity constraints)** | No quantitative assessment of uncertainty: where Approach 2 (including uncertainties in the KCA) is not used, inventory compilers are still encouraged to identify categories that are assumed to contribute most to the overall uncertainty as key, because the largest reductions in overall inventory uncertainty can be achieved by improving estimates of categories having higher uncertainties. |
| **Completeness** | Category is not included, or not estimated in the current inventory, but likely significant. Further, if there are known categories that are excluded from the inventory due to use of flexibilities in light of capacities (e.g. fluorinated gas emissions), inventory compilers can research data from countries with similar national circumstances or approximate activity data (see the *2006 IPCC Guidelines*, Volume 1, Chapter 2) to make a preliminary determination as to whether a category should be considered key. |

* Complete Table 5-13, listing the categories considered key via a qualitative assessment and the criteria used to identify these categories. Add rows as necessary to include all key categories identified using qualitative criteria.
  + In the **IPCC Category Code**, **IPCC Category**, and **Gas** columns, record the information related to the key category.
  + In the **Criteria** column, record the qualitative criteria used to determine that the respective category is a key category. Ensure all materials related to this qualitative assessment (i.e., record of expert judgement, etc.) are documented in *Template 3. Methods and Data Documentation*.

Table 5-13. Key Categories identified using Qualitative Criteria

|  |  |  |  |
| --- | --- | --- | --- |
| IPCC category code | IPCC category | Gas | Criteria |
| [Enter text] |  |  |  |
|  |  |  |  |
|  |  |  |  |

### STEP 4: Identify and Apply Improvements to the Inventory Report.

* Check the IPCC Tier of the method used to estimate emissions or removals from each key category and examine the quality and accuracy of the activity data, emission factors, and model used to estimate emissions or removals. If Tier 1 methods were used to estimate emissions or removals from a key category, examine ways to use higher tier approaches to improve accuracy and reduce uncertainty.
* In Table 5-14, record suggested improvements to the inventory. Try to make your improvement suggestions specific – the more specific they are, the more likely they are to be completed.
* For the **Type** column, identify the type of potential improvement (e.g., methodology, activity data, uncertainty, QA/QC, communication, etc.). Add rows as necessary to include all potential improvements.
* If the improvement type is related to a specific sector/category, record Energy, IPPU, Agriculture, LULUCF, or Waste followed by the **category code and** **name** (ex: 1A3Bi Cars); if it does not fall under a specific sector/category, record “Not applicable” or “N/A” in the category code and name column.
* The **Issue** column is where you should describe or justify why an improvement is needed.
* In the **Improvement Option** column, describe the action to be taken, and how it should resolve the issue.
* In the **Relevant Inventory Quality Principles** column, record which GHG inventory principle(s) that the improvement would address: transparency, accuracy, consistency, comparability, or completeness (i.e., TACCC).
* When this table is complete, copy its contents into *Template 7. National Inventory Improvement Plan.*

Table 5-14. Improvements to the GHG inventory

| Topic | Category code and name | Issue | Improvement option | Relevant inventory quality principles |
| --- | --- | --- | --- | --- |
| [Enter text] |  |  |  |  |
|  |  |  |  |  |

### STEP 5: Document Key Category Identification Methods.

* In Table 5-15, document the methodologies you used to identify key categories. Add as many rows to the table as necessary to provide detailed information for each category.
  + We recommend using the same identifiers as in the *2006 IPCC Guidelines*: L = key category according to level assessment; T = key category according to trend assessment; and Q = key category according to qualitative criteria. The approach (1 or 2) used to identify the key category should be included as L1, L2, T1, T2. For qualitative (Q), the reasons for using a qualitative methodology should be noted in comments.
  + Refer to Volume 1, Chapter 4 of the *2006 IPCC Guidelines* for a detailed description of the methodologies used to identify key categories discussed in earlier sections (Level-Based, Trend-based Assessment, Qualitative).
* Careful recording of the methodology and data sources used for the KCA ensures transparency. Cite any material used in the analysis and the methodological approaches you used. Consider citing information included in *Template 3: Methods and Data Documentation*.
* Be sure to include references for any uncertainty data you used.

Table 5-15. Summary of Key Categories Identified and Methodology

| IPCC category  code | IPCC category | Gas | Identification  criteria (L1, T2, Q, etc.) | Comments (note also if key excluding or including LULUCF) |
| --- | --- | --- | --- | --- |
| [Enter text] |  |  |  |  |
|  |  |  |  |  |

## Revision History

January 2025: Updated template for consistency with ETF reporting guidelines, including updates to reflect *2006 IPCC Guidelines* and its *2019 Refinement* framework for implementing this analysis.

1. The EPA Toolkit for Building National GHG Inventory Systems is available at <https://www.epa.gov/ghgemissions/toolkit-building-national-ghg-inventory-systems>. [↑](#footnote-ref-2)
2. The IPCC Inventory Software also performs KCA. This template follows the structure of the EPA KCA Tool. [↑](#footnote-ref-3)
3. See *2006 IPCC Guidelines*, Volume 1, Chapter 4 on Methodological Choice and Identification of Key Categories, available at <https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/1_Volume1/V1_4_Ch4_MethodChoice.pdf>. [↑](#footnote-ref-4)
4. See 18/CMA.1, Modalities, Procedures and Guidelines (MPGs), Annex Chapter II, Section C.2 Methods and E.1 Reporting guidance for National Greenhouse Gas Inventory Report, available at <https://unfccc.int/sites/default/files/resource/CMA2018_03a02E.pdf>. [↑](#footnote-ref-5)
5. See page 43 of UNFCCC, 2023. UNFCCC BTR Review Training Program Course B: Technical review of national inventory reports of anthropogenic emissions by sources and removals by sinks of GHG, Sub Course B.1: General guidance and cross-cutting issues of the GHG inventory review, available at <https://unfccc.int/documents/631894>. [↑](#footnote-ref-6)
6. If activity for a category was not occurring in the Base Year and *2006 IPCC Guidelines*, Volume 1, Chapter 4, Equation 4.2 is selected for the trend analysis in the KCA Parameters tab of the KCA Tool, the trend assessment is the same as the level assessment. [↑](#footnote-ref-7)